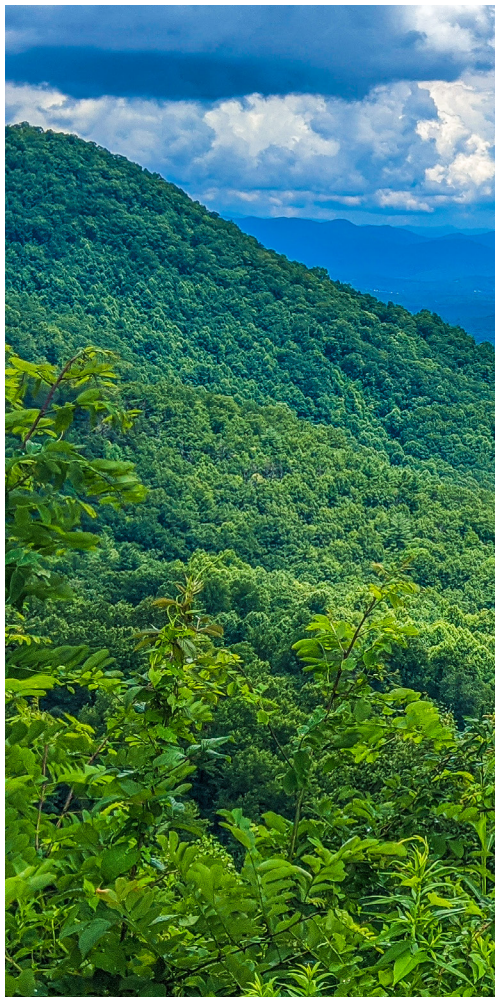




Clay Macon Regional Hazard Mitigation Plan – 2026 Update

DRAFT - May 2026

TABLE OF CONTENTS

Introduction.....	SECTION 1
Planning Process.....	SECTION 2
Community Profile.....	SECTION 3
Hazard Identification	SECTION 4
Hazard Profiles.....	SECTION 5
Vulnerability Assessment.....	SECTION 6
Capability Assessment	SECTION 7
Mitigation Strategy.....	SECTION 8
Mitigation Action Plan	SECTION 9
Plan Maintenance.....	SECTION 10
Plan Adoption	APPENDIX A
Planning Tools.....	APPENDIX B
Local Mitigation Plan Review Tool	APPENDIX C
Planning Process Documentation	APPENDIX D
Completed Mitigation Actions	APPENDIX E
Flood Hazard Maps.....	APPENDIX F
Wildfire Hazard Maps	APPENDIX G
NCEI Hazard Events.....	APPENDIX H
FEMA NRI Report.....	APPENDIX I
Post-Helene Report.....	APPENDIX J
Mountain Camp Dam HHPD.....	APPENDIX K

SECTION 1

INTRODUCTION

This section provides a general introduction to the *Clay Macon Regional Hazard Mitigation Plan*. It consists of the following five subsections:

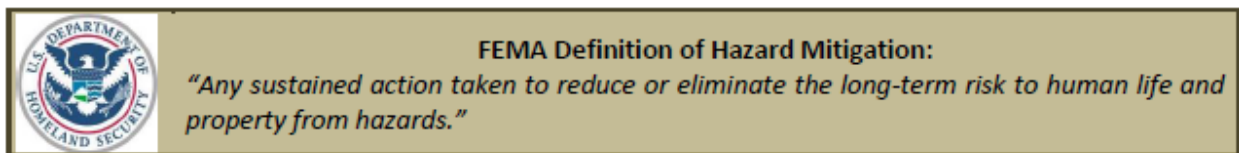
- 1.1 Background
 - 1.2 Purpose
 - 1.3 Scope
 - 1.4 Authority
 - 1.5 Summary of Plan Contents
-

1.1 BACKGROUND

Natural hazards, such as winter storms, thunderstorms, floods, and landslides, are a part of the world around us. Their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. We must consider these hazards to be legitimate and significant threats to human life, safety, and property.

The Clay Macon Region is located in the western part of North Carolina and includes the two counties plus the municipal governments within the counties. This area is vulnerable to a wide range of natural hazards such as winter storms, severe thunderstorms, floods, and landslides. It is also vulnerable to human-caused hazards, including hazardous material spills and cyber-threats. These hazards threaten the life and safety of residents in the Clay Macon Region and have the potential to damage or destroy both public and private property, disrupt the local economy, and impact the overall quality of life of individuals who live, work, and vacation in the region.

While the threat from hazardous events may never be fully eliminated, there is much we can do to lessen their potential impact upon our community and our citizens. By minimizing the impact of hazards upon our built environment, we can prevent such events from resulting in disasters. The concept and practice of reducing risks to people and property from known hazards is generally referred to as *hazard mitigation*.



Hazard mitigation techniques include both structural measures (such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards) and non-structural measures (such as the adoption of sound land use policies and the creation of public awareness programs). It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately

made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease a community's overall hazard vulnerability.

A key component in the formulation of a comprehensive approach to hazard mitigation is to develop, adopt, and update a local hazard mitigation plan as needed. A hazard mitigation plan establishes the broad community vision and guiding principles for reducing hazard risk, and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

Both of the counties and their municipal jurisdictions have an existing hazard mitigation plan that has evolved over the years, as described in Section 2: *Planning Process*. This regional plan represents the second version of this plan. The original regional plan draws from each county's previous plans to document the region's sustained efforts to incorporate hazard mitigation principles and practices into routine government activities and functions.

At its core, the Plan recommends specific actions to minimize hazard vulnerability and protect residents from losses to those hazards that pose the greatest risk. These mitigation actions go beyond simply recommending structural solutions to reduce existing vulnerability, such as elevation, retrofitting, and acquisition projects. Local policies on community growth and development, incentives for natural resource protection, and public awareness and outreach activities are examples of other actions considered to reduce the Clay Macon Region's vulnerability to identified hazards. The Plan remains a living document, with implementation and evaluation procedures established to help achieve meaningful objectives and successful outcomes over time.

It is important to note that this plan was updated during the recovery period from historic Hurricane Helene which caused devastation in the region and helped further demonstrate the continued need for hazard mitigation. Facets of ongoing recovery efforts and resiliency planning projects have been incorporated into this update as appropriate. This integration is most visible in the Capability Assessment and Mitigation Action Plans sections (Sections 7 and 9 respectively) and Appendix J.

1.1.1 The Disaster Mitigation Act and the Flood Insurance Reform Act

In an effort to reduce the Nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) in order to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of DMA 2000 emphasizes the need for state, local and Tribal government entities to closely coordinate on mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local or Tribal government applying for federal mitigation grant funds. These funds include the Hazard Mitigation Grant Program (HMGP), the Building Resilient Infrastructure and Communities (BRIC) program, and the Flood Mitigation Assistance (FMA) program, each of which are administered by the Federal Emergency Management Agency (FEMA) under the Department of Homeland Security. Communities with an adopted and federally-approved hazard mitigation plan thereby become pre-positioned and more apt to receive available mitigation funds before and after the next disaster strikes.

Major federal flood insurance legislation was passed in 2012 under the Biggert-Waters Flood Insurance Reform Act (P.L. 112-141) and the subsequent Homeowner Flood Insurance Affordability Act (HFIAA) in

2014 which revised Biggert-Waters. HFIAA established the requirement that a FEMA-approved Hazard Mitigation Plan is now required if communities wish to be eligible for any of the FEMA mitigation programs. These acts made several changes to the way the National Flood Insurance Program is to be run, including raises in rates to reflect true flood risk and changes in how Flood Insurance Rate Map (FIRM) updates impact policyholders. These acts further emphasize Congress’ focus on mitigating vulnerable structures.

The Clay Macon Regional Hazard Mitigation Plan has been prepared in coordination with FEMA Region 4 and North Carolina Emergency Management (NCEM) to ensure that the Plan meets all applicable FEMA and state requirements for hazard mitigation plans. A *Local Mitigation Plan Review Tool*, found in Appendix C, provides a summary of federal and state minimum standards and notes the location where each requirement is met within the Plan.

1.2 PURPOSE

The purpose of the Clay Macon Regional Hazard Mitigation Plan is to:

- Completely update the existing Clay Macon Regional Hazard Mitigation Plan to demonstrate progress and reflect current conditions;
- Update plan in accordance with Community Rating System (CRS) requirements;
- Increase public awareness and education;
- Maintain grant eligibility for participating jurisdictions; and
- Maintain compliance with state and federal legislative requirements for local hazard mitigation plans.

1.3 SCOPE

The focus of the Clay Macon Regional Hazard Mitigation Plan is on those hazards determined to be “high” or “moderate” risks to the Clay Macon Region, as determined through a detailed hazard risk assessment. Other hazards that pose a “low” or “negligible” risk will continue to be evaluated during future updates to the Plan, but they may not be fully addressed until they are determined to be of high or moderate risk. This enables the participating counties and municipalities to prioritize mitigation actions based on those hazards which are understood to present the greatest risk to lives and property.

The geographic scope (i.e., the planning area) for the Plan includes the Counties of Clay and Macon, as well as their incorporated jurisdictions. **Table 1.1** indicates the participating jurisdictions.

TABLE 1.1: PARTICIPATING JURISDICTIONS IN THE CLAY MACON
REGIONAL HAZARD MITIGATION PLAN

Clay County	
Hayesville	
Macon County	
Franklin	Highlands

1.4 AUTHORITY

The Clay Macon Regional Hazard Mitigation Plan has been developed in accordance with current state and federal rules and regulations governing local hazard mitigation plans and has been adopted by each participating county and local jurisdiction in accordance with standard local procedures. Copies of the adoption resolutions for each participating jurisdiction are provided in Appendix A. The Plan shall be routinely monitored and revised to maintain compliance with the following provisions, rules, and legislation:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390);
- FEMA's Final Rule published in the Federal Register, at 44 CFR Part 201 (201.6 for local mitigation planning requirements); and
- Flood Insurance Reform Act of 2004 (P.L. 108-264) and Biggert-Waters Flood Insurance Reform Act of 2012 (P.L. 112-141) and the Homeowner Flood Insurance Affordability Act of 2014.

1.5 SUMMARY OF PLAN CONTENTS

The contents of this Plan are designed and organized to be as reader-friendly and functional as possible. While significant background information is included on the processes used and studies completed (i.e., risk assessment, capability assessment), this information is separated from the more meaningful planning outcomes or actions (i.e., mitigation strategy, mitigation action plan).

Section 2, **Planning Process**, provides a complete narrative description of the process used to prepare the Plan. This includes the identification of participants on the planning team and describes how the public and other stakeholders were involved. It also includes a detailed summary for each of the key meetings held, along with any associated outcomes.

The **Community Profile**, located in Section 3, provides a general overview of the Clay Macon Region, including prevalent geographic, demographic, and economic characteristics. In addition, building characteristics and land use patterns are discussed. This baseline information provides a snapshot of the planning area and helps local officials recognize those social, environmental, and economic factors that ultimately play a role in determining the region's vulnerability to hazards.

The Risk Assessment is presented in three sections: Section 4, **Hazard Identification**; Section 5, **Hazard Profiles**; and Section 6, **Vulnerability Assessment**. Together, these sections serve to identify, analyze, and assess hazards that pose a threat to the Clay Macon Region. The risk assessment also attempts to define any hazard risks that may uniquely or exclusively affect specific areas of the Clay Macon Region. The Risk Assessment begins by identifying hazards that threaten the Clay Macon Region. Next, detailed profiles are established for each hazard, building on available historical data from past hazard occurrences, spatial extent, and probability of future occurrence. This section culminates in a hazard risk ranking based on conclusions regarding the frequency of occurrence, spatial extent, and potential impact highlighted in each of the hazard profiles. In the vulnerability assessment, FEMA's Hazus[®]MH loss estimation methodology is used to evaluate known hazard risks by their relative long-term cost in expected damages. In essence, the information generated through the risk assessment serves a critical function as the participating jurisdictions in the Clay Macon Region seek to determine the most appropriate mitigation actions to pursue and implement—enabling them to prioritize and focus their

efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s).

The **Capability Assessment**, found in Section 7, provides a comprehensive examination of the Clay Macon Region's capacity to implement meaningful mitigation strategies and identifies opportunities to increase and enhance that capacity. Specific capabilities addressed in this section include planning and regulatory capability, staff and organizational (administrative) capability, technical capability, fiscal capability, and political capability. Information was obtained through the use of a detailed survey questionnaire and an inventory and analysis of existing plans, ordinances, and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses, or conflicts in programs or activities that may hinder mitigation efforts and to identify those activities that should be built upon in establishing a successful and sustainable local hazard mitigation program.

The *Community Profile*, *Risk Assessment*, and *Capability Assessment* collectively serve as a basis for determining the goals for the Clay Macon Regional Hazard Mitigation Plan, each contributing to the development, adoption, and implementation of a meaningful and manageable *Mitigation Strategy* that is based on accurate background information.

The **Mitigation Strategy**, found in Section 8, consists of broad goal statements as well as an analysis of hazard mitigation techniques for the jurisdictions participating in the Clay Macon Regional Hazard Mitigation Plan to consider in reducing hazard vulnerabilities. The strategy provides the foundation for a detailed **Mitigation Action Plan**, found in Section 9, which links specific mitigation actions for each county and municipal department or agency to locally-assigned implementation mechanisms and target completion dates. Together, these sections are designed to make the Plan both strategic, through the identification of long-term goals, and functional, through the identification of immediate and short-term actions that will guide day-to-day decision-making and project implementation.

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make the Clay Macon Region less vulnerable to the damaging forces of hazards while improving the economic, social, and environmental health of the community. The concept of multi-objective planning was emphasized throughout the planning process, particularly in identifying ways to link, where possible, hazard mitigation policies and programs with complimentary community goals related to disaster recovery, housing, economic development, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

Plan Maintenance, found in Section 10, includes the measures that the jurisdictions participating in the Clay Macon Regional plan will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

A series of appendices (A-J) provides supporting documentation for the plan.

SECTION 2

PLANNING PROCESS

This section describes the planning process undertaken to develop the 2026 update of the Clay Macon Regional Hazard Mitigation Plan. Copies of the 2021 plan can be obtained by contacting each county emergency management office or NCEM’s Hazard Mitigation Planning Section.

This section consists of the following nine subsections:

- 2.1 Overview of Hazard Mitigation Planning
- 2.2 History of Hazard Mitigation Planning in the Clay Macon Region
- 2.3 Preparing the 2026 Plan
- 2.4 Clay Macon Regional Hazard Mitigation Planning Team
- 2.5 Community Meetings and Workshops
- 2.6 Involving the Public
- 2.7 Involving the Stakeholders
- 2.8 Documentation of Plan Progress

44 CFR Requirement

44 CFR Part 201.6(c)(1): The plan shall include documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process and how the public was involved.

2.1 OVERVIEW OF HAZARD MITIGATION PLANNING

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and then determining how to best minimize or manage those risks. This process informs the development of the hazard mitigation plan, and more specifically, identifies specific mitigation actions to effectively address existing and evolving risks. Each mitigation action is designed to achieve both short-term goals and a long-term vision for the community.

To ensure the functionality of a hazard mitigation plan, responsibility is assigned for each proposed mitigation action to a specific individual, department, or agency along with a schedule or target completion date for its implementation (see Section 10: *Plan Maintenance*). Plan maintenance procedures are established for the routine monitoring of implementation progress, as well as the evaluation and enhancement of the mitigation plan itself. These plan maintenance procedures ensure that the plan remains a current, dynamic, and effective planning document over time that becomes integrated into the routine local decision-making process.

Communities that participate in hazard mitigation planning have the potential to accomplish many benefits, including:

- Saving lives and property
- Saving money
- Speeding recovery following disasters
- Reducing future vulnerability through wise development and post-disaster recovery and reconstruction
- Expediting the receipt of pre-disaster and post-disaster grant funding
- Demonstrating a firm commitment to improving community health and safety

Mitigation planning is intended to create long-term and ongoing benefits by breaking the cycle of disaster-related losses. A fundamental belief in hazard mitigation is that investments made before a disaster occurs can significantly reduce the need for post-disaster assistance by decreasing the demand for emergency response, repairs, recovery, and reconstruction. Additionally, effective mitigation practices enable residents, businesses, and industries to recover more quickly after a disaster, allowing the community's economy to get back on track sooner and with fewer interruptions.

The advantages of mitigation planning extend beyond merely reducing vulnerability to hazards. Measures such as acquiring or regulating land in high-risk areas can help achieve multiple community objectives (commonly referred to as co-benefits), including preserving open spaces, maintaining environmental health, and enhancing recreational opportunities. Therefore, it is crucial that any local mitigation planning process is integrated with other ongoing local planning efforts. Proposed mitigation strategies must also consider existing community goals and initiatives that could either support or impede their future implementation.

2.2 HISTORY OF HAZARD MITIGATION PLANNING IN THE REGION

Prior to the development of the Clay Macon Regional Hazard Mitigation Plan in 2016, both counties and their respective jurisdictions participating in the regional plan had previously adopted separate county-level hazard mitigation plans. Each of the county-level plans was developed using the multi-jurisdictional planning process recommended by FEMA. The FEMA approval dates for each of these plans, along with a list of the participating municipalities for each plan, are listed in **Table 2.1** below.

TABLE 2.1: FEMA APPROVED DATES OF PREVIOUS COUNTY HMPs

Plan Name	Plan Date	Jurisdictions Includes
Clay County HMP	8/9/11	Town of Hayesville
Macon County HMP	8/9/11	Towns of Franklin and Highlands

In 2016, all participating jurisdictions collaborated to create a regional plan. No new jurisdictions joined the process, and all those involved in previous planning efforts contributed to the development of the 2016 regional plan. This approach aimed to streamline planning for the jurisdictions in the Clay Macon Region, allowing resources to be shared among participants and reducing the administrative burdens on smaller, lower capacity communities.

The 2016 plan marked an important and successful beginning for regional hazard mitigation planning, and that success has continued into the 2026 update. For the development of the 2026 plan, all the

jurisdictions that participated in the development of the 2021 plan participated in this plan's development.

2.3 PREPARING THE 2026 PLAN

FEMA requires hazard mitigation plans to be updated every five years to maintain eligibility for federal mitigation assistance and certain categories of disaster recovery funding. To prepare the 2026 Clay Macon Regional Hazard Mitigation Plan, ESP Associates, Inc. was contracted by North Carolina Emergency Management to provide professional mitigation planning services.

In accordance with the scope of work, the consultant team followed the mitigation planning process outlined in FEMA Publication Series 386, the *Local Mitigation Plan Review Guide*, and guidance provided by NCEM mitigation planning staff. The planning process also incorporated direction from FEMA's *Local Mitigation Planning Policy Guide* (2022) and *Local Mitigation Planning Handbook* (2023) in compliance with current federal requirements.

The 2026 update reflects several key enhancements, including the integration of post-disaster recovery considerations, expanded evaluation of future conditions, and continued integration with complementary state and federal planning frameworks.

2.3.1 Key Updates in the 2026 Plan

The Clay Macon Regional Hazard Mitigation 2026 Plan reflects both updated federal guidance and region-specific priorities identified through the planning process. FEMA requirements for hazard mitigation planning continue to evolve through policy updates and guidance documents, particularly with respect to documenting risk, capability, and participation. In addition to meeting these requirements, this update incorporates enhancements based on local conditions, recent disaster experience, and emerging best practices to improve the overall effectiveness of the plan.

The updates summarized below distinguish between required elements and enhancements based on best practices and local conditions.

SUBSTANTIAL DAMAGE PROCEDURES (Required Capability)

The 2026 update includes documentation of substantial damage procedures within the capability assessment, consistent with National Flood Insurance Program (NFIP) requirements. This informs post-disaster damage determinations and supports compliance with federal regulations.

ENHANCED COMMUNITY ENGAGEMENT (Required Process)

FEMA requires documentation of public involvement and stakeholder coordination. However, in response to post-Helene recovery conditions, engagement methods were adapted. The planning process emphasized flexible and accessible approaches, such as online resources and targeted outreach, to maintain participation while minimizing burden on affected communities.

INTEGRATION WITH CLIMATE RESILIENCE (Current Guidance and Expectations)

The plan includes an expanded evaluation of future conditions, including changing hazard patterns and potential impacts on vulnerability over time. While not explicitly required, this approach aligns with FEMA guidance encouraging consideration of long-term risk to support more resilient mitigation strategies.

EQUITY AND SOCIAL VULNERABILITY CONSIDERATIONS (Best Practice Enhancement)

The 2026 update incorporates an expanded assessment of social vulnerability, including indicators such as spoken language, disability status, and poverty status. This analysis supports a better understanding of disproportionate risk and helps guide more targeted and effective mitigation actions

Together, these updates satisfy FEMA requirements while integrating locally relevant considerations and emerging planning practices. By incorporating both regulatory expectations and region-specific insights, the 2026 plan is better positioned to support informed decision-making, effective implementation, and long-term resilience across the region.

2.3.2 Hurricane Helene and Post-Disaster Context

The 2026 Clay Macon Regional Hazard Mitigation Plan update was developed following Hurricane Helene and the subsequent recovery efforts experienced throughout western North Carolina. Both Clay and Macon Counties experienced localized flooding, roadway disruptions, utility outages, debris accumulation, and storm-related infrastructure impacts associated with the event.

At the time of plan development, participating jurisdictions and regional stakeholders continued coordinating recovery-related activities, infrastructure repairs, debris management efforts, and mitigation funding considerations associated with Hurricane Helene. Stakeholder discussions throughout the planning process emphasized the importance of transportation connectivity, drainage infrastructure, utility resilience, emergency communications, and regional coordination throughout the mountainous planning region.

The planning process also incorporated observations and lessons learned associated with Hurricane Helene into discussions regarding future conditions, infrastructure vulnerabilities, stormwater capacity, roadway redundancy, and emergency response coordination. The impacts experienced throughout the Clay Macon Region helped inform the overall planning process for the 2026 update and contributed to discussions regarding hazard mitigation, infrastructure resilience, regional coordination, and long-term mitigation strategy development throughout the region.

2.3.3 Continued Integration with CRS and CWPP Frameworks

The 2026 update continues to incorporate elements of the FEMA Community Rating System (CRS) and the Community Wildfire Protection Plan (CWPP) processes, building upon integration established in previous plan updates. Maintaining alignment with these frameworks supports consistency across planning efforts, enhances coordination among participating jurisdictions and partner agencies, and positions communities to maximize implementation opportunities and potential program benefits.

As part of this update, CRS and CWPP considerations were reviewed and carried forward, with refinements made where appropriate to reflect updated data, current conditions, and ongoing planning priorities. This continued integration supports comprehensive hazard mitigation planning by reinforcing connections between floodplain management, wildfire risk reduction, and broader mitigation strategies.

Tables 2.2 and 2.3 below provide an overview of how the CRS and CWPP requirements were integrated into the plan.

**TABLE 2.2: FEMA HMP PLANNING REQUIREMENTS
AND CRS 10-STEP PLANNING PROCESS REFERENCE TABLE**

FEMA Disaster Mitigation Act Requirement	CRS Activity 510 Planning Requirement
Phase I – Planning Process	
§201.6(c)(1)	Step 1: Organize to Prepare the Plan
§201.6(b)(1)	Step 2: Involve the Public
§201.6(b)(2) & (3)	Step 3: Coordinate
Phase II – Risk Assessment	
§201.6(c)(2)(i)	Step 4: Assess the Hazard
§201.6(c)(2)(ii) & (iii)	Step 5: Assess the Problem
Phase III – Mitigation Strategy	
§201.6(c)(3)(i)	Step 6: Set Goals
§201.6(c)(3)(ii)	Step 7: Review Possible Activities
§201.6(c)(3)(iii)	Step 8: Draft an Action Plan
Phase IV – Plan Maintenance	
§201.6(c)(5)	Step 9: Adopt the Plan
§201.6(c)(4)	Step 10: Implement, Evaluate and Revise the Plan

**TABLE 2.3: COMMUNITY WILDFIRE PROTECTION PLAN
PROCESS INTEGRATION REFERENCE TABLE**

CWPP Process	Hazard Mitigation Plan Integration Reference
Step 1: Convene Decisionmakers	Section 2: Planning Process
Step 2: Involve Federal Agencies	Section 2: Planning Process
Step 3: Engage Interested Parties	Section 2: Planning Process
Step 4: Establish a Community Base Map	Section 3: Community Profile
Step 5: Develop a Community Risk Assessment	Sections 4, 5 and 6: Hazard Identification, Hazard Profiles and Vulnerability Assessment Section 7: Capability Assessment
Step 6: Establish Community Hazard Reduction Priorities and Recommendations to Reduce Structural Ignitability	Section 8: Mitigation Strategy
Step 7: Develop an Action Plan and Assessment Strategy	Section 9: Mitigation Action Plans Section 10: Plan Maintenance
Step 8: Finalize the CWPP	Appendix A: Plan Adoption

Source: Preparing a Community Wildfire Protection Plan – A Handbook for Wildland-Urban Interface Communities

2.3.4 Plan Compliance and Development

The Local Mitigation Plan Review Tool, included in Appendix C, provides a detailed summary of FEMA’s current minimum standards of acceptability for compliance with the Disaster Mitigation Act of 2000 (DMA 2000) and identifies where each requirement is addressed within this plan. These standards are based on FEMA’s Final Rule, as published in Part 201 of the Code of Federal Regulations (CFR).

The process used to prepare this plan included twelve major steps completed over approximately nine months, beginning in September 2025. Each step (illustrated in **Figure 2.1**) resulted in key deliverables and outcomes that collectively form the plan. Additional details regarding plan organization and content are provided in Section 1: *Introduction*.

FIGURE 2.1: MITIGATION PLANNING PROCESS



2.4 REGIONAL HAZARD MITIGATION PLANNING TEAM

To facilitate the initial development of the regional plan and its subsequent update, the participating jurisdictions established the Clay Macon Regional Hazard Mitigation Planning Committee (HMPC). This committee serves as a community-based planning team composed of representatives from various county departments, municipalities, and other essential stakeholders identified as critical partners in the planning process.

Starting in September 2025, the members of the HMPC engaged in regular discussions, local meetings, and planning workshops to address and complete tasks related to the preparation of the plan. This collaborative group coordinated all aspects of plan development and provided invaluable input throughout the process. In addition to their regular meetings, committee members maintained ongoing communication and were kept informed via an email distribution list.

Specifically, the tasks assigned to the HMPC members included:

- Participate in HMPC meetings and workshops,

SECTION 2: PLANNING PROCESS

- Provide best available data as required for the risk assessment portion of the plan,
- Provide information that will help complete the Capability Assessment section of the plan,
- Provide copies of any mitigation or hazard-related documents for review and incorporation into the plan,
- Support the development and update of the Mitigation Strategy, including the design and adoption of regional goal statements,
- Help design and propose appropriate mitigation actions for their department/agency for incorporation into the Mitigation Action Plan,
- Review and provide timely comments on all study findings and draft plan deliverables, and
- Support the adoption of the 2026 *Clay Macon Regional Hazard Mitigation Plan*.

Table 2.4 lists the members of the HMPC who were responsible for participating in the development of the plan.

TABLE 2.4: MEMBERS OF THE CLAY MACON REGIONAL HMPC

NAME	DEPARTMENT / AGENCY	Attended 9/9/25 Mtg	Attended 2/10/26 Mtg
Clay County			
Baughn, Harry	Town Council, Hayesville	X	X
Ledford, Jeff	EM Director, Clay County	X	X
O'Connor, Mark	Fire Marshal, Clay County	X	
Seagle, Todd	911 Comms Supervisor, Clay County	X	X
Joe, Sellers	Environmental Health Specialist, Clay County	X	
Stillwell, Anthony	Building Inspector/Floodplain Manager, Clay County	X	
Macon County			
Mathis, Michael	Planning Director, Highlands	X	X
Setser, Justin	Town Planner, Franklin	X	X
Sitton, Noah	Preparedness Coordinator, Macon County	X	X
Teem, Jimmy	Fire Marshal/Inspector, Macon County	X	
Ward, Josh	Town Manager, Highlands	X	
Outside Stakeholders			
Baker, Carl	Mitigation Plans Manager, NCEM	X	X
Breedlove, David	County Coordinator, NCEM	X	X
DeLude, Hannah	Hazard Mitigation Planner, ESP		X
Flores, John	Hazard Mitigation Planner, ESP		X
Mello, John	Hazard Mitigation Planner, NCEM	X	X
Rahman, Fabiha	Hazard Mitigation Planner, ESP	X	X
Slaughter, Nathan	Department Manager, ESP	X	X

All participating jurisdictions had a representative present at one or more of the HMPC meetings. In addition to scheduled HMPC meetings, each member was contacted throughout the planning process and participated by providing suggestions and comments on the plan, updates to mitigation actions and the capability assessment via email and phone conversations.

Additional participation and input from other identified stakeholders and the public was sought by the participating counties during the planning process through phone calls and the distribution of emails, advertisements, and public notices aimed at informing people on the status of the Hazard Mitigation Plan (public and stakeholder involvement is further discussed later in this section).

2.4.1 Multi-Jurisdictional Participation

The Clay Macon Regional Hazard Mitigation Plan includes two (2) counties and three (3) incorporated municipalities. To satisfy multi-jurisdictional participation requirements, each county and its participating jurisdictions were required to perform the following tasks:

- Participate in mitigation planning workshops,
- Provide implementation status updates on previously identified mitigation actions,
- Identify completed mitigation projects (if applicable); and
- Develop and adopt (or update) their local mitigation action plan.

Each participating jurisdiction has developed a local mitigation action plan unique to their jurisdiction. This provides the means for jurisdictions to implement, monitor and track progress, and update their mitigation actions on a regular basis.

2.5 COMMUNITY MEETINGS AND WORKSHOPS

The preparation of the plan involved a series of meetings and workshops designed to facilitate discussion, build consensus, and initiate data collection efforts with local government staff, community officials, and other identified stakeholders. Below is a summary of the key meetings conducted during the plan update process.

Table 2.5 summarizes key meetings and workshops held by the HMPC during the development of the plan. In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency. For example, seeking approval of specific mitigation actions for their department or agency to undertake and include in their mitigation action plan. These meetings were informal and are not documented here. Public involvement is summarized in the subsequent section.

TABLE 2.5: CLAY MACON REGIONAL HMPC MEETING SUMMARY

MEETING	MEETING TOPIC	DATE	LOCATION
HMPC Mtg #1 - Project Kick-Off	○ Introduction to DMA requirements and the planning process ○ Review HMPC responsibilities and project schedule	9/9/25	151 Courthouse Dr, Hayesville, NC 28904

MEETING	MEETING TOPIC	DATE	LOCATION
HMPC Mtg #2 - HIRA/Mitigation Strategy Mtg (combined)	- Review Draft Hazard Identification and Risk Assessment (HIRA) - Review asset inventory and discuss critical facilities - Review Capability Assessment and Mitigation Strategies - Solicit comments and feedback	2/10/26	151 Courthouse Dr, Hayesville, NC 28904

These meetings and workshops encouraged ongoing input and feedback from relevant participants throughout the drafting stages of the plan. Meeting minutes were recorded and are documented in *Appendix D*.

2.6 INVOLVING THE PUBLIC

44 CFR Requirement

44 CFR Part 201.6(b)(1): The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

An important component of the mitigation planning process involved public participation. Individual resident and community-based input provide a better understanding of local concerns, increase community buy-in and support, and heighten likelihood of mitigation action implementation. As residents become more involved in decisions that affect their safety, they are more likely to gain a greater awareness of the hazards present in their community and take the steps necessary to reduce their impact. Public awareness is a key component of any community's overall mitigation strategy aimed at making a home, neighborhood, school, business or entire planning area safer from the potential effects of hazards.

2.6.1 Public Engagement Considerations Post-Helene

Public involvement strategies were adapted in response to Hurricane Helene and ongoing recovery efforts within the Clay Macon Region. In lieu of traditional public meetings, the planning process emphasized accessible and low-burden engagement strategies to ensure meaningful public involvement. Public involvement was sought using several methods:

- A dedicated project website was developed to serve as a centralized hub for plan information, updates, and materials, including the draft plan for public review.
- Public notices were distributed through multiple channels to maximize awareness.
- A public survey was made available both online and in-person at community locations to capture a broad range of input.

These methods allowed residents and stakeholders to participate on their own time and in a manner that aligned with their individual recovery circumstances. This adapted engagement approach ensured compliance with public participation requirements while remaining sensitive to the region's recovery context and prioritizing inclusivity and community well-being.

Multiple opportunities were provided to the public during the development of the regional plan. These opportunities were offered at three distinct points in the planning process: (1) during the drafting stage of the plan, (2) upon completion of a draft plan, but prior to official plan approval and adoption, and (3) just prior to plan adoption. **Table 2.6** summarizes public involvement efforts employed during the plan update process. Documentation of these efforts is provided in *Appendix D*.

TABLE 2.6: CLAY MACON REGIONAL HMPC PUBLIC ENGAGEMENT OPPORTUNITIES AND MEASURES

OUTREACH TYPE	OUTREACH DESCRIPTION	DATE	LOCATION
Public Survey	- Shared online via municipal and county websites - Shared in-person at government and community facilities - Respondents could complete anonymously or provide name/email - Input used to inform potential mitigation strategies	-	Online ARCGIS Survey123
Project Website	- Provides general overview of mitigation and planning process - Summarizes project-specific timeline and tasks - Links to valuable resources including HMPC meeting minutes and presentations	-	Online ARCGIS Story Maps
Public Notices	- Project updates shared on municipal and county websites - Links provided to existing plan and draft plan	-	Online Municipal Websites

Furthermore, in addition to the previously mentioned opportunities for public involvement, each participating jurisdiction will hold public meetings before the final plan is officially adopted by local governing bodies. These meetings will take place at different times once FEMA grants conditional approval of the plan. Adoption resolutions will be included in *Appendix A*.

2.6.1 Public Participation Survey

Residents were successfully engaged during the planning process through the public survey. This survey was specifically designed to gather data and insights from residents of the Clay Macon region. Copies of the public survey were shared with the HMPC to distribute at local public offices, ensuring they were available for residents with limited internet accessibility. Additionally, a link to an electronic version of the survey was posted on county and municipal websites. In total, 29 survey responses were received, providing valuable input to consider while updating the plan. Selected survey results are presented below. Full results can be found in *Appendix D*.

- Approximately 38 percent of survey respondents are extremely concerned about the possibility of their community being impacted by a future disaster.

- Respondents ranked Severe Thunderstorms and High Winds as the highest threats to their neighborhood, followed by Flooding, Drought, and Landslides.
- Approximately 45 percent of respondents have taken actions to make their homes more resistant to hazards and 76 percent are interested in making their homes more resistant to hazards.
- 76 percent of respondents do not know what office to contact regarding reducing their risks to hazards.
- Emergency Services, Prevention, Natural Resource Protection, and Education and Awareness were ranked as the most important activities for communities to pursue in reducing risks.

Additionally, the public survey was streamlined relative to prior regional and comparable planning efforts by reducing the number and complexity of questions to facilitate timely completion and reduce barriers to participation. Questions were also added, modified, or removed to reflect local conditions and incorporate the impacts of Hurricane Helene.

2.7 INVOLVING THE STAKEHOLDERS

44 CFR Requirement

44 CFR Part 201.6(b)(2): The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other non-profit interests to be involved in the planning process.

At the outset of the planning process, the project consultant met with emergency management leaders from each county to initiate stakeholder outreach. A list of recommended stakeholders, derived from FEMA Publication 386-1: Getting Started: Building Support for Mitigation Planning, was distributed to identify a broad range of agencies, organizations, and institutions appropriate for participation in plan development. County emergency management leaders used this guidance to identify and invite stakeholders from their respective jurisdictions. In addition, FEMA’s Local Mitigation Planning Policy Guide (2023) and Local Mitigation Planning Handbook (2023) were reviewed to ensure all required elements for stakeholder participation and coordination were addressed.

County representatives identified and invited stakeholders from emergency management, municipal administration, planning and development, floodplain management, emergency services, communications, environmental health, and infrastructure-related functions to provide input regarding local operations, critical facilities, hazard vulnerabilities, and mitigation priorities throughout the region.

The HMPC supported ongoing coordination throughout the planning process through a combination of meetings, direct outreach, and information sharing (outlined above). Stakeholders provided input at key stages of plan development, including hazard identification, vulnerability assessment, and mitigation strategy development. Input from neighboring communities was also requested through email communication, sharing a direct link to the project website. This process ensured that the plan reflects local knowledge, operational considerations, and community priorities.

2.8 DOCUMENTATION OF PLAN PROGRESS

This plan update documents the progress made in hazard mitigation planning for the participating jurisdictions in the Clay Macon Region. Since the initial county-level plans were developed in the early 2000s, numerous mitigation actions have been completed and implemented across these jurisdictions. These actions are designed to reduce the overall risk posed by natural hazards to the people and properties in the region. A detailed account of these completed actions can be found in *Appendix E*. Status updates describing progress made on mitigation actions up until 2026 are documented in *Section 9: Mitigation Action Plan*.

Community capabilities have continued to improve in each participating jurisdiction through the adoption of new plans, policies, and programs that promote hazard mitigation at the local level. The status of local capabilities for these jurisdictions is outlined in *Section 7: Capability Assessment*. The participating jurisdictions demonstrate their ongoing commitment to hazard mitigation by reconvening every five years to update the plan and actively involving the public in the planning process.

SECTION 3

COMMUNITY PROFILE

This section of the Plan provides a general overview of the Clay Macon Region. It consists of the following four subsections:

- o 3.1 Geography and the Environment
- o 3.2 Population and Demographics
- o 3.3 Housing, Infrastructure, and Land Use
- o 3.4 Employment and Industry

3.1 GEOGRAPHY AND THE ENVIRONMENT

The Clay Macon Region, located in the southwestern portion of North Carolina, falls within the Blue Ridge Mountains and forms part of the broader Appalachian region. For the purposes of this plan, the Clay Macon Region encompasses two (2) counties: Clay County and Macon County. The planning area includes incorporated and unincorporated portions of both counties, including smaller municipalities and rural communities (see *Section 1: Introduction*).

The region comprises a total area over 700 square miles, with Macon County accounting for the majority of the region's land area. Clay County has a higher proportion of mapped water area, reflecting the presence of Lake Chatuge and associated tributary systems. The size and terrain of the region contribute to variations in population distribution, infrastructure access, and hazard exposure. The land area, water area, and total area reported for each participating county is presented in **Table 3.1**.

TABLE 3.1: TOTAL LAND AREA OF PARTICIPATING COUNTIES

County	Land Area (Sq. Mi.)	Water Area (Sq. Mi.)	Total Area (Sq. Mi.)
Clay County	215.0	5.8	220.8
Macon County	515.6	4.1	519.7
Region	730.6	9.9	740.5

Source: US Census Bureau

The Clay Macon Region is not currently included in a Metropolitan Statistical Area, Micropolitan Statistical Area, or Combined Statistical Area as defined by the U.S. Office of Management and Budget (OMB). This designation largely reflects the region's rural development patterns, lower population densities, and absence of a major urbanized population center that meets federal statistical thresholds. Unlike many portions of western North Carolina influenced by larger metropolitan hubs such as Asheville, Charlotte, or Knoxville, the region remains predominantly rural in character. This rural setting contributes to the region's distinct economic, demographic, and land use characteristics. An orientation map is provided as **Figure 3.1**.

Although the region is not formally tied to a statistical area, Clay and Macon counties maintain strong regional connections to surrounding portions of western North Carolina as well as neighboring Georgia and Tennessee. The region's location along the North Carolina – Georgia border and relative proximity to eastern Tennessee contribute to significant cross-border travel, tourism, employment commuting, healthcare access, and commercial activity. Additionally, the Clay Macon Region shares many cultural, economic, and environmental characteristics associated with the broader Appalachian region, including mountainous terrain, outdoor recreation economies, rural settlement patterns, and strong natural resource and tourism-based identities.

FIGURE 3.1: CLAY MACON REGION ORIENTATION MAP



According to the Köppen climate classification system, the Clay Macon Region is generally categorized as a humid subtropical climate (Cfa), although higher elevations throughout the region may exhibit characteristics more consistent with a temperate mountain climate due to significant variations in elevation and topography. This climate zone is described as “Mild with no dry season, hot summers, average temperature of warmest months is over 72°F average temperature of coldest months is under 64°F, and year-round rainfall but highly variable.”¹

Similar to much of western North Carolina, the region experiences four distinct seasons with generally mild winters and warm, humid summers, though temperatures are often cooler at higher elevations. According to National Centers for Environmental Information climate data for 2015-2025, the region has an average annual temperature of approximately 55.5°F and an average annual rainfall of approximately

¹ National Oceanic and Atmospheric Administration

65.5 inches. The average temperatures and precipitation of each of the participating counties is presented in **Table 3.2**.

**TABLE 3.2: ANNUAL AVERAGE TEMPERATURE AND PRECIPITATION
OF PARTICIPATING COUNTIES (2015-2025)**

County	12-Month Avg Temp	January Annual Avg Min Temp	January Annual Avg Max Temp	June Annual Avg Min Temp	June Annual Avg Max Temp	12-Month Avg. Rainfall
Clay County	56.0°F	26.4°F	47.4°F	57.8°F	80.5°F	64.92"
Macon County	54.9°F	26.1°F	45.9°F	57.1°F	78.9°F	66.12"
Region	55.5°F	26.3°F	46.7°F	57.5°F	79.7°F	65.52"

Source: National Centers for Environmental Information: Climate at a Glance (Time Series)

Winter conditions in the Clay Macon Region are generally moderate, though temperatures vary considerably across elevations and mountain valleys. Based on 2015–2025 climate averages, January minimum temperatures fall near 26°F, while highs typically remain in the mid-to-upper 40s. Higher elevations often experience colder temperatures, frost, and occasional snowfall, while lower valley areas tend to remain somewhat milder. Seasonal weather conditions can also shift rapidly throughout the winter and early spring months, which is characteristic of the Southern Appalachian Mountains.

Summers in the region are typically warm and humid, although elevation and topography strongly influence localized temperature patterns. More specifically, higher elevation communities and mountain ridges often experience more temperate summer conditions, and lower valley areas remain warmer and more humid. June average maximum temperatures reach approximately 80°F, while average minimum temperatures remain near 58°F, contributing to relatively mild mornings and cooler evenings throughout the region. Temperate conditions, particularly during summer months, support the region's strong outdoor recreation and tourism economy.

The Clay Macon Region receives abundant annual rainfall, averaging approximately 65.5 inches per year between both counties. Rainfall is generally well distributed throughout the year, although summer months often experience increased precipitation associated with thunderstorms and tropical moisture patterns. The region's mountainous terrain contributes to localized weather variability and enhanced precipitation totals compared to many other portions of North Carolina, particularly along higher ridges and slopes within the Nantahala National Forest and surrounding mountain areas.

3.1.1. Natural Features

The Clay Macon Region is located within several major river basins and watershed systems that form part of the broader Tennessee River watershed. Clay County lies primarily within the Hiwassee River Basin, while Macon County is divided between the Little Tennessee River Basin and portions of the Hiwassee River Basin.

Major watershed systems throughout the region include the Hiwassee River watershed, Nantahala River watershed, Little Tennessee River watershed, Cullasaja River watershed, Cartoogechaye Creek watershed, Shooting Creek watershed, and portions of the Upper Nantahala watershed. These river

systems and tributary networks drain much of the mountainous terrain throughout the region and contribute to the area’s extensive network of lakes, streams, waterfalls, and forested valleys.

Lake Chatuge, located in Clay County along the Hiwassee River, represents one of the region’s most prominent water resources and recreational features. In Macon County, the Little Tennessee River and its tributaries, including the Cullasaja River and Cartoogechaye Creek, form major drainage corridors throughout the county. The Nantahala River and Nantahala Lake are also significant natural features associated with the Nantahala watershed and Nantahala National Forest. Collectively, these watersheds support diverse aquatic ecosystems, public water resources, hydroelectric infrastructure, recreation, tourism, and conservation lands throughout western North Carolina and the Southern Appalachian region.

3.1.2. Parks, Preserves, and Conservation

The region contains extensive protected lands, recreational corridors, and conservation areas that contribute significantly to the environmental character and outdoor recreation economy of western North Carolina. A substantial portion of both counties is located within the Nantahala National Forest, one of the largest national forests in North Carolina, encompassing large areas of protected forestland, mountain ridges, watersheds, and natural habitats.

There are numerous recreational destinations and conservation resources, including the Appalachian Trail, Bartram Trail, Nantahala Gorge, Fires Creek Recreation Area, Jackrabbit Mountain Recreation Area, Chatuge Recreation Area, and multiple scenic overlooks, waterfalls, and camping areas. Lake Chatuge and Nantahala Lake serve as major regional recreation destinations that support boating, fishing, camping, and seasonal tourism activities. Additional public recreation lands, trail systems, campgrounds, and open space areas are managed by local governments, nonprofit conservation organizations, the U.S. Forest Service, and other state and federal agencies.

3.1.3. Threatened and Endangered Species

The region’s extensive protected lands, relatively undeveloped landscapes, and interconnected watersheds contribute to high levels of biodiversity throughout western North Carolina. The U.S. Fish and Wildlife Service maintains a regular listing of threatened species, endangered species, species of concern, and candidate species for counties across the United States. As of 2024 records, the Clay Macon Region has 52 species that are listed as threatened, endangered, proposed endangered, proposed threatened, species of concern, or under review. **Table 3.3** summarizes these identified species below.

TABLE 3.3: THREATENED AND ENDANGERED SPECIES OF PARTICIPATING COUNTIES

Group	Scientific Name	Common Name	Federal Status	County
Amphibians	Cryptobranchus Alleganiensis Alleganiensis	Eastern Hellbender	Proposed Endangered	C, M
Amphibians	Aneides Aeneus	Green Salamander	Status Undefined	M
Amphibians	Desmognathus Aeneus	Seepage Salamander	Not Listed	C, M

SECTION 3: COMMUNITY PROFILE

Group	Scientific Name	Common Name	Federal Status	County
Arachnids	Nesticus Cooperi	Lost Nantahala Cave spider	Species of Concern	M
Arachnids	Fumontana Deprehendor	No Common Name	Species of Concern	M
Birds	Grus Americana	Whooping Crane	Experimental Population, Non-Essential	C, M
Birds	Vermivora Chrysoptera	Golden-winged Warbler	Under Review	C, M
Birds	Aegolius Acadicus	Northern Saw-whet Owl	Species of Concern	C, M
Clams	Alasmidonta Raveneliana	Appalachian Elktoe	Endangered	M
Clams	Pleurobema Oviforme	Tennessee Clubshell	Proposed Endangered	C, M
Clams	Fusconaia Subrotunda	Longsolid	Threatened	C, M
Clams	Pleuronaia Barnesiana	Tennessee Pigtoe	Proposed Endangered	M
Conifers and Cycads	Abies Fraseri	Fraser Fir	Species of Concern	C
Crustaceans	Cambarus Parrishi	Parrish Crayfish	Status Undefined	C
Crustaceans	Skistodiaptomus Carolinensis	Carolina Skistodiaptomus	Species of Concern	M
Ferns and Allies	Hymenophyllum Tayloriae	Gorge Filmy Fern	Species of Concern	M
Fishes	Moxostoma sp.	Sicklefin Redhorse	Not Listed	C, M
Fishes	Erimonax Monachus	Spotfin Chub	Threatened	M
Fishes	Percina Squamata	Olive Darter	Species of Concern	M
Fishes	Etheostoma Vulneratum	Wounded Darter	Species of Concern	M
Flowering Plants	Symphyotrichum Rhiannon	Buck Creek Serpentine Barren Aster	Species of Concern	C
Flowering Plants	Plagiochila Caduciloba	Gorge Leafy Liverwort	Status Undefined	C
Flowering Plants	Juncus Caesariensis	New Jersey Rush	Species of Concern	C
Flowering Plants	Sarracenia Oreophila	Green Pitcher Plant	Endangered	C
Flowering Plants	Juglans Cinerea	Butternut	Species of Concern	C, M
Flowering Plants	Spiraea Virginiana	Virginia Spiraea	Threatened	C, M
Flowering Plants	Isotria Medeoloides	Small Whorled Pogonia	Threatened	M

SECTION 3: COMMUNITY PROFILE

Group	Scientific Name	Common Name	Federal Status	County
Flowering Plants	Helonias Bullata	Swamp Pink	Threatened	M
Flowering Plants	Sarracenia Rubra ssp. Jonesii	Mountain Sweet Pitcher-Plant	Endangered	M
Flowering Plants	Sarracenia purpurea var. Montana	Mountain Purple Pitcherplant	Under Review	M
Flowering Plants	Plagiochila Caduciloba	Gorge Leafy Liverwort	Status Undefined	M
Flowering Plants	Plagiochila Sharpii	Sharp's Leafy Liverwort	Status Undefined	M
Flowering Plants	Robinia Hartwigii	Hartweg's Locust	Species of Concern	M
Flowering Plants	Porella Wataugensis	A Liverwort	Species of Concern	M
Flowering Plants	Lysimachia Fraseri	Fraser's Yellow Loosestrife	Species of Concern	M
Flowering Plants	Buckleya Distichophylla	Piratebush	Species of Concern	M
Flowering Plants	Shortia Galacifolia var. Galacifolia	Southern Oconee Bells	Species of Concern	M
Flowering Plants	Packera Millefolia	Piedmont Ragwort	Species of Concern	M
Flowering Plants	Solidago Simulans	Granite Dome Goldenrod	Species of Concern	M
Flowering Plants	Cephaloziella Obtusilobula	Roundleaf Liverwort	Species of Concern	M
Flowering Plants	Thaspium Pinnatifidum	Mountain Thaspium	Species of Concern	M
Insects	Danaus Plexippus	Monarch Butterfly	Proposed Threatened	C, M
Insects	Phyciodes Batesii maconensis	Southern Tawny Crescent	Species of Concern	C, M
Insects	Serratella Serrata	Spiculose Serratellan Mayfly	Species of Concern	M
Lichens	Gymnoderma Lineare	Rock Gnome Lichen	Endangered	C, M
Mammals	Perimyotis Subflavus	Tricolored Bat	Proposed Endangered	C, M
Mammals	Myotis Lucifugus	Little Brown Bat	Under Review	C, M
Mammals	Myotis Septentrionalis	Northern Long- Eared Bat	Endangered	C, M
Mammals	Myotis Sodalis	Indiana Bat	Endangered	C, M
Mammals	Myotis grisescens	Gray Bat	Endangered	C, M
Mammals	Glaucmys Sabrinus Coloratus	Carolina Northern Flying Squirrel	Endangered	C, M

Group	Scientific Name	Common Name	Federal Status	County
Reptiles	Glyptemys Muhlenbergii	Bog Turtle	Similarity of Appearance (Threatened)	C, M
Snails	Mesodon Clarki Nantahala	Noonday Snail	Threatened	M

Source: US Fish & Wildlife Service, Environmental Conservation Online System (ECOS)

The Nantahala National Forest and surrounding conservation lands support many of the region’s sensitive habitats and ecological resources. Conservation and species management efforts throughout the region are coordinated through partnerships among federal and state agencies, conservation organizations, and local land trusts focused on forest stewardship, watershed protection, habitat preservation, and long-term ecological management.

3.1.4. Hurricane Helene Impacts on Natural Systems

Hurricane Helene produced localized flooding, erosion, slope instability, and debris-related impacts throughout portions of the Clay Macon Region, particularly within mountainous areas, stream corridors, and steep roadside slopes. Macon County experienced approximately 15 inches of rainfall during the event, while Clay County received approximately 8 inches of rainfall. The combination of prolonged rainfall, saturated soils, steep terrain, and extensive stream networks contributed to elevated streamflow, localized washouts, sediment movement, and erosion throughout portions of the region.

Impacts were particularly associated with mountain drainage systems, river corridors, and transportation routes located near streams and steep slopes throughout the Little Tennessee River Basin and Hiwassee River Basin. Localized flooding and erosion occurred along tributaries associated with the Cullasaja River, Cartoogechaye Creek, Nantahala River, and Hiwassee River systems, while saturated soils contributed to isolated slope instability and downed trees throughout portions of both counties. The storm also generated substantial vegetative debris within forested areas, stream corridors, and roadway rights-of-way, particularly in areas associated with the Nantahala National Forest and surrounding mountain landscapes.

The event highlighted broader concerns regarding “widespread geological destabilization,” altered hydrologic conditions, erosion, and debris flow potential throughout western North Carolina. Within the Clay Macon Region, these conditions contributed to ongoing concerns regarding streambank stabilization, roadside erosion, slope maintenance, debris removal, and drainage system performance in mountainous areas where topography and watershed conditions strongly influence stormwater movement and runoff patterns.

3.2 POPULATION AND DEMOGRAPHICS

According to the U.S. Census Bureau’s 2020–2024 American Community Survey (ACS) 5-Year Estimates, the Clay Macon Region has an estimated population of approximately 49,551 residents. As shown in **Table 3.4**, Macon County contains the majority of the regional population, while both counties experienced population growth between 2010 and 2024.

TABLE 3.4: POPULATION COUNTS FOR PARTICIPATING COUNTIES

Jurisdiction	2000 Census Population	2010 Census Population	2018 Population Estimate	2024 ACS Population	% Change 2010-2024
Clay County	8,775	10,587	11,139	11,610	9.7%
Macon County	29,811	33,922	35,285	37,941	11.8%
Region	38,586	44,509	46,424	49,551	11.3%

Source: United States Census Bureau, American Community Survey 5-Year Estimates (2020-2024)

Population distribution throughout the region remains relatively dispersed, with development concentrated primarily around the Towns of Franklin, Highlands, and Hayesville, as well as surrounding unincorporated communities and lake or mountain-oriented residential areas.

Similar to many communities throughout western North Carolina, the region has a comparatively older population profile than statewide averages, with a median age of ranging from 50 to 55 years. The racial characteristics of the participating counties are presented in **Table 3.5**. The Clay Macon Region remains predominantly White; however, demographic diversity has continued to increase gradually over time, particularly within Hispanic and Latino populations in Macon County and surrounding areas.

TABLE 3.5: DEMOGRAPHICS OF PARTICIPATING COUNTIES

Jurisdiction	White	Black or African American	American Indian or Alaska Native	Asian	Native Hawaiian or Other Pacific Islander	Some Other Race	Hispanic or Latino*	Two or More Races
Clay County	92.7%	2.2%	0.4%	0.6%	0.0%	1.6%	4.1%	2.5%
Macon County	86.5%	1.4%	0.4%	0.8%	0.0%	5.5%	10.0%	5.4%
Region	88.0%	1.6%	0.4%	0.8%	0.0%	4.6%	8.6%	4.7%

*Hispanics may be of any race, so also are included in applicable race categories

Source: United States Census Bureau, American Community Survey 5-Year Estimates (2020-2024)

The region's demographic composition is also influenced by its location within the broader western North Carolina and Appalachian region, where smaller municipalities, rural settlement patterns, and natural amenities continue to shape long-term population trends and community development patterns. Population growth throughout the region has generally remained moderate and steady compared to more urbanized areas of North Carolina, while still reflecting continued interest in mountain communities and outdoor-oriented lifestyles.

3.2.1 Hurricane Helene Population Considerations

Hurricane Helene highlighted several population and demographic considerations specific to the Clay Macon Region, particularly associated with the region's older population profile, rural settlement patterns, and dispersed mountain communities. Both Clay and Macon counties contain higher proportions of retirees, seasonal residents, and older adults compared to statewide averages. These population characteristics can influence emergency communications, evacuation needs, healthcare access, sheltering operations, and long-term recovery efforts during major storm events.

Macon County sheltered approximately 514 individuals during the storm event, reflecting the need for emergency sheltering and temporary housing support following flooding, infrastructure disruptions, and power outages. Rural portions of the region may experience additional challenges during severe weather events due to longer travel distances to healthcare facilities, limited transportation redundancy, mountainous road networks, and reduced access to emergency services in more remote communities.

Seasonal population fluctuations and second-home ownership patterns within communities such as Highlands, Lake Chatuge, and other recreation-oriented areas may also complicate emergency communications, damage assessments, and post-disaster coordination efforts. Additionally, the region’s dependence on regional transportation corridors and neighboring service centers in Georgia, Tennessee, and surrounding western North Carolina communities further highlighted the importance of inter-county and cross-state coordination during storm response and recovery operations.

3.3 HOUSING, INFRASTRUCTURE, AND LAND USE

3.3.1 Housing

The Clay Macon Region contains a predominantly rural housing stock characterized by single-family residential development, mountain communities, seasonal housing, and dispersed settlement patterns. As shown in **Table 3.6**, the region contains approximately 34,700 housing units, with the majority located within Macon County. Residential development is concentrated primarily near the Towns of Franklin, Highlands, and Hayesville, as well as within lake communities, mountain subdivisions, and unincorporated rural areas throughout both counties.

TABLE 3.6: HOUSING CHARACTERISTICS OF PARTICIPATING COUNTIES

Jurisdiction	2010 Housing Units	2024 Housing Units	2024 Owner-Occupied Units (%)	2024 Vacant Housing Units (%)	2024 Median Value (Owner-Occupied)
Clay County	7,140	7,497	81.2%	32.2%	\$278,400
Macon County	25,425	27,216	77.6%	32.4%	\$251,900
Region	32,565	34,713	78.4%	32.4%	\$257,623

Source: United States Census Bureau, American Community Survey 5-Year Estimates (2020-2024)

The region added 2,148 housing units between 2010 and 2024, an increase of approximately 6.6 percent. Housing growth was concentrated in Macon County by count, while both counties continue to reflect rural and seasonal housing patterns. The region’s high vacancy rate, approximately 32.4 percent, should not be interpreted solely as abandoned or unused housing. In mountain and lake communities, vacancy is often associated with seasonal, recreational, and second-home units.

- **Growth in Housing Units** – Housing unit growth increases the number of structures potentially exposed to flooding, severe weather, wildfire, winter weather, and slope-related hazards. New or expanded residential development should be evaluated in relation to floodplains, steep slopes, access constraints, and utility capacity.
- **Owner Occupancy** – The region has a high owner-occupied share, approximately 78.4 percent. Owner occupancy can support mitigation investment because property owners may have

greater ability to pursue elevation, drainage improvements, defensible space, backup power, and structural retrofits. However, fixed-income households may still face financial barriers.

- **Vacancy and Seasonal Housing** – High vacancy rates suggest a large seasonal housing component. Seasonal occupancy can complicate evacuation, preparedness outreach, damage reporting, and recovery coordination because property owners may not be present during hazard events.
- **Housing Value and Financial Resilience** – Median owner-occupied home values vary by county and may reflect lakefront, mountain, and second-home markets. Rising housing values can increase potential disaster losses while also making affordability and post-disaster displacement more challenging for year-round residents.

Residential development throughout the region generally follows major roadway corridors, river valleys, and areas with more developable terrain, while large portions of both counties remain forested, mountainous, or publicly protected. The combination of rural settlement patterns, mountainous terrain, and extensive natural resources contributes significantly to the distinct residential character and community identity of the Clay Macon Region.

3.3.2 Infrastructure

Transportation

The Clay Macon Region is served by a rural mountain transportation network that provides local, regional, and cross-state connectivity throughout southwestern North Carolina, northern Georgia, and eastern Tennessee.

- U.S. Route 64 remains the primary east-west corridor through the region, connecting Clay and Macon Counties to Cherokee County to the west and Jackson County to the east. This corridor also passes through Hayesville and Franklin and is associated with the Waterfall Byway, a designated scenic route through western North Carolina.
- U.S. 23/441 serves as a major north-south corridor through Macon County, connecting Franklin to Jackson County and north Georgia.
- NC 28 provides additional north-south connectivity through the Nantahala National Forest and surrounding mountain communities.

Public transportation is available in both counties, though service is generally demand-response or appointment-based rather than fixed-route urban transit. Clay County Transportation provides public transportation services for Clay County residents, including general purpose and medical trips, while Macon County Transit provides public transportation throughout Macon County and operates Monday through Friday. These services are particularly important in rural areas where residents may have limited access to personal vehicles or longer travel distances to healthcare, employment, and essential services.

The region does not currently have passenger rail service. Air transportation is supported locally by Macon County Airport, a public general aviation facility located in the Iotla Valley approximately three miles from downtown Franklin. The airport provides access to nearby communities including Highlands, Cashiers, Dillsboro, Sylva, Dillard, and Clayton, Georgia, which are generally within a 30-to-45-minute drive. Commercial air service for the region is provided by larger airports outside the planning area,

including Asheville Regional Airport, Hartsfield-Jackson Atlanta International Airport, Charlotte Douglas International Airport, and McGhee Tyson Airport near Knoxville.

Utilities

Utility service in the Clay Macon Region reflects the region's mix of incorporated towns, rural communities, and dispersed mountain development. Electrical service is provided by a combination of public utilities, electric cooperatives, and municipal providers. Duke Energy serves portions of Macon County and the southwest corner of Clay County, while Haywood Electric Membership Corporation and Blue Ridge Mountain Electric Membership Corporation serve portions of the region. The Town of Highlands also operates a municipal electric utility that serves the town limits and portions of the surrounding Horsecove community.

Water and sewer service is available in select areas but remains limited compared to more urbanized portions of North Carolina. Clay County Water and Sewer District provides water and sewer services in Clay County, while the Town of Franklin operates water and wastewater facilities and maintains water and sewer collection and distribution systems. The Town of Highlands provides water, sewer, electric, sanitation, and street services through its Public Works Department. In many rural and unincorporated areas, private wells and septic systems remain common due to the region's topography, low-density development patterns, and limited municipal utility extensions.

Recent and ongoing utility-related considerations include continued operation and permitting of local wastewater treatment facilities. For example, NCDEQ has documented permit activity for the Clay County wastewater treatment plant, which discharges treated domestic wastewater to the Hiwassee River Basin, and for the Town of Franklin wastewater treatment plant in Macon County. These facilities represent important components of the region's public utility infrastructure.

Community Facilities

The Clay Macon Region contains a range of public buildings, schools, emergency service facilities, healthcare facilities, and recreation assets that support residents and visitors. Local government facilities are concentrated in Hayesville, Franklin, and Highlands, while fire, EMS, law enforcement, and emergency management facilities are distributed throughout both counties and their municipalities. *Section 6: Vulnerability Assessment* provides additional detail regarding emergency operations centers, fire and EMS stations, law enforcement facilities, schools, medical facilities, and other critical facilities.

Public education is provided by Clay County Schools and Macon County Schools. Clay County Schools is headquartered in Hayesville, while Macon County Schools is headquartered in Franklin and serves communities throughout Macon County, including Franklin, Highlands, and Nantahala. These school systems serve as major community institutions and public facilities throughout the region.

Healthcare facilities are concentrated in Macon County. Angel Medical Center in Franklin opened a new facility in 2022 and includes a 30-bed hospital, three operating rooms, radiology and endoscopy spaces, and a 17-bed emergency department. Highlands-Cashiers Hospital, located on Highway 64 between Highlands and Cashiers, provides 24/7 emergency care, acute inpatient care, rehabilitation services, and long-term care through the 80-bed Eckerd Living Center. Clay County does not have a hospital within the county, making regional healthcare access dependent on facilities in Macon County and surrounding counties in western North Carolina, north Georgia, and eastern Tennessee.

3.3.3 Land Use

The region remains predominantly undeveloped or sparsely developed, with large portions of both counties consisting of forestland, conservation areas, agricultural land, and public lands associated with the Nantahala National Forest. Developed areas are concentrated primarily within and surrounding the Towns of Franklin, Highlands, and Hayesville, as well as along major transportation corridors, river valleys, lake communities, and recreation-oriented residential areas.

- Residential land uses represent a significant portion of developed land throughout the region and are characterized largely by low-density single-family housing, mountain subdivisions, seasonal housing, and rural residential development.
- Commercial development is generally concentrated within municipal centers and along major roadway corridors, particularly U.S. 64 and U.S. 23/441 in Macon County.
- Tourism, outdoor recreation, hospitality, and service-related commercial uses also remain important components of the regional land use pattern, particularly near Highlands, Lake Chatuge, Nantahala Lake, and other recreation-oriented destinations.
- Agricultural land uses remain present throughout portions of both counties, particularly within river valleys, lower elevation areas, and rural unincorporated communities.
- Forestry and natural resource-based land uses also remain significant due to the extent of public forestland and privately managed timberland.

Since the previous plan update in 2021, continued residential growth and development pressure associated with tourism, retirement migration, and second-home ownership have contributed to ongoing land use changes throughout portions of the region. Development activity has increasingly occurred within mountain subdivisions, recreation-oriented communities, and areas near natural amenities and transportation corridors. At the same time, both counties have continued balancing development interests with conservation priorities, infrastructure limitations, environmental protection, and preservation of rural and mountain community character.

Several planning initiatives and land use-related studies have also continued or advanced since the previous plan update. Macon County adopted a new Unified Development Ordinance (UDO) in 2023 to modernize local development regulations, consolidate ordinances, and support long-range planning efforts throughout the county. Additionally, local governments throughout the region continue to coordinate land use planning, transportation planning, infrastructure investments, and economic development initiatives associated with growth management and tourism-related development patterns. More information on these efforts is discussed in *Section 7: Capability Assessment*.

3.3.4. Hurricane Helene Infrastructure Impacts

Hurricane Helene caused localized infrastructure disruptions throughout the region, particularly involving transportation systems, utilities, drainage infrastructure, and emergency access routes. Heavy rainfall, saturated soils, downed trees, and debris accumulation contributed to roadway closures, slope-related impacts, drainage issues, and temporary utility disruptions throughout portions of both counties. While impacts within the region were less severe than those experienced in portions of eastern western North Carolina, the storm highlighted the vulnerability of mountain infrastructure systems to prolonged rainfall and regional storm events.

Transportation impacts were particularly significant due to the region’s mountainous terrain and limited roadway redundancy. Major corridors such as U.S. 64, U.S. 23/441, NC 28, and secondary mountain roads experienced debris accumulation, localized flooding, fallen trees, and temporary travel disruptions during and following the storm event. Many local roads throughout the region are located adjacent to streams, steep slopes, and narrow valleys, increasing susceptibility to erosion, culvert issues, washouts, and slope instability during heavy rainfall events. Temporary roadway disruptions also affected travel connectivity between the Clay Macon Region and neighboring portions of Georgia, Tennessee, and western North Carolina.

Utility infrastructure throughout the region experienced impacts associated primarily with tree damage, saturated soils, and prolonged rainfall conditions. Electrical outages occurred in portions of both counties due to fallen trees and damaged power lines, while localized drainage and stormwater issues affected portions of transportation and utility infrastructure. Ongoing post-storm concerns associated with damaged drainage systems, erosion, altered hydrologic conditions, and infrastructure maintenance needs reinforce the importance of roadway maintenance, drainage improvements, debris management, utility coordination, and emergency access planning within rural mountain communities where topography and limited alternate routes strongly influence regional connectivity and recovery operations.

3.4 EMPLOYMENT AND INDUSTRY

The early modern economy in the Clay Macon Region was built around extractive and land-based industries such as mining, logging, agriculture, manufacturing, and textiles. Similar to many rural mountain communities, the regional economy has shifted and reflects a combination of tourism-oriented industries, small business activity, public sector employment, and seasonal economic fluctuations associated with recreation and second-home development.

As shown in **Table 3.7**, Macon County contains the majority of the regional labor force and employment base due to its larger population, commercial activity, and concentration of regional services within Franklin and Highlands. Labor force participation rates throughout the region remain lower than statewide averages, which is consistent with retirement-oriented and rural communities. Additionally, the region maintains strong economic and commuting connections with neighboring communities in north Georgia, eastern Tennessee, and other portions of western North Carolina due to the region’s geographic location near state borders and regional transportation corridors.

TABLE 3.7: KEY ECONOMIC INDICATORS

County	Population in Labor Force	Employed (%)	Unemployed (%)	Not in Labor Force (%)	Unemployment Rate (%)
Clay County	4,567	44.2%	1.2%	54.6%	2.6%
Macon County	17,061	51.7%	1.5%	46.7%	2.8%
Region	21,628	49.9%	1.4%	48.6%	2.8%

Source: United States Census Bureau, American Community Survey 5-Year Estimates (2020-2024)

Tourism and outdoor recreation remain major economic drivers throughout the region. The Nantahala National Forest, Appalachian Trail, Lake Chatuge, Nantahala River, Nantahala Lake, and numerous hiking, rafting, fishing, camping, and scenic tourism destinations contribute significantly to the regional

economy. Communities such as Franklin, Highlands, and Hayesville support a substantial number of hospitality, lodging, retail, restaurant, and recreation-related businesses that serve both residents and seasonal visitors throughout the year. Seasonal population increases associated with tourism, retirement migration, and second-home ownership continue to influence workforce demand, commercial development, and service industries throughout both counties.

Healthcare and public services also represent major employment sectors within the region. Angel Medical Center in Franklin and Highlands-Cashiers Hospital provide healthcare services to residents across southwestern North Carolina and portions of north Georgia. Local governments, school systems, emergency services, and public administration remain important employment sources throughout the region, particularly within county seats and municipal centers. Retail trade, real estate, construction, and professional service industries have also continued to expand in response to residential growth, tourism-related development, and increasing demand for mountain and lake-oriented properties.

TABLE 3.8: OCCUPATION OF THOSE IN WORK FORCE

County	Management, Business, Science & Arts	Service	Sales & Office	Natural Resources, Construction & Maintenance	Production, Transportation & Material Moving
Clay County	33.5%	18.9%	25.7%	14.6%	7.4%
Macon County	34.8%	19.7%	22.7%	13.6%	9.2%
Region	34.5%	19.5%	23.3%	13.8%	8.8%

Source: United States Census Bureau, American Community Survey 5-Year Estimates (2020-2024)

The top industries in Clay County are (1) Management, Business, Science and Arts, (2) Sales and Office, and (3) Service. Top employers (in order) across the County include:

- Clay County Board of Education
- Clay County
- Ingles Market Inc.
- Advanced Digital Cable Inc
- Jackie Jones Ford of Hayesville

The top industries in Macon County are (1) Management, Business, Science and Arts, (2) Sales and Office, and (3) Service. Top employers (in order) across the County include:

- Macon County Public Schools
- Macon County
- Ingles Markets Inc
- Tasl Taxact Admin Services Llc
- Wal-Mart Associates Inc

The regional economy continues to reflect the broader characteristics of western North Carolina and the Appalachian region, where natural amenities, outdoor recreation, healthcare services, tourism, and small business activity remain central components of local economic development and community identity.

SECTION 4

HAZARD IDENTIFICATION

This section describes how the planning team identified the hazards to be included in this plan. It consists of the following five subsections:

- 4.1 Overview
- 4.2 Disaster Declarations
- 4.3 Summary of Hazard Impacts Since Previous Plan
- 4.4 Hazard Evaluation
- 4.5 Hazard Identification Results

44 CFR Requirement

44 CFR Part 201.6(c)(2)(i): The risk assessment shall include a description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

4.1 OVERVIEW

The Clay Macon Region is vulnerable to a wide range of natural and human-caused hazards that threaten life and property. Current FEMA regulations and guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of human-caused hazards (e.g., technological hazards, terrorism, etc.) is encouraged but not required for plan approval. The Clay Macon Region has conducted a comprehensive assessment of both types of hazards.

Upon reviewing the full range of natural hazards suggested under FEMA planning guidance, the participating jurisdictions in the Clay Macon Region have identified a number of hazards that are to be addressed in the Regional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from the Clay Macon Regional Hazard Mitigation Planning Committee members, research of past disaster declarations in the participating counties¹, and review of the North Carolina State Hazard Mitigation Plan. To maintain consistency, the Clay Macon Regional Hazard Mitigation Planning Committee agreed to assess the same hazards that were identified in the most recent update of the North Carolina State Hazard Mitigation Plan (2023). A list of all previous hazards covered in the 2021 Clay Macon Regional Hazard Mitigation Plan is viewable in **Table 4.1**, along with a summary of the hazards assessed in this 2026 update. Readily available information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

¹ A complete list of disaster declarations for the Clay Macon Region can be found below in **Section 4.2**.

TABLE 4.1: 2026 CLAY MACON REGION HAZARDS UPDATE

2021 Clay Macon Identified Hazards		2026 Clay Macon Identified Hazards		Subhazards covered in 2026 Plan
Natural Hazards	Drought	Drought	Natural Hazards	Agricultural, Hydrological, Meteorological, Socioeconomic
		Excessive Heat		Heat Wave
	Hurricanes and Coastal Hazards	Hurricanes and Coastal Hazards		Tornadoes, High Wind, Torrential Rain, Severe Weather, and Storm Surge associated with Hurricanes, Tropical Storms, and Nor'easters
	Tornadoes/Thunderstorms	Tornadoes/Thunderstorms		Hailstorms, Lightning, Torrential Rain, Thunderstorm and High Winds
	Severe Winter Weather	Severe Winter Weather		Snow, Blizzards, Wind Chill, Extreme Cold, Ice Storms, Freezing Rain
	Earthquakes	Earthquakes		
	Geological (Landslides)	Geological (Landslides)		Landslides, Sinkholes, Erosion
	Dam Failure	Dam Failure		
	Flooding	Flooding		Flash Flooding, Urban Flooding
Other Hazards	Wildfires	Wildfires	Technological Hazards	
	Infectious Disease	Infectious Disease		Vector-Borne Disease, Foreign Animal Disease
Technological Hazards	Hazardous Substances	Hazardous Substances		Hazardous Materials and Chemicals, Oil Spills, Road/Rail Incidents
	Radiological Emergency	Radiological Emergency		Fixed Nuclear Facilities
	Terrorism	Terrorism		Chemical, Biological, Radiological, Nuclear, Explosive, Other Attacks
	Cyber	Cyber Threat		Mass Power/Utility Disruption
	Electromagnetic Pulse	Electromagnetic Pulse		
		Civil Disturbance		
		Food Emergency		Supply Chain Disruption

4.2 DISASTER DECLARATIONS

Disaster declarations provide initial insight into the hazards that may impact the Clay Macon Region. Since 1973, nine (9) presidential disaster declarations have been reported in the Clay Macon Region, which can be seen in **Table 4.2** below. This includes four (4) declarations related to severe storms and flooding, three (3) storms related to hurricanes or tropical storms, one (1) storm related to severe winter weather/blizzards, and one (1) global pandemic related to COVID-19.

TABLE 4.2: CLAY MACON REGION DISASTER DECLARATIONS

Year	Disaster Number	Description	Clay County	Macon County
1973	394	SEVERE STORMS & FLOODING	X	X
1995	1073	SEVERE STORMS, FLOODING & HIGH WINDS	X	X
1996	1087	BLIZZARD OF '96		X
2004	1546	TROPICAL STORM FRANCES		X
2004	1553	HURRICANE IVAN		X
2013	4146	SEVERE STORMS, FLOODING, LANDSLIDES & MUDSLIDES		X
2013	4153	SEVERE STORMS, FLOODING, LANDSLIDES & MUDSLIDES		X
2020	4487	COVID-19 PANDEMIC	X	X
2024	4827	TROPICAL STORM HELENE	X	X

Source: FEMA Major Disaster Declarations

4.3 SUMMARY OF HAZARD IMPACTS SINCE PREVIOUS PLAN

Since the beginning of the year of the approval date of the previous Clay Macon Regional Hazard Mitigation Plan (2021) through the period of record (4/30/2025), there have been at least 46 hazard events recorded for the region in the National Centers for Environmental Information (NCEI) Storm Events Database². It is important to take note of those hazard events and consider them in the *Hazard Identification* section to help ensure that the appropriate hazards are being considered in the risk assessment sections and in the Mitigation Strategy. **Table 4.3** documents the hazard events recorded. Details for some of these events are discussed in further detail in the *Hazard Profiles* section and in the plan's appendices.

TABLE 4.3: SUMMARY OF HAZARD EVENTS SINCE PREVIOUS PLAN

Hazard Type*	Number of Reported Events in Clay County	Number of Reported Events in Macon County
Cold/Wind Chill	0	6
Flash Flood	1	1
Flood	2	0
Hail	3	3
Heavy Snow	0	1
High Wind	0	2
Lightning	0	0
Strong Wind	0	0
Thunderstorm Wind	9	13
Tornado	0	0
Tropical Storm	0	1
Winter Storm	1	1
Winter Weather	0	2
TOTAL NUMBER OF REPORTED EVENTS	16	30

Source: NCEI

* The hazard type names that NCEI uses are different than the names of hazards used in this plan; however, one can still get an understanding of the types of hazards that impact the region, as the hazard types are similar in name.

4.4 HAZARD EVALUATION

Table 4.4 documents the evaluation process used for determining which of the initially identified hazards are considered significant enough to warrant further evaluation in the risk assessment. For each hazard considered, the table indicates whether the hazard was identified as a significant hazard to be further assessed, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that *were* identified (and why) but also those that *were not* identified. Hazard events not identified for inclusion at this time may be addressed during future evaluations and updates of the risk assessment if deemed necessary by the planning committee during the plan update process.

² NCEI Storm Events Database (<https://www.ncei.noaa.gov/stormevents/>)

TABLE 4.4: DOCUMENTATION OF THE HAZARD EVALUATION PROCESS

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
NATURAL HAZARDS			
Avalanche	NO	• Review of FEMA National Risk Index • Review of the US Forest Service National Avalanche Center website • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• There is no risk of avalanche events in North Carolina. The United States avalanche hazard is limited to mountainous western states, including Alaska, as well as some areas of low risk in New England. • Avalanche hazards are not addressed in the NC State Hazard Mitigation Plan (State Plan). • Avalanche hazards were not addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Drought	YES	• Review of FEMA National Risk Index • Review of the North Carolina Drought Monitor website • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• Drought is a normal part of virtually all climatic regimes, including areas with high and low average rainfall. • There are consistent reports of drought conditions in the Clay Macon Region in the last 20+ years, according to the North Carolina Drought Monitor. • Drought hazards are addressed in the State Plan. • Drought hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Hailstorm	YES (Assessed under Tornadoes/Thunderstorms)	• Review of FEMA National Risk Index • Review of NOAA NCEI Storm Events Database • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• NCEI reports at least 90 hailstorm events (0.75-2.75 inches in size) for the Clay Macon Region between January 1950 and April 2025. For these events, there was at least \$15,000 in unadjusted property damage. • Hailstorm hazards are addressed in the State Plan

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
			under the Tornadoes/Thunderstorms hazard. Hailstorm hazards were addressed as a Tornadoes/Thunderstorms subhazard in the previous Clay Macon Regional Hazard Mitigation Plan.
Excessive Heat	YES	- Review of FEMA National Risk Index - Review of NOAA NCEI Storm Events Database - Review of the NC State Hazard Mitigation Plan - Review of the previous Clay Macon Regional Hazard Mitigation Plan	- Many areas of the United States are susceptible to excessive heat events, including North Carolina. - Excessive Heat hazards are addressed in the State Plan. - Excessive Heat hazards were not addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Hurricanes and Coastal Hazards	YES	- Review of FEMA National Risk Index - Analysis of NOAA historical tropical cyclone tracks and the National Hurricane Center website - Review of NOAA NCEI Storm Events Database - Review of FEMA historical disaster declarations - Review of the NC State Hazard Mitigation Plan - Review of the previous Clay Macon Regional Hazard Mitigation Plan	- The U.S. Atlantic and Gulf regions are most prone to landfall by hurricanes and tropical storms. - NOAA historical records indicate at least 40 hurricane or tropical storm tracks have come within 75 miles of the Clay Macon Region since 1850. - Three (3) major disaster declarations in the Clay Macon Region are directly related to hurricane and tropical storm events. - Hurricanes and Coastal Hazards are addressed in the State Plan. - Hurricanes and Coastal Hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Lightning	YES (Assessed under Tornadoes/Thunderstorms)	- Review of FEMA National Risk Index - Review of NOAA NCEI Storm	NCEI reports at least 14 lightning events for the Clay Macon Region between January

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		Events Database • Review of Vaisala's NLDN Lightning Flash Density Map • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	1950 and April 2025. These events have resulted in at least 1 injury and over \$1.8 million in unadjusted property damage. • Lightning hazards are addressed in the State Plan under the Tornadoes/Thunderstorms hazard. • Lightning hazards were addressed as a Tornadoes/Thunderstorms subhazard in the previous Clay Macon Regional Hazard Mitigation Plan.
Nor'easter	NO	• Review of FEMA National Risk Index • Review of NOAA NCEI Storm Events Database • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• NCEI does not report any nor'easter activity for the Clay Macon Region. However, nor'easters may have affected the region as severe winter storms. In this case, the activity would be reported under Severe Winter Weather events. • Nor'easter hazards are addressed in the State Plan. • Nor'easter hazards were not addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Tornadoes (Combined with Severe Thunderstorm hazard)	YES	• Review of FEMA National Risk Index • Review of NOAA NCEI Storm Events Database • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• NCEI reports at least 10 tornado events in the Clay Macon Region between January 1950 and April 2025. These events have resulted in over \$325,000 in unadjusted property damage, with the most severe being an F1 event. • Tornado hazards are addressed in the State Plan. • Tornado hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Severe Thunderstorms (Combined with Tornado hazard)	YES	• Review of FEMA National Risk Index • Review of NOAA NCEI Storm Events Database • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• NCEI reports at least 171 thunderstorm wind events in the Clay Macon Region between January 1950 and April 2025. These events have resulted in at least 1 injury, 1 death, and over \$814,000 in unadjusted property damage. • Severe Thunderstorm hazards are addressed in the State Plan. • Severe Thunderstorm hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Severe Winter Weather	YES	• Review of FEMA National Risk Index • Review of FEMA historical disaster declarations • Review of NOAA NCEI Storm Events Database • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• NCEI reports that the Clay Macon Region has been affected by at least 134 winter weather and winter storm events between January 1950 and April 2025. • One (1) major disaster declaration in the Clay Macon Region is directly related to severe winter weather/blizzard events. • Severe Winter Weather hazards, including snowstorms and ice storms, are addressed in the State Plan. • Severe Winter Weather hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Earthquakes	YES	• Review of FEMA National Risk Index • USGS Earthquake Hazards Program website • Review of NOAA NCEI records • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• Earthquakes have occurred in and around the State of North Carolina in the past. The state is affected by the Charleston and the New Madrid (near Missouri) Fault lines, which have generated a magnitude 8.0 earthquake in the last 200 years. • At least 49 events are known to have occurred in the region according to NCEI and USGS

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
			records. The greatest MMI reported was V (moderate). • According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 10% probability of exceedance in 50 years for the Clay Macon Region is approximately 8-9%g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3%g or more. • Earthquake hazards are addressed in the State Plan, and the Clay Macon Region is rated at high risk of earthquakes. • Earthquake hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Expansive Soils	NO	• Review of FEMA National Risk Index • Review of USDA Soil Conservation Service's Soil Survey • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• According to FEMA and USDA sources, the Clay Macon Region is located in an area that has a "little to no" clay swelling potential. • Expansive soil hazards are not addressed in the State Plan. • Expansive soil hazards were not addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Geological (Landslides, Sinkholes, Erosion)	YES	• Review of FEMA National Risk Index • Review of USGS Landslide Incidence and Susceptibility Hazard Map • Review of the North Carolina Geological Survey (NCGS) database of historic landslides • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard	• Landslides occur in every state in the U.S, and they are most common in the coastal ranges of California, the Colorado Plateau, the Rocky Mountains, and the Appalachian Mountains. • USGS landslide hazard maps indicate "high landslide incidence" (more than 15% of the area is involved in landslides) is found across the Clay Macon Region. Both

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		Mitigation Plan	counties also have areas of moderate incidence with high susceptibility. • Past data provided by NCGS has indicated numerous recorded landslide events in the Clay Macon Region. • Erosion remains a natural, dynamic, and continuous process in the Clay Macon Region that warrants inclusion as a potential hazard. • Geological hazards such as landslide/debris flow events are addressed in the State Plan. • Geological hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Dam Failure	YES	• Review of North Carolina Dam Safety Program Dam Inventory • Review of the U.S. Army Corps of Engineers National Inventory of Dams database • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• According to the North Carolina Dam Inventory, there are at least 36 high hazard dams in the Clay Macon Region. A high hazard dam is defined as <i>“where failure will likely cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, primary highways, or major railroads.”</i> • Dam Failure hazards are addressed in the State Plan. • Dam Failure hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Flooding	YES	• Review of FEMA National Risk Index • Review of NC State Hazard Mitigation Plan • Review of FEMA historical disaster declarations • Review of NOAA NCEI Storm	• Floods occur in all 50 states and in the U.S. territories. • At least four (4) major disaster declarations in the Clay Macon Region were directly flooding-related and do not include those caused by hurricane or

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		Events Database • Review of FEMA’s NFIP Community Status Book & Community Rating System (CRS) • Review of FEMA DFIRM data • Review of the previous Clay Macon Regional Hazard Mitigation Plan	tropical storm-related events. • NCEI reports that the Clay Macon Region has been affected by at least 48 flood and flash flood events between January 1950 and April 2025. These events caused at least 1 death and an estimated \$5.8 million in unadjusted property damage (and over \$1 million in unadjusted crop damage). • All municipalities in the region participate in the NFIP. • Flooding hazards are addressed in the State Plan. • Flooding hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Tsunami	NO	• Review of FEMA National Risk Index • Review of FEMA “How-to” mitigation planning guidance (Publication 386-2, “<i>Understanding Your Risks – Identifying Hazards and Estimating Losses</i>”) • Review of NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• No record exists of a catastrophic Atlantic basin tsunami impacting the mid-Atlantic coast of the United States. • Tsunami inundation zone maps are not available for communities located along the U.S. East Coast. • FEMA mitigation planning guidance suggests that locations along the U.S. East Coast have a relatively low tsunami risk and need not conduct a tsunami risk assessment at this time. • Tsunami hazards are not addressed in the State Plan. • Tsunami hazards were not addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Wildfires	YES	• Review of Southern Wildfire Risk Assessment (SWRA) data	• Wildfires occur in virtually all parts of the United States. Wildfire hazard risks will

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		- Review of the NC Forest Service website - Review of NC State Hazard Mitigation Plan - Review of the previous Clay Macon Regional Hazard Mitigation Plan	increase as low-density development along the wildland-urban interface (WUI) increases. - A review of SWRA data indicates that there are areas of elevated concern in the Clay Macon Region. - According to the North Carolina Forest Service (NCFS), the Clay Macon Region experiences an average of 56 fires each year, which burn a combined average of 248 acres each year. - Wildfire hazards are addressed in the State Plan. - Wildfire hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Infectious Disease	YES	- Review of FEMA historical disaster declarations - Review of the NC State Hazard Mitigation Plan - Review of the previous Clay Macon Hazard Mitigation Plan	- One (1) of the major disaster declarations in the Clay Macon Region was directly related to an infectious disease (COVID-19 pandemic). - Infectious Disease hazards are addressed in the State Plan. - Infectious Disease hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
TECHNOLOGICAL HAZARDS			
Hazardous Substances	YES	- Review of the NC State Hazard Mitigation Plan - Review of the previous Clay Macon Regional Hazard Mitigation Plan	- This update assesses hazardous materials, hazardous chemicals, and oil spills under this hazard. - Hazardous Substances are addressed in the State Plan. - Hazardous Substances were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Radiological	YES	Review of the IAEA list of	The Oconee Nuclear Station is

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Emergency – Fixed Nuclear Facilities		fixed nuclear power stations in the United States • Review of local official knowledge • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	located closest to the Clay Macon Region near Seneca, SC, and could impact the region. • Emergency nuclear events can occur due to various causes and deserve focus in this plan due to some areas of the region being in the 50-mile evacuation zone for the Oconee Nuclear Station. • Radiological Emergency hazards are addressed in the State Plan. • Radiological Emergency hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Terrorism	YES	• Review of local official knowledge • Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• This hazard assesses chemical, biological, radiological, nuclear, and explosive terrorism events. • Terrorism hazards are addressed in the State Plan. • Terrorism hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Cyber Threat	YES	• Review of the NC State Hazard Mitigation Plan • Review of the NC State Emergency Operations Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• Changing future conditions encourage the assessment of the possibility of a cyberattack with the increase in global technology. • Cybersecurity is a concern included in the North Carolina Emergency Operations Plan. • Cyber hazards are addressed in the State Plan. • Cyber hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Electromagnetic Pulse	YES	• Review of the NC State Hazard Mitigation Plan • Review of the previous Clay	• Changing future conditions encourage the assessment of the possibility of an

SECTION 4: HAZARD IDENTIFICATION

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		Macon Regional Hazard Mitigation Plan	electromagnetic pulse with the increase in global technology. • Electromagnetic Pulse hazards are addressed in the State Plan. • Electromagnetic Pulse hazards were addressed in the previous Clay Macon Regional Hazard Mitigation Plan.
Civil Disturbance	YES	• Review of the NC State Hazard Mitigation Plan	• Changing future conditions and social systems encourage the assessment of the possibility of a civil disturbance incident. • Civil Disturbance hazards are addressed in the State Plan.
Food Emergency	YES	• Review of the NC State Hazard Mitigation Plan	• Changing future conditions and food systems encourage the assessment of the possibility of a food emergency. • Food Emergency hazards are addressed in the State Plan.

4.5 HAZARD IDENTIFICATION RESULTS

Table 4.5 provides a summary of the hazard identification and evaluation process, noting which of the initially identified hazards are considered significant enough for further evaluation through this plan's risk assessment (marked with a "☑").

TABLE 4.5: SUMMARY RESULTS OF THE HAZARD IDENTIFICATION AND EVALUATION PROCESS

NATURAL HAZARDS	TECHNOLOGICAL HAZARDS
☐ Avalanche	☒ Hazardous Substances
☒ Drought	☒ Radiological Emergency – Fixed Nuclear Facilities
☒ Hailstorm**	☒ Terrorism
☒ Excessive Heat	☒ Cyber Threat
☒ Hurricanes and Coastal Hazards	☒ Electromagnetic Pulse
☒ Lightning**	☒ Civil Disturbance
☐ Nor'easter	☒ Food Emergency
☒ Tornadoes/Thunderstorms	
☒ Severe Winter Weather	
☒ Earthquakes	
☐ Expansive Soils	
☒ Geological (Landslides, Sinkholes, Erosion)	
☒ Dam Failure	
☒ Flooding	
☐ Tsunami	
☒ Wildfires	
☒ Infectious Disease	

☑ = Hazard considered significant enough for further evaluation in the Clay Macon Region hazard risk assessment.

** = Hazard is assessed as a subhazard under the Tornadoes/Thunderstorms hazard

SECTION 5

HAZARD PROFILES

This section includes detailed hazard profiles for each of the hazards identified in the previous section (*Hazard Identification*) as significant enough for further evaluation in the Clay Macon Regional Hazard Mitigation Plan. It contains the following subsections:

- 5.1 Overview
- 5.2 Study Area
- 5.3 Drought
- 5.4 Excessive Heat
- 5.5 Hurricanes and Coastal Hazards
- 5.6 Tornadoes/Thunderstorms
- 5.7 Severe Winter Weather
- 5.8 Earthquakes
- 5.9 Geological (Landslides)
- 5.10 Dam Failure
- 5.11 Flooding
- 5.12 Wildfires
- 5.13 Infectious Disease
- 5.14 Hazardous Substances
- 5.15 Radiological Emergency – Fixed Nuclear Facilities
- 5.16 Terrorism
- 5.17 Cyber Threat
- 5.18 Electromagnetic Pulse
- 5.19 Civil Disturbance
- 5.20 Food Emergency
- 5.21 Conclusions on Hazard Risk
- 5.22 Final Determinations

44 CFR Requirement

44 CFR Part 201.6(c)(2)(i): The risk assessment shall include a description of the type, location, and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

5.1 OVERVIEW

This section includes detailed hazard profiles for each of the hazards identified in the previous section (*Hazard Identification*) as significant enough for further evaluation in the hazard risk of the Clay Macon Region. Each hazard profile includes a general description of the hazard, its location and extent, notable historical occurrences, and the probability of future occurrences. Each profile also includes specific items noted by members of the Clay Macon Regional Hazard Mitigation Planning Committee as it relates to unique historical or anecdotal hazard information for Clay County and Macon County, or a participating municipality within them.

After reviewing the list of assessed hazards from a previous update, the Clay Macon Regional Planning Committee agreed to keep significant hazards consistent with the State of North Carolina Hazard Mitigation Plan. This required revisions of some hazard names, and additional hazards were included in the assessment.

The following hazards were identified:

- **Natural**
 - Drought
 - Excessive Heat
 - Hurricanes and Coastal Hazards
 - Tornadoes/Thunderstorms (including Hailstorms and Lightning)
 - Severe Winter Weather
 - Earthquakes
 - Geological (including Landslides, Sinkholes, and Erosion)
 - Dam Failure
 - Flooding
 - Wildfires
 - Infectious Disease
- **Technological**
 - Hazardous Substances
 - Radiological Emergency (including Fixed Nuclear Facilities)
 - Terrorism
 - Cyber Threat
 - Electromagnetic Pulse
 - Civil Disturbance
 - Food Emergency

SECTION 5: HAZARD PROFILES

The following supplemental table lists all initially identified hazards in the left column below, along with identification of potential “**compounding hazards**” that may either **(1)** act as a key driver or **(2)** lead to secondary risks associated with the primary hazard of concern:

HAZARD	COMPOUNDING - NATURAL											COMPOUNDING - TECHNOLOGICAL						
	Drought	Excessive Heat	Hurricanes and Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Geological	Dam Failure	Flooding	Wildfires	Infectious Disease	Hazardous Substances	Radiological Emergency	Terrorism	Cyber Threat	Electromagnetic Pulse	Civil Disturbance	Food Emergency
NATURAL HAZARDS																		
DROUGHT (6)	•				•		•		•	•								•
EXCESSIVE HEAT (7)	•	•		•			•		•	•	•							•
HURRICANES & COASTAL HAZARDS (9)			•	•			•	•	•		•	•	•				•	•
TORNADOES/THUNDERSTORMS (6)		•	•	•			•		•	•		•						
SEVERE WINTER WEATHER (6)	•			•	•		•		•		•							•
EARTHQUAKES (6)						•	•	•	•			•	•				•	
GEOLOGICAL (9)	•	•	•	•	•	•	•	•	•			•						
DAM FAILURE (5)			•			•	•	•	•					•				
FLOODING (12)	•	•	•	•	•	•	•	•	•	•	•	•					•	•
WILDFIRES (5)	•	•		•						•		•					•	
INFECTIOUS DISEASE (8)		•	•		•				•		•	•		•			•	•
TECHNOLOGICAL HAZARDS																		
HAZARDOUS SUBSTANCES (11)			•	•		•	•		•	•	•	•	•	•			•	•
RADIOLOGICAL EMERGENCY (8)			•			•						•	•	•	•	•	•	•
TERRORISM (7)								•			•	•	•	•	•	•	•	
CYBER THREAT (4)													•	•	•	•	•	
ELECTROMAGNETIC PULSE (4)													•	•	•	•	•	
CIVIL DISTURBANCE (10)			•			•			•	•	•	•	•	•	•	•	•	
FOOD EMERGENCY (8)	•	•	•		•				•		•	•	•					•

This 2026 plan update cycle also explicitly recognizes the global threat of climate change as a severe concern for the Clay Macon Region. As the Earth's climate warms, changing global weather patterns, future development in both urban and rural areas, and changing local and global environmental conditions are anticipated based on both historical trends and future projections. Recent statewide studies demonstrate that North Carolina will experience a variety of negative impacts due to climate change¹. Additionally, the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) State Climate Summary for North Carolina reports that, as of 2022, average temperatures have risen more than 1 degree Fahrenheit since the 20th century, hurricane-associated storm intensity is projected to increase as the climate warms, and statewide vulnerability to sea level rise is projected to increase due to changing elevations and land subsidence².

Some of the major impacts of climate change over the next fifty (50) years are expected to include, but are not limited to:

- More frequent and/or more intense hazard events (of various types)
- Increased vulnerability of the built/natural environment to hazards (of various types)
- Increased number of extreme heat/weather days
- Increased risks of heat stroke and other heat-related illnesses
- Increased vectors of disease
- Reduced crop yields and agricultural losses

In response to this growing body of information, each hazard profile now includes a subsection titled ***Changing Future Conditions*** that discusses how the hazard, as it impacts the Clay Macon Region, may be expected to change in the future. Where applicable, climate change is specifically addressed in those subsections.

¹ 2020 North Carolina Climate Science Report (<https://ncics.org/programs/nccsr/>)

² 2022 NOAA NCEI State Climate Summary for North Carolina (<https://statesummaries.ncics.org/chapter/nc/>)

5.2 STUDY AREA

The Clay Macon Region includes two counties: Clay and Macon. **Table 5.1** provides a summary table of the participating jurisdictions within each county. In addition, **Figure 5.1** provides a base map, for reference, of the Clay Macon Region.

TABLE 5.1: PARTICIPATING JURISDICTIONS

Clay County	
Hayesville	Unincorporated Area
Macon County	
Franklin	Highlands
Unincorporated Area	

FIGURE 5.1: CLAY MACON REGION BASE MAP



SECTION 5: HAZARD PROFILES

Table 5.2 lists each significant hazard for the Clay Macon Region and identifies whether it has been determined to be a specific hazard of concern for any municipal jurisdiction and each of the two counties' unincorporated areas. This is based on the best available data and information from the Clay Macon Regional Hazard Mitigation Planning Committee. (● = hazard of concern)

TABLE 5.2 SUMMARY OF IDENTIFIED HAZARD EVENTS

Jurisdiction	Natural								Technological			Other						
	Drought	Excessive Heat	Hurricane and Tropical Storms	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Geological	Dam Failure	Flooding	Wildfires	Infectious Disease	Hazard Substances	Radiological Emergency	Terrorism	Cyber Threat	Electromagnetic Pulse	Civil Disturbance	Food Emergency
Clay County																		
Hayesville	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Macon County																		
Franklin	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Highlands	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Natural Hazards

5.3 DROUGHT

5.3.1 Background and Description

Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. High temperatures, high winds, and low humidity can exacerbate drought conditions. In addition, human actions and demands for water resources can hasten drought-related impacts. Drought categories are based on streamflow, groundwater levels, the amount of water stored in reservoirs, soil moisture, the time of year, and other relevant factors for assessing the extent and severity of dry conditions. Prolonged drought events may also lead to more severe wildfires.

Droughts are typically classified into one of four types: 1) meteorological, 2) hydrologic, 3) agricultural, or 4) socioeconomic. **Table 5.3** presents definitions for these types of droughts.

TABLE 5.3 DROUGHT CLASSIFICATION DEFINITIONS

Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops.
Socioeconomic Drought	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

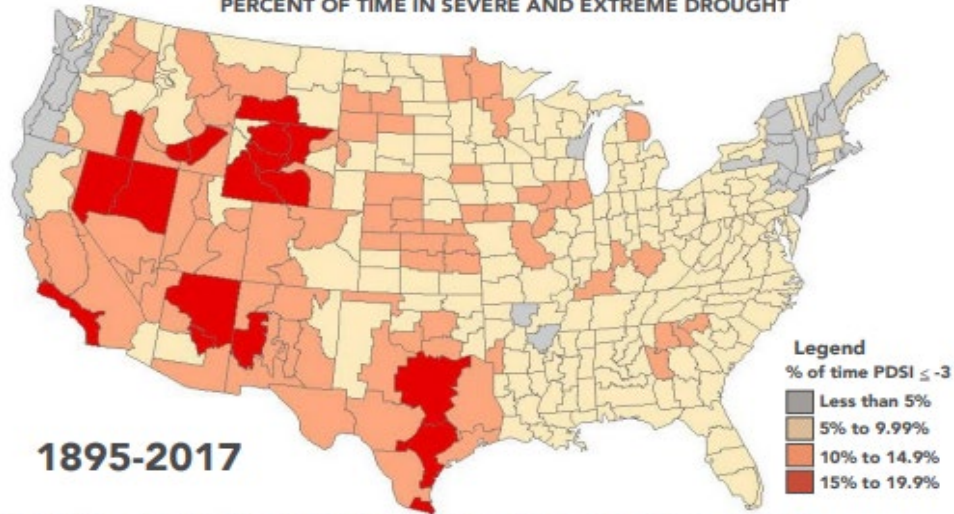
Source: Federal Emergency Management Agency (FEMA)

Droughts are slow-onset hazards, but, over time, can have very damaging effects to crops, municipal water supplies, recreational uses, and wildlife. If drought conditions extend over a number of years, the direct and indirect economic impact can be significant.

The Palmer Drought Severity Index (PDSI) is based on observed drought conditions and ranges from -0.5 (incipient dry spell) to -4.0 and above (extreme drought). Evident in **Figure 5.2**, the Palmer Drought Severity Index Summary Map for the United States, drought affects most areas of the United States but is less severe in the Eastern United States.

FIGURE 5.2: PALMER DROUGHT SEVERITY INDEX SUMMARY
Palmer Drought Severity Index

PERCENT OF TIME IN SEVERE AND EXTREME DROUGHT



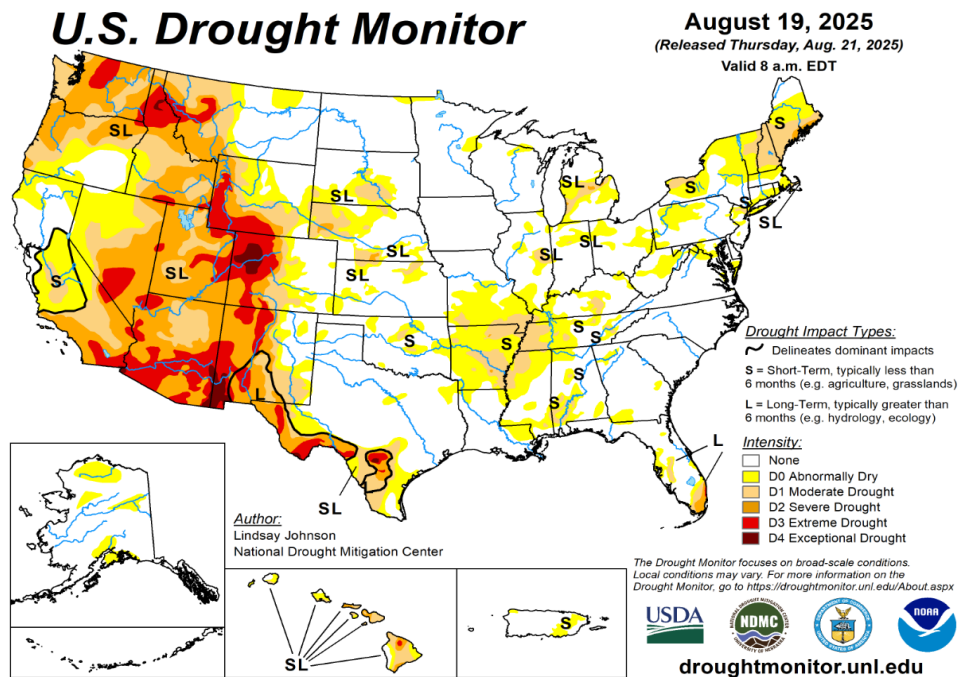
1895-2017

SOURCE: McKee et al. (1991); NOAA (1990); High Plains Regional Climate Center (1996)
 Albers Equal Area Projection; Map prepared at the National Drought Mitigation Center

Source: National Drought Mitigation Center

The figure above is the most updated version of the Palmer Drought Severity Index nationwide; however, the US Drought Monitor is updated weekly. An archived map from the fall season of 2025 can be seen below in **Figure 5.3** to illustrate more recent drought conditions in the US.

FIGURE 5.3: US DROUGHT MONITOR



Source: US Drought Monitor

5.3.2 Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. According to the Palmer Drought Severity Index (**Figure 5.2**), Western North Carolina has a relatively low risk for drought hazards. However, local areas may experience much more severe and/or frequent drought events than what is represented on the Palmer Drought Severity Index map. Furthermore, it is assumed that the Clay Macon Region would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

5.3.3 Historical Occurrences

The North Carolina Drought Management Advisory Council (DMAC) also reports data on North Carolina drought conditions from 2000 to 2025 through the North Carolina Drought Monitor³. It classifies drought conditions using the scale set by the US Drought Monitor, which classifies conditions on a scale of D0 to D4. Each class is further explained in **Table 5.4**.

TABLE 5.4: USDM DROUGHT CLASSIFICATIONS

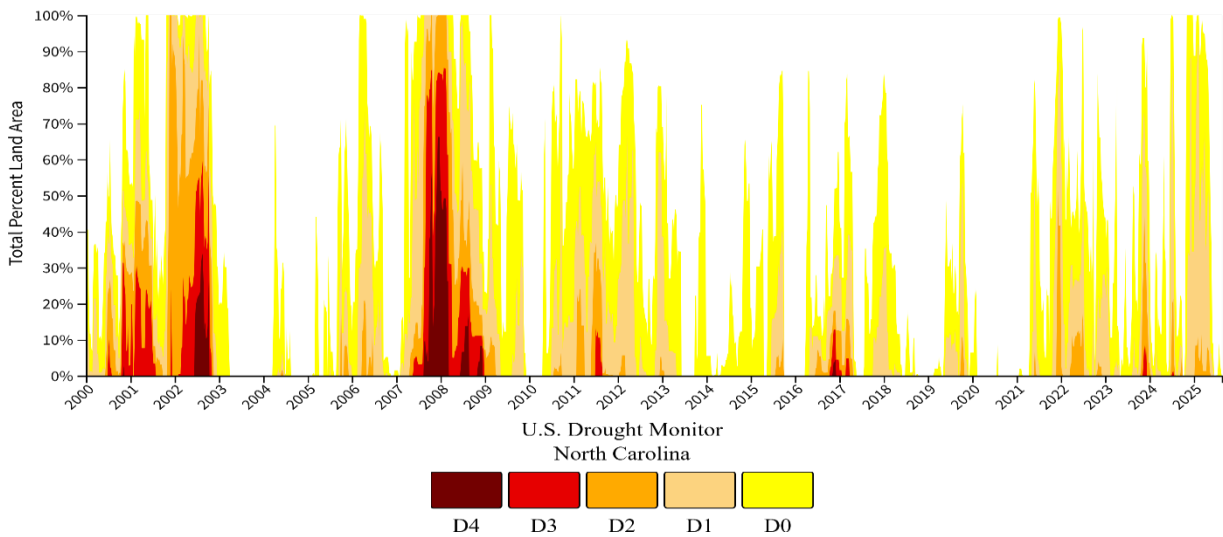
Scale	Description	Impacts
D0	Abnormally Dry	- Short-term dryness slowing planting, growth of crops - Some lingering water deficits - Pastures or crops not fully recovered
D1	Moderate Drought	- Some damage to crops, pastures - Some water shortages developing - Voluntary water-use restrictions requested
D2	Severe Drought	- Crop or pasture loss likely - Water shortages common - Water restrictions imposed
D3	Extreme Drought	- Major crop/pasture losses - Widespread water shortages or restrictions
D4	Exceptional Drought	- Exceptional and widespread crop/pasture losses - Shortages of water creating water emergencies

Source: US Drought Monitor

Data from the North Carolina Drought Management Advisory Council and the National Centers for Environmental Information (NCEI) were used to ascertain historical drought events in the Clay Macon Region. Since 2000, the longest duration of drought (D1-D4) in North Carolina lasted 155 weeks, beginning on January 4, 2000, and ending on December 17, 2002. The most intense period of drought occurred during the week of December 11, 2007, when D4 conditions affected 66.2% of North Carolina land. **Figure 5.4** shows the percentage area of North Carolina that has experienced drought conditions from 2000 to 2025.

³ North Carolina Drought Management Advisory Council (<https://www.ncdrought.org/>) and North Carolina Drought Monitor (<https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NC>)

FIGURE 5.4: NORTH CAROLINA DROUGHT CONDITIONS (2000-2025)



Source: NIDIS, Drought.gov, US Drought Portal

According to the North Carolina Drought Monitor, all the counties in the Clay Macon Region had drought occurrences (including abnormally dry) in nearly all of the last 20+ years (2000-2025). **Table 5.5** shows the most severe drought condition reported for each year in the Clay Macon Region. It should be noted that the North Carolina Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional, but a majority of the county may be in a less severe condition.

TABLE 5.5: SUMMARY OF REGIONAL DROUGHT OCCURRENCES

Year	Clay County		Macon County	
	Scale	Description	Scale	Description
2025	D1	Moderate Drought	D2	Severe Drought
2024	D2	Severe Drought	D2	Severe Drought
2023	D3	Extreme Drought	D3	Extreme Drought
2022	D2	Severe Drought	D2	Severe Drought
2021	D0	Abnormally Dry	D0	Abnormally Dry
2020	N/A	No Data	N/A	No Data
2019	D2	Severe Drought	D2	Severe Drought
2018	D1	Moderate Drought	D0	Abnormally Dry
2017	D3	Extreme Drought	D3	Extreme Drought
2016	D4	Exceptional Drought	D4	Exceptional Drought
2015	D1	Moderate Drought	D2	Severe Drought
2014	D0	Abnormally Dry	D0	Abnormally Dry
2013	N/A	Normal	N/A	Normal
2012	D2	Severe Drought	D3	Extreme Drought
2011	D2	Severe Drought	D3	Extreme Drought
2010	D2	Severe Drought	D2	Severe Drought
2009	D2	Severe Drought	D3	Extreme Drought
2008	D4	Exceptional Drought	D4	Exceptional Drought
2007	D4	Exceptional Drought	D4	Exceptional Drought
2006	D1	Moderate Drought	D2	Severe Drought
2005	D0	Abnormally Dry	N/A	Normal

Year	Clay County		Macon County	
	Scale	Description	Scale	Description
2004	D0	Abnormally Dry	D0	Abnormally Dry
2003	N/A	Normal	N/A	Normal
2002	D3	Extreme Drought	D4	Exceptional Drought
2001	D3	Extreme Drought	D3	Extreme Drought
2000	D3	Extreme Drought	D3	Extreme Drought

Source: North Carolina Drought Monitor

2007 Major Drought Event

According to the North Carolina Drought Management Advisory Council, the year 2007 was recorded as the driest year by the National Weather Service in more than 100 years in North Carolina and was #1 in the 2007 statewide temperature ranks. Records were set in many areas for the number of days of low humidity and the number of days with temperatures above 90 F⁴.

Clay County

The extent of drought pressures on farming and cattle operations in Clay County was extreme. According to the Clay County Farmland Preservation Committee, the county saw a significant drop in the number of cattle and calves in inventory, which declined from 5,619 in 1997 to 2,278 in 2007⁵. This drop in cattle and overall farmland value was exacerbated by the continuous years of drought in the region.

Macon County

Macon County experienced persistent issues in accessing potable water resources during drought conditions. In communities where hay production on farms is the dominant crop, lack of access to consistent water resources due to extreme drought conditions had negative long-term impacts.

5.3.4 Changing Future Conditions

According to findings from the 2020 North Carolina Climate Science Report⁶, it is very likely that average temperatures and the number of very warm nights will both continue to increase statewide. Annual average temperatures have been consistently above normal in the state since the 1990s, with the most recent 10-year span (2009-2018) marking the warmest 10-year period on its record. Additionally, by 2050, climate models project that the annual average temperature in North Carolina (compared to the 1996-2015 average temperature) will increase by 2 to 4°F under a lower emissions scenario and by 2 to 5°F under a higher emissions scenario. The frequency, duration, and intensity of droughts are likely to continue to increase in tandem with higher average temperatures and a higher rate of evapotranspiration.

5.3.5 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the Clay Macon Region has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location, but each area has an equal probability of experiencing a drought. While reports indicate that there is a much lower probability of extreme, long-lasting drought conditions, North Carolina will continue to have areas of persistent drought development in the future. As of 2025, the FEMA National Risk Index (NRI)⁷ rates the drought hazard as “relatively low” in both counties.

⁴ North Carolina Drought Management Advisory Council Activities Report (2008)

⁵ A Farmland Protection Plan for Clay County, North Carolina (June 2010)

⁶ North Carolina Climate Science Report. (2020). <https://ncics.org/programs/nccsr/>

⁷ FEMA National Risk Index (NRI) data is now integrated within the Resilience Analysis and Planning Tool (RAPT)

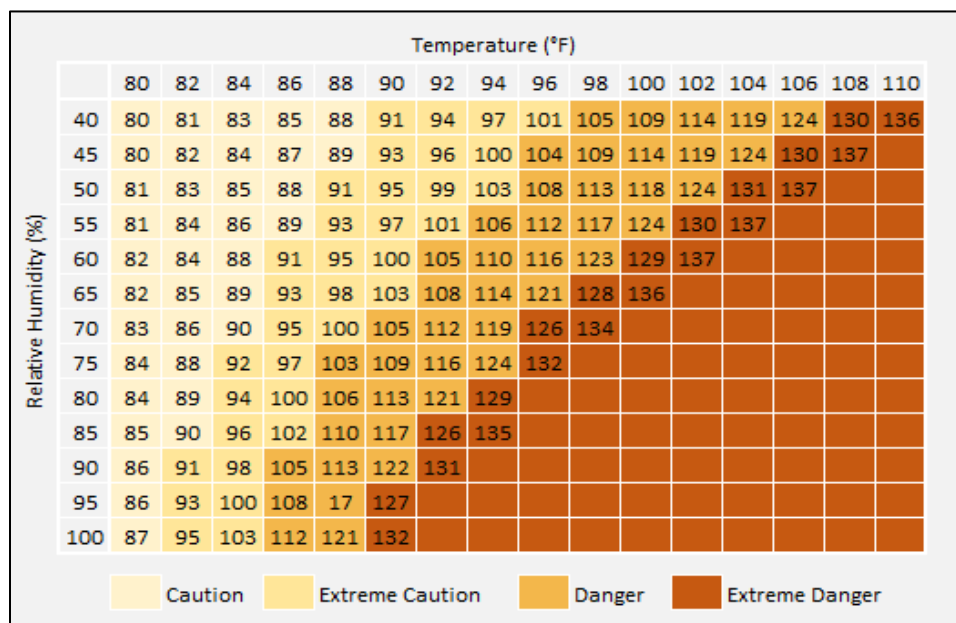
5.4 EXCESSIVE HEAT

5.4.1 Background and Description

Excessive heat, like drought, poses little risk to property. However, excessive heat can be devastating to public health. Excessive heat is often referred to interchangeably as “extreme heat” or a “heat wave.” According to the National Oceanic and Atmospheric Administration (NOAA), there is no universal definition for excessive or extreme heat because “the definition of ‘extreme’ can vary depending on the location and typical climate.” In most areas of the country, the National Weather Service generally issues alerts “when the heat index is expected to exceed 105°F-110°F for at least two consecutive days,” but they also work with local partners to determine the most appropriate conditions for a specific geography^{8, 9}. Each National Weather Service (NWS) forecast office considers its own community’s vulnerabilities, local guidelines and thresholds, forecast confidence, heat intensity and duration, occurrences during summer holidays or outdoor events, and other factors. They use this information to decide whether to issue a heat watch, warning, or advisory.

Extreme heat can lead to heat-related illness and death. The number of extreme heat days has been increasing on average each year, putting residents at a higher risk of health impacts. In 2023, more people in the United States died of heat-related illness than in any other year on record¹⁰. The National Weather Service devised the Heat Index as a mechanism to better inform the public of heat dangers. The Heat Index Chart, shown in **Figure 5.5**, uses air temperature and humidity to determine the heat index or apparent temperature. **Table 5.6** shows the dangers associated with different heat index temperatures. Some populations, such as the elderly and young, are more susceptible to heat danger than other segments of the population.

FIGURE 5.5: NWS HEAT INDEX CHART



(<https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>)

⁸ NWS Heat Forecast Tools (<https://www.weather.gov/safety/heat-index>)

⁹ NWS Heat Safety (<https://www.weather.gov/safety/heat-ww>)

¹⁰ Associated Press Climate (<https://apnews.com/article/record-heat-deadly-climate-change-humidity-south-11de21a526e1cbe7e306c47c2f12438d>)

Source: NOAA, National Weather Service

TABLE 5.6: HEAT DISORDERS ASSOCIATED WITH HEAT INDEX TEMPERATURE

Heat Index Temperature (Fahrenheit)	Description of Risks
80° - 90°	Fatigue possible with prolonged exposure and/or physical activity
90° - 105°	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105° - 130°	Sunstroke, heat cramps, and heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity
130° or higher	Heatstroke or sunstroke is highly likely with continued exposure

Source: National Weather Service, NOAA

In addition to the direct impact excessive heat has on health, heat waves can cause air pollution levels to spike. Stagnant atmospheric conditions trap pollutants. Heat accelerates the production of ground-level ozone. Excessive heat can lead to droughts, which subsequently increase wildfire risk. These compounding impacts can add unhealthy air to excessively hot temperatures. In addition, the urban heat island effect, which occurs anywhere with development – not just in large urban areas, can produce significantly higher nighttime temperatures because asphalt and concrete (which store heat longer) gradually release heat at night.

5.4.2 Location and Spatial Extent

Extreme heat typically impacts a large area and cannot be confined to any geographic or political boundaries. Therefore, the entire Clay Macon Region is susceptible to extreme heat conditions.

5.4.3 Historical Occurrences

Data from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI)¹¹ was used to determine that there are no reported historical events of excessive heat for the Clay Macon Region. Extreme weather information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the region. Temperature data has been reported since 1872 in Macon County, and there was no station data available for Clay County. The recorded maximum for each county can be found below in **Table 5.7**.

TABLE 5.7: HIGHEST RECORDED REGIONAL TEMPERATURES

Location	Date	Temperature (°F)
Clay County	N/A	N/A
Macon County	7/29/1952	101
Clay Macon Region Maximum Temperature	--	101

Source: State Climate Office of North Carolina

The State Climate Office also reports station percentiles of average maximum temperatures in various locations in the region. **Table 5.8** shows the average maximum temperatures by month between 1873 and 2025 from the Macon County Airport observation station in Macon County, which can be used as a

¹¹ **Note for all NOAA NCEI data:** These records represent the best available data for a variety of natural hazards and may only represent a partial total of the actual number of events occurring within a given county or planning region due to inconsistencies in collection, validation, and entry of official records. These gaps in hazard event records will be supplemented with any local information or other authoritative sources where available.

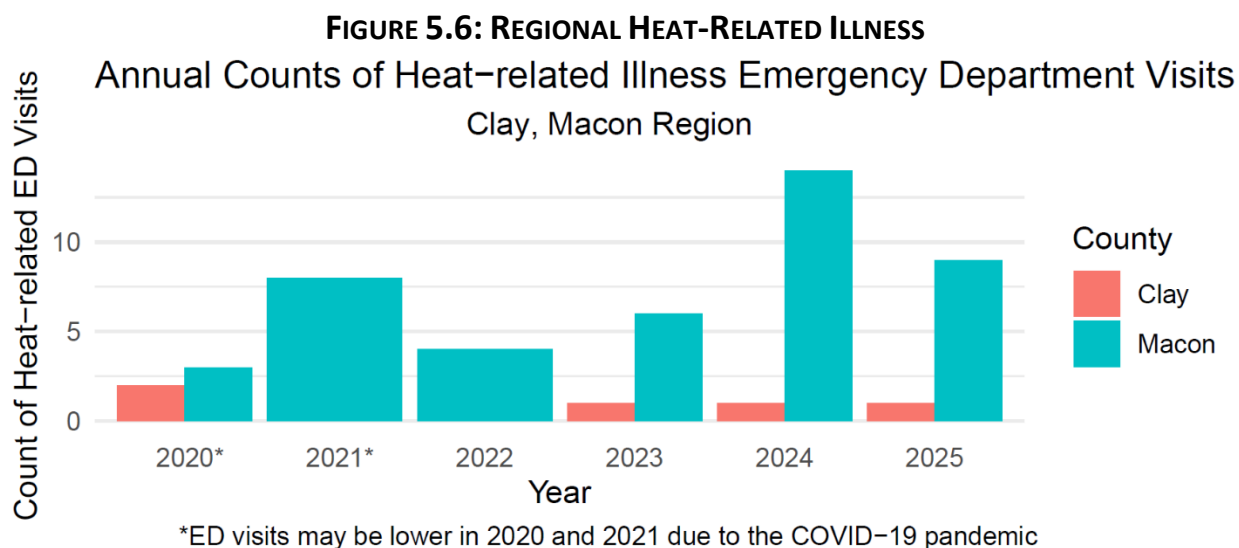
general comparison site for the region.

TABLE 5.8: AVERAGE MAXIMUM TEMPERATURE BY MONTH (MACON COUNTY AIRPORT, FRANKLIN, NC)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	65.9	69.6	77.0	83.9	86.1	90.3	91.4	90.4	87.6	81.5	74.6	66.8

Source: State Climate Office of North Carolina

Additional data for heat-related illnesses reported in the region is discussed in detail below.



Source: North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT)

Figure 5.6 shows the annual count of emergency department visits for heat-related illness in the Clay Macon Region, using public health syndromic surveillance system data from the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). The annual count of emergency department visits for heat-related illness in Clay County ranged from 0 visits in 2021 and 2022 to 2 visits in 2020. The annual count of emergency department visits for heat-related illness in Macon County ranged from 3 visits in 2020 to 14 visits in 2024.

5.4.4 Changing Future Conditions

According to 2022 climate summary data from the NOAA National Centers for Environmental Information, temperatures recorded since the middle of the century have steadily increased and have been consistently recorded above average since the late 1990s. Recent summer average temperatures were also logged as the warmest reported on record for the last 16 years (2005-2020). Furthermore, the last 11 years (2010-2020) indicated the greatest number of very warm nights recorded, despite no significant increase in the frequency of very hot days¹².

The State Climate Office of North Carolina provides county-specific climate projections on the North Carolina Resilience Exchange. These projections, which are based on the Fifth National Climate

¹² NOAA NCEI 2022 State Climate Summaries (<https://statesummaries.ncics.org/chapter/nc/>)

Assessment, anticipate that the number of days above 90°F and 95°F, along with nighttime lows above 70°F, will increase significantly in all counties of the region, as shown in **Table 5.9**¹³.

TABLE 5.9: REGIONAL EXTREME HEAT PROJECTIONS

Location	Average Number of Days each Year with Daytime Temperatures Over 90°F	
	Historical Number of Days	Projected Number of Days (2060s)
Clay County	3	17-27
Macon County	2	13-21
Location	Average Number of Days each Year with Daytime Temperatures Over 95°F	
	Historical Number of Days	Projected Number of Days (2060s)
Clay County	0	2-5
Macon County	0	1-3
Location	Average Number of Days each Year with Nighttime Lows Over 70°F	
	Historical Number of Nights	Projected Number of Days (2060s)
Clay County	0	2-4
Macon County	0	1-3

Source: State Climate Office of North Carolina, North Carolina Resilience Exchange

Nights that do not go below 70°F make it hard for our bodies to recover from hot days. This continuous exposure to heat can make health problems worse, especially for residents who live in homes without adequate air conditioning, among other vulnerable populations.

5.4.5 Probability of Future Occurrences

Based on historical occurrence, it is assumed that all of the Clay Macon Region has a probability level of likely (between 10 and 100 percent annual probability) for future excessive heat events to impact the region. As of 2025, the FEMA National Risk Index rates the heat wave hazard as “very low” in Clay County, and no rating is provided in Macon County.

¹³ NC Resilience Exchange (<https://www.resilienceexchange.nc.gov/understand-your-vulnerabilities/climate-observations-and-projections>)

5.5 HURRICANES AND COASTAL HAZARDS

5.5.1 Background and Description

Hurricanes and coastal hazards are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a “safety-valve,” limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornadoes.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere. Most hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September, and the average number of storms that reach hurricane intensity per year in the Atlantic basin is about six.

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls, and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour, the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (**Table 5.10**), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

TABLE 5.10: SAFFIR-SIMPSON SCALE

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)
1	74-95	Greater than 980
2	96-110	979-965
3	111-129	964-945
4	130-156	944-920
5	157+	Less than 920

Source: National Hurricane Center

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds and barometric pressure, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as “major” hurricanes and, while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. **Table 5.11** describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

TABLE 5.11: HURRICANE DAMAGE CLASSIFICATIONS

Category	Damage Level	Description of Damages	Photo Example
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.	
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.	
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland.	
4	EXTREME	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.	
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.	

Source: National Hurricane Center; Federal Emergency Management Agency

5.5.2 Location and Spatial Extent

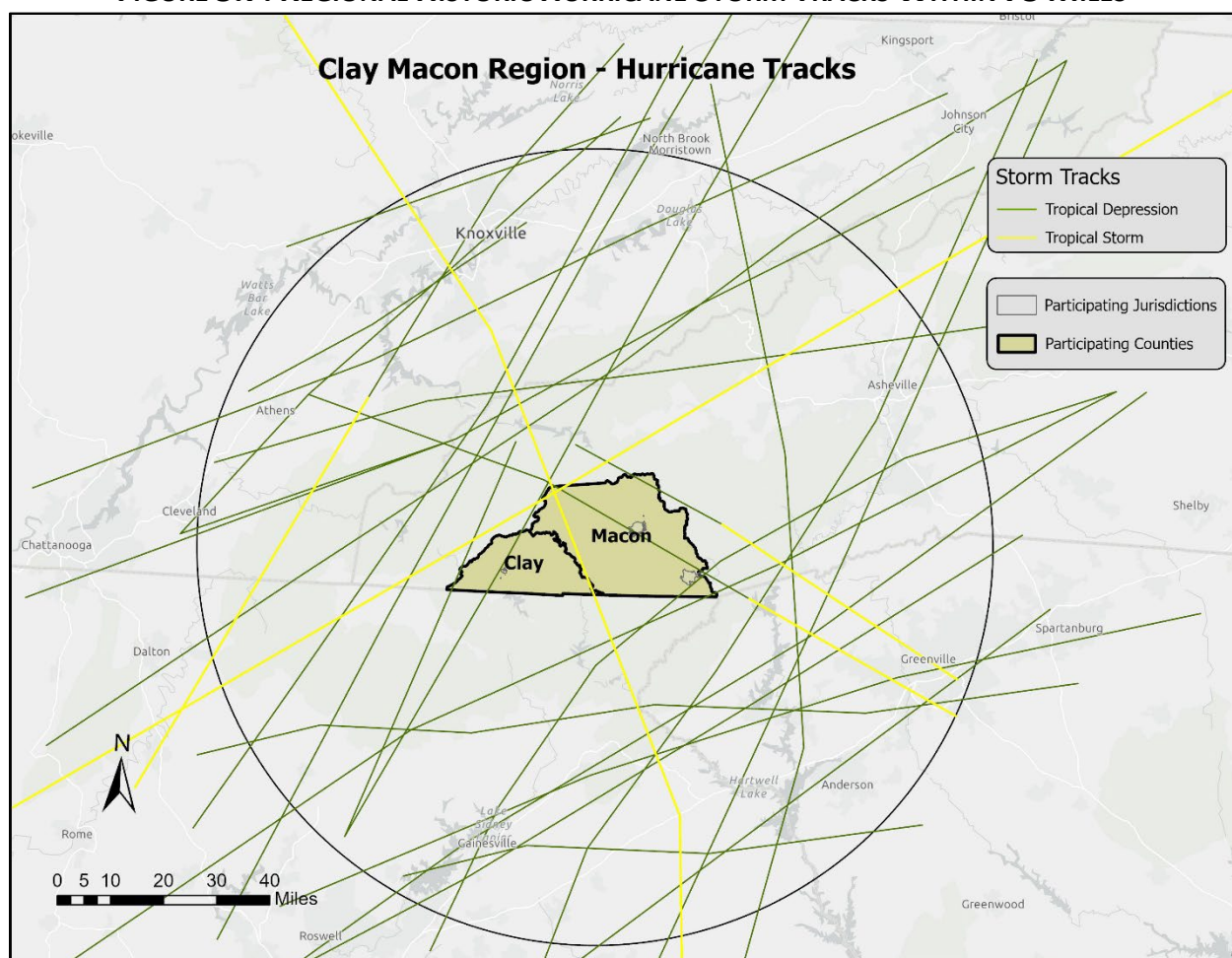
Hurricanes, tropical storms, and other coastal hazards threaten the entire Atlantic and Gulf seaboard of the United States. While coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland and they can affect the Clay Macon Region. All areas in the Clay Macon Region are equally susceptible to hurricanes and tropical storms.

5.5.3 Historical Occurrences

According to the National Oceanic and Atmospheric Administration (NOAA) National Hurricane Center (NHC) historical storm track records, at least 40 hurricane or tropical storm tracks have passed within 75 miles of the Clay Macon Region since 1850¹⁴.

Of the recorded storm events, at least 6 tracks have traversed directly through the Clay Macon Region, as shown in **Figure 5.7**. Furthermore, **Table 5.12** provides the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of the Clay Macon Region), and maximum category of the storm based on the Saffir-Simpson Scale (e.g., Hurricane Category 1-5 = *H1* to *H5*, Tropical Storm = *TS*, and Tropical Depression = *TD*) for each event.

¹⁴ These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

FIGURE 5.7: REGIONAL HISTORIC HURRICANE STORM TRACKS WITHIN 75 MILES

Source: NOAA, NHC

TABLE 5.12: HISTORICAL STORM TRACKS WITHIN 75 MILES OF THE CLAY MACON REGION (1850–2025)

Storm Name	Formation Date	Maximum Wind Speed (knots)	Maximum Storm Category ¹⁵
HELENE 2024	9/23/2024	120	H4
NICOLE 2022	11/6/2022	65	H1
FRED 2021	8/9/2021	55	TS
ZETA 2020	10/24/2020	100	H3
FLORENCE 2018	8/30/2018	130	H4
LEE 2011	9/2/2011	50	TS
FAY 2008	8/15/2008	60	TS
CINDY 2005	7/3/2005	65	H1
JEANNE 2004	9/13/2004	105	H3
IVAN 2004	9/2/2004	145	H5
FRANCES 2004	8/25/2004	125	H4
BILL 2003	6/28/2003	50	TS
DANNY 1997	7/16/1997	70	H1

¹⁵ Maximum category achieved by each storm track ranges from: Hurricane Category 1-5 = **H1** to **H5**, Tropical Storm = **TS**, and Tropical Depression = **TD**.

SECTION 5: HAZARD PROFILES

Storm Name	Formation Date	Maximum Wind Speed (knots)	Maximum Storm Category ¹⁵
BERYL 1994	8/14/1994	50	TS
ANDREW 1992	8/16/1992	150	H5
DANNY 1985	8/12/1985	80	H1
BABE 1977	9/3/1977	65	H1
ELOISE 1975	9/13/1975	110	H3
ABBY 1968	6/1/1968	65	H1
IRENE 1959	10/6/1959	40	TS
UNNAMED 1949	8/23/1949	115	H4
UNNAMED 1947	10/5/1947	50	TS
UNNAMED 1940	8/5/1940	85	H2
UNNAMED 1932	10/7/1932	60	TS
UNNAMED 1928	8/7/1928	80	H1
UNNAMED 1916	7/11/1916	100	H3
UNNAMED 1915	8/31/1915	85	H2
UNNAMED 1913	8/30/1913	75	H1
UNNAMED 1912	6/7/1912	60	TS
UNNAMED 1911	8/23/1911	85	H2
UNNAMED 1907	9/18/1907	40	TS
UNNAMED 1906	9/3/1906	80	H1
UNNAMED 1905	10/5/1905	45	TS
UNNAMED 1903	9/9/1903	80	H1
UNNAMED 1902	10/3/1902	90	H2
UNNAMED 1901	9/21/1901	45	TS
UNNAMED 1900	9/11/1900	45	TS
UNNAMED 1896	7/4/1896	85	H2
UNNAMED 1882	9/2/1882	110	H3
UNNAMED 1859	9/15/1859	70	H1

Source: NOAA, NHC

Federal records indicate that three major disaster declarations were made in 2004 (Tropical Storm Frances), 2004 (Hurricane Ivan), and 2024 (Hurricane Helene) for the region.¹⁶

Flooding is generally the greatest hazard of concern with hurricane and tropical storm events in the Clay Macon Region. Most events do not carry winds that are above those of the winter storms and straight-line winds received by the Clay Macon Region. Some anecdotal information is available about the major storms that have impacted the planning area, as found below:

Tropical Storm Frances – September 7-8, 2004

Tropical Storm Frances was a slow-moving, relatively large storm that dumped heavy rains over the Eastern United States. The remnants of Frances produced a swath of 5 to 15 inches of rain across the North Carolina Mountains, with reports of 12 to 15 inches of rain along the higher terrain and isolated reports in excess of 18 inches. Wind gusts reached between 40 and 60 mph along the Appalachian Mountains, and numerous trees were downed. Frances caused significant crop damage, totaling \$55 million statewide. North Carolina residents received almost \$20.6 million in federal disaster assistance following the storm.

Hurricane Ivan – September 16-17, 2004

¹⁶ Not all the participating counties were declared disaster areas for these storms. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Identification*.

Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed, and landslides were common across mountainous regions. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains, resulting in numerous downed trees. More than \$13.8 million of federal aid was dispersed across North Carolina following Ivan.

Hurricane Helene¹⁷ – September 24-September 29, 2024

In late September 2024, Hurricane Helene made landfall in Florida as a Category 4 hurricane, before moving further into the Southeast U.S. and causing devastating flooding, landslides, and extensive damage throughout the counties of Western North Carolina. In some places, rainfall topped 30+ inches, resulting in deadly landslides in the Appalachian Mountains and historic riverine flooding. Over one million people lost electricity due to high winds that reached speeds of over 80 mph, which brought down entire mountainsides of trees. In addition to destroying many residences across the mountains, the storm also damaged vital infrastructure, such as water systems, highways, and bridges. Helene was the most severe storm in North Carolina's history, resulting in approximately 107+ fatalities¹⁸, damage to 125,000+ housing units, and an estimated \$59+ billion in total damage statewide¹⁹. On September 28, 2024, a major disaster declaration for federal government assistance was issued, encompassing 39 counties.

5.5.4 Changing Future Conditions

North Carolina is vulnerable to the hazards of tropical storms and hurricanes due to its location along the Atlantic Coast. This inherently creates the greatest risk near low-lying coastal areas of the state, although inland areas found to the west may still face significant impacts over time. According to 2022 climate summary data from the NOAA National Centers for Environmental Information, a storm at hurricane-level intensity makes landfall in the state roughly once every 3 years. Several periods from the late 1990s through today have been notably active in terms of hurricane formation and local damage, including Hurricanes Dennis, Floyd, Frances, Ivan, Matthew, Florence, and Helene. Climate change models project that hurricane-associated storm intensity and rainfall rates will both increase in the future despite some annual variability in the number of landfalling hurricanes in North Carolina²⁰.

5.5.5 Probability of Future Occurrences

Given the inland location of the region, it is more likely to be affected by remnants of hurricane and tropical storm systems (as opposed to a major hurricane), which may result in flooding or high winds. The probability of being impacted is less than in coastal areas, but it remains a real threat to the Clay Macon Region due to subsequent compounding hazards such as flooding and landslides. Based on historical evidence and recent events, the probability level of future occurrence is considered likely (between 10 and 100 percent annual probability). Given the regional nature of the hazard, all areas are equally exposed to this hazard. However, if and when the region is affected, the damage could be catastrophic, threatening lives and property throughout the planning area. As of 2025, the FEMA National Risk Index rates the

¹⁷ More information about the impacts of this event and subsequent response efforts is available through the NCEM *Helene Retrospective Dashboard* (<https://experience.arcgis.com/experience/7892f669bb0e442981b15009c7f2b5f0/page/Helene-Retrospective?views=Home>)

¹⁸ More information about regional impacts for this event can be found in the plan appendices.

¹⁹ National Weather Service (https://www.nhc.noaa.gov/data/tcr/AL092024_Helene.pdf) and North Carolina Office of State Budget and Management (<https://www.osbm.nc.gov/hurricane-helene-dna/open>)

²⁰ NOAA NCEI 2022 State Climate Summaries (<https://statesummaries.ncics.org/chapter/nc/>)

hurricane hazard as “very low” in Clay County and “relatively low” in Macon County.

5.6 TORNADOES/THUNDERSTORMS

For the purposes of maintaining consistency with the State of North Carolina Hazard Mitigation Plan, this section will assess tornadoes and thunderstorms, which also include high winds, hailstorms, and lightning.

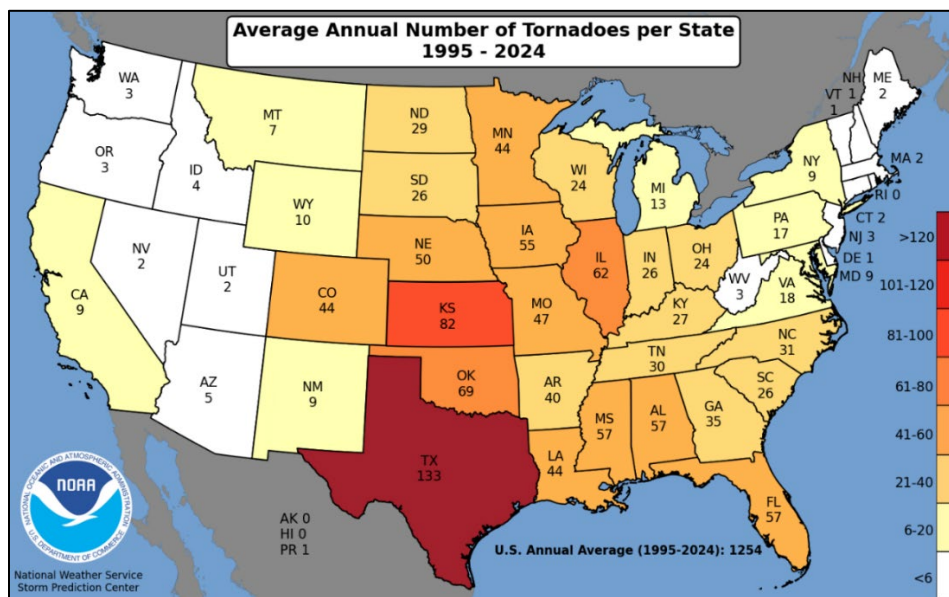
5.6.1 Background and Description

Tornadoes

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air, forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 miles per hour to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles. Each year, an average of over 1,200 tornadoes is reported nationwide, resulting in an average of 56 deaths and 1,500 injuries²¹.

According to the NOAA Storm Prediction Center (SPC), the highest concentration of tornadoes in the United States has been in Oklahoma, Texas, Kansas, and Florida, respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous tornadoes (earning the designation of “Tornado Alley”), Florida experiences the greatest number of tornadoes per square mile of all U.S. states (SPC, 2002). **Figure 5.8** shows the average annual tornado activity in the United States per state (1995-2024).

FIGURE 5.8: TORNADO ACTIVITY IN THE UNITED STATES



²¹ NOAA, 2013.

SECTION 5: HAZARD PROFILES

Source: NOAA Storm Prediction Center

Tornadoes are more likely to occur during the months of March through May and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small, short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes may carve out a path over a mile wide and several miles long.

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings (particularly mobile homes). Tornado magnitude is reported according to the Fujita and Enhanced Fujita Scales. Tornado magnitudes before 2005 were determined using the traditional version of the Fujita Scale (**Table 5.13**). However, tornado magnitudes from 2005 onwards have been determined using the Enhanced Fujita Scale (**Table 5.14**).

TABLE 5.13: THE FUJITA SCALE (EFFECTIVE BEFORE 2005)

F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage Done
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages signboards.
F1	Moderate tornado	73-112 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 mph	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forests uprooted
F4	Devastating tornado	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile-sized missiles fly through the air in excess of 100 meters; trees debarked; steel-reinforced concrete structures badly damaged.
F6	Inconceivable tornado	319-379 mph	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable, along with the mess produced by F4 and F5 winds that would surround the F6 winds. Missiles, such as cars and refrigerators, would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies

Source: National Weather Service

TABLE 5.14 THE ENHANCED FUJITA SCALE (EFFECTIVE 2005 AND LATER)

EF-Scale Number	Intensity Phrase	3 Second Gust (MPH)	Type of Damage Done
0	Gale	65-85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages signboards.
1	Moderate	86-110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
2	Significant	111-135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
3	Severe	136-165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forests uprooted.
4	Devastating	166-200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
5	Incredible	Over 200	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile-sized missiles fly through the air in excess of 100 meters; trees debarked; steel-reinforced concrete structures badly damaged.

Source: National Weather Service

Thunderstorms

Thunderstorms can produce a variety of accompanying hazards, including wind, hailstorms, and lightning²², which are all discussed here. Although thunderstorms generally affect a small area, they are very dangerous and may cause substantial property damage.

Three conditions need to occur for a thunderstorm to form. First, it needs moisture to form clouds and rain. Second, it needs unstable air, such as warm air that can rise rapidly (this is often referred to as the “engine” of the storm). Third, thunderstorms need lift, which comes in the form of cold or warm fronts, sea breezes, mountains, or the sun’s heat. When these conditions occur simultaneously, air masses of varying temperatures meet, and a thunderstorm is formed. These storm events can occur individually, in lines, or in clusters. Furthermore, they can move through an area very quickly or linger for several hours.

According to the National Weather Service, more than 100,000 thunderstorms occur each year, though only about 10 percent of these storms are classified as “severe.” A severe thunderstorm occurs when the storm produces at least one of these three elements: 1) hail of three-quarters of an inch, 2) a tornado, or 3) winds of at least 58 miles per hour.

Thunderstorm events have the capability of producing straight-line winds that can cause severe destruction to communities and threaten the safety of a population. Such wind events, sometimes separate from a thunderstorm event, are common throughout the Clay Macon Region. Therefore, high winds are also reported in this section. High winds can form due to pressure systems of the Northeast coast that combine with strong pressure moving through the Ohio Valley. This creates a tight pressure gradient across the region, resulting in high winds that increase with elevation. It is common for gusts of 30 to 60 miles per hour during the winter months.

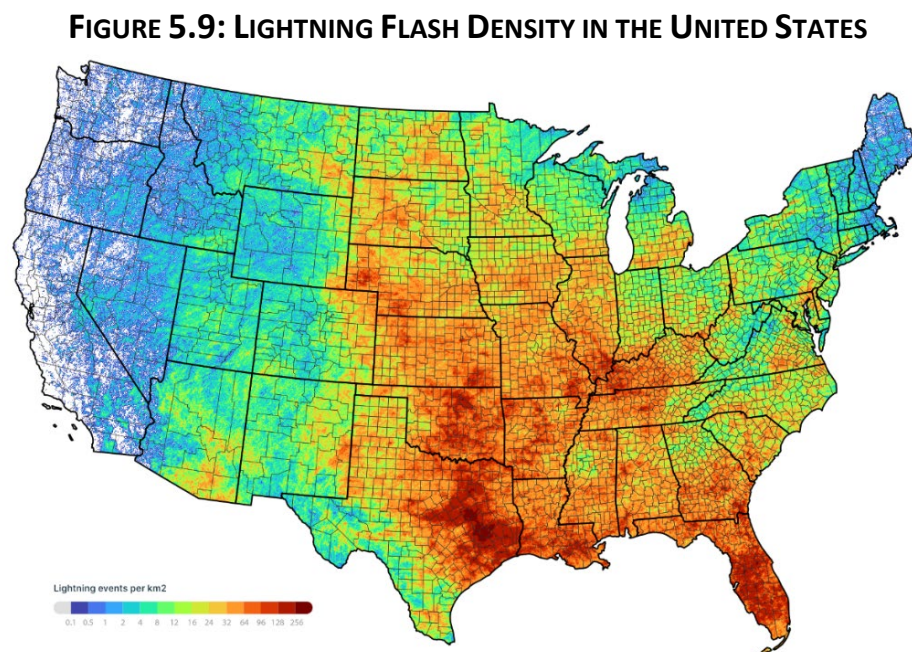
²² Lightning and hail hazards are discussed as separate hazards in this section.

Downbursts are also possible with thunderstorm events. Such events are an excessive burst of wind in excess of 125 miles per hour. They are often confused with tornadoes. Downbursts are caused by down drafts from the base of a convective thunderstorm cloud. It occurs when rain-cooled air within the cloud becomes heavier than its surroundings. Thus, air rushes towards the ground in a destructive yet isolated manner. There are two types of downbursts. Downbursts less than 2.5 miles wide, duration less than 5 minutes, and winds up to 168 miles per hour are called “microbursts.” Larger events greater than 2.5 miles at the surface and longer than 5 minutes with winds up to 130 miles per hour are referred to as “macrobursts.”

Lightning

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a “bolt” when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder, which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall.

Figure 5.9 shows a lightning flash density map for the years 2016-2024 based upon data provided by Vaisala’s U.S. National Lightning Detection Network (NLDN®).



Source: Vaisala U.S. National Lightning Detection Network

Lightning strikes occur in very small, localized areas. For example, they may strike a building, electrical transformer, or even a person. According to FEMA, lightning injures an average of 300 people and kills 80 people each year in the United States. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities, and infrastructure, largely by igniting a fire. Lightning is also

responsible for igniting wildfires that can result in widespread damage to property.

Hailstorms

Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they develop to a sufficient weight and fall as precipitation. Hail typically takes the form of spheres or irregularly shaped masses greater than 0.75 inches in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size. **Table 5.15** shows the TORRO Hailstorm Intensity Scale, which is a way of measuring hail severity.

TABLE 5.15: TORRO HAILSTORM INTENSITY SCALE

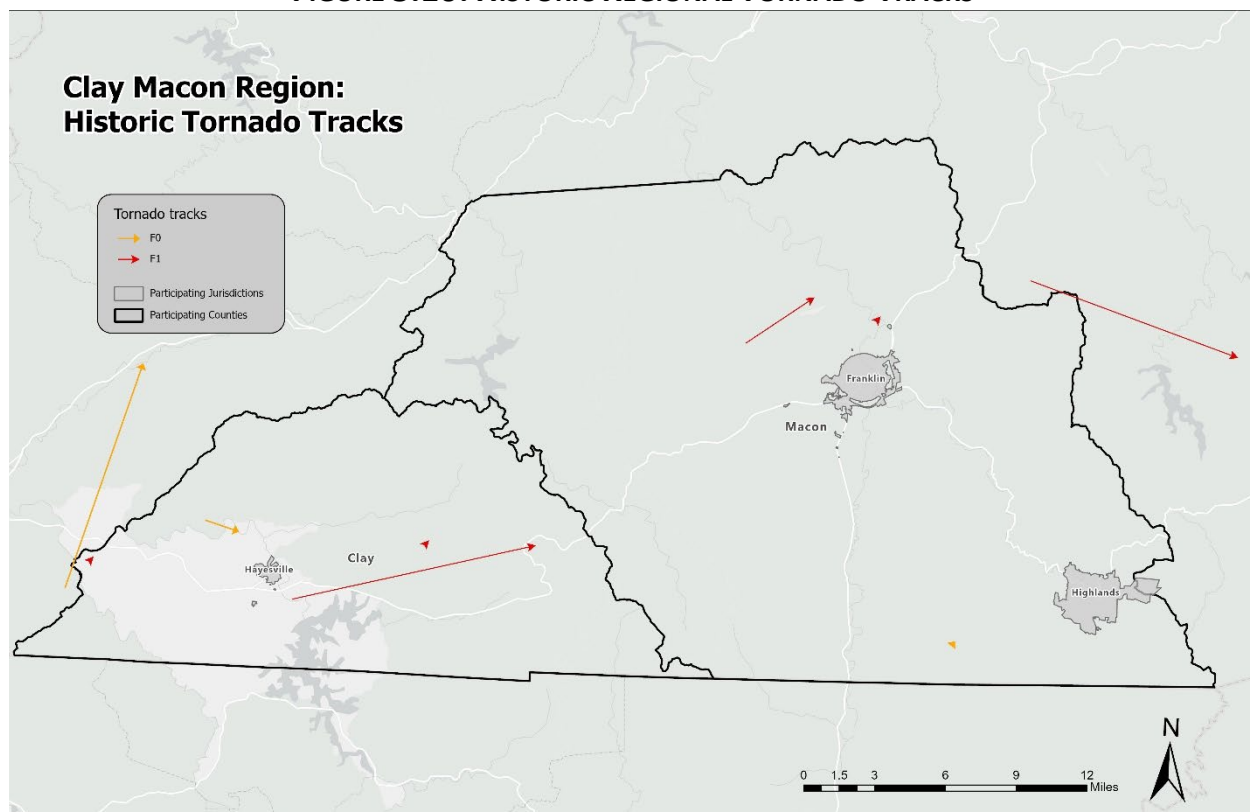
	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m ²	mm to inch conversion (inches)	Typical Damage Impacts
H0	Hard Hail	5	0-20	0 – 0.2	No damage
H1	Potentially Damaging	5-15	>20	0.2 – 0.6	Slight general damage to plants, crops
H2	Significant	10-20	>100	0.4 – 0.8	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	>300	0.8 – 1.2	Severe damage to crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	>500	1.0 – 1.6	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	>800	1.2 – 2.0	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60		1.6 – 2.4	Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-75		2.0 – 3.0	Severe roof damage, risk of serious injuries
H8	Destructive	60-90		1.6 – 3.5	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100		3.0 – 3.9	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100		3.9+	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: Tornado and Storm Research Organisation (<http://www.torro.org.uk/site/hscale.php>)

5.6.2 Location and Spatial Extent

Tornadoes

Tornadoes occur throughout the state of North Carolina, and thus in the Clay Macon Region. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the Clay Macon Region is uniformly exposed to this hazard. With that in mind, **Figure 5.10** shows tornado track data for many of the major tornado events that have impacted the region. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE 5.10: HISTORIC REGIONAL TORNADO TRACKS

Source: NOAA

Thunderstorms

A thunderstorm/wind event is an atmospheric hazard and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the Clay Macon Region typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that the Clay Macon Region has uniform exposure to a thunderstorm/wind event, and the spatial extent of an impact could be large.

Lightning

Lightning occurs randomly; therefore, it is impossible to predict where and with what frequency it will strike. It is assumed that all of the Clay Macon Region is uniformly exposed to lightning.

Hailstorms

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the Clay Macon Region is uniformly exposed to severe thunderstorms; therefore, all areas of the region are equally exposed to hail, which may be produced by such storms.

5.6.3 Historical Occurrences

Tornadoes

Tornadoes are a fairly rare occurrence in mountainous areas. However, they have and do occur in the

Clay Macon Region. Tornadoes have not resulted in any disaster declarations in the Clay Macon Region²³. According to the National Centers for Environmental Information (NCEI) Storm Events Database, there have been a total of at least 10 recorded tornado events in the Clay Macon Region between January 1950 and April 2025 (**Table 5.16**), resulting in over \$1.75 million (2025 dollars) in property damage²⁴. The magnitude of these tornadoes ranges from F0 to F1 in intensity, although an F2 through F5 event is possible. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the years.

TABLE 5.16: SUMMARY OF TORNADO OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2025 dollars)
Clay County	6	0/0	\$307,389
Hayesville	1	0/0	\$29,790
Unincorporated Area	5	0/0	\$356,172
Macon County	4	0/0	\$1,441,803
Franklin	1	0/0	\$0
Highlands	0	0/0	\$0
Unincorporated Area	3	0/0	\$1,441,803
Clay Macon Regional Total	10	0/0	\$1,749,192

Source: National Centers for Environmental Information (NCEI)

Thunderstorms

Severe storms resulted in multiple major disaster declarations in the Clay Macon Region in 1973, 1995, and twice in 2013. According to NCEI records, there have been at least 217 reported thunderstorm wind and high wind events between January 1950 and April 2025 in the Clay Macon Region²⁵. These events caused over \$3 million (2025 dollars) in property damage. There were reports of at least 2 injuries and 1 fatality. **Table 5.17** summarizes this information.

TABLE 5.17: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2025 dollars)
Clay County	90	0/0	\$977,040
Hayesville	48	0/0	\$605,463
Unincorporated Area	42	0/0	\$371,577
Macon County	127	0/2	\$2,099,317
Franklin	32	0/1	\$622,439
Highlands	10	0/0	\$20,747
Unincorporated Area	85	0/1	\$1,456,131
Clay Macon Regional Total	217	0/2	\$3,076,357

Source: National Centers for Environmental Information (NCEI)

Lightning

According to NCEI records, there have been at least 14 recorded lightning events in the Clay Macon Region

²³ A complete list of historical disaster declarations can be found in Section 4: *Hazard Identification*.

²⁴ These tornado events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is extremely likely that additional tornado events have affected the Clay Macon Region. As additional local data becomes available, this hazard profile will be amended.

²⁵ These thunderstorm events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is extremely likely that additional thunderstorm events have affected the Clay Macon Region. As additional local data becomes available, this hazard profile will be amended.

between January 1950 and April 2025²⁶. These events resulted in at least 1 injury and over \$2.5 million (2025 dollars) in property damage, as summarized in **Table 5.18**.

Many of the reported events are those that caused significant impacts or damage as reported by authoritative sources, and it should be expected that total damage in the region is likely much higher for this hazard than what is reported.

TABLE 5.18: SUMMARY OF LIGHTNING OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2025 dollars)
Clay County	0	0/0	\$0
Hayesville	0	0/0	\$0
Unincorporated Area	0	0/0	\$0
Macon County	14	0/1	\$2,504,040
Franklin	3	0/1	\$322,527
Highlands	7	0/0	\$1,858,986
Unincorporated Area	4	0/0	\$645,054
Clay Macon Regional Total	14	0/1	\$2,504,040

Source: National Centers for Environmental Information (NCEI)

Hailstorms

According to NCEI records, at least 90 recorded hailstorm events have affected the Clay Macon Region between January 1950 and April 2025²⁷. **Table 5.19** is a summary of the hail events in the Clay Macon Region. Hail ranged in diameter from 0.75 inches to 2.75 inches. In all, hail occurrences resulted in over \$27,000 (2025 dollars) in reported property damage. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Centers for Environmental Information. Therefore, it is likely that damages are greater than the reported value. Additionally, a single storm event may have affected multiple counties.

TABLE 5.19: SUMMARY OF HAIL OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2025 dollars)
Clay County	18	0/0	\$18,054
Hayesville	10	0/0	\$18,054
Unincorporated Area	8	0/0	\$0
Macon County	72	0/0	\$9,027
Franklin	26	0/0	\$0
Highlands	10	0/0	\$0
Unincorporated Area	36	0/0	\$9,027
Clay Macon Regional Total	90	0/0	\$27,081

Source: National Centers for Environmental Information (NCEI)

5.6.4 Changing Future Conditions

Tornadoes are among the most difficult hazards to link definitively with climate change, partially

²⁶ These lightning events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is extremely likely that additional lightning events have affected the Clay Macon Region. As additional local data becomes available, this hazard profile will be amended.

²⁷ These hail events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is extremely likely that additional hail events have affected the Clay Macon Region. As additional local data becomes available, this hazard profile will be amended.

because they are both relatively small and short-lived events when compared to wildfires, heat waves, and other climate disasters with a larger temporal and/or spatial distribution. However, the clustering of tornado systems has appeared to increase in recent years despite few changes in the total number of systems observed²⁸. According to 2022 climate summary data from the NOAA National Centers for Environmental Information, tornadoes can be produced by hurricanes and severe thunderstorm systems, with the largest outbreak of 30 confirmed tornadoes and 24 deaths in North Carolina reported as of April 16, 2011.

Changing weather patterns related to climate change may also result in more frequent and more severe storms (including thunderstorms, lightning, and hail) throughout the Clay Macon Region. According to the National Aeronautics and Space Administration (NASA), severe storm events are likely to become more frequent and intense throughout the Southeast due to radical changes in weather extremes²⁹.

5.6.5 Probability of Future Occurrences

Tornadoes

Tornadoes occur throughout the State of North Carolina, including the Clay Macon Region. Tornadoes typically impact a relatively small area, but damage from a single event may be catastrophic and extensive. Event locations are completely random, and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the Clay Macon Region is uniformly exposed to this hazard. The probability of future tornado occurrences affecting the region is considered possible (1 to 10 percent annual probability). As of 2025, the FEMA National Risk Index rates the tornado hazard as “relatively low” in both counties.

Thunderstorms

A thunderstorm/wind event is an atmospheric hazard and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the Clay Macon Region typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that the Clay Macon Region has uniform exposure to a thunderstorm/wind event. Given the high number of previous events, it is certain that wind events, including straight-line winds and thunderstorm winds, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future events in the planning area. As of 2025, the FEMA National Risk Index rates the strong wind hazard as “relatively low” in both counties.

Lightning

Although there was not a high number of historical lightning events reported throughout the Clay Macon Region via NCEI data, it is considered a regular occurrence, especially accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala’s U.S. National Lightning Detection Network (NLDN®), the Clay Macon Region is located in an area of the country that experienced an average of 4 to 12 lightning flashes per square kilometer per year between 2016 and 2024. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause property damage throughout the region. As of 2025, the FEMA National Risk Index rates the

²⁸ Brooks et al. (2014). Increased variability of tornado occurrence in the United States. *Science* **346**(6207). <https://doi.org/10.1126/science.1257460>

²⁹ NASA Climate Change Effects (<https://science.nasa.gov/climate-change/effects/>)

lightning hazard as “relatively low” in Clay County and “relatively moderate” in Macon County.

Hailstorms

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is likely (10 to 100 percent annual probability). Since hail is an atmospheric hazard (coinciding with thunderstorms), it is assumed that the entire Clay Macon Region has equal exposure to this hazard. It can be expected that future hail events will continue to cause property damage and vehicle damage throughout the region. As of 2025, the FEMA National Risk Index rates the hail hazard as “very low” in Clay County and “relatively low” in Macon County.

5.7 SEVERE WINTER WEATHER

5.7.1 Background and Description

Severe winter weather can range from moderate snow over a period of a few hours to blizzard conditions with blinding wind-driven snow that lasts for several days. Events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Some winter storms might be large enough to affect several states, while others might affect only localized areas. Occasionally, heavy snow might also cause significant property damage, such as roof collapses on older buildings.

All severe winter weather events have the potential to present dangerous conditions to the affected area. Larger snowfalls pose a greater risk, reducing visibility due to blowing snow and making driving conditions treacherous. A heavy snow event is defined by the National Weather Service as an accumulation of 4 or more inches in 12 hours or less. A blizzard is the most severe form of winter storm. It combines low temperatures, heavy snow, and winds of 35 miles per hour or more, which reduces visibility to a quarter mile or less for at least 3 hours. Winter storms are often accompanied by sleet, freezing rain, or an ice storm. Such freeze events are particularly hazardous as they create treacherous surfaces.

Ice storms are defined as storms with significant amounts of freezing rain and are a result of cold air damming (CAD). CAD is a shallow, surface-based layer of relatively cold, stably stratified air entrenched against the eastern slopes of the Appalachian Mountains. With warmer air above, falling precipitation in the form of snow melts, then becomes either super-cooled (liquid below the melting point of water) or re-freezes. In the former case, super-cooled droplets can freeze on impact (freezing rain), while in the latter case, the re-frozen water particles are ice pellets (or sleet). Sleet is defined as partially frozen raindrops or refrozen snowflakes that form into small ice pellets before reaching the ground. They typically bounce when they hit the ground and do not stick to the surface. However, it does accumulate like snow, posing similar problems and has the potential to accumulate into a layer of ice on surfaces. Freezing rain, conversely, usually sticks to the ground, creating a sheet of ice on the roadways and other surfaces. All of the severe winter weather elements – snow, low temperatures, sleet, ice, etcetera – have the potential to cause significant hazard to a community. Even small accumulations can down power lines and tree limbs and create hazardous driving conditions. Furthermore, communication and power may be disrupted for days.

5.7.2 Location and Spatial Extent

Nearly the entire continental United States is susceptible to severe winter weather, winter storms, and freezes. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Clay Macon Region is accustomed to severe winter weather conditions and

frequently experiences winter weather conditions during the winter months. Given the atmospheric nature of the hazard, the entire region has uniform exposure to a winter storm.

5.7.3 Historical Occurrences

Winter weather has resulted in one disaster declaration in the Clay Macon Region, which was the Blizzard of 1996³⁰. According to NCEI records, there have been at least 134 recorded winter weather and winter storm events in the Clay Macon Region between January 1950 and April 2025, as shown in **Table 5.20**³¹.

TABLE 5.20: SUMMARY OF WINTER WEATHER / WINTER STORM EVENTS

Location	Number of Occurrences	Deaths / Injuries	Property Damage
Clay County	12	0/0	\$0
Hayesville	0	0/0	\$0
Unincorporated Area	12	0/0	\$0
Macon County	122	0/0	\$0
Franklin	0	0/0	\$0
Highlands	0	0/0	\$0
Unincorporated Area	122	0/0	\$0
Clay Macon Regional Total	134	0/0	\$0

Source: National Centers for Environmental Information

There have been many severe winter weather events in the Clay Macon Region. More information about past events is available in the plan appendices. Winter storms and other severe winter weather events throughout the planning area may have multiple detrimental effects on communities, including spikes in hypothermia cases, increased costs for snow and debris cleanup, business and government service interruptions, traffic accidents, and power outages. Furthermore, citizens may resort to inappropriate heating devices, which could lead to fires or the accumulation of toxic fumes.

1996 Blizzard/Winter Storm

This storm generated up to two feet of snow and left several thousand citizens without power for over a week. Although shelters were open, some roads were impassable for several days. This event caused considerable disruption to businesses, industry, schools, and government services.

5.7.4 Changing Future Conditions

According to recent climate findings from NOAA, average winter temperatures in urban hubs throughout North Carolina have been noted at 2 to 4 degrees Fahrenheit above the normal average, which is defined as the 30-year Climate Normals data published from 1991 to 2020³². The increased atmospheric moisture of warmer conditions year-round also helps to intensify the water cycle. Air holds about 4% more water vapor for each additional degree Fahrenheit increase in temperature – thereby increasing the likelihood of warmer and wetter conditions in future winter seasons³³.

³⁰ Not all of the participating counties were declared disaster areas for these events. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Identification*.

³¹ These winter weather and winter storm events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is extremely likely that additional winter storm conditions have affected the Clay Macon Region. In addition, the events are reported by county, so many of these storms likely affected all of the counties.

³² NOAA Winter 2022 Climate Report (<https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202202>)

³³ U.S. Climate Resilience Toolkit, Southeast (<https://toolkit.climate.gov/regions/southeast>)

5.7.5 Probability of Future Occurrences

Severe winter weather events will remain a threat and regular occurrence in the Clay Macon Region due to the region's location, elevation, and climate profile. According to historical information, the Clay Macon Region experiences multiple severe winter weather and winter storm events each year. Therefore, the probability of future occurrences is considered highly likely (100 percent annual probability). As of 2025, the FEMA National Risk Index rates the winter weather hazard as "very low" in Clay County and "relatively low" in Macon County.

5.8 EARTHQUAKES

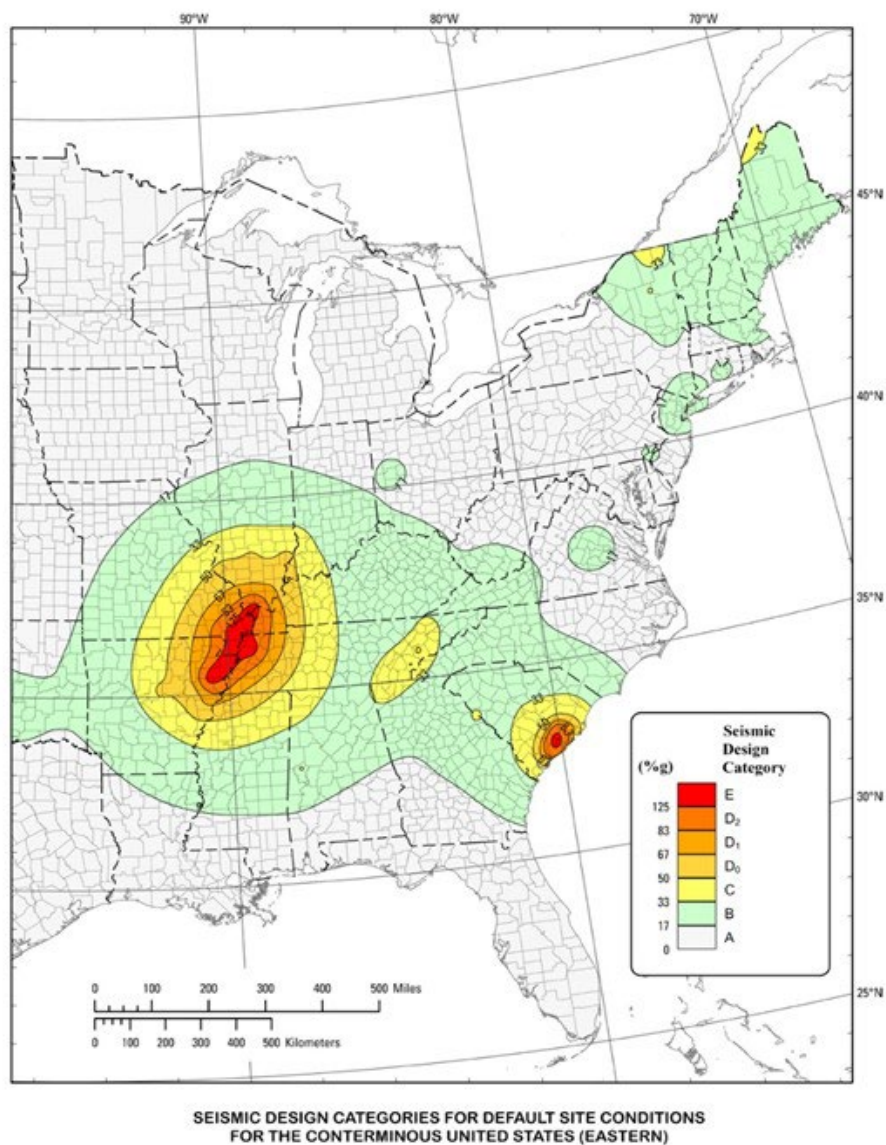
5.8.1 Background and Description

An earthquake is movement or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site, and regional geology. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (mountain regions and along hillsides), and liquefaction, in which ground soil loses the ability to resist shear and flows much like quicksand. In the case of liquefaction, anything relying on the substrate for support can shift, tilt, rupture, or collapse.

Most earthquakes are caused by the release of stress accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes are typically found along borders of the Earth's 10 tectonic plates. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

The greatest earthquake threat in the United States is along tectonic plate boundaries and seismic fault lines located in the central and western states; however, the Eastern United States does face a moderate risk of less frequent, less intense earthquake events. **Figure 5.11** shows the relative seismic risk for the Eastern United States.

FIGURE 5.11: EASTERN UNITED STATES EARTHQUAKE HAZARD MAP

Source: Federal Emergency Management Agency

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (**Table 5.21**). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using Roman numerals, ranging from “I” corresponding to imperceptible (instrumental) events to “XII” for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 5.22**.

TABLE 5.21: RICHTER SCALE FOR EARTHQUAKES

Richter Magnitudes	Earthquake Effects
< 3.5	Generally, not felt, but recorded.
3.5 – 5.3	Often felt, but rarely causes damage.
5.4 – 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 – 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 – 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Source: Federal Emergency Management Agency

TABLE 5.22: MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Not felt	Not felt except by a very few under especially favorable conditions.	
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.	< 4.2
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.	
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.	< 4.8
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.	< 5.4
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.	< 6.1
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.	
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.	< 6.9
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.	< 7.3

Source: Federal Emergency Management Agency

5.8.2 Location and Spatial Extent

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast regions most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and the New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure 5.12** is a map showing geological and seismic information for North Carolina.

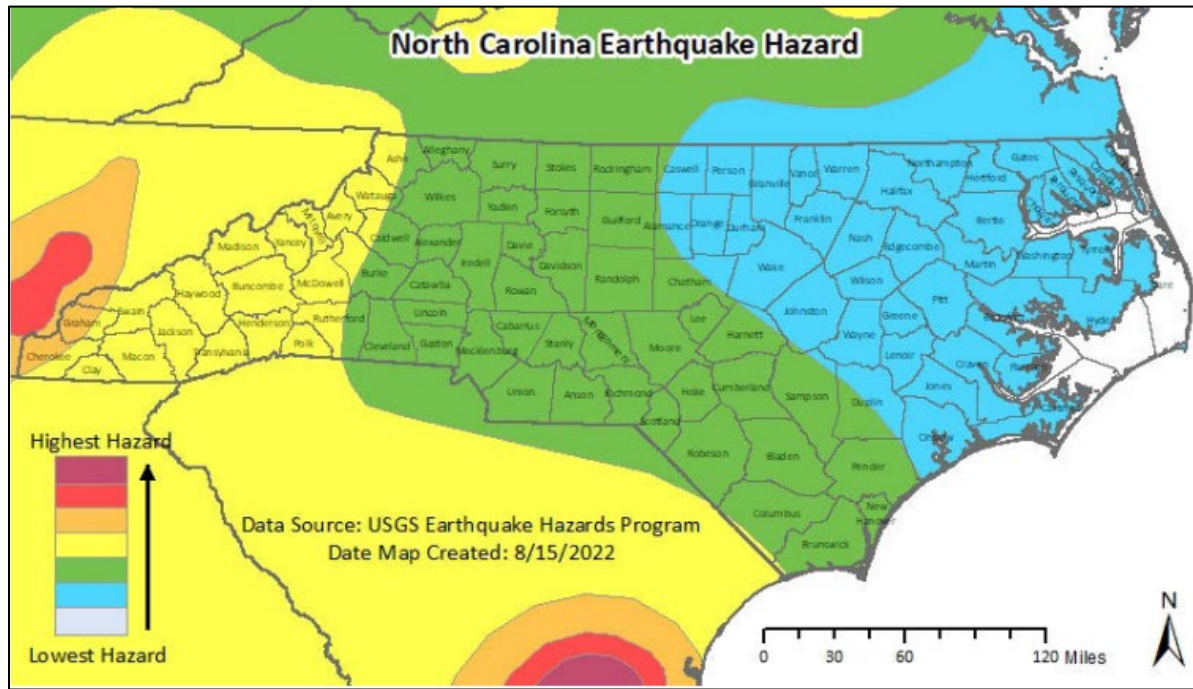
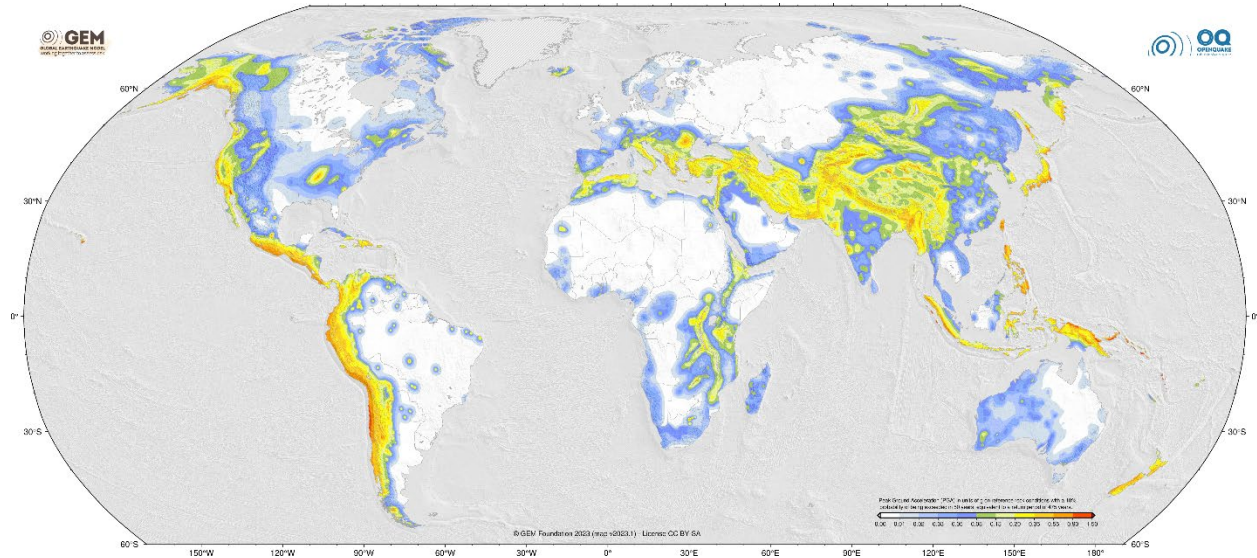
FIGURE 5.12: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA

Figure 5.13 shows the intensity level associated with the world and the Clay Macon Region, based on the national USGS mapping and the Global Earthquake Model (GEM). The GEM Global Seismic Hazard Map depicts the geographic distribution of the Peak Ground Acceleration (PGA) with a 10% probability of being exceeded in 50 years. The data represents the probability that the ground motion will reach a certain level during an earthquake. The map was created by collating maps computed using national and regional probabilistic seismic hazard models developed by various institutions and projects, and by GEM Foundation scientists. This indicates that the region as a whole exists within an area of low to moderate seismic risk.

FIGURE 5.13: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS

Source: Global Earthquake Model, 2023

5.8.3 Historical Occurrences

At least 49 earthquakes are known to have affected the Clay Macon Region since 1886. The strongest of these measured a V on the Modified Mercalli Intensity (MMI) scale. **Table 5.23** provides a summary of earthquake events reported by the United States Geological Survey between 1638 and 1985.

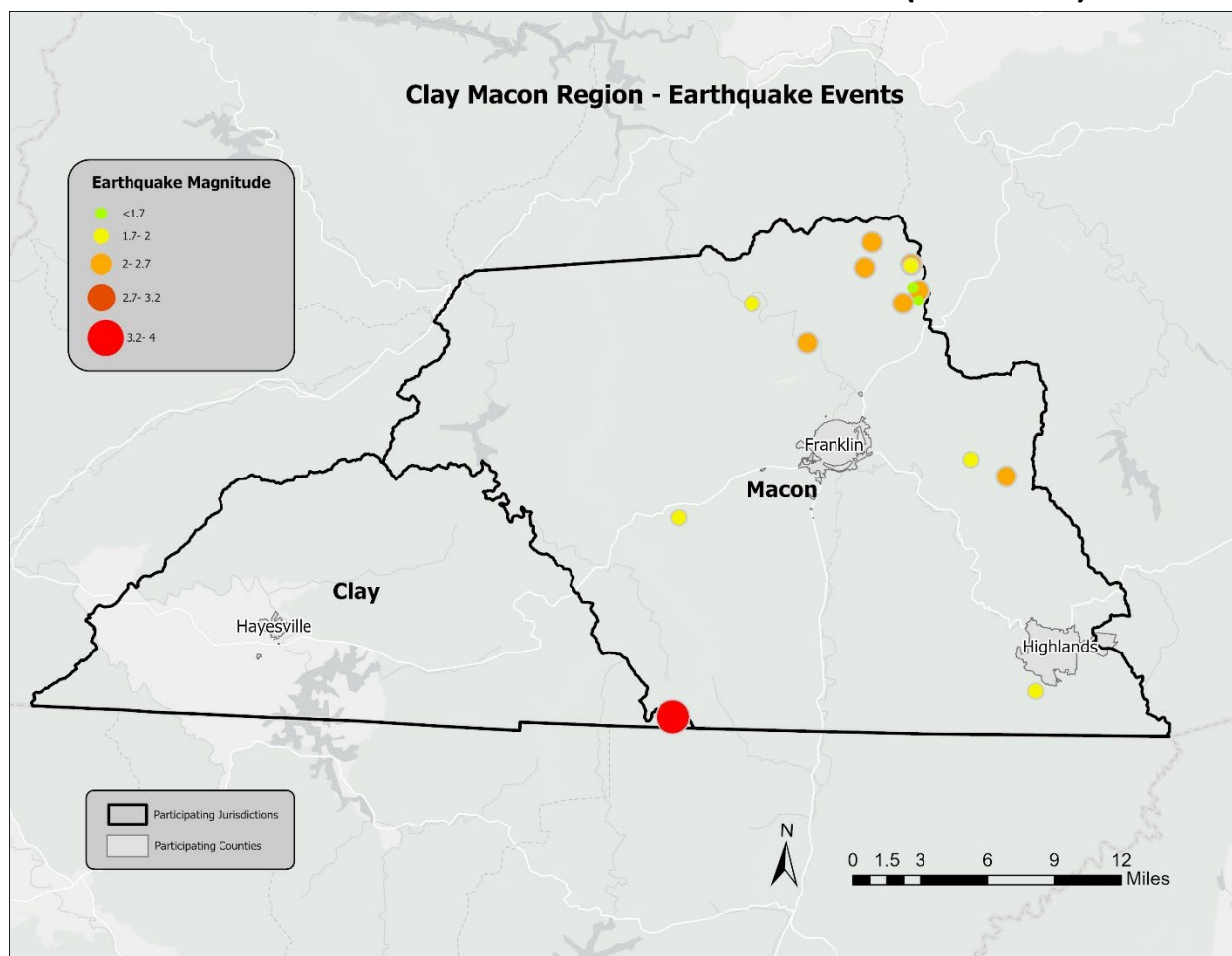
TABLE 5.23: SUMMARY OF SEISMIC ACTIVITY IN THE CLAY MACON REGION

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Clay County	13	V	< 4.8
Hayesville	8	V	< 4.8
Unincorporated Area	5	V	< 4.8
Macon County	36	V	< 4.8
Franklin	15	V	< 4.8
Highlands	4	V	< 4.8
Unincorporated Area	17	V	< 4.8
CLAY MACON REGIONAL TOTAL	49	V	< 4.8

Source: USGS, NCEI

Note: No further details about these events could be located. Future updates of the plan will attempt to provide more context to previously reported earthquake events.

Figure 5.14 below shows the historical epicenter points where earthquakes have occurred throughout the Clay Macon Region between 1960 and 2025.

FIGURE 5.14: REGIONAL HISTORIC EARTHQUAKE EVENTS (1960-2025)

Source: USGS

One of the most recent earthquake events to directly affect North Carolina was the 2020 Sparta earthquake. A narrative discussion about this earthquake can be found below.

Sparta Earthquake (August 9, 2020)

According to the National Weather Service, the 5.2 magnitude earthquake was the second strongest earthquake to occur in North Carolina since 1900. There were no immediate reports of injuries from this earthquake. Before the 5.1 earthquake, five other minor earthquakes were measured in the area. Although there were no reports of injuries or deaths associated with the earthquake, there was extensive property damage reported across in Sparta and across Alleghany County. Over 525 damage reports were filed with Alleghany County officials. People felt the effects of the earthquake across the Carolinas, in Virginia, Georgia, and Tennessee. In addition to those earthquakes specifically affecting the Clay Macon Region, a list of earthquakes that have caused damage throughout North Carolina is presented below in **Table 5.24**.

TABLE 5.24: EARTHQUAKES WHICH HAVE CAUSED DAMAGE IN NORTH CAROLINA

Date	Origin Location	Richter Scale (Magnitude)	MMI (Intensity)	MMI in North Carolina
12/16/1811 - 1	NE Arkansas	8.5	XI	VI
12/16/1811 - 2	NE Arkansas	8.0	X	VI
12/18/1811 - 3	NE Arkansas	8.0	X	VI
01/23/1812	New Madrid, MO	8.4	XI	VI
02/07/1812	New Madrid, MO	8.7	XII	VI
04/29/1852	Wytheville, VA	5.0	VI	VI
08/31/1861	Wilkesboro, NC	5.1	VII	VII
12/23/1875	Central Virginia	5.0	VII	VI
08/31/1886	Charleston, SC	7.3	X	VII
05/31/1897	Giles County, VA	5.8	VIII	VI
01/01/1913	Union County, SC	4.8	VII	VI
02/21/1916	Asheville, NC	5.5	VII	VII
07/08/1926	Mitchell County, NC	5.2	VII	VII
11/03/1928	Newport, TN	4.5	VI	VI
05/13/1957	McDowell County, NC	4.1	VI	VI
07/02/1957	Buncombe County, NC	3.7	VI	VI
11/24/1957	Jackson County, NC	4.0	VI	VI
10/27/1959	Chesterfield, SC	4.0	VI	VI
07/13/1971	Newry, SC	3.8	VI	VI
11/30/1973	Alcoa, TN	4.6	VI	VI
11/13/1976	Southwest Virginia	4.1	VI	VI
05/05/1981	Henderson County, NC	3.5	VI	VI
08/09/2020	Sparta, NC	5.1	VII	VII

Source: This information was compiled by Dr. Kenneth B. Taylor and provided by Tiawana Ramsey of NCEM. Information was compiled from the National Earthquake Center, *Earthquakes of the US* by Carl von Hake (1983), and a compilation of newspaper reports in the *Eastern Tennessee Seismic Zone* compiled by Arch Johnston, CERL, Memphis State University (1983).

5.8.4 Changing Future Conditions

According to the North Carolina Department of Environmental Quality (NCDEQ), despite infrequent occurrences of severe seismic events and no active fault zones in the state, North Carolina is bordered by the Middleton Place-Summerville Seismic Zone (near Charleston, SC) to the south, East Tennessee Seismic Zone to the west, and Central Virginia Seismic Zone to the north³⁴. Although strong earthquakes are rare in North Carolina, there have still been several notable events recorded across susceptible regions of the state within the last 100 years alone. A single event of magnitude 5 or greater can easily cut off critical infrastructure around the mountains and cause residual structural damage over a large area. Current building and development practices may account for this hazard in their designs, but significant portions of existing development, especially in more rural or older areas, will remain vulnerable to earthquakes without any new structural interventions. Earthquakes are primarily influenced by tectonic processes, and although they could potentially be affected by climate factors such as droughts, these connections remain unclear³⁵.

5.8.5 Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the Clay Macon Region is unlikely.

³⁴ NCDEQ Earthquakes (<https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/north-carolina-geological-survey/geologic-hazards/earthquakes-north-carolina>)

³⁵ NASA Science (<https://science.nasa.gov/earth/climate-change/can-climate-affect-earthquakes-or-are-the-connections-shaky/#h-getting-the-big-picture-of-the-earth-system-s-interconnectivity>)

However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damage ranging from none to very light will affect the region. The probability of earthquakes in the region is estimated to be possible (1 to 10 percent annual probability). The USGS also uses historical data to estimate the probability of a major earthquake within the next 50 years for various regions, and this probability is approximately 2% for the Clay Macon Region. As of 2025, the FEMA National Risk Index rates the earthquake hazard as “very low” in Clay County and “relatively low” in Macon County.

5.9 GEOLOGICAL (LANDSLIDES)

For the purposes of maintaining consistency with the State of North Carolina Hazard Mitigation Plan, this section will assess applicable geological hazards of the region, which primarily include landslides, along with sinkholes and erosion.

5.9.1 Background and Description

Landslides

A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snowmelt, steepening of slopes due to construction or erosion, earthquakes, volcanic eruptions, and changes in groundwater levels.

There are several types of landslides: rock falls, rock topples, slides, and flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Mudflows, sometimes referred to as mudslides, lahars, or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, such as heavy rainfall or rapid snowmelt, changing the soil into a flowing river of mud or “slurry.” Slurry can flow rapidly down slopes or through channels and can strike with little or no warning at avalanche speeds. Slurry can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. As the flows reach flatter ground, the mudflows spread over a broad area where they can accumulate in thick deposits.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly.

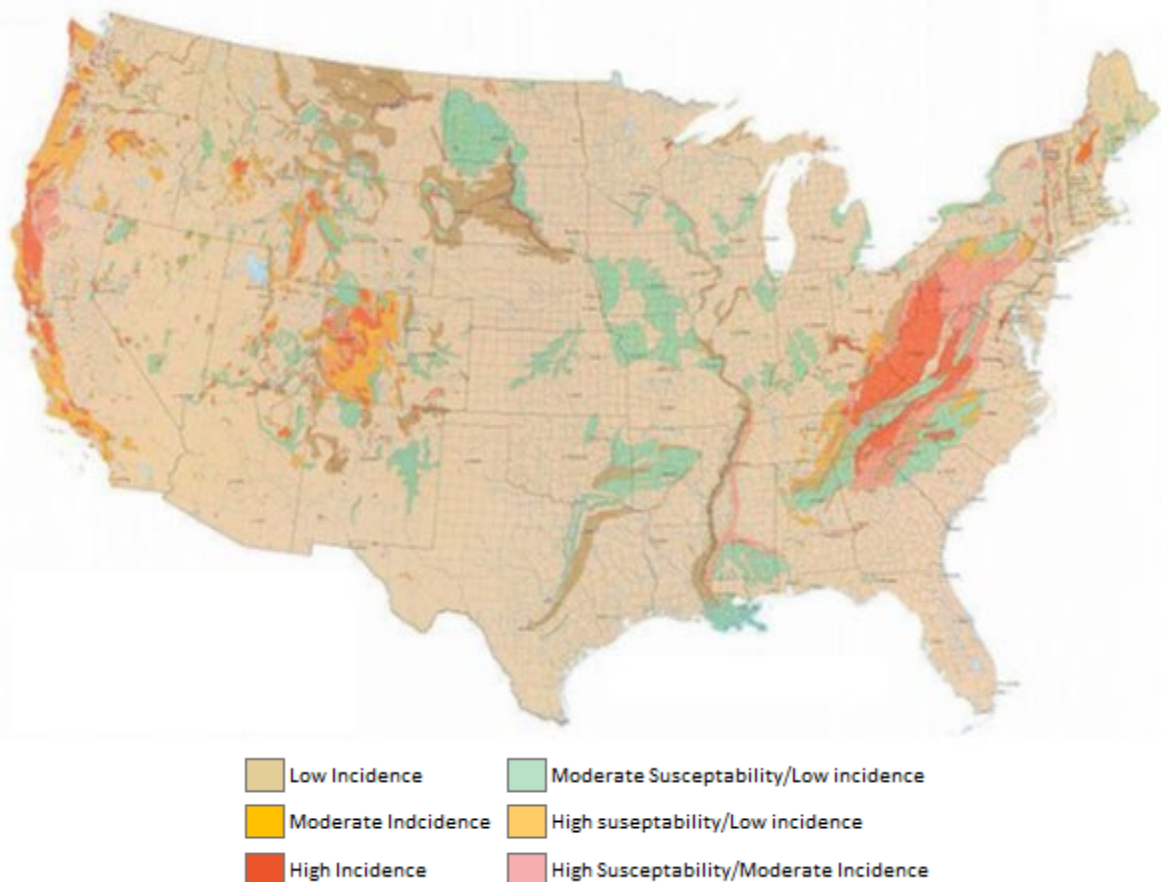
Among the most destructive types of debris flows are those that accompany volcanic eruptions. A spectacular example in the United States was a massive debris flow resulting from the 1980 eruptions of Mount St. Helens, Washington. Areas near the bases of many volcanoes in the Cascade Mountain Range of California, Oregon, and Washington are at risk from the same types of flows during future volcanic eruptions.

Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved in the past, relatively flat-lying areas away from sudden changes in slope, and areas at the top or along ridges set back

from the tops of slopes.

According to the United States Geological Survey, each year landslides cause \$5.1 billion (2018 dollars) in damage and between 25 and 50 deaths in the United States³⁶. **Figure 5.15** delineates areas where large numbers of landslides have occurred and areas that are susceptible to landslides in the conterminous United States³⁷.

FIGURE 5.15: LANDSLIDE OVERVIEW MAP OF THE UNITED STATES³⁸



Source: United States Geological Survey

Sinkholes

According to the United States Geological Survey, a sinkhole is an area of ground that has no natural external surface drainage--when it rains, all of the water stays inside the sinkhole and typically drains into

³⁶ United States Geological Survey (USGS). United States Department of the Interior. "Landslide Hazards – A National Threat." 2005.

³⁷ This map layer is provided in the U.S. Geological Survey Professional Paper 1183, Landslide Overview Map of the Conterminous United States, available online at: http://landslides.usgs.gov/html_files/landslides/nationalmap/national.html.

³⁸ Susceptibility not indicated where same or lower than incidence. Susceptibility to land sliding was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of land sliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

the subsurface. Sinkholes can vary from a few feet to hundreds of acres and from less than 1 to more than 100 feet deep. Some are shaped like shallow bowls or saucers, whereas others have vertical walls.

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by groundwater circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces just get too big. If there is not enough support for the land above the empty spaces, then a sudden collapse of the land surface can occur. These collapses can be small, or, as **Figure 5.16** below shows, they can be huge and can occur where a house or road is on top³⁹.

FIGURE 5.16: SINKHOLE IN NORTH CAROLINA



Source: NCEM

Erosion

Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geological, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.

There are two types of soil erosion: wind erosion and water erosion. Wind erosion can cause significant soil loss. Winds blowing across sparsely vegetated or disturbed land can pick up soil particles and carry them through the air, thus displacing them. Water erosion can occur over land or in streams and channels. Water erosion that takes place over land may result from raindrops, shallow sheets of water flowing off the land, or shallow surface flow, which becomes concentrated in low spots. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils. Major storms, such as hurricanes in coastal areas, may cause significant erosion by combining high winds with heavy surf and storm surge to significantly impact the shoreline.

An area's potential for erosion is determined by four factors: soil characteristics, vegetative cover, climate or rainfall, and topography. Soils composed of a large percentage of silt and fine sand are most susceptible

³⁹ Sinkholes. United States Geological Survey. Retrieved from: <https://www.usgs.gov/special-topics/water-science-school/science/sinkholes>

to erosion. As the clay and organic content of these soils increases, the potential for erosion decreases. Well-drained and well-graded gravels and gravel-sand mixtures are the least likely to erode. Coarse gravel soils are highly permeable and have a good capacity for absorption, which can prevent or delay the amount of surface runoff. Vegetative cover can be very helpful in controlling erosion by shielding the soil surface from falling rain, absorbing water from the soil, and slowing the velocity of runoff. Runoff is also affected by the topography of the area including size, shape, and slope. The greater the slope length and gradient, the more potential an area has for erosion.

Climate can affect the amount of runoff, especially the frequency, intensity, and duration of rainfall and storms. When rainstorms are frequent, intense, or of long duration, erosion risks are high. Seasonal changes in temperature and rainfall amounts define the period of highest erosion risk of the year.

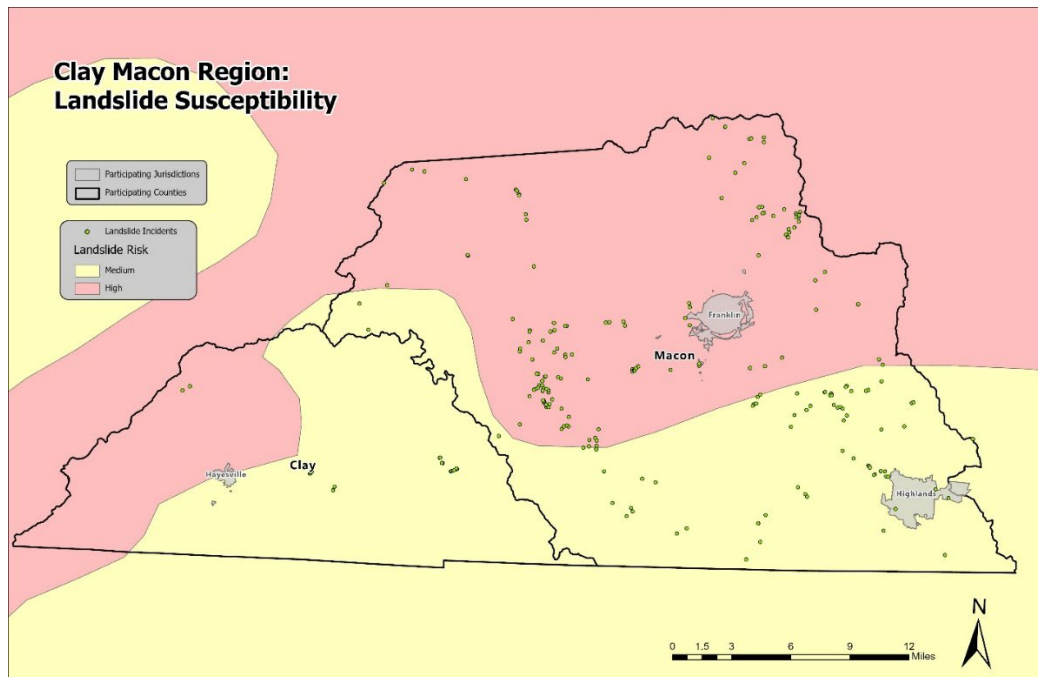
During the past 20 years, the importance of erosion control has gained increased attention of the public. Implementation of erosion control measures consistent with sound agricultural and construction operations is needed to minimize the adverse effects associated with harmful chemicals run-off due to wind or water events. The increase in government regulatory programs and public concern has resulted in a wide range of erosion control products, techniques, and analytical methodologies in the United States. The preferred method of erosion control in recent years has been the restoration of vegetation.

5.9.2 Location and Spatial Extent

Landslides

Landslides are possible throughout the Clay Macon Region. However, some areas may experience more landslide activity than others based on a variety of factors and local conditions. According to **Figure 5.17** below, landslide risk ranges from medium to high in various areas of both Clay County and Macon County. Landslide activity has primarily been concentrated in various areas of Macon County as well.

FIGURE 5.17: REGIONAL LANDSLIDE SUSCEPTIBILITY AND INCIDENCE MAP

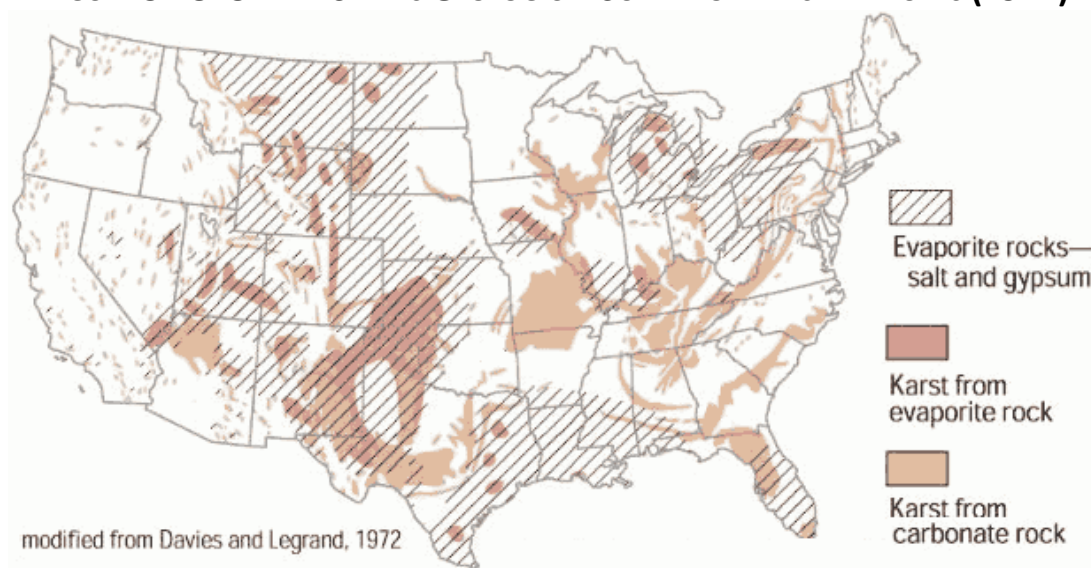


Source: United States Geological Survey

Sinkholes

Figure 5.18 below shows areas of the United States where certain rock types that are susceptible to dissolution in water occur. In these areas, underground cavities can form, which may subsequently lead to catastrophic sinkholes. These rock types include evaporites (salt, gypsum, and anhydrite) and carbonates (limestone and dolomite). Evaporite rocks underlie about 35 to 40 percent of the United States, though in many areas they are buried at great depths. In some cases, sinkholes in North Carolina have been measured at up to 20 to 25 feet in depth, with similar widths.

FIGURE 5.18: UNITED STATES GEOLOGICAL SURVEY OF KARST FEATURES (1972)



Erosion

Erosion in the Clay Macon Region is typically caused by flash flooding events. Unlike coastal areas, where the soil is mainly composed of fine-grained particles such as sand, Clay Macon soils have much greater organic matter content. Furthermore, vegetation also helps to prevent erosion in the area. Erosion occurs in the Clay Macon Region, particularly along the banks of rivers and streams, but it is not an extreme threat to any of the participating counties and jurisdictions. No areas of concern were reported by the planning committee.

5.9.3 Historical Occurrences

Landslides

Steep topography in some areas of the Clay Macon Region makes the planning area susceptible to landslides. Most landslides are caused by heavy rainfall in the area. Building on steep slopes that were not previously possible also contributes to risk. **Table 5.25** presents a summary of the landslide occurrence events as provided by the North Carolina Geological Survey⁴⁰. These incidents are depicted in **Figure 5.17** above. Some incidence mapping has also been completed throughout the western portions of North Carolina in recent years, though it is not fully complete and continues to be updated. Therefore, it should be noted that many more incidents are likely to have occurred in both counties compared to what is reported.

⁴⁰ It should be noted that the North Carolina Geological Survey (NCGS) continues to improve and update its landslide databases. Therefore, there may be additional historical landslide occurrences not previously reported. Furthermore, dates were not included for all events. No damage information was provided by NCGS.

TABLE 5.25: SUMMARY OF REGIONAL LANDSLIDE ACTIVITY

Location	Number of Occurrences
Clay County	9
Hayesville	2
Unincorporated Area	7
Macon County	212
Franklin	10
Highlands	18
Unincorporated Area	184
CLAY MACON REGIONAL TOTAL	221

Source: North Carolina Geological Survey

Hurricane Helene – September 24-September 29, 2024

Hurricane Helene caused catastrophic flooding across Western North Carolina, which led to many severe geological hazard events (e.g., landslides and mudflows) triggered by widespread heavy rain and soil erosion. According to landslide inventory analysis from the National Aeronautics and Space Administration (NASA), over 2,200 landslides were reported in North Carolina (concentrated east of the Appalachian Mountains from Asheville, NC to Johnson City, TN) by the U.S. Geological Survey⁴¹. Approximately 1,300 of these landslides directly impacted various roads, structures, and river flow regimes. Massive amounts of debris were also washed out across Western North Carolina, along with widespread losses of topsoil, trees, and other natural resources that contribute to slope stabilization.

Historical Landslide Events (2000s-2010s)

The National Centers for Environmental Information (NCEI) has previously reported at least two significant landslide events that took place in the Clay Macon Region between in 2004 and 2013, as described below.

Macon County — September 16, 2004

In response to persistent moderate to heavy rainfall associated with the remnants of Hurricane Ivan, severe flooding developed across the mountains for the second time in 9 days. Flooding first developed across the southwest mountains, when several small streams and creeks overflowed their banks, including Toot Hollow Creek near Bryson City. Several rescues were required during the evening in Macon County, as creeks and streams began to threaten homes. Overnight, flooding became more widespread, with Macon County enduring the worst of it. The Little Tennessee River overflowed its banks during the early morning of the 17th, and continued to flood through much of the day. The river flooded an industrial park in Macon County, causing extensive damage. A landslide (debris flow) began at the top of Fishhawk Mountain and flowed through the Peaks Creek Valley. The slide, consisting of water, boulders, trees, mud, and other debris, destroyed or severely damaged 20 to 30 homes and mobile homes. Four people and an unborn child were killed as their homes were overwhelmed by the debris.

Brendletown (Macon County) — January 15, 2013

A deep long wave trough developed over the western states around January 10th. The trough gradually moved east over a period of several days. As it approached the eastern states, it took on a positive tilt, with the surface cold front stalling across the south Appalachians for several days. Heavy rain periodically fell from late on the 13th through the evening hours of the 17th. The trough eventually filled, but not before a trailing southern stream upper low brought a last shot of heavy rain to the region during the

⁴¹ NASA. (2025). *Landslide Risks and Impacts – A Case Study of 2024's Hurricane Helene*.
<https://www.earthdata.nasa.gov/dashboard/stories/landslides-helene>

overnight hours over the 17th. A landslide heavily damaged a garage at a residence near the Jackson County line.

Sinkholes

In North Carolina, most sinkholes occur in the southern coastal plain due to the high concentration of limestone; however, they are also common in the western areas of the state. Few historical occurrences have been reported in the region.

Erosion

Most historical occurrences of erosion are seen near the coast of North Carolina, but the Clay Macon Region is still susceptible to the hazard. Few historical occurrences have been reported in the region. The impact of erosion in the Clay Macon Region may often be limited to areas along water courses in the region. Vulnerability could be limited to any structures and infrastructure (roads, bridges, etc.) located closer to streambanks.

5.9.4 Changing Future Conditions

According to the North Carolina Climate Risk Assessment and Resilience Plan as of 2020, the number of landslides statewide is increasing due to more extreme rainfall events. As the global climate continues to change, both storm intensity and rainfall rates affecting North Carolina are projected to increase in tandem⁴². According to the USGS, pumping water and its associated drawdown of the water table are primary risk factors associated with sinkholes. The potential impacts of climate change could accelerate this dynamic as well. For example, altered rainfall patterns and increasing rates of evaporation due to higher temperatures can lead to a decrease in subsurface groundwater flow, resulting in changes in sinkhole formations. Decreased groundwater flow could lead to additional water pumping and related drawdowns near urban and industrial areas, capable of reducing water tables and contributing to the formation of new sinkholes⁴³.

5.9.5 Probability of Future Occurrences

Landslides

Based on historical information and the USGS incidence and susceptibility index, the probability of future landslide events is likely (10 to 100 percent annual probability). Local conditions may become more favorable for landslides due to factors such as heavy rain, which would increase the likelihood of occurrence. It should also be noted that some areas in the Clay Macon Region carry greater risks than others, given factors such as slope steepness and terrain modifications. As of 2025, the FEMA National Risk Index rates the landslide hazard as “relatively moderate” in Clay County and “relatively high” in Macon County.

Sinkholes

Sinkholes have also affected parts of North Carolina in recent history, but most of those impacts have been in the southeastern region of the state. While many sinkhole events have been relatively small, it remains possible (between 1 and 10 percent annual probability) that this region will continue to be affected in the future. Given the general lack of historical events, location, data, and threat to life or property, no further analysis will be done for this subhazard.

⁴² 2020 NC Climate Risk Assessment and Resilience Plan (<https://www.deq.nc.gov/energy-climate/climate-change/nc-climate-change-interagency-council/climate-change-clean-energy-plans-and-progress/nc-climate-risk-assessment-and-resilience-plan>)

⁴³ USGS Sinkholes (<https://www.usgs.gov/special-topics/water-science-school/science/sinkholes>)

Erosion

Erosion remains a natural, dynamic, and continuous process for the Clay Macon Region, and it will continue to occur. The annual probability level assigned for erosion is possible (between 1 and 10 percent). However, given the lack of historical events, location, data, and threat to life or property, no further analysis will be done for this subhazard.

5.10 DAM FAILURE

5.10.1 Background and Description

Worldwide interest in dam and levee safety has risen significantly in recent years. Aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation, and maintenance.

There are over 91,000 dams in the United States today, the majority of which are privately owned. Other owners include state and local authorities, public utilities, and federal agencies. The benefits of dams are numerous: they provide water for drinking, navigation, and agricultural irrigation. Dams also provide hydroelectric power, create lakes for fishing and recreation, and save lives by preventing or reducing floods.

Though dams have many benefits, they can also pose a risk to communities if not designed, operated, and maintained properly. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and great property damage if development exists downstream. If a levee breaks, scores of properties may become submerged in floodwaters, and residents may become trapped by rapidly rising water. The failure of dams and levees has the potential to place large numbers of people and great amounts of property in harm's way.

In accordance with High Hazard Potential Dam (HHPD) HHPD1-a. and HHPD1-b requirements, each local government has collected and shared relevant data such as dam inspection findings with State Dam Safety Program office of NCDEQ, and shared Emergency Action Plans (EAPs) and inundation maps where available. Potential impacts on critical infrastructure were communicated to HMPC members and the public, as they are included in potential future impacts to the planning area within the HMP drafts distributed for public comment and through public meeting and draft plan reviews.

The jurisdictions in the planning area are expected to continue assisting with and continue to maintain compliance with regulatory requirements in cooperation with private, utility, and local government dam owners. Maintaining compliance with regulatory requirements will reduce vulnerabilities and the planning area will continue to explore mitigation actions that address deficiencies and reduce the long-term vulnerabilities. This includes prioritizing dams classified as high hazard dams for potential dam rehabilitation projects to reduce the long-term vulnerability of the planning area. Some counties and municipalities within the South Mountains region have included mitigation actions to explore funding and dam rehabilitation projects to reduce long-term vulnerability of the planning area to dam failure or dam related hazard events, prioritizing some of the high hazard dams in the region.

5.10.2 Location and Spatial Extent

The North Carolina Department of Environmental Quality (NCDEQ) provides information on dams, including a hazard potential classification. There are three hazard classifications — high, intermediate, and low — that correspond to qualitative descriptions and quantitative guidelines. **Table 5.26** explains

these classifications.

TABLE 5.26: NORTH CAROLINA DAM HAZARD CLASSIFICATIONS

Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low-volume roads	Less than 25 vehicles per day
	Economic Damage	Less than \$30,000
Intermediate	Damage to highways, Interruption of service	25 to less than 250 vehicles per day
	Economic Damage	\$30,000 to less than \$200,000
High	Loss of human life*	Probable loss of 1 or more human lives
	Economic Damage	More than \$200,000
	*Probable loss of human life due to breached roadway or bridge on or below the dam	250 or more vehicles per day

Source: North Carolina Department of Environmental Quality (NCDEQ)

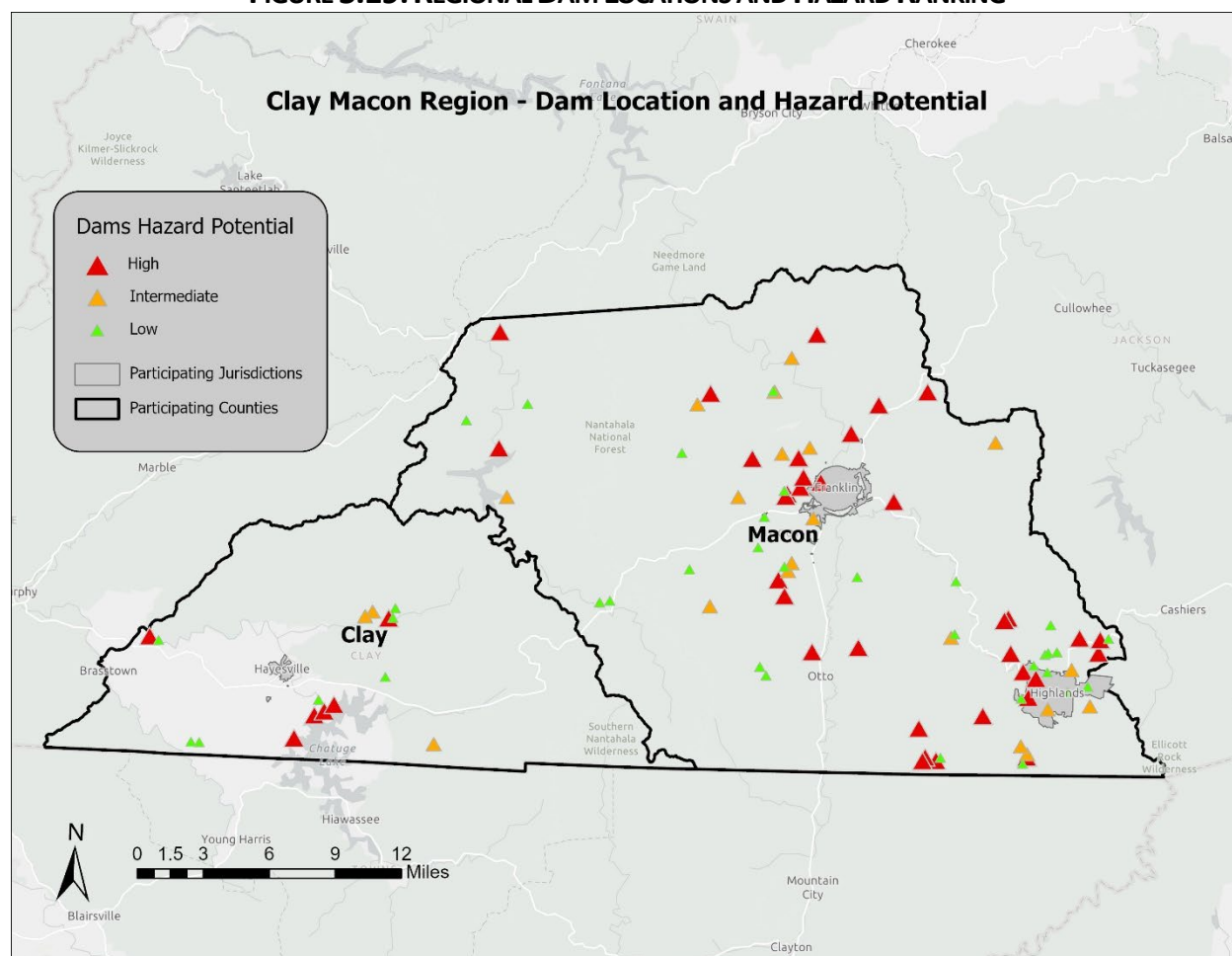
According to NCDEQ records, there are approximately 97 dams in the Clay Macon Region⁴⁴. **Figure 5.19** shows the dam locations and the corresponding hazard ranking for each. Of these dams, 40 are classified as high hazard potential. These high hazard dams are summarized by county in **Table 5.27**.

TABLE 5.27: SUMMARY OF REGIONAL HIGH HAZARD DAMS

Location	High Hazard Dams
Clay County	6
Hayesville	4
Unincorporated Area	2
Macon County	34
Franklin	8
Highlands	25
Unincorporated Area	1
Clay Macon Regional Total	40

Source: NCDEQ, July 2024

⁴⁴ The latest version of the North Carolina Dam Inventory was obtained as of July 2024.

FIGURE 5.19: REGIONAL DAM LOCATIONS AND HAZARD RANKING

Source: NCDEQ, July 2024

It should be noted that dam regulations for classifying dams were changed in recent history. As a result, generally, more dams are classified as high hazard.

5.10.3 Historical Occurrences

There have been at least two dam breaches reported in the Clay Macon Region, but there is no record of property damage, injuries, or fatalities associated with the events. However, it should be noted that several breach scenarios in the region could be catastrophic.

The information below identifies additional historical information reported in the previous hazard mitigation plans.

Clay County

There is no information provided on historical dam failure events in the previous hazard mitigation plan.

Macon County

There have been at least two dam breaches reported in Macon County: Echo Valley Pond Dam on Coon Creek and the Balfour Lake Lower Dam on Stephens Creek. There is no record of damage to property, deaths, or injuries due to dam failure in Macon County's recent history.

5.10.4 Changing Future Conditions

Changing climate and weather patterns may not affect dams as directly when compared to other hazards. However, a significant projected rise in various extreme weather events could affect dams negatively in the form of higher floodwaters, changing streamflow, structural damage, and other key risk factors. Dam failures present recurring dangers of widespread flooding, which would greatly impact the Clay Macon Region in a breach scenario. Recent events, such as the widespread devastation caused by Hurricane Helene in late 2024, have also renewed concerns about dam failure hazards across Western North Carolina due to the potential of greater stress on aging dam infrastructure.

5.10.5 Probability of Future Occurrence

Given the current dam inventory and historical data, a dam breach is considered unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events. No further analysis beyond information from the NCDEQ Dam Safety Program will be completed in **Section 6: Vulnerability Assessment**, as more sophisticated dam breach plans continue to be investigated and developed for regional dams of concern at the state and federal levels.

5.10.6 Cascading Impacts

In the context of high- and intermediate-hazard dams, cascading impacts refer to a chain reaction of different disasters. For example, a drought causes loss of vegetation that may cause additional stormwater runoff and erosion, leading to dam overtopping and/or silting. Due to a lack of available data and software modeling capabilities, the probability of the hazards identified in this plan having a cascading impact that results in a dam failure were not analyzed quantitatively. Cascading impacts are briefly discussed in the list below for each hazard this plan covers. The list identifies whether the planning committee and relevant literature judge a hazard unlikely to have a significant cascading impact on dams.

Drought: a prolonged drought can weaken a dam's foundation or cause cracks, potentially leading to structural failure when water levels rise again.

Excessive Heat: prolonged extreme heat can exacerbate structural weaknesses in dam components, increasing the risk of dam failure. This may lead to downstream flooding and severe water quality degradation, which can affect ecosystems and public health.

Hurricane and Coastal Hazards: hurricane winds can cause significant structural damage or increase water inflow from heavy rainfall, raising the risk of dam failure.

Tornadoes/Thunderstorms: tornadoes could damage a dam's infrastructure or surrounding vegetation but are less likely to cause a cascading impact that would directly cause dam failure. Thunderstorm winds alone are unlikely to cause cascading impacts that lead to dam failure, though associated heavy rain could increase the risk. Lightning strikes can disrupt dam monitoring systems and damage critical infrastructure, potentially impairing the ability to respond to emergencies and increasing the risk of an unmonitored or uncontrolled dam breach.

Severe Winter Weather: rapid snowmelt can lead to increased runoff, contributing to overtopping and potential dam failure. Ice buildup can block spillways or cause structural damage, increasing the

SECTION 5: HAZARD PROFILES

likelihood of overtopping or dam failure.

Earthquakes: earthquakes can weaken a dam's structural integrity or trigger landslides in the reservoir, increasing the risk of dam failure.

Landslides: a landslide into a reservoir can displace water, causing rapid increases in water levels and potentially overtopping the dam.

Flooding: river flooding can lead to increased water pressure on a dam, potentially causing overtopping or structural failure and creating a cascading impact.

Wildfires: wildfires can remove vegetation, increasing runoff and erosion, which may contribute to dam overtopping or silting, leading to potential failure.

5.11 FLOODING

5.11.1 Background and Description

Flooding is the most frequent and costly natural hazard in the United States and is a hazard that has caused more than 10,000 deaths since 1900. Nearly 90 percent of presidential disaster declarations result from natural events where flooding was a major component.

Floods generally result from excessive precipitation and can be classified under two categories: general floods, precipitation over a given river basin for a long period of time along with storm-induced wave action, and flash floods, the product of heavy localized precipitation in a short time period over a given location. The severity of a flooding event is typically determined by a combination of several major factors, including stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions, and the degree of vegetative clearing and impervious surface.

General floods are usually long-term events that may last for several days. The primary types of general flooding include riverine, coastal, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, and other large coastal storms. Urban flooding occurs where manmade development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff. Urban flooding and the stormwater management it requires pose significant challenges for critical facility operations, emergency response, transportation access, and utility services as developed areas continue to grow. In the event of road inundation, structural breaches, or mechanical failures due to floodwaters, the response times to many hazard events may take much longer than originally anticipated. **Growing needs for effective flood mitigation measures remain present across every regional municipality included in this plan.**

Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. However, flash flooding events may also occur from a dam or levee failure within minutes or hours of heavy amounts of rainfall or from a sudden release of water held by a retention basin or other stormwater control facility. Although flash flooding occurs most often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

The periodic flooding of lands adjacent to rivers, streams, and shorelines (land known as a floodplain) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence intervals.

Floodplain boundaries are designated and routinely updated through Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) reports and these revisions are then shown on Flood Insurance Rate Maps (FIRMs), according to various flood hazard zones. Flood hazard zone designations will depend upon local conditions and the date when the map was issued, but all will show the 100-year or base floodplain (1-percent annual chance), as well as areas of the 500-year floodplain (0.2-percent annual chance).

Floodplains are designated by the frequency of the flood that is large enough to cover them. For example,

the 10-year floodplain will be covered by the 10-year flood, and the 100-year floodplain by the 100-year flood. Flood frequencies, such as the 100-year flood, are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1 percent chance of occurring in any given year, and the 500-year flood has a 0.2 percent chance of occurring in any given year.

5.11.2 Location and Spatial Extent

There are areas in the Clay Macon Region that are susceptible to significant flooding events. Special flood hazard areas in the Clay Macon Region were mapped using Geographic Information Systems (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM)⁴⁵. This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevation), and Zone X (0.2- percent annual chance floodplain). According to GIS analysis, of the 740 square miles that make up the Clay Macon Region, there are approximately 24.4 square miles of land in zones A and AE (1-percent annual chance floodplain/100-year floodplain) and 0.72 square miles of land in shaded zone X (0.2-percent annual chance floodplain/500-year floodplain). The county totals are presented below in **Table 5.28**.

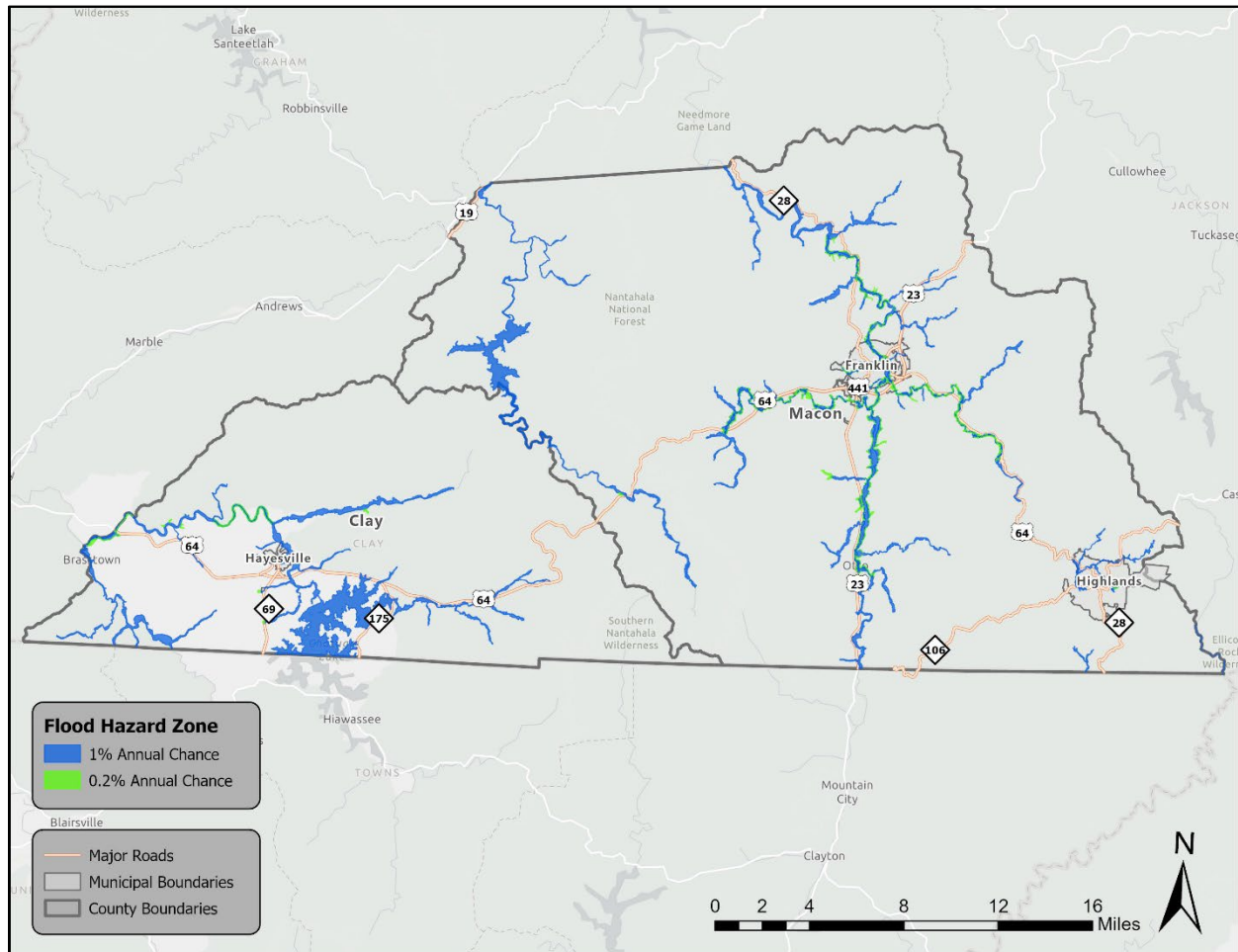
TABLE 5.28: SUMMARY OF REGIONAL FLOODPLAIN AREAS

Location	100-year flood area (square miles)	500-year flood area (square miles)
Clay County	11.1	0.3
Macon County	13.3	0.42
CLAY MACON REGION TOTAL	24.4	0.72

Source: FEMA DFIRM

These flood zone values account for approximately 3.5 percent of the total land area in the Clay Macon Region. It is important to note that while FEMA digital flood data is recognized as the best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. **Figure 5.20** illustrates the location and extent of currently mapped special flood hazard areas for the Clay Macon Region based on best available FEMA DFIRM data. **Additionally, more detailed county-level and jurisdiction-specific maps can be found in the plan appendices.**

⁴⁵ The county-level DFIRM data used for analysis were last updated in 2009 (Clay County) and 2010 (Macon County). Recent amendments made through the Letter of Map Revision (LOMR) process were updated in 2018 (Macon County).

FIGURE 5.20: REGIONAL SPECIAL FLOOD HAZARD AREAS

Source: Federal Emergency Management Agency

5.11.3 Historical Occurrences

Flooding has resulted in four major disaster declarations in the Clay Macon Region.⁴⁶ Information from the National Centers for Environmental Information (NCEI) was used to ascertain additional historical flood events. Data reported by NCEI includes a total of 48 events throughout the Clay Macon Region between January 1996 and April 2025⁴⁷. A summary of these events is presented in **Table 5.29**. These events have led to at least 1 death and over \$5 million in total unadjusted property damage throughout the region. Specific information on flood events for each county, including date, type of flooding, and event narratives, can be found in the plan appendices.

⁴⁶ Not all of the participating counties were declared disaster areas for these events. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Profiles*.

⁴⁷ These events are only inclusive of those reported by NCEI. It is likely that additional occurrences have occurred and have gone unreported.

TABLE 5.29: SUMMARY OF REGIONAL FLOOD OCCURRENCES

Location	Number of Occurrences	Injuries	Deaths	Property Damage	Crop Damage
Clay County	10	0	0	\$954,000	\$0
Hayesville	3	0	0	\$0	\$0
Unincorporated Area	7	0	0	\$954,000	\$0
Macon County	38	0	1	\$4,921,000	\$1,050,000
Franklin	7	0	0	\$300,500	\$0
Highlands	3	0	0	\$3,000	\$0
Unincorporated Area	24	0	1	\$4,617,500	\$1,050,000
Clay Macon Regional Total	48	0	1	\$5,875,000	\$1,050,000

Source: National Centers for Environmental Information (April 2025)

5.11.4 Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of June 2025, there have been approximately 72 flood losses reported in the Clay Macon Region through the National Flood Insurance Program (NFIP) since 1978, totaling over \$2 million in claims payments. A summary of these figures for each municipality in the Clay Macon Region is provided in **Table 5.30**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in the Clay Macon Region were either uninsured, denied claims payment, or not reported.

TABLE 5.30: SUMMARY OF REGIONAL INSURED FLOOD LOSSES

Location	Number of Policies	Flood Losses	Claims Payments
Clay County	35	35	\$141,226
Hayesville	0	0	\$0
Unincorporated Area	35	35	\$141,226
Macon County	79	79	\$1,968,752
Franklin	3	3	\$68,437
Highlands*	--	--	--
Unincorporated Area	76	76	\$1,900,315
Clay Macon Regional Total	114	114	\$2,109,978

Source: Federal Emergency Management Agency, National Flood Insurance Program (June 2025)

5.11.5 Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP.

As of December 2024 records, there are approximately 8 repetitive loss properties in the Clay Macon Region, which accounted for 20 total losses. All properties in Clay County are residential, and no properties are considered mitigated. All properties in Macon County are residential, and no properties are considered mitigated. Without additional mitigation measures, these properties will likely continue to experience flood losses. **Table 5.31** presents a summary of these figures for the Clay Macon Region.

TABLE 5.31: SUMMARY OF REGIONAL REPETITIVE LOSS PROPERTIES

Location	Number of Properties	Number of Losses
Clay County	2	5
Hayesville	1	3
Unincorporated Area	1	2
Macon County	6	15
Franklin	4	11
Highlands	1	2
Unincorporated Area	1	2
Clay Macon Regional Total	8	20

Source: National Flood Insurance Program (Dec 2024)

5.11.6 Changing Future Conditions

An increasingly changing climate translates to new weather patterns, stronger storms, and significant shifts in rainfall, which can all exacerbate flood risks across different regions. The 2020 North Carolina Climate Science Report notes a recent upward trend in heavy rainfall events (3 inches or more per day), with the years 2015-2018 showing the greatest number of such events since 1900. A warmer atmosphere also contributes to increased evaporation and greater water availability when it rains. Current projections in the report indicate it is likely that annual total precipitation in North Carolina will increase, and very likely that extreme precipitation frequency and intensity will increase due to related increases in atmospheric water vapor content. Additionally, greater intensity and frequency of flooding could also present a variety of extreme public health and emergency management challenges.

5.11.7 Probability of Future Occurrences

Flood events will remain a threat in the Clay Macon Region, and the probability of future occurrences will remain likely (between 10 and 100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figures above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). As of 2025, the FEMA National Risk Index rates the inland flooding hazard as “relatively low” in both counties.

5.12 WILDFIRES

5.12.1 Background and Description

A wildfire is any outdoor fire (e.g., grassland, forest, brushland) that is not under control, supervised, or prescribed⁴⁸. Wildfires are part of the natural management of forest ecosystems, but may also be caused by human factors. Nationally, over 80 percent of forest fires are started by negligent human behavior, such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause of wildfire is lightning. In North Carolina, a majority of fires are caused by debris burning.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildfires are usually signaled by dense smoke that fills the area for miles around.

Wildfire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural hazards (such as tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings.

Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high wildfire hazard areas. Furthermore, the increasing demand for outdoor recreation places more people in wildlands during holidays, weekends, and vacation periods. Unfortunately, wildland residents and visitors are rarely educated or prepared for wildfire events that can sweep through the brush and timber and destroy property within minutes.

Wildfires can result in severe economic losses as well. Businesses that depend on timber, such as paper mills and lumber companies, experience losses that are often passed along to consumers through higher prices, and sometimes jobs are lost. The high cost of responding to and recovering from wildfires can deplete state resources and increase insurance rates. The economic impact of wildfires can also be felt in the tourism industry if roads and tourist attractions are closed due to health and safety concerns.

State and local governments can impose fire safety regulations on home sites and developments to help curb wildfires. Land treatment measures such as fire access roads, water storage, helipads, safety zones, buffers, firebreaks, fuel breaks, and fuel management can be designed as part of an overall fire defense system to aid in fire control. Fuel management, prescribed burning, and cooperative land management planning can also be encouraged to reduce fire hazards.

5.12.2 Location and Spatial Extent

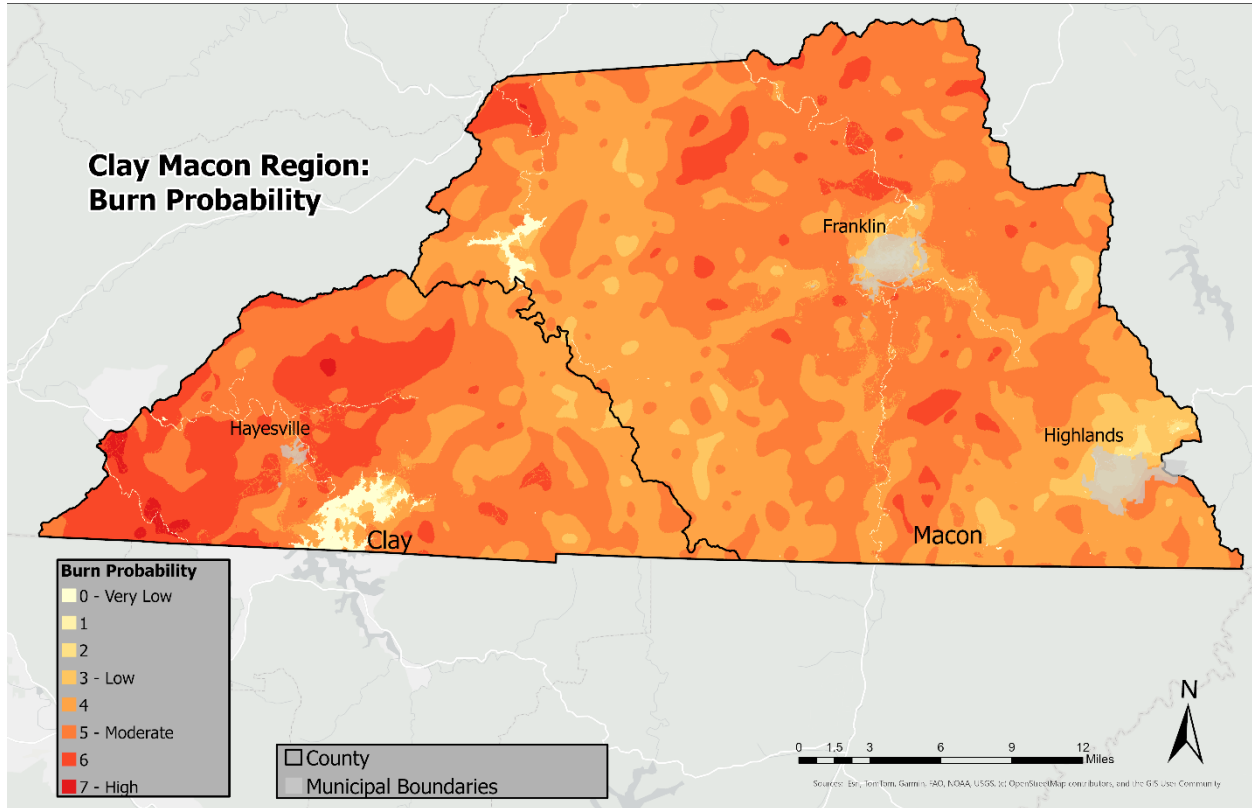
The entire region is at risk of a wildfire occurrence. However, several factors, such as drought conditions or high levels of fuel on the forest floor, may make wildfire more likely. Furthermore, areas in the wildland-urban interface (WUI) are particularly susceptible to fire hazard as populations border formerly undeveloped areas.

Figure 5.21 shows the burn probability for each county in the Clay Macon Region based on data from the

⁴⁸ Prescription burning, or “controlled burn,” undertaken by land management agencies is the process of igniting fires under selected conditions, in accordance with strict parameters.

Southern Wildfire Risk Assessment (SWRA). This data represents the likelihood of an area burning based on landscape conditions, percentile weather, historical ignition patterns, and historical fire suppression efforts. **Additionally, more detailed county-level and jurisdiction-specific maps can be found in the plan appendices.**

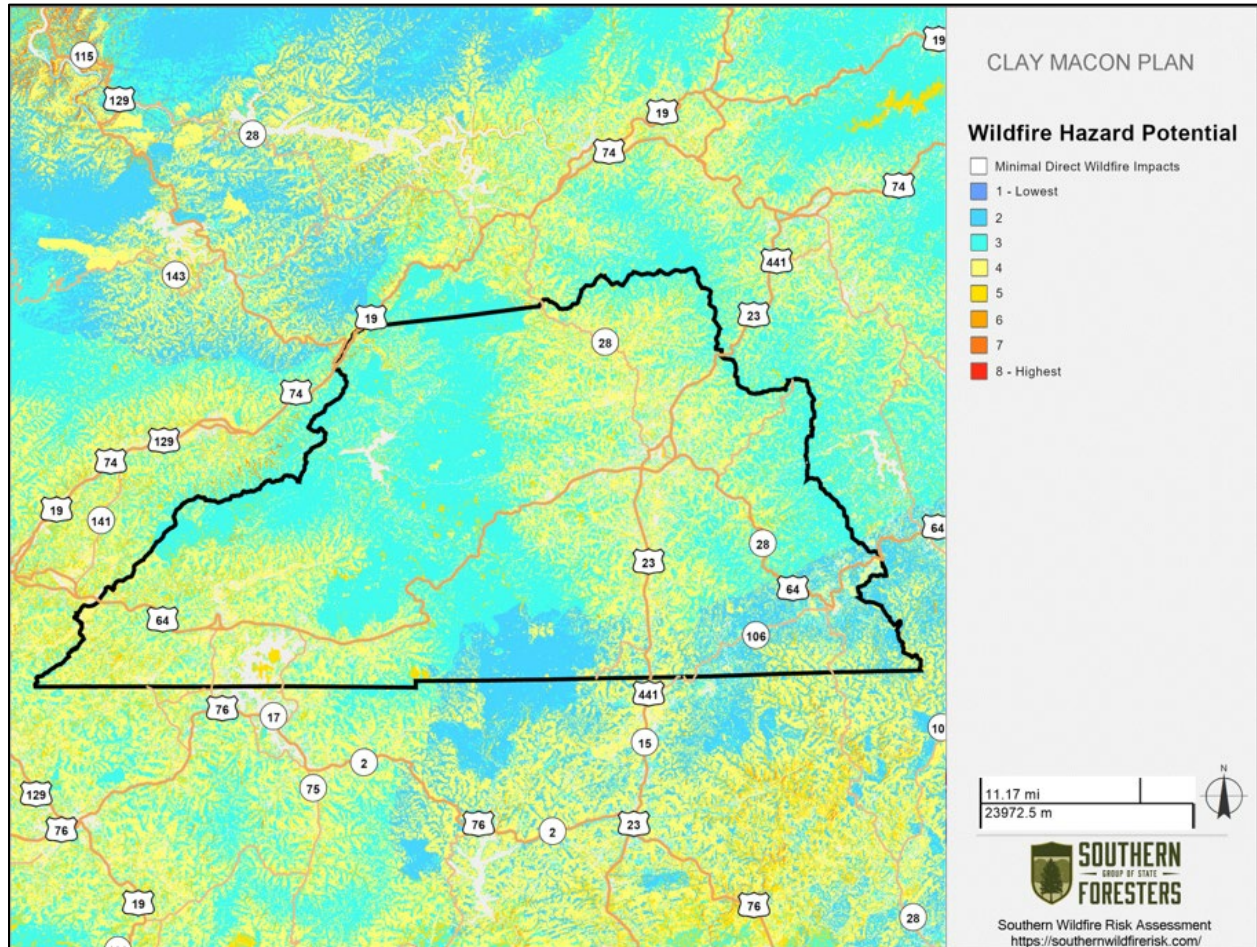
FIGURE 5.21: REGIONAL BURN PROBABILITY



Source: Southern Wildfire Risk Assessment

Figure 5.22 shows the wildfire hazard potential (WHP) for each county in the Clay Macon Region based on data from the Southern Wildfire Risk Assessment (SWRA). This data helps to inform evaluations of wildfire hazard or prioritization of fuels management needs across very large landscapes. Jurisdiction-specific maps related to this data are included in the plan appendices.

FIGURE 5.22: REGIONAL WILDFIRE HAZARD POTENTIAL (WHP)

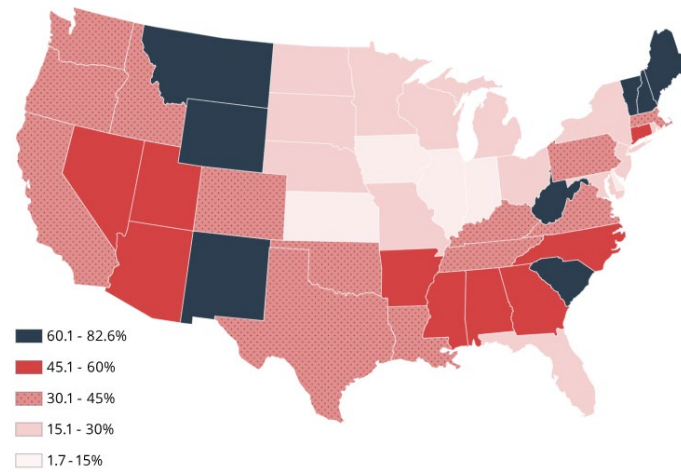


Source: Southern Wildfire Risk Assessment

Every state also has a Wildland-Urban Interface (WUI), which is an area of significance for potential wildfire impacts on people and their homes. The WUI is not a fixed geographical location, but rather a combination of human development and vegetation where wildfires have the greatest potential to result in negative impacts. Nationally, one-third of all homes lie in the WUI, which is a growing danger. **Figure 5.23** below shows a comparative map of each state's WUI. Based on the data from the U.S. Forest Service, approximately 45.1-60% of homes in North Carolina lie within the WUI.

FIGURE 5.23: PERCENT OF TOTAL HOMES IN THE WILDLAND URBAN INTERFACE

Number of houses in the WUI relative to the total houses in the state*
(%)

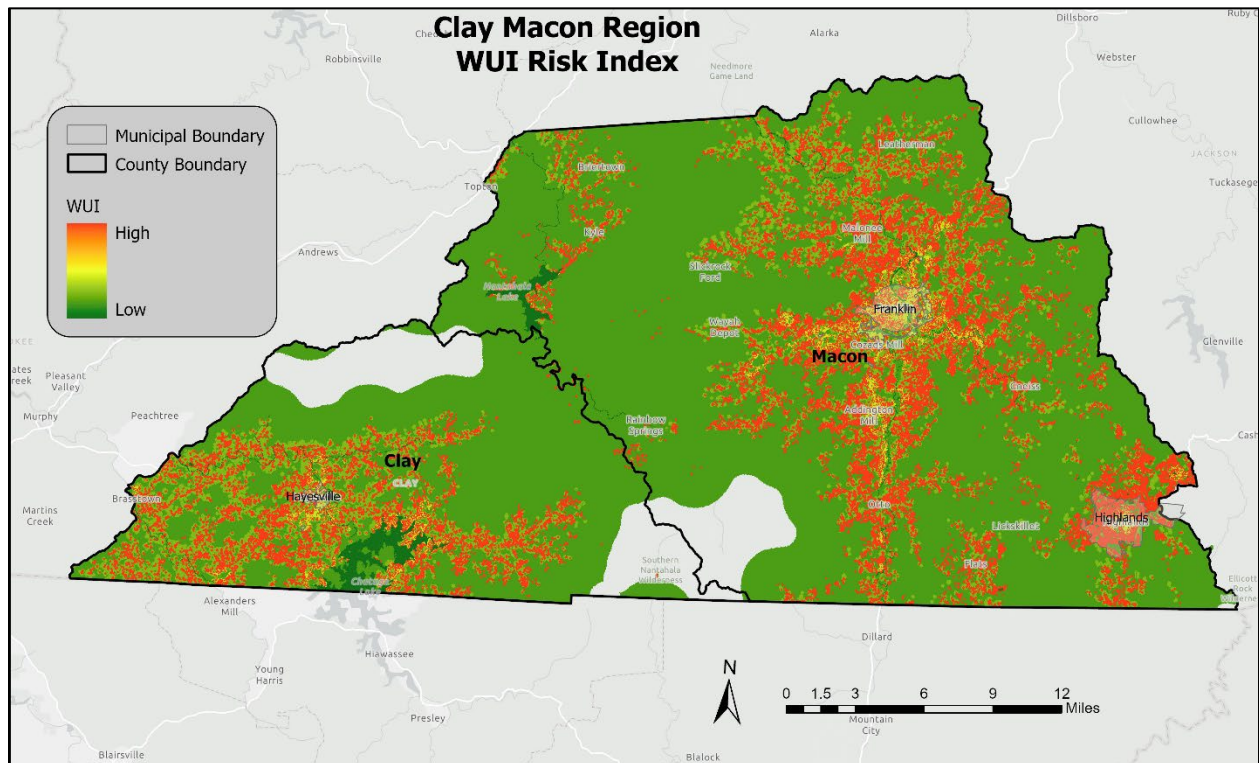


*For states in the conterminous United States.

Source: U.S. Forest Service

Below, **Figure 5.24** displays the WUI Risk Index for the counties in the Clay Macon Region.

FIGURE 5.24: REGIONAL WUI RISK INDEX



Source: Southern Wildfire Risk Assessment

5.12.3 Historical Occurrences

Information from the National Association of State Foresters (NASF) was used to ascertain historical wildfire events. The NASF has previously reported that a total of 375 events, impacting an area greater than 1 acre, have occurred throughout the Clay Macon Region between 2001 and 2018⁴⁹. A summary of these events is presented in **Table 5.32**. The largest of these events was the Boteler Fire, which occurred in Clay County in 2016 and impacted 9,036 acres.

TABLE 5.32: SUMMARY OF REGIONAL WILDFIRE INCIDENTS (2001-2018)

Location	Number of Wildfires	Total Acres Burned
Clay County	144	10,233
Hayesville	0	0
Unincorporated Area	144	10,233
Macon County	231	27,632
Franklin	1	7
Highlands	1	100
Unincorporated Area	229	27,525
Clay Macon Regional Total	375	37,865

Source: National Association of State Foresters

There is limited narrative information on historical wildfires impacting the Clay Macon Region among various sources reviewed (e.g., NCFS resources, NCEI Storm Events Database, and the NC State Hazard Mitigation Plan).

Clay County

While NCEI did not report any narrative events for wildfires in Clay County, there have been significant wildfires that have occurred in the region. Because of the frequency of drought conditions, as discussed in *Section 5.3* above, and high wind occurrences, wildfires in the region are frequent and extensive. In 2016, a major fire along the Appalachian Trail, referred to as the Boteler Fire, broke out and burned over 9,000 acres. Fire crews worked to contain the fire, but winds gusting up to 35 mph presented a challenge in controlling the blaze, which scorched large acres of woods and damaged roadways.

Macon County

Macon County also reported a major wildfire in 2016, which was related to the ongoing wildfires across the highlands that year. The Camp Branch Fire, which burned over 2,200 acres of woodland, worked its way along the Appalachian Trail as well. This fire put some structures along Forest Road 69 and the Bear Cove area at risk. The Tellico Fire, also in 2016, started in Swain County but burned over 14,000 acres, most of which were in Macon County.

The primary causes of historic wildfires in the Clay Macon Region have stemmed from debris burning (38%) and incendiary causes (20%), but they are generally smaller fires that are controlled before causing major damage.

5.12.4 Changing Future Conditions

According to the 2020 North Carolina Forest Action Plan, the state has experienced 41,551 wildfires burning a combined total of over 399,125 acres since 2010. The cost of wildfire response, WUI acreage,

⁴⁹ These events are only inclusive of those reported by NASFI. It is likely that additional occurrences have occurred and have gone unreported.

fuel loading related to fire exclusion, plant mortality, and climate change stressors are all increasing in the context of growing wildfire risks⁵⁰.

Although wildfires occur naturally and play a long-term role in the health of ecosystems, changing wildfire and climate patterns threaten to upset the status quo conditions of future seasons. The wildfire season has lengthened in many areas due to factors including warmer springs, longer summer dry seasons, and drier soils and vegetation. For instance, according to the USDA Forest Service, during the 2016 fire season, 320 (100+ acre) large fires burned more than 325,000 acres of forestland across the Southeast from October to December. Of increasing concern is the threat wildfires pose to homes and lives throughout North Carolina. Recent events, such as the widespread devastation caused by Hurricane Helene in late 2024, have also raised concerns about higher wildfire risk created by larger fuel loads of debris and vegetation scattered throughout counties in Western North Carolina.

5.12.5 Probability of Future Occurrences

Wildfire events will be an ongoing occurrence in the Clay Macon Region. The likelihood of wildfires increases during drought cycles and abnormally dry conditions. As a result of Hurricane Helene, there are significant amounts of fuel in the form of downed trees across the entire region. Fires are likely to stay small in size but could increase due to the local climate and ground conditions. Dry, windy conditions with an accumulation of forested fuels (due to droughts, ice storms, or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in overall risk. For example, highly developed areas are less susceptible unless they are located near the wildland-urban interface (WUI) boundary. Risk may also vary due to community assets and procedures. Areas in the WUI will typically have much more property at risk, resulting in increased vulnerability and increasing needs to mitigate, compared to rural, mainly forested areas. The probability assigned to the Clay Macon Region for future wildfire events is likely (10 to 100 percent annual probability). As of 2025, the FEMA National Risk Index rates the wildfire hazard as “relatively low” in Clay County and “very low” in Macon County.

⁵⁰ 2020 North Carolina Forest Action Plan (<https://www.stateforesters.org/districts/north-carolina/>)

5.13 INFECTIOUS DISEASE

5.13.1 Background and Description

For the purposes of this plan, this section will assess infectious diseases, vector-borne diseases, and foreign animal diseases (FADs) within the Clay Macon Region.

Infectious Disease

Communicable, or infectious, diseases are conditions that result in clinically evident illnesses that are transmissible directly from one person to another or indirectly through vectors such as insects, air, water, blood, or other objects. The impact of communicable disease can range from the mild effects of the common cold to the extreme lethality of pneumonic plague or anthrax. The public health system in the United States was developed in large part as a response to the often urgent need to respond to or prevent outbreaks of communicable diseases. Through public health methods of disease reporting, vaccinations, vector control, and effective treatments, most communicable diseases are well controlled in the United States and across the Clay Macon region. However, control systems can fail, and when people come together from locations outside of the state, outbreaks can occur, even in the most modern of communities. In this section, some of the more significant potential communicable disease concerns are described.

The threats discussed in this section usually do not occur on a regular basis, though some are more frequent. The diseases described herein do not originate from intentional exposure (such as through terrorist actions) but do present significant issues and concerns for the public health community. There are numerous infectious diseases that rarely, if ever, occur in the State of North Carolina, such as botulism or bubonic plague. Some highly dangerous diseases, which could potentially be used as biological weapons, such as anthrax, pneumonic plague, and smallpox, are safely housed and controlled in laboratory settings, such as at the Centers for Disease Control and Prevention (CDC). Other diseases have not (yet) mutated into a form that can infect humans or otherwise lie dormant in nature.

There have been several significant viral outbreaks from emerging diseases in recent years of both national and international importance. The Zika virus and West Nile virus are viruses that are typically passed to humans or animals by mosquitoes and made major news as emergent disease threats. Meanwhile, diseases that are spread directly between human beings, such as Severe Acute Respiratory Syndrome (SARS) and Ebola, have also been identified as serious threats. While each of these conditions caused a great deal of public health concern when they were first identified, SARS has virtually disappeared, West Nile virus occurs with low frequency and causes serious disease in only a very small percentage of cases, Ebola has been more or less contained, and a vaccine is in development, and many people infected with Zika will not experience symptoms from the disease.

Other communicable diseases pose a much more frequent threat to the citizens of the region. Some of the infectious diseases of greatest concern include influenza, particularly in a pandemic form, as well as norovirus and multiple antibiotic-resistant tuberculosis. Even in one of its normal year-to-year variants, influenza (commonly referred to as “flu”) can result in serious illness and even death in young children, the elderly, and immunocompromised persons. But there is always the potential risk of the emergence of influenza in one of the pandemic H1N1 forms, such as in the “Spanish Flu” outbreak of 1918-19, which killed over 50 million people worldwide. Every year, North Carolina sees hundreds of cases of influenza, leading to hundreds of hours of lost productivity in businesses due to sick employees. Of note, a vaccine for influenza is produced every year and, according to the CDC, is highly effective in preventing the disease.

Norovirus is recognized as the leading cause of foodborne disease outbreaks in the United States. The virus can cause diarrhea, vomiting, and stomach pain, and is easily spread from person to person through contaminated food or water and by surface-to-surface contact. Especially vulnerable populations to this virus include those living or staying in nursing homes, assisted living facilities, and other healthcare facilities such as hospitals. Norovirus could also be a threat in the event of large public gatherings such as sporting events, concerts, festivals, and so forth. North Carolina often experiences norovirus outbreaks on an annual basis. No vaccine or treatment exists for the Norovirus, making it especially dangerous for the public in the event of an outbreak.

Vector-Borne Diseases

Bacterial, viral, and parasitic diseases that are transmitted by mosquitoes, ticks, and fleas are collectively called "vector-borne diseases" (the insects and arthropods are the "vectors" that carry the diseases). Although the term "vector" can also apply to other carriers of disease — such as mammals that can transmit rabies or rodents that can transmit hantavirus — those diseases are generally called zoonotic (animal-borne) diseases.

The most common vector-borne diseases found in North Carolina and the Clay Macon Region are carried by ticks and mosquitoes. The tick-borne illnesses most often seen in the state are Rocky Mountain Spotted Fever, ehrlichiosis, Lyme disease, and Southern Tick-Associated Rash Illness (STARI). The most frequent mosquito-borne illnesses, or "arboviruses," in North Carolina include La Crosse encephalitis, West Nile virus, and Eastern equine encephalitis. An outbreak of the West Nile Virus began showing up in the United States in 1999, with North Carolina reporting 63 cases from that time through the end of 2016.

Foreign Animal Diseases

As defined in the 2023 State Hazard Mitigation Plan, Foreign Animal Disease (FAD) is recognized as an animal disease or pest not known to exist in a country of interest (e.g., United States) or any of its associated territories. A FAD in the United States, and specifically North Carolina, could prove to be extremely detrimental to agricultural producers and public health if it manages to spread over a large area. The North Carolina Department of Agriculture and Consumer Services (NCDA&CS) is designated to lead a statewide response in the event of a potential FAD outbreak. There are several diseases of future clinical significance in North Carolina: African swine fever, Dourine, contagious bovine pleuropneumonia (CBPP), foot and mouth disease (FMD), highly pathogenic avian influenza (HPAI), and Glanders, among other emerging pathogens.

Public health threats can occur at any time and can have varying impacts. Discussions between public health professionals, planning officials, and first response agencies are essential in order to facilitate safe, effective, and collaborative efforts during outbreaks.

5.13.2 Location and Spatial Extent

Extent is difficult to measure for an infectious disease event, as the extent is largely dependent on the type of disease and on the effect that it has on the population (discussed above). Extent can be somewhat defined by the number of people impacted, which, depending on the type of disease, could number in the tens of thousands within the state.

5.13.3 Historical Occurrences

Infectious Disease

Influenza is historically the most common infectious disease that has occurred in the Clay Macon Region. Cases of the flu tend to occur in the late fall and early winter months. In recent years, substantial cases of influenza and influenza-like illnesses have been reported in hospitals. According to the North Carolina Department of Health and Human Services (NCDHHS), there were over 40,000 positive tests and 542 influenza-associated deaths during the 2024-2025 respiratory season, compared to lower rates of RSV and COVID-19 versus the previous season⁵¹. The Clay Macon Region is part of Flu Surveillance Region 6 (see regional map in NCDHHS annual surveillance summaries) in the state.

Information from the North Carolina Department of Health and Human services was used to monitor and track cases of the infectious disease COVID-19. A disaster declaration for the COVID-19 Pandemic was declared for North Carolina on March 24, 2020. **Table 5.33** provides a summary of confirmed cases of COVID-19 in the Clay Macon Region as of May 10, 2023. The COVID-19 pandemic is technically still ongoing in certain regions of the world as of the final version of this plan update. Statistics may be amended as additional data becomes available.

TABLE 5.33: SUMMARY OF REGIONAL CONFIRMED COVID-19 CASES

Location	Number of Cases	Number of Deaths*
Clay County	894	4
Macon County	1,937	16
Clay Macon Region Total	2,831	20

Source: North Carolina Department of Health and Human Services

* Deaths reflect deaths in persons with laboratory-confirmed COVID-19 as reported by local health departments to NCDHHS

As of May 10, 2023, NCDHHS reported a statewide total of 3,501,404 cases of COVID-19 and 29,059 COVID-related deaths in North Carolina⁵². These cases reflect those that were tested and returned positive from monitoring institutions such as the NC State Laboratory of Public Health, hospitals, and commercial labs.

Vector-Borne Diseases

In 2016, North Carolina state health officials encouraged citizens to take preventative measures against mosquito bites to avoid contracting the Zika virus. \$477,500 was allocated from the Governor’s yearly budget to develop an infrastructure to detect, prevent, control, and respond to the Zika virus and other vector-borne illnesses. More recently, state officials have encouraged citizens to “Fight the Bite” against both mosquito and tick bites to avoid serious vector-borne diseases after nearly 700 cases were reported in 2022⁵³.

Foreign Animal Diseases

No significant cases have been reported in the region.

5.13.4 Changing Future Conditions

According to the Centers for Disease Control and Prevention (CDC), volatile climate trends of milder winters, warmer summers, and fewer days of frost make it easier for infectious diseases and vector-borne diseases to expand to new geographic areas and infect more people. Between 2004 and 2018, the

⁵¹ NCDHHS Respiratory Disease Surveillance Summaries (<https://flu.ncdhhs.gov/data.htm>)

⁵² NCDHHS Covid-19 Cases (<https://www.ncdhhs.gov/covid-19-case-count-nc#by-counties>)

⁵³ NCDHHS Press Release, March 2023 (<https://www.ncdhhs.gov/news/press-releases/2023/03/30/ncdhhs-urges-north-carolinians-fight-bite-insect-repellant-and-other-prevention-tools-avoid-tick-and>)

number of reported illnesses from mosquito, tick, and flea bites more than doubled, with more than 760,000 cases reported in the United States. Additionally, nine new germs spread by mosquitoes and ticks were discovered or introduced into the United States during this time. In 2012, a mild winter, early spring, and a hot summer also set the stage for an outbreak of West Nile Virus disease in the United States, resulting in more than 5,600 illnesses and 286 deaths⁵⁴.

5.13.5 Probability of Future Occurrence

It is difficult to predict the future probability of infectious diseases due to the difficulty in obtaining information on this type of hazard. The most common and probable disease in the state is typically strains of influenza; however, based on historical data, it is possible (between 1 and 10 percent annual probability) that the Clay Macon Region will experience an outbreak of additional infectious diseases in the future.

⁵⁴ CDC National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) (<https://www.cdc.gov/ncezid/index.html>)

Technological Hazards

5.14 HAZARDOUS SUBSTANCES

5.14.1 Background and Description

Hazardous materials can be found in many forms and quantities that can potentially cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property in varying degrees. Such materials are routinely used and stored in many homes and businesses and are also shipped daily on the nation's highways, railroads, waterways, and pipelines. This subsection on the hazardous material hazard is intended to provide a general overview of the hazard, and the threshold for identifying fixed and mobile sources of hazardous materials is limited to general information on rail, highway, and FEMA-identified fixed HAZMAT sites determined to be of greatest significance, as appropriate for the purposes of this plan.

Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways, and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 are railroad incidents, and 266 are due to other causes⁵⁵. In essence, HAZMAT incidents consist of solid, liquid, and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design, as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can accumulate beyond the initial incident area by persons, vehicles, water, wind, and possibly wildlife as well.

HAZMAT incidents can also occur because of or in tandem with natural hazard events, such as floods, hurricanes, tornadoes, and earthquakes, which, in addition to causing incidents, can also hinder response efforts. In the case of Hurricane Floyd in September 1999, communities along the Eastern United States were faced with flooded junkyards, disturbed cemeteries, deceased livestock, floating propane tanks, uncontrolled fertilizer spills, and a variety of other environmental pollutants that caused widespread toxicological concerns. Potential widespread contamination of watersheds, habitats, and other sensitive environmental areas remains a pressing issue following a hazardous substances incident.

Hazardous material incidents can include the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous material, but exclude: (1) any release which results in exposure to poisons solely within the workplace with respect to claims which such persons may assert against the employer of such persons; (2) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel or pipeline pumping station engine; (3) release of source, byproduct, or special nuclear material from a nuclear incident; and (4) the normal application of fertilizer.

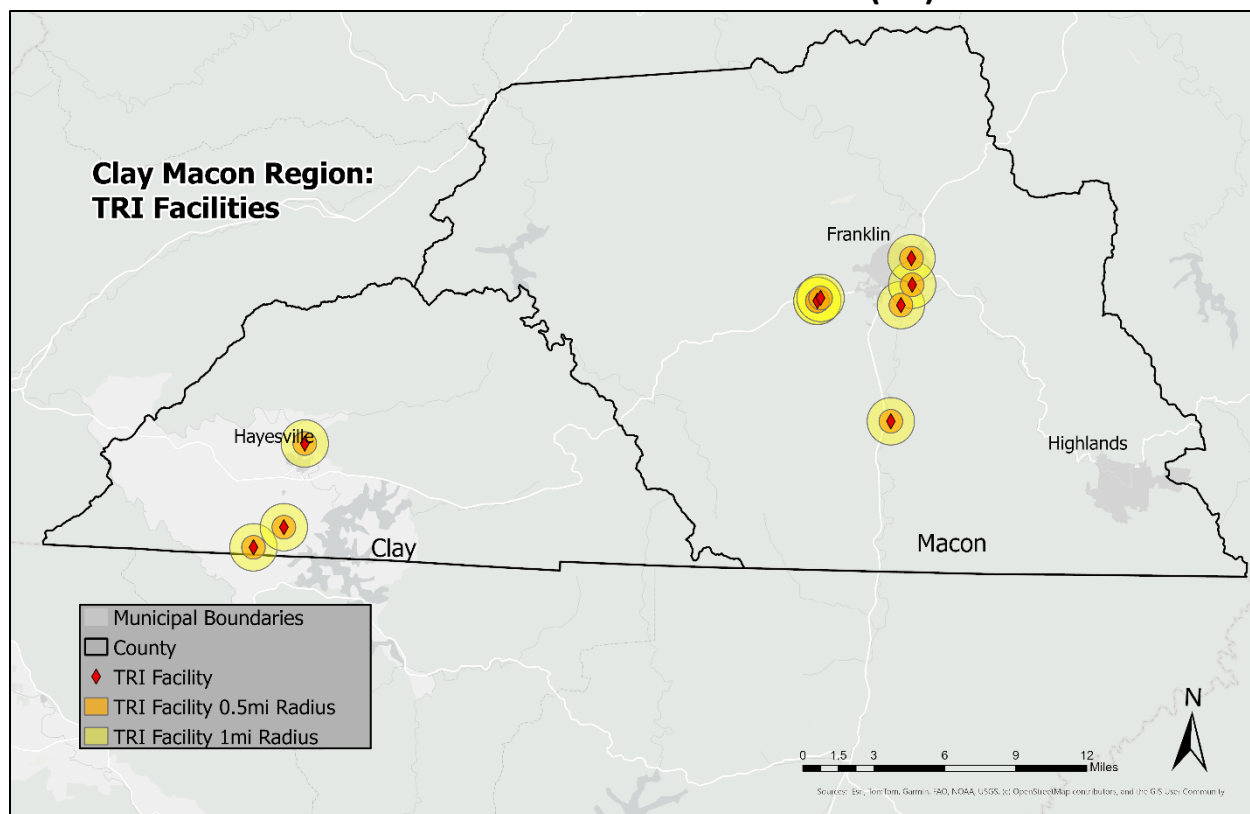
5.14.2 Location and Spatial Extent

As a result of the 1986 Emergency Planning and Community Right to Know Act (EPCRA), the U.S. Environmental Protection Agency provides public information on hazardous materials. One facet of this program is to collect information from industrial facilities on the releases and transfers of certain toxic agents. This information is then reported in the Toxic Release Inventory (TRI). TRI sites indicate where

⁵⁵ FEMA, 1997.

such activity occurs. The Clay Macon Region has approximately 9 TRI sites. These sites are shown below in **Figure 5.25**.

FIGURE 5.25: REGIONAL TOXIC RELEASE INVENTORY (TRI) SITES



Source: Environmental Protection Agency

In addition to “fixed” hazardous materials locations, hazardous materials may also impact the region via roadways and rail. Many roads in the region are narrow and winding, making hazardous material transport in the area especially treacherous. All roads that permit hazardous material transport are considered potentially at risk of an incident.

5.14.3 Historical Occurrences

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) lists historical occurrences throughout the nation. A “serious incident” is a hazardous materials incident that involves:

- ◆ a fatality or major injury caused by the release of hazardous material,
- ◆ the evacuation of 25 or more people due to the release of a hazardous material or exposure to fire,
- ◆ a release or exposure to fire which results in the closure of a major transportation artery,
- ◆ the alteration of an aircraft flight plan or operation,
- ◆ the release of radioactive materials from Type B packaging,
- ◆ the release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant, or
- ◆ the release of a bulk quantity (over 199 gallons or 882 pounds) of a hazardous material

However, before 2002, a hazardous material “serious incident” was defined as follows:

- ◆ a fatality or major injury due to hazardous material,
- ◆ closure of a major transportation artery or facility or evacuation of six or more people due to the presence of hazardous material, or
- ◆ a vehicle accident or derailment resulting in the release of hazardous material

Table 5.34 summarizes the HAZMAT incidents as reported in the Clay Macon Region.

TABLE 5.34: SUMMARY OF REGIONAL HAZMAT INCIDENTS

Location	Incidents Reported	Injuries	Deaths	Incident Costs
Clay County	0	0	0	\$0
Hayesville	0	0	0	\$0
Unincorporated Area	0	0	0	\$0
Macon County	9	0	0	\$0
Franklin	6	0	0	\$8,040
Highlands	0	0	0	\$0
Unincorporated Area	3	0	0	\$172,550
Clay Macon Regional Total	9	0	0	\$180,590

Source: U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA)

5.14.4 Changing Future Conditions

As the population of the Clay Macon Region continues to grow, more people could become increasingly vulnerable to incidents involving hazardous substances. Therefore, it is important to monitor all transportation routes and continue to prevent incidents through ongoing preparedness, monitoring, and training. Unlike other hazards discussed in this plan, climate change is unlikely to affect the occurrence or frequency of future hazardous substance events.

5.14.5 Probability of Future Occurrence

Given the location of roughly 9 TRI sites in the Clay Macon Region and serious HAZMAT incidents, a hazardous substances incident is considered possible (between 1 and 10 percent annual probability). Local officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

5.15 RADIOLOGICAL EMERGENCY

5.15.1 Background and Description

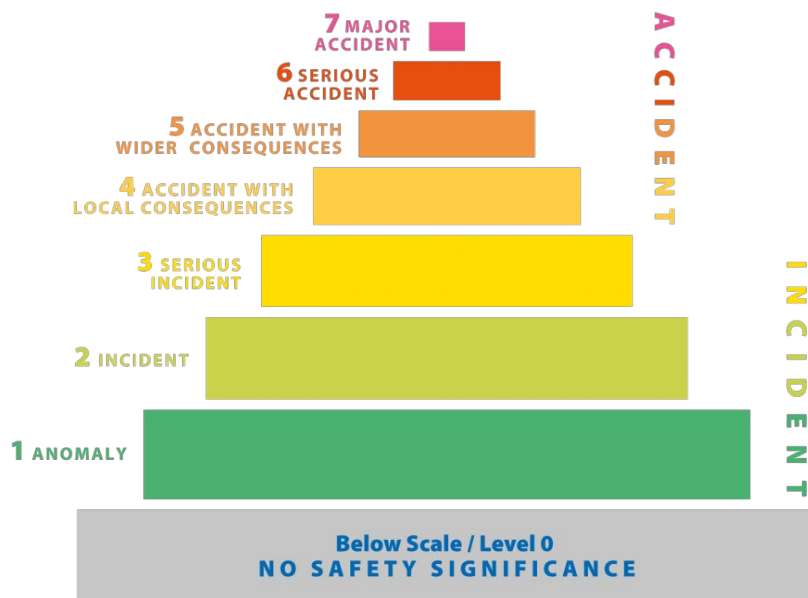
A nuclear or radiological emergency is defined by the International Atomic Energy Agency (IAEA) as “an event that has led to significant consequences to people, the environment, or the facility.” Oftentimes, this type of incident results from damage to the reactor core of a nuclear power plant, which can release radioactivity into the environment. The degree of exposure from nuclear accidents has varied from serious to catastrophic. While radiological emergencies are generally a rare occurrence, many incidents are extremely well known due to their large-scale impact and serious effects on people and the environment.

5.15.2 Location and Spatial Extent

The Clay Macon Region remains at risk of a potential nuclear incident. However, areas in the southern part of the region may be more susceptible due to their proximity to the Oconee Nuclear Station. The Oconee Nuclear Station, which is the plant located closest to the Clay Macon Region, is located on Lake Keowee near Seneca, South Carolina, and has an energy output capacity of over 2,500 megawatts. It began operation in 1973 and is currently operating under a renewed license until 2033. With three nuclear stations, it is one of the nation’s largest nuclear plants. The plant operates with a very high level of security.

The International Atomic Energy Agency (IAEA) has developed a scale called the International Nuclear and Radiological Event Scale (INES), which provides a quantitative means of assessing the extent of a nuclear event. This scale, as the MMI used for earthquakes, is logarithmic, which means that each increasing level on the scale represents an event 10 times more severe than the previous level (**Figure 5.26**).

FIGURE 5.26: INTERNATIONAL NUCLEAR EVENT SCALE



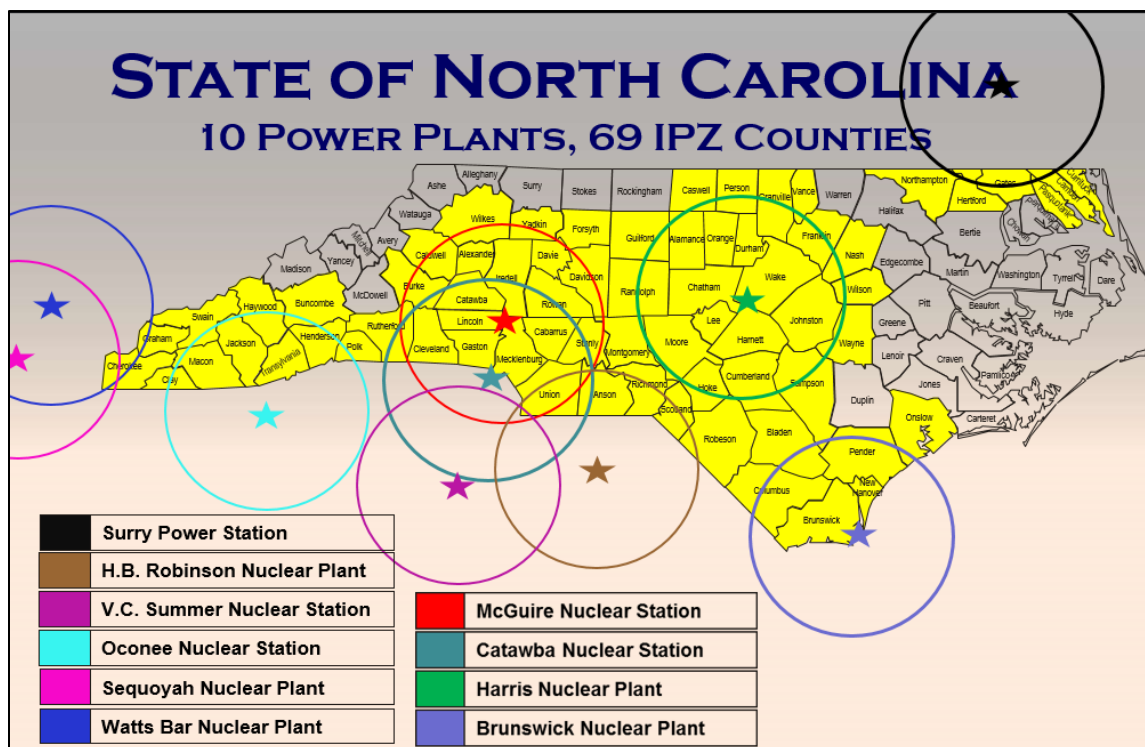
Source: International Atomic Energy Agency

The Nuclear Regulatory Commission (NRC) defines two emergency planning zones (EPZ) around nuclear plants. Areas located within 10 miles of the station are within the zone of highest risk to a nuclear incident, and this radius is the designated evacuation radius recommended by the Nuclear Regulatory Commission. Within the 10-mile zone, the primary concern is exposure to and inhalation of radioactive

contamination. The most concerning effects in the secondary 50-mile zone are related to ingestion of food and liquids that may have been contaminated. Large areas of the counties in the Clay Macon Region that are not located within the 10-mile EPZ are located within this 50-mile radius, which is still considered to be at risk from a nuclear incident.

The southeastern areas of the Clay Macon Region fall within the 50-mile incident zone for the Oconee Nuclear Station, as seen in **Figure 5.27** below.

FIGURE 5.27: NORTH CAROLINA NUCLEAR POWER STATIONS AND INCIDENT HAZARD ZONES



Source: North Carolina Emergency Management

5.15.3 Historical Occurrences

Although there have been no major nuclear events at the Oconee Nuclear Station, there is some possibility that one could occur, as there have been incidents in the past in the United States at other facilities and at facilities around the world.

5.15.4 Changing Future Conditions

Unlike other hazards discussed in this plan, climate change is unlikely to affect the occurrence or frequency of future radiological emergency events. However, severe weather could still potentially affect nuclear facilities in the form of physical damage, which necessitates close monitoring.

5.15.5 Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the stringent industry regulations. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

5.16 TERRORISM

5.16.1 Background and Description

For the purpose of this plan, terrorism encompasses chemical, biological, radiological, nuclear, explosive, and other threats.

Terrorism is defined in the United States by the Code of Federal Regulations as “the unlawful use of force or violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof, in furtherance of political or social objectives.” Terrorist acts may include assassinations, kidnappings, hijackings, bombings, small arms attacks, vehicle ramming attacks, edged weapon attacks, incendiary attacks, cyberattacks (computer-based), and the use of chemical, biological, nuclear, and radiological weapons. For the purposes of this plan, cyberattacks are included as a separate hazard.

Historically, the main categories of weapons of mass destruction (WMDs) used in terror attacks are Chemical, Biological, Radiological, Nuclear, and Explosive (collectively referred to as CBRNE). These categories are often ranked considering factors such as immediate danger posed, impact, probability, technical feasibility, frequency, and historical success.

Chemical

Chemical attacks can pose immediate danger to life and health, depending on the materials used. Chemicals are easily accessible, low-cost, and may be quickly deployed. Chemical terrorism can have high and persistent impacts on people and places.

Biological

Biological attacks can pose significant threats to life and health. They are typically deployed as diseases and biotoxins. They require some degree of technical expertise to be deployed successfully. While some biological incidents have occurred, they occur less frequently than explosive and chemical attacks.

Radiological

Radiological attacks can pose significant threats to life and health, depending upon the specific materials used. Radiological materials, while restricted and regulated, are accessible to people with some knowledge in this discipline. While radiological incidents have occurred, they occur less frequently than explosive and chemical attacks.

Nuclear

While yielding a very high impact, nuclear attacks are extremely rare due to the fact that they are cost-prohibitive and very technically difficult to achieve. This type of attack, however, could be state-sponsored, which makes it viable under extreme scenarios.

Explosive

Explosive attacks lead all others due to their immediate danger to life and health, immediate and measurable impact, high probability, low cost/easy degree of technical feasibility, and a long history of high-impact attacks.

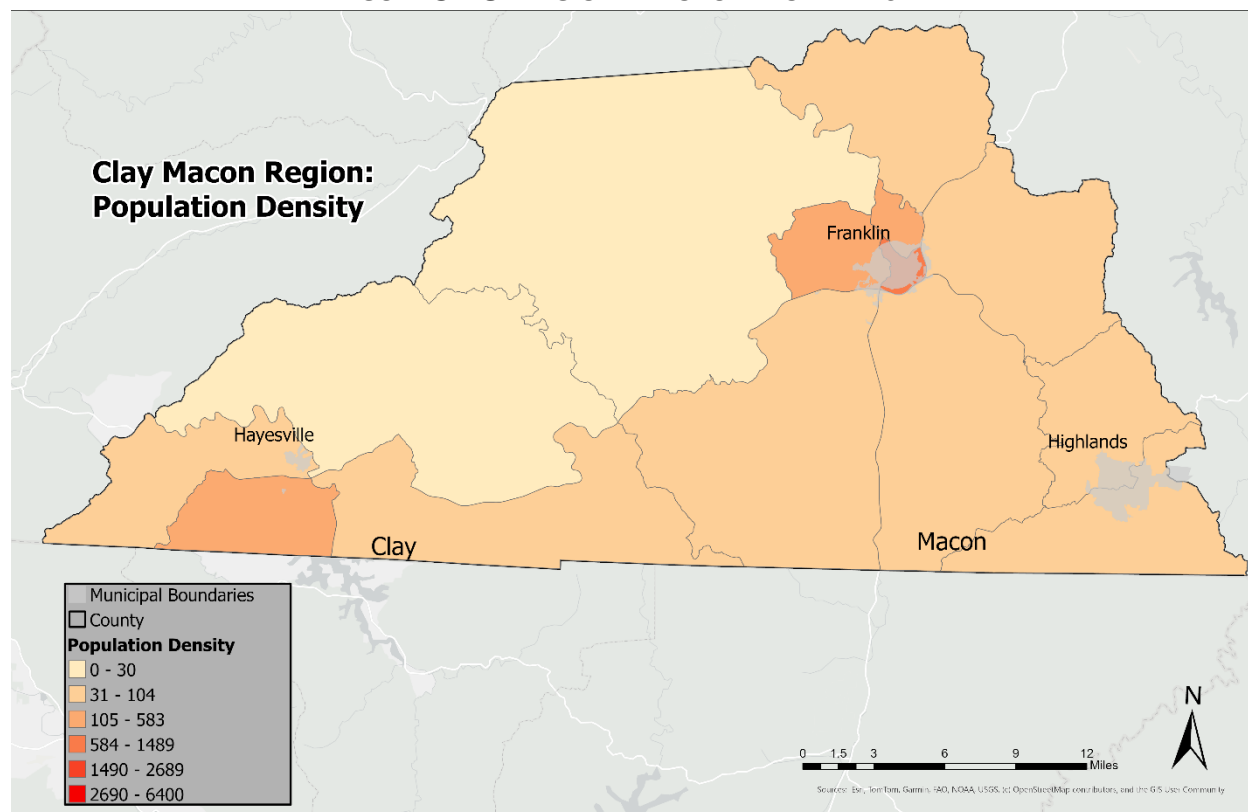
Other Attacks

Terrorism hazard assessments must also account for modern trends and changes. An additional “Other Attacks” category should be considered that includes small arms attacks (e.g., active shooters), vehicle ramming attacks, edged weapon attacks, and incendiary attacks.

5.16.2 Location and Spatial Extent

All parts of North Carolina are vulnerable to a terror event; however, terrorism tends to target more densely populated areas. The map in **Figure 5.28** displays the population density in each county of the Clay Macon Region using census tract geographies.

FIGURE 5.28: REGIONAL POPULATION DENSITY



Source: US Census Bureau

Furthermore, recently updated population estimates of each participating county and their local jurisdictions can be seen in **Table 5.35** below.

TABLE 5.35: REGIONAL POPULATION ESTIMATES

Location	2024 Population Estimate	Population Density (sq. mi.)
Clay County	12,042	52
Hayesville	481	725
Unincorporated Area	11,561	--
Macon County	38,717	72
Franklin	4,362	853
Highlands	1,110	172
Unincorporated Area	33,245	--
Clay Macon Regional Total	50,759	--

Source: US Census Bureau, World Population Review

5.16.3 Historical Occurrences

No extreme cases of terror attacks have previously affected the Clay Macon Region. However, as the population in the area continues to increase, so does the chance of an attack.

5.16.4 Changing Future Conditions

The concept of “climate security,” or the impacts of climate change on general peace and security of nations, has received increasing global attention in recent years and will likely continue to do so. According to the U.S. Government Accountability Office as of 2023, the overall threat of terrorism is also reportedly rising as incidents of domestic terrorism increased by 357% nationally between 2013 and 2021. The U.S. Department of Homeland Security notes in the 2024 Homeland Threat Assessment that national terrorism threats remain high as extremists react to future sociopolitical events.

With North Carolina ranked as the ninth most populous state in the U.S. (222.8 people/mi²) as of 2024, its population growth may inherently raise the odds of terrorism incidents within the state.

5.16.5 Probability of Future Occurrences

The Clay Macon Region has experienced no major terrorist attacks, but the area’s population is continuing to grow. The probability of future occurrences of a terrorist attack, while unlikely (less than 1 percent annual probability), is a real possibility that the region must be prepared for.

5.17 CYBER THREAT

5.17.1 Background and Description

Cyberattacks are deliberate attacks on information technology systems in an attempt to gain illegal access to a computer or purposely cause damage. As the world and the Clay Macon Region become more technologically advanced and dependent upon computer systems, the threat of cyberattacks is becoming increasingly prevalent. Also known as computer network attacks, cyberattacks are difficult to recognize and typically use malicious code to alter computer data or steal information. Critical systems (e.g., communications, emergency response, utilities, healthcare) are also a frequent target of societal disruption through cyberattacks.

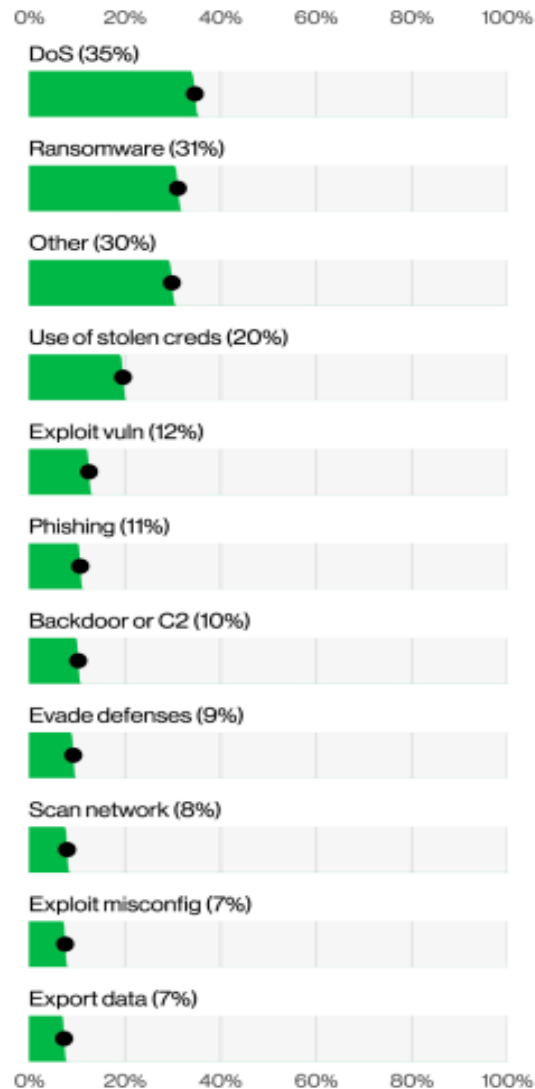
Mitigating and preparing for cyberattacks is challenging because of how diverse and complex attacks can be. The FBI is the lead federal agency for investigating cyberattacks by criminals, overseas adversaries, and terrorists. In North Carolina, the Department of Information Technology is the lead agency that maintains cybersecurity and online risk management resources.

Cyberattacks can happen in both the public and private sectors. They may be carried out by a specific individual or by groups from afar. Many attacks attempt to steal money or to disturb normal operations. According to the 2025 Data Breach Investigations Report by Verizon, 89% of all data breaches had a financial motive, and 17% of breaches had an espionage motive, with espionage cases nearly tripling since the last report.

There are many types of cyberattack incident patterns, which include:

- **Web App Attacks:** Incidents in which web applications were attacked, which can include exploiting code-level vulnerabilities in the application.
- **Point-of-Sale Intrusions:** Remote attacks against environments where card-present retail transactions are conducted.
- **Insider and Privilege Misuse:** Unapproved or malicious use of organizational resources.
- **Miscellaneous Errors:** Incidents in which unintentional actions directly compromise an attribute of security assets.
- **Physical Theft and Loss:** Incidents where an information asset went missing.
- **Crimeware:** Instances involving malware that do not fit into a more specific pattern.
- **Payment Card Skimmers:** Incidents involving skimming devices physically implanted on an asset that reads magnetic stripe data from payment cards.
- **Cyber-espionage:** Unauthorized network or system access linked to state-affiliated actors.
- **Denial-of-Service Attacks:** Any attack intended to compromise the availability of networks and systems that are designed to overwhelm systems, resulting in performance degradation or interruption of service.

Figure 5.29 below displays nationwide cyberattack incident patterns from the 2025 Verizon Data Breach Investigations Report.

FIGURE 5.29: PERCENTAGE AND COUNTS OF INCIDENTS PER PATTERN**Figure 26. Top Action varieties in incidents (n=20,271)**

Source: 2025 Verizon Data Breach Investigations Report

5.17.2 Location and Spatial Extent

Cyberattacks happen all over the world and are not restricted to a certain geographical boundary. They tend to affect public industries compared to private industries.

5.17.3 Historical Occurrences

In North Carolina and the Clay Macon Region, the Department of Information Technology specializes in cybersecurity and risk management. Within the department, the NC Information Sharing and Analysis Center gathers information on cyber threats within the state to improve cybersecurity.

Table 5.36 displays the North Carolina Cybercrimes and Victim Counts as of 2024.

TABLE 5.36: NORTH CAROLINA CYBERCRIMES AND VICTIM COUNTS (2024)

Crime Type by Victim Count			
<i>Crime Type</i>	<i>Victim Count</i>	<i>Crime Type</i>	<i>Victim Count</i>
Advanced Fee	176	Lottery/Sweepstakes/Inheritance	130
BEC	569	Malware	8
Botnet	9	No Lead Value	1,159
Confidence/Romance	519	Non-payment/Non-Delivery	1,360
Credit Card/Check Fraud	343	Other	316
Crimes Against Children	83	Overpayment	88
Data Breach	68	Personal Data Breach	1,872
Employment	557	Phishing/Spoofing	7,848
Extortion	2,683	Ransomware	72
Government Impersonation	683	Real Estate	252
Harassment/Stalking	320	SIM Swap	26
Identity Theft	636	Tech Support	1,078
Investment	1,100	Threats of Violence	26
IPR/Copyright and Counterfeit	39		
Descriptors*			
Cryptocurrency	2,494	Cryptocurrency Wallet	1,193

*These descriptors relate to the medium or tool used to facilitate the crime, and are used by the IC3 for tracking purposes only. They are available only after another crime type has been selected.

Source: FBI Internet Crime Complaint Center (IC3), 2024

Although the Clay Macon Region has not reported any major cyberattacks, the potential to experience one is unpredictable and can happen at any time.

5.17.4 Changing Future Conditions

Unlike other hazards discussed in this plan, climate change is unlikely to affect the occurrence or frequency of future cyberattack incidents. Ongoing preparedness and training efforts will remain especially important as global data usage trends and cyberattack threats evolve in future years.

5.17.5 Probability of Future Occurrences

As the world's dependency on technology grows, the possibility of experiencing cyberattacks rises as well. There have not been severe past occurrences in the region, although it is considered likely (between 10 to 100 percent annual probability) that such events could happen in the near future.

5.18 ELECTROMAGNETIC PULSE

5.18.1 Background and Description

The United States Department of Energy defines electromagnetic pulses (EMPs) as “intense pulses of electromagnetic energy resulting from solar-caused effects or man-made nuclear and pulse power devices.” EMPs can be naturally occurring or human-caused hazards. Examples of natural EMP events include:

- Lightning electromagnetic pulse
- Electrostatic discharge
- Meteoric electromagnetic pulse, and
- Coronal mass ejection, also known as a solar electromagnetic pulse

A human-caused EMP (such as a nuclear EMP) is a technological hazard that can cause severe damage to electrical components attached to power lines or communication systems. One of the most complex aspects of EMPs is the fact that they are invisible, unpredictable, and rapid. They can also overload electronic devices that people heavily rely on every day. EMPs are harmless to people biologically; however, an EMP attack could damage electronic systems such as planes or cars. This could cause destruction of property and life, and potentially generate disease or societal collapse.

In 2015, Congress amended the Homeland Security Act of 2002 by passing the Critical Infrastructure Protection Act (CIPA), which protects Americans from an EMP. It also required reporting of EMP threats, research and development, and a campaign to educate planners and emergency responders about EMP events.

5.18.2 Location and Spatial Extent

An EMP can happen in any location, and they are relatively unpredictable. Due to advancing technologies, densely populated areas may be more prone to damage from an EMP. Therefore, bigger cities in the Clay Macon Region may be more susceptible.

5.18.3 Historical Occurrences

There have been no reports of EMP occurrences in the Clay Macon Region.

5.18.4 Changing Future Conditions

Unlike other hazards discussed in this plan, climate change is unlikely to affect the occurrence or frequency of potential EMP incidents. One of the most problematic threats of EMPs is a widespread lack of general understanding regarding potential consequences among local, state, and federal entities. As technological innovation grows, updated information on this unique hazard can then be distributed.

5.18.5 Probability of Future Occurrences

The probability of an EMP is unlikely (less than 1 percent annual probability), but an occurrence could have catastrophic impacts.

5.19 CIVIL DISTURBANCE

5.19.1 Background and Description

Civil disturbances often refer to incidents in which multiple people knowingly act against established laws or regulations, with a common goal of bringing attention to a specific cause or larger sociopolitical movement. Modern laws have evolved in response to the changing understanding and real-world applications by which to peacefully resolve civil conflict. In the United States, “freedom of assembly” is a constitutional protection for peaceful and lawful purposes among the public. However, assemblies that are not peaceful or lawful (e.g., angry mobs) do not receive these same legal protections. The laws covering disruptive and disorderly conduct are generally grouped into various offenses that disturb the public peace, ranging from general misdemeanors up to severe felonies.

When a riot or similar public disturbance occurs, local law enforcement agencies are initially mobilized and responsible for addressing the event. If local law enforcement agencies lack sufficient capacity or become overwhelmed by the response effort, state law enforcement agencies may be deployed. According to the North Carolina Emergency Operations Plan (NCEOP), the State Emergency Response Team (SERT) Emergency Services Branch will coordinate state law enforcement activities during public disturbances, riots, and/or emergencies. In extreme cases, the Governor of North Carolina has the authority to mobilize the National Guard to protect persons and property and restore order.

The extent of any civil disturbance incident will often depend on the scale and crowd size of that event in conjunction with its location. The more widespread a civil incident is, the greater the likelihood of significant injuries, loss of life, and extensive property damage. Rapid containment of the event by law enforcement is especially critical in minimizing the number of injuries and damages.

A book published by the University of Minnesota, *Sociology: Understanding and Changing the Social World*, discusses the typology of crowds based on the differences observed between the gathering purpose and existing dynamics between the participants. A crowd is generally recognized to be a temporary gathering of people without any real social relationships present between them. Building off the work of sociologist Herbert Blumer, the book explicitly distinguishes five crowd categories:

- **Casual Crowd** – A random collection of people gathered somewhere at the same time. The crowd has no shared identity or purpose. This type of crowd can include shoppers and tourists, among many others. The likelihood of any violence is basically nonexistent.
- **Conventional Crowd** – A collection of people who gather for a shared purpose or activity, like a big dance, a sporting event, or a festival/concert. Crowd behavior is relatively structured and would require substantial provocation to arouse any kind of violence.
- **Expressive Crowd** – A collection of people who gather for some kind of excitement and to express at least one emotion. Examples of this crowd can include a political rally or loosely structured protests.
- **Protest Crowd** – A collection of people who gather to directly protest a targeted political, social, cultural, or economic issue. People in these types of crowds may engage in various activities together through sit-ins, demonstrations, or marches/rallies.
- **Acting Crowd** – A collection of people specifically assembled for a guiding purpose. Acting crowds tend to be more impulsive, more emotional, and require only minimal stimulation to be spurred into violence. Acting crowds can quickly spiral into large and uncontrollable riots depending on the circumstances.

5.19.2 Location and Spatial Extent

Civil disturbances can materialize from a variety of different circumstances and societal factors. The driving forces may be spontaneous or a direct result of escalating tensions. The most likely locations for this specific hazard are areas with large numbers of people clustered together. Sites preparing for political or other interest-based events/rallies should often be assessed as hotspot potential locations for a civil disturbance incident. Arenas and stadiums capable of hosting thousands of people at a time are other areas of concern as well. A civil disturbance incident may also spill over into surrounding areas beyond where an initial “trigger event” occurred.

5.19.3 Historical Occurrences

There is at least one example of a community-wide civil disturbance in the Clay Macon Region. Past incidents have involved intense protests and demonstrations by various community groups, resulting in law enforcement responses.

5.19.4 Changing Future Conditions

While climate change would not necessarily have a direct impact on civil disturbances, the ongoing climate crisis could present a cause for civil disorder in the region related to “climate security” risks. Climate change projections, previously discussed across the natural hazards included in this plan, could eventually lead to extreme weather events that exacerbate issues of drought, flooding, severe storms, and other pressing hazards with the potential to damage socio-ecological systems and greatly reduce access to critical resources (e.g., water, food, energy), thereby upsetting general order in society.

5.19.5 Probability of Future Occurrences

Civil disturbances are bound to be recurrent on a local, regional, and national scale as they are unpredictable features of social life. The Clay Macon Region will continue to experience protests, demonstrations, and other energized gatherings across its various cities and communities that could ultimately lead to some form of disruptive behavior. Based on the unpredictable nature and few past occurrences of civil disturbance in the region, the future probability of civil disturbance incidents is possible (between 1 to 10 percent annual probability).

5.20 FOOD EMERGENCY

5.20.1 Background and Description

According to the 2019 National Food and Agriculture Incident Annex (FAIA) to Federal Interagency Operational Plans (FIOPs) published by FEMA, a food emergency refers to the “adulteration and/or contamination, threatened or actual, of food that impacts or may impact human health or the safety or availability of the state’s food supply”. As noted in the 2023 State of North Carolina Hazard Mitigation Plan, food emergencies may stem from multiple distinct causes, including inclement weather events (e.g., hurricanes, floods, droughts) or technological failures like power outages and storage system leaks that ultimately result in losses of edible foods. A food emergency may also stem from human activities, including either unintentional or intentional contamination leading to public health impacts. Food emergencies often have many compounding effects with infectious disease hazards.

Additionally, the 2023 Food Emergency Response Plan in Annex B of the North Carolina Emergency Operations Plan (NCEOP) indicates that North Carolina’s impact related to the food and agricultural production, processing, and retail systems industry is:

- Valued at over **\$68 billion**
- Employs approximately **20%** of the total workforce
- Makes it the **third most agriculturally diverse state** in the U.S.

A food emergency incident could have severe consequences across the larger industry, including anywhere affected by regional food markets, and may ultimately jeopardize the public health of any locally affected populations. It is important to note that food systems are inherently complex and refer to many different interrelated activities and groups that all affect how food is produced and eventually consumed by individuals. Generally speaking, a food system can be simplified into key broader components of (1) production, (2) processing, (3) distribution, and (4) consumption.

5.20.2 Location and Spatial Extent

No rating system exists for a relative assessment of food emergency scale and overall extent since many factors depend on a case-by-case basis. However, unsafe and/or unavailable food supplies have the potential to affect isolated communities and may affect the entire planning area in extreme instances.

5.20.3 Historical Occurrences

Most foodborne outbreaks that spread across multiple states are caused by *Campylobacter*, *E. coli*, *Listeria*, and *Salmonella*. In 2024, a *Salmonella* outbreak linked to cucumbers had sickened over 400 people across 31 states, including 22 cases in North Carolina. The CDC also issued a food safety alert.

5.20.4 Changing Future Conditions

As weather patterns and the global climate continue to change in the future, the overall risk of food emergencies could begin to increase as well. According to the North Carolina Climate Science Report, it is likely that major droughts will increase in frequency and intensity due to higher temperatures and evaporation rates, which may in turn create many new agricultural challenges. It should be noted that these factors can also affect the ability of pathogens to spread among both crops and livestock. Heavy precipitation from hurricanes and thunderstorms is also very likely to increase and create greater flooding risks throughout North Carolina. This may lead to emerging threats of a food emergency based on historical trends observed regarding crop losses and subsequent contamination of edible crops from intense storm flooding.

5.20.5 Probability of Future Occurrences

Several past occurrences of this hazard in the form of foodborne illness or contamination have been documented in the Clay Macon Region. Historical data is noticeably limited for food emergencies resulting from any deliberate contamination of food, but the possibility of this risk still exists. Based on the unpredictable nature and occurrences of food emergencies in the region, the future probability of food emergency incidents is possible (1 to 10 percent annual probability).

5.21 CONCLUSIONS ON HAZARD RISK

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its “How-to” guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

5.21.1 Hazard Extent

Table 5.37 describes the extent of each natural hazard identified for the Clay Macon Region. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE 5.37 REGIONAL HAZARD EXTENT

Natural Hazards	
Drought	Drought extent is defined by the North Carolina Drought Monitor Classifications, which include <i>Abnormally Dry (D0)</i> , <i>Moderate Drought (D1)</i> , <i>Severe Drought (D2)</i> , <i>Extreme Drought (D3)</i> , and <i>Exceptional Drought (D4)</i> . According to the North Carolina Drought Monitor Classifications, the most severe drought condition is Exceptional (D4). The Clay Macon Region experienced drought conditions in nearly every year of the last 25+ years (2000-2025).
Excessive Heat	The extent of excessive heat can be defined by the maximum temperature reached. The highest temperature recorded in the Clay Macon Region is approximately 101 degrees Fahrenheit (reported on 7/29/1952). • Clay County: N/A • Macon County: 101°F
Hurricanes and Coastal Hazards	Hurricane extent is defined by the Saffir-Simpson Scale, which classifies hurricanes as <i>Category 1</i> to <i>Category 5</i> . At least 40 hurricane or tropical storm tracks have passed within 75 miles of the Clay Macon Region since 1850. Six of these tracks have traversed directly through the region. Additionally, hurricanes and tropical storms have resulted in multiple major disaster declarations.
Tornadoes / Thunderstorms	Tornadoes: Tornado hazard extent is measured by tornado occurrences in the U.S., provided by agencies such as NOAA and FEMA, as well as the Fujita/Enhanced Fujita Scale. The greatest magnitude reported thus far was an F1 event, which occurred on several occasions in the region. It should be noted that future tornado events may exceed these historical occurrences. • Clay County: F1 • Macon County: F1 Thunderstorms: Thunderstorm extent is defined by the number of thunder events and wind speed reported. thunderstorm/strong wind events and wind speed reported. According to records of 75+ years

	from the National Centers for Environmental Information, the strongest recorded wind speed event in the Clay Macon Region was reported on April 15, 2007, at 70 knots (approximately 80 mph). It should be noted that future thunderstorm events may exceed these historical occurrences. • Clay County: 65 knots • Macon County: 70 knots Lightning: According to the latest Vaisala flash density map, most of the Clay Macon Region is located in an area that experiences approximately 4-12 lightning events per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures. Hailstorms: Hail extent can be defined by the approximate size of the hailstone. The largest hailstone reported in the Clay Macon Region was 2.75 inches (reported March 28, 1984). It should be noted that future hail occurrences may exceed these figures. • Clay County: 1.75 inches • Macon County: 2.75 inches
Severe Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the region was approximately 25.5 inches, recorded on March 13, 1993. Due to extreme variations in elevation throughout the region, extent totals will vary for each participating jurisdiction, and reliable data on snowfall totals is not available. • Clay County: 7 inches • Macon County: 25.5 inches
Earthquakes	Earthquake extent can be measured by the Richter Scale, Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from the region of interest. According to data provided by the U.S. Geological Survey, the greatest MMI to impact the region was reported on November 9, 1968, with an MMI of V (Moderate) with a correlating Richter Scale measurement of approximately 5.3. • Clay County: V • Macon County: V
Geological	Landslides: As noted in the landslide section of the hazard profiles, the landslide data provided by the North Carolina Geological Survey continues to undergo updates over time. This creates a challenge when trying to determine an accurate extent for evolving landslide hazards. However, when using the USGS landslide susceptibility index, extent can be measured through incidence, which is significantly high for a majority of the Clay Macon Region. High susceptibility is also found throughout the region. Sinkholes: The Clay Macon Region has a relatively low risk for sinkholes. The region has limited historical information related to

	sinkholes. Even though there is no historical information from the North Carolina Geological Survey or the National Centers for Environmental Information, there is a possibility of unreported occurrences. Erosion: The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no clear erosion rate records available for the Clay Macon Region.																				
Dam Failure	Dam failure extent is defined using the North Carolina Department of Environmental Quality criteria outlined through the Dam Safety Program. Of the roughly 97 dams in the Clay Macon Region, 40 are classified as high hazard. High hazard dam totals by county are listed below. • Clay County: 6 • Macon County: 34																				
Flooding	Flood extent can be measured by the area of land and property in the floodplain, as well as by flood height and velocity. The amount of land in the floodplain accounts for roughly 3.5 percent of the total land area in the Clay Macon Region. Flood depth and velocity are recorded via the United States Geological Survey (USGS) streamgages found throughout the region. While a streamgage does not exist for each of the participating jurisdictions, there is one at or near many areas. The greatest peak discharge recorded for the region was reported on October 4, 1964. Water reached a discharge of 12,200 cubic feet per second, and the streamgage height was recorded at approximately 17.3 feet. Additional peak discharge readings and recorded streamgage heights are in the table below. <table><tr><th>Location/ Jurisdiction</th><th>Date</th><th>Peak Discharge (cfs)</th><th>Gage Height (ft)</th></tr><tr><td colspan="4">Clay County</td></tr><tr><td>Nantahala River near Rainbow Springs</td><td>6/16/1949</td><td>6,300</td><td>9.7</td></tr><tr><td colspan="4">Macon County</td></tr><tr><td>Little Tennessee River near Prentiss</td><td>10/4/1964</td><td>12,200</td><td>17.3</td></tr></table> Depth of flooding inside structures across the region during a maximum flood event ranges from 1-3 feet and varies based on the structure’s location in the floodplain and the elevation of the structure.	Location/ Jurisdiction	Date	Peak Discharge (cfs)	Gage Height (ft)	Clay County				Nantahala River near Rainbow Springs	6/16/1949	6,300	9.7	Macon County				Little Tennessee River near Prentiss	10/4/1964	12,200	17.3
Location/ Jurisdiction	Date	Peak Discharge (cfs)	Gage Height (ft)																		
Clay County																					
Nantahala River near Rainbow Springs	6/16/1949	6,300	9.7																		
Macon County																					
Little Tennessee River near Prentiss	10/4/1964	12,200	17.3																		
Wildfires	Wildfire data was provided by the North Carolina Forest Service (NCFS) and is reported annually by county through 2020. The data indicate the following wildfire hazard extent for each county. Clay County • The greatest number of fires to occur in any year was 24 in 2016.																				

	• The greatest number of acres burned in any single year occurred in 2016, when 9,036.38 acres burned. Macon County • The greatest number of fires to occur in any year was 21 in 2016. • The greatest number of acres burned in any single year occurred in 2016, when 7,450.25 acres burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the region.
Infectious Disease	There is no available method for determining dollar losses due to infectious diseases at this time; however, \$477,500 dollars was allocated from the Governor's yearly budget in 2016 for preventative measures related to the Zika virus. Prevention resources and messaging have also increased in recent years for "Fight the Bite" campaigns targeting mosquito and tick bites to avoid serious vector-borne diseases after nearly 700 cases were reported in 2022. The entire Clay Macon Region is susceptible to infectious diseases like influenza, which kills hundreds of people annually.
Technological Hazards	
Hazardous Substances	According to the USDOT PHMSA incident database, the largest hazardous materials incident reported in the region was ~8,000 LGA (gallons) of a substance on December 12, 1979, in Franklin. It should be noted that larger events are possible.
Radiological Emergency	Although there is no history of nuclear accident at the Oconee Nuclear Stations, other events across the globe and in the United States indicate that an event is possible. Since several national and international events were severe level 7 events on the standard INES scale, the potential for a Level 7 event at Oconee is possible.
Terrorism	Although no severe terrorist attacks have been reported in the Clay Macon Region, the entire area is still at risk of a future event. Densely populated areas, such as cities, are considered more susceptible. Terror events have the potential to affect the human population, buildings and infrastructure, and the economy in the region.
Cyber	No major cyberattacks have been historically reported in the Clay Macon Region. However, technology usage and adoption are increasing. A cyberattack could potentially devastate the region's economy and could have lasting negative impacts.
Electromagnetic Pulse	Electromagnetic pulse (EMP) occurrences have not taken place in the Clay Macon Region, but the risk still exists. If an EMP were to occur, the effects would negatively impact first responders and communication efforts and may cause panic within the area.
Civil Disturbance	Few major instances of civil disturbances have been identified in the region. However, established social systems of the area are still changing every year in response to new social, political, and/or cultural events.

Food Emergency	Some instances of food emergencies, especially in the form of mass foodborne illness (e.g., E. coli and Salmonella) or contamination, have been historically reported in the Clay Macon Region. Additionally, established food systems of the area are still changing every year in response to new hazard events, changing climatic conditions, and evolving contamination threats.
------------------------------	---

5.21.2 Priority Risk Index

In order to draw some meaningful planning conclusions on hazard risk for the Clay Macon Region, the results of the hazard profiling process were used to generate countywide hazard classifications according to a “Priority Risk Index” (PRI). The purpose of the PRI is to categorize and prioritize all potential hazards for the Clay Macon Region as high, moderate, or low risk. Combined with the asset inventory and quantitative vulnerability assessment provided in the next section, the summary hazard classifications generated through the use of the PRI allows for the prioritization of those high hazard risks for mitigation planning purposes, and more specifically, the identification of hazard mitigation opportunities for the jurisdictions in the Clay Macon Region to consider as part of their proposed mitigation strategy.

The prioritization and categorization of identified hazards for the Clay Macon Region is based principally on the PRI, a tool used to measure the degree of risk for identified hazards in a particular planning area. The PRI is used to assist the Clay Macon Regional Hazard Mitigation Planning Committee in gaining consensus on the determination of those hazards that pose the most significant threat to the counties of the region based on a variety of factors. The PRI is not scientifically based but is rather meant to be utilized as an objective planning tool for classifying and prioritizing hazard risks in the Clay Macon Region based on standardized criteria.

The application of the PRI results in numerical values that allow identified hazards to be ranked against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time, and duration). Each degree of risk has been assigned a value (1 to 4) and an agreed-upon weighting factor⁵⁶, as summarized by the scoring template in **Table 5.38**. To calculate the PRI value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final PRI value, as demonstrated in the example equation below:

$$\text{PRI VALUE} = [\text{PROBABILITY} \times .30] + (\text{IMPACT} \times .30) + (\text{SPATIAL EXTENT} \times .20) + (\text{WARNING TIME} \times .10) + (\text{DURATION} \times .10)]$$

According to the weighting scheme and point system applied, the highest possible value for any hazard is 4.0. Before being finalized, PRI values for each identified hazard were reviewed and accepted by the members of the Regional Hazard Mitigation Planning Committee.

TABLE 5.38: PRIORITY RISK INDEX SCORING

⁵⁶ The Regional Hazard Mitigation Planning Committee, based upon any unique concerns or factors for the planning area, may adjust the PRI weighting scheme during future plan updates.

SECTION 5: HAZARD PROFILES

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	30%
	Possible	Between 1% and 10% annual probability	2	
	Likely	Between 10 and 100% annual probability	3	
	Highly Likely	100% annual probability	4	
Impact	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	30%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Spatial Extent	Negligible	Less than 1% of area affected	1	20%
	Small	Between 1 and 10% of area affected	2	
	Moderate	Between 10 and 50% of area affected	3	
	Large	Between 50 and 100% of area affected	4	
Warning Time	More than 24 hours	Self-explanatory	1	10%
	12 to 24 hours	Self-explanatory	2	
	6 to 12 hours	Self-explanatory	3	
	Less than 6 hours	Self-explanatory	4	
Duration	Less than 6 hours	Self-explanatory	1	10%
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	

5.21.3 Priority Risk Index Results

Table 5.39 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this section, as well as input from the Regional Hazard Mitigation Planning Committee. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE 5.39: SUMMARY OF PRI RESULTS FOR THE CLAY MACON REGION

Hazard	Subhazard(s) Assessed	Category/Degree of Risk					
		Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Natural Hazards							
Drought	Agricultural, Hydrological, Meteorological, Socioeconomic	Likely	Minor	Large	More than 24 hours	More than 1 week	2.5
Excessive Heat	Heat Wave	Likely	Critical	Large	More than 24 hours	More than 1 week	3.1
Hurricanes and Coastal Hazards	Tornadoes, High Wind, Torrential Rain, Severe Weather, and Storm Surge associated with Hurricanes, Tropical Storms, and Nor’easters	Likely	Catastrophic	Large	More than 24 hours	Less than 1 week	3.3
Tornadoes/ Thunderstorms	Hailstorms, Lightning, Torrential Rain, Thunderstorm and High Winds	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	3.1
Severe Winter Weather	Snow, Blizzards, Wind Chill, Extreme Cold, Ice Storms, Freezing Rain	Highly Likely	Critical	Large	More than 24 hours	Less than 1 week	3.3
Earthquakes		Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	2.3
Geological	Landslides, Sinkholes, Erosion	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	3.0
Dam Failure		Unlikely	Critical	Moderate	Less than 6 hours	Less than 1 week	2.5
Flooding	Flash Flooding, Urban Flooding	Likely	Critical	Moderate	6 to 12 hours	More than 1 week	3.1
Wildfires		Likely	Critical	Large	12 to 24 hours	More than 1 week	3.2
Infectious Disease	Vector-Borne Disease, Foreign Animal Disease	Possible	Critical	Large	More than 24 hours	More than 1 week	2.8
Technological Hazards							
Hazardous Substances	Hazardous Materials and Chemicals, Oil Spills,	Possible	Limited	Small	Less than 6 hours	Less than 24 hours	2.2

SECTION 5: HAZARD PROFILES

Hazard	Subhazard(s) Assessed	Category/Degree of Risk					
		Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
	Road/Rail Incidents						
Radiological Emergency	Fixed Nuclear Facilities	Unlikely	Critical	Moderate	6 to 12 hours	Less than 1 week	2.5
Terrorism	Chemical, Biological, Radiological, Nuclear, Explosive, Other Attacks	Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	2.2
Cyber Threat	Mass Power/Utility Disruption	Likely	Critical	Moderate	Less than 6 hours	More than 1 week	3.2
Electromagnetic Pulse		Unlikely	Critical	Moderate	12 to 24 hours	Less than 24 hours	2.2
Civil Disturbance		Possible	Limited	Small	Less than 6 hours	Less than 24 hours	2.2
Food Emergency	Supply Chain Disruption	Possible	Critical	Moderate	More than 24 hours	More than 1 week	2.6

5.22 FINAL DETERMINATIONS

The conclusions drawn from the hazard profiling process for the Clay Macon Region, including the PRI results and input from the Regional Hazard Mitigation Planning Committee, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table 5.40**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout the Clay Macon Region.

A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately and is described in **Section 6: Vulnerability Assessment**. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases, and their assigned classification will continue to be evaluated during future plan updates.

TABLE 5.40: CONCLUSIONS ON HAZARD RISK FOR THE CLAY MACON REGION

HIGH RISK	Severe Winter Weather Hurricanes and Coastal Hazards Wildfires Cyber Threat Flooding Tornadoes/Thunderstorms Excessive Heat Geological (Landslides)
MODERATE RISK	Infectious Disease Earthquakes Dam Failure Drought Hazardous Substances Radiological Emergency Terrorism Food Emergency
LOW RISK	Electromagnetic Pulse Civil Disturbance

SECTION 6

VULNERABILITY ASSESSMENT

This section identifies and quantifies the vulnerability of the jurisdictions within the Clay Macon Region to the significant hazards identified in the previous sections (**Section 4: Hazard Identification** and **Section 5: Hazard Profiles**). It consists of the following subsections:

- 6.1 Overview
- 6.2 Methodology
- 6.3 Explanation of Data Sources
- 6.4 Asset Inventory
- 6.5 Vulnerability Assessment Results
- 6.6 Conclusions on Hazard Vulnerability

44 CFR Requirement

44 CFR Part 201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. The description shall include an overall summary of each hazard and its impact on the community. **The plan should describe vulnerability in terms of:** (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; (B) An estimate of the potential losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

6.1 OVERVIEW

This section builds upon the information provided in **Section 4: Hazard Identification** and **Section 5: Hazard Profiles** by identifying and characterizing an inventory of assets in the Clay Macon Region. Additionally, an assessment is conducted for each identified hazard using available data, including the potential impact and expected damage it may cause. The primary objective of the vulnerability assessment is to quantify the regional exposure and potential loss estimates for each hazard. In doing so, each county and its participating jurisdictions may better understand their unique risks of the identified hazards and be better prepared to evaluate and prioritize specific hazard mitigation actions¹.

This section begins with an explanation of the methodology applied to complete the vulnerability assessment, followed by a summary description of the asset inventory as compiled for jurisdictions in the Clay Macon Region. The remainder of this section focuses on the results of the assessment conducted.

¹ Additional information related to hazard mitigation planning is available online through the *North Carolina Department of Public Safety* (<https://www.ncdps.gov/our-organization/emergency-management/hazard-mitigation>). Resilience planning resources are available at the *North Carolina Resilience Exchange* (<https://www.resilienceexchange.nc.gov/>), and hazard preparedness resources are available at *ReadyNC.gov* (<https://www.readync.gov/stay-informed/north-carolina-hazards>).

It should be noted that portions of this assessment were conducted using data and tools that were in place prior to Hurricane Helene. It is certain that more and/or updated data and different tools relevant to assessing vulnerability will be made available in the months and years following Helene. Future updates of this plan will work to integrate those, and any associated and relevant findings from other vulnerability assessments, into this document.

6.2 METHODOLOGY

This vulnerability assessment was conducted using three distinct methodologies: (1) A stochastic risk assessment; (2) a geographic information system (GIS)-based analysis; and (3) a risk modeling software analysis. Each approach provides estimates for the potential impact of hazards by using a common, systematic framework for evaluation, including historical occurrence information provided in the *Hazard Identification* and *Hazard Profiles* sections. A brief description of the three different approaches is provided on the following pages.

6.2.1 Stochastic Risk Assessment

The stochastic risk assessment methodology was applied to analyze the hazards of concern that were outside the scope of the GIS-based risk assessment and the NCEM Risk Management Tool (RMT). This involves consideration of annualized hazard loss estimates and impacts to both current and future buildings and populations. Annualized loss is the estimated long-term weighted average value of losses to property in any single year in a specified geographic area (i.e., municipal jurisdiction or county). This methodology is applied primarily to hazards that do not have geographically definable boundaries and are therefore excluded from spatial analysis through GIS. A stochastic risk methodology was used for the following hazards:

- Tornadoes/Thunderstorms
- Geological (Landslides)
- Hazardous Substances

Except for Hazardous Substances and Dam Failure, the hazards in this section are considered natural and have the potential to affect all current and future buildings and all populations. **Table 6.1** provides estimates about all improved property in the Clay Macon Region that may be vulnerable to hazards. For all hazards, annualized loss estimates were determined using the best available data from sources including FEMA National Risk Index (NRI) records, NOAA National Centers for Environmental Information (NCEI) records, the previous Clay Macon Regional Hazard Mitigation Plan, and local knowledge. Given the standard weighting analysis of estimated losses, they can be readily compared across hazards, providing an objective approach for evaluating mitigation alternatives.

For all other hazards outside of this section, historical data regarding damage or extent was not readily available. A detailed vulnerability assessment could not be completed for these hazards at this time.

6.2.2 GIS-Based Analysis

Other hazards have specified geographic boundaries that permit additional analysis using Geographic Information Systems (GIS). These hazards include:

- Geological (Landslides)
- Flooding
- Wildfires
- Hazardous Substances
- Dam Failure

The objective of the GIS-based analysis was to determine the estimated vulnerability of critical facilities and populations for the identified hazards in the Clay Macon Region using the best available geospatial data². Digital data was collected from local, regional, state, and national sources for hazards and buildings. This included local tax assessor records for individual parcels and buildings and georeferenced point locations for identified assets (critical facilities and infrastructure, special populations, etc.) when available.

ESRI ArcGIS Pro™ was used to assess hazard vulnerability utilizing digital hazard data, as well as local building data. Using these data layers, hazard vulnerability can be quantified by estimating the assessed building value for parcels and/or buildings determined to be in identified hazard areas. To estimate vulnerable populations in hazard areas, digital Census 2020 data by census tract was obtained and supplemented with current population estimates from the US Census Bureau. This was intersected with hazard areas to determine exposed population counts. Unfortunately, due to the large scale of census tracts, the results are limited but will be revised as the population by census block becomes available for all areas in the region. The results of the analysis provided an estimate of the number of people and critical facilities, as well as the assessed value of parcels and improvements, determined to be potentially at risk to those hazards with definable geographic hazard boundaries.

6.2.3 Risk Management Tool

The Risk Management Tool (RMT) was developed by North Carolina Emergency Management (NCEM)-Risk Management (RM) as a tool to simplify hazard mitigation plan development into a single, automated, tool-based format to include geospatial risk assessment data, also developed by NCEM-RM. The RMT is a twofold system used to create and/or update local and state hazard mitigation plans. The two parts of the RMT are a step-by-step system that will prompt a user to input information and narrative text, as well as upload pictures, documents, and other information as needed. The second part of the system is the risk tool. The risk tool will run a risk assessment at the building level for certain hazards selected based on predetermined calculations for each hazard. Some hazards will have a single return period, and others have multiple return periods. The availability of multiple return periods is based on the availability of datasets for each hazard and the degree of detail in each dataset.

The risk assessment produced by the tool will also identify high-risk structures in the planning area and estimate cost by types of mitigation projects (e.g., wind retrofits, elevation, acquisition, mitigation reconstruction) and benefit-cost estimates by type of mitigation. The mitigation tool is only meant to begin the process of thinking about problem areas where mitigation may be of interest to the jurisdiction and property owners. It is also designed to drive mitigation actions that are specific, measurable, attainable, realistic, and timely.

² Note that geospatial attributes, coordinates, and/or addresses of some jurisdictional facilities may be outdated and recent changes in location or operations may not be corrected in the latest data release from various sources. This note applies to all georeferenced/GIS planning datasets used within this plan update.

SECTION 6: VULNERABILITY ASSESSMENT

Finally, the RMT also assesses vulnerable populations, such as children and elderly people. Data used to assess these populations is from the 2020 U.S. Decennial Census. According to the U.S. Census Bureau, those defined as “elderly” are 65 years old or older, while those defined as “children” are 5 years old or younger. It is important to note that the numbers assessed are from the most recent Census in 2020.

With all information combined in the system, a hazard mitigation plan can then be exported into multiple document formats. The system will also store the plan so that when it is time to update the documentation, the information is already available.

The RMT was originally developed as part of the Integrated Hazard Risk Management (IHRM) pilot project, which included Durham, Edgecombe, Macon, and New Hanover counties. The pilot was successful, and it was determined that there is a need and interest in a system designed for statewide and potentially nationwide use in the future. The RMT used in this update was the second version created by NCEM.

A list of the hazards assessed by the RMT follows:

- ☐ Hurricanes and Coastal Hazards
- ☐ Tornadoes/Thunderstorms
- ☐ Earthquakes
- ☐ Flooding
- ☐ Wildfires

All conclusions are presented in “**Conclusions on Hazard Vulnerability**” at the end of this section.

Hazard Prioritization

When it comes to evaluating hazards and determining which hazards a jurisdiction should spend the most time and effort addressing, a number of factors affect prioritization. As discussed in **Section 5: Hazard Profiles**, the risk (as determined by magnitude, probability, and location) of a hazard is one of the main elements used to determine the relative importance of addressing potential hazard impacts. However, the assessment of a hazard’s risk is generally focused on the hazard itself and how severe or likely it could be within the geographic scope of the study area. This assessment does not necessarily analyze the potential effects of that hazard on humans and/or the built environment. This is a critical component of hazard mitigation planning since a hazard that does not impact human life, safety, or welfare in significant ways is typically not considered as pressing for mitigation actions. The analysis that follows attempts to bring this consideration into the planning process by estimating the hazard-specific impacts on humans and the built environment and prioritizing hazards accordingly.

6.3 EXPLANATION OF DATA SOURCES

Hurricane and Coastal Hazards

The NCEM RMT assessed vulnerable buildings and populations to hurricanes. For this assessment, vulnerable buildings and populations were analyzed against damage caused by hurricane winds. *Additional information on hurricane and tropical storm hazards is available online through published North Carolina Department of Public Safety (NCDPS) resources³.*

Tornadoes/Thunderstorms

The NCEM RMT assessed vulnerable buildings and populations to tornadoes and thunderstorms. Subhazards assessed under the thunderstorm hazard include hail, lightning, and thunderstorm winds; however, for this assessment, thunderstorm winds were the only subhazard with available data.

Earthquakes

The NCEM RMT assessed vulnerable buildings and populations to earthquake hazards. This assessment included susceptible buildings by the type of structure and the potential dollar losses associated with the buildings. It also analyzed susceptible populations, such as children and the elderly. *Additional information on earthquake hazards is available online through published NCGS resources⁴.*

Geological (Landslide)

Data from the U.S. Geological Survey (USGS) and the North Carolina Geological Survey (NCGS) were used to determine areas considered to have varying incidence and susceptibility to landslide hazards. Data was downloaded in GIS-compatible formats. This allowed property and parcel data to be layered on landslide regions to assess vulnerability to this hazard. *Additional information on landslide hazards is available online through published NCGS resources⁵.*

Flooding

FEMA Digital Flood Insurance Rate Map (DFIRM) datasets were used to determine flood vulnerability. DFIRM data can be used in GIS for mapping purposes, and they identify several features, including floodplain boundaries and base flood elevations (BFEs). Identified areas on the DFIRM represent some features of a Flood Insurance Rate Map (FIRM), including the 100-year (1-percent annual chance) and 500-year (0.2-percent annual chance) flood zones. For the vulnerability assessment, local parcel data and critical facilities were overlaid on the 100-year floodplain and 500-year floodplain layers. This data was also supplemented with NCEM RMT data, which assessed vulnerable buildings, potential losses, and vulnerable populations within the floodplain areas. It should also be noted that this analysis does not account for building elevation as a key flood mitigation factor. *Additional information on flooding hazards is available online through published NCEM resources⁶.*

³ Additional hurricane and tropical storm vulnerability information is available through the *Tropical Storm Helene* hub site published by NCDPS (<https://www.ncdps.gov/our-organization/emergency-management/tropical-storm-helene>).

⁴ Additional earthquake vulnerability information is available through the *Earthquakes in North Carolina* hub site published by NCGS (<https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/north-carolina-geological-survey/geologic-hazards/earthquakes-north-carolina>).

⁵ Additional landslide vulnerability information is available through the *Landslides in Western North Carolina* and *Western North Carolina Landslide Hazard Data Viewer* dashboard sites published by NCGS and NCDEQ (<https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/north-carolina-geological-survey/geologic-hazards/landslides>).

⁶ Additional flood vulnerability information is available through the *Flood.NC.gov* hub site published by NCDPS (<https://flood.nc.gov/ncflood/>).

Wildfires

The data used to determine vulnerability to wildfires in the Clay Macon Region is based on GIS datasets sourced from the Southern Wildfire Risk Assessment (SWRA)⁷. Specific layers, such as Burn Probability, Wildland Urban Interface (WUI), Wildfire Hazard Potential (WHP), and Wildfire Exposure Scores were used as available to determine the vulnerability of people and property. The primary purpose of this data is to highlight areas of concern that may be conducive to wildfire mitigation actions. Many assumptions are made, making the layers not a true representation of event probability; however, it does provide a comparison of wildfire risk profiles throughout the region. This data was also supplemented with NCEM RMT data, which assessed vulnerable buildings, potential losses, and vulnerable populations within areas of wildfire risk.

Hazardous Substances

Hazardous materials incidents can occur in both fixed facilities and through mobile transportation. For the fixed incident analysis, updated Toxic Release Inventory (TRI) datasets were used. *The TRI is a publicly available database from the federal Environmental Protection Agency (EPA) that contains information on toxic chemicals, releases, and other waste management activities reported annually by certain covered industry groups, as well as federal facilities⁸. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and was further expanded by the Pollution Prevention Act of 1990.*

Facilities that meet certain activity thresholds must annually report their releases and other waste management activities for listed toxic chemicals to the EPA and to their state or tribal entity. A facility must report if it meets the following criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; RCRA Subtitle C treatment, storage, and disposal (TSD) facilities; and solvent recovery services;
- Has 10 or more full-time employee equivalents; and
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, bioaccumulative, and toxic (PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds, or 0.1 grams depending on the chemical.

For the mobile hazardous materials incident analysis, updated transportation data for major highways and railroads were obtained from the North Carolina Department of Transportation (NCDOT). This data is GIS-compatible, lending itself to buffer analysis to determine risk.

Dam Failure

Data from the North Carolina Department of Environmental Quality (NCDEQ) Dam Safety Program was used to determine the locations, characteristics, and hazard potential of dams in the region. *Additional*

⁷ Additional wildfire vulnerability information is available through the main *Southern Wildfire Risk Assessment* site (<https://southernwildfirerisk.com/>).

⁸ Additional hazardous substances vulnerability information is available through the *Toxic Release Inventory Program* hub site published by the EPA (<https://www.epa.gov/toxics-release-inventory-tri-program>).

information on dam failure hazards is available online through published NCDEQ and U.S. Army Corps of Engineers (USACE) resources⁹.

6.4 ASSET INVENTORY

An inventory of georeferenced assets within the Clay Macon Region and all associated jurisdictions was compiled to identify and characterize properties potentially at risk of significant hazards identified in this plan¹⁰. By understanding the characteristics and locations of assets in known hazard areas, their relative risk and vulnerability can be assessed¹¹. Under this assessment, two categories of physical assets were created and further assessed through GIS analysis. Additionally, social assets are addressed to determine the population at risk from the identified hazards (findings presented in **Section 6.4.2**).

6.4.1 Physical and Improved Assets

The two categories of physical assets consist of:

1. **Improved Property:** Includes all improved properties in the Clay Macon Region according to local parcel data. The information has been expressed in terms of the number of parcels and the total assessed value of improvements (buildings) that may be exposed to the identified hazards.
2. **Critical Facilities:** Critical facilities vary by jurisdiction. Identified critical facilities are emergency operations centers, fire stations, police stations, medical care facilities, schools, government facilities, or other important buildings. It should be noted that this listing is not all-inclusive for assets located in the region, but it is anticipated that it will be expanded during future plan updates as more georeferenced data becomes available for use in GIS analysis.

The following tables provide a detailed listing of the georeferenced assets that have been identified for inclusion in the vulnerability assessment for the Clay Macon Region.

Table 6.1 lists estimates related to the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for participating areas of the Clay Macon Region (study area of vulnerability assessment)¹². The U.S. Census Bureau also notes the following information for each county of the region as of the 2025 vintage year:

- **Clay County**
 - *Land area in square miles (2020):* 214.98
 - *Population per square mile (2020):* 51.6

⁹ Additional dam failure vulnerability information is available through the *Dam Safety Program* hub site published by NCDEQ (<https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/dam-safety-program-overview>) and the *National Inventory of Dams (NID)* site published by USACE (<https://nid.sec.usace.army.mil/>).

¹⁰ While potentially not all-inclusive for the jurisdictions in the Clay Macon Region, “georeferenced” assets include those assets for which specific location-based data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis.

¹¹ **Note that geospatial attributes, coordinates, and/or addresses of some jurisdictional facilities may be outdated**, and recent changes in location or operations may not be corrected in the latest data release from various sources. This note applies to all georeferenced/GIS planning datasets used within this plan update.

¹² **Total assessed values for improvements are based on tax assessor records as joined to digital parcel data.** This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities. It should also be noted that, due to record-keeping, some duplication is possible, potentially resulting in an inflated value exposure for an area.

- *Housing units (2025): 7,868*
- *Building permits (2024): 143*
- *Total employer establishments (2023): 252*
- **Macon County**
 - *Land area in square miles (2020): 515.58*
 - *Population per square mile (2020): 71.8*
 - *Housing units (2025): 27,700*
 - *Building permits (2024): 218*
 - *Total employer establishments (2023): 1,282*

TABLE 6.1: IMPROVED PROPERTY IN THE CLAY MACON REGION

Location ¹³	Estimated Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Assessed Value of Improvements
Clay County	17,018	\$2,630,571,987	9,430	\$1,414,434,487
Hayesville	459	\$153,129,100	332	\$126,307,000
Unincorporated Area	16,559	\$2,477,442,887	9,098	\$1,288,127,487
Macon County	44,584	\$6,882,318,217	28,485	\$7,663,683,250
Franklin	3,030	\$1,122,647,960	2,387	\$777,097,070
Highlands	3,160	\$3,282,227,370	2,046	\$945,528,070
Unincorporated Area	38,394	\$2,477,442,887	24,052	\$5,941,058,110
Clay Macon Regional Total	61,602	\$9,512,890,204	37,915	\$9,078,117,737

Source: NC OneMap

The following **Table 6.2** lists the emergency operations centers (EOCs), fire stations, police stations, medical care facilities, schools, and other critical facilities located in participating jurisdictions of the Clay Macon Region, as listed on NC OneMap¹⁴. In addition, **Figure 6.1** shows the locations of critical facilities in the Clay Macon Region. **Table 6.25**, at the end of this section, shows a complete list of the critical facilities by name, as well as the specific hazards that may significantly affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by the counties.

TABLE 6.2: REGIONAL CRITICAL FACILITY INVENTORY

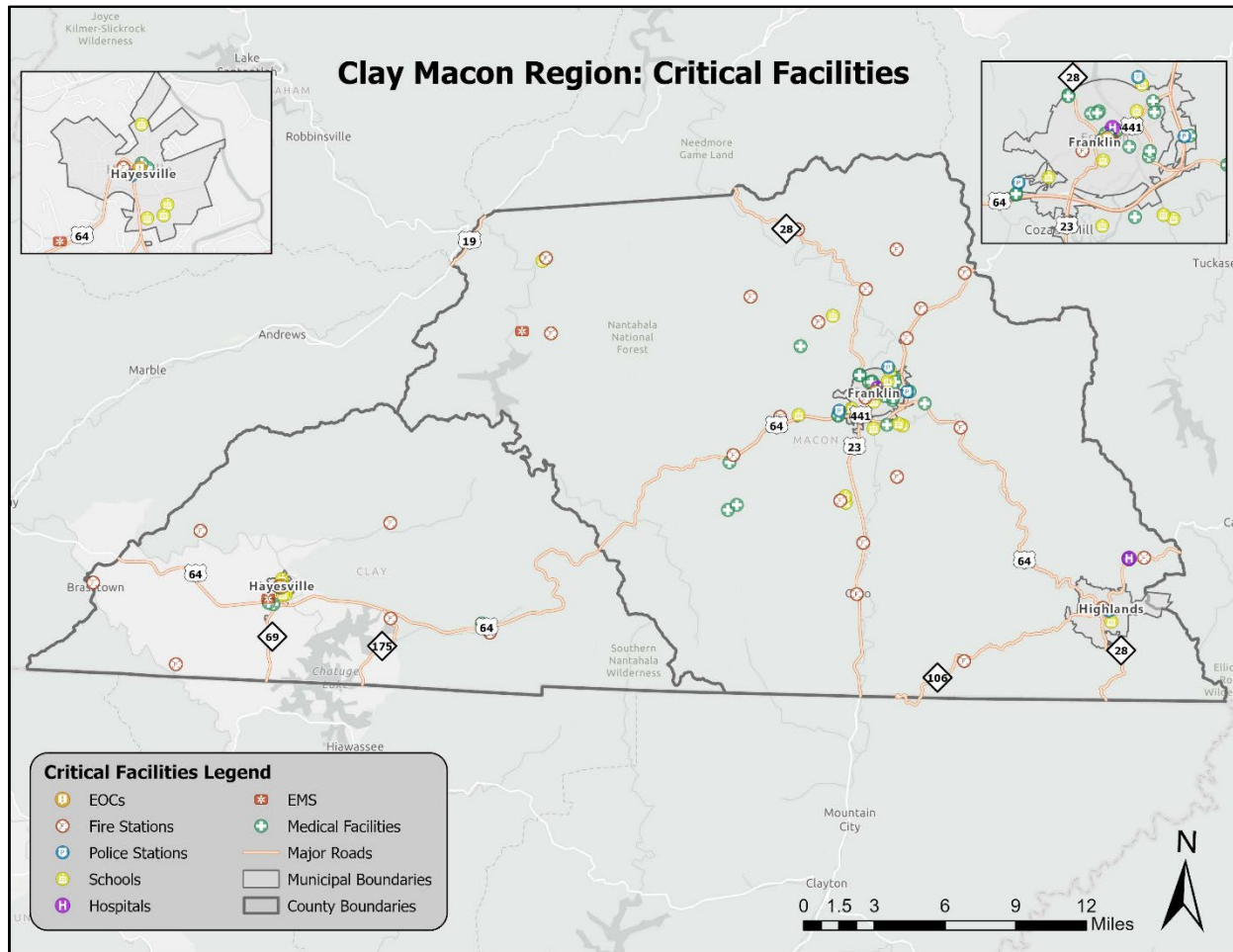
Location	EOCs	Fire/EMS Stations	Police Stations	Schools	Medical Care Facilities
Clay County	1	8	1	4	5
Hayesville	1	1	1	4	2
Unincorporated Area	0	7	0	0	3
Macon County	1	23	4	13	24
Franklin	1	2	3	2	16
Highlands	0	1	1	1	0
Unincorporated Area	0	20	1	10	8
Clay Macon Regional Total	2	31	5	17	29

Source: NC OneMap

¹³ Number of buildings for each county is based on the number of parcels with an improved building value greater than zero.

¹⁴ NC OneMap (<https://www.nconemap.gov/>)

FIGURE 6.1: REGIONAL CRITICAL FACILITIES



Source: NC OneMap

6.4.2 Social Vulnerability

Social vulnerability is defined by FEMA through the National Risk Index (NRI) methodology as “the susceptibility of social groups to the adverse impacts of hazards, including disproportionate death, injury, loss, or disruption of livelihood.” In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess subgroups of the population in the Clay Macon Region that are potentially at higher risk of these hazards.

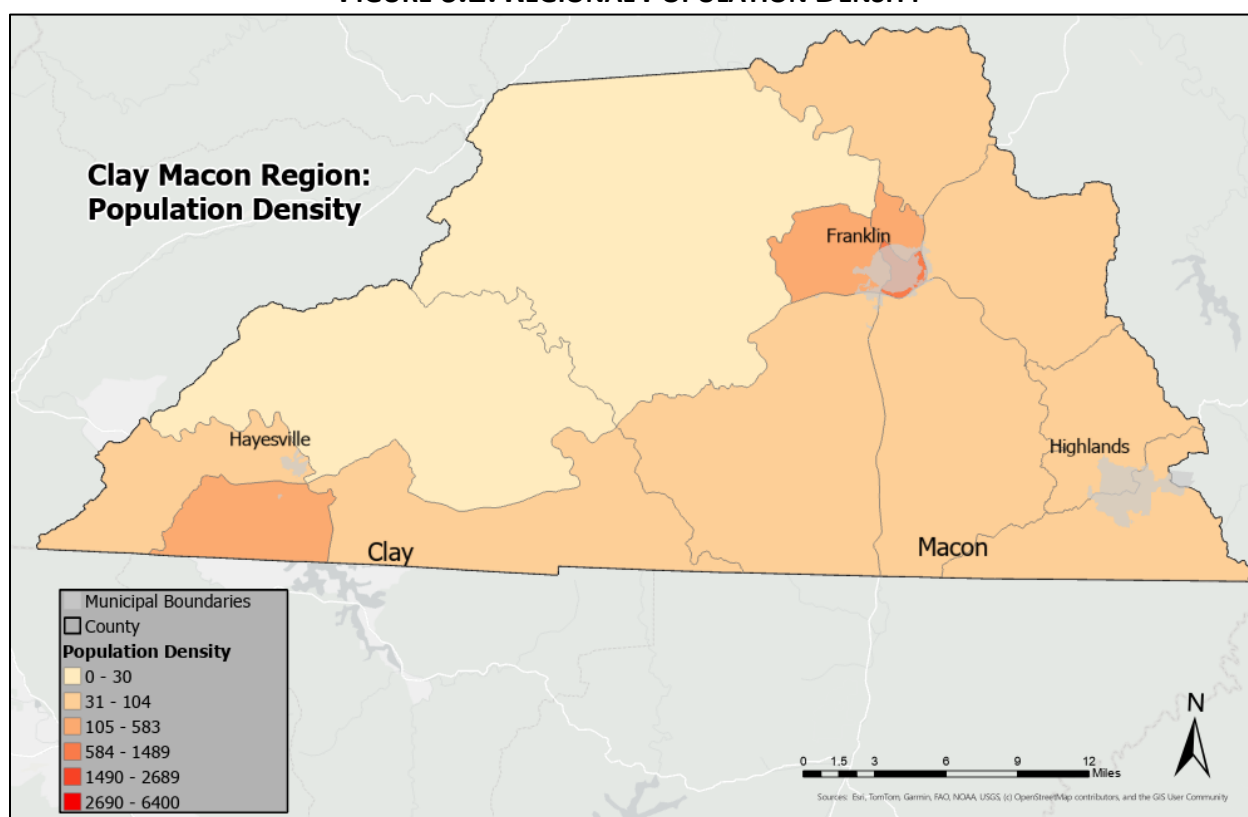
Table 6.3 lists the population by county according to U.S. Census Bureau population estimates. The population estimates are updated using the most recent vintage tables of the American Community Survey (ACS). The total population in the Clay Macon Region, according to 2024 Census data, is reported as 50,759. Key factors that may provide additional insights regarding highly vulnerable populations in the region include spoken language, disability status, and poverty status, as listed below. Additional population estimates and details are presented in **Section 3: Community Profile**.

TABLE 6.3: TOTAL POPULATION IN THE CLAY MACON REGION

Location	2024 Population Estimates	% population speaking a language other than English	% population with a disability	% population below the poverty level
Clay County	12,042	2.4%	9.9%	11.5%
Macon County	38,717	8.2%	9.5%	12.2%
Clay Macon Regional Total	50,759	--	--	--

Source: US Census Bureau, American Community Survey

In addition, **Figure 6.2** illustrates the regional population density by census tract as reported by the US Census Bureau with updated ACS estimates (2024).

FIGURE 6.2: REGIONAL POPULATION DENSITY

Source: US Census Bureau, American Community Survey

The FEMA National Risk Index (NRI)¹⁵, a publicly available online dataset now integrated under the FEMA Resilience Analysis and Planning Tool (RAPT), also provides base ratings of risk index, social vulnerability, and community resilience by county and census tract using vetted risk assessment methodologies. Community resilience is defined by FEMA through the NRI methodology as *“the ability of a community to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.”* This information is updated as of 2025, and associated tables and reports can be viewed using the NRI data available through the online RAPT application.

¹⁵ FEMA National Risk Index (NRI) & Resilience Analysis and Planning Tool (RAPT): <https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>

For Clay County, the risk index rating is very low (26.88 out of 100), and social vulnerability is rated as very high (95.17 out of 100) compared to very low community resilience (4.77 out of 100). The risk index for Macon County is relatively low (73.79), social vulnerability is relatively high (73.73), and community resilience is relatively low (21.91).

6.4.3. Development Trends and Changes in Vulnerability

Since the previous regional hazard mitigation plan was approved (in 2021), the Clay Macon Region has experienced substantial growth and development. **Table 6.4** shows the total number of housing units reported as of 2023 and the share of units constructed since 2020 among regional jurisdictions, according to estimates provided by the American Community Survey (ACS).

TABLE 6.4: HOUSING UNIT COUNTS FOR THE CLAY MACON REGION

Location	Total Housing Units (2023)	Units Built 2020 or Later	% Building Stock Built Post-2020
Clay County	7,410	46	0.62%
Hayesville	402	2	0.50%
Unincorporated Area	7,008	44	0.63%
Macon County	27,070	156	0.58%
Franklin	2,192	15	0.68%
Highlands	2,528	0	0.00%
Unincorporated Area	22,350	141	0.63%
Clay Macon Regional Total	34,480	202	0.59%

Source: US Census Bureau, American Community Survey

Table 6.5 shows population growth estimates for regional jurisdictions from 2010 to 2024 based on ACS and Decennial Census datasets.

TABLE 6.5: POPULATION GROWTH FOR THE CLAY MACON REGION

Location	2010	2018	2020	2024	% Change 2010-2024
Clay County	10,607	11,139	11,089	12,042	13.53%
Hayesville	415	440	461	481	15.90%
Unincorporated Area	10,192	10,699	10,628	11,561	13.43%
Macon County	33,958	35,285	37,014	38,717	14.01%
Franklin	3,886	4,042	4,175	4,362	12.25%
Highlands	931	969	1,072	1,110	19.23%
Unincorporated Area	29,141	30,274	31,767	33,245	14.08%
Clay Macon Regional Total	44,565	46,424	48,103	50,759	13.90%

Source: US Census Bureau, American Community Survey, Decennial Census

Based on the above data, the rate of residential development and population growth in the region has increased, especially in concentrated areas of Macon County. Changes in development since the previous plan update impact overall regional vulnerability. The greater the population, the greater the risk that people and their communities are impacted by hazards. It should be noted that if future development occurs in vulnerable areas, these populations and the infrastructure that serves them will be increasingly exposed to potential hazards.

6.5 VULNERABILITY ASSESSMENT RESULTS

As noted earlier, only hazards with a specific geographic boundary, modeling results, or sufficient historical data allow for further analysis. Those results are presented here. All other hazards are assumed to impact the entire planning region (e.g., drought, excessive heat, hailstorm, lightning, and severe winter weather) or, due to inconsistent data, analysis would not lead to credible results (e.g., sinkholes, erosion, infectious disease, terrorism, cyber, EMP, civil disturbance, and food emergency).

Hazards assessed in this section include: *Hurricanes and Coastal Hazards, Tornadoes/Thunderstorms, Earthquakes, Geological (Landslides), Flooding, Wildfires, Hazardous Substances, and Dam Failure.*

Estimated annual losses (EAL) for all natural hazards are presented at the end of this section in **Table 6.25**, whereas regional hazard exposure among individual critical facilities is presented in **Table 6.27**. For additional info related to vulnerability and expected annual losses for many natural hazards, the FEMA National Risk Index (NRI)¹⁶ allows users to view/download data for county and census tract geographies.

6.5.1. Hurricanes and Coastal Hazards

Historical evidence and recent events indicate that the Clay Macon Region faces a significant risk of hurricanes, tropical storms, and similar coastal hazards, primarily due to the coastal location of North Carolina. Many storm tracks have come near or traversed through the region, as shown and discussed in **Section 5: Hazard Profiles**.

Numerous secondary hazards, such as flooding, landslides, erosion, tornadoes, and high winds, tend to result from hurricanes or tropical storms. The effects of compounding hazards can differ significantly based on regional geography as well. These cumulative effects often make potential loss estimates difficult to calculate and track.

The Risk Management Tool (RMT) developed by North Carolina Emergency Management (NCEM) analyzed hurricane winds and no other hazards often associated with hurricanes due to modeling variabilities; therefore, only hurricane winds are assessed. Building and population vulnerabilities to hurricane winds for a 100-year frequency event (return period) are reported in **Table 6.6** and **Table 6.7**.

It is assumed that all existing and future buildings and populations are at risk from hurricanes, tropical storms, and similar coastal hazards.

TABLE 6.6: BUILDING VULNERABILITY TO HURRICANE WINDS

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Clay County	7,133	8,540	\$670,124	603	\$199,539	102	\$22,052	9,245	\$891,715
Hayesville	920	875	\$80,877	125	\$36,310	53	\$9,496	1,053	\$126,684
Unincorporated Area	6,213	7,665	\$589,247	478	\$163,229	49	\$12,556	8,192	\$765,031
Macon County	23,048	25,631	\$1,353,906	1,414	\$115,868	285	\$34,231	27,330	\$1,504,005
Franklin	1,885	3,068	\$148,597	553	\$35,943	83	\$12,932	3,704	\$197,471
Highlands	2,004	1,794	\$167,770	185	\$16,324	20	\$4,737	1,999	\$188,832
Unincorporated Area	19,159	20,769	\$1,037,539	676	\$63,601	182	\$16,562	21,627	\$1,117,702
Clay Macon Regional Total	30,181	34,171	\$2,024,030	2,017	\$315,407	387	\$56,283	36,575	\$2,395,720

Source: NCEM Risk Management Tool

¹⁶ FEMA National Risk Index (NRI) & Resilience Analysis and Planning Tool (RAPT): <https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>

TABLE 6.7: POPULATION VULNERABILITY TO HURRICANE WINDS

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	3,427	532	11,262
Hayesville	119	28	434
Unincorporated Area	3,308	504	10,828
Macon County	10,482	1,735	36,587
Franklin	1,051	225	4,353
Highlands	133	6	303
Unincorporated Area	9,298	1,504	31,931
Clay Macon Regional Total	13,909	2,267	47,849

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

Given equal susceptibility across the entire Clay Macon Region, it can be assumed that the entire population is at risk from hurricanes, tropical storms, and similar coastal hazards. Timely sheltering and evacuations of elderly and young individuals, disabled individuals, and individuals requiring specialized care or equipment are of critical importance to reducing risk during a severe hurricane or tropical storm event.

CRITICAL FACILITIES

Given equal vulnerability across the Clay Macon Region, all critical facilities are at risk. Although some buildings may perform better than others due to construction, age, and other factors, determining individual building responses is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard.

In conclusion, a hurricane or tropical storm event has the potential to impact many existing and future buildings, critical facilities, and populations in the Clay Macon Region. These events can cause substantial damage in their wake, including numerous fatalities, road closures, water contamination, gas leaks, extensive debris clean-up, and extended power outages.

6.5.2 Tornadoes/Thunderstorms

Tornadoes

A probabilistic scenario was created to estimate building and population vulnerabilities in the Clay Macon region for the tornado hazard. For this scenario, a tornado ranked EF2 on the Enhanced Fujita Scale (or F2 on the Fujita Scale) was analyzed. The RMT analyzed this information, which has been reported in **Table 6.8** and **Table 6.9**.

TABLE 6.8: BUILDING VULNERABILITY TO TORNADES

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Clay County	7,181	8,670	\$1,168,154,028	603	\$517,626,476	102	\$72,257,188	9,375	\$1,758,037,693
Hayesville	921	877	\$118,708,770	125	\$104,513,018	53	\$41,026,754	1,055	\$264,248,543
Unincorporated Area	6,260	7,793	\$1,049,445,258	478	\$413,113,458	49	\$31,230,434	8,320	\$1,493,789,150
Macon County	23,426	26,152	\$4,384,622,330	1,417	\$821,696,938	285	\$238,592,490	27,854	\$5,444,911,757
Franklin	1,886	3,082	\$347,540,594	553	\$335,362,704	83	\$81,912,503	3,718	\$764,815,801
Highlands	2,037	1,827	\$772,210,338	185	\$126,512,314	20	\$30,645,592	2,032	\$929,368,244
Unincorporated Area	19,503	21,243	\$3,264,871,398	679	\$359,821,920	182	\$126,034,395	22,104	\$3,750,727,712
Clay Macon Regional Total	30,607	34,822	\$5,552,776,358	2,020	\$1,339,323,414	387	\$310,849,678	37,229	\$7,202,949,450

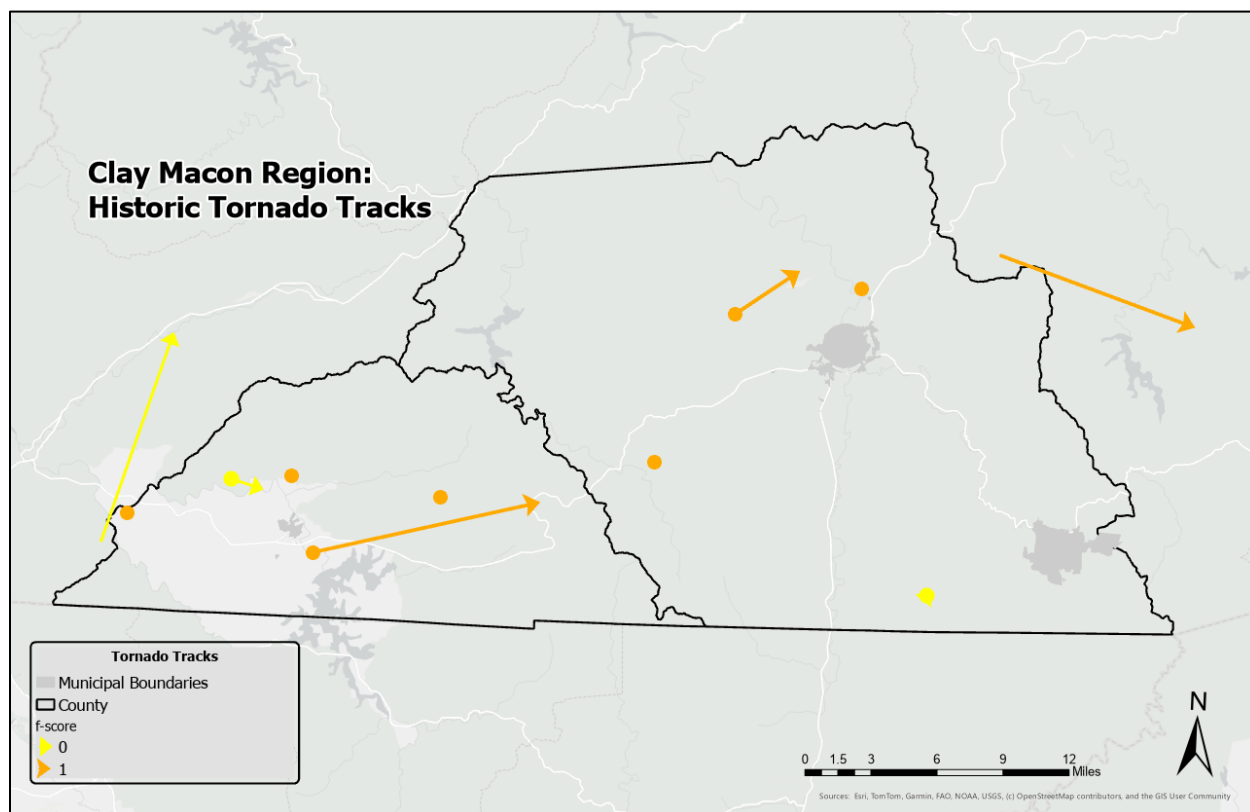
Source: NCEM Risk Management Tool

TABLE 6.9: POPULATION VULNERABILITY TO TORNADES

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	3,482	540	11,443
Hayesville	119	28	435
Unincorporated Area	3,363	512	11,008
Macon County	10,702	1,770	37,345
Franklin	1,056	226	4,373
Highlands	135	6	309
Unincorporated Area	9,511	1,538	32,663
Clay Macon Regional Total	14,184	2,310	48,788

Source: NCEM Risk Management Tool

A map of historical tornado points of origin and paths can be seen below in **Figure 6.3**.

FIGURE 6.3: HISTORICAL TORNADO TRACKS

Source: NOAA

Thunderstorms

A probabilistic scenario was created to estimate building and population vulnerabilities in the Clay Macon Region for the thunderstorm hazard. For this scenario, damages due to thunderstorm winds of a 50-year frequency event (return period) were analyzed. It is important to note that this data does not include damage caused by other remnants of thunderstorms, such as lightning or hail. The RMT analyzed this information, which has been reported below in **Table 6.10** and **Table 6.11**.

TABLE 6.10: BUILDING VULNERABILITY TO THUNDERSTORM WINDS

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Clay County	7,180	8,669	\$2,522,298	604	\$986,094	102	\$93,664	9,375	\$3,602,056
Hayesville	921	877	\$290,408	125	\$175,813	53	\$41,030	1,055	\$507,251
Unincorporated Area	6,259	7,792	\$2,231,890	479	\$810,281	49	\$52,634	8,320	\$3,094,805
Macon County	23,411	26,138	\$6,146,878	1,414	\$388,231	286	\$119,963	27,838	\$6,655,072
Franklin	1,886	3,082	\$613,272	553	\$127,605	83	\$52,132	3,718	\$793,009
Highlands	2,038	1,827	\$876,119	185	\$55,190	20	\$13,325	2,032	\$944,634
Unincorporated Area	19,487	21,229	\$4,657,487	676	\$205,436	183	\$54,506	22,088	\$4,917,429
Clay Macon Regional Total	30,591	34,807	\$8,669,176	2,018	\$1,374,325	388	\$213,627	37,213	\$10,257,128

Source: NCEM Risk Management Tool

TABLE 6.11: POPULATION VULNERABILITY TO THUNDERSTORM WINDS

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	3,482	540	11,442
Hayesville	119	28	435
Unincorporated Area	3,363	512	11,007
Macon County	10,694	1,769	37,319
Franklin	1,056	226	4,373
Highlands	135	6	309
Unincorporated Area	9,503	1,537	32,637
Clay Macon Regional Total	14,176	2,309	48,761

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

It is assumed that all existing populations and future populations are at risk from the tornadoes/thunderstorms hazard. Timely sheltering and evacuations of elderly and young individuals, disabled individuals, and individuals requiring specialized care or equipment are of critical importance to reducing risk during a severe tornado or thunderstorm event.

CRITICAL FACILITIES

All critical facilities should still be considered at risk of damage should an event occur.

6.5.3. Earthquakes

A probabilistic scenario was created to estimate building and population vulnerabilities in the Clay Macon Region for the earthquake hazard with a 500-year frequency (return period). The RMT analyzed this information, which has been reported below in **Table 6.12** and **Table 6.13**.

TABLE 6.12: BUILDING VULNERABILITY TO EARTHQUAKES

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Clay County	7,181	8,670	\$3,326,656	604	\$2,893,992	102	\$481,143	9,376	\$6,701,792
Hayesville	921	877	\$417,046	125	\$719,323	53	\$286,661	1,055	\$1,423,031
Unincorporated Area	6,260	7,793	\$2,909,610	479	\$2,174,669	49	\$194,482	8,321	\$5,278,761
Macon County	23,427	26,152	\$9,223,616	1,417	\$3,559,497	286	\$958,111	27,855	\$13,741,225
Franklin	1,886	3,082	\$859,945	553	\$1,524,785	83	\$331,072	3,718	\$2,715,802
Highlands	2,038	1,827	\$1,503,153	185	\$523,535	20	\$125,870	2,032	\$2,152,558
Unincorporated Area	19,503	21,243	\$6,860,518	679	\$1,511,177	183	\$501,169	22,105	\$8,872,865
Clay Macon Regional Total	30,608	34,822	\$12,550,272	2,021	\$6,453,489	388	\$1,439,254	37,231	\$20,443,017

Source: NCEM Risk Management Tool

TABLE 6.13: POPULATION VULNERABILITY TO EARTHQUAKES

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	3,482	540	11,443
Hayesville	119	28	435
Unincorporated Area	3,363	512	11,008
Macon County	10,702	1,770	37,345
Franklin	1,056	226	4,373
Highlands	135	6	309
Unincorporated Area	9,511	1,538	32,663
Clay Macon Regional Total	14,184	2,310	48,788

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

It is assumed that all existing and future populations are at risk from earthquake hazards. Timely sheltering/evacuations of elderly and young individuals, disabled individuals, and individuals requiring specialized care or equipment are of critical importance to reducing risk during a severe event.

CRITICAL FACILITIES

All critical facilities should still be considered at risk of damage should a significant event occur.

In conclusion, an earthquake could potentially impact all existing and future buildings, facilities, and populations in the Clay Macon Region. Though minor earthquakes are often recorded but not felt, they may rattle breakables and cause minimal damage. Furthermore, major earthquakes have the potential to damage structures. Severe impacts of earthquakes may result in debris clean-up, service disruption, building collapse, and fatalities. Specific vulnerabilities of assets will depend on their design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

6.5.4. Geological (Landslides)

GIS analysis was used to complete the vulnerability assessment for landslides in the Clay Macon Region. The total improved value of exposed property can be estimated using the USGS Landslide Susceptibility Index (detailed in **Section 5: Hazard Profiles**) and local parcel data.

Table 6.14 presents the potential at-risk property based on estimates informed by local parcel data (where available). All areas of the Clay Macon Region are identified as high-incidence or susceptible areas based on USGS landslide susceptibility and incidence analysis. Varying incidence levels (e.g., high, moderate) were used to identify different jurisdictions of concern for the analysis below.

TABLE 6.14: TOTAL POTENTIAL AT-RISK PARCELS FOR THE GEOLOGICAL (LANDSLIDE) HAZARD

Location	Number of Parcels at Risk		Approximate Value of Improvements at Risk (\$)	
	Moderate	High	Moderate	High
Clay County	0	17,018	0	\$1,414,434,487
Hayesville	0	459	0	\$126,307,000
Unincorporated Area	0	16,559	0	\$1,288,127,487
Macon County	0	44,584	0	\$7,663,683,250
Franklin	0	3,030	0	\$777,097,070
Highlands	0	3,160	0	\$945,528,070
Unincorporated Area	0	38,394	0	\$5,941,058,110
Clay Macon Regional Total	0	61,602	0	\$9,078,117,737

Source: NC OneMap, United States Geological Survey

SOCIAL VULNERABILITY

Given high landslide incidence and susceptibility across the entire Clay Macon Region, it is assumed that a significant portion of the total regional population is at risk. Timely sheltering/evacuations of elderly and young individuals, disabled individuals, and individuals requiring specialized care or equipment are of critical importance to reducing risk when dangerous landslide conditions exist.

CRITICAL FACILITIES

All critical facilities of the region are considered at risk of landslides due to widespread areas of high incidence or susceptibility.

In conclusion, landslides can impact many existing and future buildings, facilities, and populations in the Clay Macon Region, though some areas are at a higher risk than others. For example, steep slopes and modified slopes bear a significantly greater risk than flatter areas. Specific vulnerabilities for assets in the Clay Macon Region will depend on their design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available.

6.5.5 Flooding

In order to assess flood risk, a GIS-based analysis was used to estimate regional exposure to flooding using Digital Flood Insurance Rate Map (DFIRM) data¹⁷ in combination with local parcel data for each county of the Clay Macon Region. The determination of assessed value at risk (exposure) was calculated using GIS analysis by summing the total assessed building values of improved properties that were confirmed to be in an identified floodplain area. **Table 6.15** presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

TABLE 6.15: ESTIMATED EXPOSURE OF PARCELS TO THE FLOODING HAZARD

Location	1% Annual Chance of Flooding (100-year)		0.2% Annual Chance of Flooding (500-year)	
	Approx. Number of Parcels	Approx. Value of Improvements	Approx. Number of Parcels	Approx. Value of Improvements
Clay County	2,538	\$116,024,766	2,549	\$117,208,805
Hayesville	53	\$1,236,848	53	\$1,236,848
Unincorporated Area	2,485	\$114,787,918	2,496	\$115,971,957
Macon County	3,458	\$119,945,424	3,687	\$136,158,475
Franklin	361	\$24,986,304	385	\$30,999,291
Highlands	394	\$36,766,242	400	\$39,145,054
Unincorporated Area	2,703	\$58,192,878	2,902	\$66,014,130
Clay Macon Regional Total	5,996	\$235,970,190	6,236	\$253,367,280

Source: FEMA DFIRM, NC OneMap

To assess flood risk, the RMT analyzed buildings located in the 1-percent annual chance (100-year) floodplain area. The buildings are assessed by the type of building (commercial, residential, or public) and by pre-FIRM status, or structures built before modern floodplain management regulations became effective. This data is shown by jurisdiction in **Table 6.16**.

TABLE 6.16: BUILDING VULNERABILITY FOR 100-YEAR FLOODPLAINS

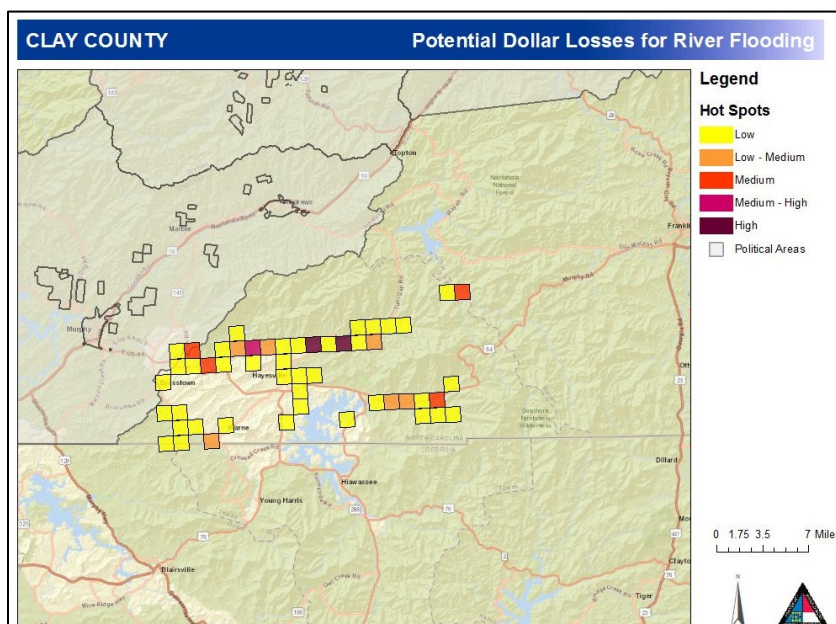
Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Clay County	232	350	\$3,779,691	6	\$62,014	1	\$11,901	357	\$3,853,606
Hayesville	23	33	\$161,599	1	\$4,273	0	\$0	34	\$165,872
Unincorporated Area	209	317	\$3,618,092	5	\$57,741	1	\$11,901	323	\$3,687,734
Macon County	432	442	\$6,785,229	70	\$3,291,003	7	\$306,591	519	\$10,382,824
Franklin	70	48	\$2,627,907	54	\$2,822,681	5	\$233,565	107	\$5,684,154
Highlands	45	44	\$194,025	1	\$8,234	0	\$0	45	\$202,259
Unincorporated Area	317	350	\$3,963,297	15	\$460,088	2	\$73,026	367	\$4,496,411
Clay Macon Regional Total	664	792	\$10,564,920	76	\$3,353,017	8	\$318,492	876	\$14,236,430

Source: NCEM Risk Management Tool

Figure 6.4 below displays visual hotspots of potential dollar losses for the flood hazard in Clay County based on NCEM analysis.

¹⁷ The county-level DFIRM data used for analysis were last updated in 2009 (Clay County) and 2010 (Macon County). Recent amendments made through the Letter of Map Revision (LOMR) process were updated in 2018 (Macon County).

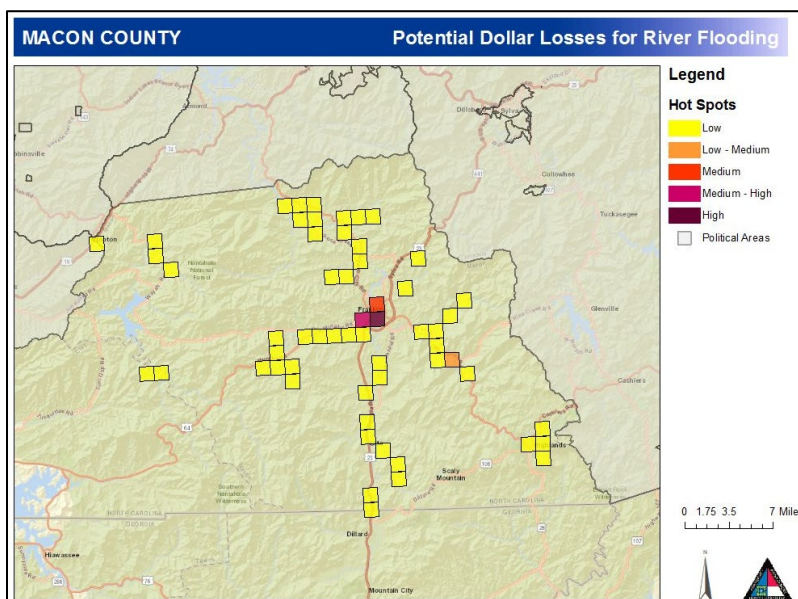
FIGURE 6.4: POTENTIAL DOLLAR LOSSES FOR FLOODING IN CLAY COUNTY



Source: NCEM Risk Management Tool

The same information for Macon County is presented below in **Figure 6.5**. Based on the figures shown, most potential hotspots of flood loss are in areas with relatively low vulnerability.

FIGURE 6.5: POTENTIAL DOLLAR LOSSES FOR FLOODING IN MACON COUNTY



Source: NCEM Risk Management Tool

Table 6.17 assesses vulnerable populations of the region. This data is also from the RMT and analyzes the populations of elderly and children living at risk from 1-percent annual chance (100-year) flooding.

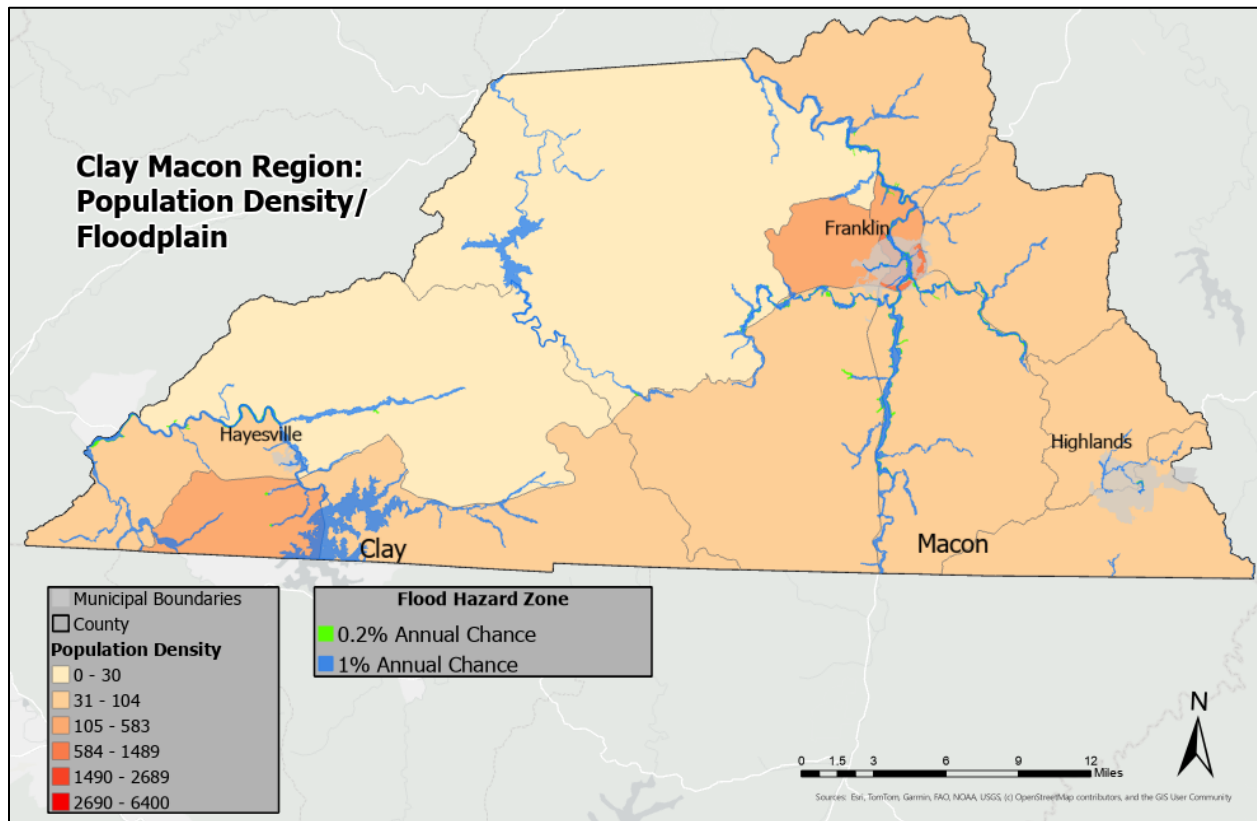
TABLE 6.17: POPULATION VULNERABILITY FOR 100-YEAR FLOODPLAINS

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	140	22	462
Hayesville	4	1	16
Unincorporated Area	136	21	446
Macon County	175	29	612
Franklin	16	4	68
Highlands	3	0	7
Unincorporated Area	156	25	537
Clay Macon Regional Total	315	51	1074

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

A national Census was last conducted in 2020 and may offer more accurate insights compared to the current availability of population estimates. This data was analyzed at the census tract level to further understand at-risk populations to the flooding hazard in the Clay Macon Region, and specific floodplain areas of concern based on population density can be seen below in **Figure 6.6**.

FIGURE 6.6: POPULATION DENSITY NEAR FLOODPLAINS

Source: FEMA DFIRM, US Census Bureau

CRITICAL FACILITIES

The critical facility analysis revealed that there are at least 2 critical facilities located in the Clay Macon Region's 100-year (1-percent annual chance) and 500-year (0.2-percent annual chance) floodplains based on FEMA DFIRM boundaries and GIS analysis. As previously noted, this analysis does not consider building

SECTION 6: VULNERABILITY ASSESSMENT

elevation, which may negate risk. These facilities include at least 1 fire/EMS facility in Clay County and 1 in Macon County.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in the Clay Macon Region, though some areas are at a higher risk than others. All types of structures in a floodplain are inherently at risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA-regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries, or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations should be considered during future plan updates. Furthermore, specific areas of properties subject to repetitive flooding losses should continue to be assessed and targeted for mitigation actions.

6.5.6 Wildfires

Historical evidence indicates that the Clay Macon Region is susceptible to wildfire events. To estimate exposure to wildfire, the Wildfire Exposure Score (or Structure Exposure Score), among other wildfire risk layers for the region, was obtained directly from the Southern Wildfire Risk Assessment (SWRA). This layer combines the chance of wildfire (*Burn Probability*) with potential wildfire damage to homes (*Damage Potential*) for a comprehensive index of risk. Each subsequent score category also accounts for a 1.5x increase (+ 50%) in exposure (e.g., Category 4/10 acreage is 1.5 times, or 50% more, exposed to wildfire vs. Category 3/10 acreage). **Figure 6.7** shows the Wildfire Exposure Scores for the region below.

FIGURE 6.7: REGIONAL WILDFIRE EXPOSURE SCORES



Source: Southern Wildfire Risk Assessment

Based on an analysis of SWRA data, the Clay Macon Region has some areas of significant wildfire risk exposure. Exposure score categories of the region range from 1/10 (lowest exposure, 6,637 acres or 1% of total area) up to 9/10 (high exposure, 1 acre or less than 1% of total area). The most common wildfire exposure categories are 4/10 (337,047 acres or 71% of total area), 5/10 (75,794 acres or 16% of total area), and 3/10 (43,779 acres or 9% of total area).

SOCIAL VULNERABILITY

Even though not all areas have equal vulnerability, there is some susceptibility across the entire Clay Macon Region. It is assumed that the total population is at risk of wildfire hazards. Determining the exact number of people in certain wildfire zones is difficult with existing data and could be misleading.

SECTION 6: VULNERABILITY ASSESSMENT

Timely sheltering/evacuations of elderly and young individuals, disabled individuals, and individuals requiring specialized care or equipment are of critical importance to reducing risk during a severe wildfire event.

CRITICAL FACILITIES

Relatively few critical facilities in the Clay Macon Region appear to be in the at-risk area of wildfire burn probability, which is measured as a -7 or higher on a -1 (lowest) to -9 (highest) scale of risk. Clay County had at least 2 fire/EMS facilities in the at-risk zone, while Macon County had none. **Table 6.18** shows the results of the GIS analysis.

TABLE 6.18: CRITICAL FACILITIES IN THE AT-RISK WUI RISK INDEX AREA

Location	At-Risk Critical Facilities
Clay County	2
Macon County	0
Clay Macon Regional Total	2

Source: Southern Wildfire Risk Assessment, NC OneMap

Additional information was provided through RMT analysis. This data can be seen below in **Table 6.19** and **Table 6.20**.

TABLE 6.19: BUILDING VULNERABILITY TO WILDFIRES

Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Clay County	5,312	6,422	\$1,057,341,897	447	\$512,750,474	49	\$60,548,915	6,918	\$1,630,641,286
Hayesville	476	487	\$88,205,839	55	\$79,104,556	7	\$11,617,206	549	\$178,927,601
Unincorporated Area	4,836	5,935	\$969,136,058	392	\$433,645,918	42	\$48,931,709	6,369	\$1,451,713,685
Macon County	19,230	21,649	\$3,395,114,360	965	\$579,765,274	214	\$179,251,535	22,828	\$4,154,131,169
Franklin	1,423	2,610	\$302,780,868	294	\$203,657,911	47	\$44,999,688	2,951	\$551,438,467
Highlands	1,547	1,434	\$592,282,193	93	\$69,998,782	14	\$24,087,585	1,541	\$686,368,560
Unincorporated Area	16,260	17,605	\$2,500,051,299	578	\$306,108,581	153	\$110,164,262	18,336	\$2,916,324,142
Clay Macon Regional Total	24,542	28,071	\$4,452,456,257	1,412	\$1,092,515,748	263	\$239,800,450	29,746	\$5,784,772,455

Source: NCEM Risk Management Tool

TABLE 6.20: POPULATION VULNERABILITY TO WILDFIRES

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	2,628	405	8,628
Hayesville	66	15	241
Unincorporated Area	2,562	390	8,387
Macon County	8,881	1,471	31,008
Franklin	893	191	3,699
Highlands	106	5	242
Unincorporated Area	7,882	1,275	27,067
Clay Macon Regional Total	11,509	1,876	39,636

Source: NCEM Risk Management Tool

6.5.7 Hazardous Substances

Although historical evidence and existing Toxic Release Inventory (TRI) sites indicate that the Clay Macon Region is susceptible to hazardous substance events, there are few reports of damage. Therefore, a calculated annualized loss figure may not be completely reliable.

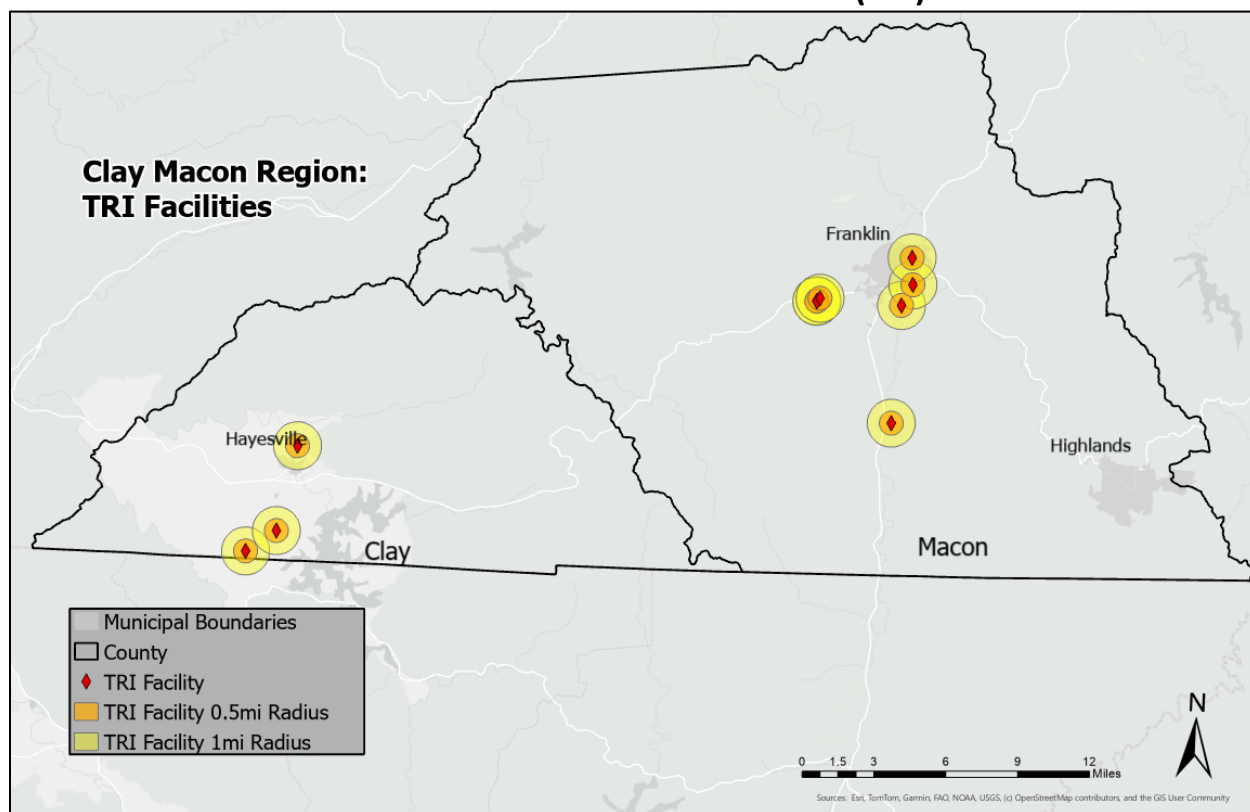
Most hazardous substance incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous substance incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and parcels¹⁸. In both scenarios, two buffer sizes, 0.5-mile and 1-mile, were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from *FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings*, and engineering judgment.

For the fixed site analysis, georeferenced TRI-listed toxic sites in the Clay Macon Region, along with buffers, were used for analysis as shown in **Figure 6.8**. For the mobile analysis, the major roads (e.g., Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported, that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure 6.9** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels, improved value, as shown in **Table 6.21** (fixed sites), **Table 6.22** (mobile road sites), and **Table 6.23** (mobile railroad sites)¹⁹.

¹⁸ This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).

¹⁹ Note that parcels included in the 1-mile analysis are also included in the 0.5-mile analysis.

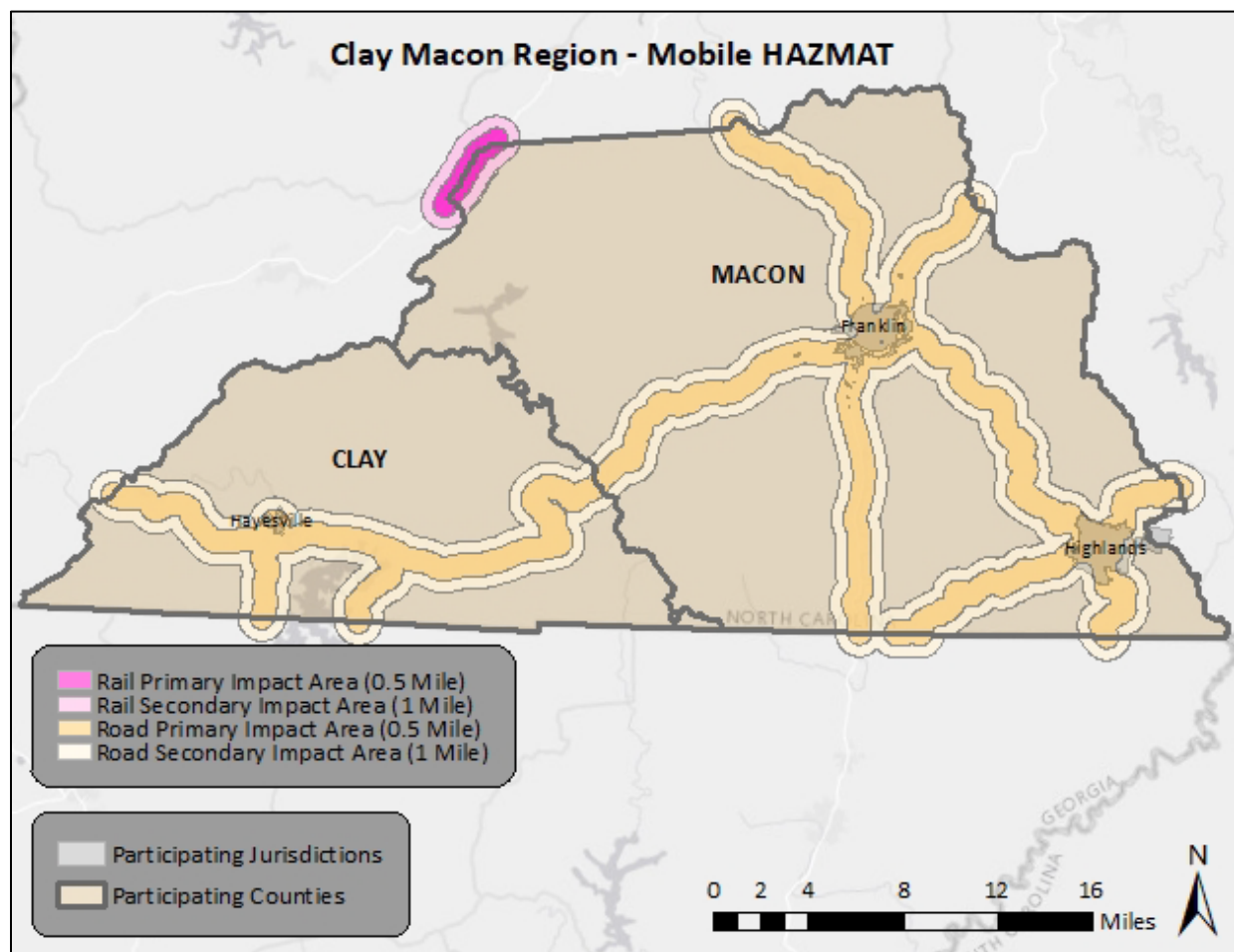
FIGURE 6.8: REGIONAL TOXIC RELEASE INVENTORY (TRI) FACILITIES

Source: EPA

TABLE 6.21: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS SUBSTANCES (FIXED SITES)

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Clay County	487	339	\$40,872,120	1,780	1,092	\$214,814,460
Hayesville	83	66	\$9,181,400	371	265	\$95,490,300
Unincorporated Area	404	273	\$31,690,720	1,409	827	\$119,324,160
Macon County	1,367	918	\$283,593,510	4,001	2,735	\$917,558,180
Franklin	740	519	\$148,846,750	1,698	1,197	\$497,754,490
Highlands	1	0	\$0	1	0	\$0
Unincorporated Area	626	399	\$134,746,760	2,302	1,538	\$419,803,690
Clay Macon Regional Total	753	480	\$100,183,010	2,812	1,947	\$448,650,410

Source: EPA, NC OneMap

FIGURE 6.9: MOBILE HAZMAT IMPACT BUFFER ZONES

Source: NC Department of Transportation

TABLE 6.22: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS SUBSTANCES (MOBILE ANALYSIS – ROAD)

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Clay County	6,005	3,355	\$580,870,884	9,323	4,880	\$824,612,089
Hayesville	443	309	\$125,076,400	459	321	\$126,307,000
Unincorporated Area	5,693	3,323	\$540,409,074	8,985	4,957	\$4,811,663,379
Macon County	18,702	12,455	\$2,838,384,070	27,606	17,704	\$3,924,379,810
Franklin	2,700	1,959	\$701,741,630	3,012	2,211	\$771,434,660
Highlands	2,756	1,985	\$1,703,276,430	3,069	2,199	\$1,963,241,620
Unincorporated Area	13,392	8,079	\$2,557,541,090	21,717	12,735	\$4,127,979,480
Clay Macon Regional Total	24,707	15,810	\$3,419,254,954	36,929	22,584	\$4,748,991,899

Source: NC Department of Transportation, NC OneMap

TABLE 6.23: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS SUBSTANCES (MOBILE ANALYSIS – RAILROAD)

Location	0.5 Mile Buffer			1.0 Mile Buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value
Clay County	0	0	0	0	0	0
Hayesville	0	0	0	0	0	0
Unincorporated Area	0	0	0	0	0	0
Macon County	95	46	\$7,678,990	111	50	\$9,015,030
Franklin	0	0	0	0	0	0
Highlands	0	0	0	0	0	0
Unincorporated Area	95	46	\$7,678,990	111	50	\$9,015,030
Clay Macon Regional Total	95	46	\$7,678,990	111	50	\$9,015,030

Source: NC Department of Transportation, NC OneMap

SOCIAL VULNERABILITY

Given high susceptibility across the entire Clay Macon Region, it is assumed that the total population is at risk of hazardous materials incidents. It should be noted that areas of higher population concentration may be at an elevated risk due to a greater burden to evacuate the population quickly.

CRITICAL FACILITIES

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are at least 55 facilities located in a HAZMAT risk zone. The primary impact zone (0.5-mile buffer) includes 8 facilities throughout the region, while the remaining facilities are in the secondary, 1-mile zone.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors revealed that there are at least 76 critical facilities located in the primary (0.5-mile) mobile HAZMAT buffer areas for roads and railroads throughout the region. Although this is a worst-case scenario model, it indicates that most of the critical facilities in the Clay Macon Region are vulnerable to a potential mobile HAZMAT incident. Additionally, there are 81 critical facilities located in the secondary (1-mile) buffer area of both roads and railroads, accounting for approximately 79 percent of the total number of critical facilities in the region. This may be the result of many critical facilities being located near major roadways for ease of access, but it is nonetheless important to recognize that a large percentage of critical facilities in the region are located in the smaller buffer area.

In conclusion, a hazardous substances incident has the potential to impact many existing and future buildings, critical facilities, and populations in the Clay Macon Region. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area, such as wind speed and direction, volume of release, etc.

6.5.8 Dam Failure

Vulnerability to dam failure in the region is essentially defined by the people, property, infrastructure, critical facilities, and the environment of areas immediately downstream of dams, especially high hazard dams. At the time of the 2025 update of this plan, there is limited modeling data available (or available data is protected) to conduct a detailed vulnerability assessment for the entire region. However, North Carolina Emergency Management has made improvements to available dam failure inundation data and dam failure impact data for many high hazard dams in North Carolina including many in the Clay Macon region. This update attempts to integrate some of those vulnerability results into this update. Specifically, more detailed vulnerability assessments can be found in Appendices K for Mountain Camp Dam in Macon County. This information will be expanded in future updates of this plan as additional dam vulnerability data becomes available.

Additionally, the North Carolina Department of Environmental Quality oversees the statewide Dam Safety Program to reduce the overall risk of this hazard and implement Emergency Action Plans (EAP) for future reference. The U.S. Army Corps of Engineers also maintains the National Inventory of Dams (NID) at the federal level.

Additional information that is available related to high hazard dams of the region can be found below in **Table 6.24**.

TABLE 6.24: SUMMARY OF REGIONAL HIGH-HAZARD DAM VULNERABILITY

Dam Name	NID ID	EAP?	Condition (as of May 2026)	Owner Type	Max Capacity (acre-feet)	Max Discharge (ft ³ /s)	River/Stream
CLAY COUNTY							
Chatuge Lake Dam	NC00391	No	Satisfactory	Federal	247,800	39,000	Hiwassee River
Mission Lake Dam	NC00348	No	Satisfactory	Private	5,433	39,000	Hiwassee River
Chatuge Saddle Dam No. 1	NC05536	No	N/A	Private	N/A	N/A	Hiwassee River
Chatuge Saddle Dam No. 2	NC05537	No	N/A	Federal	N/A	N/A	Hiwassee River
Chatuge Saddle Dam No. 3	NC05538	No	N/A	Federal	N/A	N/A	Hiwassee River
Tusquittee Landing Dam #1	NC07063	No	N/A	Private	N/A	N/A	Hiwassee River
MACON COUNTY							
Cold Springs Saddle Club Dam	NC01355	Yes*	Fair	Private	85	N/A	Big Creek
Sequoyah Dam	NC00160	Yes*	Fair	Local Gov	2,376	11,900	Cullasaja River
Franklin Dam	NC00140	No	N/A	Private	2,282	N/A	Little Tennessee River
Mirror Lake Dam	NC00159	No	Fair	Private	230	0	Cullasaja River
Queens Creek Dam	NC00333	No	N/A	Utility	1,332	N/A	Queens Creek
Nantahala Lake Dam	NC00371	No	N/A	Utility	138,730	N/A	Nantahala River
R.S. Jones Jr Upper Dam	NC03329	Yes*	Fair	Private	12	0	Wallace Branch
R.S. Jones Jr Lower Dam	NC03330	Yes*	Fair	Private	6	0	Wallace Branch
White Myatt Dam	NC00162	Yes*	Poor	Private	60	N/A	Scott Branch
Vitale Orchard Dam	NC00158	Yes*	Poor	Private	54	1,775	UT to N. Fork Skeenah Creek
Osage Lake Dam	NC00171	Yes*	Poor	Private	211	25	Watkins Creek
Ravenel Lake Dam	NC00142	Yes*	Fair	Private	185	N/A	Cullasaja River
Burningtown Lake Dam	NC01614	Yes*	Poor	Private	56	0	Daves Creek
Wilson Creek Lower Dam	NC01363	No	Poor	N/A	80	N/A	Brooks Creek
Watauga Vista Dam	NC01365	Yes*	Fair	Private	31	808	Watauga Creek
Wildwood Mountain Dam	NC01366	Yes*	Unsatisfactory	Private	15	103	Big Creek
Palmisano Dam	NC03334	Yes*	Poor	Private	12	1,500	S. Fork Skeenah Creek

SECTION 6: VULNERABILITY ASSESSMENT

Dam Name	NID ID	EAP?	Condition (as of May 2026)	Owner Type	Max Capacity (acre-feet)	Max Discharge (ft ³ /s)	River/Stream
Cliffside Lake Dam	NC00161	No	Fair	Federal	175	N/A	Skitty Creek
Club Lake Dam	NC03339	Yes*	Poor	Private	55	699	Monger Creek
Brush Creek Upper Dam	NC03341	Yes*	Fair	Private	40	N/A	Brush Creek
Brush Creek Lower Dam	NC03342	Yes*	Fair	Private	215	N/A	Brush Creek
Tritonia Dam	NC03345	No	Poor	Private	15	N/A	Iotla Creek
Trimont Mtn. Dam	NC03346	No	Poor	Private	21	0	Crawford Branch
Echo Valley Pond Dam	NC03347	No	Fair	Private	0	N/A	Coon Creek
Mountain Camp Dam	NC03349	Yes*	Poor	Private	7	N/A	Turtle Pond Creek
Browns Lake Dam	NC03350	No	Poor	Private	27	N/A	Middle Creek
Cobb Lake Dam	NC03353	No	Fair	Private	16	0	Matlock Creek
Rocky Knob Dam	NC03358	No	Fair	Private	43	N/A	Watkins Creek
Fisher Pond Dam	NC05565	No	Poor	Private	21	N/A	Watkins Creek
Rogers Dam	NC05691	Yes*	Poor	Private	0	N/A	N/A
Coweeta Lake Dam	NC06305	No	Poor	Private	N/A	N/A	Coweeta River
Trimont Trail Dam	NC06620	No	Poor	Private	N/A	N/A	UT to Crawford Branch
Eddie Bateman Dr. Dam	NC07178	No	Poor	Private	N/A	N/A	N/A

Source: NCDEQ Dam Safety Program, May 2026

*EAP not approved

People

Those who are located near a high-risk dam are at a higher risk of catastrophic damage to property, infrastructure, and critical facilities, which requires rapid response time for residents in areas of potential or imminent dam failure. Those who do not have access to telephone service may not receive imminent dam failure alerts in time to evacuate or prepare. In addition, the ability to respond to evacuation orders requires access to a vehicle. However, many residents in the region do not have access to a vehicle in their household. This can create a significant challenge in the event of evacuation orders or the need for urgent evacuation. Special considerations should also be made for those who may have limited mobility, and residents with disabilities. To address the potential impact on individuals vulnerable to dam failure impacts in the planning area, jurisdictions should consider the following mitigation actions:

- Evaluate emergency response resource capabilities to accommodate potential population growth, including additional shelters, supplies, and trained personnel.
- Expand emergency response resources to develop evacuation plans for residents without vehicles, residents with limited mobility, or those requiring extra assistance in a time-sensitive emergency.
- Conduct regular evaluations to ensure that all community members have equitable access to support and resources to prepare and recover from dam failure or levee failure events.
- Collaborate with nonprofits and community organizations to reach underserved communities and populations to ensure that flood and dam failure preparedness resources are provided.

- Consider collaborating with telephone and internet utility providers to expand service to areas with limited telephone signals to ensure that individuals in high-hazard areas can receive alerts of impending dam failure in a timely manner.

Changes in Development or Housing Characteristics

Population and housing unit increases in the region demonstrate potential need to consider limiting development in high-hazard areas. Potential mitigation actions to consider to address these challenges include the following:

- Incorporate a growth management strategy integrating housing development into emergency response plans to minimize the potential risks associated with increased development in dam hazard areas.
- Assess emergency response capabilities annually to enhance emergency response capabilities to align with projected population growth.
- Invest in flood mitigation infrastructure (e.g., retention ponds, improved drainage systems) in areas with high housing density or projected high housing density and flood risk for flooding related to dam failure.

Economy

Dam failures can damage property, businesses, agriculture, and infrastructure, resulting in a significant loss of income for the planning area. Each County in the planning area has a portion of land dedicated to agriculture, so river flooding threatens to impact local crops and agricultural operations. In addition, as the planning area aims to see a general increase in development in the future, potential dam failure could lead to property damage, infrastructure damage, and disruption of continuity of operations, significantly impacting the local economy, businesses, residents, and government. To address the potential impact on the economy from dam failure impacts in the planning area, jurisdictions should consider the following mitigation actions:

- Explore funding for flood-resilient infrastructure in key areas to improve post-dam failure flooding resilience.
- Explore funding to enhance dam maintenance and safety programs, which would fund actions such as repairing damage and addressing dam status to prevent dam failures.

Natural Environment

Dam failure causes increased soil erosion and rapid sedimentation, which clogs the waterways, decreases water quality by carrying pollutants downstream, contributing to contamination of rivers and lakes, and can destroy ecosystems downstream by destroying habitats for wildlife and plants. Dam Failure events also create the potential for hazardous materials and chemicals to contaminate local

water sources and disrupt ecosystems. To address the potential impact on the environment from dam failure in the planning area, jurisdictions should consider the following mitigation actions:

- Conduct a hazardous material inventory or confirm locations of hazardous materials in flood-prone areas or areas that may be impacted by dam failure.
- Reduce storage of hazardous materials in dam hazard areas
- Develop post-dam failure protocol to assess and clean up hazardous materials or contamination after dam failure-related flooding causes a release of hazardous materials.

First Responders

First Responders are at significant risk of severe injury and even potentially life-threatening injuries when rescuing people stuck in dangerous or life-threatening situations. Dam Failure may reduce emergency services' capacity in their response and assistance during levee failure events. To address potential vulnerabilities of first responders in the event of dam failure in the planning area, jurisdictions should consider the following mitigation actions:

- Periodically review emergency response and evacuation procedures in the event of imminent dam failure.
- Implement and maintain advanced warning systems to utilize real-time data to alert communities of impending dam failure and areas under evacuation orders.
- Establish clear evacuation routes, procedures, and operations considering those with limited transportation options, underserved communities, and residents with limited mobility.

Continuity of Operations

Dam Failure can disrupt the affected area's normal operations and create catastrophic barriers to recovery associated with damaged infrastructure, facilities, property, and critical facilities. Loss of power, disruption of communication, and reduced ability to respond to emergencies will significantly reduce the capacity to continue normal operations in the event of Dam failure. To address potential vulnerabilities of continuity of operations in the event of dam failure in the planning area, jurisdictions should consider the following mitigation actions:

- Schedule regular reviews and updates of Continuity of Operation Plans (COP) plans based on new risks, lessons learned from past dam failure events, and operation changes.
- Develop an inventory of critical resources, personnel, equipment, and supplies available during dam failure recovery and assess which resources are located primarily in high hazard dam areas to account for resources that may be damaged or destroyed by postdam failure events.

6.6 CONCLUSIONS ON HAZARD VULNERABILITY

The results of this vulnerability assessment are useful in at least three ways:

- Improving our understanding of the risk associated with the natural hazards in the Clay Macon Region through better understanding of the complexities and dynamics of risk, how levels of risk can be measured and compared, and the myriad of factors that influence risk. An understanding of these relationships is critical in making balanced and informed decisions on managing the risk.
- Providing a baseline for policy development and comparison of mitigation alternatives. The data used for this analysis presents a current picture of risk in the Clay Macon Region. Updating this risk “snapshot” with future data will enable comparison of the changes in risk with time. Baselines of this type can support the objective analysis of policy and program options for risk reduction in the region.
- Comparing the risk among the natural hazards addressed. The ability to quantify the risk of all these hazards relative to one another helps in a balanced, multi-hazard approach to risk management at each level of governing authority. This ranking provides a systematic framework to compare and prioritize the very disparate natural hazards that are present in the Clay Macon Region. This final step in the risk assessment provides the necessary information for local officials to craft a mitigation strategy to focus resources on only those hazards that pose the most threat to the region.

Exposure to hazards can be an indicator of vulnerability. Economic exposure can be identified through locally assessed values for improvements (buildings), and social exposure can be identified by estimating the population exposed to each hazard. This information is especially important for decision-makers to use in planning for evacuation or other public safety-related needs.

The types of assets included in these analyses include all building types in the participating jurisdictions. Specific information about the types of assets that are vulnerable to the identified hazards is included in each hazard subsection (for example, all building types are considered at risk to the severe winter weather hazard, and commercial, residential, and government-owned facilities are at risk to repetitive flooding, etc.).

Table 6.25 presents a summary of estimated annual losses (EAL) for each hazard and on a composite scale in the Clay Macon Region as reported in 2025 by the FEMA National Risk Index²⁰. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level. If no historical occurrences were reported, an accurate annualized loss estimate could not be obtained. These values should be used as an additional planning tool or risk measurement for determining prioritized hazard mitigation strategies of the region.

²⁰ FEMA National Risk Index (NRI) & Resilience Analysis and Planning Tool (RAPT): <https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>. Note that the Tornadoes/Thunderstorms (hail, lightning, strong wind, tornado) and Severe Winter Weather (cold wave, ice storm, winter weather) hazards are calculated using an average of available subhazard EAL data.

TABLE 6.25: POTENTIAL ESTIMATED ANNUAL LOSSES (EAL) BY HAZARD

Hazard	Clay County	Macon County	Total
Drought	\$6,627	\$5,566	\$12,193
Excessive Heat	Negligible	Negligible	Negligible
Hurricane and Coastal Hazards	\$38,053	\$408,921	\$446,974
Tornadoes/Thunderstorms ²¹	\$185,473	\$479,588	\$665,061
Severe Winter Weather ²²	\$47,138	\$250,930	\$298,068
Earthquakes	\$68,953	\$263,629	\$332,582
Geological (Landslides)	\$21,900	\$220,916	\$242,816
Dam Failure	Negligible	Negligible	Negligible
Flooding	\$98,844	\$591,589	\$690,433
Wildfires	\$4,217	\$15,042	\$19,259
Infectious Disease	Negligible	Negligible	Negligible
Hazardous Substances	Negligible	Negligible	Negligible
Radiological Emergency	Negligible	Negligible	Negligible
Terrorism	Negligible	Negligible	Negligible
Cyber	Negligible	Negligible	Negligible
Electromagnetic Pulse	Negligible	Negligible	Negligible
Civil Disturbance	Negligible	Negligible	Negligible
Food Emergency	Negligible	Negligible	Negligible

**In this table, the term “Negligible” is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there was minimal significant damage noted or because documentation of that particular type of event is not well kept.*

Source: FEMA NRI

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to natural hazards, including drought, hurricanes and coastal hazards, severe winter weather, and tornadoes/thunderstorms. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table 6.26** shows an expanded number of regional critical facilities retrieved from NCEM RMT data grouped by updated FEMA Community Lifelines²³. These critical facility counts are planning estimates subject to future changes. Additionally, **Table 6.27** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an “X”).

²¹ Calculated using an average of hail, lightning, strong wind, and tornado hazards

²² Calculated using an average of cold wave, ice storm, and winter weather hazards

²³ **FEMA Community Lifelines** are defined as “facilities that enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security.”

TABLE 6.26: REGIONAL CRITICAL FACILITIES BY FEMA COMMUNITY LIFELINE

FEMA Lifeline	Food	Comms	Hazmat	Shelter	Comms	Supply	Safety	Safety	Medical	Comms	Safety	Hazmat	Safety	Transport	Energy	Safety	Water	N/A
Location	Food & Farm	Banking & Finance	Chemical	Commercial	Comms	Manufacturing	Defense	Government	Healthcare	IT	National Monument	Nuclear	Postal & Shipping	Transport	Energy	Emergency Services	Water	Total
Clay County	891	169	0	311	0	168	0	37	12	0	0	0	0	0	3	3	2	1,596
Hayesville	60	38	0	58	0	36	0	24	6	0	0	0	0	0	0	2	2	226
Unincorporated Area	831	131	0	253	0	132	0	13	6	0	0	0	0	0	3	1	0	1,370
Macon County	0	283	0	1,112	2	152	0	82	41	0	0	0	0	0	2	13	19	1,712
Franklin	0	128	0	388	0	46	0	37	30	0	0	0	0	0	0	3	0	634
Highlands	0	31	0	153	0	7	0	7	2	0	0	0	0	0	0	3	6	210
Unincorporated Area	0	124	0	571	2	99	0	38	9	0	0	0	0	0	2	7	13	868
Clay Macon Regional Total	891	452	0	1,423	2	320	0	119	53	0	0	0	0	0	5	16	21	3,308

Source: NCEM Risk Management Tool

SECTION 6: VULNERABILITY ASSESSMENT
TABLE 6.27: HAZARD RISK PROFILES OF REGIONAL CRITICAL FACILITIES

Facility Name	Facility Type	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Clay County																		
Clay County Emergency Management	EOC/Response	X	X	X	X	X	X			X				X	X	X		
Clay County Fire and Rescue Squad, Inc.	Fire/EMS	X	X	X	X	X	X			X				X	X	X		
Clay County Fire and Rescue Squad, Inc. 2	Fire/EMS	X	X	X	X	X	X			X					X	X		
Clay County Fire and Rescue Squad, Inc. 3	Fire/EMS	X	X	X	X	X	X			X								
Clay County Fire and Rescue Squad, Inc. 4	Fire/EMS	X	X	X	X	X	X			X								
Clay County Fire and Rescue Squad, Inc. 6	Fire/EMS	X	X	X	X	X	X			X					X	X		
Clay County Fire and Rescue Squad, Inc. 7	Fire/EMS	X	X	X	X	X	X			X		X						
Clay County Fire and Rescue Squad, Inc. 14	Fire/EMS	X	X	X	X	X	X	X	X	X		X						
CLAY COUNTY AMBULANCE SERVICE	Fire/EMS	X	X	X	X	X	X			X					X	X		
CLAY COUNTY SHERIFFS OFFICE / CLAY COUNTY JAIL	Police	X	X	X	X	X	X			X				X	X	X		
Hayesville Elementary	School	X	X	X	X	X	X			X				X	X	X		
Hayesville High	School	X	X	X	X	X	X			X					X	X		
Hayesville Middle	School	X	X	X	X	X	X			X					X	X		
Carolina Christian Academy	School	X	X	X	X	X	X			X			X	X	X	X		
Good Shepherd Home Health and Hospice Agency, Inc.	Medical	X	X	X	X	X	X			X					X	X		
Mountain Home Nursing Service, Inc.	Medical	X	X	X	X	X	X			X					X	X		
Bridging the Gap of Care, Inc.	Medical	X	X	X	X	X	X			X					X	X		
Hayesville Group Home	Medical	X	X	X	X	X	X			X				X	X	X		
Smoky Mountain Counseling Center	Medical	X	X	X	X	X	X			X				X	X	X		
Macon County																		
Macon County Emergency Management	EOC/Response	X	X	X	X	X	X			X				X	X	X		

SECTION 6: VULNERABILITY ASSESSMENT

Facility Name	Facility Type	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Burningtown-Iotla Volunteer Fire & Rescue, Inc.	Fire/EMS	X	X	X	X	X	X			X								
Burningtown-Iotla Volunteer Fire & Rescue, Inc. 2	Fire/EMS	X	X	X	X	X	X			X								
Clarks Chapel Fire and Rescue Department, Inc.	Fire/EMS	X	X	X	X	X	X			X								
Clarks Chapel Fire and Rescue Department, Inc. 2	Fire/EMS	X	X	X	X	X	X			X					X			
Cowee Volunteer Fire/Rescue, Inc	Fire/EMS	X	X	X	X	X	X			X								
Cowee Volunteer Fire/Rescue, Inc 2	Fire/EMS	X	X	X	X	X	X			X					X	X		
Cowee Volunteer Fire/Rescue, Inc 3	Fire/EMS	X	X	X	X	X	X			X					X	X		
Cullasaja Gorge Fire and Rescue, Inc.	Fire/EMS	X	X	X	X	X	X			X					X	X		
Franklin Fire And Rescue Department	Fire/EMS	X	X	X	X	X	X	X	X	X					X	X		
Franklin Fire And Rescue Department 2	Fire/EMS	X	X	X	X	X	X			X					X	X		
Highlands Fire & Rescue	Fire/EMS	X	X	X	X	X	X			X					X	X		
Highlands Fire & Rescue 2	Fire/EMS	X	X	X	X	X	X			X					X	X		
Mountain/Valley Volunteer Fire & Rescue, Inc.	Fire/EMS	X	X	X	X	X	X			X					X	X		
Mountain/Valley Volunteer Fire & Rescue, Inc. 2	Fire/EMS	X	X	X	X	X	X			X					X	X		
Nantahala Volunteer Fire and Rescue, Inc.	Fire/EMS	X	X	X	X	X	X			X								
Nantahala Volunteer Fire and Rescue, Inc. 2	Fire/EMS	X	X	X	X	X	X			X								
Otto Volunteer Fire and Rescue, Inc.	Fire/EMS	X	X	X	X	X	X			X					X	X		
Otto Volunteer Fire and Rescue, Inc. 2	Fire/EMS	X	X	X	X	X	X			X					X	X		
Sky Valley - Scaly Mountain Volunteer Fire and Rescue Department Incorporated	Fire/EMS	X	X	X	X	X	X			X					X	X		
West Macon Fire and Rescue, Inc.	Fire/EMS	X	X	X	X	X	X			X					X	X		
West Macon Fire and Rescue, Inc. 2	Fire/EMS	X	X	X	X	X	X			X			X	X	X	X		
MACON COUNTY EMERGENCY MEDICAL SERVICES - NANTAHALA STATION	Fire/EMS	X	X	X	X	X	X			X								

SECTION 6: VULNERABILITY ASSESSMENT

Facility Name	Facility Type	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
MACON COUNTY EMERGENCY MEDICAL SERVICES - FRANKLIN STATION	Fire/EMS	X	X	X	X	X	X			X				X	X	X		
UNITED STATES FOREST SERVICE - NANTAHALA NATIONAL FOREST WAYAH RANGER DISTRICT	Police	X	X	X	X	X	X			X					X	X		
FRANKLIN POLICE DEPARTMENT	Police	X	X	X	X	X	X			X				X	X	X		
CITY OF HIGHLANDS POLICE DEPARTMENT	Police	X	X	X	X	X	X			X					X	X		
MACON COUNTY SHERIFFS DEPARTMENT / MACON COUNTY DETENTION CENTER	Police	X	X	X	X	X	X			X				X	X	X		
NORTH CAROLINA STATE HIGHWAY PATROL - MACON	Police	X	X	X	X	X	X			X				X	X	X		
Nantahala School	School	X	X	X	X	X	X			X								
Cartoogechaye Elementary	School	X	X	X	X	X	X			X			X	X	X	X		
Highlands School	School	X	X	X	X	X	X			X					X	X		
East Franklin Elementary	School	X	X	X	X	X	X			X			X	X	X	X		
Franklin High	School	X	X	X	X	X	X			X				X	X	X		
Iotla Valley Elementary	School	X	X	X	X	X	X			X						X		
Macon Middle School	School	X	X	X	X	X	X			X				X		X		
South Macon Elementary	School	X	X	X	X	X	X			X						X		
Macon Early College High School	School	X	X	X	X	X	X			X				X	X	X		
Mountain View Intermediate	School	X	X	X	X	X	X			X				X	X	X		
Union Academy	School	X	X	X	X	X	X			X					X	X		
Macon County Juvenile School	School	X	X	X	X	X	X			X				X	X	X		
Trimont Christian Academy	School	X	X	X	X	X	X			X					X	X		
Franklin Cardiac Rehabilitation Program	Medical	X	X	X	X	X	X			X			X	X	X	X		
Angel Home Health & Hospice	Medical	X	X	X	X	X	X			X				X	X	X		

SECTION 6: VULNERABILITY ASSESSMENT

Facility Name	Facility Type	Natural								Geological		Other						
		Drought	Excessive Heat	Hurricane & Coastal Hazards	Tornadoes/Thunderstorms	Severe Winter Weather	Earthquakes	Flood 100-year	Flood 500-year	Landslide - High Incidence	Landslide - Mod. Incidence	Wildfires	Fixed HAZMAT 0.5 Mile	Fixed HAZMAT 1 Mile	Mobile HAZMAT 0.5 Mile (Road)	Mobile HAZMAT 1 Mile (Road)	Mobile HAZMAT 0.5 Mile (Rail)	Mobile HAZMAT 1 Mile (Rail)
Companion Health Care, Inc.	Medical	X	X	X	X	X	X			X					X	X		
Continuum Home Care of Franklin	Medical	X	X	X	X	X	X			X								
Grandview Assisted Living Services	Medical	X	X	X	X	X	X			X				X	X	X		
Kelley's Home Health Services	Medical	X	X	X	X	X	X			X			X	X	X	X		
Lincare, Inc.	Medical	X	X	X	X	X	X			X					X	X		
Macon County Department on Aging	Medical	X	X	X	X	X	X			X				X	X	X		
Western Home Health Care	Medical	X	X	X	X	X	X			X				X	X	X		
Grandview Manor Care Center	Medical	X	X	X	X	X	X			X				X	X	X		
Highlands-Cashiers Hospice	Medical	X	X	X	X	X	X			X					X	X		
Angel Medical Center, Inc.	Medical	X	X	X	X	X	X			X				X	X	X		
Highlands-Cashiers Hospital, Inc.	Medical	X	X	X	X	X	X			X					X	X		
Harrison Avenue Group Home	Medical	X	X	X	X	X	X			X					X	X		
Iotla Street Group Home	Medical	X	X	X	X	X	X			X				X	X	X		
Macon County Group Home	Medical	X	X	X	X	X	X			X			X	X	X	X		
Rowland Home	Medical	X	X	X	X	X	X			X								
Shope Therapeutic Home	Medical	X	X	X	X	X	X			X								
Smoky Mountain Counseling Center	Medical	X	X	X	X	X	X			X				X	X	X		
The Family Restoration Program	Medical	X	X	X	X	X	X			X				X	X	X		
Wayah Counseling Services	Medical	X	X	X	X	X	X			X				X	X	X		
West Home	Medical	X	X	X	X	X	X			X					X	X		
Yonce House	Medical	X	X	X	X	X	X			X					X	X		
Britthaven of Franklin	Medical	X	X	X	X	X	X			X					X	X		

Source: NC OneMap

SECTION 7

CAPABILITY ASSESSMENT

This section of the plan discusses the capability of the communities in the Clay Macon Region to implement hazard mitigation activities.

This section consists of the following four subsections:

- 7.1 What is a Capability Assessment?
- 7.2 Conducting the Capability Assessment
- 7.3 Capability Assessment Findings
- 7.4 Conclusions on Local Capability

7.1 WHAT IS A CAPABILITY ASSESSMENT?

The purpose of the capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects.¹ As in any planning process, it is important to try to establish feasible goals, objectives, and/or actions based on an understanding of the organization's capacity (agencies and/or departments) to implement the proposed strategies. The capability assessment helps determine practical mitigation actions that are likely to be implemented over time, given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate.

A capability assessment has two primary components: 1) an inventory of a local jurisdiction's relevant plans, ordinances, or programs already in place and 2) an analysis of its capacity to implement mitigation measures. Careful examination of local capabilities helps identify existing gaps, shortfalls, or weaknesses with ongoing government activities that potentially hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A capability assessment acknowledges the existing mitigation measures (completed or underway) at the local government level, which should be leveraged and enhanced through future mitigation efforts.

The capability assessment completed for the Clay Macon Region serves as a critical planning step and an integral part of the foundation for designing an effective hazard mitigation strategy. Coupled with the risk assessment, the capability assessment helps identify and target meaningful mitigation actions for incorporation in the Mitigation Strategy portion of the Hazard Mitigation Plan. This helps establish the

¹ 1 While the Final Rule for implementing the Disaster Mitigation Act of 2000 does not require a local capability assessment to be completed for local hazard mitigation plans, it is a critical step in developing a mitigation strategy that meets the needs of the region while taking into account their own unique abilities. The Rule does state that a community's mitigation strategy should be "based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools" (44 CFR, Part 201.6(c)(3)).

goals and objectives for the region to pursue under this Plan and ensures that such goals and objectives are feasible under given local conditions.

7.1.1 Hurricane Helene Post-Disaster Capability Considerations

The 2026 Clay Macon Regional Hazard Mitigation Plan update was developed during the broader Hurricane Helene recovery period occurring throughout western North Carolina. As a result, stakeholder discussions regarding local capability and implementation capacity were informed by recent response and recovery experiences throughout the region. Participating jurisdictions and agencies remained actively involved in roadway repairs, debris management, drainage maintenance, utility restoration, permitting, and emergency coordination activities throughout development of the plan update.

During the Hazard Identification and Risk Assessment (HIRA) and Mitigation Strategy Workshop, stakeholders identified roadway connectivity, stormwater and drainage limitations, utility resilience, emergency communications, and staffing capacity as continuing operational concerns throughout the Clay Macon Region. Stakeholders discussed the challenges associated with maintaining emergency access and transportation connectivity throughout mountainous terrain where roadway redundancy is limited and localized flooding, fallen trees, debris accumulation, and slope instability can disrupt transportation networks and utility services.

Stakeholder discussions also emphasized the importance of maintaining administrative and technical capability associated with grant administration, mitigation project implementation, floodplain management, infrastructure maintenance, and emergency management coordination throughout smaller rural jurisdictions. These discussions reinforced the importance of regional coordination and intergovernmental partnerships throughout both day-to-day operations and post-disaster recovery efforts.

7.2 CONDUCTING THE CAPABILITY ASSESSMENT

To facilitate the inventory and analysis of local government capabilities within Clay and Macon counties, a detailed capability assessment was completed for each of the participating jurisdictions based on the information found in existing hazard mitigation plans and local government websites. The assessment compiled information on various “capability indicators” including relevant planning regulatory practices (plans, programs, and ordinances), fiscal resources, administrative and technical capacity, and current political climate. These capability indicators provide insight into existing conditions that support and/or hinder the region’s ability to implement hazard mitigation actions.

The standardized indicators used to assess capability promote an extensive inventory of existing local plans, ordinances, programs, and resources that are in place or underway in addition to their overall effect on hazard loss reduction. Additionally, this information can help identify gaps, weaknesses, or conflicts that counties and local jurisdictions can be addressed through newly proposed mitigation actions as part of the hazard mitigation strategy.

The information collected for the capability assessment was incorporated into a database for further analysis. A general scoring methodology was then applied to quantify each jurisdiction’s overall capability. According to the scoring system, each capability indicator was assigned a point value based

on its relevance to hazard mitigation. The scoring methodology is included in Appendix B: Planning Tools. Using this scoring methodology, a total score² and an overall capability rating of “high,” “moderate,” or “limited” could be determined according to the total number of points received. These classifications are designed to provide a general assessment of local government capability. The results of this capability assessment help inform and the development of an effective and practical mitigation strategy.

7.2.1 Integration of Post-Helene Recovery Conditions

Post-Hurricane Helene recovery conditions were incorporated throughout development of the 2026 Clay Macon Regional Hazard Mitigation Plan update and informed discussions regarding hazard vulnerability, infrastructure resilience, mitigation priorities, and long-term planning considerations throughout the region. Stakeholders incorporated observations and lessons learned associated with localized flooding, roadway disruptions, utility outages, debris accumulation, and infrastructure-related impacts experienced throughout portions of Clay and Macon counties during Hurricane Helene.

Throughout the planning process, stakeholders emphasized the importance of transportation connectivity along major regional corridors such as U.S. 64, U.S. 23/441, NC 28, and secondary mountain roadway networks that support emergency response, utility access, and regional connectivity throughout the mountainous planning region. Discussions also focused on stormwater and drainage infrastructure limitations, culvert maintenance needs, utility resilience, and ongoing infrastructure maintenance demands throughout the region. These observations helped inform updates to vulnerability discussions, mitigation actions, infrastructure considerations, and future planning assumptions incorporated throughout the 2026 update.

7.3 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this plan to provide insight into the relevant capacity of the participating jurisdictions in the Clay Macon Region to implement hazard mitigation activities. All information is based upon the review of existing hazard mitigation plans and local government websites and input provided by local government officials during meetings of the Clay Macon Regional Hazard Mitigation Planning Team.

7.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the successful enforcement and implementation of plans, ordinances, and programs that are intended to guide and manage growth, development, and redevelopment in a responsible manner while maintaining the general welfare of the community.

It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning; the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built; as well as protecting environmental, historic, and cultural resources in the community. These planning initiatives generally present significant

² The scoring methodology used to quantify and rank the region’s capability can be found in Appendix B.

SECTION 7: CAPABILITY ASSESSMENT

opportunities to integrate hazard mitigation principles and practices into the local decision-making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools and programs in place or underway for the participating jurisdictions in the Clay Macon Region and highlight the potential effect on loss reduction. This information helps identify opportunities to address existing gaps, weaknesses, or conflicts with other initiatives in addition to integrating the implementation of this Plan with existing planning mechanisms where appropriate.

Table 7.1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the jurisdictions in the Clay Macon Region. A checkmark (✓) indicates that the given item is currently in place and an asterisk (*) indicates that the given item is currently being developed for future implementation.

TABLE 7.1: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning / Regulatory Tool	CLAY COUNTY	Hayesville	MACON COUNTY	Franklin	Highlands
Hazard Mitigation Plan	✓	✓	✓	✓	✓
Comprehensive Land Use Plan	✓	✓	✓	✓	✓
Floodplain Management Plan	✓	✓			
Open Space Management Plan (Parks & Rec/Greenway Plan)	✓	✓	✓		✓
Stormwater Management Plan/Ordinance				✓	✓
Natural Resource Protection Plan					
Flood Response Plan					
Emergency Operations Plan	✓	✓	✓	✓	✓
Continuity of Operations Plan			✓	✓	✓
Evacuation Plan					
Disaster Recovery Plan					
Capital Improvements Plan	✓	✓	✓	✓	✓
Economic Development Plan			✓		
Historic Preservation Plan					

Planning / Regulatory Tool	CLAY COUNTY	Hayesville	MACON COUNTY	Franklin	Highlands
Flood Damage Prevention Ordinance	✓	✓	✓	✓	✓
Zoning Ordinance		✓		✓	✓
Subdivision Ordinance	✓	✓	✓	✓	✓
Unified Development Ordinance				✓	✓
Post-Disaster Redevelopment Ordinance					
Building Code	✓	✓	✓	✓	✓
Fire Code	✓	✓	✓	✓	✓
National Flood Insurance Program (NFIP)	✓	✓	✓	✓	✓
NFIP Community Rating System					

7.3.1.1 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases include preparedness, response, and recovery. Each phase is interconnected with hazard mitigation, as **Figure 7.1** suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before disaster strikes, such as the elevation of flood prone structures or the continuous enforcement of policies that prevent and regulate development that is vulnerable to hazards due to its location, design, or other characteristics. Mitigation opportunities can be presented during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane, and during the long-term recovery and redevelopment process following a hazard event.

FIGURE 7.1: THE FOUR PHASES OF EMERGENCY MANAGEMENT



Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As a result, the Capability Assessment Survey asked several questions across a range of emergency management plans in order to assess the Clay Macon Region's willingness to plan and their level of technical planning proficiency.

Hazard Mitigation Plan: A hazard mitigation plan represents a community's blueprint for how it intends to reduce the impact of natural and human-caused hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

- Both of the counties participating in this multi-jurisdictional plan adopted the previous version of this plan. Each participating municipality was also included in previous version of the regional plan.

Disaster Recovery Plan: A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event.

- None of the participating jurisdictions have adopted a disaster recovery plan. The jurisdictions should consider developing a plan to guide the recovery and reconstruction process following a disaster.

Emergency Operations Plan: An emergency operations plan outlines responsibilities and the means by which resources are deployed during and following an emergency or disaster.

- The Clay County Emergency Management Office maintains emergency operational guidelines which define the responsibility of every person and organization involved in the response and recovery of an emergency in the county.

- The Macon County Emergency Management Office maintains a countywide emergency operations plan for the county and its incorporated municipalities.

Continuity of Operations Plan: A continuity of operations plan establishes a chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster event.

- None of the participating jurisdictions have adopted a continuity of operations plan. However, Macon County addresses continuity of operations in its emergency operations plan.

7.3.1.2 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they are not designed as such. Therefore, the Capability Assessment Survey also asked questions regarding general planning capabilities and the degree to which hazard mitigation is integrated into other on-going planning efforts in the Clay Macon Region.

Comprehensive Land Use Plan: A comprehensive land use plan establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically, a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions.

- Clay County has adopted a comprehensive plan intended to help county government leaders and citizens guide short- and long-range change, growth, and development. This plan includes the unincorporated area of Clay County as well as the incorporated Town of Hayesville and its extraterritorial jurisdiction.
- Macon County, the Town of Franklin, and the Town of Highlands have each adopted a comprehensive land use plan. Each jurisdiction's plan is intended to help guide short- and long-range change, growth, and development.

Capital Improvements Plan: A capital improvements plan guides the scheduling of spending on public improvements. A capital improvements plan can serve as an important mechanism for guiding future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

- Clay County included a 20-year capital improvement plan in the county Water and Sewer System Master Plan update that summarizes the capital improvements recommended in the plan.
- In Macon County, each department in the county has developed a 6-year capital improvements plan. The Town of Franklin has also implemented a 20-year water capital improvement plan and the Town of Highlands has developed a wastewater collection system capital improvement plan.

SECTION 7: CAPABILITY ASSESSMENT

Historic Preservation Plan: A historic preservation plan is intended to preserve historic structures or districts within a community. An often-overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards and the identification of ways to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards or are within a historic district that cannot easily be relocated out of harm's way.

- None of the counties or municipalities participating in this multi-jurisdictional plan have a historic preservation plan.

Zoning Ordinance: Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety, and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas.

- Clay County has not adopted a zoning ordinance in the unincorporated areas of the county. However, the Town of Hayesville has adopted a zoning ordinance.
- Macon County does not have a zoning ordinance. However, the Towns of Franklin and Highlands include zoning regulations as part of their local unified development ordinances.

Subdivision Ordinance: A subdivision ordinance is intended to regulate the development of residential, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development.

- Clay County and the Town of Hayesville have each adopted and enforce subdivision regulations.
- Macon County has adopted subdivision regulations. The Towns of Franklin and Highlands include subdivision regulations as part of their local unified development ordinances.

Building Codes, Permitting, and Inspections: Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

- North Carolina has a state compulsory building code, which applies throughout the state; however, jurisdictions may adopt codes if approved as providing adequate minimum standards. All of the participating counties and municipalities have adopted a building code.
- Clay County provides building code enforcement for the unincorporated county as well as the Town of Hayesville.
- Macon County enforces the building code and performs inspections in the county and both the Towns of Franklin and Highlands.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program developed by the Insurance Services Office, Inc. (ISO).³ In North Carolina, the North Carolina Department of Insurance assesses the building codes in effect in a particular community and how the community enforces its building codes *with special emphasis on mitigation of losses from natural hazards*. The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The concept is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses and, as a result, should have lower insurance rates.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education as well as the number of inspections performed per day. This type of information combined with local building codes is used to determine a grade for that jurisdiction. The grades range from 1 to 10 with a BCEGS grade of 1 representing exemplary commitment to building code enforcement and a grade of 10 indicating less than minimum recognized protection.

7.3.1.3 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. Accordingly, advanced tools have been developed and are readily available to help reduce the impacts associated with flooding. These tools are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards.

Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step to implement and sustain an effective hazard mitigation program. It is therefore used as part of this assessment as a key indicator for measuring local capability. In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain.

These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year flood event and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties. A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in the community.

Table 7.2 provides NFIP policy and claim information for each participating jurisdiction in the Clay Macon Region.

³ Participation in BCEGS is voluntary and may be declined by local governments if they do not wish to have their local building codes evaluated.

TABLE 7.2: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	Policies in Force	Insurance in Force	Total Losses	Total Payments to Date
CLAY COUNTY†	04/01/99	05/04/09	120	\$33,930,000	28	\$141,226
Hayesville	12/11/08	05/04/09	17	\$4,595,000	0	\$0
MACON COUNTY†	06/01/01	04/19/10	170	\$45,512,000	70	\$1,968,752
Franklin	02/23/71	04/19/10	20	\$6,206,000	3	\$68,446
Highlands	10/28/09	04/19/10	42	\$14,485,000	0	\$0

†Includes unincorporated areas of county only

Source: NFIP Community Status information as of May 2026; NFIP claims and policy information as of December 2025

All jurisdictions listed above that are participants in the NFIP will continue to comply with all required provisions of the program and will work to adequately comply in the future utilizing several strategies. For example, the jurisdictions will coordinate with NCEM and FEMA to develop maps and regulations related to special flood hazard areas within their jurisdictional boundaries and, through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property.

Community Rating System: An additional indicator of floodplain management capability is the active participation of local jurisdictions in the Community Rating System (CRS). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP by adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class rating. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in **Table 7.3**. As class rating improves (the lower the number the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

TABLE 7.3: CRS PREMIUM DISCOUNTS, BY CLASS

CRS Class	Premium Reduction
1	45%
2	40%
3	35%
4	30%
5	25%

SECTION 7: CAPABILITY ASSESSMENT

6	20%
7	15%
8	10%
9	5%
10	0

Source: FEMA

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years based on community comments. Changes were made with the intent to make the CRS more user-friendly and make extensive technical assistance available for communities who request it.

- None of the jurisdictions currently participate in the CRS. Participation in the CRS program should be considered as a mitigation action by the counties and other municipalities. The program would be most beneficial to Macon County and Clay County, which have 152 and 118 NFIP policies, respectively.

Flood Damage Prevention Ordinance: A flood damage prevention ordinance establishes minimum building standards in the floodplain with the intent to minimize public and private losses due to flood conditions.

- All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. All counties and municipalities participating in this hazard mitigation plan also participate in the NFIP and they all have adopted flood damage prevention regulations.

Floodplain Management Plan: A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts.

- Clay County has a floodplain management plan that contains provisions for elevating structures in the floodplain and structural measures like rebuilding and retrofitting but as only Zone A flood maps are available, the requirements are not specific.

Open Space Management Plan: An open space management plan is designed to preserve, protect, and restore largely undeveloped lands in their natural state and to expand or connect areas in the public domain such as parks, greenways, and other outdoor recreation areas. In many instances, open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood-prone areas in their natural state in perpetuity.

- Clay County has a system-wide comprehensive parks and recreation plan that describes existing facilities, rationale for the decisions in improvements, maintenance, and acquisition.
- Macon County has adopted a parks and recreation master plan and the Town of Highlands has adopted a greenway plan.

SECTION 7: CAPABILITY ASSESSMENT

Stormwater Management Plan: A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

- None of the participating jurisdictions have stormwater management plans in place; however, the Towns of Franklin and Highlands have adopted stormwater management regulations through their respective unified development ordinances. Clay County, the Town of Hayesville, and Macon County also include some regulations related to stormwater management in various local ordinances.

Substantial Damage Estimate Procedures: Properties in communities that participate in the NFIP that are determined to be “substantially damaged” following a flood event must be brought into compliance with the local flood damage prevention ordinance. Determination of substantial damage is a coordinated effort between emergency management, police and fire departments and permitting departments such as planning and building inspections departments. Substantial damage estimating procedures for participating jurisdictions are detailed below. The SDE procedures are summarized in **Table 7.4**.

TABLE 7.4: SUBSTANTIAL DAMAGE ESTIMATE (SDE) PROCEDURES

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
CLAY COUNTY	The County maintains a county-wide Flood Damage Prevention Ordinance.	The County Building Inspector is designated as the floodplain administrator. Determination of substantial damage is a coordinated effort between Clay County Emergency Management, Police and Fire Departments, Permitting Departments and all jurisdictions within the County that participate in the NFIP.	Following a flood event, County Emergency Management staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: - Estimation of market value or obtaining appraisal - Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure - Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by County staff and compliance with building codes and flood prevention ordinance required.

SECTION 7: CAPABILITY ASSESSMENT

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
Town of Hayesville	The County maintains and enforces a county-wide Flood Damage Prevention Ordinance, which includes Hayesville.	The County Building Inspector is designated as the floodplain administrator.	Clay County provides floodplain management services for Hayesville. (See specific procedures above)	Clay County provides floodplain management services for Hayesville,. (See specific procedures above)
MACON COUNTY	The County maintains a county-wide Flood Damage Prevention Ordinance.	The County Director of Planning, Permitting, and Development is designated as the floodplain administrator. Determination of substantial damage is a coordinated effort between Macon County Emergency Management, Police and Fire Departments, Permitting Departments and all jurisdictions within the County that participate in the NFIP.	Following a flood event, County Emergency Management staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: d. Estimation of market value or obtaining appraisal e. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure f. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by County staff and compliance with building codes and flood prevention ordinance required.
Town of Franklin	The Town maintains a town-wide Flood Damage Prevention Ordinance.	The Town Land Use Administrator is designated as the floodplain administrator. Determination of substantial damage is a coordinated effort between relevant Town staff and Macon County Emergency Management, Police and Fire Departments, Permitting Departments.	Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.

SECTION 7: CAPABILITY ASSESSMENT

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
			c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	
Town of Highlands	The County maintains and enforces a county-wide Flood Damage Prevention Ordinance, which includes Highlands.	The County Director of Planning, Permitting, and Development is designated as the floodplain administrator.	Macon County provides floodplain management services for Highlands. (See specific procedures above)	Clay County provides floodplain management services for Highlands. (See specific procedures above)

7.3.1.4 Post-Helene Planning and Regulatory Context

Hurricane Helene reinforced the importance of local planning and regulatory capability throughout the Clay Macon Region, particularly related to floodplain management, development review, stormwater management, and infrastructure planning within mountainous terrain. Stakeholder discussions throughout the planning process emphasized the importance of maintaining and enforcing local development regulations intended to reduce vulnerability associated with flooding, erosion, steep slopes, and infrastructure limitations.

The planning process also highlighted the importance of integrating hazard mitigation considerations into future land use planning, infrastructure investments, capital improvement planning, and post-disaster recovery activities throughout the region. Discussions regarding roadway vulnerabilities, drainage limitations, emergency access, and continued development pressures throughout mountain communities informed updates to mitigation actions and long-term resilience considerations included within the 2026 update.

7.3.2 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using Geographic Information

SECTION 7: CAPABILITY ASSESSMENT

Systems (GIS) to analyze and assess community hazard vulnerability. The Capability Assessment Survey was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Table 7.4 provides a summary of the capability assessment results for the Clay Macon Region with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

TABLE 7.4: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	CLAY COUNTY	Hayesville	MACON COUNTY	Franklin	Highlands
Planners with knowledge of land development / land management practices			✓	✓	✓
Engineers or professionals trained in construction practices related to buildings and/or infrastructure	✓	✓	✓	✓	✓
Planners or engineers with an understanding of natural and/or human-caused hazards					
Emergency Manager	✓	✓	✓	✓	✓
Floodplain Manager	✓	✓	✓	✓	✓
Land Surveyors					
Scientists familiar with the hazards of the community	✓	✓	✓	✓	✓
Staff with education or expertise to assess the community's vulnerability to hazards	✓	✓	✓	✓	✓
Personnel skilled in GIS and/or Hazus	✓	✓	✓	✓	✓
Resource development staff or grant writers					

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

7.3.2.1 Post-Helene Administrative and Staffing Context

The post-Helene recovery environment highlighted the importance of administrative and technical capability throughout the Clay Macon Region. Participating jurisdictions and agencies remained actively involved in disaster coordination, debris management, permitting, infrastructure repair coordination, damage documentation, and funding-related activities throughout development of the 2026 plan update.

Stakeholder discussions emphasized that smaller rural jurisdictions throughout the region often rely on coordination between county governments, municipalities, NC Emergency Management, utility providers, and regional partners to support technical planning, grant administration, emergency management operations, and mitigation project implementation. Discussions also highlighted the importance of maintaining staff capacity, technical expertise, GIS and mapping capabilities, emergency communications systems, and grant management capability throughout the region

7.3.3 Fiscal Capability

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of outside grant funding awards or locally-based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project, such as the acquisition of flood-prone homes, which can require a substantial commitment from local, state, and federal funding sources. The Capability Assessment Survey was used to capture information on the region's fiscal capability through the identification of locally available financial resources.

Table 7.5 provides a summary of the results for the Clay Macon Region with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous county hazard mitigation plans.

TABLE 7.5: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	CLAY COUNTY	Hayesville	MACON COUNTY	Franklin	Highlands
Capital Improvement Programming	✓	✓	✓	✓	✓
Community Development Block Grants (CDBG)	✓	✓	✓	✓	✓
Special Purpose Taxes (or taxing districts)	✓	✓	✓	✓	✓
Gas / Electric Utility Fees					
Water / Sewer Fees					
Stormwater Utility Fees					
Development Impact Fees					
General Obligation, Revenue, and/or Special Tax Bonds					
Partnering Arrangements or Intergovernmental Agreements	✓		✓	✓	✓
Other: HMGP, FMAP, PDM, and other federal, state, local and non-governmental funding sources, etc.	✓	✓	✓	✓	✓

7.3.3.1 Post Helene Fiscal Resource Considerations

Stakeholder discussions conducted throughout the planning process emphasized the financial challenges associated with maintaining and repairing infrastructure throughout rural mountain communities, particularly following severe weather events such as Hurricane Helene. Ongoing recovery-related activities throughout western North Carolina further reinforced the importance of state and federal funding assistance, hazard mitigation grants, infrastructure funding programs, and regional coordination to support long-term resilience and recovery efforts.

The planning process also highlighted the importance of prioritizing mitigation projects that improve drainage infrastructure, roadway resilience, utility reliability, emergency communications, and flood risk reduction throughout the region. Stakeholders discussed the need to pursue additional mitigation funding opportunities and maintain administrative capacity necessary to support grant application, management, and implementation activities throughout the Clay Macon Region.

7.3.4 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority or may conflict with or be seen as an impediment to other goals of the community, such as growth and economic development. Therefore, the local political climate must be considered in designing mitigation strategies as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

The Capability Assessment Survey was used to capture information on political capability of the Clay Macon Region. Previous county-level hazard mitigation plans were reviewed for general examples of local political capability, such as guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (i.e., building codes, floodplain management, etc.).

7.3.4.1. Post-Helene Political Capability and Policy Context

The post-Helene recovery environment reinforced the importance of continued political support for hazard mitigation, infrastructure resilience, emergency management coordination, and long-term recovery planning throughout the Clay Macon Region. Participating jurisdictions and stakeholders continued coordinating throughout development of the 2026 update despite ongoing operational and recovery-related demands occurring throughout western North Carolina.

Stakeholder participation throughout the planning process demonstrated continued regional support for mitigation planning, infrastructure improvements, emergency communications, drainage and stormwater management, and resilience-focused planning initiatives throughout the region. Coordination between county governments, municipalities, NC Emergency Management, and regional stakeholders also reinforced the importance of maintaining collaborative decision-making and long-term commitment to hazard mitigation implementation throughout the Clay Macon Region.

7.4 CONCLUSIONS ON LOCAL CAPABILITY

In order to form meaningful conclusions on the assessment of local capability, a quantitative scoring methodology was designed and applied to results of the capability assessment. This methodology, further described in **Appendix B**, attempts to assess the overall level of capability of the Clay Macon Region to implement hazard mitigation actions.

The overall capability to implement hazard mitigation actions varies among the participating jurisdictions. For planning and regulatory capability, all of the jurisdictions are in the moderate range. There is some variation in the administrative and technical capability among the jurisdictions with larger jurisdictions generally having greater staff and technical resources. All of jurisdictions are in the limited range for fiscal capability.

Table 7.6 shows the results of the capability assessment using the designed scoring methodology. The capability score is based solely on the information found in existing hazard mitigation plans and readily

available on the jurisdictions' government websites. According to the assessment, the average local capability score for all jurisdictions is 32.2, which falls into the moderate capability ranking.

TABLE 7.6: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
CLAY COUNTY	36	Moderate
Hayesville	34	Moderate
MACON COUNTY	38	Moderate
Franklin	38	Moderate
Highlands	38	Moderate

As previously discussed, one of the reasons for conducting a Capability Assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified for each jurisdiction in the tables found throughout this section. The participating jurisdictions used the Capability Assessment as part of the basis for the Mitigation Actions that are identified in **Section 9**; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their Mitigation Actions.

7.4.1 Linking the Capability Assessment with the Risk Assessment and the Mitigation Strategy

The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. During the process of identifying specific mitigation actions to pursue, the regional planning committee considered not only each jurisdiction's level of hazard risk, but also their existing capability to minimize or eliminate that risk.

SECTION 8

MITIGATION STRATEGY

This section of the Plan provides the blueprint for the participating jurisdictions in the Clay Macon Region to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Clay Macon Regional Hazard Mitigation Planning Team and the findings and conclusions of the *Capability Assessment* and *Risk Assessment*. It consists of the following five subsections:

- 8.1 Introduction
- 8.2 Mitigation Goals
- 8.3 Identification and Analysis of Mitigation Techniques
- 8.4 Selection of Mitigation Techniques for the Clay Macon Region
- 8.5 Plan Update Requirement

8.1 INTRODUCTION

The intent of the Mitigation Strategy is to provide Clay and Macon Counties and their municipalities with the goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of mitigation techniques available to meet those goals and reduce the impact of identified hazards. It is designed to be comprehensive, strategic, and functional in nature:

- In being *comprehensive*, the development of the strategy includes a thorough review of all hazards and identifies extensive mitigation measures intended to not only reduce the future impacts of high risk hazards, but also to help the region achieve compatible economic, environmental, and social goals.
- In being *strategic*, the development of the strategy ensures that all policies and projects proposed for implementation are consistent with pre-identified, long-term planning goals.
- In being *functional*, each proposed mitigation action is linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the Mitigation Strategy includes the identification of mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific mitigation actions. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas through a local ordinance) and hazard mitigation projects that seek to address specifically targeted hazard risks (such as the acquisition and relocation of a repetitive loss structure).

The second step involves the identification, consideration, and analysis of available mitigation measures

to help achieve the identified mitigation goals. This is a long-term, continuous process sustained through the development and maintenance of this Plan. Alternative mitigation measures will continue to be considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as this Plan is maintained over time.

The third and last step in designing the Mitigation Strategy is the selection and prioritization of specific mitigation actions for the Clay Macon Region (provided separately in Section 9: *Mitigation Action Plan*). Each county and participating jurisdiction has its own Mitigation Action Plan (MAP) that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process.

The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for the participating counties and municipalities to complete. Each action has accompanying information, such as those departments or individuals assigned responsibility for implementation, potential funding sources, and an estimated target date for completion. The MAP provides those departments or individuals responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring success or progress over time. The cohesive collection of actions listed in the MAP can also serve as an easily understood menu of mitigation policies and projects for those local decision makers who want to quickly review the recommendations and proposed actions of the Regional Hazard Mitigation Plan.

In preparing each Mitigation Action Plan for the Clay Macon Region, officials considered the overall hazard risk and capability to mitigate the effects of hazards as recorded through the risk and capability assessment process, in addition to meeting the adopted mitigation goals and unique needs of the community.

8.1.1 Mitigation Action Prioritization

Prioritization of the proposed mitigation actions was based on the following six factors:

- Effect on overall risk to life and property
- Ease of implementation
- Political and community support
- A general economic cost/benefit review¹
- Funding availability
- Continued compliance with the NFIP

The point of contact for each county helped coordinate the prioritization process by reviewing each

¹ Only a general economic cost/benefit review was considered by the Regional Hazard Mitigation Planning Committee through the process of selecting and prioritizing mitigation actions. Mitigation actions with “high” priority were determined to be the most cost effective and most compatible with the participating jurisdictions’ unique needs. Actions with a “moderate” priority were determined to be cost-effective and compatible with jurisdictional needs, but may be more challenging to complete administratively or fiscally than “high” priority actions. Actions with a “low” priority were determined to be important community needs, but the community likely identified several potential challenges in terms of implementation (e.g. lack of funding, technical obstacles). A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.

action and working with the lead agency/department responsible to determine a priority for each action using the six factors listed above.

Using these criteria, actions were classified as high, moderate, or low priority by the participating jurisdiction officials.

8.2 MITIGATION GOALS

44 CFR Requirement
44 CFR Part 201.6(c)(3)(i): The mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The primary goal of all local governments is to promote the public health, safety, and welfare of its citizens. In keeping with this standard, Clay and Macon counties and the participating municipalities have developed goal statements for local hazard mitigation planning in the region. In developing these goals during the development of the initial version of this regional plan, the previous two county hazard mitigation plans were reviewed to determine areas of consistency. Many of the goals were similar and regional goals were formulated based on commonalities found between the goals in each plan. The regional goals are presented in **Table 8.1**.

As part of the plan update process, and as required by FEMA during 5-year plan updates, the regional goals were reviewed, voted on, and confirmed by the Planning Team at the second Regional Hazard Mitigation Planning Team meeting. It was determined that the goals, with some minor revisions to the working, are still applicable for the region. Each goal, purposefully broad in nature, serves to establish parameters that were used in developing more mitigation actions. Consistent implementation of actions over time will ensure that community goals are achieved.

TABLE 8.2: CLAY MACON REGIONAL MITIGATION GOALS

Goal	
Goal #1	Prevent or lessen the negative impacts caused by natural disasters and/or technological and manmade incidents.
Goal #2	Through implementation of mitigation projects, increase the response capability in the region.
Goal #3	Protect public and private property and other assets from the damage that results from hazard events.
Goal #4	Increase public awareness of natural and technological/manmade hazards.
Goal #5	Reduce the impact of hazards by preserving or restoring the function of natural systems.
Goal #6	Lessen the impact of hazards by responsibly modifying the environment, hardening existing or proposed structures, and implementing projects that have a positive effect on reducing the negative impact of hazards.

8.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

44 CFR Requirement

44 CFR Part 201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effect of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In formulating the Mitigation Strategy for the Clay Macon Region, a wide range of activities were considered in order to help achieve the established mitigation goals, in addition to addressing any specific hazard concerns. These activities were discussed during the Clay Macon Regional Hazard Mitigation Planning Team meetings. In general, all activities considered by the Regional Hazard Mitigation Planning Team can be classified under one of the following six broad categories of mitigation techniques: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, and Public Awareness and Education. These are discussed in detail below.

8.3.1 Prevention

Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- Planning and zoning
- Building codes
- Open space preservation
- Floodplain regulations
- Stormwater management regulations
- Drainage system maintenance
- Capital improvements programming
- Riverine / fault zone setbacks

8.3.2 Property Protection

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Acquisition
- Relocation
- Building elevation
- Critical facilities protection
- Retrofitting (e.g., windproofing, floodproofing, seismic design techniques, etc.)
- Safe rooms, shutters, shatter-resistant glass
- Insurance

8.3.3 Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- Floodplain protection
- Watershed management
- Riparian buffers
- Forest and vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.)
- Erosion and sediment control
- Wetland preservation and restoration

- Habitat preservation
- Slope stabilization

8.3.4 Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Reservoirs
- Dams / levees / dikes / floodwalls
- Diversions / detention / retention
- Channel modification
- Storm sewers

8.3.5 Emergency Services

Although not typically considered a “mitigation” technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems
- Evacuation planning and management
- Emergency response training and exercises
- Sandbagging for flood protection
- Installing temporary shutters for wind protection

8.3.6 Public Education and Awareness

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects
- Speaker series / demonstration events
- Hazard map information
- Real estate disclosure
- Library materials
- School children educational programs
- Hazard expositions

8.5 SELECTION OF MITIGATION TECHNIQUES FOR THE CLAY MACON REGION

In order to determine the most appropriate mitigation techniques for the communities in the Clay Macon Region, the Regional Hazard Mitigation Planning Team members thoroughly reviewed and considered the findings of the *Capability Assessment* and *Risk Assessment* to determine the best activities for their respective communities. Other considerations included the effect of each mitigation action on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if necessary).

8.6 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the Mitigation Actions identified in the previous Clay Macon Regional Hazard Mitigation Plan to determine their 2026 implementation status. Updates on the implementation status of each action are provided. Any change to the relative priority of the action was noted during this update as well. The mitigation actions provided in Section 9: Mitigation Action Plan include the mitigation actions from the previous plans as well as any new mitigation actions proposed through the 2026 planning process. Actions identified as completed in previous versions of the plan have been moved to Appendix E.

SECTION 9

MITIGATION ACTION PLAN

This section includes the listing of the mitigation actions proposed by the participating jurisdictions in the Clay Macon Region. It consists of the following two subsections:

- 9.1 Overview
- 9.2 Mitigation Action Plans

44 CFR Requirement

44 CFR Part 201.6(c)(3)(iii): The mitigation strategy shall include an action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction.

9.1 OVERVIEW

As described in the previous section, the Mitigation Action Plan, or MAP, provides a functional plan of action for each jurisdiction. It is designed to achieve the mitigation goals established in Section 8: *Mitigation Strategy* and will be maintained on a regular basis according to the plan maintenance procedures established in Section 10: *Plan Maintenance*.

Each proposed mitigation action has been identified as an effective measure (policy or project) to reduce hazard risk for the Clay Macon Region. Each action is listed in the MAP in conjunction with background information such as hazard(s) addressed and relative priority. Other information provided in the MAP includes potential funding sources to implement the action should funding be required (not all proposed actions are contingent upon funding). Most importantly, implementation mechanisms are provided for each action, including the designation of a lead agency or department responsible for carrying the action out as well as a timeframe for its completion. These implementation mechanisms ensure that the Clay Macon Regional Hazard Mitigation Plan remains a functional document that can be monitored for progress over time. The proposed actions are not listed in priority order, though each has been assigned a priority level of “high,” “moderate,” or “low” as described below and in Section 8 (page 8.2).

The Mitigation Action Plan is organized by mitigation strategy category (Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, or Public Education and Awareness). The following are the key elements described in the Mitigation Action Plan:

- Hazard(s) Addressed—Hazard which the action addresses.
- Relative Priority—High, moderate, or low priority as assigned by the jurisdiction.
- Lead Agency/Department—Department responsible for undertaking the action.
- Potential Funding Sources—Local, State, or Federal sources of funds are noted here, where applicable.
- Implementation Schedule—Date by which the action should be completed. More information is provided when possible.
- Implementation Status (2026)—Indication of completion, progress, deferment, or no change

since the previous plan. If the action is new, that will be noted here. (Many of the previous actions were not clear in terms of purpose, and during this update, revisions were made to make their intent more specific. However, the actions themselves still correlate to the previous actions and have been marked as “reworded and deferred.”)

9.2 MITIGATION ACTION PLANS

The mitigation actions proposed by each of the participating jurisdictions are listed in 5 individual MAPs on the following pages. **Table 9.1** shows the location of each jurisdiction’s MAP within this section as well as the number of mitigation actions proposed by each jurisdiction.

TABLE 9.1: INDIVIDUAL MAP LOCATIONS

Location		Page	Number of Mitigation Actions
Clay County		9:3	31
	Hayesville	9:10	33
Macon County		9:17	16
	Franklin	9:21	15
	Highlands	9:25	9

Clay County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Implement projects that promote Sustainable Development and Smart Growth	All Hazards	Moderate	Clay County Board of Commissioners	Local	2031	Deferred: The County continues to attempt to implement Sustainable Development and Smart Growth projects across the County. While there have been no tangible projects with this action over the past five years, the County will continue to work to identify and implement such projects in the future.
P-2	Enforce Zoning and Subdivision regulations that reduce risk	All Hazards	High	Clay County Planning	Local	2031	Deferred: There is no County-wide zoning at this time. Subdivision regulations are enforced in conjunction with the Flood Damage Prevention Ordinance which helps to reduce risk. This action will be revisited during the 2031 update.
P-3	Encourage Open Space Preservation throughout the county	All Hazards	Moderate	Clay County Planning	Local	2031	Deferred: The county will continue to identify areas that can be preserved as open space that will help reduce risk to hazards. This action will be revisited during the 2031 update.
P-4	Enforce Floodplain Management Regulations	Flooding	High	Clay County Planning	Local	2031	Deferred: The county enforces floodplain management regulations in accordance with the NFIP and will continue to enforce these regulations going forward so this action will remain in place.
P-5	Develop a Transportation and Evacuation Plan	All Hazards	Moderate	Clay County Transportation; Clay County EMS	Local	2031	Deferred: Transportation and evacuation planning have been initiated in addition to the execution of a tabletop exercise. However, this formal development and adoption of the referenced plan has been deferred. The action will be revisited during the 2031 update of the plan.
P-6	Set Government Expenditure Limitation in High Hazard Areas	All Hazards	High	Clay County Board of Commissioners; Clay County Planning	Local	2031	Deferred: The county continues to limit expenditures on construction in known high-risk areas and will continue to do so in the future. This action will be revisited during the 2031 plan update.
P-7	Create a Business and Industry Plan to promote disaster planning	All Hazards	High	Clay County Planning; Clay County Chamber of Commerce	Local	2031	Deferred: Currently there is no specific Business and Industry Plan for disaster planning. This will continue to be a mitigation action for the County pending funding and time.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-9	Update Comprehensive Plan	All Hazards	High	Clay County Board of Commissioners; Clay County Planning	Federal, State, Private	Completed	Completed: The County Board of Commissioners adopted the Clay County Comprehensive Plan 2024-2034 on April 19, 2024. This action will be deleted during the 2031 plan update.
P-10	Develop Stormwater Management Plan	Flooding	Moderate	NC DENR; NRCS	Federal, State, Private	2031	Deferred: In continued coordination with the State, the county continues to implement some stormwater management planning and will continue to work on improving stormwater management going forward. This action will be revisited during the 2031 plan update.
P-11	Develop a Capital Improvement Plan (CIP) to guide the major capital expenditures over a given period	All Hazards	High	Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: The county has implemented a number of projects that have reduced risk in the past, but the county will continue to work on including projects in the CIP in the future.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Property Protection							
PP-1	Require storm shelters in Mobile Home Parks	All Hazards	Low	Clay County Planning; Clay County Board of Commissioners	Local	2031	Deferred: The county continues to encourage the installation of storm shelters in Mobile Home Parks, but there is no regulation requiring these. The county will continue to evaluate implementing such regulations
PP-3	Update Development Regulations	All Hazards	Moderate	Clay County Planning	Local	2031	Deferred: The county will continue to consider additional updates to keep regulations up to date and appropriate. This action will be revisited during the 2031 plan update.
PP-4	Implement Critical Facility Protection	All Hazards	High	Clay County Engineering; Clay County EMS; Utility Companies; Hospital; NCDOT	Federal, State, Private	2031	Deferred: The county has taken steps to protect critical facilities, but there are several other steps that could reduce potential risk. This action will be revisited during the 2031 update (pending funding and time).

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PP-5	Utilize Acquisition to Allow Property Owners to Voluntarily be Removed from High Hazard Areas	All Hazards	Moderate	Clay County Planning; NCDEQ; FEMA	Federal, State, Private	2031	Deferred: Pending time, funding and willing participants/homeowners. The county has not extensively used acquisition in the past, but if homeowners are willing and grant funding is available, the county would look into acquisition of homes.
PP-6	Utilize Relocation to Allow Property Owners to Voluntarily be Removed from High Hazard Areas	All Hazards	Moderate	Clay County Planning; NCDEQ; FEMA	Federal, State, Private	2031	Deferred: Pending time, funding and willing participants/homeowners. The county has not extensively used relocation in the past, but if homeowners are willing and grant funding is available, the county would look into acquisition of homes.
PP-7	Provide advanced training to Building Inspectors	All Hazards	Moderate	Clay County Fire Department; Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: The County continues to provide training opportunities for building inspectors and supports sending them to training as needed.
PP-8	Utilize windproofing to protect structures	All Hazards	Moderate	Clay County Engineering; FEMA; Clay County Planning	Federal, State, Private	2031	Deferred: The county continues to encourage the use of windproofing techniques in the past and will continue to try to implement these techniques into future designs and structures.
Natural Resource Protection							
NRP-1	Preserve and expand parks	All Hazards	High	Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2031	Deferred: The County leases two parks from TVA and both have had extensive updating over the past two years. The County will continue to look for opportunities to preserve and expand parks pending funding.
NRP-2	Preserve wetlands where feasible.	Flooding	Moderate	Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2031	Deferred: The county continues to identify areas that can be preserved to help reduce risk to hazards, pending funding.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
NRP-3	Develop Natural Resource Protection Plan	All Hazards	Moderate	Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2031	Deferred: The County still would like to develop a Natural Resource Protection Plan, pending time and funding.
Structural Projects							
SP-1	Raise bridges subject to flooding or other hazards.	All Hazards	Low	Clay County Engineering; FEMA; NCDOT	Federal, State, Private	2031	Partially complete and deferred: The county continues to coordinate with NCDOT to implement bridge improvement projects and support transportation infrastructure investments that reduce flood risk. Several projects have advanced since the 2021 update, including post-disaster recovery efforts following Tropical Storm Helene. The county will continue to support projects that improve the resilience of bridges and stream crossings. This action will be revisited during the 2031 plan update.
SP-2	Complete Stormwater Drain Maintenance procedures as needed.	All Hazards	Moderate	Clay County Public Works; Clay County Environment, Health & Natural Resources	Federal, State, Private	2031	Deferred: The county continues to routinely clean and repair storm drains, but a more comprehensive system of drain maintenance would be useful so the county will continue to evaluate this action.
Emergency Services							
ES-1	Equipment Buyout	All Hazards	Moderate	Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Local	2031	Deferred: The county will continue to look into purchases of equipment that make sense especially when grants are available.
ES-2	Form Local coordinators and Communication Network	All Hazards	High	Clay County Emergency Management; Clay County Board of Commissioners	Local	2031	Deferred: The county has worked to improve communication between local coordinators to improve response in smaller communities. This coordination has been successful, but will need to be maintained and improved going forward.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
ES-3	Integrate information and Communication Technology	All Hazards	High	Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: The county has continued to make significant progress in integrating information and communication technology among all of its departments. However, this is continues to be a constantly evolving field and there will be a need to update and re- evaluate fairly consistently.
ES-5	Improve Emergency Transportation	All Hazards	Moderate	Clay County Emergency Management	Federal, State, Private	2031	Deferred: Pending time and funding. Although there are systems in place for emergency transportation, the county still would like to develop emergency thoroughfares for medical transportation in case of a disaster.
ES-6	Conduct Mass Casualty Training	All Hazards	Moderate	Clay County Emergency Management	Federal, State, Private	2031	Deferred. Pending time and funding. The county has some experience in mass casualty incidents, but it would like to have additional trainings available to improve this capability.
ES-7	Establish Emergency Shelters	All Hazards	High	Clay County Planning; Clay County Emergency Management	Federal, State, Private	2031	Partially completed and deferred: The County has four shelters in place that are approved by the ARC. The County will continue to evaluate its sheltering needs.
Public Education and Awareness							
PEA-1	Install Disaster Warning Systems	All Hazards	High	Clay County Emergency Management; Clay County Planning	Federal, State, Local	2031	Deferred: Pending funding. The county has some disaster warning systems in place, but as these technologies have improved, the county has identified this as an area that needs improvement going forward.
PEA-2	Designate Assembly Points	All Hazards	High	Clay County Emergency Management; Clay County Planning	Local	2031	Deferred: Working with the evacuation plan, which has not been finalized or adopted, to identify and solidify these points. This action will be revisited during the 2031 plan update.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Implement Community Awareness Program	All Hazards	High	Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: The county continues to implement a community awareness program to provide outreach to citizens on potential hazards. The materials and forms of this outreach will need to be updated and evaluated going forward.

Town of Hayesville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Implement projects that promote Sustainable Development and Smart Growth	All Hazards	Moderate	Town of Hayesville and Clay County Board of Commissioners	Local	2031	Deferred; The Town works closely with the County and will follow their lead. The County continues to attempt to implement Sustainable Development and Smart Growth projects across the County. While there have been no tangible projects with this action over the past five years, the County will continue to work to identify and implement such projects in the future.
P-2	Enforce Zoning and Subdivision regulations that reduce risk	All Hazards	High	Town of Hayesville and Clay County Planning	Local	2013	Deferred: The Town continues to enforce its zoning ordinance and subdivision regulations are enforced in conjunction with the Flood Damage Prevention Ordinance which helps to reduce risk. This action will be revisited during the 2031 update.
P-3	Encourage Open Space Preservation	All Hazards	Moderate	Town of Hayesville and Clay County Planning	Local	2031	Deferred: The Town will continue to identify areas that can be preserved as open space that will help reduce risk to hazards. This action will be revisited during the 2031 update.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Enforce Floodplain Management Regulations	Flooding	High	Town of Hayesville and Clay County Planning	Local	2031	Deferred: The Town enforces floodplain management regulations in accordance with the NFIP and will continue to enforce these regulations going forward so this action will remain in place.
P-5	Develop a Transportation and Evacuation Plan	All Hazards	Moderate	Town of Hayesville and Clay County Transportation; Clay County EMS	Local	2031	Deferred: The County is leading this effort. Transportation and evacuation planning as well as a tabletop exercise have been completed for this effort, but plan finalization and adoption have not yet occurred. The action will be revisited during the 2031 update of the plan.
P-6	Set Government Expenditure Limitation in High Hazard Areas	All Hazards	High	Town of Hayesville and Clay County Board of Commissioners; Clay County Planning	Local	2031	Deferred: The Town continues to work on limiting expenditures on construction in known high risk areas and will continue to do so in the future. This action will be revisited during the 2031 plan update.
P-7	Create a Business and Industry Plan to promote disaster planning	All Hazards	High	Town of Hayesville and Clay County Planning; Clay County Chamber of Commerce	Local	2031	Deferred: Currently there is no specific Business and Industry Plan for disaster planning. This will continue to be a mitigation action for the Town pending funding and time.
P-8	Develop an Inclement Weather Plan	All Hazards	Moderate	Town of Hayesville and Clay County Planning; Clay County Emergency Management; Clay County Public Works	Local	2031	Deferred: This action is still in planning stages.
P-9	Update Comprehensive Plan	All Hazards	High	Town of Hayesville and Clay County Board of Commissioners; Clay County Planning	Federal, State, Private	Completed	Completed: Town Council adopted the Town of Hayesville Comprehensive Land Use Plan on August 8, 2022. This action will be deleted during the 2031 plan update.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-10	Develop Stormwater Management Plan	Flooding	Moderate	NCDEQ; NRCS	Federal, State, Private	2031	Deferred: In continued coordination with the State, and the County, the Town continues to implement some stormwater management planning and will continue to work on improving stormwater management going forward. This action will be revisited during the 2031 plan update.
P-11	Develop a Capital Improvement Plan (CIP) to guide the major capital expenditures over a given period	All Hazards	High	Town of Hayesville and Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: The Town has implemented a number of projects that have reduced risk in the past, but the Town will continue to work on including projects in the CIP in the future.
Property Protection							
PP-1	Require storm shelters in Mobile Home Parks	All Hazards	Low	Town of Hayesville and Clay County Planning; Clay County Board of Commissioners	Local	2031	Deferred: The Town continues to encourage the installation of storm shelters in Mobile Home Parks, but there is no regulation requiring these. The Town will continue to evaluate implementing such regulations
PP-3	Update Development Regulations	All Hazards	Moderate	Town of Hayesville and Clay County Planning	Local	2031	Deferred: The Town will continue to consider additional updates to keep regulations up to date and appropriate. This action will be revisited during the 2031 plan update.
PP-4	Implement Critical Facility Protection	All Hazards	High	Town of Hayesville and Clay County Engineering; Clay County EMS; Utility Companies; Hospital; NCDOT	Federal, State, Private	2031	Deferred: The Town continues to take steps to protect critical facilities but there are many additional steps that could be taken to reduce potential risk many critical facilities in the Town pending funding and time. This action will be revisited during the 2031 plan update.
PP-5	Utilize Acquisition to Allow Property Owners to Voluntarily be Removed from High Hazard Areas	All Hazards	Moderate	Town of Hayesville and Clay County Planning; NCDEQ; FEMA	Federal, State, Private	2031	Deferred: Pending time, funding and willing participants/homeowners. The Town has not extensively used acquisition in the past, but if homeowners are willing and grant funding is available, the Town would look into acquisition of homes.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PP-6	Utilize Relocation to Allow Property Owners to Voluntarily be Removed from High Hazard Areas	All Hazards	Moderate	Town of Hayesville and Clay County Planning; NCDEQ; FEMA	Federal, State, Private	2031	Deferred: Pending time, funding and willing participants/homeowners. The Town has not extensively used relocation in the past, but if homeowners are willing and grant funding is available, the Town would look into acquisition of homes.
PP-7	Provide advanced training to Building Inspectors	All Hazards	Moderate	Town of Hayesville and Clay County Fire Department; Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: The Town continues to provide training opportunities for building inspectors and supports sending them to training as needed.
PP-8	Utilize Windproofing to protect structures	All Hazards	Moderate	Town of Hayesville and Clay County Engineering; FEMA; Clay County Planning	Federal, State, Private	2031	Deferred: The Town continues to encourage the use of windproofing techniques in the past and will continue to try to implement these techniques into future designs and structures.
Natural Resource Protection							
NRP-1	Preserve and Expand Parks	All Hazards	High	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2031	Deferred: The Town will continue to look for opportunities to preserve and expand parks pending funding.
NRP-2	Preserve wetlands where feasible.	Flooding	Moderate	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2031	Deferred: The Town continues to identify areas that can be preserved to help reduce risk to hazards, pending funding.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
NRP-3	Develop Natural Resource Protection Plan	All Hazards	Moderate	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2031	Deferred: The Town still would like to develop a Natural Resource Protection Plan, pending time and funding.
Structural Projects							
SP-1	Raise Bridges that are vulnerable to flooding or other hazards.	All Hazards	Low	Town of Hayesville and Clay County Engineering; FEMA; NCDOT	Federal, State, Private	2031	Deferred: The Town continues to coordinate with NCDOT to implement such projects and the Town will continue to support projects that raise bridges out of harm’s way. This action will be revisited during the 2031 update.
SP-2	Complete Stormwater Drain Maintenance procedures as needed.	All Hazards	Moderate	Town of Hayesville and Clay County Public Works; Clay County Environment, Health & Natural Resources	Federal, State, Private	2031	Deferred: The Town continues to routinely clean and repair storm drains, but a more comprehensive system of drain maintenance would be useful so the Town will continue to evaluate this action.
Emergency Services							
ES-1	Equipment Buyout	All Hazards	Moderate	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Local	2031	Deferred: The Town will continue to look into purchases of equipment that make sense especially when grants are available.
ES-2	Form Local coordinators and Communication Network	All Hazards	High	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Local	2031	Deferred: The Town has worked to improve communication between the County and Town coordinators to improve response in smaller communities. This coordination has been successful, but will need to be maintained and improved going forward.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
ES-3	Integrate Information and Communication Technology	All Hazards	High	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: The Town has continued to make significant progress in integrating information and communication technology among all of its departments. However, this continues to be a constantly evolving field and there will be a need to update and re- evaluate fairly consistently.
ES-4	Use Citizens in Emergency Management Functions	All Hazards	Moderate	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	Completed	Completed: This is now in place as part of the County EOP. This action will be removed from future plan updates.
ES-5	Improve Emergency Transportation	All Hazards	Moderate	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	2031	Deferred: Pending time and funding. Although there are systems in place for emergency transportation, the Town still would like to develop emergency thoroughfares for medical transportation in case of a disaster.
ES-6	Conduct Mass Casualty Training	All Hazards	Moderate	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	2031	Deferred. Pending time and funding. The county has some experience in mass casualty incidents, but it would like to have additional trainings available to improve this capability. The Town supports this action as needed.
ES-7	Establish Emergency Shelters	All Hazards	High	Town of Hayesville and Clay County Planning; Clay County Emergency Management	Federal, State, Private	2031	Deferred: Same as County shelters. See update provided by the County.
Public Education and Awareness							
PEA-1	Install Disaster Warning Systems	All Hazards	High	Town of Hayesville and Clay County Emergency Management; Clay County Planning	Federal, State, Local	2031	Deferred: Pending funding. The county has some disaster warning systems in place, but as these technologies have improved, the county has identified this as an area that needs improvement going forward. The Town supports this action as needed.
PEA-2	Designate Assembly Points	All Hazards	High	Town of Hayesville and Clay County Emergency Management; Clay County Planning	Local	2031	Deferred: Will be included in County Plan. See update provided by County for County action PEA-2.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Implement Community Awareness Program	All Hazards	High	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2031	Deferred: Will be included in County Plan. See update provided by County for County action PEA-3.

Macon County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Review and update the floodplain ordinance and ensure that new infrastructure is not built in the flood prone areas.	Flooding	High	Macon County Planning, Permitting & Development	Local	2031	Deferred. County planning Board has not been tasked with reviewing yet due to other concerns.
P-2	Continue identifying potential floodplain areas to submit requests for map updates.	Flooding	High	Macon County Planning, Permitting & Development	Local	2031	Deferred. TOF has looked at changes in their mapping. EM has submitted data to NWS to update flood warning areas and this will be discussed at a later date.
Property Protection							
PP-1	Elevate access road (Arthur Drake Road) “above” the floodway.	Flooding	Moderate	Macon County Emergency Management	FEMA HMA Programs	2031, As funds become available	Deferred. No funding has been available and construction costs continue to rise.
PP-2	Work with town to remove Franklin Fire Department from floodplain.	Flooding	High	Macon County Emergency Management	FEMA HMA Programs, USACE, 406 Mitigation	2031, As soon as funds become available	Deferred. No funding available. PD is also located on the property.
PP-3	Protect bridge in the main part of town at the intersection of East Main Street and Highway 64 East from debris coming downstream during flood events.	Flooding	High	Macon County Public Works; USACE	FEMA HMA Programs USACE	2031, As soon as funds become available	Deferred. Bridge has been replaced and project evaluated for issues prior to proceeding.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s)	Relative Priority	Lead Agency/ Department	Potential Funding	Implementation Schedule	Implementation Status (2026)
PP-4	Protect sewage treatment plant from flood damage by erecting a concrete flood wall around the plant.	Flooding	High	Macon County Public Works	FEMA HMA Programs USACE, 406 Mitigation	2031, As soon as funds become available	Deferred. No funding available.
PP-5	Replace inadequately sized water mains and tanks to a size adequate for fire protection.	Wildfires	High	Macon County Public Works	Local	2031, When funding becomes available	Deferred. Water plant undergoing upgrade. No funds available.
PP-6	Ensure all homes are secured properly and that building codes are followed as directed to minimize risk of hazards.	All Hazards	High	Macon County Planning, Permitting & Development	Local	2031, When funding becomes available	Deferred. Planning, Permitting and Development department ensures compliance with all building codes and local requirements.

SECTION 9: MITIGATION ACTION PLAN

PP-7	Apply for funding through the FEMA Rehabilitation of High Hazard Potential Dams (HHPD) grant program regarding mitigation measures associated with high hazard dams which may include: 1) Investigate feasibility and funding opportunities for construction to replace dams such as Mountain Camp Dam to reduce risk of failure hazards 2) Ensure that residents who live in buildings within the inundation area are aware of the hazards associated with dam failure and encourage them to develop emergency strategies to evacuate in a timely manner 3) Ensure that any residents who live in the inundation area who require assistance to evacuate are assisted in the event of a dam failure event 4) Develop inundation modeling for each dam in the planning area that does not already have inundation data 5) Ensure that emergency action plans developed for dams in the planning area are shared with emergency management and incorporated into emergency management plans 6) Geotechnical investigation to establish data for risk analysis and development of engineering designs/solutions 7) Investigate potential of upstream dam(s) to reduce load on existing dam(s) 8) Property acquisition in inundation area(s) below dam 9) Raise crest of dam to increase storage capacity 10) Add additional spillways, widen or lower existing spillways to increase discharge capacity 11) Warning systems to alert downstream areas of potential dam failure 12) Improve flow path below dam to increase conveyance capacity 13) Encourage conservation or re-forestation of upstream land to reduce runoff 14) Development of community Stormwater Management Plans for upstream communities 15) Complete an EAP in conjunction with NCDEQ for all high hazard dams in the county	Dam Failure	High	Macon County Public Works; Macon County Planning, Permitting & Development	Grants	2031	New Action
------	---	-------------	------	--	--------	------	------------

SECTION 9: MITIGATION ACTION PLAN

Natural Resource Protection							
NRP-1	Work to increase total area of open space throughout the county, which will have a dual role of reducing risks to many hazards (examples: flooding, tropical storms, etc) and will also serve as space for recreational purposes.	All Hazards	Moderate	Macon County Emergency Management and Administration	Local	2031	Deferred. No funding available for purchases and no properties identified during this period that would meet the criteria. Evaluation continuing.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Structural Projects							
SP-3	Work with Southwestern Community College Division of Public Safety Training Center to pursue funding to relocate the Live Fire Training Center outside of flood-prone area.	Flooding	High	Macon County Emergency Management	FEMA HMA Programs 406 Mitigation	2031, or as soon as funds become available	Deferred. Bond funds available but construction estimates were above expectations and inadequate funding available to complete at this time.
SP-4	Remove athletic equipment storage area from floodprone area.	Flooding	Moderate	Recreation Park	General Fund, Federal or State Grant Funds	2031 or whenever funds become available.	New action
Emergency Services							
ES-1	Obtain and install a second source of electricity for public buildings and emergency services buildings to continue operations after unexpected loss of power during a disaster. Several recent high-water events have affected the facility as recent as April 2020. Equipment stored inside was completely replaced in 2017 at an estimated cost of \$12-15K.	All Hazards	High	Macon County Emergency Management	State grant	2031, or as soon as funds become available	Deferred. Some facilities have capability of second source of power but funding inadequate to complete all buildings.
Public Education and Awareness							
PEA-1	The county will work to improve its outreach by utilizing online surveys to get input from the public.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Some surveys complete on various aspects but still need public input.
PEA-2	The county will push information out to the public in a number of ways such as at live outreach events, through paper materials such as brochures, and online.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Information placed on website and more efforts will continue to educate citizens.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Include emergency information in the website to inform and educate citizens about potential risks from hazards and opportunities to mitigate them, as they pertain to the jurisdiction.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Information placed on website and more efforts will continue to educate citizens.
PEA-4	Make flyers and information sheets available in public buildings to educate citizens on potential risks from hazards and potential ways to mitigate them as well as safety measures to be conducted during a hazard event.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Some information available but most success has been had from online or electronic submissions.

Town of Franklin Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Property Protection							
PP-1	Elevate access road (Arthur Drake Road) “above” the floodway.	Flooding	Moderate	Macon County Emergency Management	FEMA HMA Programs	2031, As funds become available	Deferred. The Town is still working to implement this action.
PP-2	Protect bridge in the main part of town at the intersection of East Main Street and Highway 64 East from debris coming downstream during flood events.	Flooding	High	Franklin Public Works; USACE	FEMA HMA Programs USACE	2031, As soon as funds become available	Deferred. The Town is still working to implement this action.
PP-4	Remove Franklin Fire Department and Police Station from flood plain.	Flooding	High	Franklin Public Works	FEMA HMA Programs, USACE, 406 Mitigation	2031, As soon as funds become available	Deferred. The Town is still actively working to implement this action but grant funding is needed.
PP-5	Install generator and automatic transfer switch at Franklin Fire Department. Franklin Fire Department (a critical facility) current location was built in 1986 and the current generator is a 1986 model and only has a manual transfer switch.	All Hazards	High	Town of Franklin	Federal, State and Private	Complete	Action complete. It will be removed from the 2031 plan update.
PP-6	Install generator and automatic transfer switch at Franklin Fire Department Substation Franklin Fire Department is in the process of building a new substation and would need a generator and automatic transfer switch because it is a critical facility.	All Hazards	High	Town of Franklin	Federal, State, Private	Complete	Action complete. It will be removed from the 2031 plan update.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PP-7	Install Generator and automatic transfer switch at Town of Franklin Public Works Facility. The Town of Franklin Public Works facility currently doesn't have a generator on site. It does have a manual transfer switch but not an automatic transfer switch. The site would need a generator and automatic transfer switch because it is a critical facility.	All Hazards	High	Town of Franklin	Federal, State, Private	Completed	Action complete. It will be removed from the 2031 plan update.
PP-8	Install automatic transfer switch at Town of Franklin Water Treatment Plant Facility. The Town of Franklin Water treatment facility currently does have a generator on site. The does have a manual transfer switch but not an automatic transfer switch. The site would need an automatic transfer switch because it is a critical assess facility.	All Hazards	High	Town of Franklin	Federal, State, Private	Complete	Action complete. It will be removed from the 2031 plan update.
Natural Resource Protection							
NRP-2	Develop new water source/build new water treatment plant to meet the demands of continued growth.	Drought	High	Franklin Public Works	CDBG; EPA, USDA	2031, As soon as funds become available.	Deferred: The Town is still working to implement this action.
NRP-4	Work with county to increase total area of open space throughout the county, which will have a dual role of reducing risks to many hazards (examples: flooding, tropical storms, etc) and will also serve as space for recreational purposes.	All Hazards	Moderate	Macon County Emergency Management and Administration; Franklin Administration	Local	Action to be deleted.	The Town wishes to delete this action. It will be removed from the 2031 updates.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Structural Projects							
SP-5	Replace and install with new culverts or open up stream along Crawford Branch. The Town of Franklin would like assess the area for potential changes to the culverts along Crawford branch for better flow of the stream. 2020 flood along Crawford branch caused damages to a number of building. Area to focus on are culverts under W Palmer St at Maple St and Parking lots at American Legion and auto mechanic shop beside American legion on W Main St.	Flooding	High	Town of Franklin	Federal, State grants	2031	Deferred. More engineering needed and funding.
Emergency Services							
ES-1	Obtain and install a second source of electricity for public buildings and emergency services buildings to continue operations after unexpected loss of power during a disaster.	All Hazards	High	Macon County Emergency Management, Franklin Administration	State grant	Action to be deleted.	The Town wishes to delete this action. It will be removed from the 2031 update.
Public Education and Awareness							
PEA-1	Improve outreach by utilizing online surveys to get input from the public.	All Hazards	High	Macon County Emergency Management	Local	Action to be deleted.	The Town wishes to delete this action. It will be removed from the 2031 update.
PEA-2	Push information out to the public in a number of ways such as at live outreach events, through paper materials such as brochures, and online.	All Hazards	High	Macon County Emergency Management	Local	Action to be deleted.	The Town wishes to delete this action. It will be removed from the 2031 update.

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Include and update emergency information on the website to inform and educate citizens about potential risks from hazards and opportunities to mitigate them, as they pertain to the jurisdiction.	All Hazards	High	Macon County Emergency Management	Local	2031	Partially complete and deferred: The Town hosts educational materials on their webpage. The updated hazard mitigation plan will be shared under the “Planning” tab where other relevant plans/ordinances are linked for public viewing. Planning staff will consider additional resources to educate and bolster awareness/action of residents. This action will be revisited during the 2031 plan update.
PEA-4	Make flyers and information sheets available in public buildings to educate citizens on potential risks from hazards and potential ways to mitigate them as well as safety measures to be conducted during a hazard event.	All Hazards	High	Macon County Emergency Management	Local	Action to be deleted.	The Town wishes to delete this action. It will be removed from the 2031 update.

Town of Highlands Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
PP-2	Ensure all homes are secured properly and that building codes are followed as directed to minimize risk of hazards.	All Hazards	High	Macon County Planning, Permitting & Development; Highlands Administration	Local	2031, When funding becomes available	Deferred. Continual process with Planning, Permitting and Development along with TOH Code Enforcement
Property Protection							
PP-2	Replace inadequately sized water mains and tanks to a size adequate for fire protection.	Wildfires	High	Highlands Public Works	Local	2031, When funding becomes available	Deferred. Funding not available.
Natural Resource Protection							
NRP-2	Work with county to increase total area of open space throughout the county, which will have a dual role of reducing risks to many hazards (examples: flooding, tropical storms, etc) and will also serve as space for recreational purposes.	All Hazards	Moderate	Macon County Emergency Management and Administration; Franklin Administration	Local	2031	Deferred. Funding not available
Structural Projects							
SP-1	Build storm water controls, such as culverts and floodwalls, in flood prone areas and continue compliance with NFIP.	Flooding	High	Town of Highlands Administration	State	2031	Deferred. Continued area of focus.
Emergency Services							
ES-1	Obtain and install a second source of electricity for public buildings and emergency services buildings to continue operations after unexpected loss of power during a disaster.	All Hazards	High	Macon County Emergency Management, Highlands Administration	State grant	2031, or as soon as funds become available	Deferred due to funding.
Public Education and Awareness							

SECTION 9: MITIGATION ACTION PLAN

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-1	Improve outreach by utilizing online surveys to get input from the public.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Some surveys completed.
PEA-2	Push information out to the public in a number of ways such as at live outreach events, through paper materials such as brochures, and online.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Continual process as education needs change.

SECTION 9: MITIGATION ACTION PLAN

Action #	Dscription	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Include emergency information in the website to inform and educate citizens about potential risks from hazards and opportunities to mitigate them, as they pertain to the jurisdiction.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Educational information updated continually.
PEA-4	Make flyers and information sheets available in public buildings to educate citizens on potential risks from hazards and potential ways to mitigate them as well as safety measures to be conducted during a hazard event.	All Hazards	High	Macon County Emergency Management	Local	2031	Deferred. Most effective means of distribution now is electronic.

SECTION 9: MITIGATION ACTION PLAN

SECTION 10

PLAN MAINTENANCE

This section discusses how the Clay Macon Regional Mitigation Strategy and Mitigation Action Plan will be implemented and how the Regional Hazard Mitigation Plan will be evaluated and enhanced over time. This section also discusses how the public will continue to be involved in a sustained hazard mitigation planning process. It consists of the following four subsections:

- 10.1 Implementation and Integration
- 10.2 Monitoring, Evaluation, and Enhancement
- 10.3 Continued Public Involvement
- 10.4 Evaluation of Monitoring, Evaluation and Update Process

44 CFR Requirement

44 CFR Part 201.6(c)(4)(i):

The plan shall include a plan maintenance process that includes a section describing the method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle.

44 CFR Part 201.6(c)(4)(ii):

The plan maintenance process shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

10.1 MONITORING AND EVALUATING THE PREVIOUS PLAN

Each agency, department or other partner participating under the Clay Macon Regional Hazard Mitigation Plan is responsible for implementing specific mitigation actions as prescribed in the Mitigation Action Plan. Every proposed action listed in the Mitigation Action Plan is assigned to a specific “lead” agency or department in order to assign responsibility and accountability and increase the likelihood of subsequent implementation.

In addition to the assignment of a local lead department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion. Clay and Macon Counties and the municipalities within will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the Mitigation Action Plan.

The participating jurisdictions will integrate this Hazard Mitigation Plan into relevant City and County government decision-making processes or mechanisms, where feasible. This includes integrating the requirements of the Hazard Mitigation Plan into other local planning documents, processes or mechanisms, such as comprehensive or capital improvement plans, when appropriate. The members of the Clay Macon Regional Hazard Mitigation Planning Committee will remain charged with ensuring that the goals and mitigation actions of new and updated local planning documents for their agencies or

departments are consistent, or do not conflict with, the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in the Clay Macon Region.

Since the initial regional plan was adopted (in 2016), and with each County-specific plan prior to that, each County and participating jurisdiction has worked to integrate the hazard mitigation plan into other planning mechanisms where applicable/feasible. Examples of how this integration has occurred have been documented in the Implementation Status discussion provided for each of the mitigation actions found in Section 9. Specific examples of how integration has occurred include:

- Integrating the mitigation plan into reviews and updates of floodplain management ordinances
- Integrating the mitigation plan into reviews and updates of County emergency operations plans
- Integrating the mitigation plan into review and updates of building codes
- Integrating the mitigation plan into the capital improvements plan through identification of mitigation actions that require local funding.

Opportunities to further integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the Regional Hazard Mitigation Planning Committee, individual county meetings, and the annual review process described herein. Although it is recognized that there are many possible benefits to integrating components of this Plan into other local planning mechanisms, the development and maintenance of this stand-alone Regional Hazard Mitigation Plan is deemed by the Clay Macon Regional Hazard Mitigation Planning Committee to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

10.2 IMPLEMENTATION AND INTEGRATION

Periodic revisions and updates of the Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the Plan is in full compliance with applicable federal and state regulations. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to the Mitigation Action Plan.

When determined necessary, the Clay Macon Regional Hazard Mitigation Planning Committee shall meet in March of every year to evaluate and monitor the progress attained and to revise, where needed, the activities set forth in the Plan. The findings and recommendations of the Regional Hazard Mitigation Planning Committee shall be documented in the form of a report that can be shared with interested City and County Council members. The Regional Hazard Mitigation Planning Committee will also meet following any disaster events warranting a reexamination of the mitigation actions being implemented or proposed for future implementation. This will ensure that the Plan is continuously updated to reflect changing conditions and needs within the Clay Macon Region. For future updates of the plan, Clay and Macon County Emergency Management Directors will help coordinate the reconvening the Regional Hazard Mitigation Planning Committee for these reviews. Additionally, the Emergency Management Director from Clay and Macon Counties will maintain ultimate responsibility for their respective County's plan implementation and monitoring, evaluation and update.

Five (5) Year Plan Review

The Plan will be thoroughly reviewed by the Regional Hazard Mitigation Planning Committee every five years to determine whether there have been any significant changes in the Clay Macon Region that may,

in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, an increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the necessary content of the Plan.

The plan review provides participating jurisdiction officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. The Clay and Macon County Emergency Management Directors will help coordinate the reconvening the Regional Hazard Mitigation Planning Committee and conducting the five-year review.

During the five-year plan review process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Has the nature or magnitude of risks changed?
- Are the current resources appropriate for implementing the Plan?
- Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did County departments participate in the plan implementation process as assigned?

Following the five-year review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and plan amendment process outlined herein. Upon completion of the review and update/amendment process, the Clay Macon Regional Hazard Mitigation Plan will be submitted to the State Hazard Mitigation Officer at the North Carolina Division of Emergency Management (NCEM) for final review and approval in coordination with the Federal Emergency Management Agency (FEMA).

Because the plan update process can take several months to complete, and because Federal funding may be needed to update the plan, it is recommended that the five-year review process begin at the beginning of the third year after the plan was last approved. This will allow the participants in the Clay Macon Regional Hazard Mitigation Plan to organize in order to seek Federal funding if necessary and complete required plan update documentation before the plan expires at the end of the fifth year.

Disaster Declaration

Following a disaster declaration, the Clay Macon Regional Hazard Mitigation Plan will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. It will be the responsibility Clay and Macon County Emergency Management Directors to coordinate the reconvening of the Regional Hazard Mitigation Planning Committee, and ensure the appropriate stakeholders are invited to participate in the plan revision and update process following declared disaster events.

Reporting Procedures

The results of the five-year review will be summarized by the Regional Hazard Mitigation Planning Committee in a report that will include an evaluation of the effectiveness of the Plan and any required

or recommended changes or amendments. The report will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommended strategies to overcome them.

Plan Amendment Process

Plan amendments are sometimes needed before the 5-year plan update takes place. Potential reasons why an update could be needed include the following:

- Errors, inaccuracies, or omissions in the current Plan to include missing or newly identified mitigation actions.
- New issues or needs not addressed in the Plan.
- Changes in data or assumptions used in the Plan.

When an amendment process is needed, the jurisdiction proposing the amendment will share details of the proposed changes with all relevant parties, including affected departments, residents (if needed), businesses (if needed), and North Carolina Emergency Management.

Once the proposed amendment has been circulated, the proposing jurisdiction will coordinate with NCEM and FEMA to adopt the amended plan. Other jurisdictions participating in the plan will not be required to re-adopt the amended plan until the 5-year update.

10.3 CONTINUED PUBLIC INVOLVEMENT

44 CFR Requirement

44 CFR Part 201.6(c)(4)(iii):

The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process

Public participation is an integral component to the mitigation planning process and will continue to be essential as this Plan evolves over time. As described above, significant changes or amendments to the Plan shall require a public hearing prior to any adoption procedures.

Other efforts to involve the public in the maintenance, evaluation and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Regional Hazard Mitigation Planning Committee in local newspapers, public bulletin boards and/or County office buildings
- Designating willing and voluntary citizens and private sector representatives as official members of the Regional Hazard Mitigation Planning Committee
- Utilizing local media to update the public on any maintenance and/or periodic review activities taking place
- Utilizing the county websites to advertise any maintenance and/or periodic review activities taking place, and
- Keeping copies of the Plan in public libraries.

10.4 EVALUATION OF PREVIOUS MONITORING, EVALUATIONS AND UPDATE PROCESS

Over the past five years, the participating jurisdictions have been independently implementing, monitoring and evaluating their own mitigation action plans. Progress made in implementing actions has been documented in Section 9: Mitigation Action Plan where each action contains a narrative about the implementation status of the action as of 2026. That said, the jurisdiction did waiver slightly from the monitoring and evaluation process defined in the original version of the plan, but still made significant process in implementing their mitigation action plans. During the 2026 update of this plan, the Regional Hazard Mitigation Planning Committee determined that the procedures for the upcoming five-year monitoring and evaluation process will remain as defined above and will be re-evaluated during the next plan update process.

The five-year comprehensive update process began when North Carolina Emergency Management made the decision to set aside HMGP funding for the update of the Clay Macon Regional Hazard Mitigation Plan. To facilitate this effort, NCEM assigned the plan update to their pre-qualified hazard mitigation planning consultants ESP Associates. Representatives from ESP Associates first reached out to Clay-Macon representatives in July of 2025 to initiate the plan update process. More details about the plan update process are provided in Section 2, Planning Process.

For the next update of this plan, NCEM's Hazard Mitigation Planning section will continue take the lead on organizing and initiating the 5-year update of the plan.

Appendix A

Plan Adoption

This appendix includes the local adoption resolutions for each of the participating jurisdictions.

Appendix B

Planning Tools

This appendix includes the following:

1. Blank Public Participation Survey
2. Scoring Criteria for Capability Assessment
3. Blank Mitigation Action Worksheet

Clay Macon Hazard Mitigation Plan Survey

We need your help!

Clay County and Macon County, along with their local municipalities, are working together to become less vulnerable to natural disasters, and your participation in the process is important to us!

These counties, local jurisdictions, and other key partners are currently updating the previous Clay Macon Regional Hazard Mitigation Plan ahead of its 2026 expiration. This plan identifies and assesses the region's various hazard risks and identifies mitigation strategies designed to best minimize or manage those risks.

 **Plan Update Project Website:** <https://arcg.is/8PuT90>

This survey is an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help both (1) inform local hazard planning and (2) develop targeted mitigation actions to lessen the impacts of future hazard events.

 If you have any questions regarding this planning process or want to contribute your comments for the plan, please use the "Contact Us" feature included on the plan website (see link above). Thank you for your participation!

1. Where do you live?*

☐ Franklin

☐ Hayesville

☐ Highlands

○ Unincorporated
Macon County

☐ Yes

☐ No

- **Please also include any relevant descriptions of the hazards or areas** in Question 3 (directly above)!

5. How concerned are you about the possibility of your community being impacted by a disaster?*

☐ Extremely concerned

☐ Somewhat concerned

☐ Not concerned

6. Please select the one (1) hazard you think is the HIGHEST threat to your neighborhood:*

☐ Cyberattack

☐ Civil Disturbance

☐ Dam Failure

☐ Drought

☐ Earthquakes

☐ Electromagnetic Pulse (EMP)

☐ Erosion

☐ Excessive Heat

☐ Flooding

☐ Food Emergency

☐ Hazardous Substances

☐ Hurricane and Coastal Hazards

☐ Infectious Disease

☐ Landslides

☐ Lightning

☐ Radiological Emergency

☐ Severe Thunderstorms and High Winds

☐ Severe Winter Weather

☐ Terrorism

☐ Tornadoes

☐ Wildfire

7. Please select the one (1) hazard you think is the SECOND HIGHEST threat to your neighborhood:*

--	--	--

☐ Cyberattack	☐ Civil Disturbance	☐ Dam Failure
☐ Drought	☐ Earthquakes	☐ Electromagnetic Pulse (EMP)
☐ Erosion	☐ Excessive Heat	☐ Flooding
☐ Food Emergency	☐ Hazardous Substances	☐ Hurricane and Coastal Hazards
☐ Infectious Disease	☐ Landslides	☐ Lightning
☐ Radiological Emergency	☐ Severe Thunderstorms and High Winds	☐ Severe Winter Weather
☐ Terrorism	☐ Tornadoes	☐ Wildfire

8. Are there any other hazards that you feel pose a wide-scale or increasing threat to your community? If so, please explain:

1000 

9. Is your home located in a floodplain?*

☐ Yes	☐ No	☐ I'm not sure
---------------------------	--------------------------	------------------------------------

10. Do you have flood insurance?*

☐ Yes

☐ No

☐ I'm not sure

11. If you do not have flood insurance, why not?

☐ Not located in floodplain

☐ Too expensive

☐ Not necessary because it never floods

☐ Not necessary because I am elevated or otherwise protected

☐ Never really considered it

☐ Other

12. If "Other" for not having flood insurance, please explain below:

1000 

13. Have you taken any steps to make your home or neighborhood more resistant to hazards?*

☐ Yes

☐ No

☐ I'm not sure

14. If "Yes," please explain below:

1000

15. Are you interested in making your home or neighborhood more resistant to hazards?*

☐ Yes

☐ No

16. Do you know what office to contact to find out more information about how to reduce your risks to hazards in your area?*

☐ Yes

☐ No

17. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?*

☐ Automated Phone Calls	☐ Internet (including social media)	☐ Mail
☐ Newspaper	☐ Public Workshops and Meetings	☐ Radio
☐ School Meetings	☐ Television	☐ Text Messages and Alerts

18. Are there any other ways you prefer to receive information? If so,

please explain:

1000

19. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?

1000

20. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important? If so, please explain:

1000

21. In the following table, please rate HOW IMPORTANT you think each activity category is for your community to pursue.

- **Prevention:** Examples include zoning, building codes, open space preservation or conservation, and floodplain regulations
- **Property Protection:** Examples include buyouts, relocation, elevation (to protect from floods), retrofitting/reinforcing buildings, and adding improvements like storm shutters
- **Natural Resource Management:** Examples include habitat preservation, slope stabilization, and river/forest management
- **Structural Projects:** Examples include dams, levees, retention ponds, retaining walls, and storm sewers
- **Emergency Services:** Examples include evacuation planning, warning systems, and protecting emergency facilities/systems
- **Education/Awareness:** Examples include outreach/media campaigns, community education programs, written materials, and special events

	Very important	Somewhat important	Not important
How important would you rate Prevention?	☐	☐	☐
How important would you rate Property Protection?	☐	☐	☐
How important would you rate Natural Resource Management?	☐	☐	☐
How important would you rate Structural Projects?	☐	☐	☐
How important would you rate Emergency Services?	☐	☐	☐
How important would you rate Education/Awareness?	☐	☐	☐

22. Name?

23. Position/Organization?

24. Email?

Submit

Points System for Capability Ranking

0-19 points = Limited overall capability
20-39 points = Moderate overall capability
40-68 points = High overall capability

I. Planning and Regulatory Capability (Up to 43 points)

Yes = 3 points

Under Development = 1 point

Included under County plan/code/ordinance/program = 1 point

No = 0 points

- Hazard Mitigation Plan
- Comprehensive Land Use Plan
- Floodplain Management Plan
- National Flood Insurance Program
- NFIP Community Rating System

Yes = 2 points

Under Development = 1 point

Included under County plan/code/ordinance/program = 1 point

No = 0 points

- Open Space Management Plan / Parks & Recreation Plan
- Stormwater Management Plan
- Natural Resource Protection Plan
- Flood Response Plan
- Emergency Operations Plan
- Continuity of Operations Plan
- Evacuation Plan
- Disaster Recovery Plan
- Flood Damage Prevention Ordinance
- Post-disaster Redevelopment / Reconstruction Ordinance

Yes = 1 point

No = 0 points

- Capital Improvements Plan
- Economic Development Plan
- Historic Preservation Plan
- Zoning Ordinance
- Subdivision Ordinance
- Unified Development Ordinance
- Building Code
- Fire Code

II. Administrative and Technical Capability (Up to 15 points)

Yes = 2 points

Service provided by County = 1 point

No = 0 points

- Planners with knowledge of land development and land management practices
- Engineers or professionals trained in construction practices related to buildings and/or infrastructure
- Planners or engineers with an understanding of natural and/or human-caused hazards
- Emergency manager
- Floodplain manager

Yes = 1 point

No = 0 points

- Land surveyors
- Scientist familiar with the hazards of the community
- Staff with education or expertise to assess the community's vulnerability to hazards
- Personnel skilled in Geographical Information Systems (GIS) and/or Hazus
- Resource development staff or grant writers

III. Fiscal Capability (Up to 10 points)

Yes = 1 point

No = 0 points

- Capital Improvement Programming
- Community Development Block Grants (CDBG)
- Special Purpose Taxes (or tax districts)
- Gas / Electric Utility Fees
- Water / Sewer Fees
- Stormwater Utility Fees
- Development Impact Fees
- General Obligation / Revenue / Special Tax Bonds
- Partnering arrangements or intergovernmental agreements
- Other

MITIGATION ACTION WORKSHEETS

Mitigation Action Worksheets are used to identify potential hazard mitigation actions that participating jurisdictions in the Clay Macon Region will consider to reduce the negative effects of identified hazards. The worksheets provide a simple yet effective method of organizing potential actions in a user-friendly manner that can easily be incorporated into the Region's Hazard Mitigation Plan.

The worksheets are to be used as part of a strategic planning process and are designed to be:

- a.) completed electronically (worksheets and instructions will be e-mailed to members of the Hazard Mitigation Planning Team following the Mitigation Strategy Workshop);
- b.) reviewed with your department/organization for further consideration; and
- c.) returned according to the contact information provided below.

Electronic copies may be emailed to: nslaughter@espassociates.com

Hard copies can be mailed to:

Nathan Slaughter
2200 Gateway Centre Blvd, Suite 216
Morrisville, NC 27560

INSTRUCTIONS

Each mitigation action should be considered to be a separate local project, policy or program and each individual action should be entered into a separate worksheet. By identifying the implementation requirements for each action, the worksheets will help lay the framework for engaging in distinct actions that will help reduce the community's overall vulnerability and risk. Detailed explanations on how to complete the worksheet are provided below.

Proposed Action: Identify a specific action that, if accomplished, will reduce vulnerability and risk in the impact area. Actions may be in the form of local policies (i.e., regulatory or incentive-based measures), programs or structural mitigation projects and should be consistent with any pre-identified mitigation goals and objectives.

Site and Location: Provide details with regard to the physical location or geographic extent of the proposed action, such as the location of a specific structure to be mitigated, whether a program will be citywide, countywide or regional, etc.

History of Damages: Provide a brief history of any known damages as it relates to the proposed action and the hazard(s) being addressed. For example, the proposed elevation of a repetitive loss property should include an overview of the number of times the structure has flooded, total dollar amount of damages if available, etc.

Hazard(s) Addressed: List the hazard(s) the proposed action is designed to mitigate against.

Category: Indicate the most appropriate category for the proposed action as discussed during the Mitigation Strategy Workshop (Prevention; Property Protection; Natural Resource Protection; Structural Projects; Emergency Services; Public Education and Awareness).

Priority: Indicate whether the action is a "high" priority, "moderate" priority or "low" priority based generally on the following criteria:

1. Effect on overall risk to life and property
2. Ease of implementation / technical feasibility
3. Project costs versus benefits
4. Political and community support
5. Funding availability

Estimated Cost: If applicable, indicate what the total cost will be to accomplish this action. This amount will be an estimate until actual final dollar amounts can be determined. Some actions (such as ordinance revisions) may only cost “local staff time” and should be noted so.

Potential Funding Sources: If applicable, indicate how the cost to complete the action will be funded. For example, funds may be provided from existing operating budgets or general funds, a previously established contingency fund, a cost-sharing federal or state grant program, etc.

Lead Agency/Department Responsible: Identify the local agency, department or organization that is best suited to implement the proposed action.

Implementation Schedule: Indicate when the action will begin and when the action is expected to be completed. Remember that some actions will require only a minimal amount of time, while others may require a long-term or continuous effort.

Comments: This space is provided for any additional information or details that may not be captured under the previous headings.

MITIGATION ACTION	
Proposed Action:	
BACKGROUND INFORMATION	
Site and Location:	
History of Damages:	

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	
Category:	
Priority (High, Moderate, Low):	
Estimated Cost:	
Potential Funding Sources:	
Lead Agency/Department Responsible:	
Implementation Schedule:	

COMMENTS

Appendix C

Local Mitigation Plan Review Tool

Local Mitigation Plan Review Tool

Cover Page

The Local Mitigation Plan Review Tool (PRT) demonstrates how the local mitigation plan meets the regulation in 44 CFR § 201.6 and offers states and FEMA Mitigation Planners an opportunity to provide feedback to the local governments, including special districts.

1. The Multi-Jurisdictional Summary Sheet is a worksheet that is used to document how each jurisdiction met the requirements of the plan elements (Planning Process; Risk Assessment; Mitigation Strategy; Plan Maintenance; Plan Update; and Plan Adoption).
2. The Plan Review Checklist summarizes FEMA's evaluation of whether the plan has addressed all requirements.

For greater clarification of the elements in the Plan Review Checklist, please see Section 4 of this guide. Definitions of the terms and phrases used in the PRT can be found in Appendix E of this guide.

Plan Information	
Jurisdiction(s)	Click or tap here to enter text.
Title of Plan	Clay Macon Regional Hazard Mitigation Plan
New Plan or Update	Update
Single- or Multi-Jurisdiction	Multi-jurisdiction
Date of Plan	5/29/2026
Local Point of Contact	
Title	Nathan Slaughter, Hazard Mitigation Department Manager, ESP Associates
Agency	ESP Associates
Address	2200 Gateway Centre Blvd, Suite 310, Morrisville NC 27560
Phone Number	919-264-9582
Email	nslaughter@espassociates.com

Additional Point of Contact	
Title	Click or tap here to enter text.
Agency	Click or tap here to enter text.
Address	Click or tap here to enter text.
Phone Number	Click or tap here to enter text.
Email	Click or tap here to enter text.

Review Information	
State Review	
State Reviewer(s) and Title	John Mello
State Review Date	6/4/2026
FEMA Review	
FEMA Reviewer(s) and Title	Click or tap here to enter text.
Date Received in FEMA Region	Click or tap to enter a date.
Plan Not Approved	Click or tap to enter a date.
Plan Approvable Pending Adoption	Click or tap to enter a date.
Plan Approved	Click or tap to enter a date.

Multi-Jurisdictional Summary Sheet

In the boxes for each element, mark if the element is met (Y) or not met (N).

#	Jurisdiction Name	A. Planning Process	B. Risk Assessment	C. Mitigation Strategy	D. Plan Maintenance	E. Plan Update	F. Plan Adoption	G. HHPD Requirements	H. State Requirements
1	Clay County								
2	Hayesville								
3	Macon County								
4	Franklin								
5	Highlands								

Plan Review Checklist

The Plan Review Checklist is completed by FEMA. States and local governments are encouraged, but not required, to use the PRT as a checklist to ensure all requirements have been met prior to submitting the plan for review and approval. The purpose of the checklist is to identify the location of relevant or applicable content in the plan by element/sub-element and to determine if each requirement has been “met” or “not met.” FEMA completes the “required revisions” summary at the bottom of each element to clearly explain the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is “not met.” Sub-elements in each summary should be referenced using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each element and sub-element are described in detail in Section 4: Local Plan Requirements of this guide.

Plan updates must include information from the current planning process.

If some elements of the plan do not require an update, due to minimal or no changes between updates, the plan must document the reasons for that.

Multi-jurisdictional elements must cover information unique to all participating jurisdictions.

Element A: Planning Process

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))	Section 2: 2.3 Updating the Plan in 2026 2.4 Clay Macon Regional HMPC 2.5 Community Meetings and Workshops 2.6 Involving the Public 2.7 Involving the Stakeholders Appendix D	
A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved?	Section 2: 2.3 Updating the Plan in 2026 2.4 Clay Macon Regional HMPC 2.5 Community Meetings and Workshops 2.6 Involving the Public 2.7 Involving the Stakeholders	Choose an item.

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?	Section 2: 2.2 History of Hazard Mitigation Planning in the Clay Macon Region 2.3 Updating Developing the Plan in 2026 2.4 Clay Macon Regional HMPC 2.5 Community Meetings and Workshops 2.6 Involving the Public 2.7 Involving the Stakeholders Appendix D	Choose an item.
A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))	Section 2: 2.7 Involving the Stakeholders Appendix D	
A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?	Section 2: 2.7 Involving the Stakeholders Appendix D	Choose an item.
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))	2.5 Community Meetings and Workshops 2.6 Involving the Public Appendix D	
A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?	2.6 Involving the Public Appendix D	Choose an item.

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))	7.2 Conducting the Capability Assessment and throughout Section 7	
A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?	7.2 Conducting the Capability Assessment and throughout Section 7.	Choose an item.
ELEMENT A REQUIRED REVISIONS		
Required Revision: NCEM 1st Review: No revisions required.		

Element B: Risk Assessment

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))	Sections 4 and 5 throughout	
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?	Sections 4 and 5 throughout	Choose an item.
B1-b. Does the plan include information on the location of each identified hazard?	Section 5, Location subsection provided for each hazard	Choose an item.
B1-c. Does the plan describe the extent for each identified hazard?	Section 5, Extent subsection provided for each hazard	Choose an item.
B1-d. Does the plan include the history of previous hazard events for each identified hazard?	Section 5, Historical Occurrences subsection provided for each hazard	Choose an item.

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1-e. Does the plan include the probability of future events for each identified hazard, including the type, location and range of anticipated intensities?	Section 5, Probability of Future Occurrences subsection provided for each hazard	Choose an item.
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?	Section 5, Hazard Summary by Jurisdiction provided for each hazard	Choose an item.
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))	Section 5, Hazard Summary by Jurisdiction provided for each hazard. Repetitive Loss Analysis begins on page 5-52	
B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards?	Section 5, Hazard Summary by Jurisdiction provided for each hazard	Choose an item.
B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?	Section 5, Hazard Summary by Jurisdiction provided for each hazard	Choose an item.
B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?	Repetitive Loss Analysis begins on page 5-52	Choose an item.

ELEMENT B REQUIRED REVISIONS

Required Revision:

NCEM 1st Review: No revisions required.**Element C: Mitigation Strategy**

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))	Section 7: Capability Assessment – entire section	
C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?	Section 7: Capability Assessment – entire section	Choose an item.
C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?	Section 7: Capability Assessment – entire section	Choose an item.
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))	Section 7: 7.3.1.3 pages 7:9-7:14; Table 7.2 NFIP Policy and Information	
C2-a. Does the plan contain a narrative description or a table/list of their participation activities?	Section 7: 7.3.1.3 pages 7:9-7:14; Table 7.2 NFIP Policy and Information and SDE Procedures begin on page 7:12	Choose an item.
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))	Section 8.2, page 8:3	
C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan?	Section 8.2, page 8:3	Choose an item.

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement 44 CFR § 201.6(c)(3)(ii))	Section 8 and 9 throughout.	
C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?	Section 8 and 9 throughout.	Choose an item.
C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?	Section 9 throughout.	Choose an item.
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 8 and 9 throughout.	
C5-a. Does the plan describe the criteria used for prioritizing actions?	Section 8, Section 8.1.1 pages 8:2 and 8:3.	Choose an item.
C5-b. Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?	Section 9 throughout	Choose an item.

ELEMENT C REQUIRED REVISIONS

Required Revision:

NCEM 1st Review: C1, C2, C3, C5, No revisions required.

C4-b: Mitigation Actions

Clay County: Status “The action will be revisited during the 2026 update of the plan” needs updating to 2031 for the following actions; P5, P6, P9, P10, PP3, PP4, SP1.

PEA2: Status “COVID has this stopped at the moment.” needs updating to be current.

Hayesville: Status “The action will be revisited during the 2026 update of the plan” needs updating to 2031 for the following actions; P2, P3, P5, P6, P9, P10, PP3, PP4, SP1.

PEA2, PEA3: Status “See update provided by County” Describe what update and where to access?

Franklin: Every “All Hazard” action is identified for removal from plan. Need at least one All Hazard action added that is not being removed from the plan or, revise one action from “Delete” to “Deferred.”

ESP Response: Corrected all

Element D: Plan Maintenance

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))	Section 10, 10.3 page 10:5	
D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?	Section 10, 10.3 page 10:5	Choose an item.
D2. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))	Section 10	
D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?	Section 10, 10.2, pages 10:2 through 10:4	Choose an item.

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.	Section 10, 10.2, pages 10:2 through 10:4	Choose an item.
D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?	Section 10, 10.2, pages 10:2 through 10:4	Choose an item.
D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))	Section 10.1	
D3-a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?	Section 10.1	Choose an item.
D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?	Section 10.1	Choose an item.
D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?	Section 10.1	Choose an item.
ELEMENT D REQUIRED REVISIONS		
Required Revision: NCEM 1st Review: No revisions required.		

Element E: Plan Update

Element E Requirements	Location in Plan (section and/or page number)	Met / Not Met
E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))		
E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved?	Section 3.3.3, page 3:12 and throughout section 6	Choose an item.
E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))		
E2-a. Does the plan describe how it was revised due to changes in community priorities?	Section 8.5, Section 9 throughout	Choose an item.
E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan?	Section 9 throughout and Appendix E	Choose an item.
E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?	Section 10.1, Section 9 throughout and Appendix E	Choose an item.
ELEMENT E REQUIRED REVISIONS		
Required Revision: NCEM 1st Review: No revisions required.		

Element F: Plan Adoption

Element F Requirements	Location in Plan (section and/or page number)	Met / Not Met
F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F1-a. Does the participant include documentation of adoption?	Click or tap here to enter text.	Choose an item.

Element F Requirements	Location in Plan (section and/or page number)	Met / Not Met
F2. For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F2-a. Did each participant adopt the plan and provide documentation of that adoption?	Click or tap here to enter text.	Choose an item.
ELEMENT F REQUIRED REVISIONS		
Required Revision: NCEM 1st Review: Plan adoption resolutions are pending formal approval by participating jurisdictions.		

Element G: High Hazard Potential Dams (Will be submitted later)

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD1. Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?		
HHPD1-a. Does the plan describe how the local government worked with local dam owners and/or the state dam safety agency?	Click or tap here to enter text.	Choose an item.
HHPD1-b. Does the plan incorporate information shared by the state and/or local dam owners?	Click or tap here to enter text.	Choose an item.
HHPD2. Did the plan address HHPDs in the risk assessment?		
HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD2-b. Does the plan document the limitations and describe how to address deficiencies?	Click or tap here to enter text.	Choose an item.
HHPD3. Did the plan include mitigation goals to reduce long-term vulnerabilities from HHPDs?		
HHPD3-a. Does the plan address how to reduce vulnerabilities to and from HHPDs as part of its own goals or with other long-term strategies?	Click or tap here to enter text.	Choose an item.
HHPD3-b. Does the plan link proposed actions to reducing long-term vulnerabilities that are consistent with its goals?	Click or tap here to enter text.	Choose an item.

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD4-a. Did the plan include actions that address HHPDs and prioritize mitigation actions to reduce vulnerabilities from HHPDs?		
HHPD4-a. Does the plan describe specific actions to address HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-b. Does the plan describe the criteria used to prioritize actions related to HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-c. Does the plan identify the position, office, department or agency responsible for implementing and administering the action to mitigate hazards to or from HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD Required Revisions		
Required Revision: NCEM 1st Review: Element G, High Hazard Potential Dams Annex will be submitted later.		

Element H: Additional State Requirements (Optional)

Element H Requirements	Location in Plan (section and/or page number)	Met / Not Met
This space is for the State to include additional requirements.		
Click or tap here to enter text.	Click or tap here to enter text.	Choose an item.

Plan Assessment

These comments can be used to help guide your annual/regularly scheduled updates and the next plan update.

Element A. Planning Process

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element B. Risk Assessment

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element C. Mitigation Strategy

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element D. Plan Maintenance

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element E. Plan Update

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element G. HHPD Requirements (Optional)

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Element H. Additional State Requirements (Optional)

Strengths

- [insert comments]

Opportunities for Improvement

- [insert comments]

Appendix D

Planning Process

Documentation

This appendix includes:

1. Meeting Agendas
2. Meeting Sign-In Sheets
3. Neighboring Jurisdiction Outreach Documentation
4. Public Survey Advertising Documentation
5. Public Survey Summary Results

CLAY MACON MEETING PARTICIPANTS

Meeting Participant Summary

NAME	DEPARTMENT / AGENCY	Attended 9/9/25 Mtg	Attended 2/10/26 Mtg
Clay County			
Baughn, Harry	Town Council, Hayesville	X	X
Ledford, Jeff	EM Director, Clay County	X	X
O'Connor, Mark	Fire Marshal, Clay County	X	
Seagle, Todd	911 Comms Supervisor, Clay County	X	X
Joe, Sellers	Environmental Health Specialist, Clay County	X	
Stillwell, Anthony	Building Inspector/Floodplain Manager, Clay County	X	
Macon County			
Mathis, Michael	Planning Director, Highlands	X	X
Setser, Justin	Town Planner, Franklin	X	X
Sitton, Noah	Preparedness Coordinator, Macon County	X	X
Teem, Jimmy	Fire Marshal/Inspector, Macon County	X	
Ward, Josh	Town Manager, Highlands	X	
Outside Stakeholders			
Baker, Carl	Mitigation Plans Manager, NCEM	X	X
Breedlove, David	County Coordinator, NCEM	X	X
DeLude, Hannah	Hazard Mitigation Planner, ESP		X
Flores, John	Hazard Mitigation Planner, ESP		X
Mello, John	Hazard Mitigation Planner, NCEM	X	X
Rahman, Fabiha	Hazard Mitigation Planner, ESP	X	X
Slaughter, Nathan	Department Manager, ESP	X	X

Email Correspondence

Hi All,

I hope this message finds you well.

I am reaching out to inform you that Clay Macon Region is currently in the process of updating our regional hazard mitigation plan. As part of this important initiative, we would like to extend an invitation to neighboring jurisdictions to participate in the planning process.

We believe that collaboration is vital for effective hazard mitigation, and your insights and contributions would be invaluable to our efforts. Our team has created a project website, which you can access here: [Clay Macon Hazard Mitigation Plan Update](#).

This site contains important information about the project and ongoing updates, including the draft plan. There is a feedback loop located on the website under “Contact Us” where you can ask questions or provide input on the draft plan.

Thank you for considering this opportunity to collaborate on enhancing our regional resilience. We look forward to your participation and support.

Kind regards,

Nathan Slaughter, AICP, CFM

Outside Stakeholder Contacts

Agency	Name	Title	Email
Neighboring Jurisdictions			
Cherokee County NC	Sam Davis	EM Coordinator	sam.davis@cherokeecounty-nc.gov
Graham County NC	Larry Hembree	EM Director	larry.hembree@grahamcounty.org
Jackson County NC	Zeb Holland	EM Director	zebholland@jacksonnc.org
Swain County NC	Misty Tabor	EM/ES Director	emergencymanagement@swaincountync.gov
Rabun County GA	Brian Panell	EMA Director	(Staff Directory)
Towns County GA	Marty Roberts	EMA Director	911@townscountygga.com

Larger Stakeholder Meeting Kickoff
September 9th, 2025
2:00pm – 3:00pm
Hayesville, NC

Welcome and Introductions

- I. KICKOFF PROJECT
 - II. PROJECT TEAM INTRODUCTIONS
 - III. MEETING OBJECTIVES
-

Mitigation Overview

- I. MITIGATION DEFINITIONS
 - II. TYPES OF MITIGATION
 - III. MITIGATION TECHNIQUES
-

Purpose of Update

- I. REFLECT ON CHANGING RISKS
 - II. INCREASE COMMUNITY RESILIENCE
 - III. ENSURE COMPLIANCE AND FUNDING
 - IV. INCREASE PREPAREDNESS
-

Plan Update Process

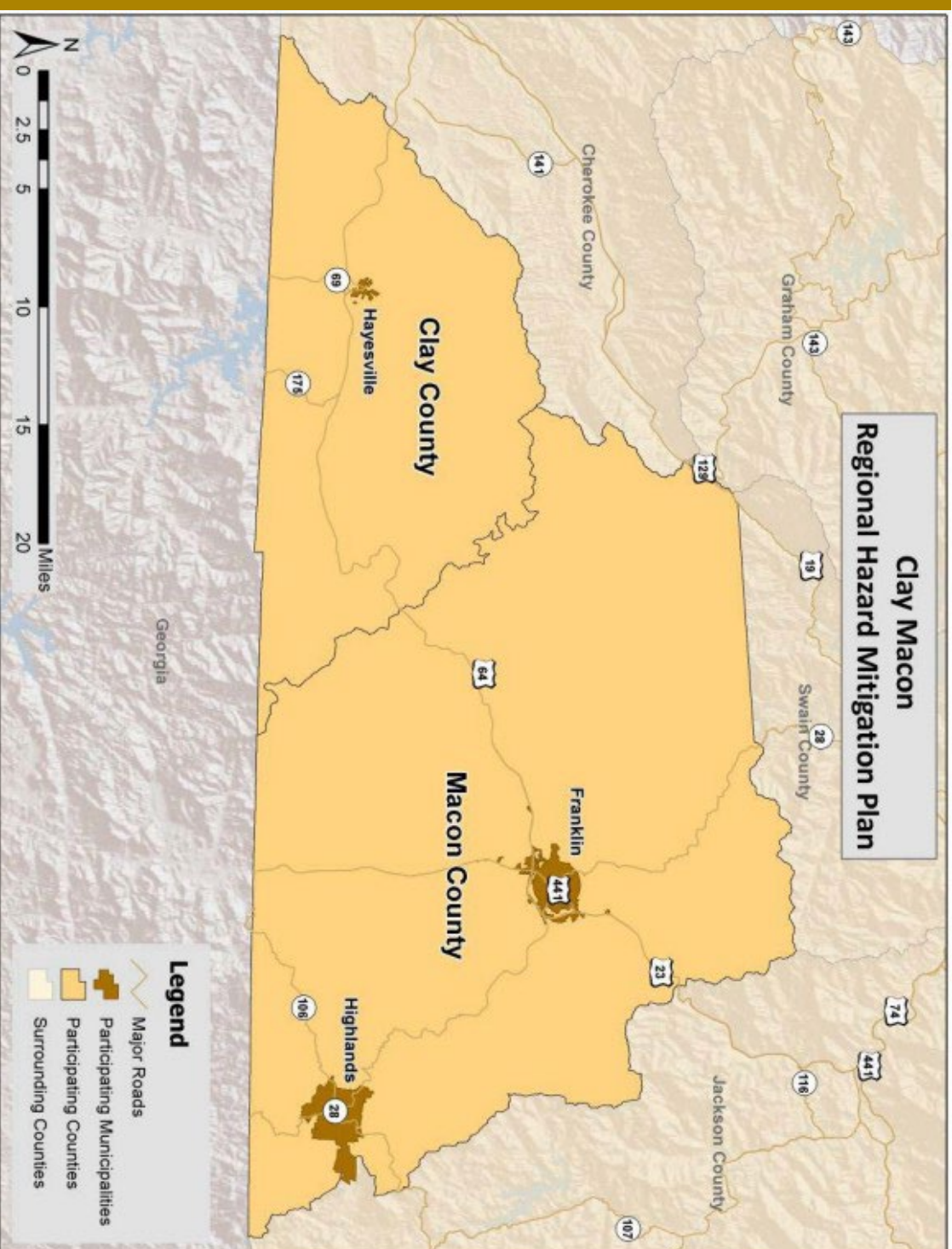
- I. ORGANIZE RESOURCES
 - II. PERFORM RISK ASSESSMENT
 - III. DEVELOP MITIGATION PLAN
 - IV. ADOPTION AND IMPLEMENTATION
-

Next Steps

- I. SHARE PUBLIC SURVEY ON MUNICIPAL SITES
- II. ENGAGE SMALLER COMMUNITIES TO ENCOURAGE PARTICIPATION

Clay Macon

Regional Hazard Mitigation Plan Update
Stakeholder Meeting
September 9th, 2025



Agenda

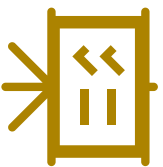
- Introductions & Meeting Objectives
- Roles & Responsibilities (NCEM)
- Brief Mitigation Overview
- Interactive Session
- Purpose of Update
- Plan Update Process
- Project Information/Resources
- Q&A

Meeting Kickoff

Welcome & Introductions

Reminder to Sign In!

Meeting Objectives



Review Scope and
Planning Process



Identify & Engage
Key Stakeholders



Outline Roles &
Responsibilities

Project Roles and Approval Process

NCEM Facilitated

Carl Baker, Mitigation Plans Manager with NCEM, will be reviewing:

1. Project Team Roles & Responsibilities (NCEM, Local Jurisdictions, and Contractor)
2. Plan Review & Approval Process (Elements, Timeline, Issuance)



Emergency Management
NC DEPARTMENT OF PUBLIC SAFETY

Hazard Mitigation Plan (HMP) Update Process

- NCEM Role
- Local Jurisdiction Role
- Contractor Role
- Plan Review and Approval Process
- NCEM Hazard Mitigation Plans (Use QR Code)





Emergency Management
NC DEPARTMENT OF PUBLIC SAFETY

NCEM Role

- Plan updates are funded through the HMGP (State pays the non-fed share)
- Support jurisdictions throughout the plan update process
- Review draft plans for accuracy and compliance with Federal guidance
- Submit plans for FEMA approval
- Coordinate plan adoptions and submit final plan to FEMA



Local Jurisdiction Role

- Invite stakeholders and attend Hazard Mitigation Planning Committee (HMPC) meetings
- Provide input for plan update, particularly the Capability Assessment and Mitigation Action Strategy/Plan
- Review the draft plan
- Present adoption notice to local/county board for approval





Emergency Management
NC DEPARTMENT OF PUBLIC SAFETY

Contractor Role

- Facilitate HMPC meetings
- Research and update all sections of the HMP
- Coordinate input from local HMPC into plan update (HIRA, Capability Assessment, Mitigation Actions, etc.)
- Submit draft plan to NCEM for review
- Coordinate adoptions and submit final plan





Emergency Management
NC DEPARTMENT OF PUBLIC SAFETY

Plan Review and Approval Process

- NCEM reviews submitted draft plan
 - 33 review elements
 - Mitigation Actions, may require revisions such as category, status, etc. Must have one per hazard, or one all hazard action. Emergency Services actions do not count towards the minimum requirements.
- Submit draft plan to FEMA for review and approval
 - Begin adoption process
- FEMA issues approval letter
- Once plan is fully adopted a final plan is submitted to FEMA



Background/ Overview



“mit-i-gate”

- 1: to cause to become less harsh or hostile.
- 2: to make less severe or painful.

What is Mitigation?



Hazard Mitigation

Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.

Basic Types of Mitigation



Mitigating against hazard impacts on **existing development**

Houses
Businesses
Infrastructure
Critical Facilities



Ensuring **future development** is conducted in a way that does not increase vulnerability

Plans
Policies
Procedures

Mitigation Techniques

1. Prevention
2. Property Protection
3. Natural Resource Management
4. Structural Projects
5. Emergency Services
6. Education and Awareness

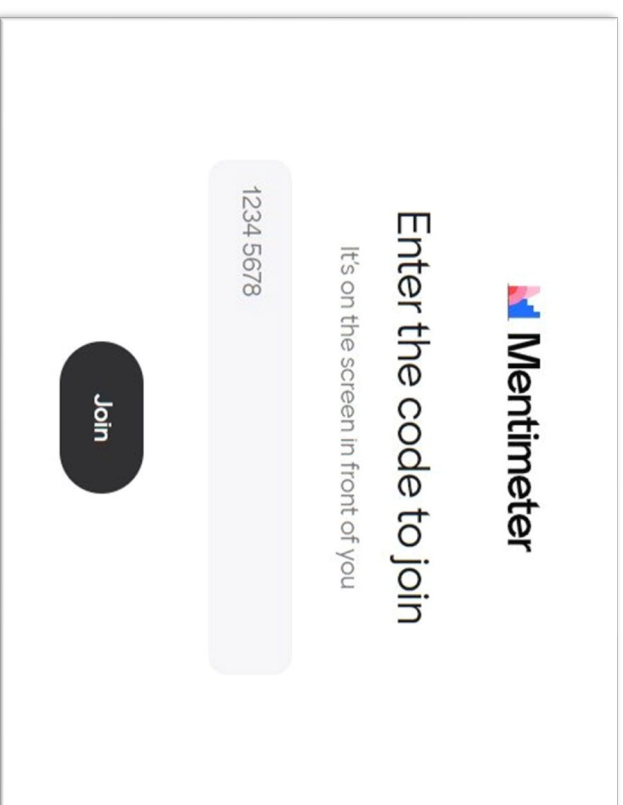
Interactive Session

SWOT Analysis

We'll be going through a series of open-ended questions that will be used to inform the plan update.

Your input matters!

Please open menti.com

A screenshot of the Mentimeter join interface. It features the Mentimeter logo at the top, followed by the instruction "Enter the code to join" and "It's on the screen in front of you". Below this is a light blue input field containing the code "1234 5678". At the bottom is a dark blue "Join" button.

 **Mentimeter**

Enter the code to join

It's on the screen in front of you

1234 5678

Join

Menti Poll

 **Mentimeter**

Enter the code to join

It's on the screen in front of you

123

Use code 1816 3374

Join



Scan the QR Code for Access to the [Menti Poll](#)

Purpose of Plan Update

Why is it Necessary?

Reflect on Changing Risks

Increase Community Resilience

Ensure Compliance and Funding

Heighten Preparedness

Addressing Changing and Emerging Risk

Population Increase and Community Growth	Greater Exposure to Hazard Risk Increased Exposure = More Damage
More Hazards (Man-Made)	Included in State Plan Ex. Technological, Civil Disturbance, Terrorism
Changing Conditions	Anticipated Increase in Frequency and Magnitude **Optional Inclusion/Reference to Climate Change
Development Patterns	Increased Impermeable Surfaces More Infrastructure and Assets at Risk

Increasing Community Resilience



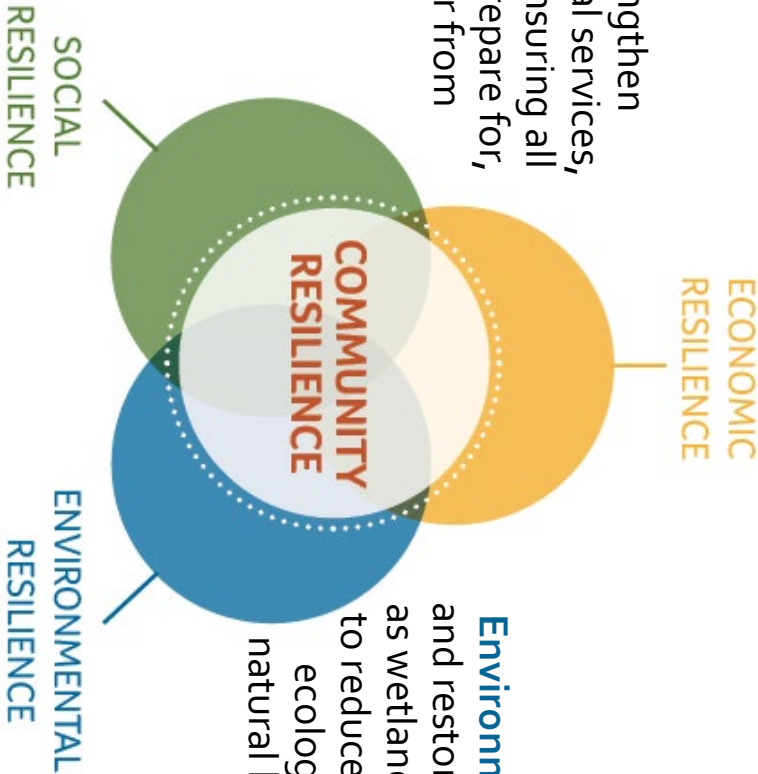
Economic Resilience: Support the stability and recovery of local businesses and employment opportunities to ensure the community can withstand and bounce back from hazard impacts.



Social Resilience: Strengthen community networks, social services, and access to resources, ensuring all residents can effectively prepare for, respond to, and recover from hazards.



Environmental Resilience: Protect and restore natural ecosystems such as wetlands, forests, and floodplains to reduce hazard impacts, promote ecological health, and sustain natural buffers against disasters.



Ensuring Compliance and Funding



Ensure compliance with
federal and state
requirements

**Disaster Mitigation Act
of 2000**
NC GS 166 A



Maintain eligibility for
disaster mitigation funding
and assistance programs

HMGP
FMA

Community Rating System (CRS)

Specific CRS elements will be integrated into the hazard mitigation planning process including:

1. Public and Targeted Outreach (Public Meetings Timing)
2. Hazard Mapping and Regulations
3. Flood Damage Reduction Activities (SDE Procedures)
4. CRS Steering Committee (50% NGO/Public)
5. Thorough Documentation of Process (Section 2)

CRS Key Benefits

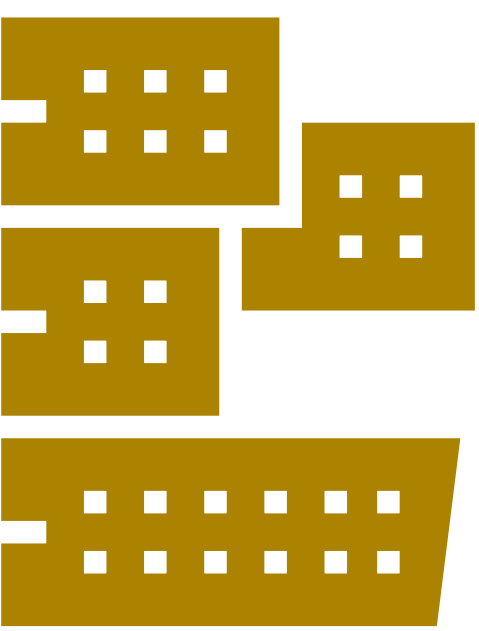
Participation in the CRS offers economic benefits and supports hazard mitigation efforts:

- 1. Financial Incentives** – Potential for reduced insurance premiums and access to mitigation grants
- 2. Recognition and Credibility** – Demonstrates community's commitment to risk reduction and transparency
- 3. Compliance and Stakeholder Engagement** – Encourages collaboration among agencies, insurers, and residents

Heightening Preparedness

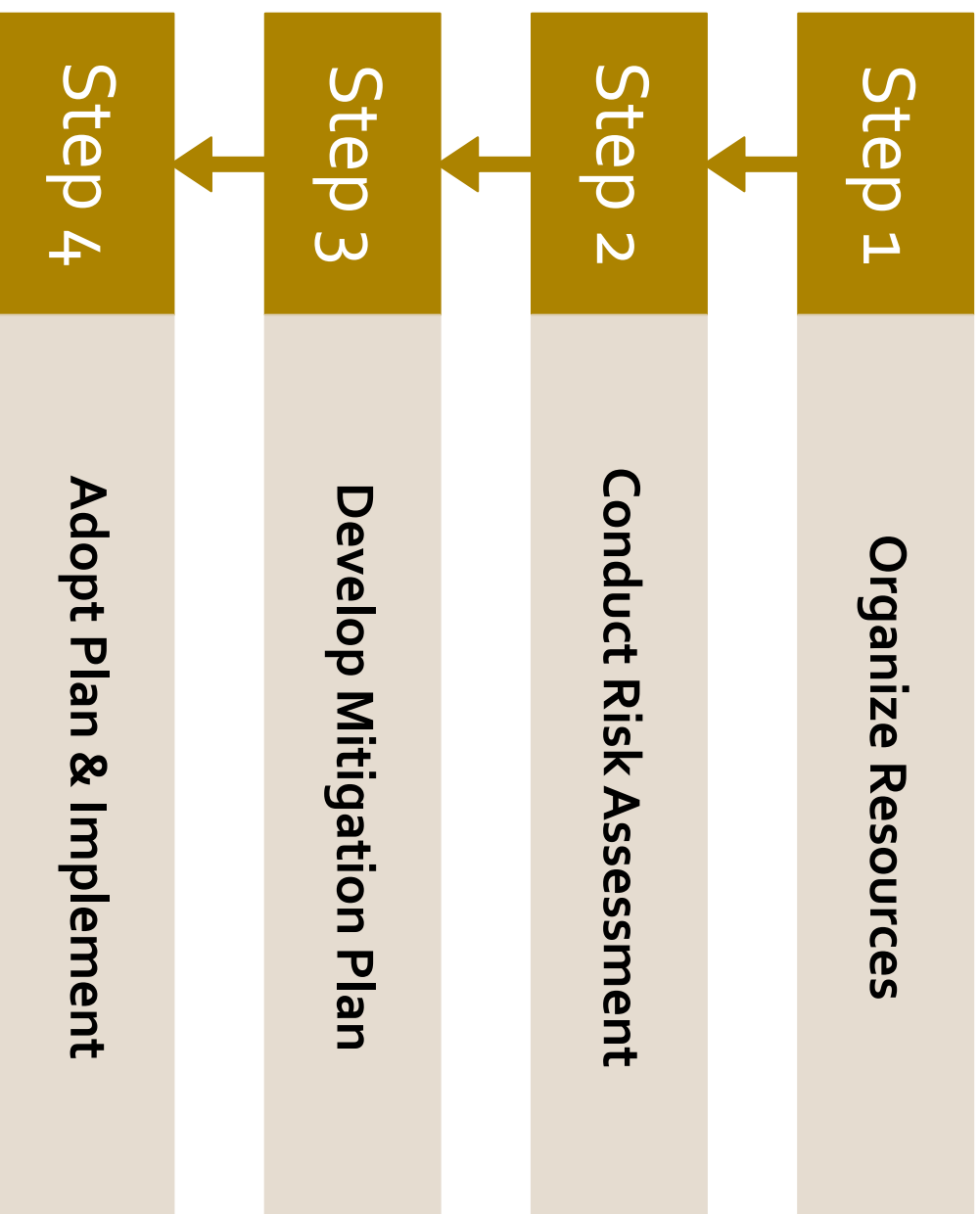
This plan update ensures that the participating jurisdictions are better prepared to:

1. Address existing and emerging hazards
2. Protect lives and property
3. Sustain continuity of essential services during and following an event



Planning Process

*How will it be
done?*

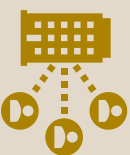


Step 1: Organize Resources



Planning

Planning for Public
Involvement



Coordinating

Coordinating with
Departments and
Agencies



Finalizing

Finalizing a List of
Stakeholders for
Involvement
(HMPC)



Hazard Identification

What Can Happen Here?

- Previously Identified Hazards
- Identify New Hazards



Vulnerability Assessment

What Will be Affected/Impacted?

- Will Use County Parcel Data, FEMA HAZUS Analysis, and NCEM Data



Capability Assessment

What Can We Do About It?

- What Mitigation Actions are Feasible
- Where Gaps Exist

Step 2: Risk Assessment

Previously Identified Hazards (2021)

HIGH RISK	Severe Winter Weather Tornadoes/Thunderstorms Flooding Hazardous Substances
MODERATE RISK	Hurricanes and Coastal Storms Terrorism Electromagnetic Pulse Drought Radiological Emergency Wildfires Excessive Heat
LOW RISK	Dam Failure Geological Infectious Disease Earthquakes Cyber

Step 3: Develop a Mitigation Plan



Setting Planning Goals



Reviewing Mitigation Alternatives



Drafting an Action Plan



**Clay Macon Regional Hazard
Mitigation Plan – 2021 Update**

FINAL - June 2021

Step 4: Adopt Plan and Implement Actions



Integration Efforts

Leveraging existing efforts ensures a more robust and efficient hazard mitigation plan, supporting:

1. Comprehensive Risk Perspective
2. Resource Optimization
3. Regional Coordination
4. Plan Continuity and Alignment
5. Stakeholder Buy-In

Project Information

*Where is
information
being shared?*

- Project Team requests counties/municipalities post relevant project information and updates
- Can be used as a Tool for HMPC Coordination and Public Outreach
- Project Website & Public Survey are readily available online!

Visit and Share the Project Website

The Project Website will be updated regularly throughout the planning process to provide access to:

1. Project Overview
2. Meeting Information
3. Public Survey
4. Previous HMP (2021)
5. Relevant Planning Resources

Complete and
Share the
Public Survey!



Scan the QR Code for Access to the [Public Survey](#)

Project Schedule

Project
Kickoff Date –

Larger Stakeholder
Meeting – 9/9/25

Public Meeting #1
– TBD

HIRA Meeting –
Fall 2025

Mitigation
Strategy Meeting –
Winter 2025

Public Meeting #2
– TBD

Proposed Delivery
of Draft Plan –
January 2026

Existing Plan
Expiration Date –
7/15/26

Your Role Moving Forward

Participating local jurisdictions play a critical role in the plan update and we wanted to reiterate that your input/expertise ensures plan relevance and usefulness:

- 1. Tell us who should be involved in the process.** Have we missed anyone? This can include community groups, non-profits, businesses, etc.
- 2. Share the project website to your county/municipal page.** We're actively updating this site, so sharing/promoting is all you need to do!
- 3. Complete the survey and encourage others to do so.** Print copies and place them in community buildings. Let us know if translation is needed.
- 4. Determine location, date, and times for meetings in a timely fashion.** Our aim is to send invites out with at least 2 weeks notice.

Your Role Moving Forward cont.

Participating local jurisdictions play a critical role in the plan update and we wanted to reiterate that your input/expertise ensures plan relevance and usefulness:

5. **Review your Capability Assessment.** Identify new capabilities or adjust existing capabilities. Efforts underway should be noted.
6. **Review your Mitigation Plan.** Provide a detailed status update on each action and brainstorm new actions that address existing gaps/weaknesses.
7. **Collaborate amongst other agencies/departments.** This update spans beyond EM and will benefit from the cross-sectoral collaboration/expertise.
8. **Reach out to smaller jurisdictions to ensure their participation.** Whether actively present or represented through the county, this will help expedite the update and adoption process.

Questions

Questions/Comments/Concerns

Adjourn –
Thank you!

Contact Information:

- **Nathan Slaughtner**, Project Manager
- nslaughtner@espassociates.com
- **Hannah Delude**, Planner -
hdelude@espassociates.com
- **John Flores**, Planner -
jflores@espassociates.com

Stakeholder Meeting
September 9th, 2025
Hayesville, NC
2:00pm – 3:00pm

Participants

Name	Organization/Role
Baker, Carl	Mitigation Plans Manager, NCEM
Baughn, Harry	Councilman, Town of Hayesville
Breedlove, David	Area 15 Coordinator, NCEM
Ledford, Jeff	EM Director, Clay County
Mathis, Michael	Planning and Development Director, Town of Highlands
Mello, John	Hazard Mitigation Planner, NCEM
O'Connor, Mark	Fire Marshal, Clay Macon
Rahman, Fabiha	Hazard Mitigation Planner, ESP Associates
Seagle, Todd	EM/Communications Director, Macon County
Sellers, Joe	Environmental Health Specialist, Clay County
Setser, Justin	Town Planner, Town of Franklin
Sitton, Noah	Public Health Preparedness Coordinator, Macon County
Slaughter, Nathan	Department Manager, ESP Associates
Stillwell, Anthony	Building Inspector/Floodplain Manager, Clay County
Teem, Jimmy	Fire Marshal/Inspector, Macon County
Ward, Josh	Town Manager, Town of Highlands

Introductions & Meeting Objectives

The Stakeholder Meeting for the Clay Macon Hazard Mitigation Plan Update 2026 was held in Hayesville at the Clay County 911 Center with a virtual option to facilitate efficient collaboration. Nathan Slaughter, Project Manager, welcomed all participants to the meeting and gave a brief overview of the meeting agenda and objectives. Meeting objectives included (1) Review scope and planning process, (2) Identify and engage key stakeholders, and (3) Outline roles and responsibilities. Participants were asked to sign-in or enter their information in the Teams chat for documentation purposes.

Roles & Responsibilities

Carl Baker, Mitigation Plans Manager, was then introduced to touch on the roles and responsibilities of all parties as well as the plan review and approval process. NCEM oversees the plan review and approval process, including elements such as plan updates funded through HMGP, with the State covering the non-federal share. NCEM also supports jurisdictions throughout the update process by reviewing draft plans for accuracy and federal compliance, submitting them for FEMA approval, and coordinating adoptions before final submittal to FEMA.

The local jurisdictions' roles were outlined, emphasizing their responsibilities to invite stakeholders, participate in HMPC meetings, provide input (particularly on the Capability Assessment and Mitigation Action Strategy), and review draft plans. They also present the adoption notice for approval by local or county boards.

The contractor's role was described as facilitating HMPC meetings, researching and updating all sections of the HMP, coordinating input from the local HMPC, and submitting drafts for review. The contractor also manages the coordination of adoptions and submission of the final plan.

Plan review and approval process was reviewed, which involves NCEM's evaluation of 33 review elements, including mitigation actions that may require revisions. The process includes submitting draft plans to FEMA, initiating the adoption process, and awaiting FEMA's approval letter. Once fully adopted, the final plan is submitted to FEMA for official approval.

Brief Mitigation Overview

During the meeting, mitigation was reviewed, which refers to *proactive measures taken to reduce the impact of hazards before they occur*, with the goal of minimizing future risks and damages. It was noted that all mitigation actions are categorized into two major groups (existing development and future development) and fall under one of the six techniques summarized (prevention, preparedness, natural resource protection, emergency services, property protection, and education and awareness).

Purpose of Update

The purpose of the plan update was discussed, and its importance was emphasized. The update is necessary to reflect changing risks, such as population increases, community growth, the emergence of new hazards and man-made threats, shifting conditions, and evolving development patterns. The plan aims to enhance community resilience across social, economic, and

environmental dimensions, ensuring the community is better prepared to withstand and recover from disasters.

Furthermore, the update is essential for maintaining compliance with Federal and State requirements, including DMA 200, NC GS 166 A, and funding programs like HMGP and FMA, which are critical for securing ongoing support and funding. CRS elements were also highlighted at this time along with the key benefits of CRS participation. Finally, the plan contributes to heightened preparedness by addressing both existing and emerging threats, with the goal of protecting lives and property, and ensuring the continuity of essential services during and following disasters.

Plan Update Process

The planning process was reviewed, which outlined four essential steps:

1. Organizing resources – The planning team has started working with participating counties and municipalities within this region and will conduct public outreach/stakeholder engagement for diverse perspectives.
2. Conducting a risk assessment – This will begin with hazard identification (*What can happen here?*) considering historical occurrence and emerging hazards. After hazards have been identified, the planning team will examine hazard impact (*What do these hazards do when they occur within the region?*), while considering capability to act.
3. Developing a mitigation plan – Existing actions from the previous update must be reviewed, including project implementation status updates (as required by FEMA). In addition to project status updates, new mitigation actions will be discussed during the Mitigation Strategy Meeting and integrated into the mitigation plan.
4. Final adoption and implementation – The final step is to adopt the plan and begin action implementation. The draft plan will be sent to the Planning Committee and then will go through its first round of review by NCEM. FEMA will provide the final review and approval of the plan.

SWOT Analysis

A Menti Poll was conducted to engage participants and gather feedback that will be used to guide the planning process. The questions are provided below:

1. What do you see as the most significant strengths your region has when it comes to hazard mitigation and resilience?
2. Has your recently community completed projects/implemented actions to address vulnerability? Please share & include your community's name!
3. What weaknesses, challenges, or barriers have hindered mitigation efforts in the past?

4. Can you identify opportunities (e.g. partnerships, funding sources, or new technologies) that we could leverage to enhance the planning process?
5. Are there any existing planning efforts/initiatives that we should integrate into the plan update to maximize efficiency and effectiveness?
6. Are there any specific stakeholders (businesses, academia, community groups, etc.) that should be included in the planning process?

Results to this Menti activity are provided in a separate PDF.

Project Information/Resources

Participating counties and municipalities were asked to post relevant project information and updates to facilitate ongoing communication. The team highlighted that the project website and public survey were already accessible online and would be updated regularly throughout the planning process. The website provides key resources, including the project overview, meeting minutes and presentations, the public survey, the previous 2021 HMP, and relevant planning resources.

Additionally, the critical role of participating jurisdictions was reiterated, emphasizing that their input and expertise will be essential to enhance the plan and ensure it remains relevant and useful. The active involvement of local stakeholders was recognized as vital to the success of the update process. The primary role and key tasks assigned to local jurisdictions was also shared at this time to give a general overview.

Meeting Closeout

The meeting concluded with a call for collaborative updates among counties and municipalities. Contact information was shared at this time. Meeting minutes and the presentation will be shared with participants, as requested, and uploaded to the project website for documentation purposes. The meeting officially adjourned at 3:00pm.

HIRA/Mitigation Meeting
February 10th, 2026
Hayesville, NC
10:00am – 12:00pm

Meeting Objectives

- I. IDENTIFY HAZARD
 - II. ASSESS HAZARDS AND VULNERABILITY
 - III. DETERMINE POTENTIAL IMPACTS AND PRIORITIES
 - IV. DISCUSS FINDINGS
 - V. EDUCATE AND INFORM
-

Hazard Identification and Risk Assessment

- I. IDENTIFIED & PROFILED HAZARDS
 - II. INVENTORIED ASSETS & ESTIMATED LOSSES
 - III. PRIORITY RISK INDEX (PRI) SCORES
 - I. CAPABILITY INDICATORS & OVERALL RATINGS
 - II. PUBLIC SURVEY FINDINGS
-

Mitigation Strategy

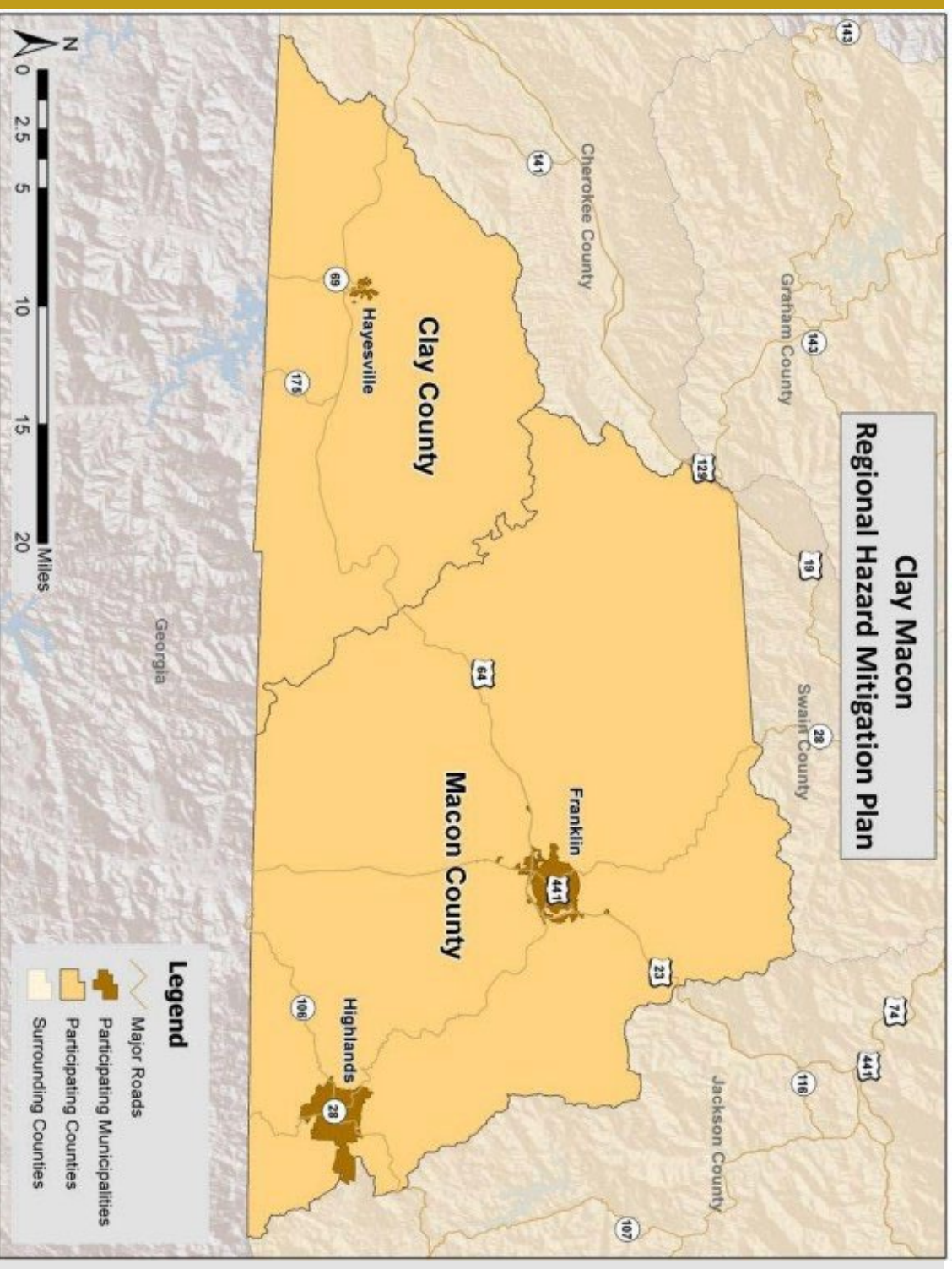
- I. MITIGATION GOALS
 - II. MITIGATION ALTERNATIVES (EXISTING AND NEW)
-

Next Steps

- I. SUBMIT UPDATED AND NEW MITIGATION ACTIONS
- II. SUBMIT DRAFT PLAN – SPRING 2026

Clay Macon

2026 Hazard Mitigation Plan Update
HIRA/Mitigation Strategy Meeting
February 10, 2026
Hayesville, NC



Agenda

- Welcome & Introductions
- Meeting Objectives
- Hazard Identification
- Hazard Profiles: Risk & Vulnerability
- Asset Inventory
- Discuss Findings
- Mitigation Strategy
- Next Steps & Questions

Introductions

Welcome!

Reminder to Sign-In

Introductions: Project Team and
Participants

Meeting Objectives



Identify Hazards



Assess Hazards and
Vulnerability



Determine Potential
Impacts & Priorities



Discuss Findings



Educate and Inform

Planning Process

Step 1: Organize to Prepare the Plan

Step 2: Involve the Public (*ongoing*)

Step 3: Coordinate (*ongoing*)

Step 4: Assess the Hazard (current)

Step 5: Assess the Problem (current)

Step 6: Set Goals (current)

Step 7: Review Possible Activities (current)

Step 8: Draft an Action Plan (current)

Step 9: Adopt the Plan

Step 10: Implement, Evaluate, & Revise the Plan

Hazard Identification & Risk Assessment (HIRA) Process

Risk = a combination of hazard, vulnerability, and exposure; each factor is assessed in the process



Hazard Identification

44 CFR Requirement

44 CFR Part 201.6(c)(2)(i): The risk assessment shall include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan must include information on previous occurrences of hazard events and on the probability of future hazard events.



FEMA Major Disaster Declarations

Total Declarations: 9

Year	Disaster Number	Description	Clay County	Macon County
1973	394	SEVERE STORMS & FLOODING	X	X
1995	1073	SEVERE STORMS, FLOODING & HIGH WINDS	X	X
1996	1087	BLIZZARD OF '96		X
2004	1546	TROPICAL STORM FRANCES		X
2004	1553	HURRICANE IVAN		X
2013	4146	SEVERE STORMS, FLOODING, LANDSLIDES & MUDSLIDES		X
2013	4153	SEVERE STORMS, FLOODING, LANDSLIDES & MUDSLIDES		X
2020	4487	COVID - 19 PANDEMIC	X	X
2024	4827	NC TROPICAL STORM HELENE	X	X

- Help identify hazards using evidence, not assumptions
- Provide record of hazards that exceeded state and local response capacity
- Highlight hazards that caused significant impacts to people, property, and infrastructure

Review of Existing Plan Hazards

Comparing hazards across the previous regional plan (2021) and the State HMP (2023) helps identify **core hazards** that persist and **emerging risks**

Hazard	Included in 2023 State HMP?	Included in 2021 Regional Plan?	Included in 2026 Regional Plan?
Flooding	X	X	X
Hurricanes and Coastal Hazards	X	X	X
Severe Winter Weather	X	X	X
Excessive Heat	X		
Earthquakes	X	X	X
Wildfires	X	X	X
Dam Failure	X	X	X
Drought	X	X	X
Tornadoes/Thunderstorms	X	X	X
Geological (Landslides, Sinkholes, Erosion)	X	X	X
Hazardous Substances	X	X	X
Radiological Emergency	X	X	X
Terrorism	X	X	X
Infectious Disease	X	X	X
Cyber	X	X	X
Electromagnetic Pulse	X	X	X
Civil Disturbance (new)	X		X
Food Emergency (new)	X		X



Hazard Identification

44 CFR Requirement

44 CFR Part 201.6(c)(2)(i): The risk assessment shall include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan must include information on previous occurrences of hazard events and on the probability of future hazard events.



Hazards Profiled

1. Civil Disturbance
2. Cyber
3. Dam Failure
4. Drought
5. Earthquakes
6. Electromagnetic Pulse
7. **Flooding**
8. Food Emergency
9. Geological
10. **Hazardous Substances**
11. Hurricane and Coastal Hazards
12. Infectious Disease
13. Radiological Emergency
14. **Severe Winter Weather**
15. Terrorism
16. **Tornadoes/Thunderstorms**
17. Wildfires

Hazards in **RED** scored
"high risk" based on PRI
metrics

- Hazard Profiles to include:**
- *Background*
 - *Location*
 - *Extent*
 - *Historical Occurrences*
 - *Probability of Future Occurrence/FEMA NRI info*
 - *Changing Future Conditions*
 - *Summaries by Jurisdiction*
 - *Vulnerability Assessment*

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	30%
	Possible	Between 1% and 10% annual probability	2	
	Likely	Between 10 and 100% annual probability	3	
	Highly Likely	100% annual probability	4	
	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	30%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Impact	Negligible	Less than 1% of area affected	1	20%
	Small	Between 1 and 10% of area affected	2	
	Moderate	Between 10 and 50% of area affected	3	
	Large	Between 50 and 100% of area affected	4	
Spatial Extent	More than 24 hours	Self-explanatory	1	10%
	12 to 24 hours	Self-explanatory	2	
	6 to 12 hours	Self-explanatory	3	
	Less than 6 hours	Self-explanatory	4	
Warning Time	Less than 6 hours	Self-explanatory	1	10%
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	
Duration	Less than 6 hours	Self-explanatory	1	10%
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	



Probability	Impact	Spatial Extent	Warning Time	Duration
Likely	Critical	Large	More than 24 hours	Less than 1 week

- A winter storm can range from moderate snowfall or ice over a few hours to blizzard conditions with blinding snow that lasts for several days
- Severe winter weather can lead to dangerous driving conditions, communications and utility disruptions, and severe injuries
- Winter weather has resulted in 1 disaster declarations and 207 recorded events in the region since 1950 per NCEI records

NCEI WINTER WEATHER EVENTS

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2025)
Clay County	26	1/0	\$0
Macon County	181	0/0	\$0
TOTAL	1,393	1/0	\$104,364,890

Severe winter weather is a top hazard in the nation in terms of weather-related mortality. Frigid winter conditions contribute to a high number of deaths and injuries each year. In recent years, **U.S. death rates have spiked by 8-12% in the winter months.**

Severe Winter Weather



Probability	Impact	Spatial Extent	Warning Time	Duration
Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours

Tornadoes / Thunderstorms

***Note:** National Centers for Environmental Information (NCEI) records only include those officially reported by the agency. It is highly likely that additional events, damages, and casualties have occurred that are not fully captured in this dataset.

ENHANCED FUJITA (EF) SCALE				
EF-Scale Number	Intensity Phrase	3 Second Gust (MPH)	Type of Damage Done	
0	Gale	65-85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.	
1	Moderate	86-110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.	
2	Significant	111-135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	
3	Severe	136-165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	
4	Devastating	166-200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	
5	Incredible	Over 200	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile-sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.	

- North Carolina averages 30 tornadoes per year, formation most likely between March-May
- 10 recorded events in the region have resulted in \$1.75 million in property damages since 1950



Probability	Impact	Spatial Extent	Warning Time	Duration
Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours

Tornadoes / Thunderstorms

NCEI THUNDERSTORM / HIGH WIND EVENTS

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2025)
Clay County	90	0/0	\$977,040
Hayesville	48	0/0	\$605,463
Unincorporated Area	42	0/0	\$371,577
Macon County	127	0/2	\$2,099,317
Franklin	32	0/1	\$622,439
Highlands	10	0/0	\$20,747
Unincorporated Area	85	0/1	\$1,456,131
Clay Macon Regional Total	217	0/2	\$3,076,357

Source: National Centers for Environmental Information

- Although thunderstorms generally affect a small area, they are very dangerous and may cause extensive damages
- According to NOAA, severe storm events are likely to become more frequent and intense throughout the Southeast U.S. over time



Probability	Impact	Spatial Extent	Warning Time	Duration
Likely	Limited	Moderate	6 to 12 hours	Less than 1 week

NFIP INSURED FLOOD LOSSES

Location	Number of Policies	Flood Losses	Claims Payments
Clay County	35	35	\$141,226
Hayesville	0	0	\$0
Unincorporated	35	35	\$141,226
Macon County	79	79	\$1,968,752
Franklin	3	3	\$68,437
Highlands *	--	--	--
Unincorporated	76	76	\$1,900,315
Regional Total	114	114	\$2,109,978

NFIP REPETITIVE LOSS PROPERTIES

Location	Number of Properties	Number of Losses	Total Payments
Clay County	1	3	\$8495
Hayesville	0	0	\$0
Unincorporated	0	0	\$0
Macon County	5	13	\$302,955
Franklin	--	--	--
Highlands	0	0	\$0
Unincorporated	5	13	\$302,955
Regional Total	6	16	\$311,450

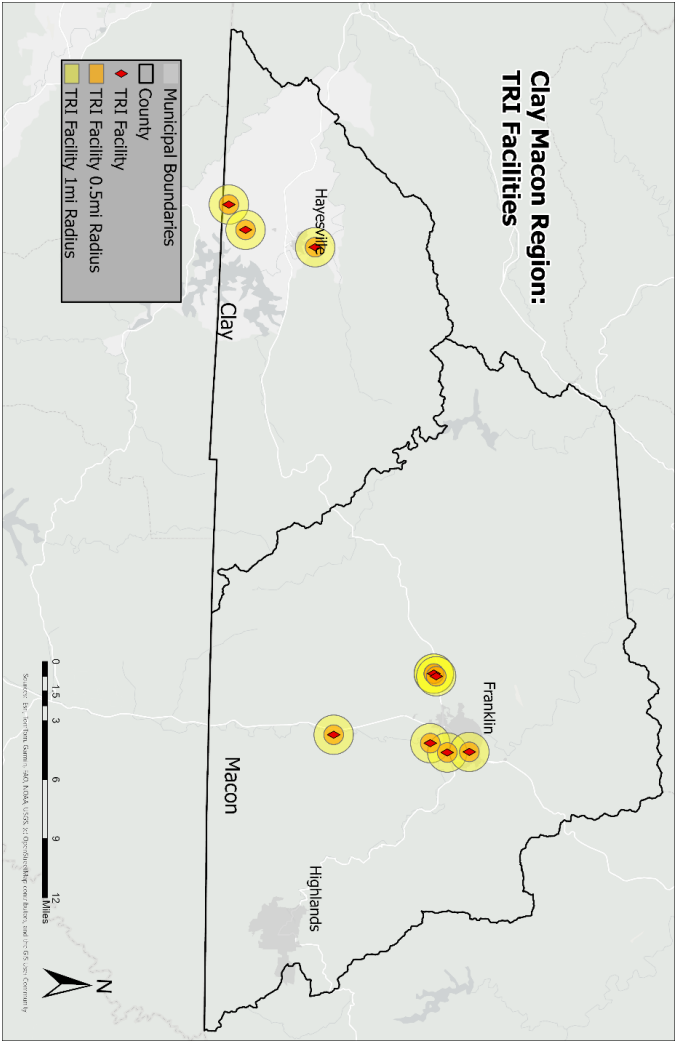
Source: Federal Emergency Management Agency, National Flood Insurance Program

Flooding

- Flooding is a top hazard in the nation for weather-related mortality and the most common and costly natural hazard
- 2 main sources:
 - Riverine flooding
 - Flash flooding
- NC climate projections suggest a likely increase in total annual precipitation and a very likely increase in extreme precipitation frequency/intensity

Probability	Impact	Spatial Extent	Warning Time	Duration
Possible	Limited	Small	Less than 6 hours	Less than 24 hours

Hazardous Substances



Population growth increases exposure by expanding development near facilities, infrastructure, and transportation routes where chemicals are stored, used, or transported.

- Chemicals that can threaten public health, the property, or the environment if spilled, leaked, released, or improperly stored/disposed
- Where they often can occur:
 - Fixed facilities
 - Transportation corridors
- 10 recorded events in the region have resulted in \$180,000 in property damages since 2004

Categorized PRI Results

*Note: table is not ordered in succession & low-risk hazards are not prioritized for mitigation

HIGH RISK	Severe Winter Weather Tornadoes/Thunderstorms Flooding Hazardous Substances
MODERATE RISK	Hurricanes and Coastal Storms Terrorism Electromagnetic Pulse Drought Radiological Emergency Wildfires Excessive Heat Food Emergency Civil Disturbance
LOW RISK	Dam Failure Geological Infectious Disease Earthquakes Cyber

- Initial PRI results are based solely on the quantitative analysis performed to date
- Stakeholder input / qualitative feedback received will be used to adjust initial scores

****Review** tabulated results on following slides

Natural Hazard Risk Summary – Tabulated PRI

Hazard	Sub-hazard(s) Assessed	Category/Degree of Risk					PRI Score
		Probability	Impact	Spatial Extent	Warning Time	Duration	
Natural Hazards							
Drought		Likely	Minor	Large	More than 24 hours	More than 1 week	2.5
Excessive Heat		Possible	Minor	Large	More than 24 hours	Less than 1 week	2.1
Hurricane and Coastal Hazards		Possible	Critical	Large	More than 24 hours	Less than 24 hours	2.6
Tornadoes/ Thunderstorms	Hailstorm, Lightning	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	2.8
Severe Winter Weather		Likely	Critical	Large	More than 24 hours	Less than 1 week	3.0
Earthquakes		Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	2.0
Geological	Landslide, Sinkholes, Erosion	Possible	Limited	Small	Less than 6 hours	Less than 6 hours	2.1
Dam Failure		Unlikely	Critical	Moderate	Less than 6 hours	Less than 24 hours	2.2
Flooding		Likely	Limited	Moderate	6 to 12 hours	Less than 1 week	2.7



Other & Technological Hazard Risk Summary – Tabulated PRI

Hazard	Sub-hazard(s) Assessed	Category/Degree of Risk					PRI Score
		Probability	Impact	Spatial Extent	Warning Time	Duration	
Other Hazards							
Wildfires		Likely	Minor	Small	Less than 6 hours	More than 1 week	2.4
Infectious Disease		Unlikely	Limited	Moderate	More than 24 hours	More than 1 week	2.0
Technological Hazards							
Hazardous Substances		Possible	Limited	Small	Less than 6 hours	Less than 24 hours	2.2
Radiological Emergency	Fixed Nuclear Facilities	Unlikely	Critical	Moderate	6 to 12 hours	Less than 1 week	2.4
Terrorism		Unlikely	Critical	Moderate	Less than 6 hours	More than 1 week	2.6
Cyber		Unlikely	Minor	Moderate	Less than 6 hours	Less than 1 week	1.9
Electromagnetic Pulse		Unlikely	Limited	Large	Less than 6 hours	More than 1 week	2.5
Civil Disturbance		Possible	Limited	Small	Less than 6 hours	Less than 24 hours	2.2
Food Emergency		Possible	Limited	Moderate	More than 24 hours	More than 1 week	2.3



44 CFR Requirement

44 CFR Part 201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description must include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008, must also address NFIP insured structures that have been repetitively damaged by floods.

The plan should describe vulnerability in terms of: (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; (B) An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Asset Inventory

1. Identify Hazards

2. Profile Hazard Events

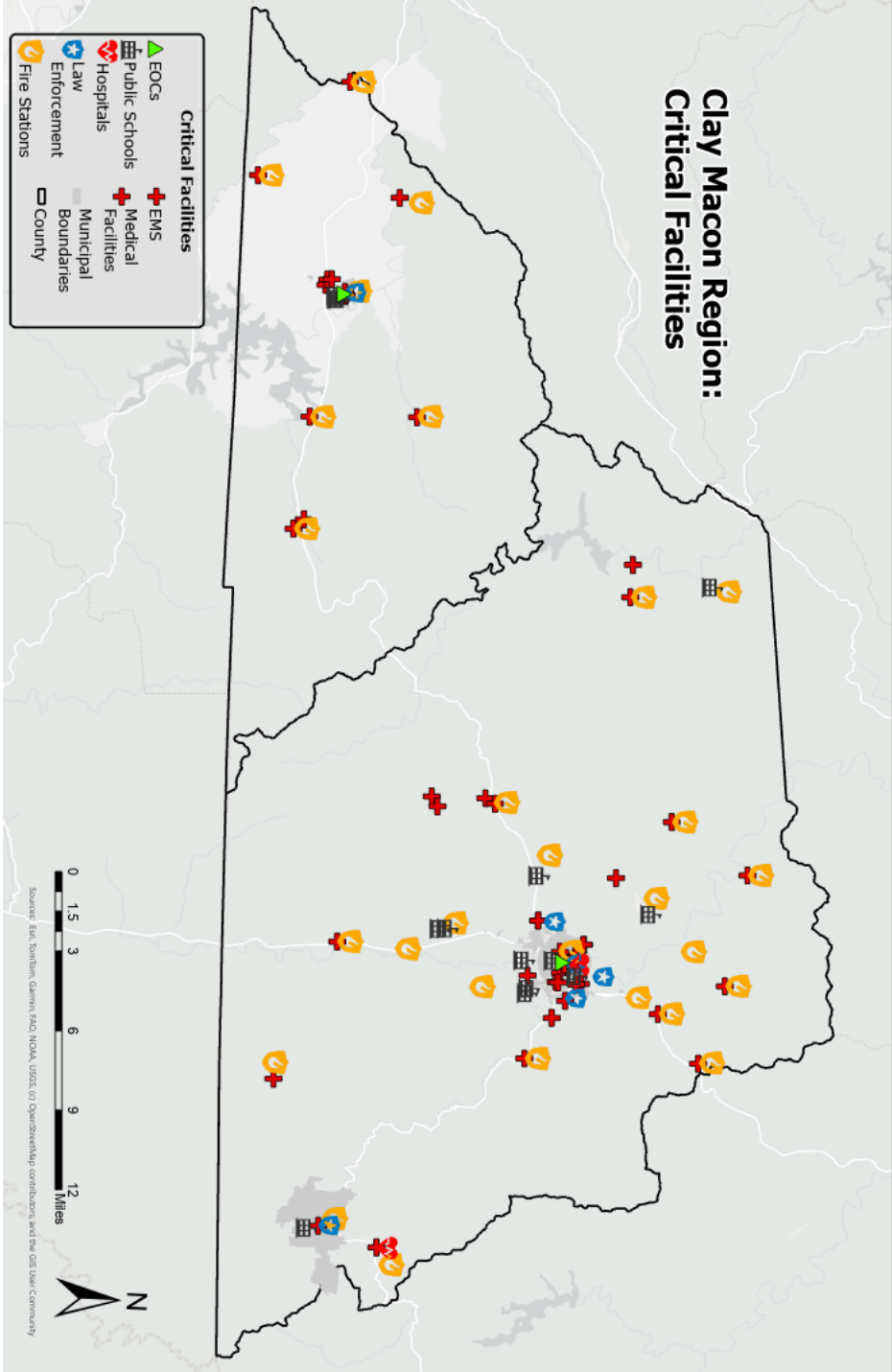
3. Inventory Assets

4. Estimate Losses



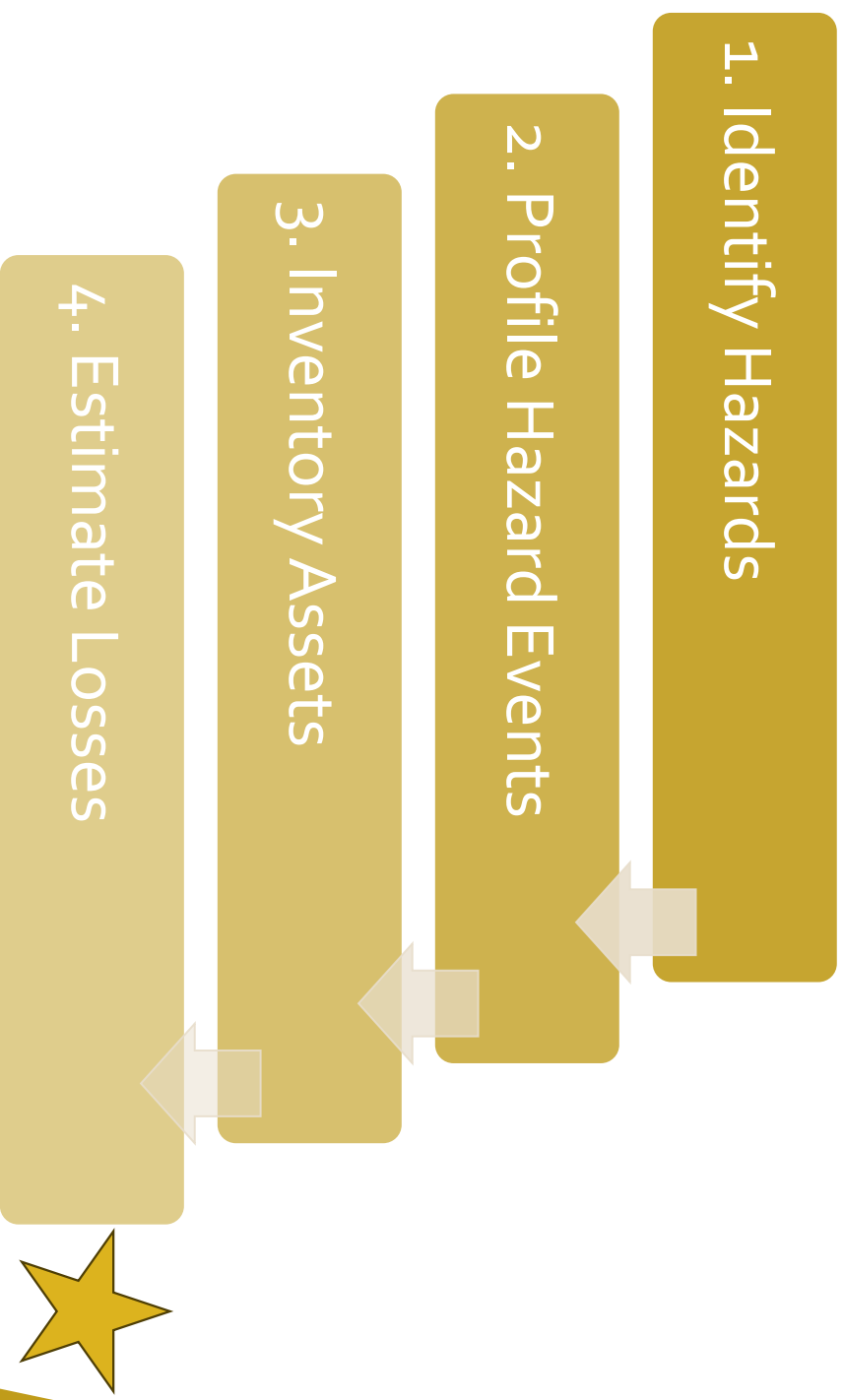
Asset Inventory – Critical Facilities

*Note: approximate counts using available georeferenced facility data (NC OneMap) and updated municipal boundaries



Source: Local Governments

Hazard Profiles



NRI Expected Annual Losses

The **NRI Expected Annual Loss** quantifies the average economic loss expected per year from natural hazards, including property damage, crop loss, and population impacts.

It combines historical hazard frequency, exposure, and vulnerability data to estimate annualized losses for each county.

County	Building Value	Agriculture Value	TOTAL
Clay County	\$3,811,026	\$49,320	\$5,106,611
Macon County	\$13,219,721	\$192,602	\$24,397,518
TOTAL	\$17,030,747	\$241,922	\$29,504,129

Source: National Risk Index

Questions

Questions/Comments/Concerns

Mitigation Strategy



Mitigation Overview

What is Mitigation?

- Mitigation is *an action that reduces the impact of natural, technological, and human-caused hazards on property and life*
- The HIRA focuses on problem identification whereas the Mitigation Strategy will focus on problem solutions

Benefits of Mitigation:

1. Support Prevention and Protection Activities
2. Ease Response and Speed Recovery
3. Create More Resilient Communities

Mitigation Strategy

The Mitigation Strategy has 3 primary requirements:



Mitigation Goals

What long-term goals does the Region want to achieve?



Mitigation Actions

What specific actions are needed to reduce risk?



Mitigation Action Plan

How will the actions be prioritized and implemented?

Mitigation Purpose

What is the purpose?

- Reduce vulnerability and mitigate the impact of natural and man-made hazards on communities
- Prioritize actions and allocate resources effectively
- Collaborate with stakeholders, heighten awareness, and build capacity for continued hazard mitigation efforts

What does it entail?

- Development, prioritization, and implementation of feasible measures to prevent, prepare for, respond to, and recover from potential disasters



Basic Types of Mitigation



Mitigating against hazard impacts on **existing development**

Houses
Businesses
Infrastructure
Critical Facilities



Ensuring **future development** is conducted in a way that does not increase vulnerability

Plans
Policies
Procedures

Mitigation Techniques

1. Emergency Services
2. Prevention
3. Education and Awareness
4. Natural Resource Management
5. Structural Projects
6. Property Protection

Mitigation Techniques – Examples

Prevention	Natural Resource Mgmt.	Emergency Services
Planning/Zoning	Floodplain Protection	Warning Systems
Building Codes	Watershed Mgmt.	Response Equipment
Open Space Preservation	Riparian Buffers	Shelter Operations
Floodplain Regulations	Erosion/Sediment Control	Evacuation Planning
Stormwater Mgmt.	Wetland Restoration	Response Training
Drainage Maintenance	Habitat Preservation	Sandbagging
Property Protection	Structural Projects	Education/Awareness
Acquisition/Relocation	Reservoirs	Outreach Projects
Building Elevation	Dams, Levees, Dikes	Speaker Series
Critical Facility Protection	Stormwater Diversions	Hazard Map Info
Retrofitting	Retention Basins	Real Estate Disclosure
Safe Room/Shutters	Channel Modification	Library Materials
Insurance	Storm Sewers	Hazard Expositions

Mitigation Goals

Review existing mitigation goals from the 2021 plan to determine if these goals **still align with current priorities.**

Goal Description	
Goal #1	Prevent or lessen the negative impacts caused by natural disasters and/or technological and manmade incidents.
Goal #2	Increase the response capability in the region, especially to unexpected emergencies that have never experienced before.
Goal #3	Protect public and private property and other assets from the damage that results from hazard events.
Goal #4	Increase public awareness of natural and technological/manmade hazards.
Goal #5	Reduce the impact of hazards by preserving or restoring the function of natural systems.
Goal #6	Lessen the impact of hazards by responsibly modifying the environment, hardening existing or proposed structures, and implementing projects that have a positive effect on reducing the negative impact of hazards.



Informing the Mitigation Strategy

Each step in the plan's development builds upon the others. As such:

1. The **risk assessment informs the actions** chosen for the mitigation strategy
2. Any significant hazard profiled in the plan must have **at least 1 mitigation action** associated with it



Action Plan Development

44 CFR Requirement

44 CFR Part 201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effect of each hazard, with particular emphasis on new and existing buildings and infrastructure.

All participating jurisdictions have an existing mitigation action plan from the previous plan update (2021)

Updating the mitigation action plan will involve **two key components:**

- 1. Review existing mitigation actions** to determine action status
- 2. Identify, refine, and integrate new mitigation actions** to address evolving needs and challenges

Existing Mitigation Actions

Review the previous plan to determine the status of
existing mitigation actions:



Status update required by FEMA



Designate each action as:
*Completed, Deleted, or Carried
Forward (include any details)*



Identify existing gaps and
weaknesses

New Mitigation Actions

Brainstorm and discuss a full range of potential **new mitigation actions** and successful mitigation techniques, ensuring they:



Align with mitigation goals and other community objectives

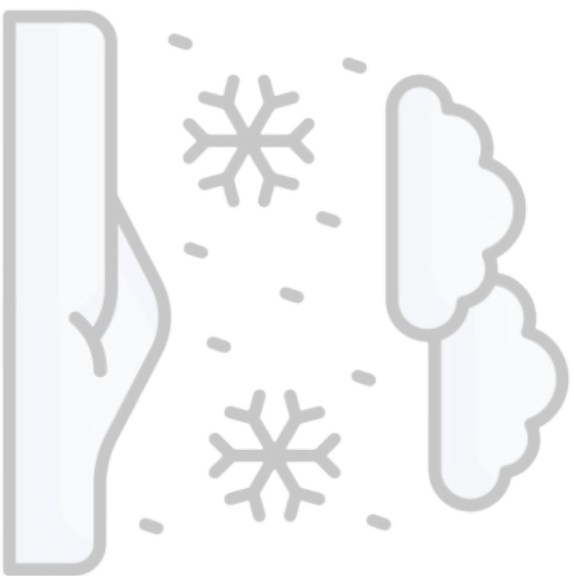


Reflect hazard risk and local capability



Address existing gaps or weaknesses

Mitigation Strategy – Examples



Potential Actions to Mitigate Severe Winter Weather:

1. Designate/Equip Regional Warming Centers
2. Strengthen Utility/Power Grid Resilience
3. Pre-Stage Salt, Plows, & Fuel Regionwide
4. Maintain Registry for Vulnerable Winter Residents

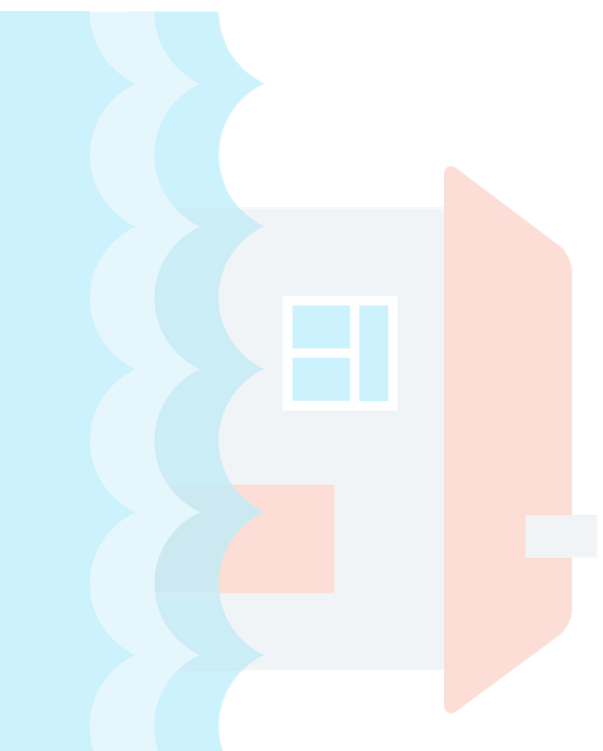
Mitigation Strategy – Examples



Potential Actions to Mitigate Thunderstorms/Tornadoes:

1. Enhance Early Warning Systems
2. Harden Critical Facilities & Shelters
3. Bury or Reinforce Power Lines & Communication Infrastructure
4. Require/Designate Safe Rooms in Certain Types of Buildings

Mitigation Strategy – Examples



Potential Actions to Mitigate Flooding:

1. Identify and Prioritize RL or Substantially Damaged Properties
2. Retrofit Bridges, Culverts, and Road Crossings
3. Develop Regional Stormwater Management Plans
4. Expand CRS and Flood Awareness Programs

Mitigation Strategy – Examples



Potential Actions to Mitigate Hazardous Substances:

1. Conduct and regularly update hazardous materials inventories
2. Improve facility-level spill prevention and containment measures
3. Coordinate with facility operators to enhance emergency response plans
4. Promote land use compatibility and buffer considerations

Action	Description	Hazard(s) Addressed	Priority	Lead Agency	Potential Funding Sources	Implementation Schedule	Implementation Status
P-2	Develop a policy to minimize public services to proposed new structures that will be located in 100-year floodplain areas.	Flood	Medium	Emergency Management	Local	2025	No policy has been developed as of 2020. This is to be completed in 2025 pending funding, staff resources and political will.

Mitigation Action Information

Leverage Guides & Resources

Use available resources to aid in strategy development:

- [FEMA Local Mitigation Planning Handbook](#)
- [FEMA Mitigation Ideas](#)
- [FEMA Economic Development Strategy and Hazard Mitigation Plan Alignment](#)
- [NCORR North Carolina Resilience Exchange](#)
- [NCORR North Carolina Resilient Communities Planning Guide](#)

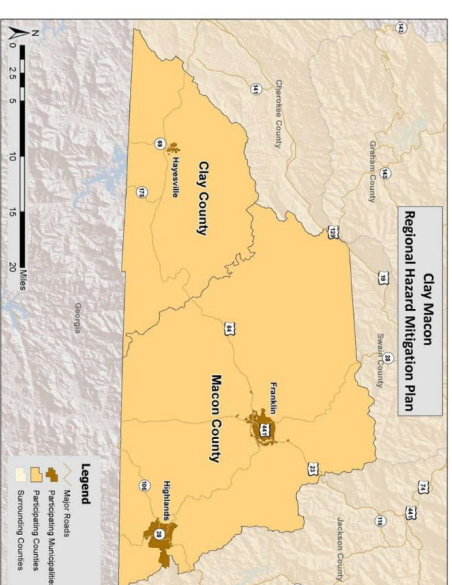
Visit and Share the Project Website



Clay Macon Hazard Mitigation Plan Update

Welcome to the official website for
the Clay Macon Regional Hazard
Mitigation Plan 2026 Update!

Last updated: Q3 2025



The [Project Website](#) will be updated regularly
throughout the planning process to provide access to:

1. Project Overview
2. Meeting Information
3. Public Survey
4. Previous HMP (2021)
5. Relevant Planning Resources

Complete and
Share the
Public Survey!



Scan the QR Code for Access to the Public Survey

Project Schedule

Larger
Stakeholder
Meeting – 9/9/25

HIRA Mitigation
Meeting – 2/10/26

Public Meeting –
TBD

Proposed Delivery
of Draft Plan –
Spring 2026

Existing Plan
Expiration Date –
7/15/26

Questions

Questions/Comments/Concerns

Next Steps

1. Use and Reference Project Resources
 - Previous 2021 Plan
 - Meeting follow-up materials
 - FEMA/NC Planning Resources
 - Project Website
2. Review Existing Mitigation Action Plan from 2021 HMP
 - Provide Status Updates for Each Action
3. Brainstorm New Mitigation Strategies for 2026 HMP
 - Consider Evolving Needs
4. Draft Plan Delivery

Adjourn –
Thank you!

Contact Information

Nathan Slaughter –
nslaughter@espassociates.com

John Flores –
jflores@espassociates.com

Hannah DeLude –
hdelude@espassociates.com

Fabiha Rahman –
frahman@espassociates.com

HIRA/Mitigation Meeting
 February 10th, 2026
 Hayesville, NC
 10:00am – 11:00am

Meeting Participants

Name	Organization/Role
Baker, Carl	Hazard Mitigation Plans Manager, NCEM
Baughn, Harry	Town Council, Town of Hayesville
Breedlove, David	County Coordinator, NCEM
DeLude, Hannah	Hazard Mitigation Planner, ESP Associates
Flores, John	Hazard Mitigation Planner, ESP Associates
Ledford, Jeff	EM Director, Clay County
Mathis, Michael	Planning & Development Director, Town of Highlands
Mello, John	Hazard Mitigation Planner, NCEM
Rahman, Fabiha	Hazard Mitigation Planner, ESP Associates
Seagle, Todd	911 Communications Supervisor, Clay County EM
Setser, Justin	Town Planner, Town of Franklin
Sitton, Noah	Preparedness Coordinator, Macon County EM
Slaughter, Nathan	Department Manager, ESP Associates

Introductions & Meeting Objectives

The Hazard Identification and Risk Assessment (HIRA) Meeting and the Mitigation Strategy Meeting for the Clay Macon Regional Hazard Mitigation Plan Update 2026 were combined and held in Hayesville, NC at the Clay County Emergency Operations Center (ECO) with a virtual option to facilitate efficient collaboration. Nathan Slaughter, Project Manager with ESP Associates, gave a brief overview of the meeting agenda and objectives. Meeting objectives included (1) Identify hazards, (2) Assess hazards and vulnerability, (3) Determine potential impacts and priorities, (4) Discuss findings, and (5) Obtain stakeholder feedback. Stakeholder input was emphasized as a critical component of this meeting. Participants, online and in-person, were asked to introduce themselves, their role, and their organization/agency. They were also asked to sign-in or enter their information in the Teams chat for documentation purposes.

Planning Process & HIRA Overview

The meeting provided an in-depth review of Hazard Identification and Risk Assessment (HIRA) and its critical role in mitigation planning. HIRA is essential for state and federal compliance and serves as the foundation for effective hazard mitigation plans (HMP). Understanding various hazards enables communities to secure funding from programs like the Hazard Mitigation Grant Program.

The project team provided a recap of the FEMA-compliant planning process, emphasizing that hazard mitigation planning is designed to identify hazards, assess risk, and develop actions that reduce long-term vulnerability. The HIRA serves as the foundation for the mitigation strategy and focuses on evaluating both natural and technological hazards based on hazard frequency, severity, and exposure. This is referred to as an “All-Hazards” plan and aligns with the State HMP.

The region’s FEMA Major Disaster Declarations were summarized, totaling 9 declarations to date, representing a mix of flooding, severe winter weather, tropical system impacts, and landslides/mudslides.

Hazard Profiles: Risk & Vulnerability

The project team presented the list of hazards included in the 2026 plan update. These consist of natural, technological, and human-caused hazards. For the sake of time, the presentation focused on hazards that initially ranked as “High Risk” through the Priority Risk Index (PRI) methodology. The following summarizes the key discussions by hazard category:

1. Flooding – Identified as one of the top hazards, flooding poses a recurring threat due to increased storm intensity and topography. Participants discussed the need for stormwater improvements as capacity is becoming a concern.
2. Thunderstorms and Tornadoes – With over 200 recorded thunderstorm/high wind events since 1950 resulting in over \$3 million in damages, these hazards remain a high concern. Increasing frequency and clustering of severe storm events were noted, aligning with state climate projections.
3. Severe Winter Weather – Frequent in the region, winter storms have led to one Federal disaster declarations and more than 1300 recorded events. This hazard was ranked higher based on the sheer volume of events.
4. Hazardous Substances – This was based on EPA Toxic Release Inventory (TRI) data and presence of major highways in the region, although rail hazmat is not a major concern. There are nine TRI facilities in the region.

Asset Inventory & Vulnerability Assessment

The updated asset inventory was briefly reviewed, which compiles parcel, structure, and critical facility data across the region. The inventory is derived primarily from NC OneMap datasets and local government sources and serves as a valuable baseline for assessing exposure to hazards. Critical facilities such as schools, hospitals, fire stations, water treatment plants, and shelters were mapped to understand exposure and service-area vulnerabilities.

PRI Findings & Discussion

The initial priority risk index (PRI) scores were then reviewed. The index operates on a scale where higher numbers indicate greater concerns, helping to inform the overall mitigation strategy. Many hazards identified fall into the “high” and “moderate” category, suggesting a significant level of risk that requires attention. While the PRI adequately represents regional risks, it was acknowledged that local nuances might not be fully captured, prompting discussions on potential adjustments to the index. These adjustments aim to enhance the accuracy and relevance of the PRI in reflecting specific community needs and vulnerabilities. Initial PRI findings are shown below:

HIGH RISK	Severe Winter Weather Tornadoes/Thunderstorms Flooding Hazardous Substances
MODERATE RISK	Hurricanes and Coastal Storms Terrorism Electromagnetic Pulse Drought Radiological Emergency Wildfires Excessive Heat Food Emergency Civil Disturbance
LOW RISK	Dam Failure Geological Infectious Disease Earthquakes Cyber

Noted changes from stakeholders included:

1. Wildfires, Hurricanes and Coastal hazards, Cyber should increase to HIGH RISK
2. Geological hazard and Dam Failure should at least be MODERATE RISK

Mitigation Overview

Transitioning from risk assessment to strategy development, the project team defined mitigation as “an action that reduces the long-term impact of hazards on people and property.” All mitigation actions are categorized into two major groups (existing development and future development) and fall under one of the six techniques summarized (prevention, preparedness, natural resource protection, emergency services, property protection, and education and awareness). It was noted that property protection and structural projects are relevant to the main problems/concerns in the region. The plan is required to be updated every five years, although some communities revise it more frequently in response to emerging risks.

Mitigation Action Strategy

This portion of the plan will translate the findings of the HIRA into specific, actionable measures for reducing regional risk. The team outlined three key objectives guiding the strategy:

1. Reduce vulnerability to natural and technological hazards.
2. Prioritize and allocate resources effectively among jurisdictions.
3. Promote regional collaboration and long-term capacity building.

Participants reviewed the six existing regional mitigation goals from the 2021 plan and began discussing whether these still align with current needs. The only notable change for these goals was to reference “all-hazards” instead of solely “natural hazards.” These mitigation goals included:

1. Prevent or lessen the negative impacts caused by natural disasters and/or technological and manmade incidents.
2. Increase the response capability in the region, especially to unexpected emergencies that have never experienced before. → The wording of this goal will be tightened/refined to enhance mitigation relevance. The current language is aimed at response, which differs from mitigation. John Mello with NCEM suggested putting a focus on routes/access routes to achieve this.
3. Protect public and private property and other assets from the damage that results from hazard events.
4. Increase public awareness of natural and technological/manmade hazards.
5. Reduce the impact of hazards by preserving or restoring the function of natural systems.
6. Lessen the impact of hazards by responsibly modifying the environment, hardening existing or proposed structures, and implementing projects that have a positive effect on reducing the negative impact of hazards. → This goal will be separated into two individual goals as this language is broad/vague. It was suggested to add language surrounding “hardening” of critical infrastructure, which will be included as a revision.

Each participating jurisdiction has an existing mitigation plan, which must be reviewed and updated to ensure compliance with FEMA requirements. Additionally, there is an opportunity to incorporate new projects as part of the mitigation action plan. Mitigation action ideas for all identified high risk hazards were shared at this time in addition to valuable State and Federal resources that can be used to draft new actions. The existing mitigation action plan will be shared in the meeting follow-up communication. Additionally, Mountain Camp Dam (STATE ID: MACON-047) is a high hazard dam in the region that will apply for HHPD federal grants.

Project Information/Resources

The team highlighted that the project website and public survey were already accessible online and would be updated regularly throughout the planning process. The website provides key resources, including the project overview, meeting minutes and presentations, the public survey, the previous 2021 HMP, and relevant planning resources. The public survey will be re-opened for one final push to provide additional time for responses as initial response rate was relatively low.

Project Schedule & Next Steps

The tentative project schedule was then reviewed, which is summarized below:

- Stakeholder Meeting – September 2025
- Risk Assessment & Mitigation Strategy Meeting – February 2026
- Draft Plan Delivery – Target completion by Spring 2026
- Plan Expiration – July 15, 2026

Next steps include:

- ESP will distribute jurisdiction-specific mitigation action spreadsheets for review and update.
- A follow-up email will include resource links, planning tools, and FEMA reference materials.
- The regional website will be updated regularly with project materials, public survey results, and meeting summaries.

Meeting Closeout

The meeting adjourned with appreciation extended to all attendees for their continued engagement and collaboration in advancing regional resilience and hazard preparedness across the Clay Macon Region. The meeting officially adjourned at 11:00am.

Public Survey Results

As part of the planning process, the Clay Macon Regional Hazard Mitigation Plan included a public survey to gather community input on local hazards, impacts, and mitigation priorities. The survey received a total of **29 responses**, providing valuable insight into regional risk perception and community needs.

For the sake of brevity, detailed survey results were not included directly in this plan. However, the full survey results are available upon request. Please contact **nslaughter@espassociates.com** to obtain a copy of the complete survey findings

Appendix E

COMPLETED MITIGATION ACTIONS

Clay County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-13	Smart Growth	All		Clay County Board of Commissioners; Clay County Planning	Federal, State, Private	Deleted	Deleted. This action was combined with Action P-1 and is reflected as such.
P-8	Develop an Inclement Weather Plan	All Hazards	Moderate	Town of Hayesville and Clay County Planning; Clay County Emergency Management; Clay County Public Works	Local	2031	Completed: Plan has been made for County employees and with the use of the Nixle System seems to work well. This action will be removed from future plan updates.
P-12	Update the Emergency Operation Guideline	All Hazards	High	Clay County Emergency Management	Federal, State, Private	Completed	Completed: The EOP was rewritten and is now up to date with all needed changes in place.
PP-2	Mandate Tie downs for mobile homes and propane tanks.	All Hazards	Low	Clay County Planning; Clay County Board of Commissioners	Local	Completed.	This action has been completed.

APPENDIX E: COMPLETED MITIGATION ACTIONS

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
NRP-4	Tree Limb Removal Maintenance Plan	All Hazards	Moderate	Clay County Environment, Health & Natural Resources; Clay County Fire Department	Federal, State, Private	Completed	Completed: While there is no specific Tree Limb Removal Maintenance Plan, the county routinely clears hanging tree limbs from the right of way to prevent damage to utilities. It will continue to provide this service going forward and this action will be removed from future plan updates.
ES-4	Use Citizens in Emergency Management Functions	All Hazards	Moderate	Clay County Emergency Management	Federal, State, Private	Completed	Completed: This is now in place as part of the County EOP. This action will be removed from future plan updates.

Town of Hayesville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-12	Update the Emergency Operation Guideline	All Hazards	High	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	Completed	Completed: The EOP was rewritten and is now up to date with all needed changes in place.
PP-2	Mandate Tie downs for mobile homes and propane tanks.	All Hazards	Low	Clay County Planning; Clay County Board of Commissioners	Local	Completed.	This action has been completed.

APPENDIX E: COMPLETED MITIGATION ACTIONS

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
NRP-4	Tree Limb Removal Maintenance Plan	All Hazards	Moderate	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Fire Department	Federal, State, Private	Completed	Completed: While there is no specific Tree Limb Removal Maintenance Plan, the Town routinely clears hanging tree limbs from the right of way to prevent damage to utilities. It will continue to provide this service going forward and this action will be removed from future plan updates
ES-4	Use Citizens in Emergency Management Functions	All Hazards	Moderate	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	Completed	Completed: This is now in place as part of the County EOP. This action will be removed from future plan updates.

Macon County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Structural Projects							
SP-1	Remove the Fire Department (Burningtown) from the floodway.	Flood	High	Macon County Emergency Management	HMGP, PDM, 406 Mitigation	Deleted	Deleted. The county has worked to try to acquire funding to remove this fire department from the floodway, but have not received assistance. Estimated cost \$500,000. The county will likely not be able to complete this project due to an issue with the Burningtown FD deed.
SP-2	Remove the Fire Department (West Macon) from the floodway.	Flood	High	Macon County Emergency Management	HMGP, PDM, 406 Mitigation	Completed	Completed. The county removed this fire department from the floodway in 2006.

Town of Franklin Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Natural Resource Protection							
P-1	Town of Franklin to join the NFIP.	Flooding	High	Franklin Public Works	Local	Completed	Action complete. The Town joined the NFIP. This action will be removed from future plan updates.
P-2	Ensure all homes are secured properly and that building codes are followed as directed to minimize risk of hazards.	All Hazards	High	Macon County Planning, Permitting & Development; Franklin Administration	Local	Completed	Completed: The Town continually works to ensure that building codes are followed and that homes are secured to the greatest extent possible. This action will be removed from future plan updates.
NRP-1	Increase size/capacity of waste water treatment plant.	Drought	High	Franklin Public Works	CDBG; EPA; USDA	Completed	Completed. The capacity of the wastewater treatment plant was expanded.

Town of Highlands Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Previously Completed Actions							
P-1	Replace roadway culvert on Laurel Street with a bridge to alleviate flooding caused by Mill Creek.	Flooding	High	Highlands Public Works	FEMA HMA Programs 406 Mitigation	Completed	Completed. Flood maps revised after this was complete
PP-1	Upgrade water treatment plant to one that does not use chlorine (the existing container of chlorine gas could rupture during a seismic event).	Earthquakes	High	Highlands Public Works	Local	Completed	Complete. Chlorine gas no longer used in the process.
	Thorough inspection and testing of Sequoia Dam and Mirror Lake Dam.	Dam Failure	High	Highlands Public Works		Completed	Completed. This action was completed during the last update and will be removed.
NRP-1	Build fence around water plant.	Terrorism	High	Highlands Public Works	Local	Deleted	Deleted. This action was removed from the plan as Terrorism was not addressed in the plan

Appendix F

Flood Hazard Maps

This section of the plan includes **(1)** a table of potential flood extent for each participating county and municipality in the Clay Macon Region based on maximum height streamgauge data coupled with base flood elevations (BFE) and **(2)** Special Flood Hazard Area (SFHA) floodplain maps for each participating county and municipality in the Clay Macon Region based on effective county data from the Federal Emergency Management Agency (FEMA).

Potential Flood Extent by Jurisdiction

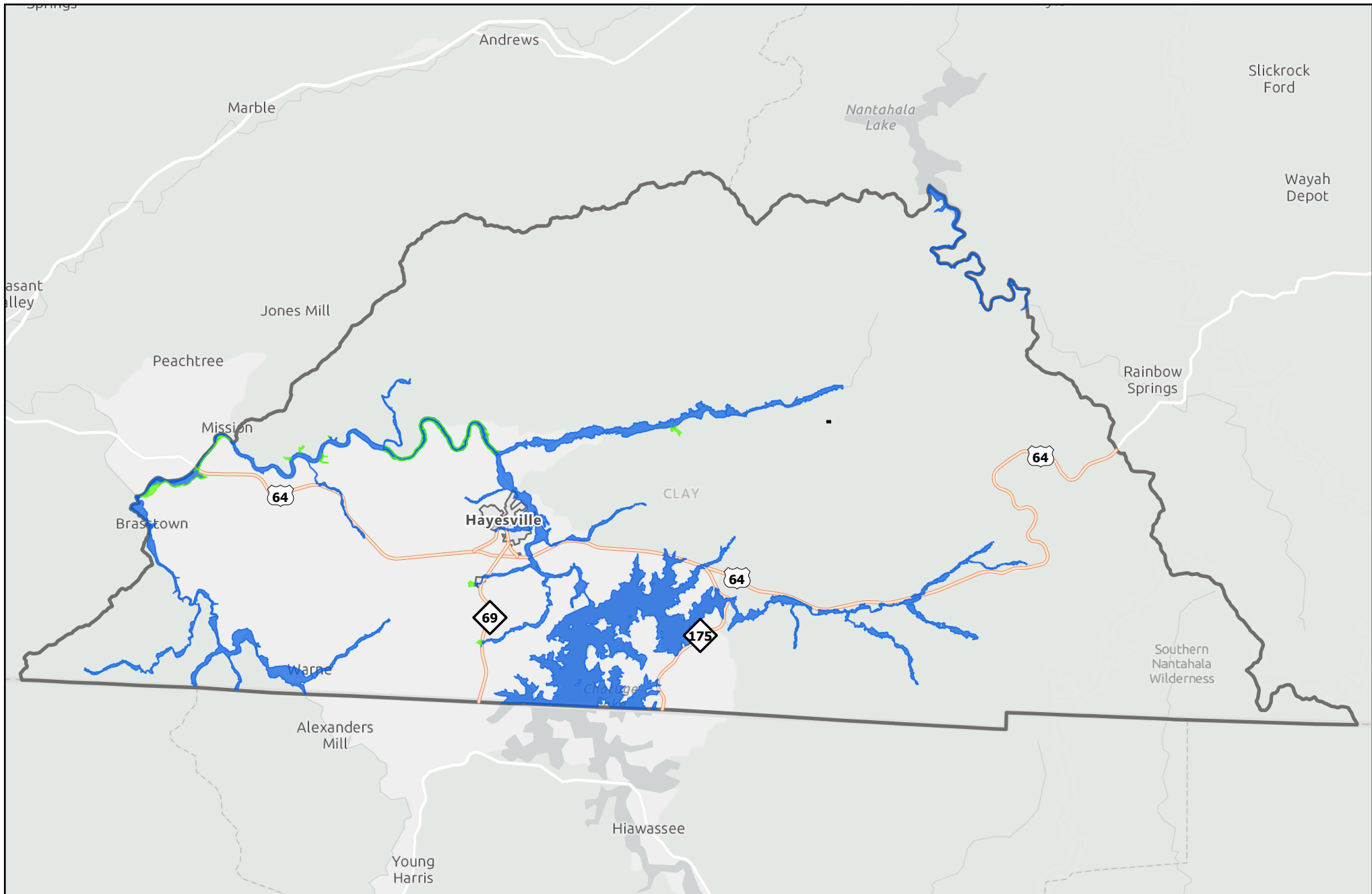
Location	USGS National Water Information System (NWIS) & NC FRIS
Clay County	No USGS gage data, approximate highest BFE = 3,089.2 ft
Hayesville	No USGS gage data, approximate highest BFE = 1,830.6 ft
Macon County	3,081.43 ft (8.36 ft + 3,073.07 ft NAVD88 Datum, 12/24/2015, USGS)
Franklin	2,051.19 ft (8.06 ft + 2,043.13 ft NAVD88 Datum, 2/6/2020, USGS)
Highlands	No USGS gage data, approximate highest BFE = 3,831.5 ft

Sources: USGS¹, NC FRIS²

¹ USGS Water Data: <https://waterdata.usgs.gov/>

² North Carolina Flood Risk Information System (FRIS): <https://fris.nc.gov/>

Clay County - Flood Hazard Areas



Legend

- Major Roads
- Clay County Municipal Boundaries
- Clay County Boundaries

Flood Zone

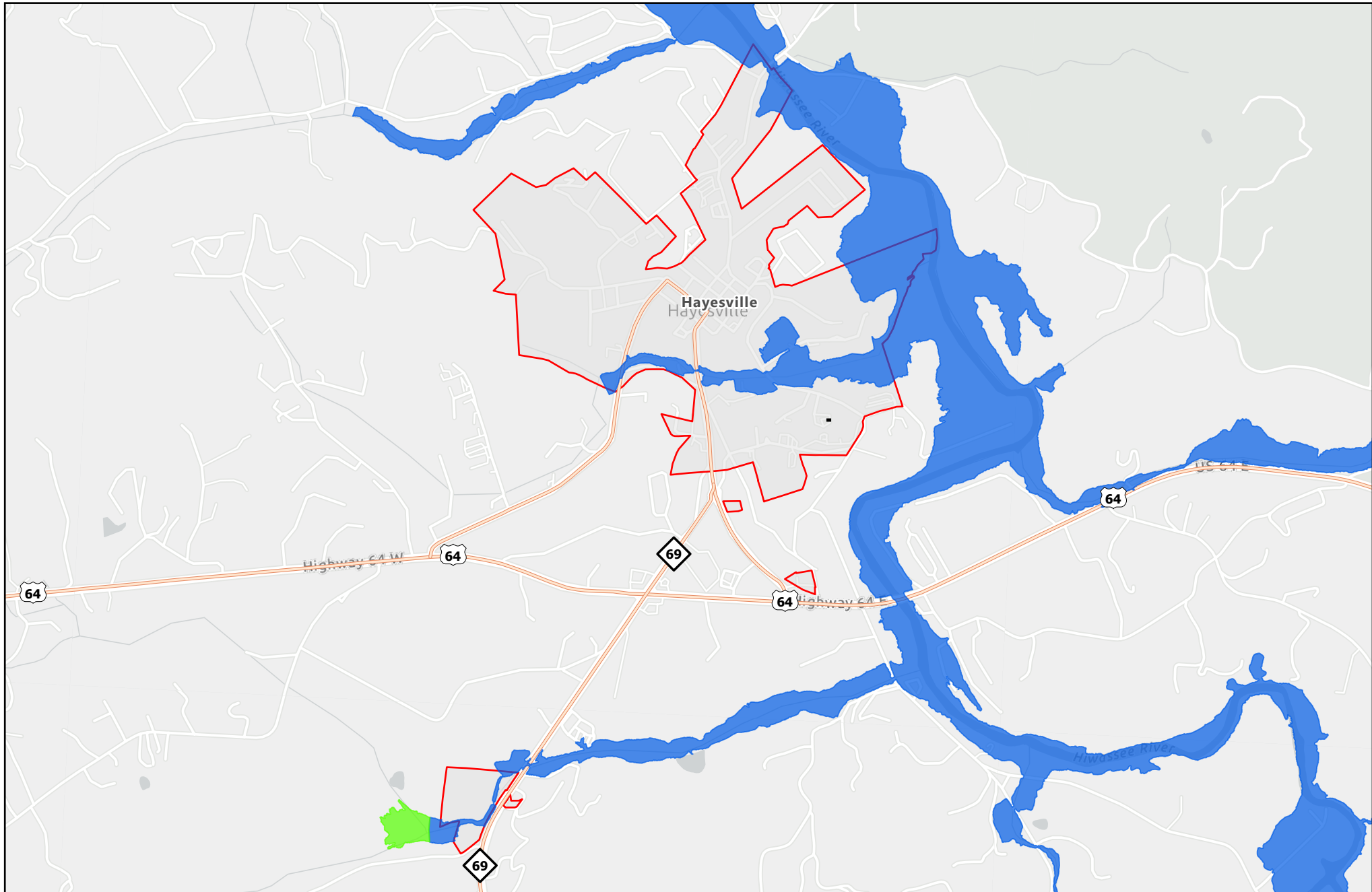
- 1% Annual Chance
- 0.2% Annual Chance

0 2.25 4.5 9 Miles

Data Source: Flood Map Service Center, Federal Emergency Management Agency
Product ID: NFHL_37043C
Latest Study Effective Date: 5/4/2009
Latest LOMR Effective Date: N/A



Hayesville - Flood Hazard Areas



Legend

- Major Roads
- Hayesville Boundaries
- Clay County Boundaries

Flood Zone

- 1% Annual Chance
- 0.2% Annual Chance

0 0.28 0.55 1.1 Miles

Data Source: Flood Map Service Center, Federal Emergency Management Agency

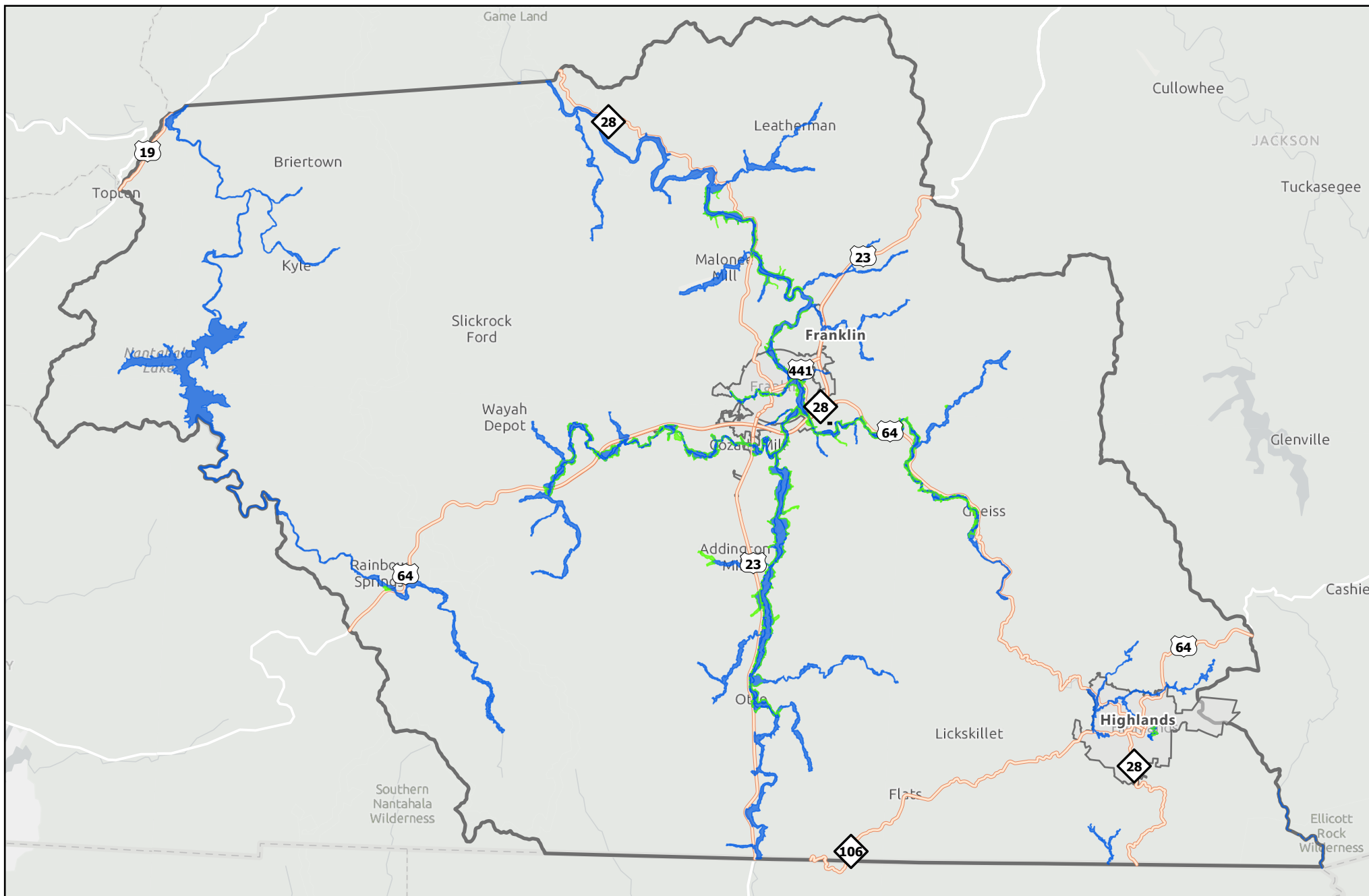
Product ID: NFHL_37043C

Latest Study Effective Date: 5/4/2009

Latest LOMR Effective Date: N/A



Macon County - Flood Hazard Areas



Legend

- Major Roads
- Macon County Municipal Boundaries
- Macon County Boundaries

Flood Zone

- 1% Annual Chance
- 0.2% Annual Chance

0 3 6 12 Miles

Data Source: Flood Map Service Center, Federal Emergency Management Agency

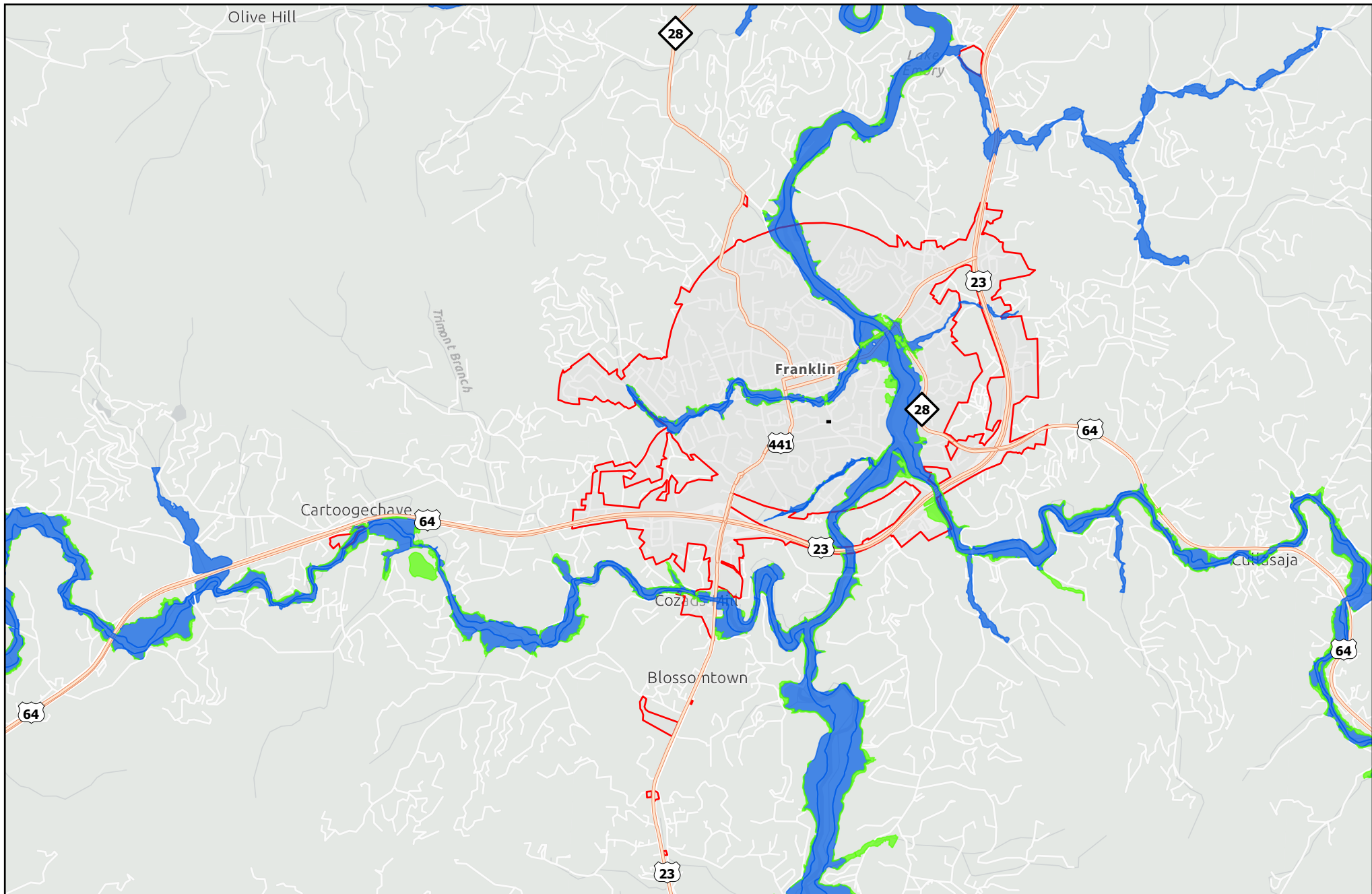
Product ID: NFHL_37113C

Latest Study Effective Date: 4/19/2010

Latest LOMR Effective Date: 11/8/2018



Franklin - Flood Hazard Areas



Legend

- Major Roads
- Franklin Boundaries
- Macon County Boundaries

Flood Zone

- 1% Annual Chance
- 0.2% Annual Chance

0 0.75 1.5 3 Miles

Data Source: Flood Map Service Center, Federal Emergency Management Agency

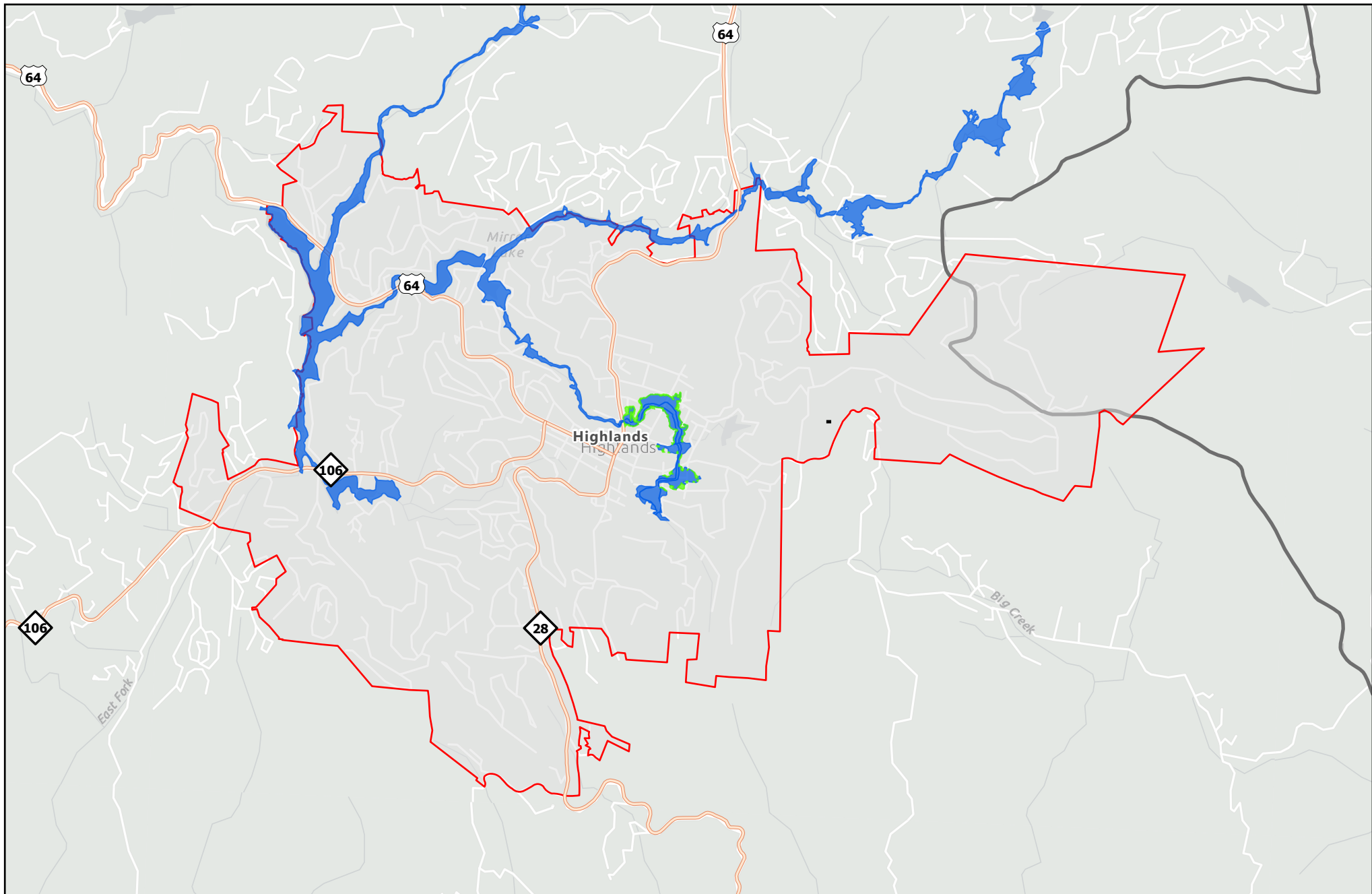
Product ID: NFHL_37113C

Latest Study Effective Date: 4/19/2010

Latest LOMR Effective Date: 11/8/2018



Highlands - Flood Hazard Areas



Legend

- Major Roads
- Highlands Boundaries
- Macon County Boundaries

Flood Zone

- 1% Annual Chance
- 0.2% Annual Chance

0 0.5 1 2 Miles

Data Source: Flood Map Service Center, Federal Emergency Management Agency

Product ID: NFHL_37113C

Latest Study Effective Date: 4/19/2010

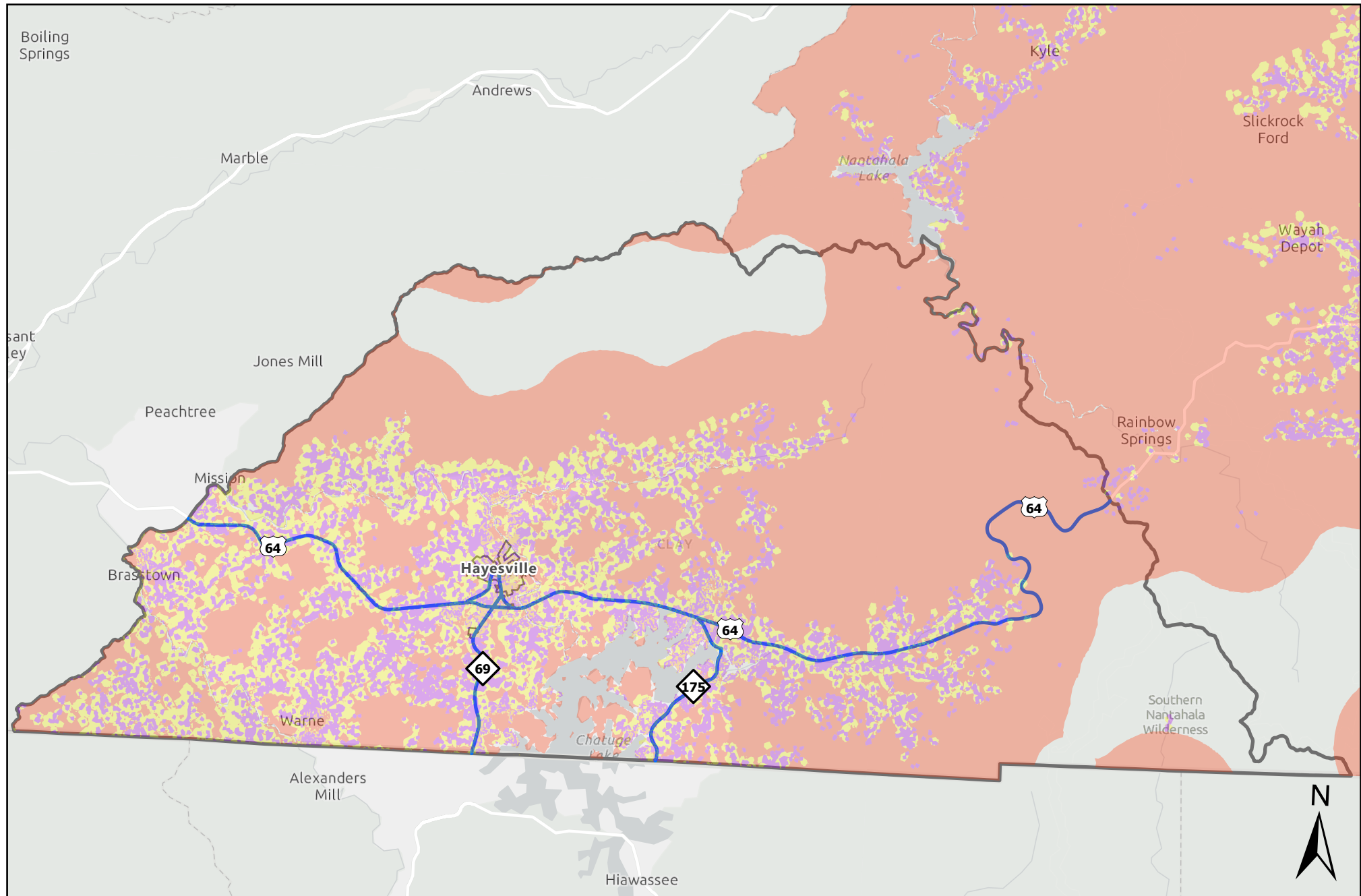
Latest LOMR Effective Date: 11/8/2018



Appendix G

Wildfire Hazard Maps

Clay County - Functional Wildland Urban Interface (WUI)



Legend

- Major Roads
- Clay County Municipal Boundaries
- Clay County Boundaries

Functional WUI Classes

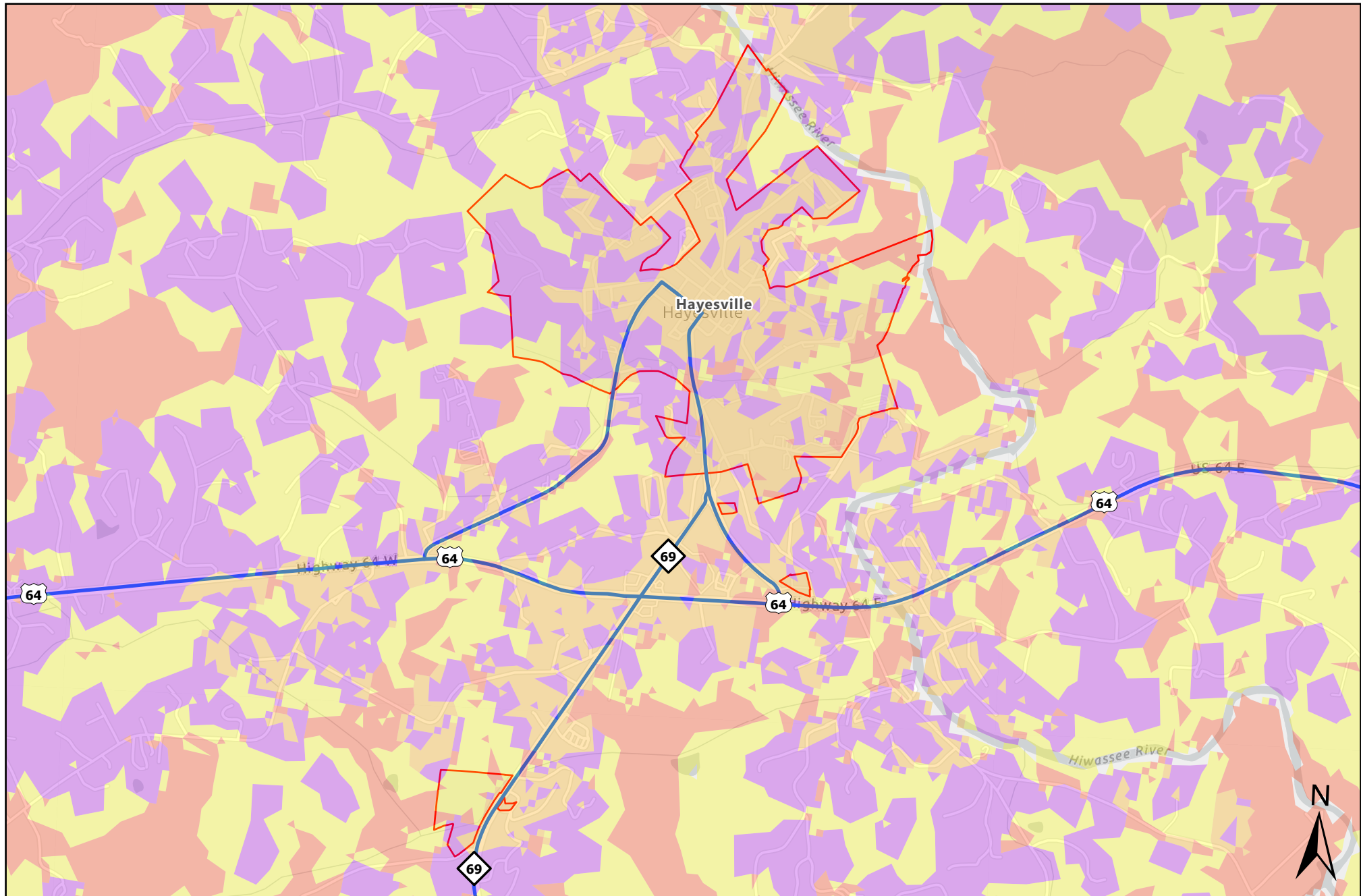
- Primary Exposure (17% region area)
- Secondary Exposure (1% region area)
- Sources of Ember Load (68% region area)
- Wildfire Transmission Zone (12% region area)

0 1.75 3.5 7 Miles

Data Source: Southern Wildfire Risk Assessment
Data Layer: Functional Wildland Urban Interface (WUI)

Functional WUI represents a classification of the land near buildings (> 40 m²) into zones that describe the wildfire risk mitigation activities appropriate for each zone.

Hayesville - Functional Wildland Urban Interface (WUI)



Legend

- Major Roads
- Hayesville Boundaries
- Clay County Boundaries

Functional WUI Classes

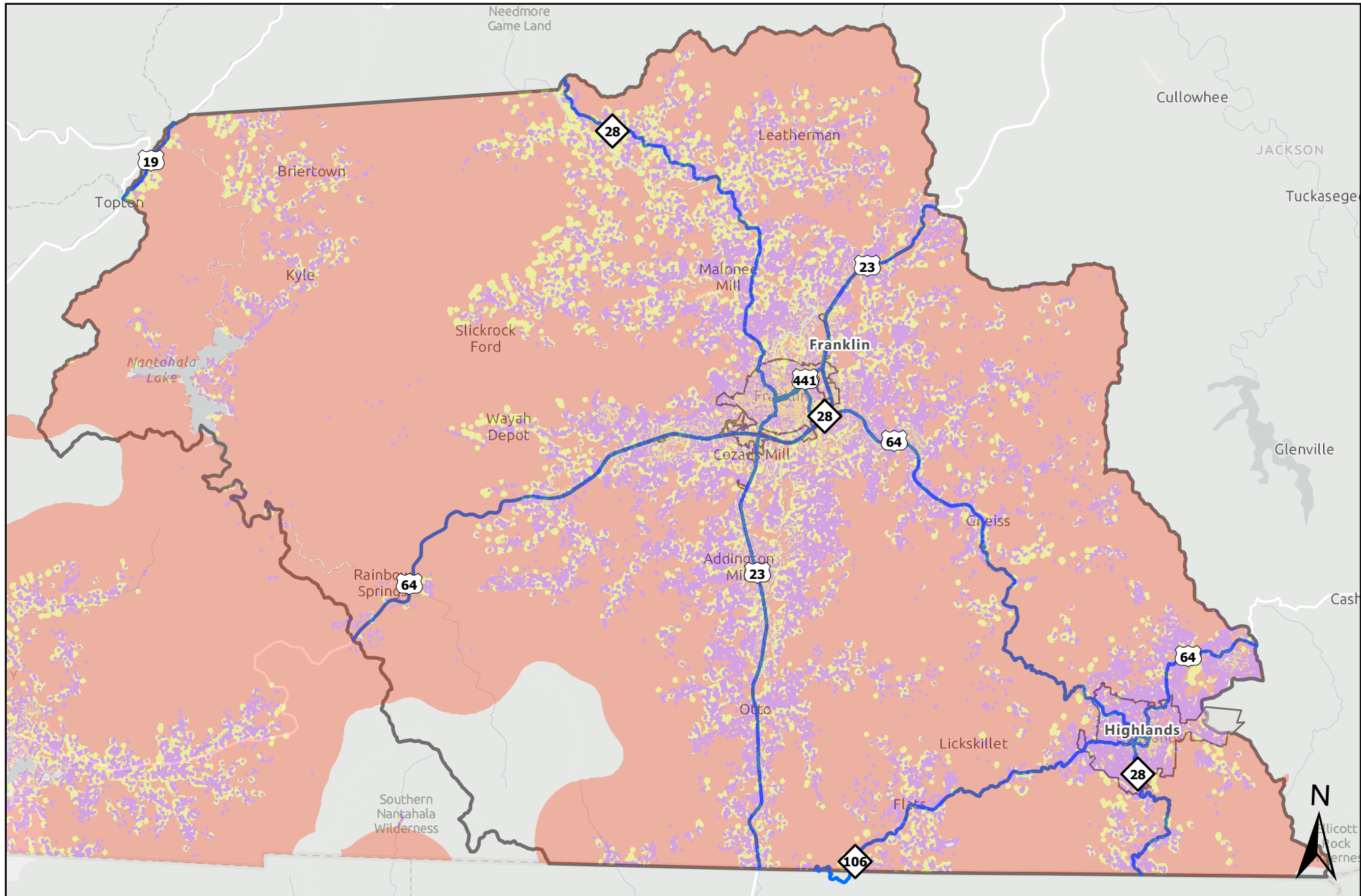
- Primary Exposure (17% region area)
- Secondary Exposure (1% region area)
- Sources of Ember Load (68% region area)
- Wildfire Transmission Zone (12% region area)

0 0.23 0.45 0.9 Miles

Data Source: Southern Wildfire Risk Assessment
Data Layer: Functional Wildland Urban Interface (WUI)

Functional WUI represents a classification of the land near buildings (> 40 m²) into zones that describe the wildfire risk mitigation activities appropriate for each zone.

Macon County - Functional Wildland Urban Interface (WUI)



Legend

- Major Roads
- Macon County Municipal Boundaries
- Macon County Boundaries

Functional WUI Classes

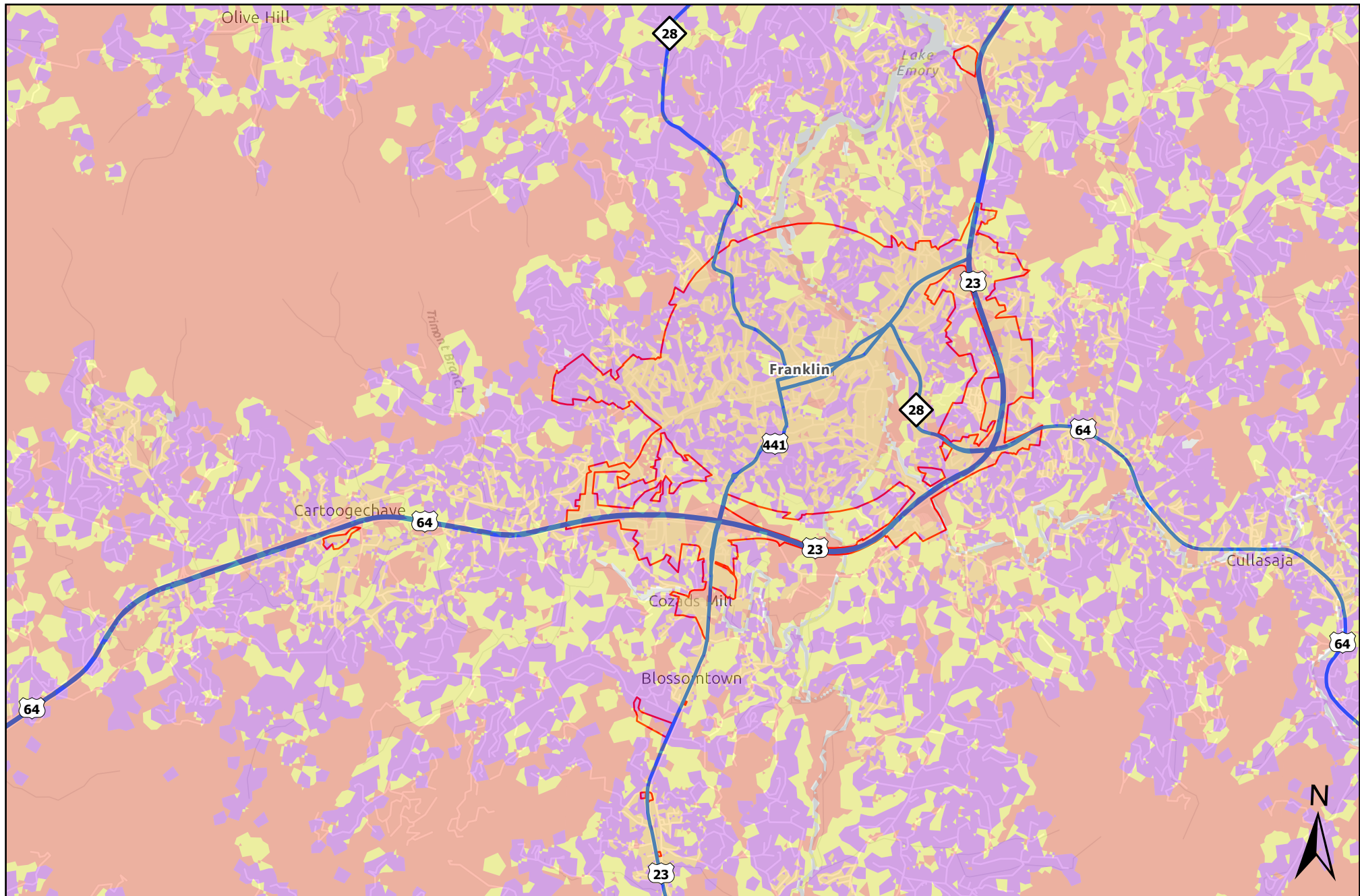
- Primary Exposure (17% region area)
- Secondary Exposure (1% region area)
- Sources of Ember Load (68% region area)
- Wildfire Transmission Zone (12% region area)

0 2.25 4.5 9 Miles

Data Source: Southern Wildfire Risk Assessment
Data Layer: Functional Wildland Urban Interface (WUI)

Functional WUI represents a classification of the land near buildings (> 40 m²) into zones that describe the wildfire risk mitigation activities appropriate for each zone.

Franklin - Functional Wildland Urban Interface (WUI)



Legend

- Major Roads
- Franklin Boundaries
- Macon County Boundaries

Functional WUI Classes

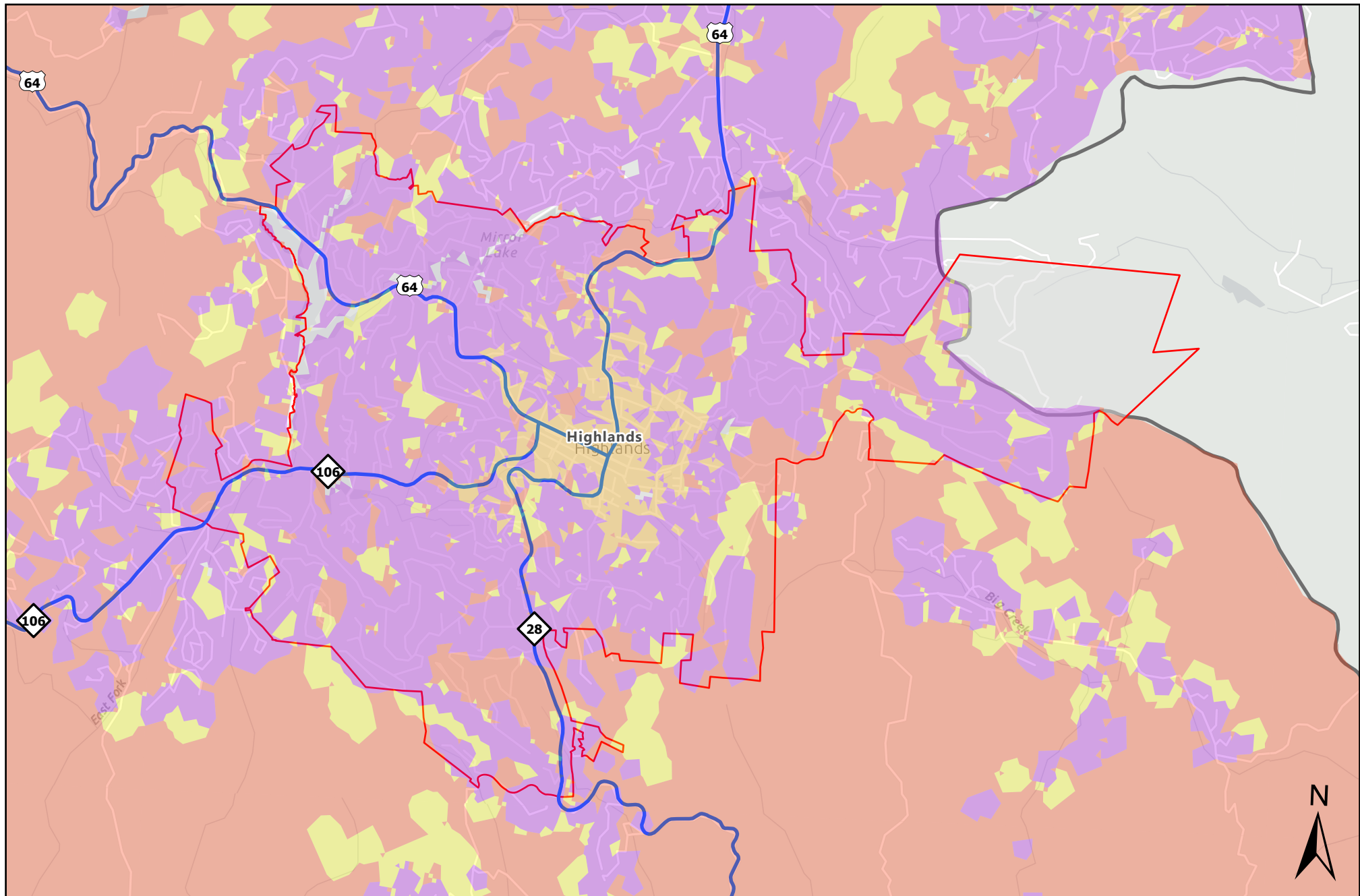
- Primary Exposure (17% region area)
- Secondary Exposure (1% region area)
- Sources of Ember Load (68% region area)
- Wildfire Transmission Zone (12% region area)

0 0.5 1 2 Miles

Data Source: Southern Wildfire Risk Assessment
Data Layer: Functional Wildland Urban Interface (WUI)

Functional WUI represents a classification of the land near buildings (> 40 m²) into zones that describe the wildfire risk mitigation activities appropriate for each zone.

Highlands - Functional Wildland Urban Interface (WUI)



Legend

- Major Roads
- Highlands Boundaries
- Macon County Boundaries

Functional WUI Classes

- Primary Exposure (17% region area)
- Secondary Exposure (1% region area)
- Sources of Ember Load (68% region area)
- Wildfire Transmission Zone (12% region area)

0 0.38 0.75 1.5 Miles

Data Source: Southern Wildfire Risk Assessment
Data Layer: Functional Wildland Urban Interface (WUI)

Functional WUI represents a classification of the land near buildings (> 40 m²) into zones that describe the wildfire risk mitigation activities appropriate for each zone.



Reducing Wildfire Risk Caused by Tropical Storm Helene

SPRUCE PINE, N.C.—With western North Carolina facing the risk of larger and more intense wildfires for years to come because of damage to its forests by Tropical Storm Helene, efforts are underway by government agencies, private forest owners and others to reduce the risk.

Timber grower Jim Phillips of Avery County is clearing debris-filled logging roads and rebuilding other roads in his forests damaged by Helene to give firefighters access to fight potential wildfires. “If we don’t have access, we’re going to burn down,” said Phillips.

Phillips’ forests, like many hundreds of thousands of acres of storm-damaged forestland in the region, are filled with 100-foot-tall trees blown down by the storm, with many broken and uprooted trees leaning into the canopies of still-standing trees. The destroyed trees are fuel for future wildfires.

Logging roads that once served as firebreaks and provided access for firefighters in the forest-covered mountains are blocked by fallen trees or damaged beyond repair by flooding or landslides. Streams that could be firebreaks are filled with debris.

Firefighters can’t contain wildfires if access is limited, so they will be forced to expand perimeters for wildfires, forestry officials say.

“It will result in bigger wildfires,” said Kevin Harvell, Assistant State Forester for forest protection with the North Carolina Forest Service.

Forestry officials are alarmed by the elevated wildfire risk facing storm-damaged counties. Most of the region’s population lives in the wildland-urban interface, where human development meets forests and other wildland vegetation, exposing inhabitants to increased wildfire risk.

“It poses a huge threat to public safety,” said Michael Cheek, Regional Forester for the western region with the state forest service.



A worker with the North Carolina Forest Service conducts a prescribed burn to reduce the risk of wildfires.

“This fall, we’ll see a dramatic increase in wildfires,” Harvell said, coinciding with when homeowners burn leaves. Debris burning is the main cause of wildfires in the state.

There likely will be some increase in wildfires this spring, he said. The state has a spring and fall fire season. The increased wildfire threat will remain for more than a decade, he said.

An estimated 822,000 acres of timberland in western North Carolina was damaged by the storm, 78 percent of it privately owned and 21 percent located in federal forests, according to the state forest service.

The U.S. Forest Service estimated 187,000 acres in the Pisgah and Nantahala national forests had moderate to catastrophic storm damage. That’s nearly 20 percent of the forests’ combined 1 million acres.

Most of the downed trees will be left in forests because of cost and safety issues to remove them.

Tropical Storm Helene ravaged western North Carolina on Sept. 27, 2024, with flooding, winds up to 100-miles an hour, landslides and tornadoes. The storm caused an estimated \$59.6 billion in damage. More than 100 people died and tens of thousands of homes were damaged or destroyed.

The storm-damaged forests are at serious risk for harmful invasive vegetation, and private owners need access into their forests not only to combat wildfires but to apply herbicides. Phillips, whose family has lived in the region since the early 1800s, said storm damage to his forests threatened his livelihood and may force him to sell forestland to developers.

He is trying to save some of his least-damaged forests by opening access into them, building flood-resistant logging roads and installing bigger culverts at creek crossings to better withstand flooding.

Forestry officials are referring private owners with damaged forests to programs like the Federal Emergency Forest Restoration Program, which helps owners of non-industrial forestland restore forests damaged by natural disaster. The program can provide up to \$500,000 funding to a single applicant.

The state forestry service also helps private forest owners and others reduce wildfire risk through prescribed burns, building fuel breaks and other services. State forest rangers are stationed in counties to help.

The agency doesn’t have the resources to meet the increased wildfire risk in private forests caused by the storm, Harvell said. The state agency plans to work with NOAA to use satellite images to help locate where the greatest fuel is in damaged forests to prioritize where firefighter access and fuel breaks are most needed.

The agency plans to bring in firefighters from other states to help deal with the increased wildfire risk in western North Carolina, pre-positioning them if needed, Harvell said.

The state forestry service gets funding from the U.S. Forest Service to maintain fuel breaks on private land next to the region’s national forests and has requested more funding for that effort following the storm.

The agency is engaged in a public awareness campaign about how to reduce wildfire risk, including around homes. It is encouraging participation in programs such as Firewise Communities USA.

The North Carolina State Extension is planning workshops for private forest owners that will focus on wildfire mitigation, battling invasive vegetation and related concerns. The state extension is also offering workshops on how to use chainsaws safely to remove downed trees and other storm debris.

Community organizations like the Southern Blue Ridge Prescribed Burn Association are also helping to lower wildfire risk. The association helps private landowners with small tracts conduct prescribed burns to reduce wildfire risk.

Appendix H:

NCEI Storm Event Data

This section of the Plan includes historic storm/hazard event data as reported between January 2000 and June 2025 to the Storm Events Database managed by the NOAA National Weather Service (NWS) and National Centers for Environmental Information (NCEI)¹.

- Table H.1 – Drought
- Table H.2 – Cold/Wind Chill
- Table H.3 – Flood/Flash Flood
- Table H.4 – Hail
- Table H.5 – Heavy Rain
- Table H.6 – Heavy Snow
- Table H.7 – Ice Storm
- Table H.8 – Lightning
- Table H.9 – Thunderstorm Wind
- Table H.10 – Tornado
- Table H.11 – Winter Storm

¹ **Note for all NOAA NWS/NCEI data:** These records represent the best available data for a variety of natural hazards and may only represent a partial total of the actual number of events occurring within a given county or planning region due to inconsistencies in collection, validation, and entry of official records. These gaps in hazard event records will be supplemented with any local information or other authoritative sources where available.

TABLE H.1: DROUGHT EVENTS (2000-2025)

Date	Description
8/1/2000	The 2 year drought was reaching a critical stage by late summer. Many 80 to 100 foot wells were going dry. Area lakes were at record low levels causing property damage to docks, boats, etc.
9/1/2000	Overall, drought conditions continued across western North Carolina despite some locations receiving near their month's average rainfall. Low stream flow and municipal water supply remained the largest issues with many towns and cities enacting water restrictions. Citizens were quoted as saying this is the driest they have ever seen it. Despite the drought conditions, impact on crops seemed to be minimal.
10/1/2000	Effects of the drought intensified as many areas received absolutely no rain during the month, setting records for the longest stretch without measurable rainfall in several locations. Wells and mountain streams continued to dry up and lake levels continued to drop. Many communities were forced to start more stringent water conservation measures.
11/1/2000	The long-term drought continued to affect the region. Rainfall during the month was near or slightly above normal, but this had little effect on the ground water levels. Numerous wells dried up during the fall, and well borers and drillers could not keep up with the demand. Large lakes reported record low levels and some communities continued or initiated water control measures.
2/1/2001	The long term drought's impact became more severe, even during the winter, as water levels in lakes dropped and stream flow on rivers reached the lowest in memory. More and more communities began water restrictions and started preparing for a busy fire weather season.
3/1/2001	Despite beneficial rain during March, the drought continued to grip most of the area. Severe water restrictions were implemented in parts of the North Carolina piedmont, where reservoir had dropped to all-time low levels. In Concord, food establishments were asked to use paper and plastic products to conserve water.
4/1/2001	Some relief to the long-term drought occurred at mid-month, but for the most part, the rainfall deficit for the three-year period actually grew larger by the end of April. Mandatory water restrictions continued at a few mountain locations, with voluntary water restrictions urged at many others. Numerous wells went dry during April.
5/1/2001	Unprecedented drought conditions continued. Some rivers and lakes reached record-low levels. Well-drilling companies in the North Carolina piedmont were recording twice as much business as usual.
8/1/2001	The effects of the long-term drought became more severe, especially in the North Carolina piedmont. Critical water conditions were beginning to concern officials and residents of Charlotte.
11/1/2001	
12/1/2001	Very little active weather during December signaled that the drought was still present - and becoming critically important to more and more people. The Charlotte area recorded an all-time record dry calendar year with just 26.23 inches of rainfall during 2001. Records have been kept in the area since 1878. Many communities initiated either mandatory or voluntary water restrictions. At Kings Mountain, NC - a new pump was required at Lake Moss because the water level dropped below 2 of the 3 existing pumps. Record low ground water supplies, lake levels, and stream flows were reported across all of Western North Carolina.
8/1/2002	The water supply situation reached crisis levels in some communities, as the effects of the long term drought continued to plague western North Carolina. Particularly hard hit were several Piedmont communities along the Interstate 77 corridor. The city of Shelby was forced to buy water from surrounding communities and even from private companies and citizens. In Statesville, emergency construction of wells and a dam was necessary to prevent the city from running out of water, as the South Yadkin River reached historically low levels. Water levels on area lakes were as much as 10 feet below full pond. Most of the larger towns and cities along the I-77 corridor had imposed mandatory water restrictions by the end of the month, including the Charlotte metro area.
5/1/2007	The effects of an extended period of dry weather were exacerbated by an abnormally dry May, with many locations reporting one of the driest Mays in recorded history. By the end of May, many climatological stations were reporting yearly rainfall deficits as high as 10 inches. The result was severe to extreme drought conditions across much of western North Carolina by the end of the month. Water restrictions were implemented in some counties across extreme western North Carolina. The very dry conditions added to agriculture hardships caused by a hard freeze and widespread damaging winds in April.
6/1/2007	Despite an increase in thunderstorm activity, drought conditions persisted across much of western North Carolina. The persistent drought continued to cause hardships to agricultural interests that were still recuperating from the

APPENDIX H: NCEI STORM EVENT DATA

Date	Description
	April freeze. Dollar values for the drought damage should be included in either the August or September Storm Data for this region.
7/1/2007	Drought conditions persisted across much of western North Carolina during July. By the end of July, voluntary water restrictions were instituted in almost all North Carolina counties along and west of I-77. Some mandatory restrictions were introduced in Union County, NC. Agricultural interests continued to be especially hard hit. The absence of rain negatively affected the hay crop, creating concern for the loss of livestock. Dollar values for the drought damage should be included in either the August or September Storm Data for this region.
8/1/2007	Severe to extreme drought conditions persisted across much of western North Carolina during August. By the end of the month, voluntary water restrictions continued in almost all North Carolina counties along and west of I-77. Stream flows and groundwater levels approached record low levels. Water levels on some reservoirs decreased by as much as 1 foot every 10 days. Agricultural interests continued to be especially hard hit, and the North Carolina governor requested federal disaster aid by the end of the month. Dollar values for the drought should be included in either the September or October Storm Data for this region.
9/1/2007	Extreme drought conditions persisted across western North Carolina through September, as the region experienced another month of well-below normal precipitation. By the end of the month, most locations were running a yearly rainfall deficit of 11-17 inches. Stream flows and groundwater levels were near record low levels, with many streams running at 5 percent or less of normal flow. Water levels on area reservoirs were some of the lowest in recorded history. Agricultural interests continued to be especially hard hit. Farmers continued to struggle to feed livestock due to a lack of hay and poor pasture conditions, forcing many cattle to be sold or slaughtered. Agricultural and other losses attributed to the drought are estimated to be in the hundreds of millions of dollars. County-based losses for the growing season will be included in next month's Storm Data.
10/1/2007	Unusually dry weather continued across western North Carolina through October. Although a soaking rain near the end of the month resulted in near-normal monthly precipitation for the mountains, the piedmont saw another month of well-below normal rainfall. Most areas were on pace to break yearly rainfall deficit records. By the end of the month, exceptional drought conditions were reported across the majority of the area. Water flow on area streams continued at 3 to 6 percent of normal, while lake levels remained at near-record lows. Although most cities and towns were requesting voluntary water restrictions be observed, mandatory restrictions were ordered in quite a few communities. In some areas, the water situation was becoming dire, with Monroe, NC officials reporting that water supplies would be exhausted by early 2008 if significant rain did not occur. Also, private wells were beginning to dry up in many areas. Agriculture continued to be severely impacted by the drought. As of this writing, county by county dollar estimates of drought damage have not been made available.
11/1/2007	November provided no relief from the effects of the long term drought. In fact, another month of well-below normal rainfall made an already dire situation even worse. Many locations remained on pace to set annual records for rainfall deficit. By the end of the month, the vast majority of the region was experiencing exceptional drought conditions. Streamflow on area rivers remained extremely low, generally less than 10 percent of normal. Meanwhile, lakes continued to gradually fall toward record low levels.
12/1/2007	The latter half of December saw a transition to a wetter pattern across the southeast. Most observing stations in western North Carolina reported above normal monthly rainfall for the first time since January 2007. However, this was not enough to put much of a dent in the long-term drought as extreme to exceptional drought conditions persisted into the New Year. Although the increase in rainfall did allow for some recharge of area streams, many were still running at less than 25 percent of normal flow at the end of the month.
1/1/2008	January saw a return to dry weather across western North Carolina. Most observing stations across the region reported a rainfall deficit of 1 to 2 inches during the month, resulting in another month of exceptional drought conditions across most of the area. Water levels on area lakes remained within a foot or two of record low stages. However, rivers and streams remained somewhat recharged from the December rains, with streamflow on most waterways running 25 to 75 percent of normal.
6/1/2008	Although near normal rainfall was observed across much of the area during the late winter and early spring, another period of abnormally dry weather in May and June exacerbated severe to extreme drought conditions over the western Carolinas and northeast Georgia. Much of the area saw less than 2 inches of rain during this period of time. By the end of the month, much of the mountains and foothills of western North Carolina were running 10 inches below normal annual rainfall. Total rainfall deficits since the beginning of 2007 were around 20 inches or more in the

APPENDIX H: NCEI STORM EVENT DATA

Date	Description
	hardest hit areas. By the end of the month, flow on almost all major streams was running less than 10 percent of normal. Many area crops suffered.
7/1/2008	Unusually dry weather continued through the month of July, with severe to extreme drought conditions persisting across the area. Afternoon and evening thunderstorms provided some degree of relief across portions of the North Carolina piedmont, but locations across Upstate South Carolina and extreme western North Carolina reported annual rainfall deficits of nearly 11 inches by the end of the month. Mandatory water restrictions were instituted across much of the North Carolina foothills. Water well levels began to descend below record low levels, most of which were recorded during the 1999-2002 drought. The vast majority of major streams across the area continued to run 1-10 percent of normal flow. Agriculture continued to be hard hit, with some areas reporting a 100 percent loss of the corn crop.
8/1/2008	Dry weather persisted across much of the area for most of August, although portions of the North Carolina Piedmont began to see relief from the dry conditions early in the month, due to an increase in daily thunderstorm activity. Elsewhere, exceptional drought conditions persisted and even expanded slightly westward to cover more of far western North Carolina and northeast Georgia. During the early part of the month, flows on most of the major streams across the area were running at record low levels, with the French Broad River setting a minimum flow record that had stood for almost 100 years. Only a handful of streams were running at more than 1 to 7 percent of normal. Groundwater levels were 2-5 feet below normal. Significant agricultural impacts persisted, with losses to summer crops, including hay, estimated at 30%. The dry weather also affected the livestock industry, due to shortages of pasture crops necessary for feeding. By the end of the month, Tropical Storm Fay had dropped up to 11 inches of rainfall across the area, providing some relief from the drought conditions, especially across the North Carolina Piedmont.
9/1/2008	The heavy rain brought by Tropical Storm Fay in late August provided some relief to the drought conditions across the area. This was particularly true across the North Carolina piedmont, where improving conditions were aided by normal September rainfall. However, another dry month resulted in a persistence of extreme to exceptional drought conditions across the North Carolina mountains and foothills. Voluntary water restrictions remained widespread during the month. A few communities held onto mandatory restrictions early in the month, but many of these were lifted by the end of the month. Well water remained near record low levels in many areas, while lake levels persisted well below normal stages. Rainfall from Fay resulted in some improvement in streamflows, although most rivers and major streams remained at less than 25 percent of normal, with many still running at less than 10 percent of normal. By the end of the month, government officials had requested a federal disaster declaration for most of the counties in the area, due to crop damages.
10/1/2008	Another abnormally dry month resulted in a persistence of severe to exceptional drought conditions over much of the mountains and foothills of North Carolina. Some slight improvement was observed in well water levels, but they remained near record lows. Most rivers and major streams continued to flow at less than 10 percent of normal. Voluntary water restrictions continued in most areas, with a few areas continuing to institute mandatory restrictions. Meanwhile, severe crop losses resulted in a federal disaster declaration for much of the larger agricultural communities across the area.
11/1/2008	Another month of below normal rainfall resulted in a persistence of severe to exceptional drought conditions over much of western North Carolina through November. In fact, drought conditions actually worsened in some areas, with portions of the central North Carolina mountains deteriorating to exceptional drought conditions late in the month. Slight improvements in well water levels continued across the area. Most rivers and major streams continued to flow at less than 10 percent of normal. Voluntary water restrictions continued in most areas, with a few areas continuing to institute mandatory restrictions.
11/1/2016	Abnormally dry weather that began early in 2016 and continued through the spring, summer, and early fall resulted in establishment of extreme to exceptional drought conditions across the across the southern and central mountains and southern foothills of North Carolina by November. Total rainfall deficits for the period from July until the end of November were as much as 18 inches below normal, while annual rainfall deficits were two feet or more below normal. The drought conditions worsened farther to the southwest across the state. Drought conditions were exacerbated by an unusually warm late summer and early fall, when it is not unusual to see temperatures 10 to 15 degrees above normal. Stream flows and reservoir levels were well below normal across the area, while the very dry vegetation resulted in volatile wildfire conditions. A strong cold front brought much needed rainfall to the area

APPENDIX H: NCEI STORM EVENT DATA

Date	Description
	during the last couple of days of the month, spelling the start of a wetter period that brought an end to the more extreme drought conditions.
12/1/2016	Much needed rainfall, especially early in the month resulted in slight improvement of drought conditions across the North Carolina mountains in December. In fact, thanks to the rainfall, extreme drought conditions had once again retreated to southwest corner of the state. Nevertheless, monthly rainfall totals were still a little below normal, while final yearly totals were as much as 15 inches below normal in most locations. Levels were well below normal on all area streams, while some streams observed near-record low discharge rates. Reservoirs were several feet below target elevations and all communities continued to observe at least voluntary water restrictions, while some had instituted mandatory restrictions.

TABLE H.2: COLD/WIND CHILL EVENTS (2000-2025)

Date	Description
12/1/2000	December, 2000 will long be remembered for the brutal hold that cold weather had on the region. Temperatures ran 6 to 8 degrees below normal for the entire month. At Charlotte, it was the coldest month in 83 years.
1/6/2014	An arctic cold front blasted through the mountains during the morning hours of the 6th, bringing strong gusty winds and the coldest air mass to have affected the region since 1994. By the evening hours, air temperatures within the mountain valleys had fallen to the single digits, while the high elevations were below zero. Winds that continued in the 20 to 30 mph range with higher gusts yielded life threatening wind chill values through the overnight of the 6th and the morning of the 7th. Low temperatures on the 7th ranged from 0 to -5 in the lowest valleys, to -15 to -25 above 5000 feet. Meanwhile, winds remained gusty through the morning hours of the 7th. Minimum wind chills of -20 to -30 were common in the valleys early on the 7th, while wind chills reached as low as -50 at the highest peaks. Although the winds diminished enough to bring wind chills above -15 in the valleys by early afternoon, high temperatures on the 7th did not warm out of the teens in many locations.
1/7/2015	An arctic cold front moved through the southern Appalachians and adjacent foothills during the morning and afternoon of the 7th, bringing strong winds and very cold air to the region. By late evening, sustained winds of 10 to 20 mph combined with air temperatures in the teens to yield wind chill values in the 0 to -5 range in the valleys. By daybreak on the 8th, air temperatures in the valleys were near 0 while the high elevations were well below 0. Wind chill values during this time ranged from 0 to -15 across the valleys, while stronger winds and colder temperatures likely yielded values as low as -50 across the high elevations of the Smokies and Balsams. The very low wind chills abated throughout the 8th, as temperatures warmed and winds diminished. However, air temperatures remained below freezing throughout the 8th.
2/18/2015	A strong arctic cold front blasted through the southern Appalachians and adjacent foothills during the afternoon and evening of the 18th, bringing strong winds and bitterly cold air to the region. By mid-evening, sustained winds of 10 to 25 mph combined with air temperatures in the single digits and teens to yield wind chill values in the 0 to -10 range in the valleys. By daybreak on the 19th, air temperatures in the valleys were near 0 while the high elevations were well below 0. Wind chill values during this time ranged from -5 to -20 across the valleys, while stronger winds and colder temperatures likely yielded values as low as -50 across the high elevations of the Smokies and Balsams. The low wind chills continued throughout the 19th, as air temperatures failed to warm above the mid-20s in even the lowest valleys, and the high elevations remained within a few degrees either side of 0. Wind chills remained no higher than the single digits across most of the area until late morning on the 20th.
1/7/2017	Gusty northwest winds ushering in an arctic air mass to the southern Appalachians combined with a snowpacked ground to produce frigid temperatures and low wind chill values across the North Carolina mountains on the night of the 7th through the morning of the 8th. By daybreak on the 8th, air temperatures were in the single digits and lower teens across the mountains valleys, while the high peaks and ridge tops saw temperatures below 0. Valley wind chill values ranged from around 0 to -10 across the southern and central mountains, and from -5 to -15 from the French Broad Valley north. The high peaks and ridge tops likely saw wind chill values of -30 or lower at times. Although temperatures warmed slightly and winds abated during the day, conditions remained unseasonably cold across the mountains for a couple of days. Even some valley locations did not warm above freezing until the afternoon of the 10th.
1/1/2018	A large area of arctic high pressure slowly settled in over western North Carolina in the wake of a cold front that pushed through the area on 12/30, resulting in an extended period of unusually cold weather across the region. By the morning of the 1st, wind chill values of 0 to -15 were common in the mountain valleys and northern foothills, while high elevation wind chills as low as -40 were reported. These trends repeated during most nights and early morning hours through the 7th, when low temperatures were typically in the lower teens and single digits. Meanwhile, daytime temperatures remained at or below freezing in most areas through the week, with the few areas that did reach the melting level only staying there for a couple of hours during the afternoon.
1/17/2018	A cold arctic air mass built into western North Carolina on the heels of gusty northwest winds developing west of a storm system moving up the Southeast coast. The gusty winds and cold air passing over a fresh snowpack resulted in low wind chills across much of the high terrain and portions of the foothills. Wind chill values from 0 to -10 were common in elevations above 1500 feet or so. Meanwhile, wind chill values of -20 to -30 were measured above about 4000 feet.

APPENDIX H: NCEI STORM EVENT DATA

1/20/2019	Gusty northwest winds developing in the wake of an arctic cold front ushered in a very cold air mass into the North Carolina mountains throughout the 20th and remained in place into the 21st. Wind chill values as of -5 to -10 occurred across the valleys the morning of the 21st, while values as low as -20 were reported across the high elevations throughout the night of the 20th and through much of the 21st. Meanwhile, air temperatures remained below freezing for more than 48 hours (from late morning of the 20th until the afternoon of the 22nd) in all areas except for the lowest valleys of far southwest North Carolina.
3/5/2019	Unseasonably cold air combined with gusty northwest winds in the wake of a cold front to produce very low wind chills in the high elevations of the North Carolina mountains during the night of the 5th into the morning of the 6th. Air temperatures in the teens and winds gusting to 20 to 30 mph generally produced wind chill values of -5 to -10 in areas above 3500 feet. However, locations above 5000 feet, where air temperatures dropped to as low as 0 and where winds gusted to 40 mph or higher, saw wind chills as low as -30.
12/25/2020	Cold air filtering into western North Carolina on the heels of very gusty northwest winds in the wake of an Arctic cold front resulted in widespread temperatures in the teens throughout Christmas night into the morning of the 26th. Winds gusting in the 25 to 35 mph range resulted in wind chill values of -5 or colder, primarily in elevations above about 3000 feet. Meanwhile, elevations above 5000 feet or so saw gustier winds, temperatures in the single digits, and wind chill values of -15 or lower, with values as cold as -30 reported on the highest peaks and ridge tops.
1/16/2024	Gusty northwest winds brought very cold air to the southern Appalachians in the wake of an arctic cold front. Winds gusting from 35 to 50 mph combined with air temperatures in the single digits, with some below zero readings observed above 4000 feet, to produce wind chill values between 10 and 20 below above 3500 feet. Meanwhile, wind chill values of 5 to 10 below were observed in the lower elevations from the French Broad Valley north.
1/20/2024	The second arctic cold front in 4 days brought gusty northwest winds and another shot of very cold air to the southern Appalachians. Winds gusting from 30 to 45 mph combined with air temperatures in the single digits, with some below zero readings observed above 4000 feet, to produce wind chill values between 10 and 25 below above 3500 feet. Meanwhile, wind chill values from 0 to 10 below were observed in the valleys.
1/9/2025	Very cold air associated with arctic high pressure settled over the North Carolina mountains during the early morning hours of the 9th. Temperatures in the single digits and teens and winds gusting from 10 to 20 mph resulted in minimum wind chill values of 0 to -10 during this time. Stronger winds and temperatures at or below 0 caused wind chills of -15 or colder above 5000 feet.
1/20/2025	An arctic cold front brought strong northwest winds and reinforced very cold air over the North Carolina mountains during the early morning hours of the 22nd. Temperatures in the single digits and teens and winds gusting from 15 to 25 mph resulted in minimum wind chill values of 0 to -10 during this time. Stronger winds and temperatures at or below 0 caused wind chills of -15 or colder above 5000 feet.
1/22/2025	Strong northwest winds in the wake of another arctic cold front reinforced very cold air over the North Carolina mountains during the early morning hours of the 22nd. Temperatures in the single digits and teens and winds gusting from 20 to 30 mph resulted in minimum wind chill values of 0 to -10 during this time. Stronger winds and temperatures at or below 0 caused wind chills of -15 or colder above 5000 feet.
12/23/2022	An arctic cold front swept across the North Carolina mountains during the morning of the 23rd and introduced the coldest air mass in more than 5 years. Valley temperatures in the single digits and lower teens combined with 10 to 20 mph winds to produce wind chill values in the 0 to -20 range throughout the 23rd and especially during the morning of Christmas Eve. Meanwhile, air temperatures around or below 0 across the high elevations resulted in wind chill values as low as -40 above 3500 feet. While winds abated throughout Christmas Eve into Christmas Day, the cold weather persisted, and even some valley locations saw air temperatures remained below freezing for the better part of four days. There were numerous reports of frozen and burst pipes along with mostly minor damage to infrastructure throughout the area.

TABLE H.3: FLOOD/FLASH FLOOD EVENTS (2000-2025)

Location	Date	Description
Clay County		
COUNTYWIDE	5/6/2003	Creeks out of banks, low spots flooded, and roads closed countywide. Some tiles, privated bridges, drives damaged.
SOUTHWEST PORTION	7/16/2003	Eight inches of water flowed across the bridge over Brasstown Creek along the Cherokee County line.
WARNE	9/21/2009	A strong storm system moved northeast into southwest North Carolina, producing repeat rainfall over the same area. Several area roads in Cherokee and Clay counties were flooded during the event.
HAYESVILLE	12/2/2015	Persistent moist southwest flow and a nearly stationary surface front brought rains to the area from November 29th to December 2nd, resulting in flooding.
TUSQUITEE	4/13/2020	A prolonged convective event with deep moist southerly flow in an unstable environment with strong wind shear generated supercell thunderstorms across Southeast Tennessee and Southwest North Carolina. The lengthy period of heavy rain resulted in widespread three to four inch rainfall totals across East Tennessee, Southwest North Carolina, and Southwest Virginia.
FIRES CREEK	3/25/2021	A weather system moved from the Lower Mississippi River Valley through the Appalachian Mountains, bringing locally heavy rainfall across southwestern North Carolina on the 25th.
HAYESVILLE	3/25/2021	A weather system moved from the Lower Mississippi River Valley through the Appalachian Mountains, bringing locally heavy rainfall across southwestern North Carolina on the 25th.
HAYESVILLE	4/7/2025	A cold front swept through the southern Appalachian region on April 6th, exiting the area to the east during the morning hours on April 7th. This front produced several hours of moderate to heavy rainfall in the mountains of east Tennessee and western North Carolina. This rainfall caused flooding along Tusquittee Creek near Hayesville.
Macon County		
FRANKLIN	6/26/2001	Crawford Creek began to flood, followed by several other creeks in town and in the surrounding countryside. A city park was flooded out for a short time. The Little Tennessee River ran high but stayed within its banks. Heavy rainfall from 0530 to 1030 EST contributed to the flooding.
Unincorporated Area	9/27/2002	The Cullasaja River flooded part of Highway 64 near Highlands.
NORTH PORTION	5/6/2003	After an extended period of heavy rainfall, early morning thunderstorms produced very heavy rainfall in a short period of time, which resulted in rapid rises and flash flooding along many streams and creeks. Most of the flooding was concentrated in areas from Briertown to Franklin to Ellijay.
Unincorporated Area	5/6/2003	Persistent heavy rainfall resulted in slow rises and eventual flooding along the Little Tennessee and Cullasaja Rivers, as well as some smaller tributaries in the Needmore area.
CENTRAL PORTION	5/7/2003	Thunderstorms producing very heavy rainfall caused flash flooding for the second consecutive day, mainly in areas near Franklin. Flooding along tributaries of the Little Tennessee River resulted in some water covered roads near Franklin.
Unincorporated Area	5/7/2003	Although flash flooding abated by noon across the southern mountains, many creeks and streams remained above flood stage through the afternoon hours.
Unincorporated Area	7/1/2003	Heavy rainfall and mudslides caused numerous trees to fall across the county. Some roads were also flooded.
Unincorporated Area	11/19/2003	Some low-lying areas along highway 64 flooded west of Franklin. Some homes were flooded in Franklin. The Cullasaja River flooded in spots, and the Little Tennessee overflowed its banks along the Swain County line near highway 28.
Unincorporated Area	9/7/2004	Flooding developed in the early evening in areas near the Blue Ridge, from Highlands to Cashiers, then quickly spread to include locations such as Cullowhee, Bryson City, and Cherokee. Jackson and southern Macon counties were the hardest hit, as numerous creeks and streams flooded, including the Little Tennessee River. Several homes and businesses were damaged and a few private dams were breached or damaged in Macon County. Several sections of highway 281

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Description
		were washed out in Jackson County. By early morning of the 8th, flood gates were open on all Jackson County dams, and numerous rescues and evacuations were underway.
Unincorporated Area	9/16/2004	In response to persistent moderate to heavy rainfall associated with the remnants of Hurricane Ivan, severe flooding developed across the mountains for the second time in 9 days. Flooding first developed across the southwest mountains, when several small streams and creeks overflowed their banks, including Toot Hollow Creek near Bryson City. Several rescues were required during the evening in Macon County, as creeks and streams began to threaten homes. Overnight, flooding became more widespread, with Macon County enduring the worst of it. The Little Tennessee River overflowed its banks during the early morning of the 17th, and continued to flood through much of the day. The river flooded an industrial park in Macon County, causing extensive damage. In Swain County, 500,000 gallons of raw sewage and numerous natural gas tanks were swept down the river. Hundreds of structures were damaged or destroyed, and several private bridges were swept away. Portions of highways 105, 64, and 28 were all closed in Macon County, some due to major damage that was estimated to take several months to repair. In addition, a trout farm lost 60,000 pounds of fish.
Unincorporated Area	6/12/2005	Flooding developed on the Cullasaja River and some of its tributaries between the communities of Cullasaja and Highlands, closing several roads and forcing the evacuation of a campground. The rising river washed out a new sewer line near Wells Grove Rd. Flooded tributaries included Nickajack Creek and Turtle Pond Creek, which forced evacuation of at least 1 residence. Closed roads included Turtle Pond Creek and River Roads. A 2-day rainfall total of 7.9 inches was reported at Scaly Mountain.
HIGHLANDS	6/18/2005	Street flooding in Highlands, at least part of the flooding was due to Mill Creek overflowing its banks.
Unincorporated Area	7/11/2005	Middle Creek flooded near the community of Otto, with two homes surrounded by water. Flooding developed later in the evening in low spots along the Little Tennessee River near Franklin.
FRANKLIN	11/29/2005	River Rd was covered with water and closed due to flooding along the Cullasaja River.
FRANKLIN	7/26/2007	Several roads were closed due to flooding after 2 to 4 inches of rain fell in a short period of time in locations from Franklin north to the Cowee community. Water entered 7 homes in the area, while some cabins were evacuated along the Little Tennessee River north of Franklin. Closed roads included Cowee Creek Rd and Rickman Creek Rd north of town and Depot St and West Main St in the city. In addition, a landslide washed out part of Leatherman Gap Rd and part of highway 28 was washed out north of Franklin.
OLIVE HILL	9/21/2009	Flooding developed in several spots along the Little Tennessee River after an extended period of heavy rainfall. Several roads were closed, including Arthur Drake Rd and Riverside Rd. At least one motorist required rescue after driving over a flooded road. Water entered and damaged several homes along the river. In addition, water from Cartoogechaye Creek surrounded several homes on Patton Creekside Dr.
LEATHERMAN	5/28/2010	Several roads flooded in the northeast part of the county, including Leatherman Gap Rd and Old Mill Rd.
GNEISS	11/28/2011	Several locations along River Road were flooded.
OTTO	7/14/2012	Around 4 inches of rain fell during the early morning hours over southern Macon County. This caused Middle Creek to flood parts of Middle Creek Road.
BURNING TOWN	1/16/2013	Burningtown Creek flooded Middle Burningtown Road in several spots during the early morning hours of the 16th. One vehicle become stuck in flood waters and had to be pulled out.
STILES	12/23/2013	Needmore road was closed due to flooding along the Little Tennessee River.
FRANKLIN	12/24/2015	After as much as 4 inches of rain fell across Macon County in about a 24-hour period, flooding developed across central portions of the county, just north and west of the city of Franklin. An automated stream gauge on the Little Tennessee River near Iotla exceeded its established flood stage, indicating Needmore Rd was flooded near the Swain County line. Also, Public reported

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Description
		Gibson Cove Branch flooded part of Old Murphy Rd west of Franklin, and the back yards of some homes in the same vicinity. A few small landslides also occurred in the general area.
HIGHLANDS	5/27/2018	County comms reported flash flooding developed along Edwards Creek and Big Creek after as much as 4 inches of rain fell in just a few hours. Portions of Horse Cove Rd and Walking Stick Rd were flooded and closed due to water from these streams. In addition, many small landslides and downed trees due to slides or saturated ground were reported throughout the Highlands area. Some of these blocked roads and driveways.
STILES	12/28/2018	County comms reported the Little Tennessee River overflowed its banks and flooded several low spots, including on Riverside Rd, Needmore Rd, and Carnes Rd. 3.5 to 5 inches of rain fell in the basin in about a 24 hour period.
NORTON	2/22/2019	A stream gauge reported and NWS employee confirmed minor flooding developed along the Little Tennessee River in Macon County after 2.5 to 4 inches of rain fell in the basin in a 24 to 36 hour period. Roads impacted by flood water included Shady Ln, Sam Corn Rd, Riverside Rd, and Old Dairy Rd.
NORTON	2/6/2020	County comms reported multiple roads flooded and closed throughout Macon County due to a combination of small stream and poor drainage flooding after 3 to 6 inches of rain fell in about an 18 hour period. At least half of that fell in less than six hours during the morning of the 6th.
NORTON	2/6/2020	Although heavy rain tapered off across Macon County during the afternoon and evening, county comms reported multiple roads remained flooded and closed for several hours after the rain ended.
FRANKLIN	4/13/2020	Emergency manager reported flash flooding developed across Franklin and vicinity after 4 to 6 inches fell across a swath of central Macon County in less than 8 hours. The most significant impact was to Gibson Cove Branch, which inundated Old Murphy Rd and several adjacent businesses. One business saw up to 3 feet of water inundation, damaging vehicles and storage buildings. Additionally, a stream gauge on the Little Tennessee River near Franklin exceeded its flood stage, indicating flooding of a couple of low lying roads. Other poor drainage and urban flooding issues were reported in the Franklin area.
GNEISS	9/27/2024	A stream gauge on the Cullasaja River in the Gneiss community indicated flash flooding developed along the lower portion of the river after 10-15 inches of rain fell across the headwaters over three days. 1.5 to 3.5 inches of that fell in less than six hours during the early morning of the 27th. Portions of River Rd and Fulton Rd were inundated, with water entering several homes along River Rd near Peaceful Cove Rd. A couple of campgrounds and RV parks were also inundated. A 75-year-old man was killed when he drove his vehicle into floodwater on Fulton Rd.

TABLE H.4: HAIL EVENTS (2000-2025)

Location	Date	Size	Description
Clay County			
HAYESVILLE	4/28/2002	0.75	Dime size hail reported in Hayesville.
HAYESVILLE	4/28/2002	0.75	Dime size hail reported in Hayesville.
HAYESVILLE	4/19/2006	0.75	Penny-size hail at Hayesville.
HAYESVILLE	5/13/2006	1	Quarter size hail was reported at Hayesville.
HAYESVILLE	5/20/2006	0.88	Nickel size hail was reported near Hayesville.
HAYESVILLE	5/20/2006	0.88	Nickel size hail was reported in Hayesville.
HAYESVILLE	6/17/2009	0.75	Thunderstorm complex tracked along a boundary during the afternoon and evening hours. Most of the storm reports were for thunderstorm wind damage, but a few hail occurrences were also reported.
HAYESVILLE	5/26/2011	1	The atmosphere destabilized during the late morning into afternoon period as a cold front progressed into the Southern Appalachian region. Large hail was the primary mode of severe weather as a pocket of cold air aloft moved across the forecast area.
TUSQUITEE	6/9/2011	1.75	A boundary across the area produced severe thunderstorms during the afternoon hours. Most of the storm reports were for damaging thunderstorm winds but hail as large as a golfball was also reported.
HAYESVILLE	6/15/2011	1.75	A front tracking through the region triggered severe thunderstorms over extreme southwest North Carolina. Storm reports contained both thunderstorm wind damage as well as large hail.
HAYESVILLE	4/26/2012	1.75	A frontal boundary lingered across southwest North Carolina during the afternoon hours producing scattered thunderstorms over the area. A few of the storms produced hail as large as golfball.
TUSQUITEE	5/6/2024	1	An upper level weather system moving over the wider region allowed for scattered severe thunderstorms to develop, including in southwest North Carolina.
SHOOTING CREEK	5/26/2024	1	An upper trough, a shortwave, and a cold front combined in a potent environment to produce several rounds of severe thunderstorms that produced large hail and damaging winds to southwest North Carolina.
HAYESVILLE	6/24/2025	1	Thunderstorms took advantage of a low shear, high cape environment to produce severe hail and damaging winds.
Macon County			
FRANKLIN	2/13/2000	0.75	Strong gradient winds ahead of an approaching squall line and cold front gusted from the south up to an estimated 60 mph. There were numerous reports of trees and power lines downed across Macon county. Severe thunderstorms then crossed the southwestern mountains of North Carolina, resulting in many more trees being blown down. Pea to dime size hail accompanied some of the thunderstorms as well.
FRANKLIN	6/20/2002	1.5	N/A
AQUONE	6/20/2002	0.75	N/A
FRANKLIN	7/1/2002	0.75	N/A
SCALY	7/2/2002	1	N/A
FRANKLIN	5/15/2003	0.75	N/A
FRANKLIN	7/13/2003	0.88	N/A
HIGHLANDS	7/22/2003	1	N/A
SCALY	3/27/2005	0.88	N/A
FRANKLIN	5/10/2005	0.88	N/A
HIGHLANDS	8/5/2005	1.75	N/A
OTTO	4/2/2006	0.75	N/A
OTTO	4/3/2006	0.75	N/A
FRANKLIN	4/3/2006	0.75	N/A

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Size	Description
FRANKLIN	4/19/2006	0.75	N/A
FRANKLIN	4/20/2006	0.88	N/A
FRANKLIN	4/20/2006	1.5	N/A
FRANKLIN	4/20/2006	1	N/A
FRANKLIN	4/20/2006	1	N/A
FRANKLIN	5/13/2006	1.25	N/A
HIGHLANDS	5/11/2007	0.75	Isolated severe storms produced large hail in the North Carolina mountains during the afternoon hours.
FRANKLIN	8/3/2007	0.88	Isolated severe storms affected western North Carolina during the late afternoon hours.
FRANKLIN	8/24/2007	1	Several severe storms affected western North Carolina during the afternoon hours.
FRANKLIN	8/24/2007	2	Several severe storms affected western North Carolina during the afternoon hours.
HIGHLANDS	5/20/2008	1	Several clusters of severe thunderstorms developed over western North Carolina during the afternoon and evening hours ahead of a cold front.
CULLASAJA	8/5/2009	0.75	A cold front triggered thunderstorms over the North Carolina Mountains starting in the early afternoon hours. The storms organized into a slow moving mesoscale convective system as they moved across the foothills and western piedmont. Quite a bit of wind damage, and some large hail, was produced.
HIGHLANDS	5/15/2010	1	Thunderstorms developed over western North Carolina along a stationary front. A few of the storms produced large hail.
SEALY MTN	5/27/2010	0.75	An isolated thunderstorm produced small hail over southern Macon County. The storm eventually went on to produce a little wind damage over northeast Georgia.
SEALY MTN	4/27/2011	1	An historic tornado outbreak affected areas from the Deep South to the Mid-Atlantic states April 27-28. A strong tornado touched down in Rabun County late on the 27th, with additional tornadoes affecting the North Carolina foothills during the early morning hours of the 28th. At least three supercell thunderstorms crossed the western Carolinas and northeast Georgia during this time. A greater number of supercells and tornadoes affected areas to the west of the Appalachians. Scattered areas of straight line wind damage and large hail also accompanied the storms.
FAIRVIEW	5/26/2011	1	Numerous showers and thunderstorms affected the western Carolinas and northeast Georgia during the afternoon and evening hours. Some of the thunderstorms were severe, producing large hail and damaging straight line wind.
IOTLA	5/26/2011	1.5	Numerous showers and thunderstorms affected the western Carolinas and northeast Georgia during the afternoon and evening hours. Some of the thunderstorms were severe, producing large hail and damaging straight line wind.
FRANKLIN	5/26/2011	0.88	Numerous showers and thunderstorms affected the western Carolinas and northeast Georgia during the afternoon and evening hours. Some of the thunderstorms were severe, producing large hail and damaging straight line wind.
PRENTISS	5/26/2011	1	Numerous showers and thunderstorms affected the western Carolinas and northeast Georgia during the afternoon and evening hours. Some of the thunderstorms were severe, producing large hail and damaging straight line wind.
ELLNAY	5/26/2011	1	Numerous showers and thunderstorms affected the western Carolinas and northeast Georgia during the afternoon and evening hours. Some of the thunderstorms were severe, producing large hail and damaging straight line wind.
OTTO	5/26/2011	1	Numerous showers and thunderstorms affected the western Carolinas and northeast Georgia during the afternoon and evening hours. Some of the thunderstorms were severe, producing large hail and damaging straight line wind.
HIGHLANDS	6/1/2011	1	A few thunderstorms developed over the southwest mountains of North Carolina. A couple of the storms produced large hail.
OTTO	6/2/2011	0.88	Scattered thunderstorms developed across the North Carolina Mountains starting in the early afternoon hours. The storms moved across the southern foothills and piedmont,

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Size	Description
			tracking a little to the north of a weak cold front. Several of the storms produced large hail.
HIGHLANDS	6/9/2011	1	Numerous thunderstorms again developed over western North Carolina as an unseasonably hot airmass persisted across the region. The storms produced both large hail and damaging winds.
AQUONE	7/3/2011	1	Isolated thunderstorms developed over western North Carolina during the afternoon hours. One storm in the mountains and one storm in the western piedmont produced severe weather.
BLOSSOMTOWN	3/2/2012	1.75	Two supercell thunderstorms entered the North Carolina mountains during the evening hours. One of the storms produced a strong tornado in the town of Murphy in Cherokee County. The supercell remained surprisingly strong as it crossed the southern mountains, producing large hail and eventually another weak tornado in Jackson County. Later at night, storms organized into a broken line across Upstate South Carolina. The northern part of the line crossed the southern North Carolina piedmont where it produced a strong, brief tornado on the northeast side of Charlotte. The storm did not exhibit supercell characteristics, and the tornado spun up quite quickly as the line intersected a low level boundary.
FRANKLIN ARPT	3/2/2012	1.75	Two supercell thunderstorms entered the North Carolina mountains during the evening hours. One of the storms produced a strong tornado in the town of Murphy in Cherokee County. The supercell remained surprisingly strong as it crossed the southern mountains, producing large hail and eventually another weak tornado in Jackson County. Later at night, storms organized into a broken line across Upstate South Carolina. The northern part of the line crossed the southern North Carolina piedmont where it produced a strong, brief tornado on the northeast side of Charlotte. The storm did not exhibit supercell characteristics, and the tornado spun up quite quickly as the line intersected a low level boundary.
ELLNAY	3/2/2012	2	Two supercell thunderstorms entered the North Carolina mountains during the evening hours. One of the storms produced a strong tornado in the town of Murphy in Cherokee County. The supercell remained surprisingly strong as it crossed the southern mountains, producing large hail and eventually another weak tornado in Jackson County. Later at night, storms organized into a broken line across Upstate South Carolina. The northern part of the line crossed the southern North Carolina piedmont where it produced a strong, brief tornado on the northeast side of Charlotte. The storm did not exhibit supercell characteristics, and the tornado spun up quite quickly as the line intersected a low level boundary.
HIGDONVILLE	4/5/2012	0.75	Thunderstorms developed over the mountains during the afternoon hours. A couple of the storms produced hail up to the size of quarters.
FRANKLIN	4/26/2012	0.75	A well organized MCS moved into the North Carolina Mountains around 8 a.m. EDT. The line weakened as it crossed the mountains, though it still downed a number of trees and produced small hail. The line did not produce any additional severe weather after emerging into the foothills, though it did hold together as it moved across the foothills and western piedmont and even produced periodic small hail.
FRANKLIN	4/26/2012	1	Thunderstorms developed during the afternoon along an outflow boundary from an MCS that crossed the region earlier in the day. The afternoon and evening storms produced large hail and some straight-line wind damage.
ELLNAY	4/26/2012	1	Thunderstorms developed during the afternoon along an outflow boundary from an MCS that crossed the region earlier in the day. The afternoon and evening storms produced large hail and some straight-line wind damage.
ELLNAY	4/26/2012	1	Thunderstorms developed during the afternoon along an outflow boundary from an MCS that crossed the region earlier in the day. The afternoon and evening storms produced large hail and some straight-line wind damage.

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Size	Description
SHOOKVILLE	7/5/2012	1	A very unstable airmass and weak upslope flow helped trigger numerous thunderstorms over western North Carolina. Several of the storms produced wind damage and large hail. A long-lived line of storms moved across the North Carolina Mountains, causing quite a bit of wind damage during the late afternoon hours.
ELLIJAY	5/20/2013	1	Isolated thunderstorms developed over the North Carolina mountains during the afternoon hours. A couple of the storms produced large hail.
FRANKLIN ARPT	5/22/2013	0.88	Numerous thunderstorms developed over the region ahead of a cold front. The storms produced a mix of hail and damaging winds across western North Carolina.
FRANKLIN	6/18/2014	0.75	Scattered to numerous thunderstorms developed over the mountains and foothills during early-to-mid afternoon and moved into the Piedmont by late afternoon and early evening. A few storms produced large hail and/or damaging winds, mainly over the foothills and Piedmont.
TERESITA	6/19/2014	1.5	Scattered thunderstorms developed over the high terrain throughout the afternoon and moved east, while additional numerous thunderstorms moved into western North Carolina from East Tennessee during the late afternoon and early evening. Multiple localized severe thunderstorms developed from this activity and produced quite a bit of large hail along with isolated wind damage.
RAINBOW SPGS	3/27/2017	0.75	Isolated thunderstorms developed across the North Carolina Blue Ridge during the afternoon, followed by a weakening line of storms that moved into the mountains during the evening. A couple of cells produced brief periods of hail.
HIGHLANDS	6/15/2022	0.88	Isolated to widely scattered thunderstorms developed over western North Carolina during the afternoon. A few of the storms produced hail in the mountains and foothills.
RAINBOW SPGS	5/26/2024	1	Numerous thunderstorms and storm clusters moved across western North Carolina during the afternoon and evening. Some storms produced severe weather in the form of isolated large hail and swaths of damaging wind gusts.
OTTO	4/10/2025	1.75	Scattered thunderstorms developed over western North Carolina during the late afternoon and evening. A couple of the storms produced brief severe weather in the mountains.

TABLE H.5: HEAVY RAIN EVENTS (2000-2025)

Location	Date	Description
Macon County		
COUNTYWIDE	6/4/2002	Heavy rain caused trees to fall onto roads and also resulted in some mudslides.
COUNTYWIDE	12/19/2002	Heavy rain caused a few North Carolina mountain streams to rise to near bankfull. In addition, the wet soil combined with gusty winds to cause some drought weakened trees to fall across the area.
FRANKLIN	7/26/2007	Torrential rainfall during a severe thunderstorm caused a clogged culvert to overflow, flooding the basement of a home on Whispering Creek Rd. Property in the basement was a total loss.
FRANKLIN	1/6/2009	Water covered parts of Arthur Drake Rd when the Little Tennessee River overflowed its banks, flooding low lying areas.
GNEISS	9/20/2009	Flooding developed briefly along a portion of the Cullasaja River during the morning. River Rd was covered by water for a short time. Also, two wastewater spills occurred closer to town due to the heavy rain.
FRANKLIN	1/30/2013	Heavy rain resulted in urban flooding in Franklin. Many roads had water over them, and a few were briefly closed, including East Main Street.

TABLE H.6: HEAVY SNOW EVENTS (2000-2025)

Location	Date	Description
Clay County		
Unincorporated Area	1/5/2003	Snows of 4 to 6 inches fell across extreme southwest North Carolina.
Unincorporated Area	2/11/2006	A strong storm system moved across the appalachian region producing snowfalls totals between 4 and 6 inches.
Unincorporated Area	1/29/2010	Four to five inches of snow occurred across the area.
Unincorporated Area	12/25/2010	Law enforcement personnel reported 5 inches of snow fell at Hayesville.
Unincorporated Area	3/5/2013	Four inches of snow was reported in the higher terrain near Hayesville.
Unincorporated Area	2/13/2014	Amateur radio personnel reported 3.5 of snow fell in Brasstown.
Unincorporated Area	2/25/2015	Dispatch personnel recorded 4 inches of snow in Hayesville.
Unincorporated Area	2/26/2015	Amateur radio personnel recorded 6.5 inches of snow in Brasstown.
Unincorporated Area	12/8/2017	A snowfall total of 6.6 inches was measured three miles southeast of Tusquitee.
Unincorporated Area	12/8/2017	A snowfall total of 6 inches was measured at Hayesville.
Unincorporated Area	2/8/2020	Snow depth was measured at 3.6 inches four miles northwest of Hayesville.
Macon County		
Unincorporated Area	1/22/2000	A cold dome of arctic high pressure centered over the Mid-Atlantic States provided very cold and dry air to western North Carolina. Meanwhile, weak low pressure moved east along a frontal boundary stalled across the Gulf Coast States to the Georgia coast. Abundant moisture flowed north into the sub-freezing air over western North Carolina, resulting in light snow as early as the afternoon on the 22nd. Snow became heavy by mid-afternoon across the mountains and by evening across the foothills and piedmont. A general 4 to 7-inch snowfall occurred in the mountains with as much as 10 inches reported in Jackson county. Generally, 4 to 6 inches of snow fell across the foothills and piedmont, with a local maximum of 7 inches in western Lincoln county. Rowan county failed to meet heavy snow criteria with accumulations of up to 3 inches. Freezing rain and sleet mixed with the snow for a short time before the precipitation ended, and for the most part, caused little additional problems. The one exception was across southern Union county where freezing rain lasted all night and through much of the morning on the 23rd. Ice accumulations reached damaging levels there around 3 am, causing a large number of trees and power lines to fall throughout the morning. This in turn, resulted in widespread power outages.
Unincorporated Area	1/26/2000	An upper level disturbance and northwest flow combined to produce varying amounts of snow across the mountains from early evening on the 25th through noon on the 26th. One to three inches of snow fell from Macon county to Buncombe and Yancey counties. Heavy snow accumulated 4 to 6 inches across most of the Tennessee border counties from Graham to Avery.
Unincorporated Area	4/8/2000	A cold and moist northwest flow behind a cold front produced light snow across the mountains. Accumulations were generally a dusting to one inch, but the highest mountains north of Asheville received 2 to 3 inches.
Unincorporated Area	11/19/2000	Light to moderate snow started in the mountains and spread southeast, lasting through the day. Generally, 1 to 3 inches of snow fell, but some higher elevations of the central and southern mountains reported more than 4 inches.

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Description
Unincorporated Area	12/3/2000	A developing surface cyclone off the Carolina Coast spread abundant moisture into western North Carolina, which was still mired in a cold, winter-like temperature regime. The result was another widespread snowfall. Accumulations ranged from a dusting in the northern foothills to more than 6 inches in western Macon County and 5 inches in Henderson County. Most accumulations were in the 1 to 3-inch range.
Unincorporated Area	12/17/2000	A dynamic system affected western North Carolina during the 16th and 17th, bringing a variety of weather to the region, from freezing rain in mountain valleys to large hail and damaging winds across much of the region. A number of meteorological factors came together to produce such interesting atmospheric phenomena: a very strong cold front that would eventually usher in the coldest air in nearly two years into the state, strong mid-level and upper-level jets, a potent upper level disturbance, a temporary surge of warm, moist air into the region and the antecedent cold air trapped in lower valleys of the higher terrain in the mountains. Heavy rain, with embedded thunderstorms, crossed the region from late morning through the afternoon on the 16th. Cold air trapped in some valleys of the northern mountains never completely scoured out, resulting in a light glaze south and west of Newland. Just as surface temperatures rose above freezing in the northern mountains, thunderstorms pushed out ahead of the strong front, with numerous small hail reports. Nickel-sized hail was reported 8 miles north of Sylva in Jackson County. As the front, and attendant pressure gradient, pushed its way into western North Carolina, winds increased into the 50 to 60 mph range, resulting in numerous downed trees and power lines. Nearly every county in the mountains reported some wind damage. The high winds eventually affected the foothills and piedmont. In Charlotte, numerous trees were downed and furniture was blown off porches. An unsteady building in Spencer collapsed. In the wake of the frontal passage, much colder air invaded the region, and as another shortwave affected the region on the 17th, a wide swath of 1 to 3-inch snow blanketed the higher terrain. Flurries were reported as far east as Hickory and Gastonia.
Unincorporated Area	12/19/2000	N/A
Unincorporated Area	1/1/2001	A powerful upper level disturbance interacted with left-over cold air and abundant low-level moisture to wring out snow showers across the North Carolina mountains from midday New Year's Day through the early morning hours on the 2nd. Highest accumulations were in Haywood County, with several reports of 3-inch accumulations.
Unincorporated Area	3/20/2001	N/A
Unincorporated Area	1/3/2002	Flurries and light snow began in the early evening and became moderate to heavy by late evening on the 2nd. Heavy snowfall accumulations were reached across this portion of the foothills and piedmont overnight on the 3rd, with 4 to 6 inches observed by noon.
Unincorporated Area	1/6/2002	Snow began in the early morning, reaching accumulations of 4 to 8 inches by 3 pm. The highest accumulations were in the high elevations. Some sleet was mixed in with the snow.
Unincorporated Area	2/3/2002	Light snow fell from late afternoon into late evening, resulting in 1 to 2.5 inches accumulations in some areas, and a few slick roads.
Unincorporated Area	1/16/2003	Light snow began across the mountains of North Carolina during the afternoon of the 16th, and gradually intensified with time. By early morning of the 17th, 4 to 8 inches of snow had accumulated. As much as a foot was reported on some of the highest peaks.
Unincorporated Area	2/6/2003	Light snow began falling across the western mountains of North Carolina during the afternoon of the 6th, and gradually increased in intensity and coverage during the evening and overnight hours. General snowfall amounts of 4 to 5 inches were reported in the major valleys. However, accumulations of up to 8 inches occurred in the highest elevations along the Tennessee border.
Unincorporated Area	3/30/2003	Snow intensified across the southern and central mountains during the pre-dawn hours, and by sunrise, heavy snow accumulations were realized. Valley locations received anywhere from a trace to 6 inches, while up to 8 inches accumulated in the highest elevations. The heavy, wet snow

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Description
		caused widespread power outages, especially in Haywood County. Three hikers required rescue in Haywood County, and one was hospitalized with hypothermia.
Unincorporated Area	12/18/2003	Heavy snow began during the evening of the 18th across the southern mountains of North Carolina, and continued overnight. Three to five inches of snow accumulated across much of the area.
Unincorporated Area	1/25/2004	Light snow developed early in the morning across the mountains, foothills, and northern piedmont of North Carolina. The snow intensified throughout the morning and afternoon, and by early evening 3 to 5 inches had accumulated across much of the area. Accumulations as high as 8 inches occurred in mountainous areas along the Tennessee border.
Unincorporated Area	2/26/2004	Snow intensity increased during the late morning across the North Carolina mountains, and continued through the afternoon. Total accumulations of 3 to 5 inches occurred, but much of it melted rapidly.
Unincorporated Area	2/11/2006	By sunrise on the 11th, snow accumulation became heavy across the southwest mountains, with generally 2-4 inches reported across the valleys, and slightly higher amounts occurring in the higher elevations. After a lull in snow activity during the late morning and afternoon hours, widespread snow showers developed across the area during the late evening of the 11th and continued through the 12th and into the early morning hours of the 13th. Additional accumulations were highly variable across the area, ranging from trace amounts to 5 inches in the valleys. However, as much as an additional foot fell in the higher elevations of the Nantahala mountains and the Balsams.
Unincorporated Area	2/1/2007	Precipitation began as snow during the early morning hours across the southern mountains of North Carolina. The snow became moderate to heavy at times by sunrise. As much as 3 inches of snow had accumulated by 6 am. Snow, heavy at times continued during the mid and late morning hours across the mountains and foothills, with heavy snowfall totals occurring in most locations. Total snowfall accumulations of 2 to 5 inches were reported across the area by the time the snow tapered off around noon.
Unincorporated Area	1/16/2008	Light snow began during the early evening hours across the southern mountains and foothills of the western Carolinas. Snowfall intensity began to increase during the mid and late evening. Snow continued to fall during the early morning hours across the southern mountains and foothills, and total accumulations of 2-4 inches were reached across much of the area shortly after midnight.
Unincorporated Area	1/29/2010	Low pressure tracked across southern Georgia during the night of the 29th, and then off the Southeast coast on the 30th. As the low passed so far south of the region, most of the precipitation fell as snow, though other precipitation types mixed in toward the end. Snow, heavy at times began across the southern and central mountains during the late afternoon, and began to quickly accumulate. By early evening, some areas had picked up 4 inches of snowfall. Heavy snow continued most of the night. The precipitation changed over to sleet and freezing rain before ending, but only trace amounts of ice occurred. Total accumulations ranged from 4-8 inches across the Tennessee border counties, to more than a foot in the upper French Broad Valley. The heavy wet snow caused numerous trees to fall, especially in the interior and southwest valleys, resulting in fairly widespread power outages.
Unincorporated Area	2/12/2010	As low pressure tracked along the northern Gulf Coast, light snow developed during the late afternoon across the southern North Carolina mountains. The snow gradually increased in intensity through the remainder of the afternoon and into the early evening. Numerous traffic accidents occurred during the evening rush. Snow, heavy at times, continued through the evening, with heavy accumulations reached in most areas. The snow ended a little before midnight. Total accumulations averaged around 3 inches.
Unincorporated Area	3/2/2010	Snow began to fall during the pre-dawn across the mountains of the western Carolinas. After sunrise, snow became moderate to heavy at times, resulting in accumulations of 1 to 4 inches across most of the area by late morning. Snow, heavy at times, continued into the afternoon across the mountains, with heavy accumulations realized in most areas by early afternoon. By early

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	Description
		evening, total snowfall ranged from 4 to 8 inches across the area, with localized amounts as high as 10 inches, especially in the higher elevations.
Unincorporated Area	12/25/2010	A developing coastal storm system brought light to moderate snow, with occasional heavy bursts to the mountains beginning around sunrise on Christmas, and continuing through the morning. Snow, heavy at times, continued through the afternoon across the central and southern mountains. By Christmas evening, most locations had 6 to 10 inches of fresh snowpack. Although snow ended in most areas during the evening of the 25th, a strong northwest flow resulted in development of numerous snow showers along the Tennessee border on the 26th through the 27th. Many of these snow showers managed to add to snowfall totals, mainly in the higher elevations of the Nantahala Mountains and the Balsams, where total accumulations of more than a foot became common. Very gusty winds and cold temperatures resulted in wind chill values less than 0 and considerable blowing and drifting of snow, mainly in the high elevations.
Unincorporated Area	1/10/2011	Moderate to heavy snow associated with a Gulf Coast storm system spread from south to north across the mountains of western North Carolina during the nighttime hours. Heavy snow accumulations of up to 4 inches were reported over the southern mountains by as early as 4 am. Heavy snow accumulations were not reported over the northern mountains until mid-morning. The snow became lighter around sunrise, but continued to accumulate through the morning. By early afternoon, snowfall totals ranged from 7 to 10 inches over the southern and central mountains and 3 to 6 inches over the northern mountains. During early afternoon, precipitation changed to light freezing rain and continued into the evening hours. This added as much as a tenth of an inch of ice to the heavy snowfall totals. Persistent cold temperatures ensured that many roads remained snow-packed or ice covered for several days. Some schools and businesses remained closed for as much as 5 days.
Unincorporated Area	1/6/2017	As an area of surface low pressure moved northeast along the Gulf and Southeast coasts, moisture overspread the southern Appalachians throughout the 6th. Although the precip may have started as rain in the lower valleys, it primarily fell as snow. It was initially light in most areas, but became heavy during mid-to-late evening, continuing into the overnight. By the time the heavier snowfall rates tapered off around sunrise, total accumulations ranged from 5 to 7 inches. Locally higher amounts of as much as 10 were observed across the higher elevations of the foothills counties.
Unincorporated Area	12/8/2018	Rain and snow developed across the Great Smoky Mountains, the Nantahala Mountains, and surrounding areas during the evening of the 8th and continued into the overnight. While precipitation fell as mostly snow above 3500 feet or so, mostly rain (with snow mixing in at times) fell in the valleys. By daybreak on the 9th, accumulations of 2 to 5 inches were common in the high elevations, while valley accumulations were generally less than an inch.
Unincorporated Area	1/15/2022	Moisture overspread the southern Appalachians late on the 15th as strengthening low pressure moved across the Deep South. Strong northeast winds supplied ample cold air for the precipitation to begin as light snow. Snow increased in intensity throughout the overnight, with snowfall rates of around an inch per hour becoming common during the pre-dawn hours. Heavy snowfall criteria of 3 to 5 inches was reached in many areas by daybreak, with accumulating snow continuing through the morning hours before tapering off to occasional snow showers that continued to produce light accumulations through the afternoon. Total snowfall ranged from 6 to 10 inches across much of the area, although amounts in excess of a foot were reported near the eastern escarpment of the Blue Ridge. Some of the valleys of far southwest North Carolina saw lesser amounts as temperatures warmed above freezing during the morning. Travel was very difficult to nearly impossible across much of the area throughout the 16th and much of the 17th.

TABLE H.7: ICE STORM EVENTS (1998-2025)

Date	Description
Clay County	
12/22/1998	Only light accumulations of ice were reported, mainly in higher mountain elevations. In the valleys, precipitation was mostly in the form of rain, with only a few icy spots on bridges.
1/29/2005	A low pressure system spread moist air above a cold air mass in place at the surface across southwest North Carolina creating a mixture of freezing rain and sleet over the region. Much of the area ended up with ice accumulation around one quarter inch. The weight of the ice downed trees and power lines.

TABLE H.8: LIGHTNING EVENTS (2000-2025)

Location	Date	Description
Macon County		
HIGHLANDS	8/31/2003	Lightning ignited a fire at a house.
FRANKLIN	4/13/2004	A 28-year-old woman received minor injuries when lightning struck the building she was in.
SCALY	5/9/2004	Lightning ignited a fire at a residence, destroying the home and its contents.
HIGHLANDS	6/27/2005	Lightning hit a gas line on Flat Mountain Rd, which caused a nearby house to catch fire.
FRANKLIN	7/1/2005	Lightning ignited a house fire on Chickadee Trail, causing significant damage.
HIGHLANDS	8/1/2005	Lightning ignited a fire at a house, causing significant damage to the home.
HIGHLANDS	8/1/2005	Lightning ignited a fire at a house, completely destroying the structure.
FRANKLIN	7/26/2007	Lightning ignited a fire that destroyed a house in the Clarks Chapel area.
FRANKLIN ARPT	5/15/2010	Lightning ignited a fire at a home off Pendergrass Rd, causing significant damage.
HIGHLANDS	5/16/2010	Lightning ignited a fire at an inn, destroying roughly half of a building with an estimated value of \$2.5 million.
SEALY MTN	5/27/2010	Lightning struck a detached garage on Tater Hill Dr, causing extensive damage. Lightning had struck a waterline at this same location 2 weeks earlier.

TABLE H.9: THUNDERSTORM WIND EVENTS (2000-2025)

Location	Date	MPH	Description
Clay County			
HAYESVILLE	2/13/2000	N/A	Trees down.
HAYESVILLE	8/2/2002	N/A	A few trees and power lines were reported down.
BRASSTOWN	7/13/2003	60	A few trees reported down by 911 dispatch.
COUNTYWIDE	8/15/2003	60	Several trees and power lines reported down by utility company.
HAYESVILLE	5/22/2004	60	A few trees were reported down on Hinton Road.
HAYESVILLE	5/31/2004	65	Several trees were reported down across the county.
HAYESVILLE	6/12/2004	65	Numerous trees down at High Bridge Park in Hayesville.
COUNTYWIDE	7/5/2004	60	Trees were reported down across the county.
HAYESVILLE	7/26/2004	60	Two trees were reported down partially blocking a road three miles northeast of Hayesville.
HAYESVILLE	4/22/2005	65	A few trees and powerlines down in Hayesville area. Reported by a local newspaper.
HAYESVILLE	7/1/2005	55	A tree was reported down on Tusquittee Road and Downings Creek Road.
SHOOTING CREEK	7/1/2005	55	A tree was reported down across West Vineyard Road.
HAYESVILLE	8/5/2005	60	Two trees down near of Hayesville.
HAYESVILLE	8/5/2005	60	A few trees and powerlines down in western half of county. Reported by Blue Ridge Mountain Power Co.
SHOOTING CREEK	8/30/2005	60	A few trees down.
FIRES CREEK	5/27/2006	60	Several large trees, tree tops and limbs were downed across roads in Fires Creek.
HAYESVILLE	7/21/2006	60	A few trees were reported down near Hayesville.
SHOOTING CREEK	9/23/2006	60	Several trees were reported down on Shooting Creek Road.
HAYESVILLE	9/28/2006	60	Numerous trees and power lines were reported down across the county.
HAYESVILLE	8/3/2007	52	The North Carolina Department of Transportation reported several trees downed by thunderstorm winds near Hayesville.
HAYESVILLE	8/24/2007	55	The Blue Ridge Mountain Electric reported numerous trees and powerlines downed by thunderstorm winds countywide.
HAYESVILLE	5/10/2008	50	Several trees were reported down on power lines across the county. Reported by Blue Ridge Mountain EMC.
HAYESVILLE	5/10/2008	50	Tree limbs were reported down on Qualla Road. Reported by the county sheriff's office.
HAYESVILLE	6/28/2008	60	Power company reported numerous trees and powerlines downed by thunderstorm winds countywide.
HAYESVILLE	7/6/2008	55	A few trees were reported down near Hayesville.
HAYESVILLE	2/11/2009	55	The highway department reported a few trees downed by thunderstorm winds at Hayesville and the rest of the county as well.
FIRES CREEK	4/10/2009	55	Law enforcement personnel reported several trees downed by thunderstorm winds in the Fire Creek area.
FIRES CREEK	5/8/2009	55	A tree was reported down on Fires Creek Road.
HAYESVILLE	5/15/2009	50	A few trees were reported down from Pine Log to Hayesville.
HAYESVILLE	6/17/2009	60	Law enforcement personnel reported numerous trees downed by thunderstorm winds in Hayesville and countywide.
HAYESVILLE	6/17/2009	60	Law enforcement personnel reported numerous trees downed by thunderstorm winds from Hayesville to Shooting Creek and Chatuga Lake and old Highway 64.
HAYESVILLE	4/25/2010	52	Law enforcement personnel reported one tree downed by thunderstorm winds on Jarrett Road in Hayesville.
HAYESVILLE	6/21/2010	52	Law enforcement personnel reported 1 tree downed by thunderstorm winds southwest of Hayesville on Highway 175 near the Georgia border.

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	MPH	Description
HAYESVILLE	6/21/2010	55	The utility company personnel reported several trees and powerlines downed by thunderstorm winds in Hayesville.
HAYESVILLE	6/25/2010	50	Utility company personnel reported 1 tree and powerlines downed by thunderstorm winds in Hayesville.
TUSQUITEE	6/25/2010	52	The utility company personnel reported 1 tree and powerlines downed by thunderstorm winds in Tusquitee.
SHOOTING CREEK	6/25/2010	52	The utility company personnel reported 1 tree and powerlines downed by thunderstorm winds in Shooting Creek.
WARNE	8/13/2010	50	Law enforcement personnel reported several large limbs downed by thunderstorm winds on old Highway 64 near Warne.
SHOOTING CREEK	4/4/2011	52	Law enforcement personnel reported multiple trees downed by thunderstorm wind in along Highway 64 East northeast of Shooting Creek.
HAYESVILLE	6/15/2011	60	Law enforcement personnel reported numerous trees downed by thunderstorm wind in the Tusquittee Road and the Downings Creek Road areas near Hayesville.
HAYESVILLE	6/18/2011	55	Law enforcement personnel reported several trees downed by thunderstorm wind in Hayesville.
BRASSTOWN	6/19/2011	55	Law enforcement personnel reported several trees downed by thunderstorm wind in Brasstown.
HAYESVILLE	6/24/2011	52	Law enforcement personnel reported several trees downed by thunderstorm wind 3 miles east of Hayesville.
HAYESVILLE	4/17/2012	52	Newspaper personnel reported several trees downed by thunderstorm wind in Hayesville. A couple of the trees fell on houses.
SHOOTING CREEK	7/1/2012	50	A few trees were reported down approximately two miles east northeast of Shooting Creek.
SHOOTING CREEK	7/1/2012	50	Two trees were reported down.
HAYESVILLE	6/13/2013	50	Dispatch personnel reported 2 trees downed by thunderstorm wind across the county.
HAYESVILLE	4/28/2014	50	Law enforcement personnel reported 2 trees downed by thunderstorm wind in the Hayesville area.
HAYESVILLE	6/19/2014	50	Highway department personnel reported several trees downed by thunderstorm wind 7 miles east-northeast of Hayesville.
HAYESVILLE	7/8/2014	50	Trees were reported down near Hayesville.
SHOOTING CREEK	6/8/2015	50	One tree was reported down.
HAYESVILLE	6/24/2015	50	Two trees were reported down in the area.
SHOOTING CREEK	7/14/2015	50	Several trees were snapped and uprooted.
HAYESVILLE	3/21/2017	50	Several trees were reported down across the county.
FIRES CREEK	3/17/2018	65	Numerous large trees were downed and quarter size hail was reported three miles north of highway 64 on Fires Creek Road.
HAYESVILLE	3/17/2018	50	Several trees and power lines were reported down at Hayesville.
HAYESVILLE	5/31/2018	50	Several trees were reported down across the county.
HAYESVILLE	6/23/2018	50	Several trees were reported down across the county.
FIRES CREEK	6/25/2018	50	Several trees and power lines were reported down three miles west of Hayesville.
PINELOG	6/21/2019	50	Several trees were reported down.
SHOOTING CREEK	6/22/2019	50	Trees were reported down across the county.
WARNE	6/24/2019	50	Several trees were reported down.
HAYESVILLE	1/11/2020	60	Numerous trees were reported down.
HAYESVILLE	4/12/2020	55	Several trees were reported down near the intersection of Bristol Road and Fires Creek Road. The time was estimated from radar.
TUSQUITEE	6/15/2022	52	Several trees were blown down.

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	MPH	Description
HAYESVILLE	1/3/2023	52	A few trees were blown down.
HAYESVILLE	3/3/2023	52	Trees and power lines were blown down across the county.
SHOOTING CREEK	8/7/2023	52	Several trees and powerlines blown down by severe thunderstorm winds on Pounding Mill Terrace Road.
TUSQUITEE	8/12/2023	52	A few trees were blown down by powerful thunderstorm gusts.
SHOOTING CREEK	5/27/2024	52	A large tree was felled by severe thunderstorm wind gusts and landed on a trailer. The tree crushed an occupant within the trailer, resulting in a fatality.
WARNE	5/27/2024	52	A large tree was blown down by severe thunderstorm wind gusts, blocking egress from a structure.
HAYESVILLE	5/27/2024	52	Numerous trees were blown down by powerful thunderstorm wind gusts across the county.
HAYESVILLE	7/30/2024	52	Several trees and powerlines were blown down by powerful thunderstorm wind gusts.
WARNE	5/2/2025	61	Numerous reports of small hail during the storms. Severe thunderstorms also felled numerous trees in Warne, Shooting Creek, and Tusquittee.
HAYESVILLE	6/24/2025	52	Several trees blown down by powerful thunderstorm wind gusts.
Macon County			
KYLE	2/13/2000	55	Strong gradient winds ahead of an approaching squall line and cold front gusted from the south up to an estimated 60 mph. There were numerous reports of trees and power lines downed across Macon county. Severe thunderstorms then crossed the southwestern mountains of North Carolina, resulting in many more trees being blown down. Pea to dime size hail accompanied some of the thunderstorms as well.
FRANKLIN	2/13/2000	55	Strong gradient winds ahead of an approaching squall line and cold front gusted from the south up to an estimated 60 mph. There were numerous reports of trees and power lines downed across Macon county. Severe thunderstorms then crossed the southwestern mountains of North Carolina, resulting in many more trees being blown down. Pea to dime size hail accompanied some of the thunderstorms as well.
FRANKLIN	8/10/2000	50	Large trees were blown down across roads.
FRANKLIN	10/24/2001	50	Sheriff's Department reported trees and power lines down countywide -- starting in the west.
FRANKLIN	10/24/2001	50	Sheriff's Department reported trees and power lines blown down countywide -- reaching Franklin shortly after midnight. The wind blew the porch off a house at Mill Creek and left about 1000 customers without power.
HIGHLANDS	10/24/2001	50	Sheriff's Department reported trees and power lines blown down countywide -- reaching the higher mountains shortly after midnight.
HIGHLANDS	5/13/2002	50	Trees and powerlines were blown down.
FRANKLIN	7/1/2002	50	A few trees were blown down.
FRANKLIN	7/1/2002	50	Several trees were blown down on the north side of Franklin.
FRANKLIN	11/11/2002	50	A few trees were blown down.
FRANKLIN	5/2/2003	50	Several trees were blown down, One of which fell on a house.
FRANKLIN	7/13/2003	52	N/A
HIGHLANDS	7/22/2003	50	Trees were blown down on Main St.
HIGHLANDS	4/12/2004	50	A couple of large tree limbs were blown down.
FRANKLIN	5/31/2004	55	Numerous trees and power lines were blown down.
COUNTYWIDE	7/5/2004	60	Numerous trees were blown down.
FRANKLIN	7/17/2004	55	Numerous trees were blown down. At least two vehicles and 2 homes were damaged by falling trees.

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	MPH	Description
FRANKLIN	9/16/2004	65	A mobile home at the base of Fishhawk Mountain was destroyed in the Peeks Creek community. The home's resident was injured when debris from the collapsing home fell on him. At least one other home was damaged in the area.
COUNTYWIDE	2/21/2005	50	A few trees blown down in the northern part of the county.
RAINBOW SPGS	5/13/2006	50	Trees down along with some small hail.
FRANKLIN	6/22/2006	50	Several pine trees and large branches blown down, resulting in minor damage to a fence.
FRANKLIN	9/28/2006	50	A tree down on highway 28 north of Franklin, and another tree down just east of downtown.
FRANKLIN	6/14/2007	50	A tree was blown down north just north of Franklin, and another was downed south of town.
FRANKLIN	6/28/2007	50	A tree blown down on Burningtown Rd and another tree down on Bradley Creek Rd.
FRANKLIN	7/26/2007	55	Large trees blown down in the highway 28 area north of Franklin.
FRANKLIN	8/3/2007	55	Several trees and power lines blown down, some blocking roads.
COWEE	8/24/2007	50	Trees and large limbs down.
FRANKLIN	5/20/2008	50	Several trees snapped on Bailey Rd during a microburst.
COWEE	5/20/2008	50	Several trees blown down in the Cowee area.
AQUONE	6/11/2009	55	Numerous trees were blown down across the county.
CARTOOGECHAYE	8/13/2009	50	Three trees were blown down on highway 64 near county road 1442 about 4 miles southwest of Franklin.
FRANKLIN	4/25/2010	55	Several trees and power lines were blown down in and around the city, with one tree down on a home.
DEAN	5/28/2010	50	Trees were blown down in the Riverbend area north of Franklin.
LEATHERMAN	7/31/2010	50	Trees were blown down on Piney Grove Rd and on Leatherman Gap Rd. Trees were also blown down along highway 28 in the same general area.
FRANKLIN	8/13/2010	55	Numerous trees and power lines blown down west of the city of Franklin, from Old Murphy Rd, to Industrial Park Rd, to near the Wayah Rd, highway 64 intersection.
AQUONE	10/25/2010	55	Numerous trees were blown down across the north and west parts of the county.
FLATS	4/4/2011	55	Numerous trees and power lines were blown down across the county, with some trees on structures. Also, a door was blown off a hangar at the Macon County airport.
OTTO	6/2/2011	50	Numerous large tree limbs were blown down in the Otto area.
KYLE	6/15/2011	60	Numerous trees were blown down across the county.
ELLIJAY	6/19/2011	50	Multiple trees were blown down along highway 70 north of Marshall, including in the Walnut community.
BEECHERTOWN	6/19/2011	55	Multiple trees were blown down from the Nantahala community, to the Cowee community, to near the city of Franklin.
AQUONE	7/3/2011	50	A couple trees were blown down just east of Nantahala Lake.
BLOSSOMTOWN	3/2/2012	55	Numerous trees were blown down in the Nantahala Lake area.
FRANKLIN ARPT	3/2/2012	50	Several trees were blown down in the Franklin area.
KYLE	3/2/2012	50	Additional trees were blown down as a second severe thunderstorm moved over the Nantahala Lake area.
FRANKLIN	7/1/2012	55	Multiple trees were blown down across the county, particularly the central and eastern parts.
FRANKLIN	7/5/2012	55	Numerous trees were blown down across the county from north of Franklin to the Georgia border.
KYLE	1/30/2013	55	Multiple trees blown down, mainly across northern and western sections of the county, as a line of heavy rain showers and embedded thunderstorms moved across the county. Trees fell on two homes near Franklin.
FRANKLIN ARPT	5/22/2013	51	The AWOS at the Macon County airport measured a 59 mph gust.

APPENDIX H: NCEI STORM EVENT DATA

Location	Date	MPH	Description
CULLASAJA	6/26/2013	50	Multiple trees were blown down in the Cullasaja Gorge.
HIGHLANDS	6/8/2015	50	EM reported multiple trees blown down in the Highlands area.
FRANKLIN	7/14/2015	50	County comms reported trees blown down on Bryson City Rd and Depot St in the Franklin area.
BEECHERTOWN	7/7/2016	50	County comms reported a few trees blown down throughout the county, with one tree on a house.
ETNA	5/27/2017	50	County comms reported numerous trees blown down throughout Macon County.
WAYAH DEPOT	6/24/2018	50	County comms reported two trees blown down.
NORTON	6/24/2018	50	Law enforcement reported a few trees and power lines blown down near Otto.
BEECHERTOWN	6/26/2018	50	County comms reported numerous trees and power lines blown down across the county.
STILES	6/21/2019	50	County comms reported multiple trees blown down in the northern part of the county, with one tree blocking Highway 28.
BLOSSOMTOWN	1/11/2020	50	County comms reported multiple trees blown down across Macon County with one tree falling on a house in Franklin.
KYLE	6/17/2022	50	Emergency manager reported multiple trees blown down in the Nantahala National Forest.
FLATS	3/3/2023	50	County comms reported multiple trees blown down just north of the Kyle community.
FRANKLIN	3/3/2023	55	County comms reported numerous trees blown down in and around Franklin.
FRANKLIN	7/1/2023	50	Utility company reported multiple trees blown down on power lines in the Franklin area.
PRENTISS	7/2/2023	50	County comms reported trees blown down on roads north of Otto.
PRENTISS	7/18/2023	50	County comms reported a few trees blown down between the Franklin area and Highlands.
DEAN	8/7/2023	50	County comms reported several trees blown down around Franklin, including one that grazed a house on Rolling Hills Dr.
HIGHLANDS	8/7/2023	55	County comms reported numerous trees and power lines blown down around Highlands.
BLOSSOMTOWN	8/12/2023	50	County comms reported power lines blown down on a tree down on Nantahala Shores, a tree down on Camp Branch Rd, and another tree down on Wayah Rd.
FRANKLIN	9/7/2023	50	County comms reported a few trees and power lines blown down in the Franklin area.
AQUONE	5/26/2024	50	Public reported several trees blown down around Nantahala Lake.
CARTOOGECHAYE	5/27/2024	50	County comms reported a couple of trees blown down in the roadway along with a few power lines down.
HIGHLANDS	7/5/2024	50	County comms reported a tree blown down on Flat Mountain Rd north of Highlands and another tree down closer to town.

TABLE H.10: TORNADO EVENTS (1965-2025)

Location	Date	Scale	Description
Clay County			
Unincorporated Area	1/10/1965	F1	N/A
Unincorporated Area	12/25/1974	F1	N/A
Unincorporated Area	12/25/1974	F1	N/A
Unincorporated Area	2/25/1980	F0	N/A
HAYESVILLE	4/25/2010	EF1	The tornado began north of Hayesville as an EF0 rating with a maximum wind speed of 65 mph and a damage path of 20 yards. It strengthened to an EF1 rating with a maximum wind speed of 90 mph and a damage path of 60 yards. The tornado weakened to an EF0 rating with a maximum wind speed of 65 mph and a damage path of 10 yards before dissipating. The path length was 1.5 miles.
FIRES CREEK	3/17/2018	EF0	The tornado started approximately near Fires Creek Road and Barlow Fields Drive. This was a non-continuous track more than likely due to the terrain. There was extensive softwood tree damage noted with most trees uprooted. Many trees were snapped in the upper third of their trunks as well. Trees also fell on homes and vehicles along the track. The rear flank downdraft winds were impressive particularly along Lance Cove Road and Sweetwater Bend, just south of the Hiawassee River. The tornado weakened and ended near Poplar Cove just south of the Hiawassee River.
Macon County			
Unincorporated Area	2/18/1976	F1	N/A
Unincorporated Area	7/29/1976	F1	N/A
FRANKLIN	8/30/2005	F1	30 to 40 trees down in the area around Old Murphy Rd near Standing Indian Campground.
SEALY MTN	4/27/2011	EF0	An area of weak tornado damage began in the Dryman Ridge Rd area of Scaly Mountain. A mobile home was flipped and several trees were downed. The tornado appeared to lift briefly as it moved toward the north northeast, before touching down again briefly just north of highway 106, where the tops of several trees were snapped.

TABLE H.11: WINTER STORM EVENTS (2000-2025)

Date	Description
Clay County	
12/2/2000	Widespread snow fell across southwest North Carolina. Amounts averaged 1 to 2 inches in the valleys to 3 to 4 inches across the higher elevations.
12/18/2000	Widespread light snow fell across extreme southwest North Carolina. Amounts averaged between 1 and 3 inches.
1/1/2001	A strong upper level disturbance swept through the Tennessee Valley and southern Appalachians bringing a round of light snow to the area. Amounts were generally 1 inch or less.
1/20/2001	An area of low pressure moved northeast across the southern Appalachians, bringing light snow to the region. Amounts averaged from 1/2 inch to 2 inches.
3/20/2001	A low pressure system passing to the south and east of the southern Appalachians and Tennessee Valley dropped snow of varying depth. Around 12 inches fell on the highest elevations in Clay County. Little if any snow was reported elsewhere in Clay and Cherokee Counties.
1/5/2002	A winter storm brought only light amounts to extreme southwest North Carolina. Amounts averaged between a dusting and 1 inch.
1/16/2003	A storm system moved east from the Southern Plains across the Tennessee Valley of Alabama into the Southern Appalachians bringing snowfall totals ranging from 2 to 4 inches across Cherokee and Clay counties of extreme southwest North Carolina.
1/9/2004	Trace-1-inch snowfall
1/10/2025	Heavy snow followed by several hours of sleet and freezing rain led to a compaction of the snowpack. Observer took several samples before averaging and yielded 3.4 inches of snow and ice pack outside of Hayesville, NC.
Macon County	
12/18/2009	A strengthening area of low pressure moved out of the Gulf of Mexico, across southern Georgia, and then up the southeast coast. As the low passed south of the region, snow became heavy across the southern and central mountains, as well as the Smokies and surrounding valleys late in the morning. Heavy snow developed a little later over the northern mountains. The heavy snow continued throughout the afternoon. Snowfall rates of 1-2 inches per hour became common across the area during the afternoon. Meanwhile, warming temperatures allowed the snow to mix with and eventually change to rain and sleet in the southwest mountain valleys. The heavy, wet snow combined with gusty winds to cause numerous trees and power lines to fall across the area during the afternoon. Widespread power outages resulted, and some customers were without power for as much as a week. Even longer outages affected parts of the northern mountains. The snow ended over the Blue Ridge and the central mountains on the evening of the 18th. However, wrap around snow showers developed along the Tennessee line, resulting in additional snow accumulations overnight and into the morning hours of the 19th. Total accumulations ranged from 12-18 inches across the lower northern mountain valleys, to 2-3 feet in the higher elevations along the Tennessee border, and in areas along the eastern escarpment. Over the southern and central mountains, total accumulations ranged from 6-10 inches in the lower elevations near the southern escarpment, to as much as 2 feet in the higher elevations. While the southwest mountain valleys generally saw only 3-5 inches, 2-3 feet of total snowfall was reported in the higher elevations of the Smokies and along the Cherokee Skyway in Graham County. Hundreds of traffic accidents were reported during the storm, and continued for several days thereafter, as continuous melting and refreezing of ice and snow resulted in treacherous road conditions during the late night and morning hours. Hospitals reported 100s of cases and slips and falls during this time as well.
2/12/2014	A Miller type-A low pressure system moved up along the South Carolina coast bringing widespread heavy snow to the northern NC Piedmont, NC Foothills, and southern NC Mountains. Most areas saw 5-9 inches of snow with up to a foot in the higher elevations near the Blue Ridge Mountains.
2/16/2015	Sleet and snow overspread the mountains and foothills of North Carolina during the afternoon and began to accumulate. Precipitation changed quickly to sleet in most areas, before mixing with freezing rain from southwest to northeast during the late afternoon and early evening. Sleet and freezing caused deteriorating road conditions by early evening, when heavy accumulations of sleet and/or freezing rain were reported across much of the area. Most locations saw around a half inch to an inch of sleet, along with around a tenth of an inch of ice accretion. The valleys of southwest North Carolina saw more freezing rain than sleet, with about one quarter inch of ice reported. Scattered power outages were therefore more concentrated there. Meanwhile, the northern foothills saw mostly

APPENDIX H: NCEI STORM EVENT DATA

	sleet, with many areas reporting 2 to 3 inches of accumulation. Roads became very treacherous and impassable in many areas until melting began on the afternoon of the 17th.
2/23/2015	Light snow associated with a wave of low pressure overspread the southern Appalachians by late evening of the 23rd, and continued into the overnight. Snow, heavy at times, continued into the pre-dawn hours, when heavy snow accumulations were reported across much of the area. Total accumulations were generally in the 3 to 5 inch range, with locally higher amounts reported in the high elevations. The snow tapered off shortly after sunrise.
2/25/2015	After the significant snowfall that fell across the mountains on the morning of the 24th, an area of low pressure moving along the Gulf Coast spread yet another round of snow across the southern Appalachians during the evening of the 25th. The snow was heavy at times, and quickly accumulated. Heavy accumulations were reported in many areas by late evening. By the time the snow tapered off during the early morning of the 26th, total accumulations ranged from 4 to 6 inches, with locally higher amounts across the mountains.
1/22/2016	Light snow developed around midnight across the southwest mountains of North Carolina in association with an area of low pressure. The snow became moderate to heavy at times during the pre-dawn hours. By sunrise, accumulations of 2-6 inches were common across the area. Warm air began filtering into the valleys from the southwest through the morning, and by late morning, most of the Little Tennessee Valley and surrounding valleys south of the Smokies had transitioned to rain. Total accumulations ranged from 2-5 inches in the far southwest valleys, to more than a foot across the high elevations and the upper French Broad Valley, where the cold air remained in place through the day.
12/8/2017	As moisture associated with developing and strengthening low pressure over the northeast Gulf of Mexico overspread the western Carolinas, snow developed over the mountains of southwest North Carolina around daybreak on the 8th and quickly accumulated. By late morning, heavy snowfall accumulations were reported across the Smoky Mountains and Balsams and vicinity. Total accumulations generally ranged from 8-12 inches, with locally higher amounts well over a foot reported in the higher elevations, and lower amounts reported in the low valleys along the Tennessee border. While occasional flurries and light snow showers produced locally light additional accumulations into the early daylight hours of the 9th, the accumulating snow ended in most areas shortly after midnight.
1/10/2025	Moisture and lift associated with low pressure developing along the Gulf Coast overspread the Southeast and combined with cold surface high pressure to result in development of snow across the southern Blue Ridge escarpment during the morning of the 10th, continuing through the afternoon. The snow mixed with and briefly changed to sleet during the late afternoon and evening before ending. Total snow accumulations were generally 2-3 inches, with sleet accumulation of around 1/2 inch reported on top of the snow.

National Risk Index

August 21, 2025

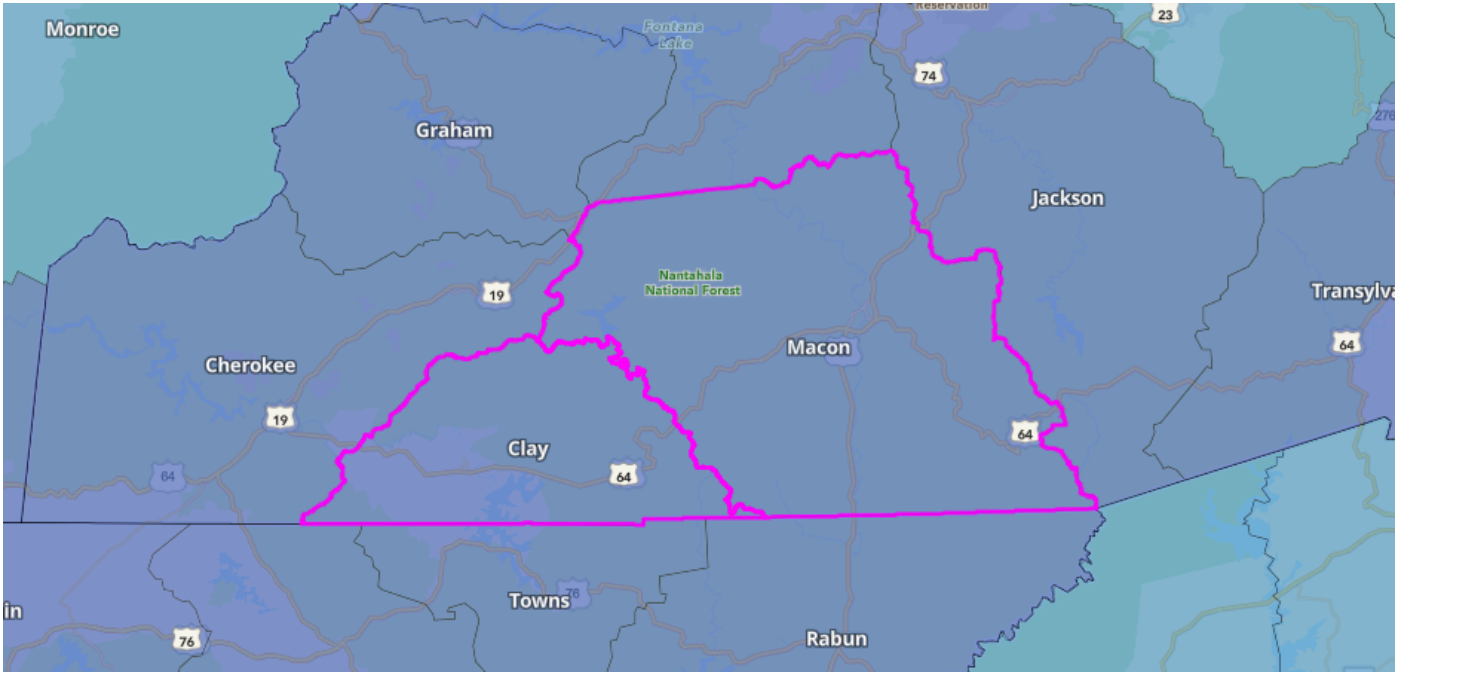
Risk Comparison Report

Use this report to determine how risk factors in selected communities compare to each other. Click a community name in any table below to open an individual risk profile report for that community and review its risk factors in more detail.

While reviewing this report, keep in mind that low risk is driven by lower loss due to natural hazards, lower social vulnerability, and higher community resilience.

For more information about the National Risk Index, its data, and how to interpret the information it provides, please review the **About the National Risk Index** and **How to Take Action** sections at the end of this report. Or, visit the National Risk Index website at hazards.fema.gov/nri/learn-more to access supporting documentation and links.

Risk Index



Risk Index Legend

Very High

Relatively High

Relatively Moderate

Relatively Low

Very Low

No Rating

Not Applicable

Insufficient Data

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Very Low	44.51	0 100
2	Clay County	NC	Very Low	7.57	0 100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$4,176,806	Relatively Moderate	Relatively Low	1.29	\$5,383,593	44.51
2	Clay County	NC	\$1,121,900	Relatively Moderate	Very Low	1.2	\$1,345,816	7.57

Hazard Type Risk Index

Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's relative risk for only that hazard type.

Avalanche

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
	Clay County	NC	Not Applicable		
	Macon County	NC	Not Applicable		

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
	Clay County	NC	N/A	Relatively Moderate	Very Low	1.2	N/A	N/A
	Macon County	NC	N/A	Relatively Moderate	Relatively Low	1.29	N/A	N/A

Coastal Flooding

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
	Clay County	NC	Not Applicable		
	Macon County	NC	Not Applicable		

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
	Clay County	NC	N/A	Relatively Moderate	Very Low	1.2	N/A	N/A
	Macon County	NC	N/A	Relatively Moderate	Relatively Low	1.29	N/A	N/A

Cold Wave

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively High	84.57	0  100
2	Clay County	NC	Relatively Low	46.99	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$380,934	Relatively Moderate	Relatively Low	1.29	\$497,647	84.57
2	Clay County	NC	\$42,989	Relatively Moderate	Very Low	1.2	\$51,855	46.99

Drought

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Clay County	NC	Very Low	37.35	0  100
2	Macon County	NC	Very Low	36.33	0  100

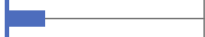
Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Clay County	NC	\$6,627	Relatively Moderate	Very Low	1.2	\$8,171	37.35
2	Macon County	NC	\$5,566	Relatively Moderate	Relatively Low	1.29	\$7,673	36.33

Earthquake

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Very Low	64.02	0  100
2	Clay County	NC	Very Low	40.5	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$263,629	Relatively Moderate	Relatively Low	1.29	\$337,994	64.02
2	Clay County	NC	\$68,953	Relatively Moderate	Very Low	1.2	\$85,434	40.5

Hail

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Clay County	NC	Very Low	19.41	0  100
2	Macon County	NC	Very Low	18.99	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Clay County	NC	\$18,362	Relatively Moderate	Very Low	1.2	\$21,924	19.41
2	Macon County	NC	\$16,395	Relatively Moderate	Relatively Low	1.29	\$21,409	18.99

Heat Wave

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
	Clay County	NC	No Rating	0	0  100
	Macon County	NC	No Rating	0	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
	Clay County	NC	\$0	Relatively Moderate	Very Low	1.2	\$0	0
	Macon County	NC	\$0	Relatively Moderate	Relatively Low	1.29	\$0	0

Hurricane

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Very Low	60.16	0  100
2	Clay County	NC	Very Low	30.06	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$408,921	Relatively Moderate	Relatively Low	1.29	\$513,541	60.16
2	Clay County	NC	\$38,053	Relatively Moderate	Very Low	1.2	\$45,253	30.06

Ice Storm

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively Moderate	80.01	0  100
2	Clay County	NC	Relatively Low	55.76	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$227,103	Relatively Moderate	Relatively Low	1.29	\$285,015	80.01
2	Clay County	NC	\$74,339	Relatively Moderate	Very Low	1.2	\$88,428	55.76

Landslide

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively High	94.8	0  100
2	Clay County	NC	Relatively Low	48.73	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$220,916	Relatively Moderate	Relatively Low	1.29	\$276,710	94.8
2	Clay County	NC	\$21,900	Relatively Moderate	Very Low	1.2	\$26,295	48.73

Lightning

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively Low	58.62	0  100
2	Clay County	NC	Relatively Low	33.82	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$109,287	Relatively Moderate	Relatively Low	1.29	\$139,380	58.62
2	Clay County	NC	\$53,549	Relatively Moderate	Very Low	1.2	\$64,702	33.82

Riverine Flooding

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively Low	61.44	0  100
2	Clay County	NC	Very Low	25.2	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$591,589	Relatively Moderate	Relatively Low	1.29	\$785,346	61.44
2	Clay County	NC	\$98,844	Relatively Moderate	Very Low	1.2	\$119,066	25.2

Strong Wind

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively Moderate	72.1	0  100
2	Clay County	NC	Relatively Low	28.35	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$585,154	Relatively Moderate	Relatively Low	1.29	\$755,096	72.1
2	Clay County	NC	\$146,978	Relatively Moderate	Very Low	1.2	\$175,749	28.35

Tornado

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively Low	58.42	0  100
2	Clay County	NC	Relatively Low	34.39	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$1,207,517	Relatively Moderate	Relatively Low	1.29	\$1,555,445	58.42
2	Clay County	NC	\$523,004	Relatively Moderate	Very Low	1.2	\$625,608	34.39

Tsunami

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
	Clay County	NC	Not Applicable		
	Macon County	NC	Not Applicable		

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
	Clay County	NC	N/A	Relatively Moderate	Very Low	1.2	N/A	N/A
	Macon County	NC	N/A	Relatively Moderate	Relatively Low	1.29	N/A	N/A

Volcanic Activity

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
	Clay County	NC	Not Applicable		
	Macon County	NC	Not Applicable		

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
	Clay County	NC	N/A	Relatively Moderate	Very Low	1.2	N/A	N/A
	Macon County	NC	N/A	Relatively Moderate	Relatively Low	1.29	N/A	N/A

Wildfire

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Very Low	37.77	0  100
2	Clay County	NC	Very Low	12.44	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$15,042	Relatively Moderate	Relatively Low	1.29	\$19,611	37.77
2	Clay County	NC	\$4,217	Relatively Moderate	Very Low	1.2	\$4,368	12.44

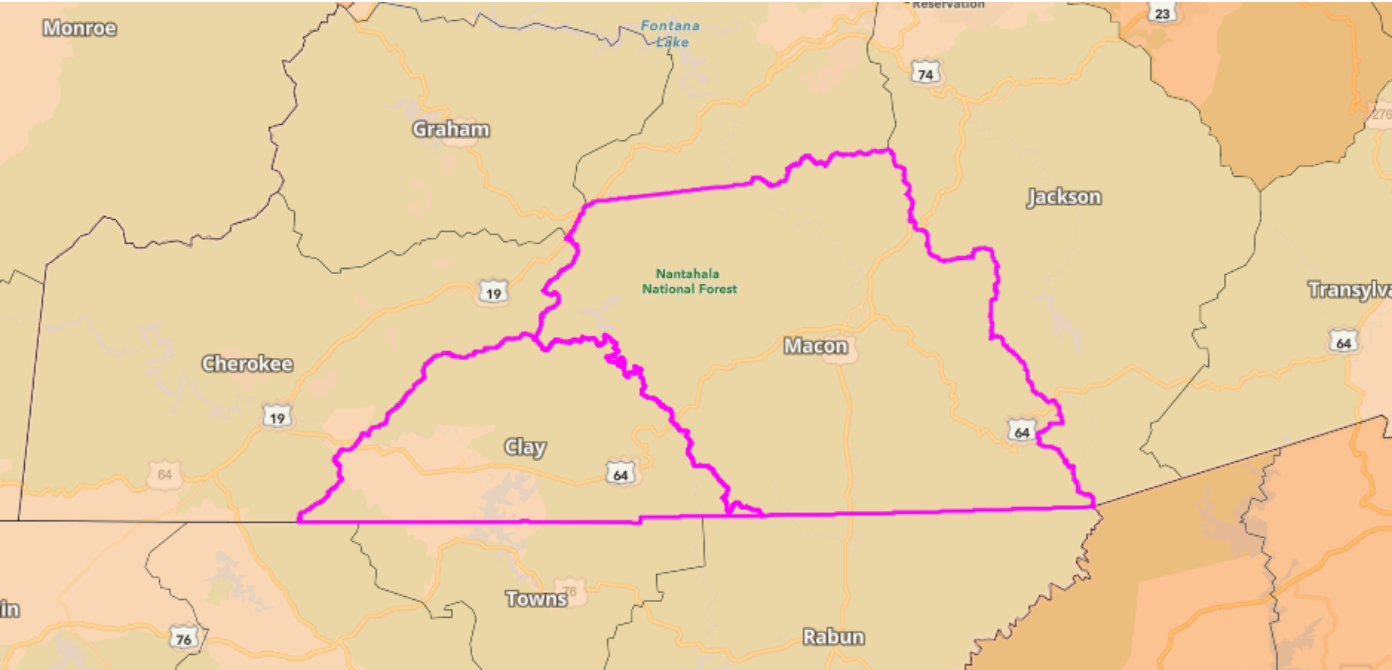
Winter Weather

Rank	Community	State	Risk Index Rating	Risk Index Score	National Percentile
1	Macon County	NC	Relatively Moderate	78.49	0  100
2	Clay County	NC	Relatively Low	32.61	0  100

Rank	Community	State	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
1	Macon County	NC	\$144,752	Relatively Moderate	Relatively Low	1.29	\$188,727	78.49
2	Clay County	NC	\$24,086	Relatively Moderate	Very Low	1.2	\$28,963	32.61

Expected Annual Loss

Expected Annual Loss measures the expected loss each year due to natural hazards.



Expected Annual Loss Legend

- Very High
- Relatively High
- Relatively Moderate
- Relatively Low
- Very Low
- No Expected Annual Losses
- Not Applicable
- Insufficient Data

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$4,176,806	40.08
2	Clay County	NC	\$1,121,900	7.64

Expected Annual Loss for Hazard Types

Expected Annual Loss scores for hazard types are calculated using data for only a single hazard type, and reflect a community's relative expected annual loss for only that hazard type.

Avalanche

Rank	Community	State	EAL Value	Score
	Clay County	NC	N/A	--
	Macon County	NC	N/A	--

Coastal Flooding

Rank	Community	State	EAL Value	Score
	Clay County	NC	N/A	--
	Macon County	NC	N/A	--

Cold Wave

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$380,934	82.7
2	Clay County	NC	\$42,989	48.0

Drought

Rank	Community	State	EAL Value	Score
1	Clay County	NC	\$6,627	37.7
2	Macon County	NC	\$5,566	36.2

Earthquake

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$263,629	61.3
2	Clay County	NC	\$68,953	39.2

Hail

Rank	Community	State	EAL Value	Score
1	Clay County	NC	\$18,362	20.8
2	Macon County	NC	\$16,395	19.4

Heat Wave

Rank	Community	State	EAL Value	Score
	Clay County	NC	\$0	0.0
	Macon County	NC	\$0	0.0

Hurricane

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$408,921	57.8
2	Clay County	NC	\$38,053	29.1

Ice Storm

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$227,103	78.4
2	Clay County	NC	\$74,339	54.9

Landslide

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$220,916	94.4
2	Clay County	NC	\$21,900	31.2

Lightning

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$109,287	57.0
2	Clay County	NC	\$53,549	33.8

Riverine Flooding

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$591,589	58.8
2	Clay County	NC	\$98,844	25.7

Strong Wind

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$585,154	70.0
2	Clay County	NC	\$146,978	30.3

Tornado

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$1,207,517	56.9
2	Clay County	NC	\$523,004	36.2

Tsunami

Rank	Community	State	EAL Value	Score
	Clay County	NC	N/A	--
	Macon County	NC	N/A	--

Volcanic Activity

Rank	Community	State	EAL Value	Score
	Clay County	NC	N/A	--
	Macon County	NC	N/A	--

Wildfire

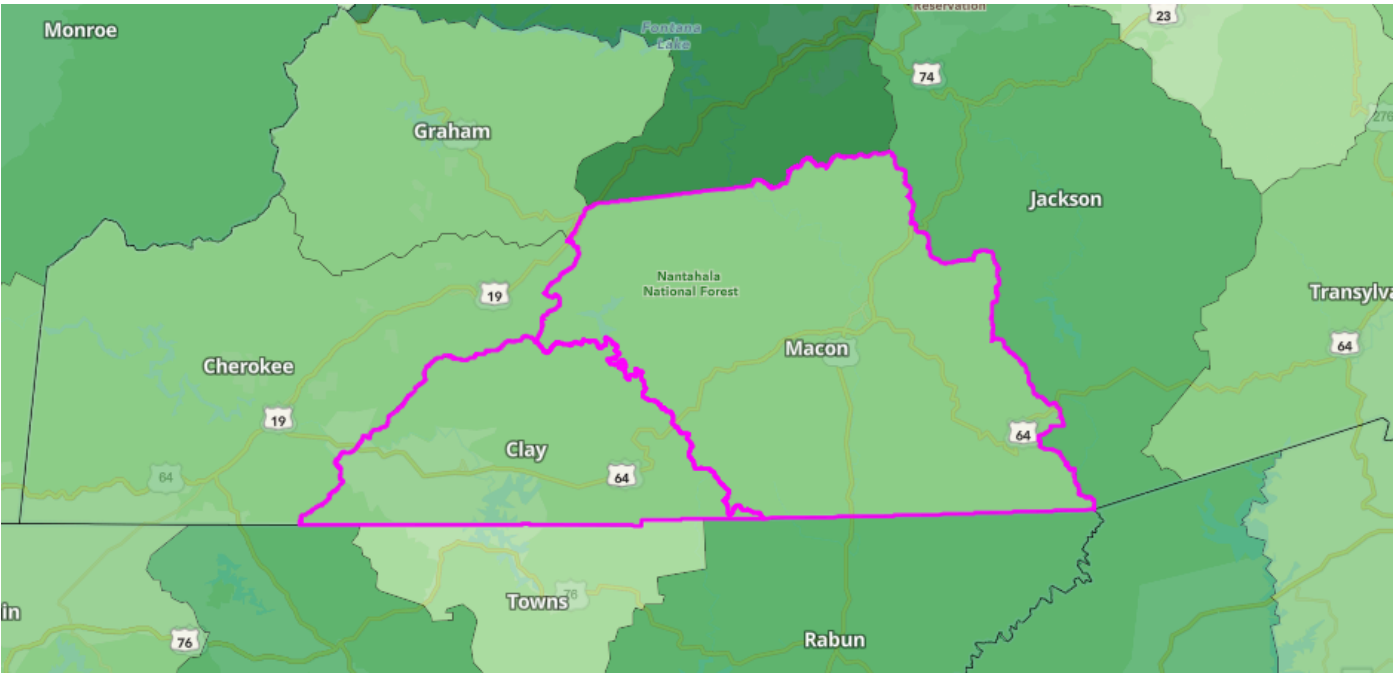
Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$15,042	34.8
2	Clay County	NC	\$4,217	13.7

Winter Weather

Rank	Community	State	EAL Value	Score
1	Macon County	NC	\$144,752	76.2
2	Clay County	NC	\$24,086	34.5

Social Vulnerability

Social Vulnerability measures the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood.



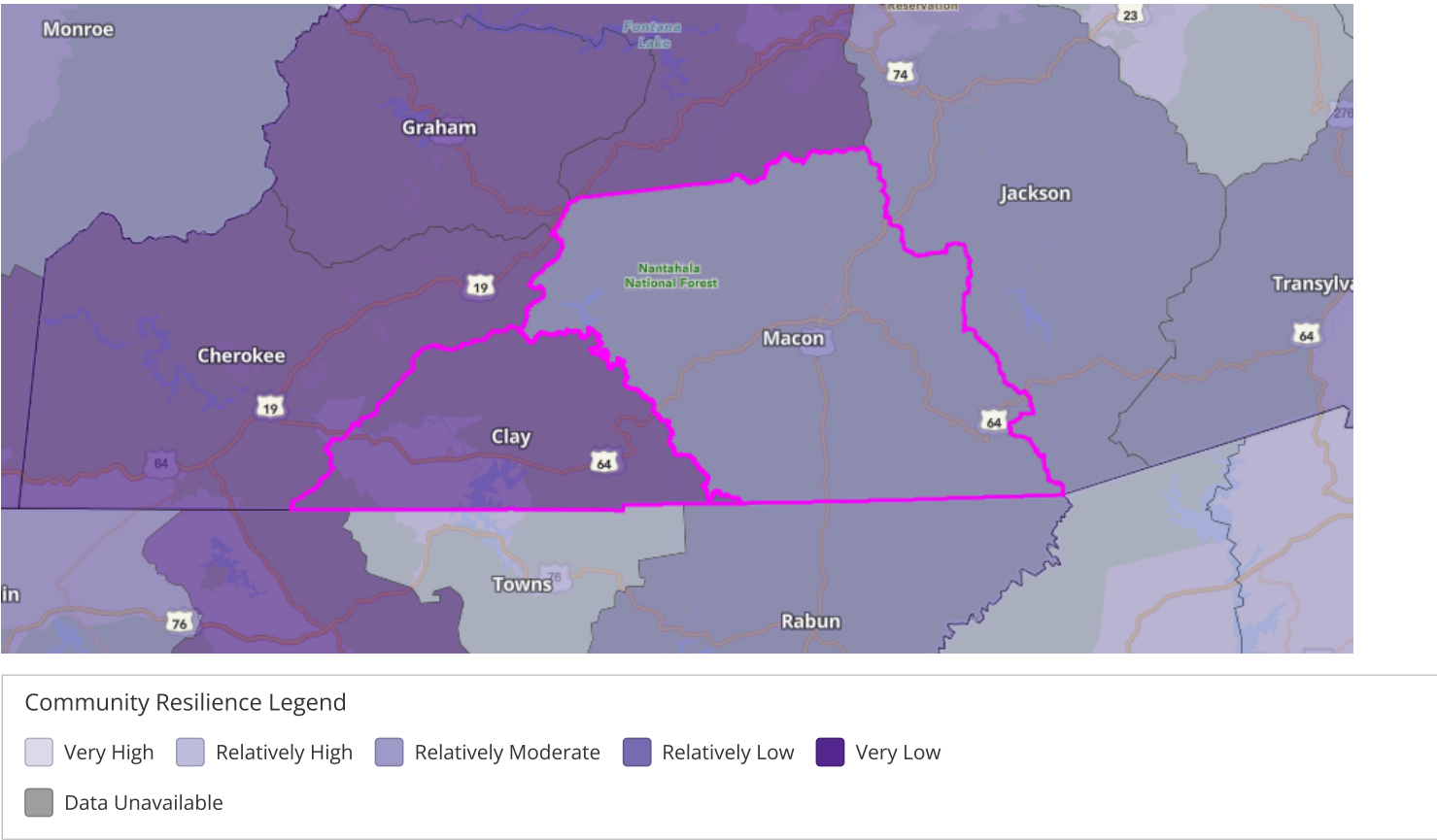
Social Vulnerability Legend

- Very High
- Relatively High
- Relatively Moderate
- Relatively Low
- Very Low
- Data Unavailable

Rank	Community	State	Rating	Score
1	Macon County	NC	Relatively Moderate	56.4
2	Clay County	NC	Relatively Moderate	48.5

Community Resilience

Community Resilience measures a County's ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.



Rank	Community	State	Rating	Score
1	Macon County	NC	Relatively Low	20.3
2	Clay County	NC	Very Low	3.8

About the National Risk Index

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather.

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and Census tract. These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Explore the National Risk Index Map at hazards.fema.gov/nri/map.

Visit the National Risk Index website at hazards.fema.gov/nri/learn-more to access supporting documentation and links.

Calculating the Risk Index

Risk Index values are calculated using an equation* that combines values for Expected Annual Loss (EAL) due to natural hazards, with the Community Risk Factor (CRF), which is a function of Social Vulnerability and Community Resilience:

$$\text{Risk Index} = \text{Expected Annual Loss} \times \text{Community Risk Factor}$$

$$\text{where Community Risk Factor} = f\left(\frac{\text{Social Vulnerability}}{\text{Community Resilience}}\right)$$

*County-level risk values are derived by summing the risk values of all Census tracts within that county.

Risk is presented as a composite value and score for all 18 hazard types, as well as individual values and scores for each hazard type.

For more information, visit hazards.fema.gov/nri/determining-risk.

Calculating Expected Annual Loss

Expected Annual Loss values are calculated using an equation* that combines values for exposure, annualized frequency, and historic loss ratios for 18 hazard types:

$$\text{Expected Annual Loss} = \text{Exposure} \times \text{Annualized Frequency} \times \text{Historic Loss Ratio}$$

*Excluding Avalanche, Drought, Earthquake, and Tornado, EAL values for each hazard are calculated at the Census block level and summed together to determine Census tract and county-level hazard type EAL values.

Expected Annual Loss is presented as a composite value and score for all 18 hazard types, as well as individual values and scores for each hazard type.

For more information, visit hazards.fema.gov/nri/expected-annual-loss.

Calculating Social Vulnerability

Social Vulnerability is measured using the Social Vulnerability Index (SVI) published by the Centers for Disease Control and Prevention (CDC).

For more information, visit hazards.fema.gov/nri/social-vulnerability.

Calculating Community Resilience

Community Resilience is measured at the County level using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).

For more information, visit hazards.fema.gov/nri/community-resilience.

Values, Scores, and Ratings

The National Risk Index provides three different types of results for Risk and each component used to derive Risk: EAL, Social Vulnerability, and Community Resilience:

Values. Values for Risk and EAL are in units of dollars, representing the community's average economic loss from natural hazards each year. For Social Vulnerability and Community Resilience, values are the index values for the community provided by the source data sets.

Scores. Scores represent the national percentile ranking of the community's component value compared to all other communities at the same level (county or Census tract).

Ratings. Ratings refer to the qualitative terms that describe the relative risk of an area within the same geographic level. These rating categories range from "Very Low" to "Very High". Ratings for Social Vulnerability and Community Resilience are based on quintiles of those components' scores, while Risk and EAL ratings are based on more advanced statistical calculations on values. As a result, there is no fixed range of scores or values that correspond to the rating categories.

How to Take Action

There are many ways to reduce natural hazard risk through mitigation. Communities with high National Risk Index scores can take action to reduce risk by decreasing Expected Annual Loss due to natural hazards, decreasing Social Vulnerability, and increasing Community Resilience.

For information about how to take action and reduce your risk, visit hazards.fema.gov/nri/take-action.

Disclaimer

The National Risk Index (the Risk Index or the Index) and its associated data are meant for planning purposes only. This tool was created for broad nationwide comparisons and is not a substitute for localized risk assessment analysis. Nationwide datasets used as inputs for the National Risk Index are, in many cases, not as accurate as available local data. Users with access to local data for each National Risk Index risk factor should consider substituting the Risk Index data with local data to recalculate a more accurate risk index. If you decide to download the National Risk Index data and substitute it with local data, you assume responsibility for the accuracy of the data and any resulting data index. Please visit the [Contact Us](#) page if you would like to discuss this process further.

The methodology used by the National Risk Index has been reviewed by subject matter experts in the fields of natural hazard risk research, risk analysis, mitigation planning, and emergency management. The processing methods used to create the National Risk Index have produced results similar to those from other natural hazard risk analyses conducted on a smaller scale. The breadth and combination of geographic information systems (GIS) and data processing techniques leveraged by the National Risk Index enable it to incorporate multiple hazard types and risk factors, manage its nationwide scope, and capture what might have been missed using other methods.

The National Risk Index does not consider the intricate economic and physical interdependencies that exist across geographic regions. Keep in mind that hazard impacts in surrounding counties or Census tracts can cause indirect losses in your community regardless of your community's risk profile.

Nationwide data available for some risk factors are rudimentary at this time. The risk profiles for the vast majority of hazard types are based on historical frequency and loss data. They represent risk and expected annual loss based on average past conditions, not future predictions. The National Risk Index will be continuously updated as new data become available and improved methodologies are identified.

For comprehensive details about how the Risk Index can help you and its limitations, see the [National Risk Index Technical Documentation](#)

Assumption of Risk

In view of the identified limitations of the National Risk Index associated data, by using the data, you acknowledge and agree that FEMA makes no representations or warranties about the accuracy, completeness, or fitness for any particular purpose of the data; that the data is provided "as is" without warranty of any kind; that you assume full responsibility for any consequences that may arise, including financial losses, legal disputes, or other adverse outcomes; and that you release FEMA and the federal government from any liability that may arise to the extent allowable by law.

Attribution, No Endorsement

Please attribute your use of the National Risk Index and its associated data to the Federal Emergency Management Agency.

However, you acknowledge and agree that nothing herein constitutes and endorsement of you or your work by FEMA or the federal government, and you shall not imply through use of the National Risk Index or its associated data or through providing attribution, that FEMA or the federal government endorses you.

Preferred citation for the National Risk Index:

Zuzak, C., E. Goodenough, C. Stanton, M. Mowrer, A. Sheehan, B. Roberts, P. McGuire, and J. Rozelle. 2023. National Risk Index Technical Documentation. Federal Emergency Management Agency, Washington, DC.

The National Risk Index Contact Us page is available at hazards.fema.gov/nri/contact-us.

Appendix J:

Regional Post-Helene Report

Event Summary

Hurricane Helene caused massive devastation across Clay County, Macon County, and all other counties of Western North Carolina. The hurricane, classified as a Category 4 at its peak, made landfall in Florida on September 26, 2024, and subsequently brought record-breaking rainfall to Western North Carolina, resulting in catastrophic flooding (e.g., 1,000-year or 0.1% annual chance floods) and massive landslides¹. Direct hazard impacts from this event included severe flooding, widespread geological destabilization (e.g., landslides, mudslides, and erosion), disruptions to various community networks, and increased wildfire fuel loads in the aftermath, making it one of the deadliest and costliest storms in history. Intense rainfall of the storm led to extreme overflows of riverine systems, exacerbating historic flooding across multiple communities, damaging homes and infrastructure, and disrupting power and communications for extended periods. The storm resulted in at least 107 reported fatalities and total damages in excess of \$59 billion in North Carolina².

- **Key Event Numbers:**
 - **140+ miles per hour** maximum sustained winds (Category 4)
 - **92+ miles per hour** peak wind gusts in North Carolina (Category 1)
 - **31.33+ inches** 3-day total rainfall peak (recorded at NCFS RAWs station in Busick, NC)
 - **\$78+ billion** damage nationwide
 - **\$59+ billion** damage in North Carolina
 - **250+ fatalities** nationwide
 - **107+ fatalities** in North Carolina³
 - **0** in Clay County
 - **2** in Macon County
 - **1+ million** residents without power in North Carolina
 - **125,000+ housing units** damaged or destroyed in North Carolina
 - **822,000+ acres** of timberland damaged in North Carolina

¹ National Weather Service (<https://www.weather.gov/ilm/Helene2024>) and North Carolina State Climate Office (<https://climate.ncsu.edu/blog/2024/09/rapid-reaction-historic-flooding-follows-helene-in-western-nc/>)

² National Weather Service (https://www.nhc.noaa.gov/data/tcr/AL092024_Helene.pdf) and North Carolina Office of State Budget and Management (<https://www.osbm.nc.gov/hurricane-helene-dna/open>)

³ North Carolina Department of Health and Human Services (<https://www.ncdhhs.gov/assistance/disaster-preparation-and-recovery/hurricane-helene-recovery-resources>)

Impact Assessment & Response

Many regional jurisdictions in Western North Carolina faced immediate challenges in securing essential supplies, restoring community services/infrastructure, and continuing evacuations following Helene. Emergency support services were activated at all levels, along with a large influx of community-based support, to provide shelter, supplies, critical services, and other forms of assistance. Following the immediate response effort, recovery funding requests and programs across the federal, state, regional, and local levels have continued to move forward.

FEMA Disaster Declaration (2024)

FIGURE J.1: HELENE DISASTER DECLARATION (FEMA, 2024)

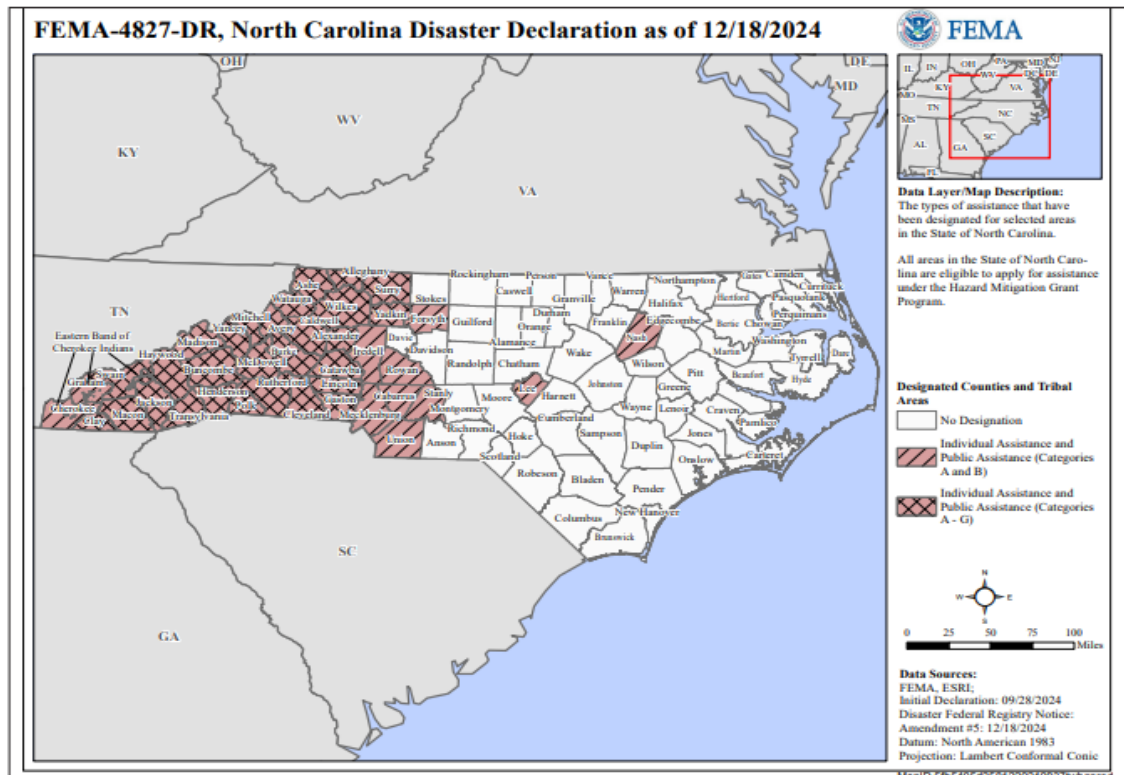


Figure 3: A map of Designated Counties and Tribal Areas in North Carolina for DR-4827 NC.

- The Federal Emergency Management Agency (FEMA) declared Tropical Storm Helene a major disaster in North Carolina as of September 28, 2024⁴. The declaration page outlines the federal assistance available for disaster recovery efforts. The declaration covers areas in 39 counties (including Clay County and Macon County, as shown in **Figure J.1**).
- Disaster funding obligations published by FEMA as of April 2026 include:
 - Individual Assistance
 - **Total Housing Assistance (HA) - Dollars Approved:** \$291,687,622.26
 - **Total Other Needs Assistance (ONA) - Dollars Approved:** \$272,883,043.09
 - **Total Individuals & Households Program - Dollars Approved:** \$564,570,665.35
 - **Individual Assistance Applications Approved:** 161,023
 - Public Assistance

⁴ FEMA Disaster Declaration DR-4827-NC (<https://www.fema.gov/disaster/4827>)

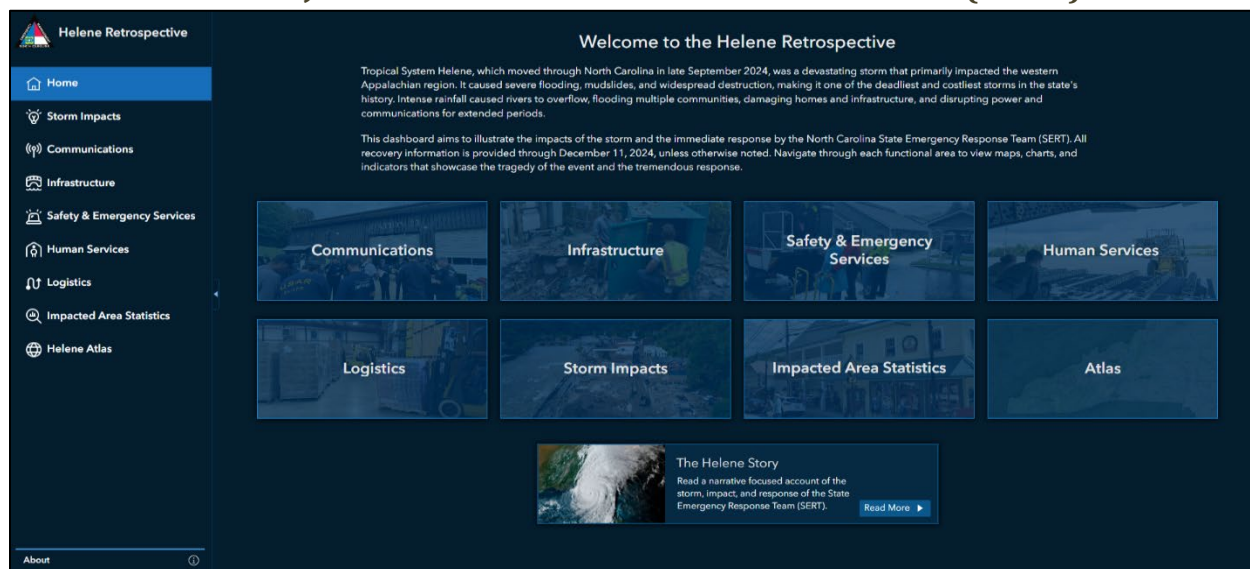
- **Emergency Work (Categories A-B) - Dollars Obligated:** \$870,173,795.64
- **Permanent Work (Categories C-G) - Dollars Obligated:** \$710,475,820.04
- **Total Public Assistance Grants - Dollars Obligated:** \$1,617,772,644.97
 - **Hazard Mitigation Assistance**
 - **Hazard Mitigation Grant Program (HMGP) - Dollars Obligated:** \$93,450,776.86
- Disaster resources published by FEMA as of April 2026 include:
 - **Disaster Assistance:** <http://www.disasterassistance.gov/>
 - **Housing Assistance:** <https://www.fema.gov/fact-sheet/direct-temporary-housing-assistance-0>
 - **U.S. Army Corps of Engineers (USACE) Debris Removal Assistance:** <https://www.fema.gov/fact-sheet/debris-clearance-and-removal>
 - **Volunteer and Donate:** <https://www.fema.gov/disasters/volunteer-donate> and <https://www.nvoad.org/volunteer/>

Helene Damage and Needs Assessment (2024)

- More information regarding assessed damages and needs in the aftermath of Helene is available through the North Carolina Office of State Budget and Management (OSBM)⁵. Updates on funding requests and quarterly reports continue to be published as recovery efforts continue.

Helene Retrospective Dashboard & StoryMap (2024-2025)

FIGURE J.2: HELENE RETROSPECTIVE DASHBOARD (NCEM)



Source: North Carolina Emergency Management (NCEM)

- More information regarding assistance programs, support numbers, and additional resources is available through the North Carolina Department of Public Safety (NCDPS) and North Carolina Emergency Management (NCEM)⁶.

⁵ North Carolina Office of State Budget and Management (<https://www.osbm.nc.gov/budget/hurricane-helene-damage-needs-assessment>)

⁶ North Carolina Department of Public Safety (<https://www.ncdps.gov/our-organization/emergency-management/tropical-storm-helene>)

- The *Helene Retrospective* dashboard (**Figure J.2**), published by the North Carolina State Emergency Response Team (SERT), provides an interactive overview of Helene’s impacts and the subsequent actions of SERT⁷. It consolidates storm damage, flooding effects, and response activities into maps, charts, and key indicators, helping users understand the scale of the disaster and evaluate the state’s immediate response efforts as recorded through December 11, 2024.
 - **Table J.1** below provides an impact comparison between Clay County and Macon County based on the dashboard data. An example of flooding in Macon County during the event is shown in **Figure J.3**.
- A comprehensive StoryMap developed by NCEM detailing the event timeframe, impacts, and community responses is also publicly available⁸.

TABLE J.1: HELENE IMPACTS COMPARISON BY COUNTY

Impact Type	Clay County	Macon County
County Rainfall Totals	8 inches	15 inches
Peak Streamgage Stage	N/A	15.52 inches (Cullasaja River)
Total Structures Damaged or Destroyed	29	677
Total Welfare Checks	9	40
Sheltered Population ⁹	30	514
Identified Hazard Locations	0	2

Source: *Helene Retrospective Dashboard*

FIGURE J.3: FLOODING IN MACON COUNTY



Source: *Smoky Mountain News*, Photo by Bob Scott, 2024

⁷ NCEM *Helene Retrospective Dashboard*

(<https://experience.arcgis.com/experience/7892f669bb0e442981b15009c7f2b5f0/page/Helene-Retrospective?views=Home>)

⁸ NCEM *Tropical Storm Helene StoryMap* (<https://storymaps.arcgis.com/stories/e8b069fa5bab418db1e64b032e920550>)

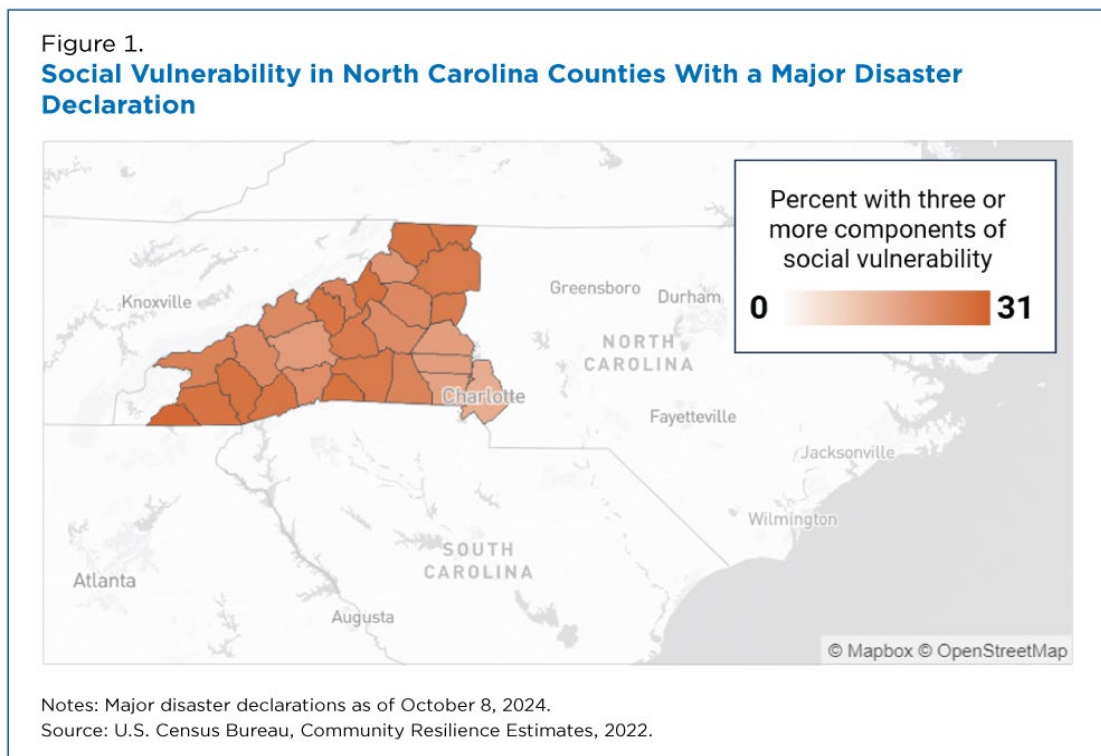
⁹ Clay County had 1 non-state shelter listed for this population. Macon County had 1 non-state shelter listed for this population.

Social Vulnerability

Social vulnerability, defined by FEMA as “the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood,” is an important determinant of subpopulations that may face the greatest risk of hazards due to various compounding factors. Key categorical factors of social vulnerability may include socioeconomic status, household characteristics, racial and ethnic minority status, and housing type/transportation.

- As of 2025, the FEMA National Risk Index (NRI) rates social vulnerability in Clay County as 95.17 on a scale of 0 (lowest) to 100 (highest) points compared to 73.73 for Macon County¹⁰.
- **Figure J.4** illustrates the distribution of social vulnerability across North Carolina counties that received a major disaster declaration¹¹. The map highlights counties shaded in varying tones of orange, representing the percentage of residents exhibiting 3 or more components of social vulnerability, based on U.S. Census Bureau Community Resilience Estimates. Darker shades correspond to higher concentrations of socially vulnerable populations, indicating communities that may face greater challenges in disaster preparedness, response, and recovery.
- **Figures J.5 and J.6** show the 2022 Social Vulnerability Index¹² of Clay/Macon County.

FIGURE J.4: SOCIAL VULNERABILITY OF DISASTER COUNTIES (U.S. CENSUS)



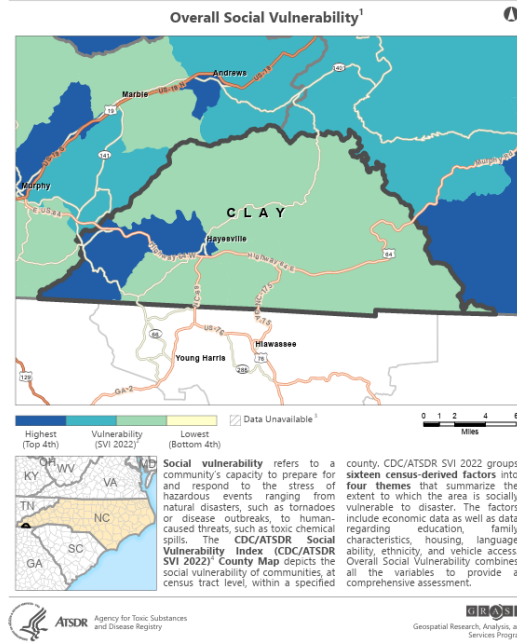
¹⁰ FEMA National Risk Index (NRI) datasets are now housed within the Resilience Analysis and Planning Tool (RAPT) (<https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>)

¹¹ U.S. Census Bureau (<https://www.census.gov/library/stories/2024/10/hurricane-helene.html>)

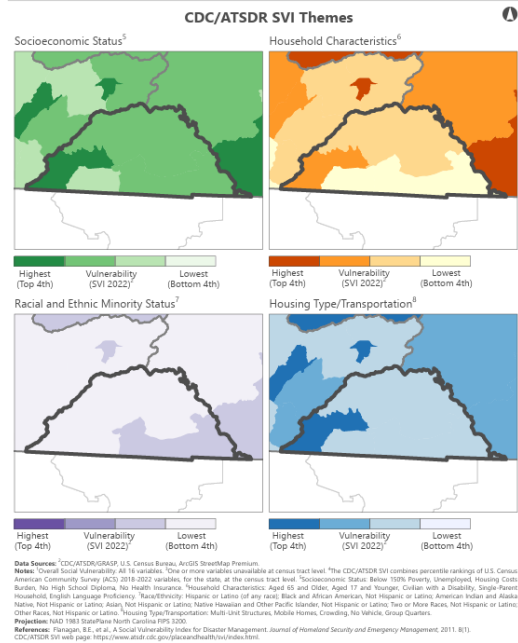
¹² Centers for Disease Control and Prevention (<https://www.atsdr.cdc.gov/place-health/php/svi/index.html>)

FIGURE J.5: SOCIAL VULNERABILITY INDEX OF CLAY COUNTY (CDC, 2022)

CDC/ATSDR Social Vulnerability Index 2022
CLAY COUNTY, NORTH CAROLINA



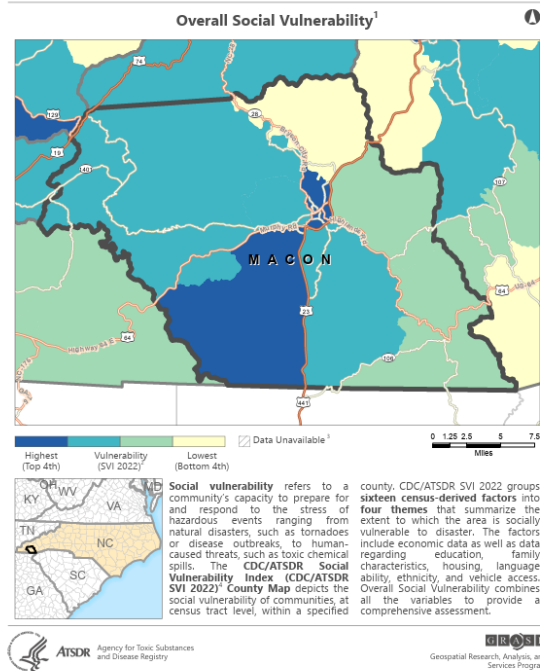
CDC/ATSDR SVI 2022 – CLAY COUNTY, NORTH CAROLINA



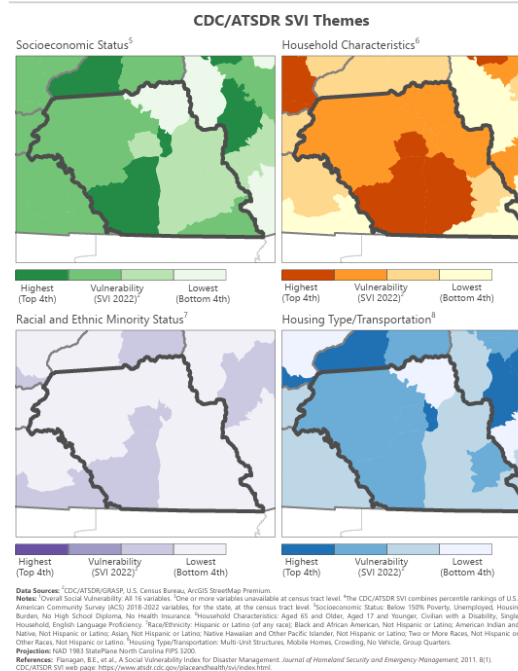
Source: Centers for Disease Control and Prevention

FIGURE J.6: SOCIAL VULNERABILITY INDEX OF MACON COUNTY (CDC, 2022)

CDC/ATSDR Social Vulnerability Index 2022
MACON COUNTY, NORTH CAROLINA



CDC/ATSDR SVI 2022 – MACON COUNTY, NORTH CAROLINA



Source: Centers for Disease Control and Prevention

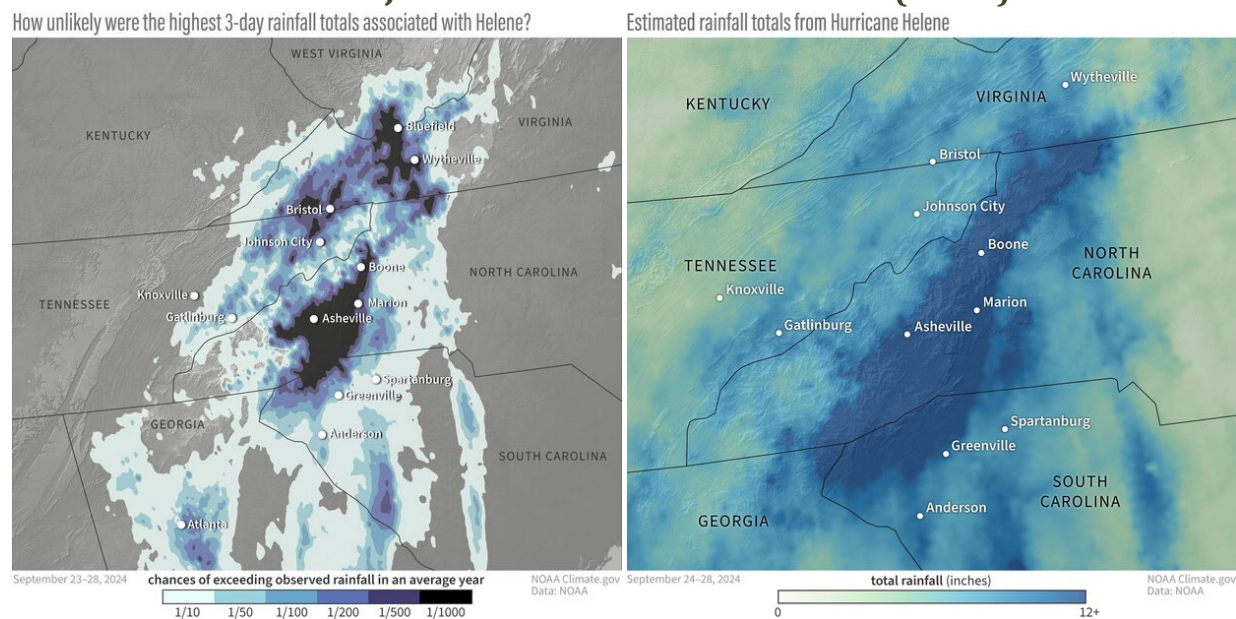
Hazard Vulnerability

Key natural hazards of concern in the wake of Helene include (1) flooding, (2) landslides, and (3) wildfires. Many floods caused by this event were considered record-breaking and surpassed the 500-year (0.2% annual chance) floodplain as 1,000-year (0.1% annual chance) or greater floods. Severe landslides were also widespread across Western North Carolina before, during, and after the storm as slopes, soils, and vegetation became increasingly destabilized. Both hazards irreversibly altered the regional landscape and created new hydrological and topological conditions that may ultimately affect how future hazard risks develop. Huge swaths of damaged vegetation across the Southeast U.S. have also increased the risk of wildfires, as decaying organic matter continues to dry out and become fuel. Other hazards, such as supply chain disruptions, hazardous substances exposure, and environmental degradation, are additional regional considerations of importance as disaster-affected areas continue to rebuild for the future.

Flooding

Figures J.7 and J.8 below detail the extreme extent of regional rainfall and flooding during Helene. Rainfall around Asheville and other jurisdictions was considered a 1-in-1,000-year event and directly contributed to a similarly extreme extent of flooding as determined by high-water marks, streamgages, and other sources. More information about the impacts of rainfall and flooding from the event is available in published resources from the National Oceanic and Atmospheric Administration (NOAA)¹³.

FIGURE J.7: HELENE EXTREME RAINFALL (NOAA)

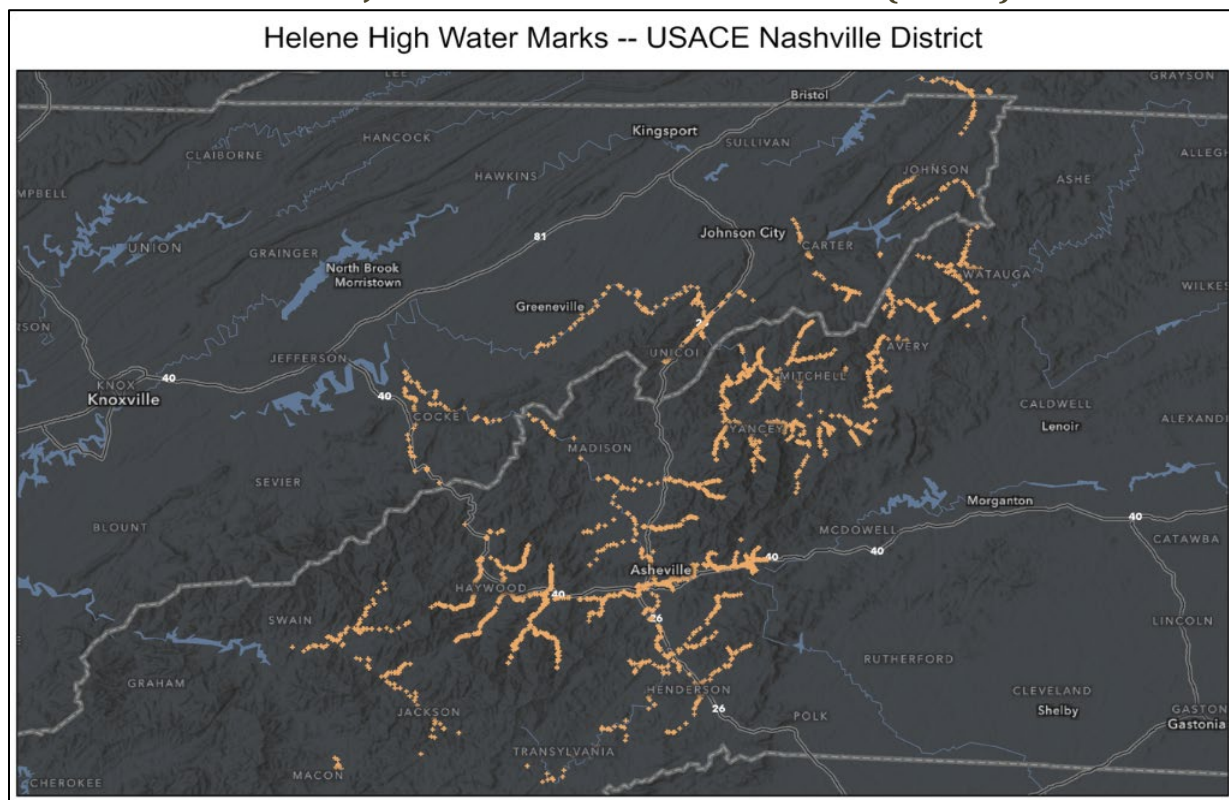


Source: NOAA Climate.gov

¹³ NOAA *Helene in Southern Appalachia* StoryMap

(<https://storymaps.arcgis.com/stories/8887acbd2dbd4d28a68e79fe53cbfaa3>) and NOAA Climate.gov

(<https://www.climate.gov/news-features/event-tracker/hurricane-helene-extreme-rainfall-and-catastrophic-inland-flooding>)

FIGURE J.8: HELENE HIGH WATER MARKS (USACE)

Source: USACE, NOAA

Flooding hazards of various types (e.g., riverine, flash, and urban) remain a significant risk throughout the Clay Macon Region and should be planned for accordingly through continued assessment of risks and implementation of feasible mitigation actions and projects.

Landslides

The U.S. Geological Survey's (USGS) landslide hazard estimate data for Hurricane Helene (**Figure J.9**) shows that Clay and Macon counties were located within corridors of high risk for storm-triggered landslides in Western North Carolina. The map illustrates a dense band of high-hazard zones stretching through parts of both counties. This region's steep slopes, saturated soils, and extensive rainfall during Helene created ideal conditions for slope failures, increasing the probability of landslides capable of damaging homes, blocking roadways, and isolating rural communities. More information about the impacts of landslides from the event is available in published resources from the U.S. Geological Survey (USGS)¹⁴.

¹⁴ USGS Hurricane Helene's Deadly Landslide Legacy (<https://www.usgs.gov/news/featured-story/hurricane-helenes-deadly-landslide-legacy>) and USGS Hurricane Helene Landslide Observations Inventory (<https://www.arcgis.com/apps/dashboards/01b4f51fc0b64002bf7722a9acfc181d>)

FIGURE J.9: HELENE LANDSLIDE HAZARD ESTIMATE (USGS)

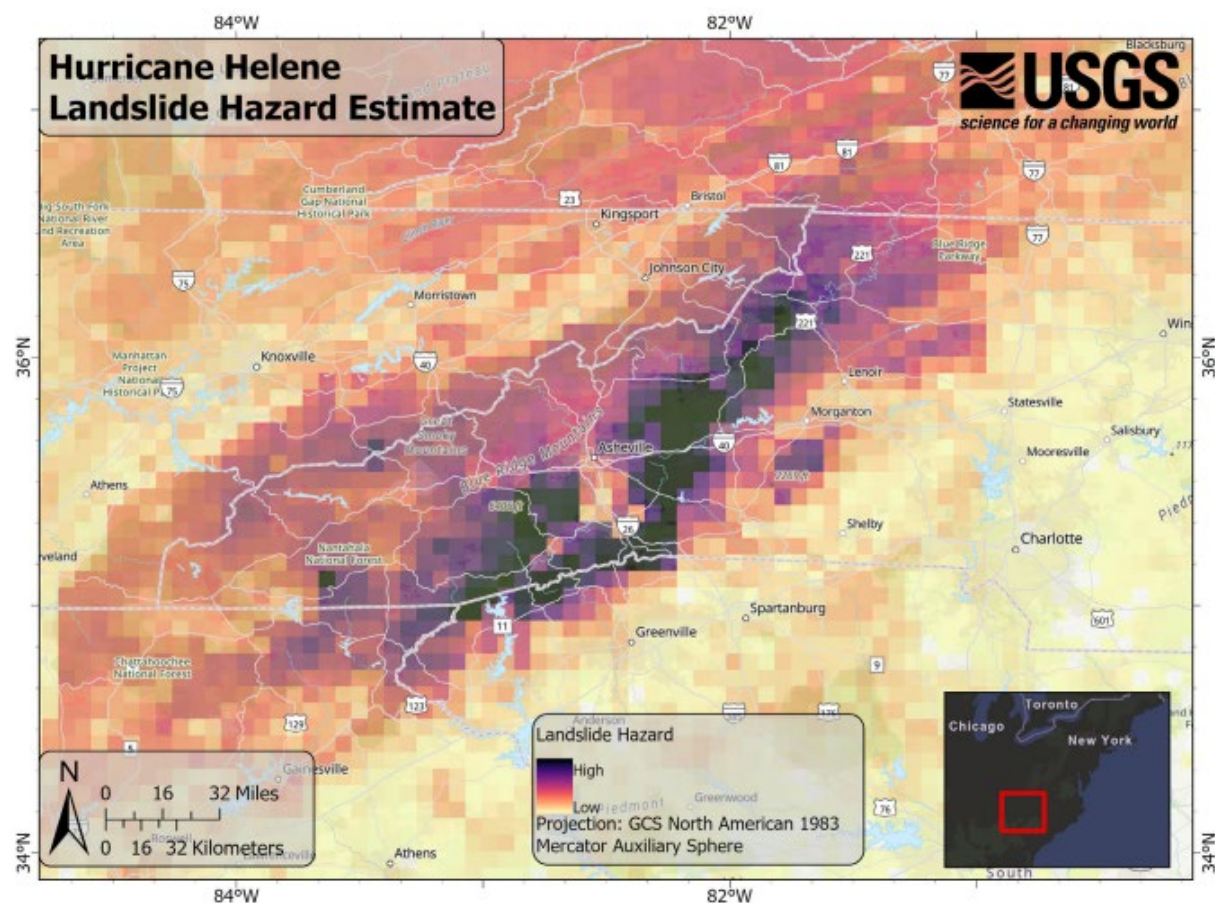


Figure 6: U.S. Geological Survey Hurricane Helen Landslide Hazard Estimate.

Source: USGS

For both counties, the widespread high-risk designations indicate that landslides posed a major threat to transportation access, emergency response, and long-term recovery, compounding the storm's already significant impacts on housing, utilities, and community safety. Landslide hazards remain a significant risk throughout the Clay Macon Region and should be planned for accordingly through continued assessment of risks and implementation of feasible mitigation actions and projects.

Wildfires

A limited extent of trees was knocked down in the Clay Macon Region compared to other counties during Helene, resulting in some level of ecological damage. Tree losses of any magnitude near the region may significantly increase the likelihood of more intense fire seasons in the coming years, both in scale and severity, due to the accumulation of downed timber and debris that now serve as abundant fuel sources. Additionally, the North Carolina Forest Service notes that Helene debris could influence fire risks for the next 10-20 years based on current estimates. More information about the impacts of wildfires from the event is available in published resources from the Southern Fire Exchange (SFE)¹⁵.

¹⁵ Southern Fire Exchange, *Resources for Understanding Hurricane Helene Impacts on Prescribed Fire and Wildfire* (<https://southernfireexchange.org/resources-for-understanding-hurricane-helene-impacts-on-prescribed-fire-and-wildfire/>)

Wildfire hazards remain a significant risk throughout the Clay Macon Region and should be planned for accordingly through continued assessment of risks and implementation of feasible mitigation actions and projects.

Other Hazards

Other hazards of concern related to the impacts of Helene include the following:

1. **Critical facilities/services access** continues to be restored as quickly as possible, although regional capacity remains diminished compared to pre-Helene facilities and operations.
2. **Regional supply chain disruptions** were widespread, and some networks may need additional time, resources, and/or planning to reestablish or reroute logistics for critical dependencies.
3. **Additional geological hazards** (e.g., sinkholes, soil erosion, and land subsidence) were observed at various points and may present future risks to people and property.
4. **Exposure to hazardous substances** remains a risk as large quantities of chemicals, heavy metals, fuels, sewage, and other debris have entered waterways and spilled from industrial sites.
5. **Environmental degradation** following the storm has led to significant challenges regarding regional habitat damage/loss, pollution, and long-term ecological stability.

Future Restoration & Resilience



Restoration work remains ongoing across communities of the Clay Macon Region and broader areas of Western North Carolina at the time of this plan update to ensure greater stability, hazard mitigation, and community resilience in the context of an increasingly uncertain future. Online resources related to response, restoration, and recovery efforts are shared below. As development of this plan continues along with the region, these findings and resources will be revisited by the Regional Hazard Mitigation Planning Committee in future updates.

Helene Recovery Resources

- Federal
 - **FEMA:** <https://www.fema.gov/disaster/current/hurricane-helene>
 - FEMA Disaster Declaration: <https://www.fema.gov/disaster/4827>
 - **USDA:** <https://www.usda.gov/hurricane-helene>
 - **NOAA StoryMap:** <https://storymaps.arcgis.com/stories/8887acbd2dbd4d28a68e79fe53cbfaa3>
- State
 - **WNC Recovery Hub:** <https://www.wncrecovery.nc.gov/resources/recovery-resources>
 - **NC DPS:** <https://www.ncdps.gov/our-organization/emergency-management/tropical-storm-helene>
 - NCEM Helene Retrospective Dashboard: <https://experience.arcgis.com/experience/7892f669bb0e442981b15009c7f2b5f0/page/Helene-Retrospective?views=Home>
 - **NC State Climate Office Resources:** <https://climate.ncsu.edu/heleneresources/>
 - **NCDEQ:** <https://www.deq.nc.gov/news/key-issues/storm-season/hurricane-helene-response>
 - **NCDOI:** <https://www.ncdoi.gov/hurricane-helene-response-and-recovery#DisasterResources-3184>
 - **UNC:** <https://www.sog.unc.edu/resources/microsites/nc-emergency-management/hurricane-helene-resources>
- Regional
 - **ARC:** <https://www.arc.gov/hurricane-helene-resources/>

Appendix K:

Mountain Camp Dam HHPD Report

This section of the plan includes additional risk and vulnerability information related to Mountain Camp Dam (MACON-047) and multiple other dams classified as “*high hazard*” within the jurisdiction limits of Macon County, NC.

- **This report focuses primarily on the Mountain Camp Dam, as it is the focus of the applicant for the Federal Emergency Management Agency (FEMA) *Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program*¹.**
- Information on the additional high hazard dams located within the jurisdiction (county) limits is also provided as required by regulations of the HHPD program.
- More information on dams located throughout the State of North Carolina is also available directly through the North Carolina Department of Environmental Quality (NCDEQ) Dam Safety Program² and the U.S. Army Corps of Engineers (USACE) National Inventory of Dams³.

¹ FEMA *Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program*:

<https://www.fema.gov/grants/mitigation/learn/dam-safety/rehabilitation-high-hazard-potential-dams>

² NCDEQ *Dam Safety Program*: <https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/dam-safety-program-overview>

³ USACE *National Inventory of Dams*: <https://nid.sec.usace.army.mil/>

Contents

<i>Dam Characteristics</i>	<i>3</i>
<i>Inundation Modeling Methodology</i>	<i>4</i>
<i>Infrastructure, Buildings, and People at Risk</i>	<i>5</i>
<i>Buildings at Risk</i>	<i>5</i>
<i>Structure Vulnerability Recommendations</i>	<i>6</i>
<i>Population at Risk</i>	<i>7</i>
<i>Population Vulnerability Recommendations</i>	<i>7</i>
<i>Roads/Bridges at Risk</i>	<i>8</i>
<i>Road/Bridges Vulnerability Recommendations</i>	<i>9</i>
<i>Proposed Mitigation Actions</i>	<i>10</i>
<i>Dam Vulnerability Maps</i>	<i>11</i>

Dam Characteristics

NOTE: This report focuses primarily on Mountain Camp Dam, as it is the focus of the applicant for the HHPD grant program. General risk information for the additional high hazard dams within county limits is also provided under the Dam Vulnerability Maps section as required by HHPD regulations.

According to the NCDEQ Dam Safety Office and the federal National Inventory of Dams (NID), Mountain Camp Dam is an earthen dam that is used primarily for recreation⁴. It is privately owned. The dam owner may continue to coordinate with NCDEQ, North Carolina Emergency Management (NCEM), and/or the regional hazard mitigation planning team regarding the grant application process and provision of necessary information. The surface area of the dam is approximately 1 acre, and the drainage area is less than 1 acre. It has a max storage capacity of 7 acre-feet with a normal pool storage capacity of 5 acre-feet.

The dam does not have any incidents listed on the Association of Dam Safety Officials Incident Database, but it is listed as a *high hazard* dam in poor condition as of January 14, 2026. Mountain Camp Dam is also listed as having an approved Emergency Action Plan (EAP), but these are not made available to the public for confidentiality reasons. The last listed inspection was on 1/14/2026, and the condition and hazard level are expected to remain the same, but the next inspection date is listed as 1/14/2027 (dependent on the next refresh of the published dam dataset).

- **State Dam ID:** MACON-047
- **Owner Type:** Private
- **Receiving Stream:** Turtle Pond Creek
- **Emergency Action Plan (EAP) Date:** 9/1/2025
- **Dam Status:** Impounding
- **Dam Hazard:** High
- **Dam Condition:** Poor
- **Last Inspection:** 1/14/2026
- **Next Inspection:** 1/14/2027

TABLE K.1: MOUNTAIN CAMP DAM BASE INFORMATION

NID ID	Dam Type	Dam Purpose	Hydraulic Height (ft)	Structural Height (ft)	Normal Freeboard (ft)	Max Storage (acre ft)	Drainage Area (acres)	Surface Area (acres)	Normal Storage (acre ft)
NC03349	Earth	Recreation	16.4	18.4	2	7	0	1	5

⁴ NCDEQ Dam Safety Office (<https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/dam-safety-program-overview>) and USACE National Inventory of Dams (<https://nid.sec.usace.army.mil/>)

Inundation Modeling Methodology

The high hazard dam failure models for those in Macon County, similar to other high hazard dams of the state, were prepared based on a full pond failure scenario where an overtop failure mechanism and 100-year baseflow were used to develop the inundation data provided by NCEM and NCDEQ. This methodology provides a detailed, comprehensive perspective of high hazard dam risk, although inherent limitations of modeling and information on file for the dam(s) of interest should be periodically reviewed for updates. Not all dams in North Carolina have fully mapped inundation areas, and not all inundation areas that are mapped are readily accessible to the public.

Using dam inundation data provided by NCEM/NCDEQ, GIS software (e.g., ArcGIS Pro) was used to determine the approximate number of assets intersecting the potential inundation area for all applicable dams. Specific facilities and assets were evaluated to determine what assets may be at the greatest risk of inundation during a potential dam failure event. They include: (1) *fire stations*, (2) *medical facilities*, (3) *law enforcement facilities*, (4) *nursing homes*, (5) *public/private schools*, (6) *emergency medical services (EMS) facilities*, (7) *roads*, (8) *NCDOT structures*, (9) *railroads*, (10) *buildings*, (11) *communication facilities*, (12) *electric power facilities*, (13) *natural gas facilities*, (14) *natural gas pipelines*, (15) *oil facilities*, (16) *potable water facilities*, and (17) *wastewater facilities*. Census tracts overlapping the inundation area were also used to determine how many people could be at risk, along with economic losses, in an inundation scenario.

TABLE K.2: FACILITIES IN MOUNTAIN CAMP DAM INUNDATION AREA

Facility/Infrastructure Type	In Inundation Area?	Data Source ⁵	Approximate Facility Count in Inundation Area
Fire Stations	No	NC OneMap	0
Medical Facilities	No	NC OneMap	0
Law Enforcement Facilities	No	NC OneMap	0
Nursing Homes	No	NC OneMap	0
Public Schools	No	NC OneMap	0
Private Schools	No	NC OneMap	0
Emergency Medical Services	No	NC OneMap	0
Roads	Yes	NCDOT	18
NCDOT Structures	Yes	NCDOT	3
Railroads	No	NCDOT	0
Buildings	Yes	NCEM Spatial Data Download (SDD)	2
Communication Facilities	No	FEMA Hazus	0
Electric Power Facility	No	FEMA Hazus	0
Natural Gas Facility	No	FEMA Hazus	0
Natural Gas Pipeline	No	FEMA Hazus	0
Oil Facility	No	FEMA Hazus	0
Potable Water Facility	No	FEMA Hazus	0
Wastewater Facility	No	FEMA Hazus	2

⁵ Referenced sources of authoritative GIS data include NC OneMap (<https://www.nconemap.gov/>), NCDOT (<https://connect.ncdot.gov/resources/gis/Pages/default.aspx>), NCEM (<https://sdd.nc.gov/>), and FEMA Hazus (<https://www.fema.gov/flood-maps/products-tools/hazus>)

Infrastructure, Buildings, and People at Risk

No critical facilities appear to be immediately at risk within the Mountain Camp Dam inundation area based on GIS analysis. However, multiple structures, roads, bridges, and other infrastructure assets are at elevated risk within the same area, and certain downstream facilities may carry a similar degree of secondary risk. The impact of a breach or failure would be significant across any downstream jurisdictions.

The following subsections summarize the key assets identified within the Mountain Camp Dam inundation area.

NOTE: This section contains information related to the primary dam of interest (Mountain Camp Dam). The areas, assets, and populations at risk of any other high hazard dams in the county are shown in the **Dam Vulnerability Maps** section at the end of this document. **Potential economic and population impacts (based on intersections with local census tract data) are noted in the inset tables at the bottom right of each respective impact map.**

Buildings at Risk

There are approximately 2 buildings located directly within the Mountain Camp Dam inundation area, all of which are residential occupancy types. The total building value of structures in the inundation area is approximately \$844,000. Because these at-risk buildings are primarily categorized as residential occupancy types, these residents are especially vulnerable to dam failure impacts, which may include extensive property damage and/or loss of life. Residential structures that are constructed with inadequate anchoring, improper foundations, or low-quality materials may have much greater vulnerability to inundation and experience disproportionate damage in the event of dam failure. Building locations are observed in the maps shown above (Figures J.1 to J.10).

TABLE K.3: MOUNTAIN CAMP DAM BUILDINGS AT RISK OF INUNDATION⁶

Occupancy Type ⁷	Building Type	Building Value (\$)	Building Replacement Value (\$)	Foundation Type	Number of Stories	First Floor Elevation (FFE in ft)
RES1 - ESTIMATED	WOOD - HAZUS DERIVED	\$392,910	\$392,910	SLAB ON GRADE - HAZUS DERIVED	1 - N/A	3,420.45
RES1 - ESTIMATED	WOOD - HAZUS DERIVED	\$451,040	\$451,040	SLAB ON GRADE - HAZUS DERIVED	2 - N/A	3,329.40
TOTALS		\$843,950	\$843,950	--	--	--

Source: FEMA Hazus

⁶ North Carolina Emergency Management [NCEM]. 2020-2023 Building Footprints. Retrieved from NCEM Spatial Data Download (SDD). <https://sdd.nc.gov/>

⁷ Occupancy type classes and other attributes are defined by FEMA Hazus and the National Structure Inventory (NSI) as adapted by North Carolina Emergency Management (NCEM) for use in building footprint datasets. More information is available here: <https://www.fema.gov/flood-maps/tools-resources/flood-map-products/hazus/documentation> and <https://www.hec.usace.army.mil/confluence/hsi/userguides/survey-tool/attribute-guide>

Structure Vulnerability Recommendations

To reduce vulnerability of structures that are within dam inundation zones, officials in the planning area should consider the following mitigation actions and prioritize them according to the greatest needs and/or threats of the planning area:

- Evaluate structures that are in inundation zones and ensure that buildings are adequately anchored and elevated above the determined dam inundation height for Mountain Camp Dam and other high hazard dams in the planning area.
- Assist residents of the structures at risk to understand the potential impacts of dam failure and determine whether they require assistance to safely evacuate in a timely manner.
- Determine whether residents in structures at risk have a way of receiving emergency dam failure notifications and to safely evacuate in a timely manner.
- Prohibit the development of new residential structures within the inundation area and ensure that any future development in or around the inundation areas is built with adequate construction methods to reduce damage from dam inundation or flooding.

Population at Risk

The census tracts⁸ intersecting the potential dam inundation area have a total combined population of approximately 7,947, in addition to over \$2.1 billion in total building value and \$2.5 million in total agricultural value based on estimates from the Federal Emergency Management Agency (FEMA) National Risk Index (NRI)⁹.

TABLE K.4: MOUNTAIN CAMP DAM CENSUS TRACTS AT RISK

Census Tract	Population (2020)	Building Value (\$)	Agricultural Value (\$)	Social Vulnerability	Community Resilience
37113970501	1,604	\$893,381,353	\$4,314	Relatively Low	Very Low
37113970600	6,343	\$1,232,554,153	\$2,526,774	Relatively High	Very Low
TOTALS	7,947	\$2,125,935,506	\$2,531,088	--	--

Source: FEMA NRI

Population Vulnerability Recommendations

To reduce the vulnerability of residents reliant on the local infrastructure, structures, businesses, or critical facilities in inundation areas, officials in the planning area should consider the following mitigation actions and prioritize them according to the greatest needs and/or threats of the planning area:

- Consider developing an early warning system for the planning area, which could include text alerts, sirens, and/or automatic warning notifications to reduce the potential loss of life.
- Restrict development in inundation areas to ensure that those who live and work in the surrounding area do not have an increased risk of dam inundation impacts.

⁸ Census tract data for population, dollar values, social vulnerability, and community resilience were sourced from the FEMA National Risk Index (NRI), which is now hosted on the *Resilience Analysis and Planning Tool* (RAPT) site, available at <https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool>

⁹ **NOTE:** Census tract totals are used to estimate population/economic exposure and vulnerability across a larger geographic area than the potential dam inundation area alone. **Reported values may be inflated or unrealistic for the dam planning area, but they represent the best available data at the time of this report. These findings are considered baseline planning estimates and should only be used for reference.**

Roads/Bridges at Risk

Over 1.14 miles of roads overlap the dam inundation area and serve an approximate Annual Average Daily Traffic (AADT) yield of at least 3,700 vehicles based on available records. Some roads within the inundation area may have multiple distinct segments at risk of inundation.

TABLE K.5: MOUNTAIN CAMP DAM ROADS AT RISK¹⁰

Street Name	Route Name	Route Class	Miles at Risk	Annual Average Daily Traffic (AADT) ¹¹	Inundation Arrival Time (Min) ¹²
NS-97661	Mountain Brook Way	Non-System	0.03	0	0.02
US-64	Highlands Rd	System	0.51	3,500	116.04
US-64	Highlands Rd	System	0.07	3,500	116.20
US-64	Highlands Rd	System	0.03	3,500	115.63
US-64	Highlands Rd	System	0.00	3,500	117.43
US-64	Highlands Rd	System	0.01	3,500	118.07
SR-1620	Turtle Pond Rd	System	0.05	200	103.14
SR-1620	Turtle Pond Rd	System	0.04	200	100.07
SR-1620	Turtle Pond Rd	System	0.05	200	98.83
SR-1620	Turtle Pond Rd	System	0.10	200	91.68
SR-1620	Turtle Pond Rd	System	0.05	200	0.05
SR-1620	Turtle Pond Rd	System	0.00	200	77.43
SR-1620	Turtle Pond Rd	System	0.04	200	77.13
SR-1620	Turtle Pond Rd	System	0.09	200	60.48
SR-1620	Turtle Pond Rd	System	0.05	200	27.63
NS-96970	Retreat Ln	Non-System	0.01	0	97.00
NS-96970	Retreat Ln	Non-System	0.00	0	97.40
NS-97030	Painted Turtle Ln	Non-System	0.01	0	0.03
TOTALS			1.14	3,700	--

Source: NCDOT

There are also at least 3 bridge assets maintained by the North Carolina Department of Transportation (NCDOT) at risk within the inundation area. These bridges serve an approximate AADT yield of at least 200 vehicles based on available records, and the total detour mileage needed for this infrastructure could be up to 31 miles across the dam inundation area.

¹⁰ Sourced from the North Carolina Department of Transportation (NCDOT) *NC Route Characteristics* dataset.

¹¹ An AADT value of "0" represents no recorded traffic data for specific assets.

¹² Inundation arrival times sourced from the *NC State Emergency Response Application* (SERA) database.

TABLE K.6: MOUNTAIN CAMP DAM NCDOT STRUCTURES AT RISK¹³

Bridge Number	Bridge Type	Feature Intersected by Structure	Facilities Carried by Structure	Annual Average Daily Traffic (AADT)	Detour Length (Miles)
550036	BRIDGE	TURTLE POND CREEK	SR1620	N/A	11
550037	BRIDGE	TURTLE POND CREEK	SR1620	N/A	11
550133	BRIDGE	TURTLE POND CREEK	SR1620	200	9
TOTALS				200	31

Source: NCDOT

Road/Bridges Vulnerability Recommendations

To reduce the vulnerability of roads and bridges, officials in the planning area should consider the following mitigation actions and prioritize them according to the greatest needs and/or threats of the planning area:

- Evaluate and implement projects that elevate or protect roadways at risk of dam inundation to improve the resiliency of roadways and assist with post-disaster recovery.
- Consider retrofitting bridges to improve their resilience in the event of dam failure.
- Coordinate with NCDOT to prioritize road and bridge protections in the event of dam failure.

¹³ Sourced from the North Carolina Department of Transportation (NCDOT) *NCDOT Structures* dataset.

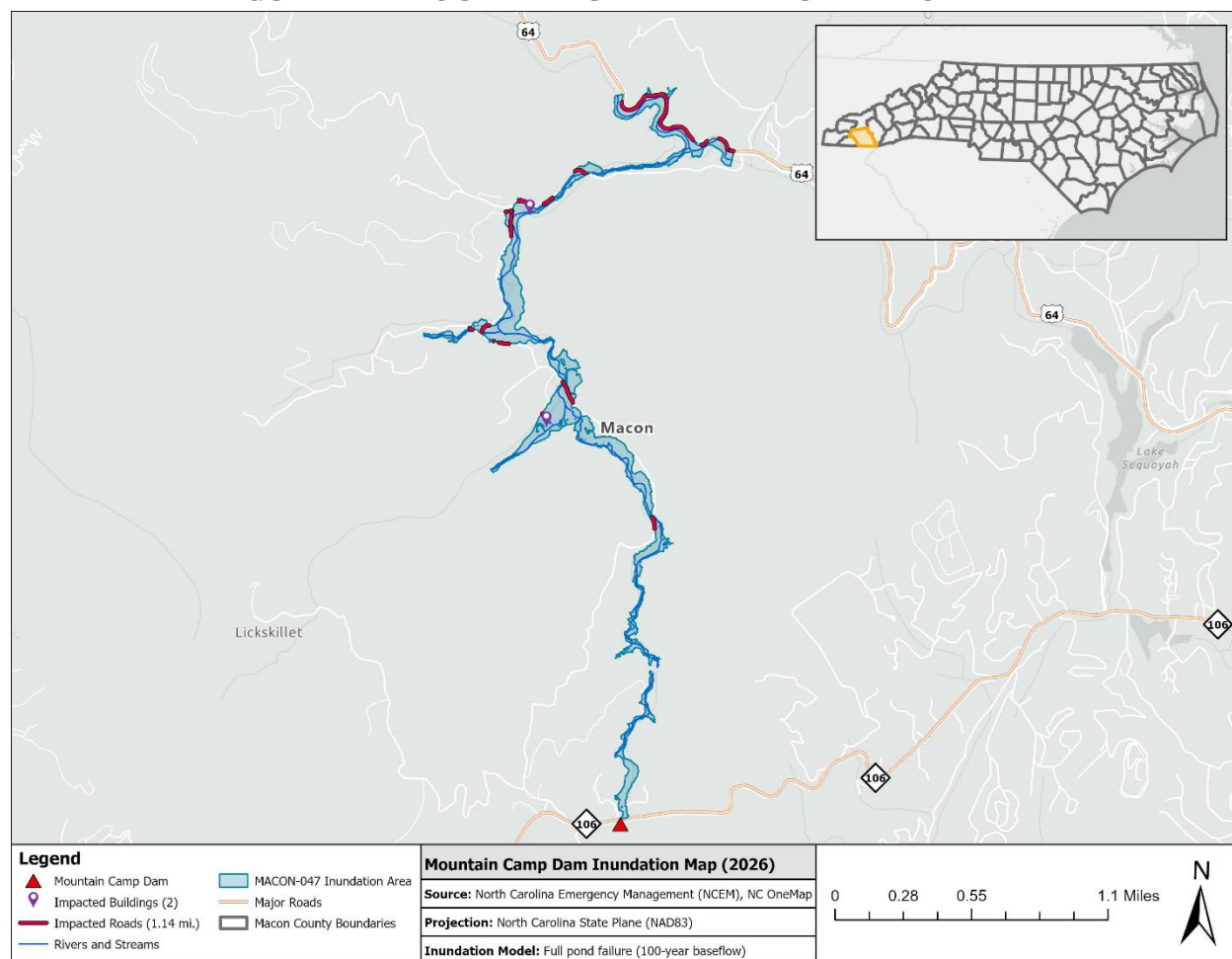
Proposed Mitigation Actions

To reduce vulnerability of the planning area to dam failure impacts, the following mitigation actions were considered for addition to the mitigation action plan(s) of the planning area:

- Investigate feasibility and funding opportunities for construction to improve or replace dams such as Mountain Camp Dam and other high hazard dams in the planning area to reduce the risk of failure hazards.
- Ensure that residents who live in buildings within inundation areas are aware of the hazards associated with dam failure and encourage them to develop emergency strategies to evacuate in a timely manner.
- Ensure that any residents who live in the inundation area who require assistance to evacuate are assisted in the event of a dam failure.
- Develop updated inundation modeling for each dam in the planning area that does not already have effective inundation data.
- Ensure that emergency action plans (EAPs) developed for dams in the planning area are shared with emergency management staff and incorporated into emergency management plans.

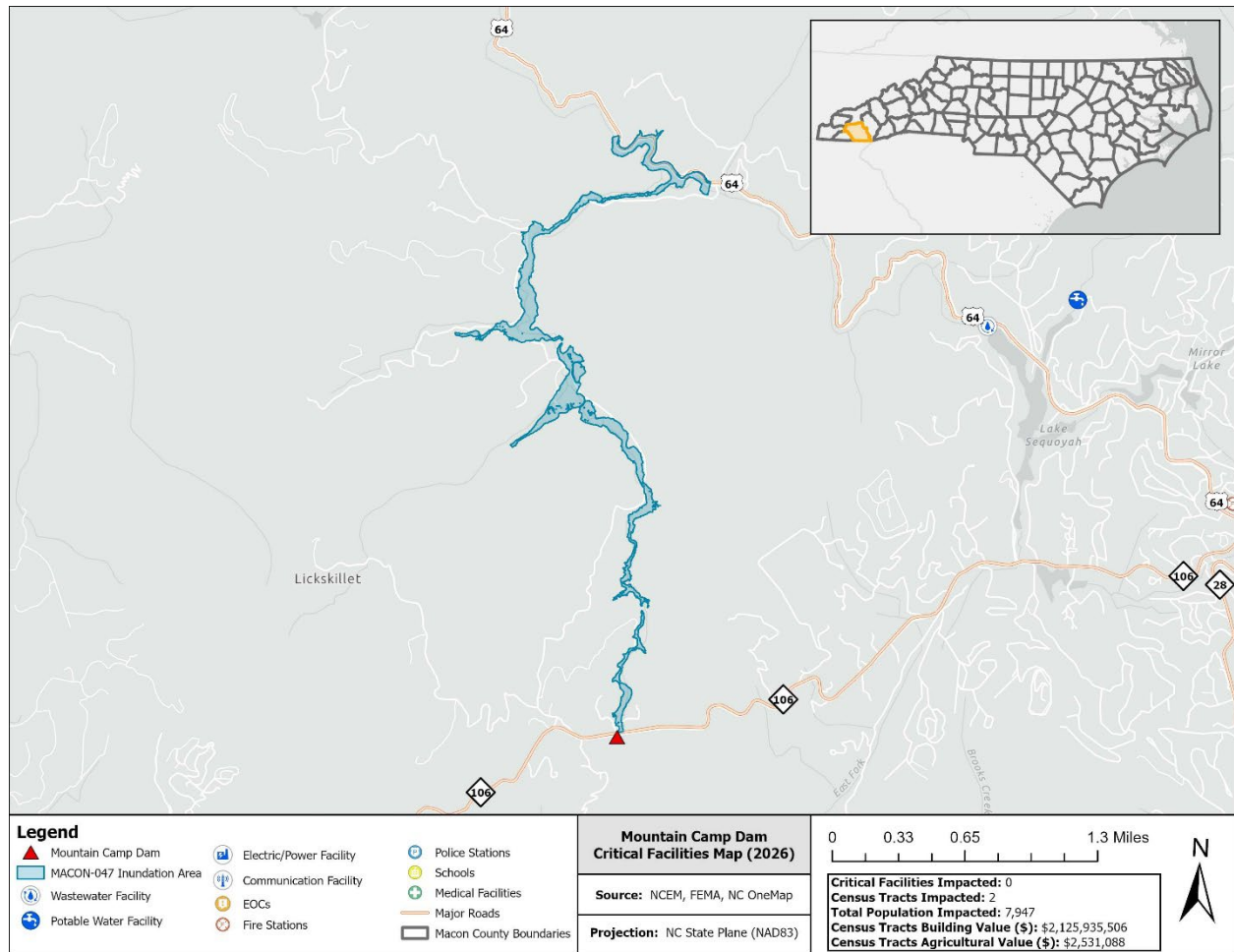
Dam Vulnerability Maps

FIGURE K.1: MOUNTAIN CAMP DAM INUNDATION MAP



Source: NCEM, NCDOT

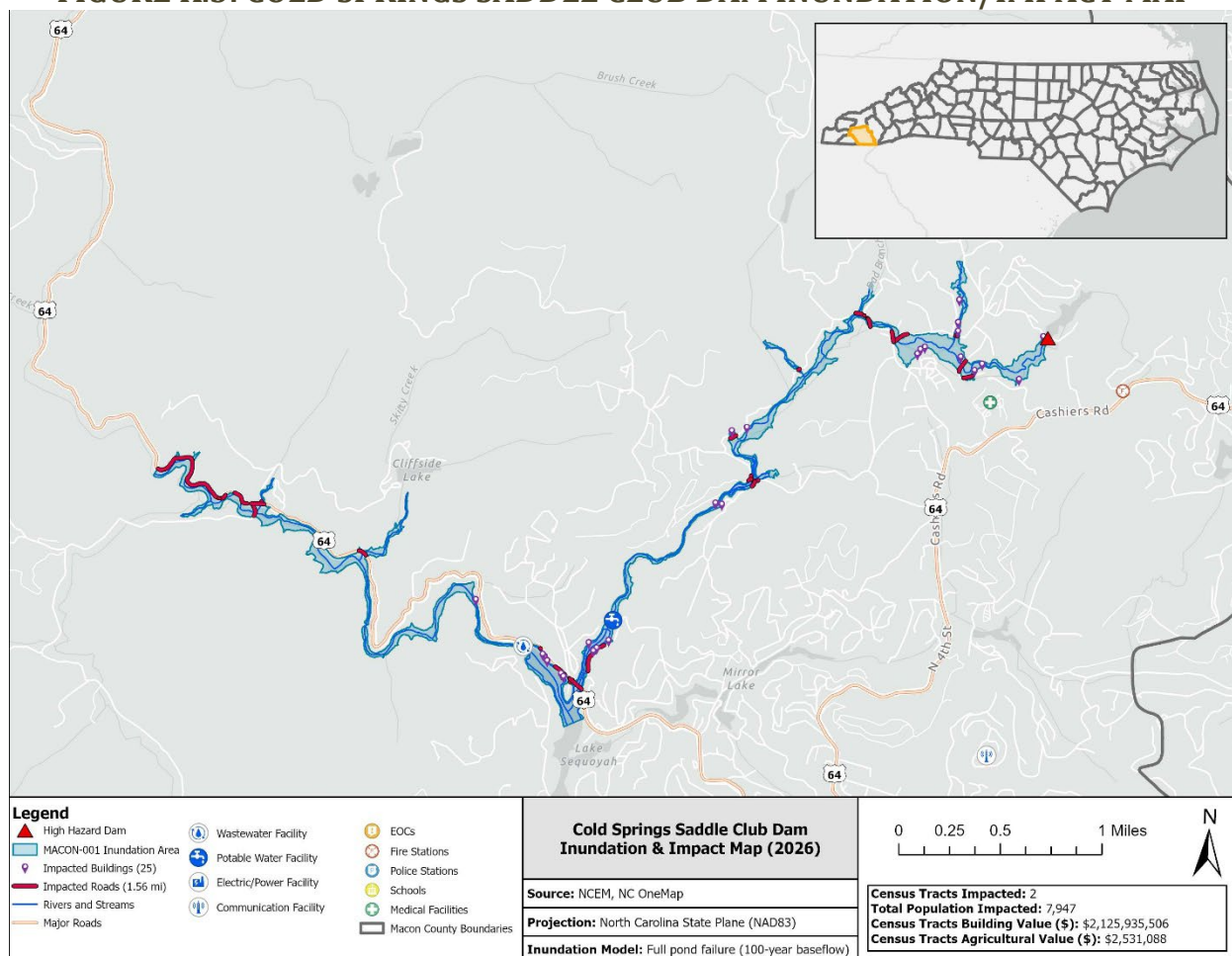
FIGURE K.2: MOUNTAIN CAMP DAM CRITICAL FACILITIES MAP



Source: FEMA, NCEM, NCDOT

- **NOTE:** The following figures and information encompass the other high hazard dams with available data in Macon County, NC aside from the applicant dam (Mountain Camp Dam)¹⁴.

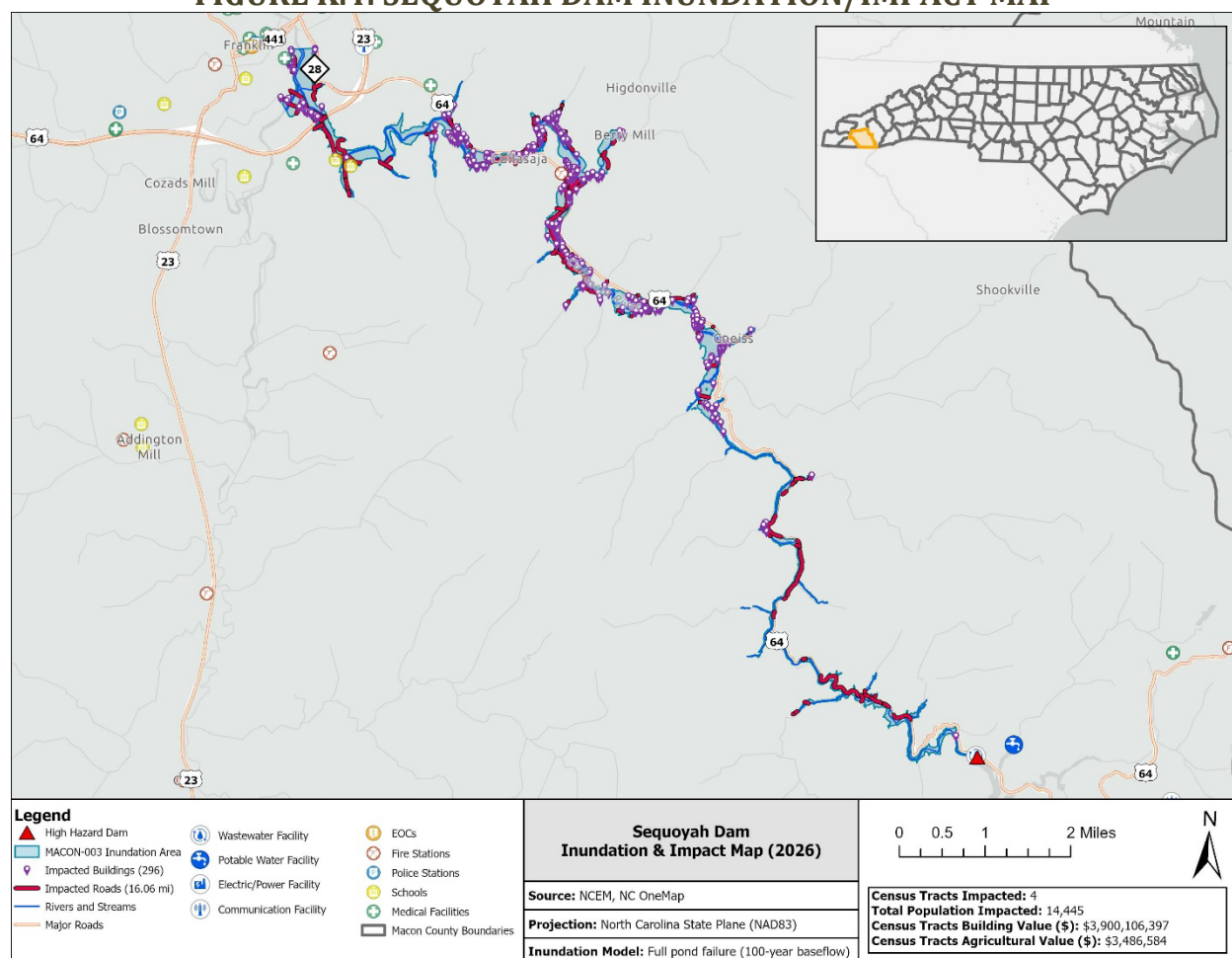
FIGURE K.3: COLD SPRINGS SADDLE CLUB DAM INUNDATION/IMPACT MAP



Source: FEMA, NCEM, NCDOT

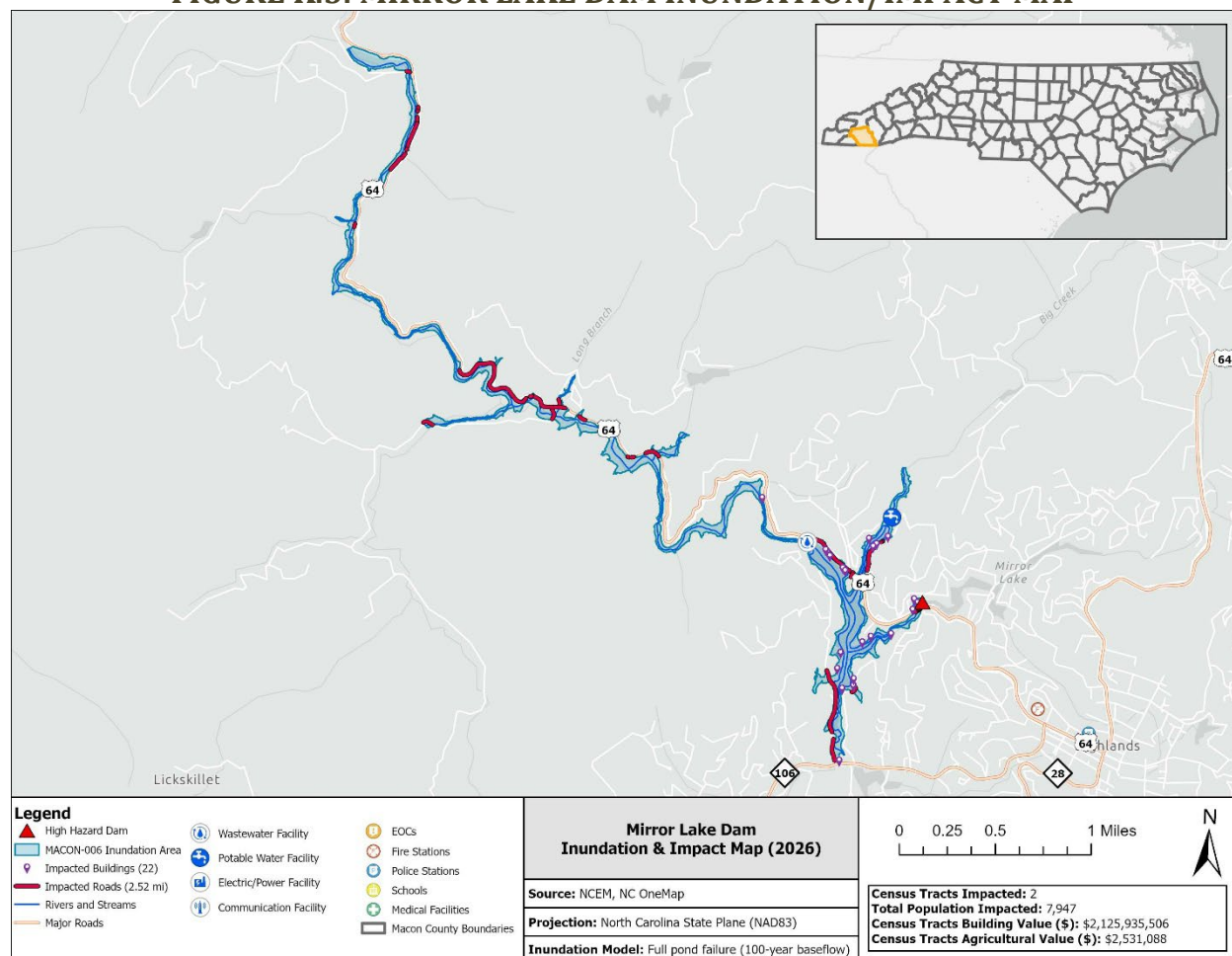
¹⁴ **Flood depth inundation and impact data are currently unavailable for the following 7 high hazard dams in Macon County:** MACON-004 (Franklin Dam), MACON-008 (Queens Creek Dam), MACON-009 (Nantahala Lake Dam), MACON-018 (Wilson Creek Lower Dam), MACON-045 (Echo Valley Pond Dam), MACON-071 (Trimont Trail Dam), and MACON-075 (Eddie Bateman Dr. Dam).

FIGURE K.4: SEQUOYAH DAM INUNDATION/IMPACT MAP



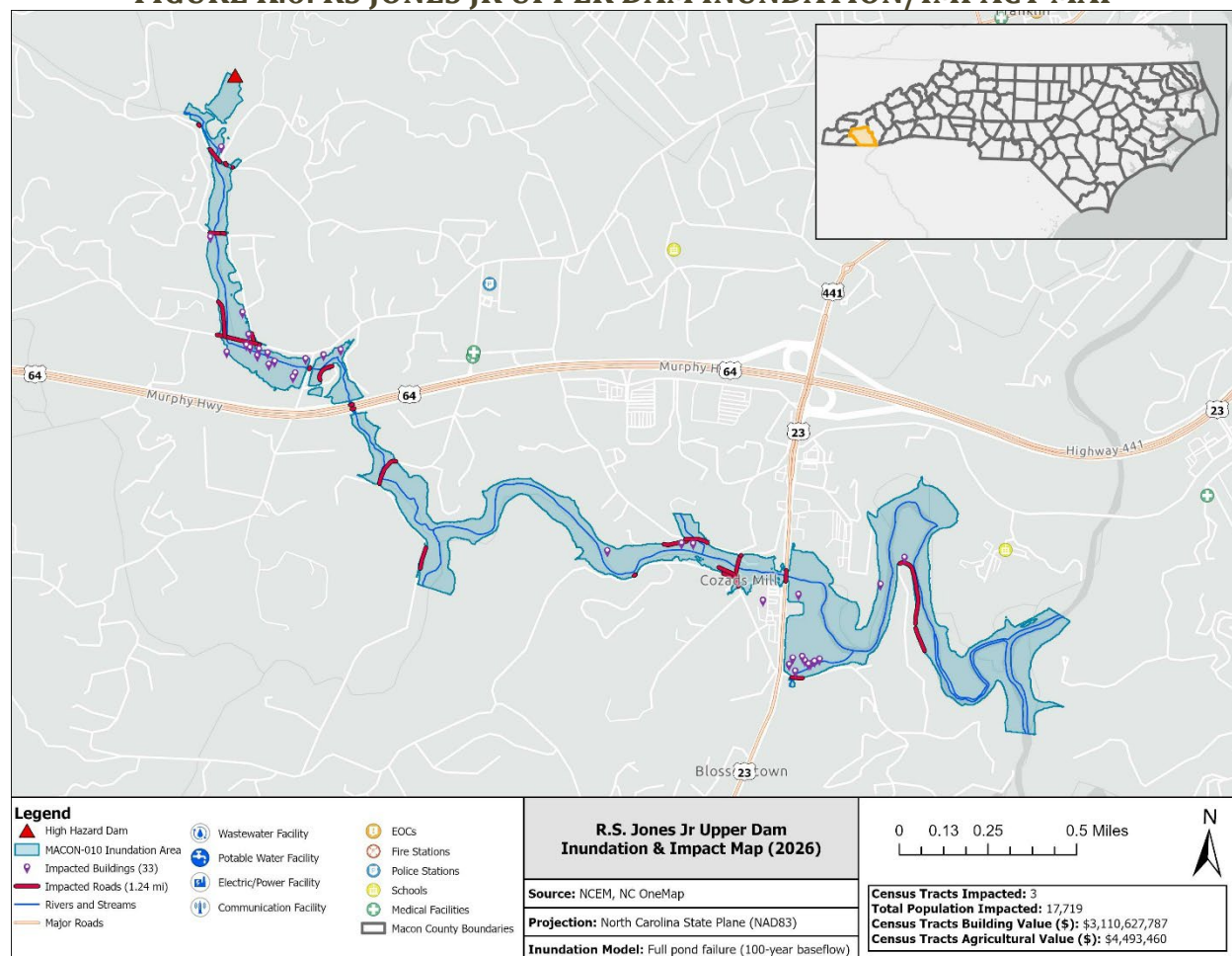
Source: FEMA, NCEM, NCDOT

FIGURE K.5: MIRROR LAKE DAM INUNDATION/IMPACT MAP



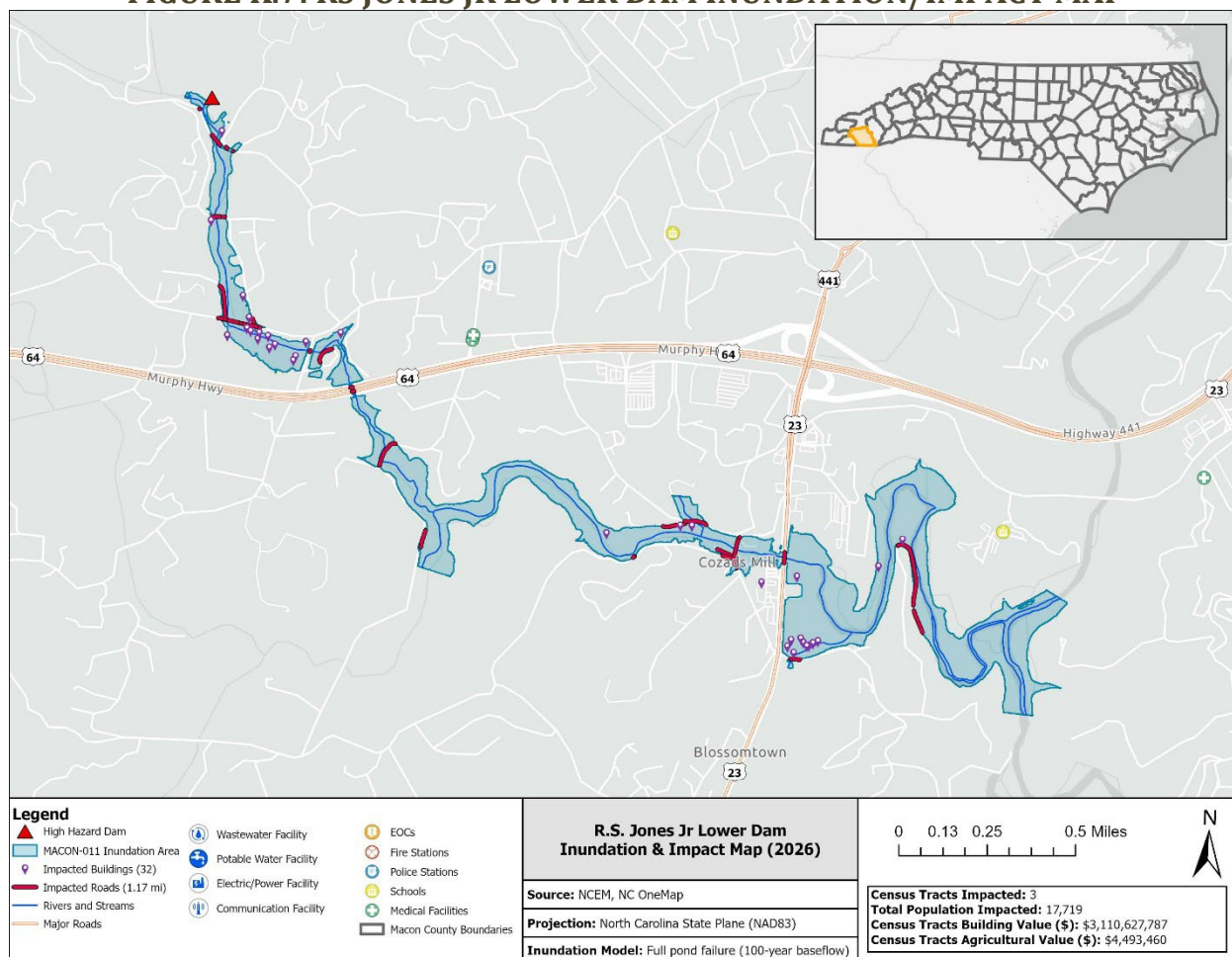
Source: FEMA, NCEM, NCDOT

FIGURE K.6: RS JONES JR UPPER DAM INUNDATION/IMPACT MAP



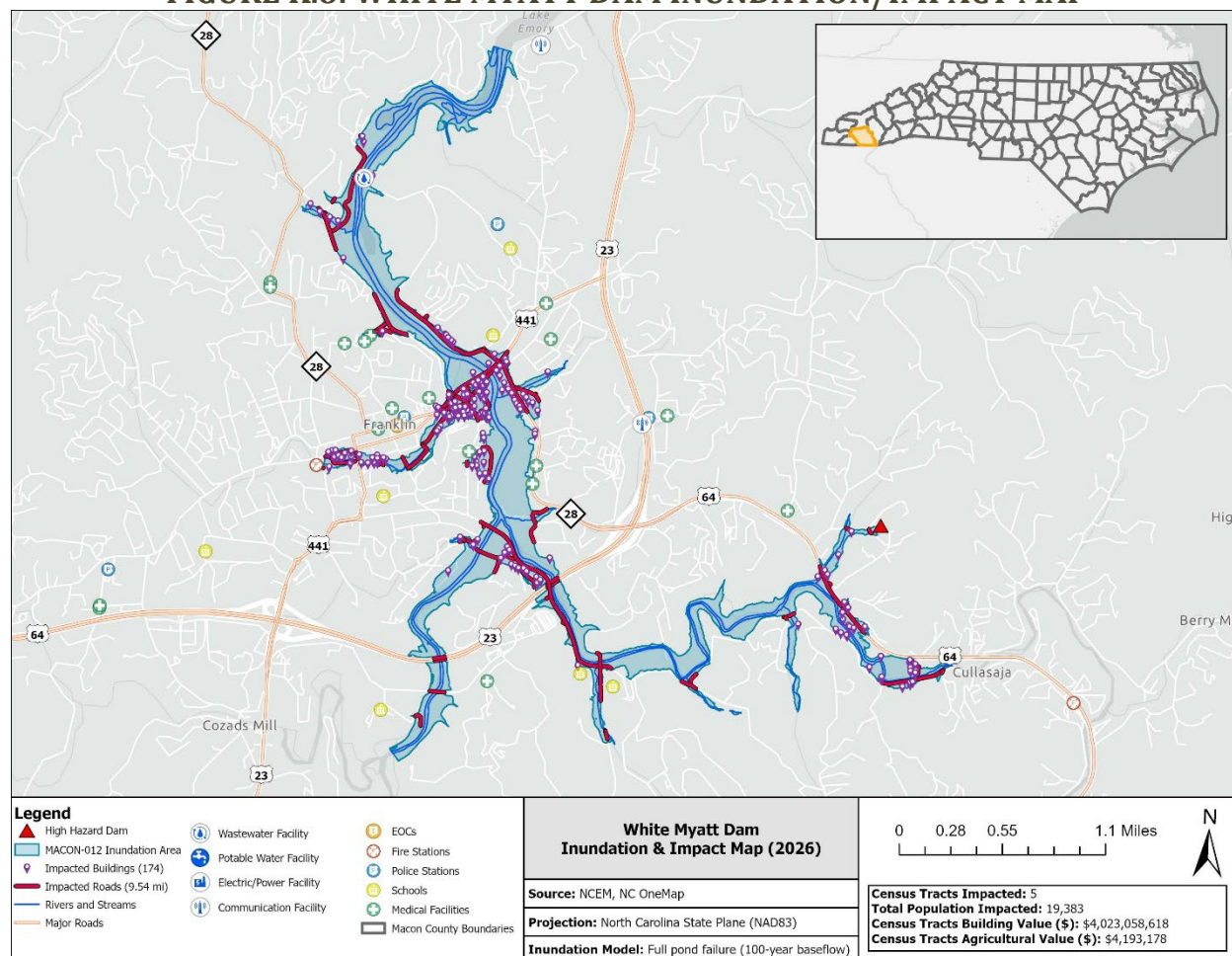
Source: FEMA, NCEM, NCDOT

FIGURE K.7: RS JONES JR LOWER DAM INUNDATION/IMPACT MAP



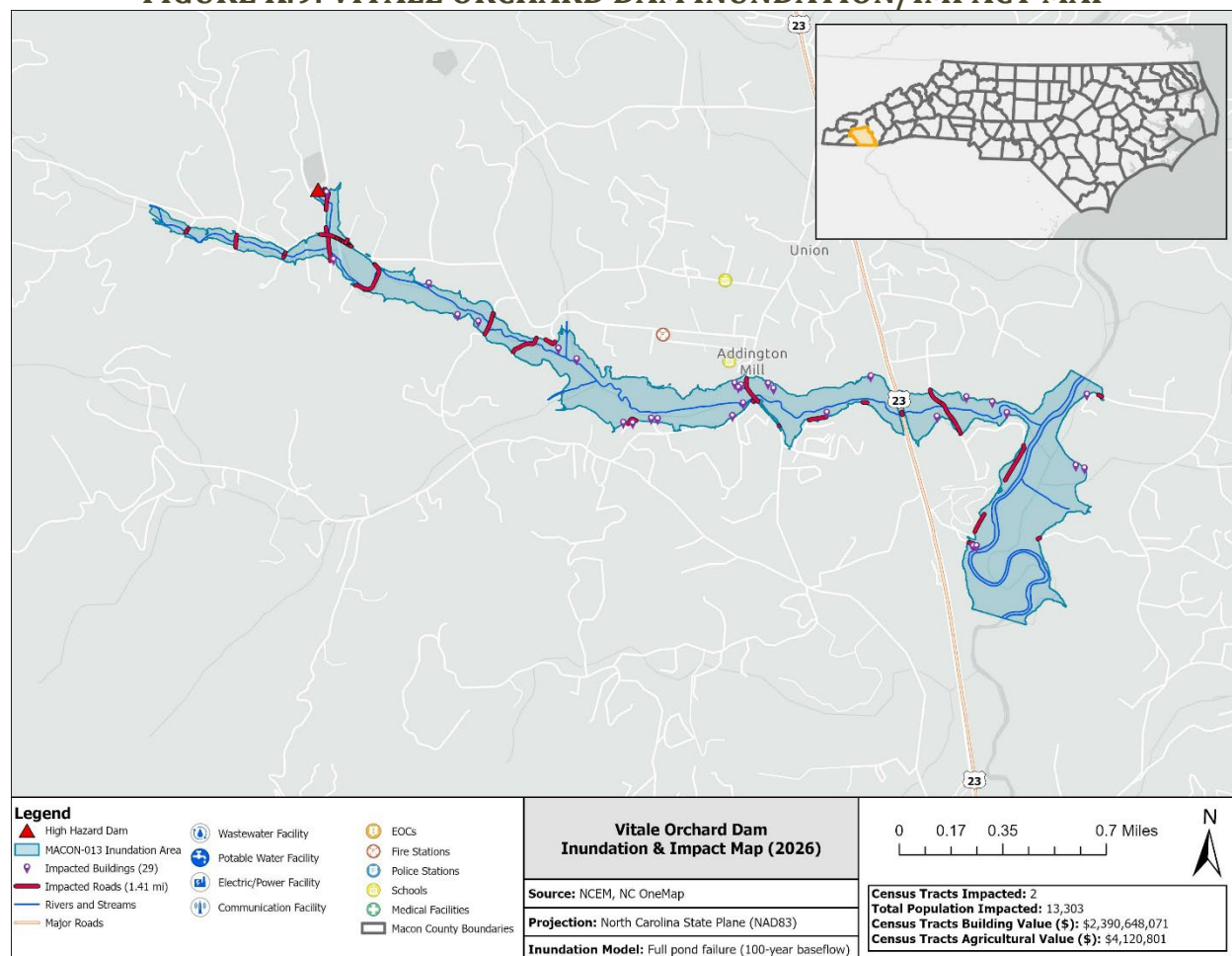
Source: FEMA, NCEM, NCDOT

FIGURE K.8: WHITE MYATT DAM INUNDATION/IMPACT MAP



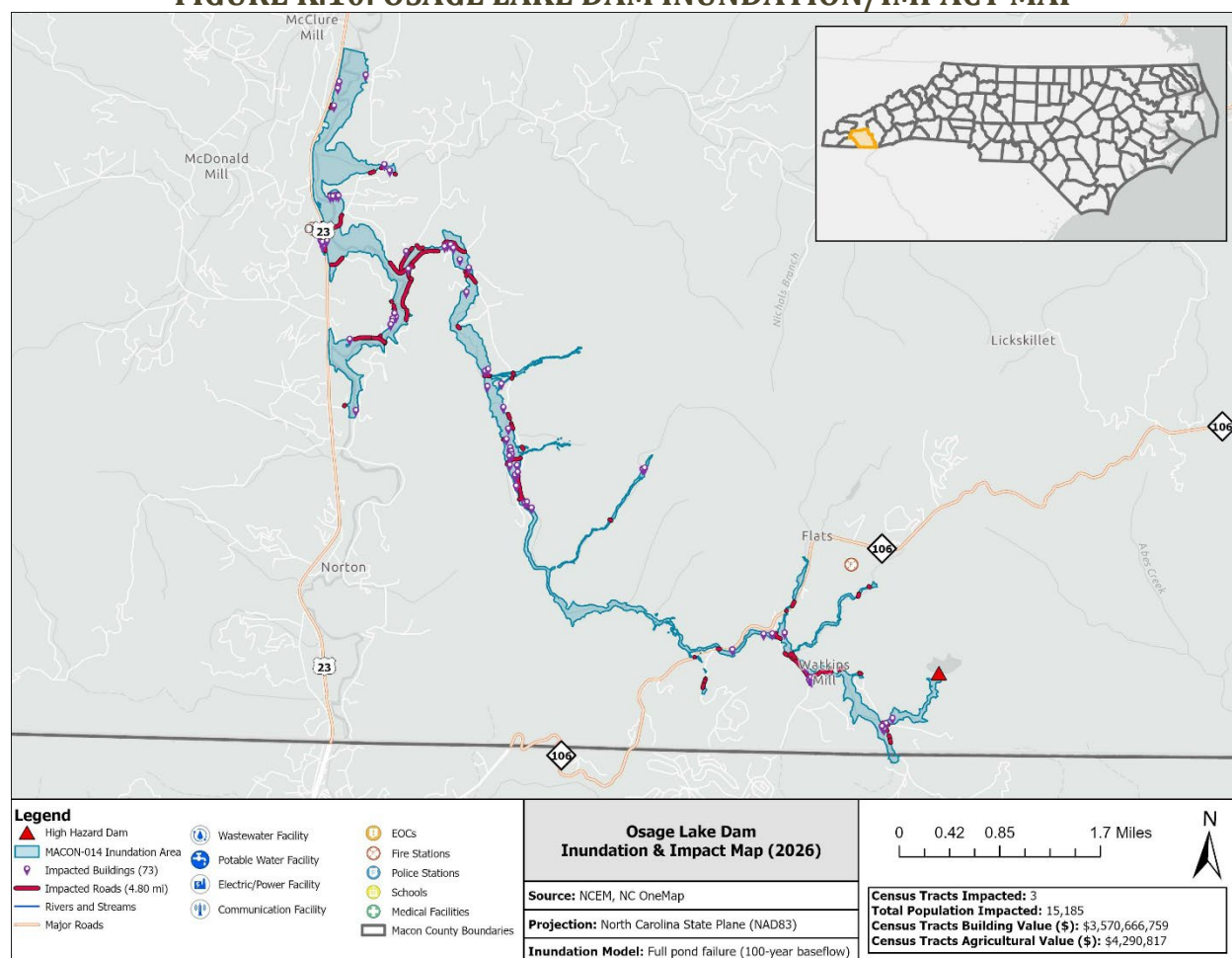
Source: FEMA, NCEM, NCDOT

FIGURE K.9: VITALE ORCHARD DAM INUNDATION/IMPACT MAP



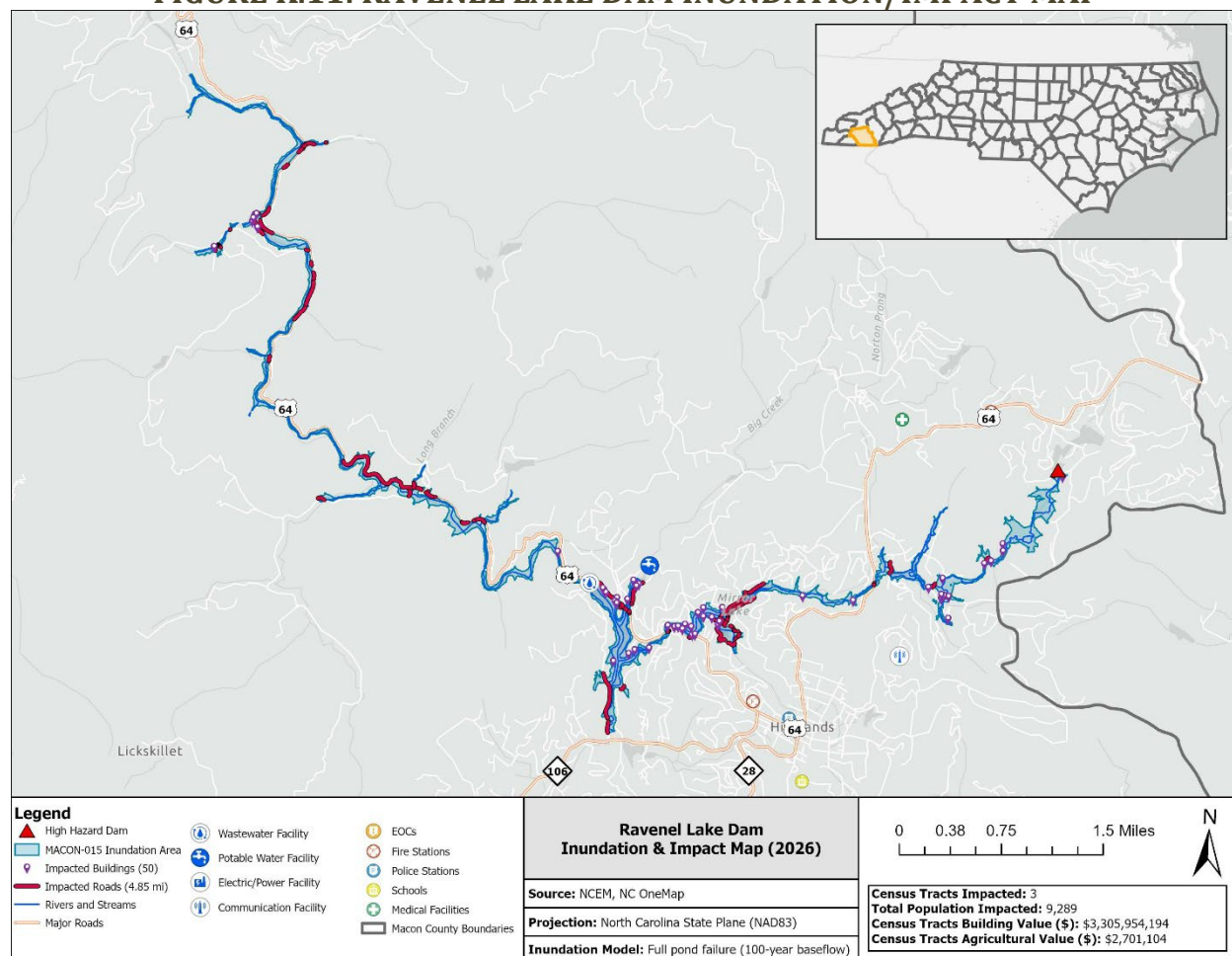
Source: FEMA, NCEM, NCDOT

FIGURE K.10: OSAGE LAKE DAM INUNDATION/IMPACT MAP



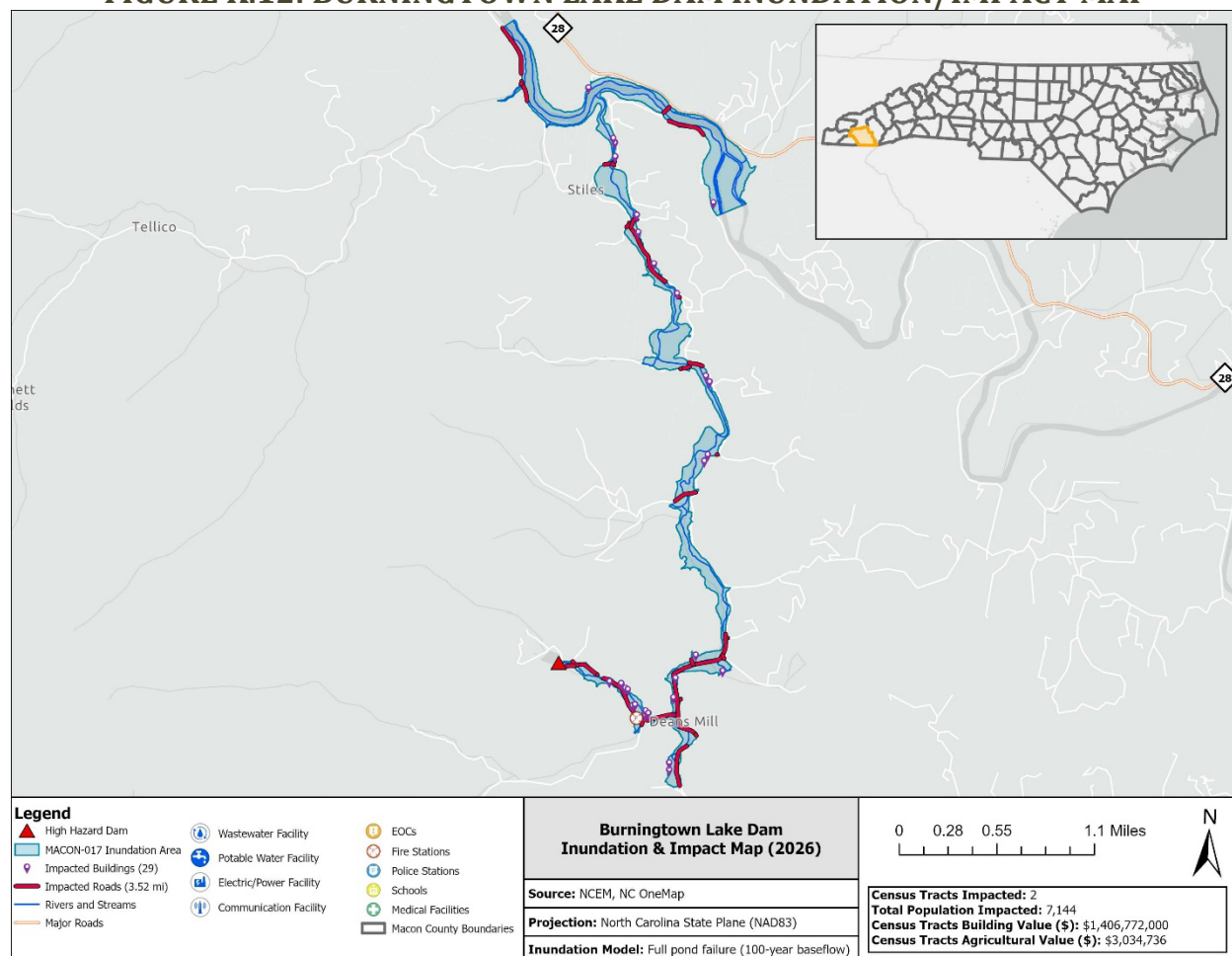
Source: FEMA, NCEM, NCDOT

FIGURE K.11: RAVENEL LAKE DAM INUNDATION/IMPACT MAP



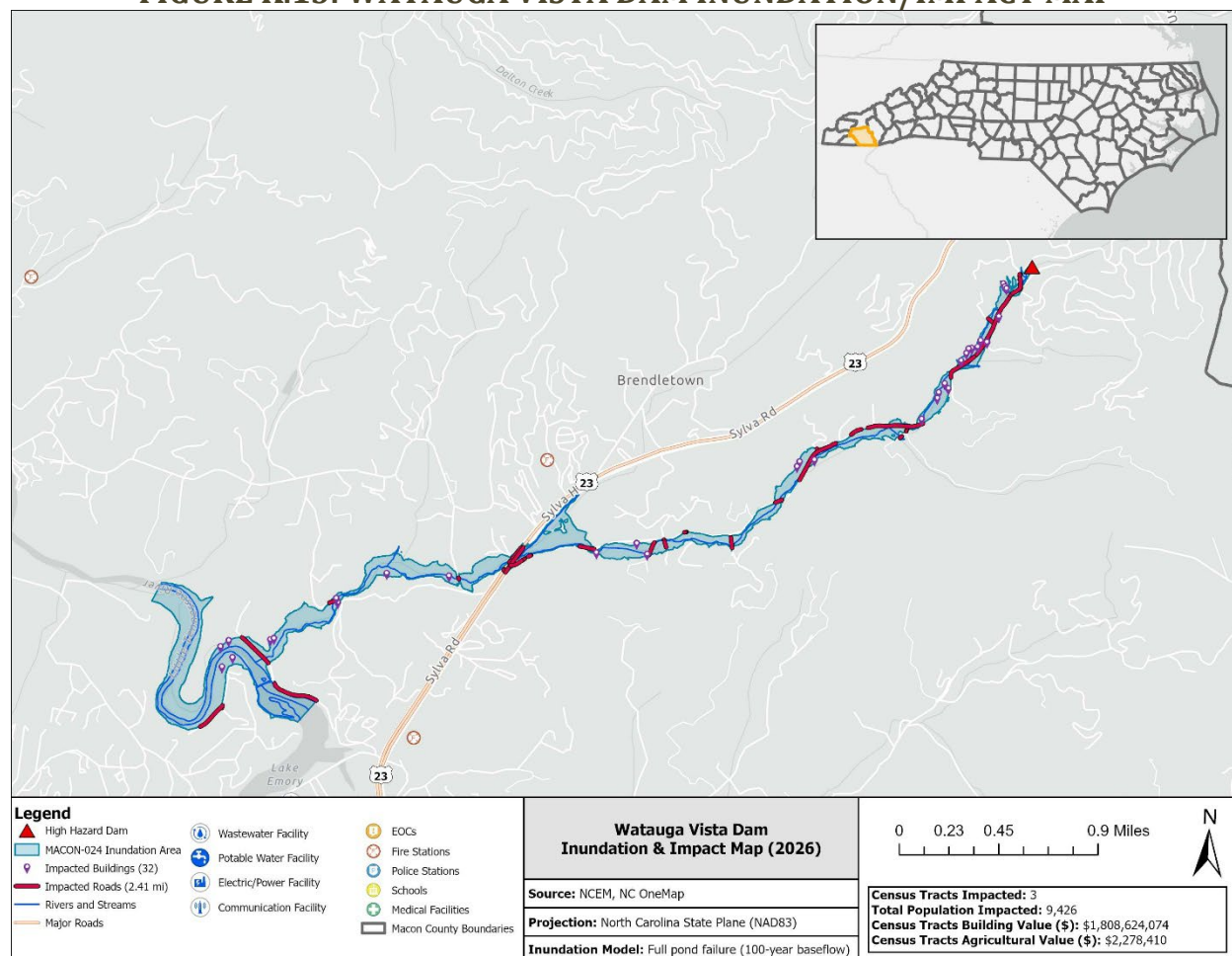
Source: FEMA, NCEM, NCDOT

FIGURE K.12: BURNINGTOWN LAKE DAM INUNDATION/IMPACT MAP



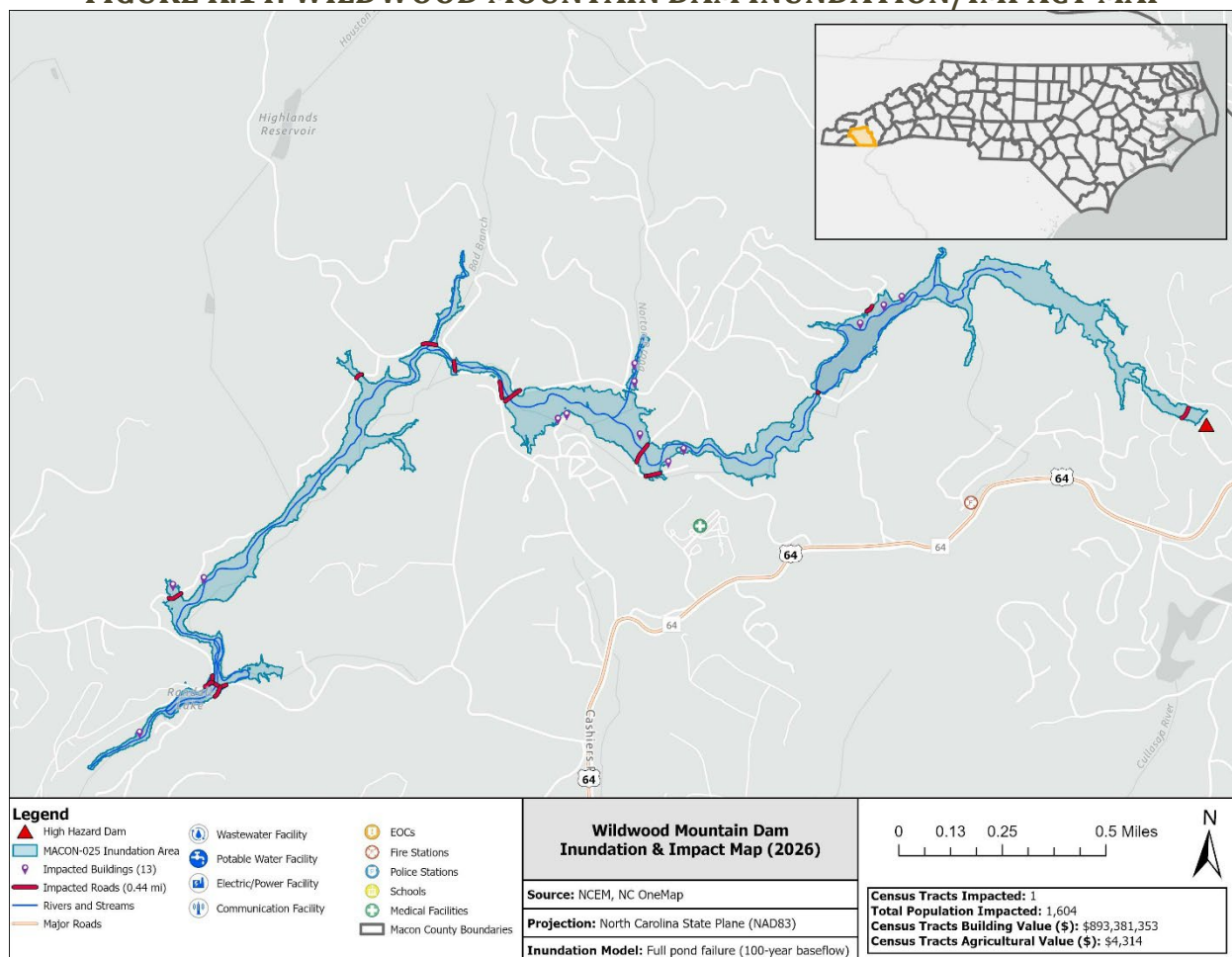
Source: FEMA, NCEM, NCDOT

FIGURE K.13: WATAUGA VISTA DAM INUNDATION/IMPACT MAP



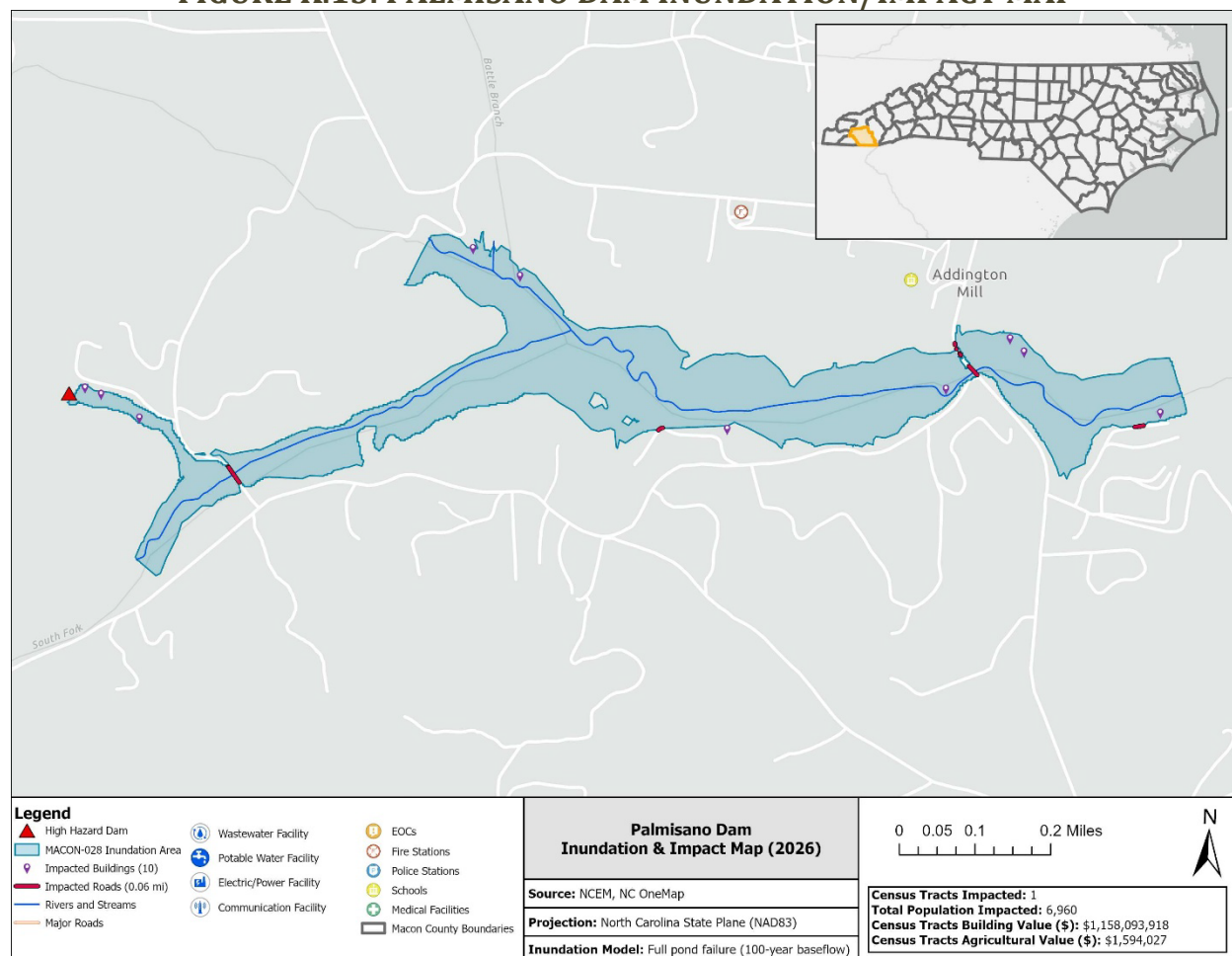
Source: FEMA, NCEM, NCDOT

FIGURE K.14: WILDWOOD MOUNTAIN DAM INUNDATION/IMPACT MAP



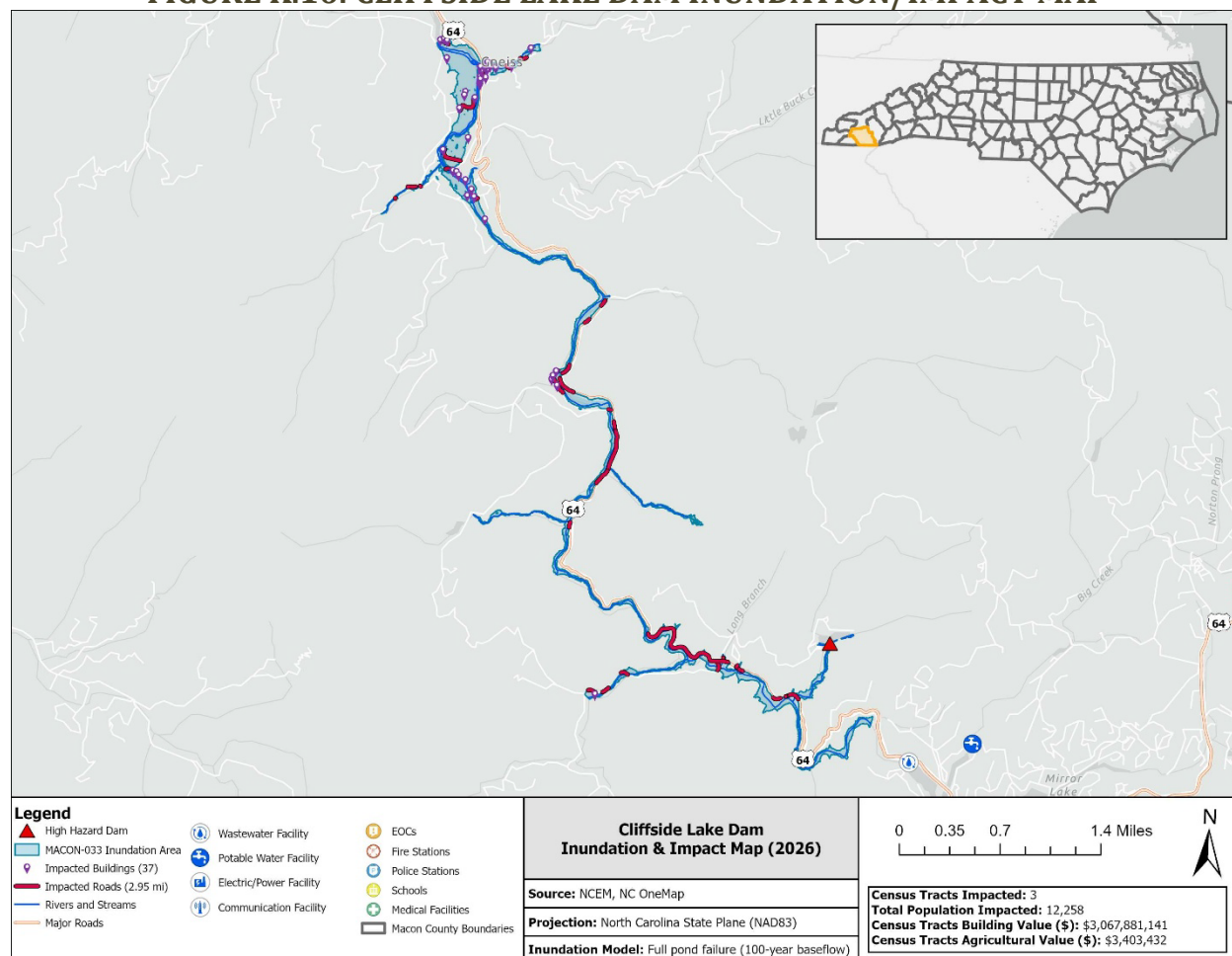
Source: FEMA, NCEM, NCDOT

FIGURE K.15: PALMISANO DAM INUNDATION/IMPACT MAP



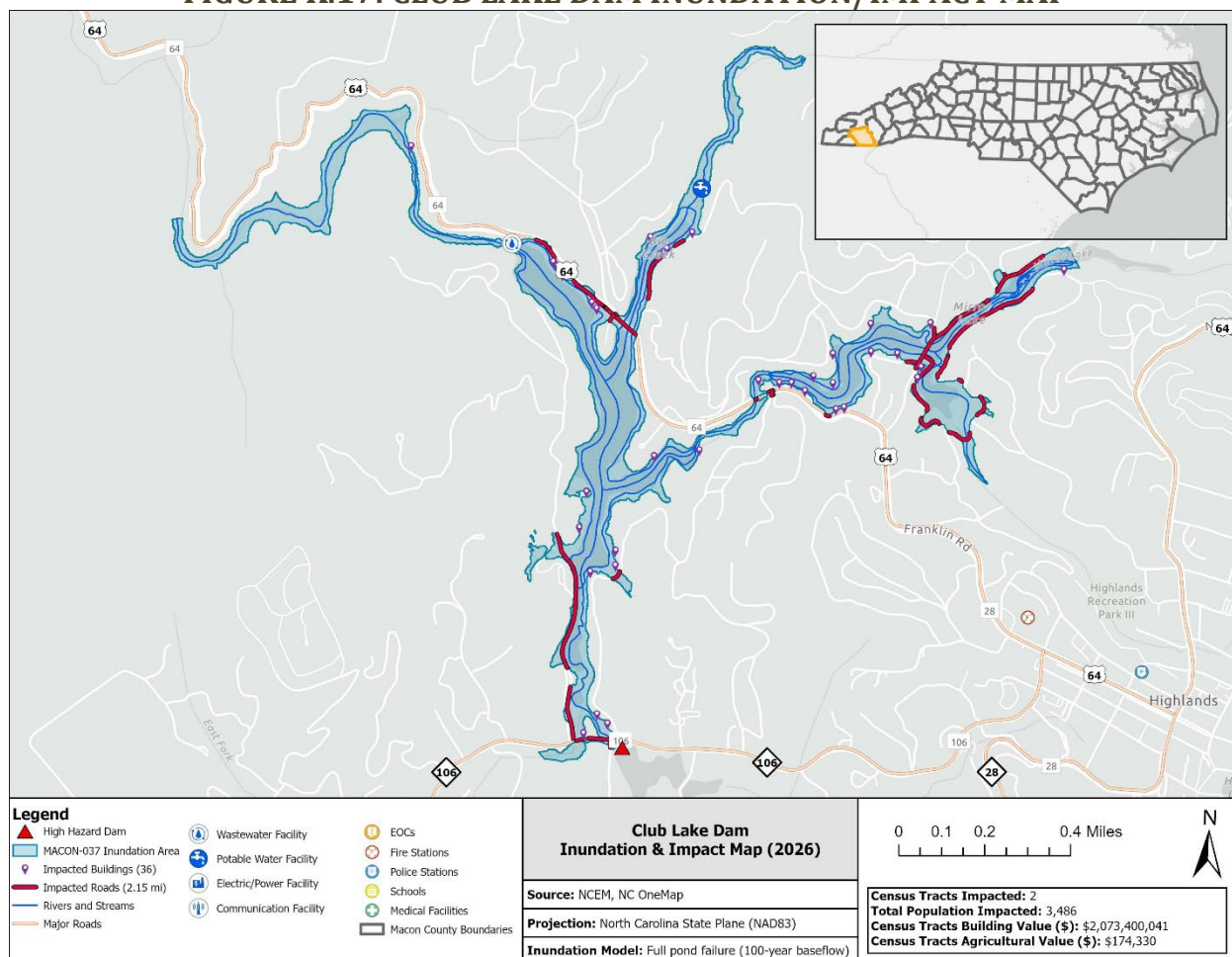
Source: FEMA, NCEM, NCDOT

FIGURE K.16: CLIFFSIDE LAKE DAM INUNDATION/IMPACT MAP



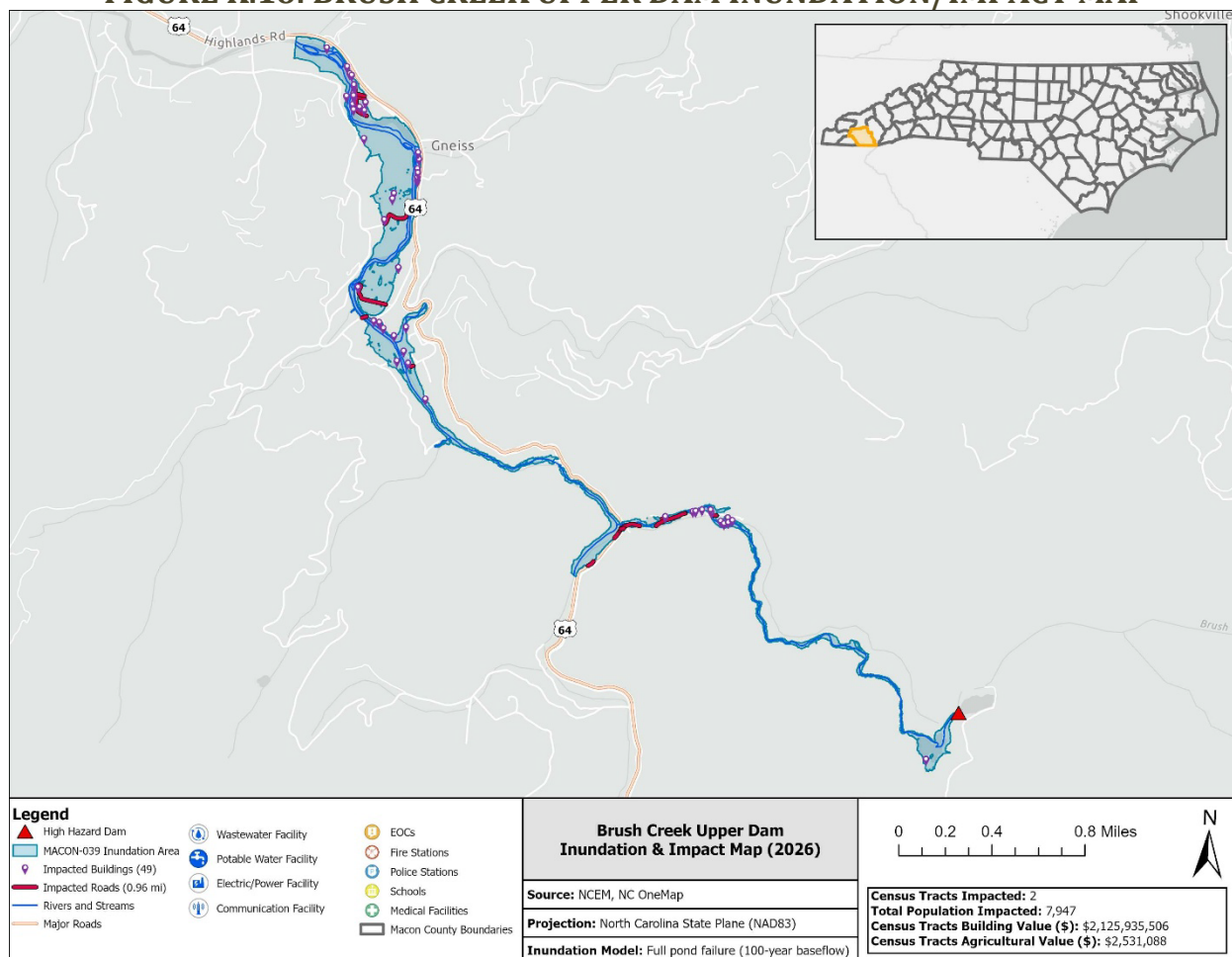
Source: FEMA, NCEM, NCDOT

FIGURE K.17: CLUB LAKE DAM INUNDATION/IMPACT MAP



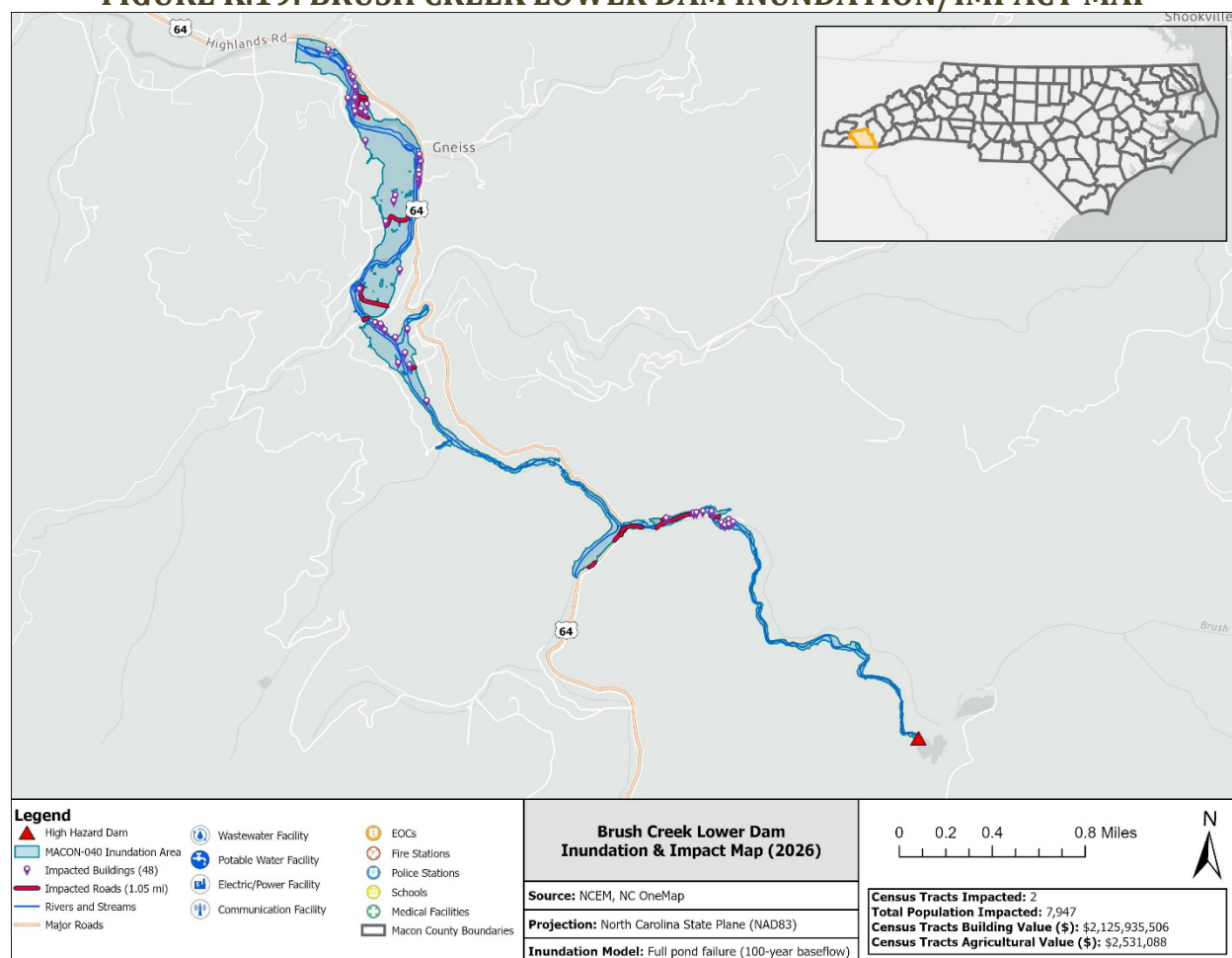
Source: FEMA, NCEM, NCDOT

FIGURE K.18: BRUSH CREEK UPPER DAM INUNDATION/IMPACT MAP



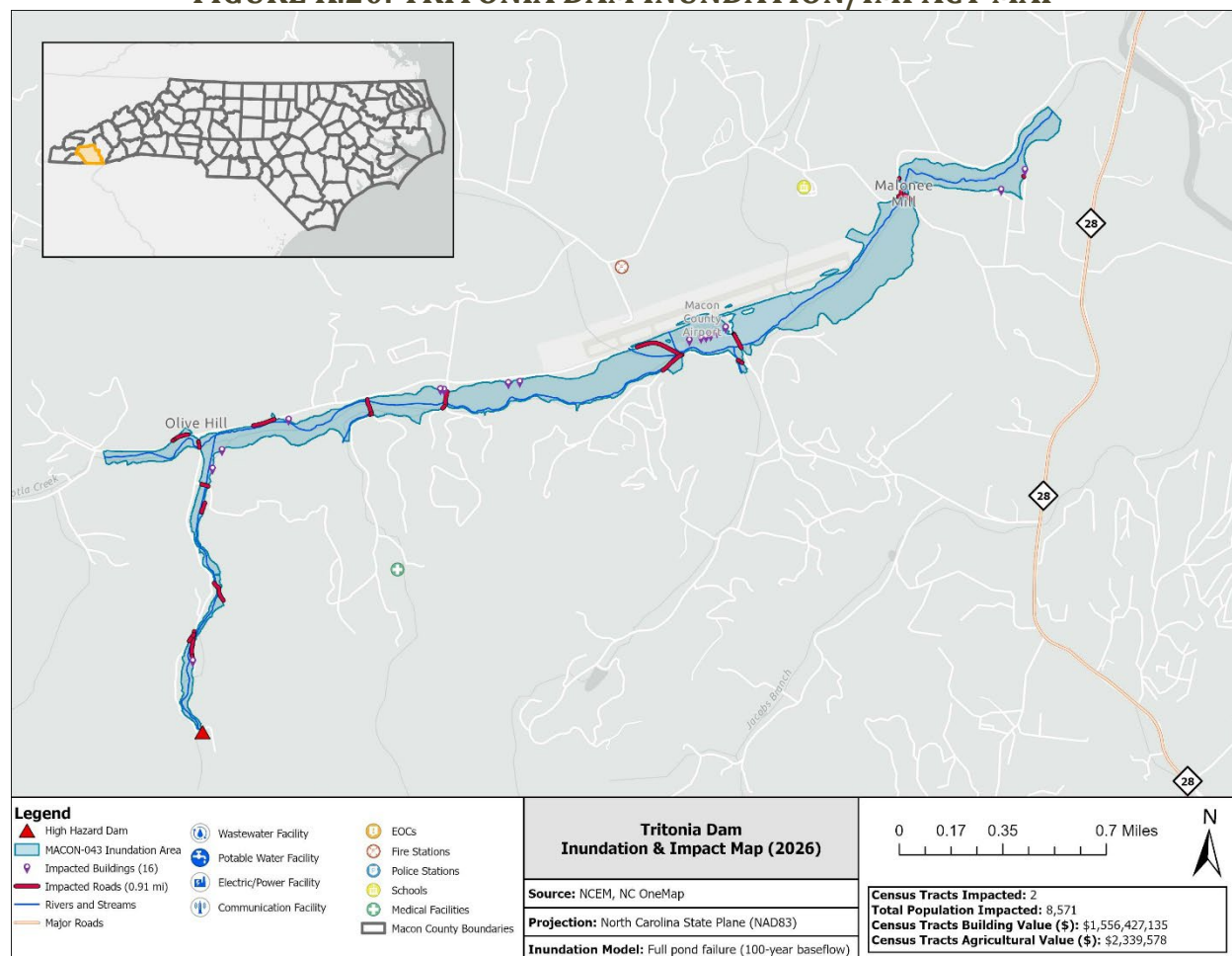
Source: FEMA, NCEM, NCDOT

FIGURE K.19: BRUSH CREEK LOWER DAM INUNDATION/IMPACT MAP



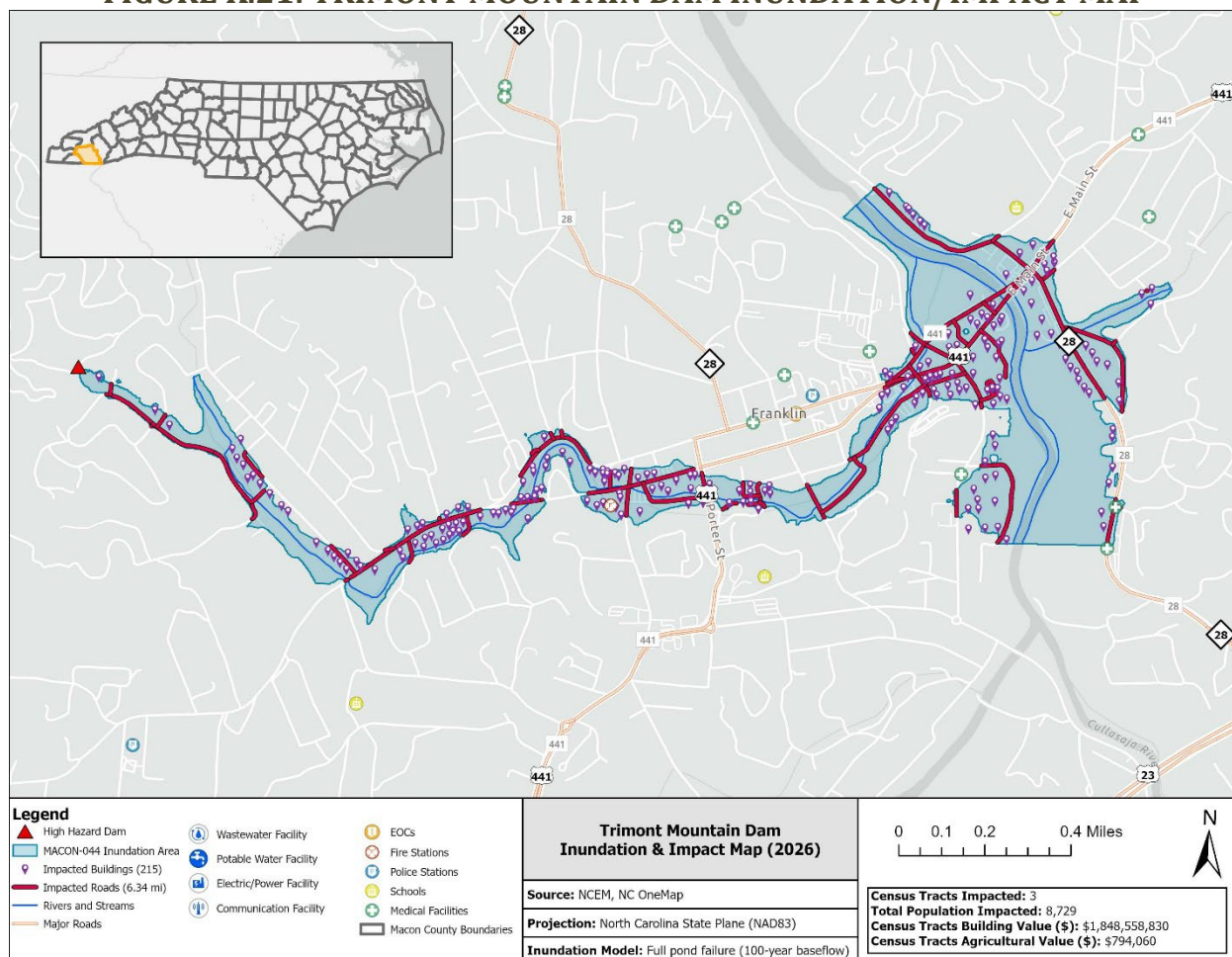
Source: FEMA, NCEM, NCDOT

FIGURE K.20: TRITONIA DAM INUNDATION/IMPACT MAP



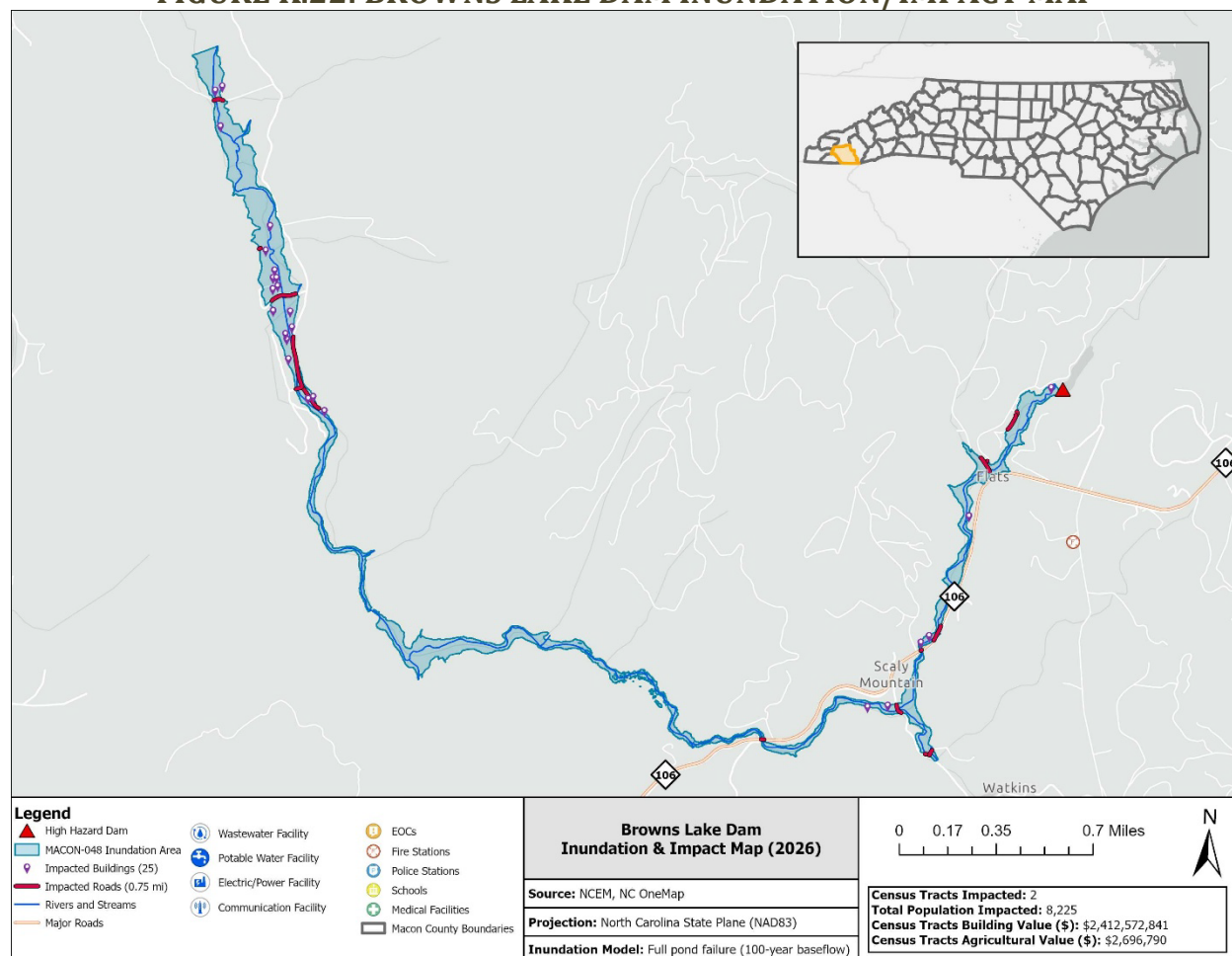
Source: FEMA, NCEM, NCDOT

FIGURE K.21: TRIMONT MOUNTAIN DAM INUNDATION/IMPACT MAP



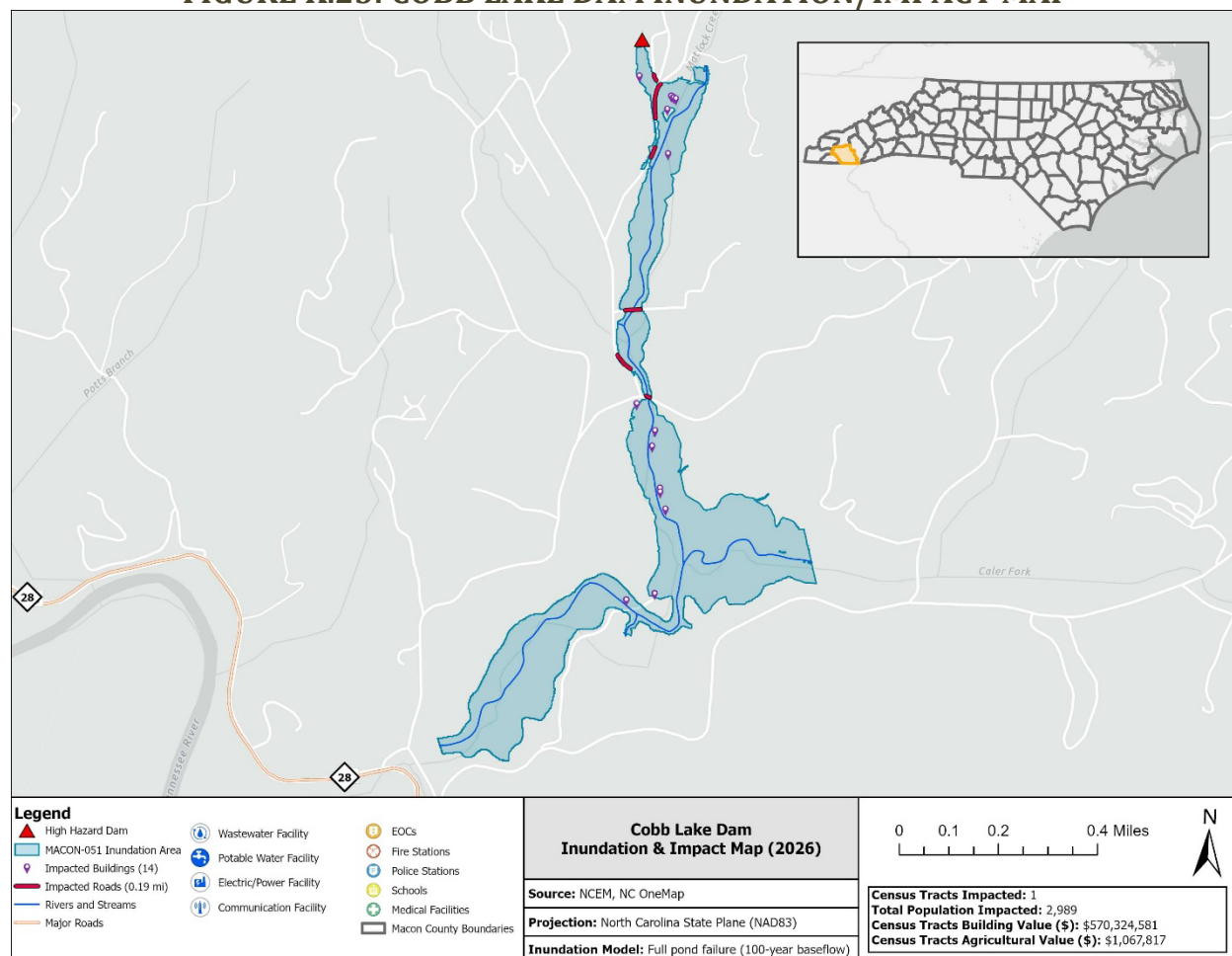
Source: FEMA, NCEM, NCDOT

FIGURE K.22: BROWNS LAKE DAM INUNDATION/IMPACT MAP



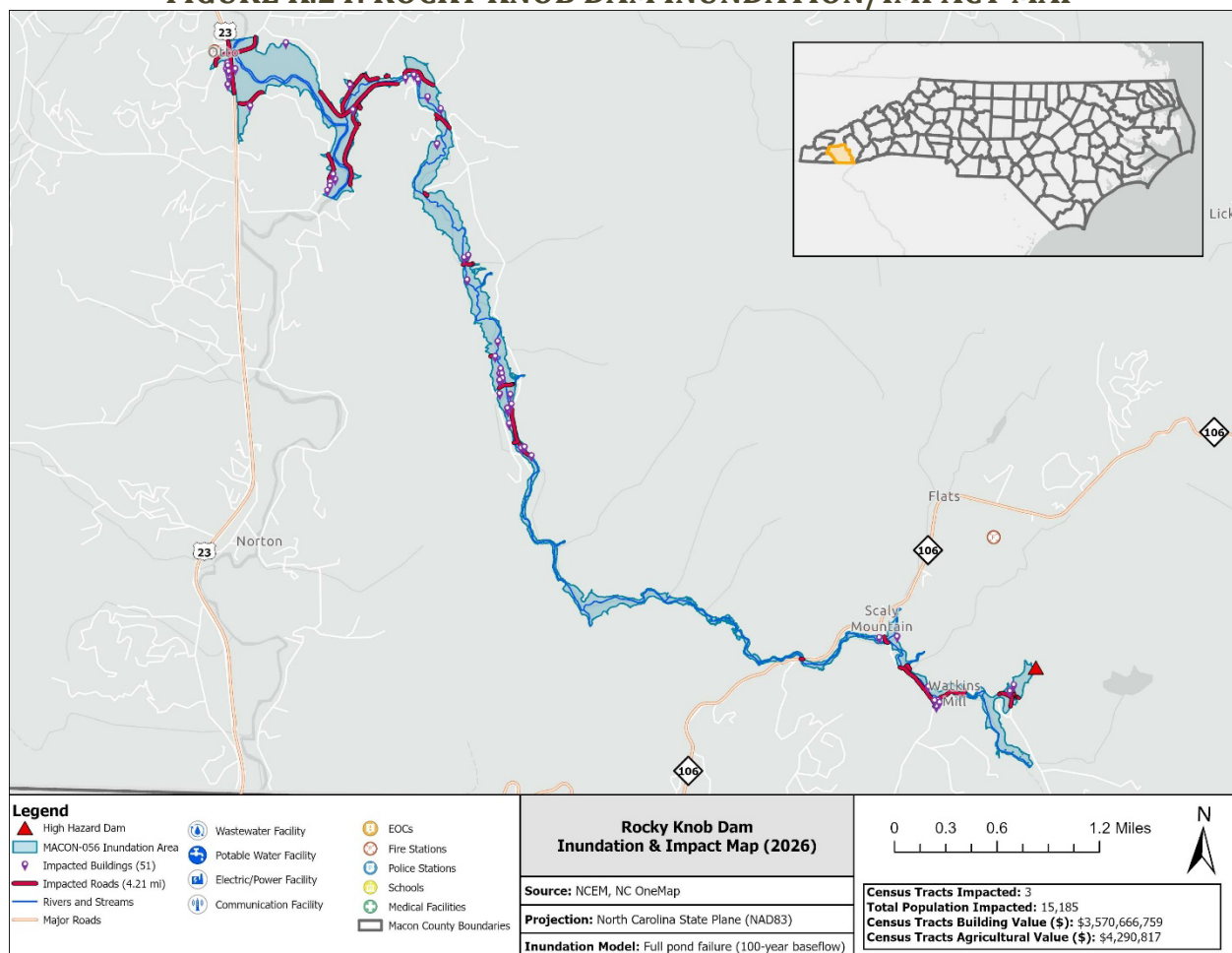
Source: FEMA, NCEM, NCDOT

FIGURE K.23: COBB LAKE DAM INUNDATION/IMPACT MAP



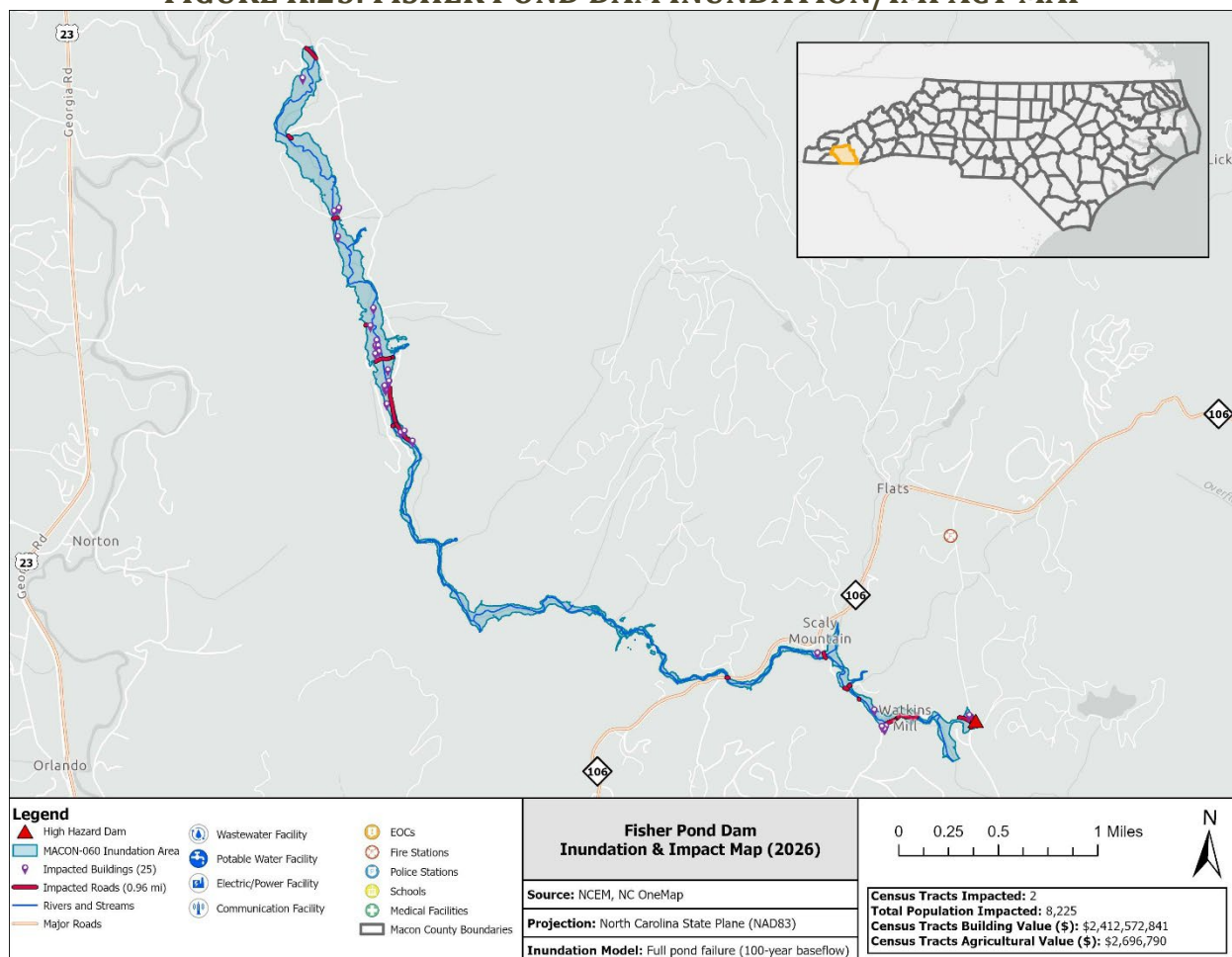
Source: FEMA, NCEM, NCDOT

FIGURE K.24: ROCKY KNOB DAM INUNDATION/IMPACT MAP



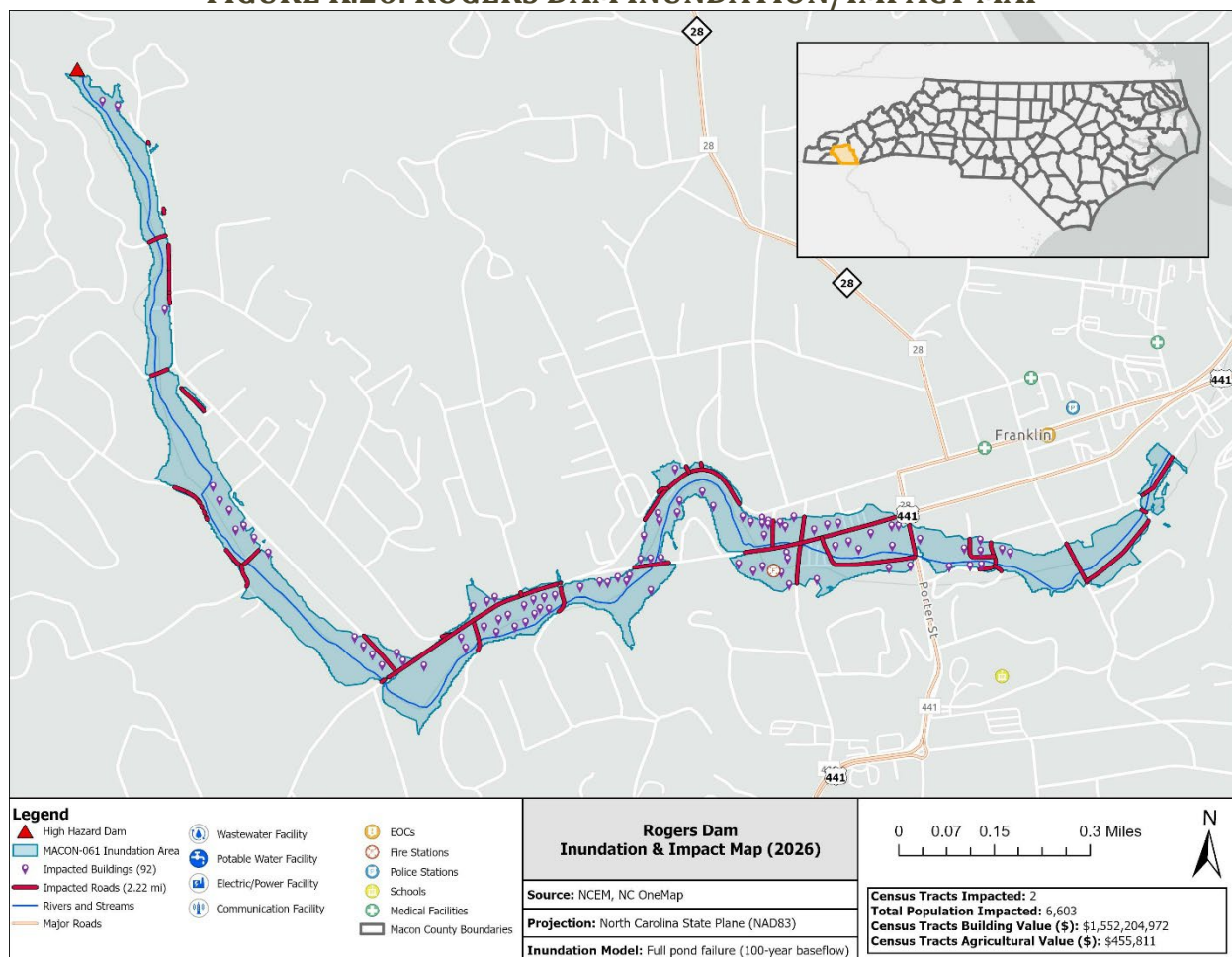
Source: FEMA, NCEM, NCDOT

FIGURE K.25: FISHER POND DAM INUNDATION/IMPACT MAP



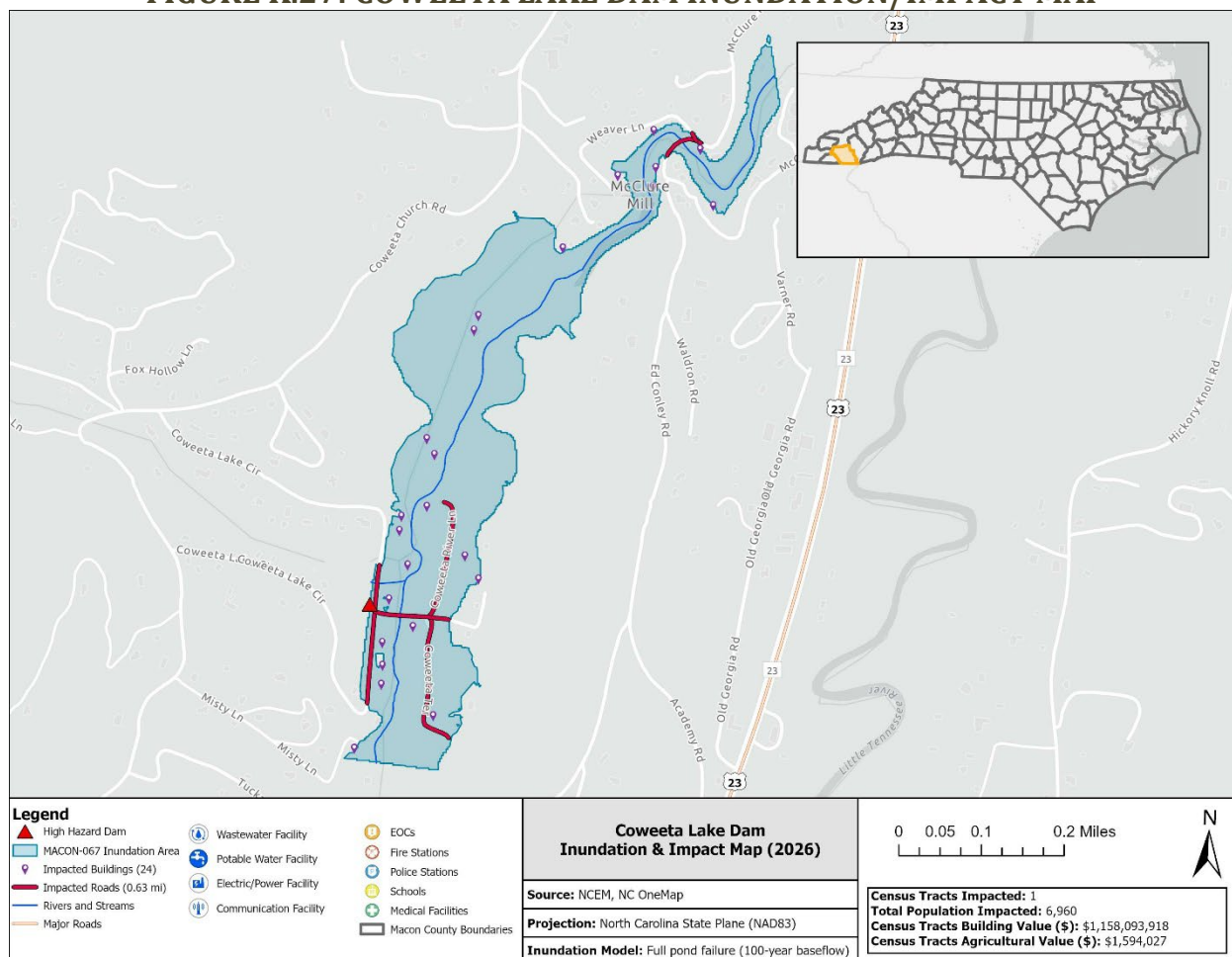
Source: FEMA, NCEM, NCDOT

FIGURE K.26: ROGERS DAM INUNDATION/IMPACT MAP



Source: FEMA, NCEM, NCDOT

FIGURE K.27: COWEETA LAKE DAM INUNDATION/IMPACT MAP



Source: FEMA, NCEM, NCDOT