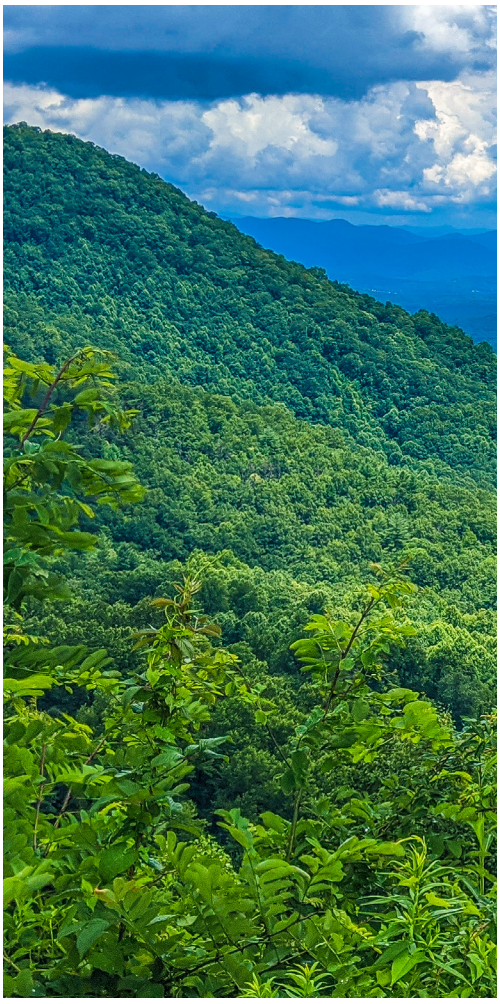
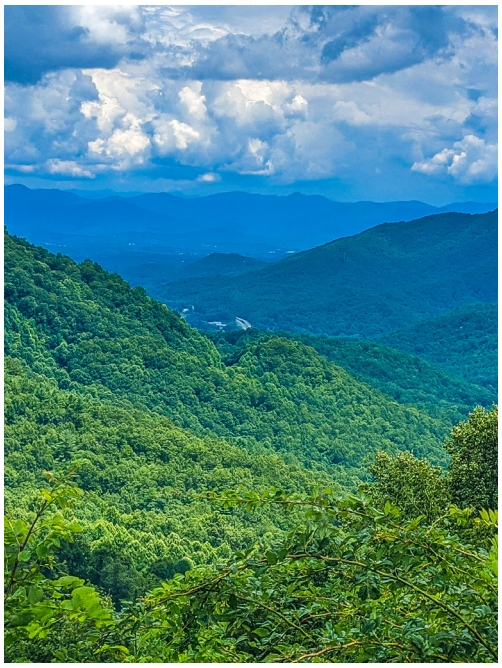





Clay Macon Regional Hazard Mitigation Plan – 2021 Update

FINAL - June 2021

U. S. Department of Homeland Security
Region IV
3005 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

July 16, 2021

Mr. Steve McGugan
State Hazard Mitigation Officer
Assistant Director / Mitigation Section Chief
Division of Emergency Management
NC Department of Public Safety
200 Park Offices Drive
Durham, NC 27713

Reference: Multi-Jurisdictional Hazard Mitigation Plan: Clay Macon Regional

Dear Mr. McGugan:

We are pleased to inform you that the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan Update is in compliance with the Federal hazard mitigation planning requirements resulting from the Disaster Mitigation Act of 2000, as contained in 44 CFR 201.6. The plan is approved for a period of five (5) years effective July 16, 2021 to July 15, 2026.

This plan approval extends to the following participating jurisdiction that provided a copy of their resolution adopting the plan:

- Town of Franklin

The approved participating jurisdiction is hereby an eligible applicant through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan for development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note, all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years. We also encourage each community to conduct a plan update process within one (1) year of being included

within a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development.

When you prepare a comprehensive plan update, it must be resubmitted through the State as a "plan update" and is subject to a formal review and approval process by our office. If the plan is not updated prior to the required five (5) year update, please ensure that the Draft update is submitted at least six (6) months prior to expiration of this plan approval.

The State and the participants in the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or the participants in the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan have any questions or need any additional information, please do not hesitate to contact Celicia Davis, of the Hazard Mitigation Assistance Branch, at (202) 997-7490, Carol Maldonado, of the Hazard Mitigation Assistance Branch, at (470) 307-6294, Hailey Peterson, of the Hazard Mitigation Assistance Branch, at (202) 655-8757 or Edwardine S. Marrone, of my staff, at (404) 433-3968.

Sincerely,

Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV

U. S. Department of Homeland Security
Region IV
3005 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

July 26, 2021

Mr. Steve McGugan
State Hazard Mitigation Officer
Assistant Director / Mitigation Section Chief
Division of Emergency Management
NC Department of Public Safety
200 Park Offices Drive
Durham, NC 27713

Reference: Multi-Jurisdictional Hazard Mitigation Plan: Clay Macon Regional

Dear Mr. McGugan:

This is a follow-up to our previous correspondence of July 16, 2021, in which we approved the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan and all the participating communities that submitted their resolutions at the time of plan approval. We have recently received from your office the following resolution for inclusion within this plan and subsequently have approved the jurisdiction under the approved the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan, effective July 23, 2021.

- Macon County, Unincorporated

The approved participating community is hereby an eligible applicant through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years. We also encourage each community to conduct a plan update process within one (1) year of being included within a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development.

When the Plan is amended or revised, the amendments and revisions should be incorporated into the next plan update. If the Plan is not updated prior to the required five (5) year update, please ensure that the Draft update is submitted at least six (6) months prior to expiration of this plan approval.

If you or the participants in the Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan have any further questions or need any additional information, please do not hesitate to contact Celicia Davis, of the Hazard Mitigation Assistance Branch, at (202) 997-7490, Carol Maldonado, of the Hazard Mitigation Assistance Branch, at (470) 307-6294, Hailey Peterson, of the Hazard Mitigation Assistance Branch, at (202) 655-8757 or Edwardine S. Marrone, of my staff, at (404) 433-3968.

Sincerely,

Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV

U.S. Department of Homeland Security
Region 4
3005 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

May 3, 2022

Mr. Steve McGugan
State Hazard Mitigation Officer
Assistant Director / Mitigation Section Chief
Division of Emergency Management, NC Department of Public Safety
200 Park Offices Drive
Durham, NC 27713

Reference: Clay Macon Regional Hazard Mitigation Plan

Dear Mr. McGugan:

This is a follow-up to our previous correspondence of July 16, 2021, in which we approved the Clay Macon Regional Hazard Mitigation Plan and all participating jurisdictions that originally submitted adoption resolutions. We have recently received and approved additional resolution(s) for inclusion.

Enclosed is the status of all participating jurisdictions. Approved jurisdictions are eligible applicants through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC)

Please note that all funding requests will be evaluated individually according to the program's specific eligibility requirements.

If you or any plan participant need assistance, please do not hesitate to contact Edwardine Marrone, of my staff, at (404) 433-3968.

Sincerely,

Kristen M. Martinenza

Kristen Martinenza, P.E., CFM
Branch Chief, Risk Analysis Branch
FEMA Region 4

Enclosure

Enclosure: Plan Participant Status List

Attached is the list of participating jurisdictions in the referenced hazard mitigation plan.

	Jurisdiction Name	Jurisdiction Status	Date Approved by FEMA
1)	Clay County	Approved	10/4/21
2)	Franklin town	Approved	7/16/21
3)	Hayesville town	Approved	5/3/22
4)	Highlands town	Approved	10/4/21
5)	Macon County	Approved	7/23/21

TABLE OF CONTENTS

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. 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*.

FEMA Definition of Hazard Mitigation:
"Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards."

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.

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) and the Pre-Disaster Mitigation (PDM) program, both 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 IV and the North Carolina Division of Emergency Management (NCDEM) 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.

SECTION 2
PLANNING PROCESS

This section describes the planning process undertaken to develop the Clay Macon Regional Hazard Mitigation Plan. It consists of the following eight subsections:

- 2.1 Overview of Hazard Mitigation Planning
- 2.2 History of Hazard Mitigation Planning in the Clay Macon Region
- 2.3 Preparing the 2021 Plan
- 2.4 The 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 determining how to best minimize or manage those risks. This process culminates in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short-term planning objectives and a long-term community vision.

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, and
- demonstrating a firm commitment to improving community health and safety.

Typically, communities that participate in mitigation planning are described as having the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that the investments made before a hazard event will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery, and reconstruction. Furthermore, mitigation practices will enable local residents, businesses, and industries to re-establish themselves in the wake of a disaster, getting the community economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond solely reducing hazard vulnerability. Mitigation measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, maintaining environmental health, and enhancing recreational opportunities. Thus, it is vitally important that any local mitigation planning process be integrated with other concurrent local planning efforts, and any proposed mitigation strategies must take into account other existing community goals or initiatives that will help complement or hinder their future implementation.

2.2 HISTORY OF HAZARD MITIGATION PLANNING IN THE CLAY MACON REGION

Prior to the development of the Clay Macon Regional Hazard Mitigation Plan in 2016, both of the counties had previously adopted separate county-level hazard mitigation plans. The FEMA approval dates for each of these plans, along with a list of the participating municipalities for each plan, are listed below:

- *Clay County Multi-Jurisdictional Hazard Mitigation Plan* (8/9/11)
  - Town of Hayesville
- *Macon County Multi-Jurisdictional Hazard Mitigation Plan* (8/9/11)
  - Town of Franklin
  - Town of Highlands

Each of the county-levels plans was developed using the multi-jurisdictional planning process recommended by the Federal Emergency Management Agency (FEMA).

For the development of the 2016 plan, all of the aforementioned jurisdictions joined to develop a regional plan. No new jurisdictions joined the process and all of the jurisdictions that participated in previous planning efforts participated in the development of the 2016 regional plan. The regional plan was developed in order to simplify planning efforts for the jurisdictions in the region and allowed resources to be shared amongst the participating jurisdiction to ease the administrative duties of all of the participants by combining the two existing County-level plans into one multi-jurisdictional plan. The 2016 plan was important and successful first start for regional hazard mitigation planning efforts and that success has carried over into the 2021 update of the plan.

2.3 PREPARING THE 2021 PLAN

FEMA requires that hazard mitigation plans be updated every five years to remain eligible for federal mitigation and public assistance funding. To prepare the 2021 *Clay Macon Regional Hazard Mitigation*

Plan, ESP Associates, Inc. was hired by North Carolina Emergency Management to provide professional mitigation planning services. Per the contractual scope of work, the consultant team followed the mitigation planning process recommended by FEMA (Publication Series 386 and Local Mitigation Plan Review Guide) and recommendations provided by North Carolina Emergency Management (NCEM) mitigation planning staff[1]. Additionally, for the 2020 update, FEMA Community Rating System (CRS) and Community Wildfire Protection Plan (CWPP) requirements were integrated into the plan update.

Tables 2.1 and 2.2 below provide an overview of how the Community Rating System and Community Wildfire Protection Plan requirements were integrated into this plan update.

Table 2.1 FEMA Hazard Mitigation Planning Requirements and the 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 2.2 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

[1] A copy of the negotiated contractual scope of work between NCEM and ESP is available through NCEM upon request.

CWPP Process	Hazard Mitigation Plan Integration Reference
Step 8: Finalize the CWPP	Appendix A: Plan Adoption

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

The Local Mitigation Plan Review Tool, found in Appendix C, provides a detailed summary of FEMA's current minimum standards of acceptability for compliance with DMA 2000 and notes the location where each requirement is met within this Plan. These standards are based upon FEMA's Final Rule as published in the Federal Register in Part 201 of the Code of Federal Regulations (CFR). The planning team used FEMA's Local Mitigation Plan Review Guide (October 2011) for reference as they completed the Plan.

The process used to prepare this Plan included twelve major steps that were completed over the course of approximately nine months beginning in August 2019. Each of these planning steps (illustrated in **Figure 2.1**) resulted in critical work products and outcomes that collectively make up the Plan. Specific plan sections are further described in Section 1: *Introduction*.

FIGURE 2.1: MITIGATION PLANNING PROCESS FOR THE CLAY MACON REGION

2.4 THE CLAY MACON REGIONAL HAZARD MITIGATION PLANNING TEAM

In order to guide the development of this Plan, the participating jurisdictions created the Clay Macon Regional Hazard Mitigation Planning Team (Regional Hazard Mitigation Planning Team or Regional Planning Team). The Regional Hazard Mitigation Planning Team represents a community-based planning

team made up of representatives from various county and municipal departments, and other key stakeholders identified to serve as critical partners in the planning process.

Beginning in August 2019, the Regional Hazard Mitigation Planning Team members engaged in regular discussions as well as local meetings and planning workshops to discuss and complete tasks associated with preparing the Plan. This working group coordinated on all aspects of plan preparation and provided valuable input to the process. In addition to regular meetings, committee members routinely communicated and were kept informed through an e-mail distribution list.

Specifically, the tasks assigned to the Regional Hazard Mitigation Planning Team members included:

- participate in Regional Hazard Mitigation Planning Team meetings and workshops
- provide best available data as required for the risk assessment portion of the Plan
- help update the Capability Assessment section of the plan and provide copies of any mitigation or hazard-related documents for review and incorporation into the plan
- support the update of the Mitigation Strategy, including the review, update and adoption of regional goal statements
- help update existing mitigation actions and design and propose any appropriate new 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
- support the adoption of the 2021 *Clay Macon Regional Hazard Mitigation Plan*

Table 2.3 lists the members of the Regional Hazard Mitigation Planning Team who were responsible for participating in the development of the Plan. Committee members are listed in alphabetical order by last name.

TABLE 2.3: MEMBERS OF THE CLAY MACON REGIONAL HAZARD MITIGATION PLANNING TEAM

NAME	DEPARTMENT / AGENCY
Lancaster, Ricky	Clay County EM Director
Cabe, Warren	Macon County EM
Stillwell, Anthony	Clay County Building Department and Floodplain Manager
Ingram, Dakota	Clay County Water and Sewer
Wingate, Brittany	Clay County EM Assistant
Hill, Mark	NCDOT Maintenance Macon/Clay
Burch, Brian	NCDOT Division 14
Jones, Amber	Clay County Environmental Health/Health Department
Setser, Justin	Town of Franklin, Town Planner
Waldroop, Travis	Macon County Fire Services
Seagle, Todd	Macon County EM
Gregory, Jeff	NCDOT Macon County
Mauer, Charles	NCDOT Clay County
Johnson, Stephanie	Clay County Public Health Disaster Preparedness

Table 2.4 lists points of contact for several of the jurisdictions who elected to designate their respective county officials to represent their jurisdiction on the planning team, generally because they did not have the time or staff to be able to attend on their own. Although these members designated county officials

to represent them at in-person meetings, each was still 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. These members are listed below by municipality.

TABLE 2.4: MEMBERS DESIGNATING REPRESENTATIVES TO CLAY MACON REGIONAL HAZARD MITIGATION PLANNING TEAM

NAME	POSITION	DEPARTMENT / AGENCY
Ward, Josh	Town Manager	Highlands
Baughn, Harry	Mayor	Hayesville

Finally, it should be noted that many neighboring communities were offered the opportunity to participate in the planning process by being invited to meetings, through phone conversations, and in person discussions. Among those invited to participate were representatives from Emergency Management offices in several of the counties that surround Clay and Macon Counties including Cherokee, Swain, Graham, and Jackson Counties. During these discussions, no major comments or suggestions were received concerning the plan.

2.4.1 Multi-Jurisdictional Participation

The *Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan* includes two counties and three 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;
- Identify completed mitigation projects, if applicable; and
- Develop (and/or update) and adopt their local Mitigation Action Plan.

Each jurisdiction participated in the planning process and has developed a local Mitigation Action Plan unique to their jurisdiction. Each jurisdiction will adopt their Mitigation Action Plan separately. This provides the means for jurisdictions to monitor and update their Plan on a regular basis.

2.5 COMMUNITY MEETINGS AND WORKSHOPS

The preparation of this Plan required a series of meetings and workshops for facilitating discussion, gaining consensus and initiating data collection efforts with local government staff, community officials, and other identified stakeholders. More importantly, the meetings and workshops prompted continuous input and feedback from relevant participants throughout the drafting stages of the Plan. The following is a summary of the key meetings and community workshops held during the development of the plan update[2]. In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency, such as the approval of specific mitigation actions for their department or agency to undertake and include in the Mitigation Action Plan.

[2] Copies of agendas, sign-in sheets, minutes, and handout materials for all meetings and workshops can be found in Appendix D.

Meeting Minutes from Internal Kickoff Conference Call/Skype Meeting with County Leads
September 12, 2019
Phone Call/Skype Meeting

Nathan Slaughter, Department Manager from ESP Associates, Inc. and Project Manager for the update of the Clay Macon Regional Hazard Mitigation Plan, began the meeting by welcoming the attendees and giving a brief overview of the project and the purpose of the meeting.

Mr. Slaughter recognized both of the participating counties were represented. Mr. Slaughter then explained new project information, which included funding and grant information, and that there was no local match requirement for this update.

Next, Mr. Slaughter gave a brief mitigation refresher and reviewed both the Disaster Mitigation Act of 2000 and NC Senate Bill 300. He explained two ways of how we should think about mitigation: we want to mitigate hazard impacts of existing development in the community (houses, businesses, critical facilities, etc.), and ensure that future development is conducted in a way that doesn't increase vulnerability. He also introduced the six hazard mitigation techniques and provided examples of each. The key objectives of the update were shared: coordinate between two counties; update the plan to demonstrate progress and reflect current conditions; increase public education and awareness; maintain grant eligibility for participating jurisdictions; update the plan in accordance with Community Rating System (CRS) requirements; and maintain compliance with State and Federal requirements. Mr. Slaughter then explained new elements that will be included in this update, such as the NCEM Risk Management Tool, CRS 510 compliance, Risk MAP products, Community Wildfire Protection Plan elements, and the Resilience Assessment.

The elements of the planning process were shared and explained, and the hazards identified in the State of North Carolina Hazard Mitigation Plan were reviewed. Next, the project schedule was shared and the roles and responsibilities of ESP Associates, county leads, and participating jurisdictions were explained in detail.

Finally, Mr. Slaughter gave the group the link to the public survey. The group then discussed the next steps; due to the number of participating communities, all were in agreement to initially hold a regional meeting with all counties, and then to hold individual countywide meetings to update the mitigation strategy.

Mr. Slaughter thanked everyone for their participation and the call was ended.

September 29, 2019
First Regional Hazard Mitigation Planning Team
Meeting – Project Kickoff Meeting -
Clay County Department of Social Services Building
Nathan Slaughter, Department Manager from ESP Associates, Inc. and Project Manager for the update of the Clay Macon Regional Hazard Mitigation Plan, began the meeting by welcoming the attendees and giving a brief overview of the project and the purpose of the meeting.

Mr. Slaughter led the meeting of the Regional Hazard Mitigation Planning Team and began by having attendees introduce themselves. The attendees included representatives from various departments and local jurisdictions within each of the counties participating in the plan update. Mr. Slaughter then provided an overview of the items to be discussed at the meeting and briefly reviewed the agenda and presentation slide handouts. He then defined mitigation and gave a review of the Disaster Mitigation Act of 2000 and NC Senate Bill 300.

To continue, Mr. Slaughter provided detailed information about the project. He mentioned that the project is funded by a FEMA HMGP grant, and that NCEM was managing the project this time around and had assigned ESP Associates to serve as the project manager because of their prior experience working in the region. For this update, there was no local match requirement.

Mr. Slaughter then explained some of the basic concepts of mitigation. He explained how we should think about mitigation: we want to mitigate hazard impacts of existing development in the community (houses, businesses, critical facilities, etc.), and ensure that future development is conducted in a way that doesn't increase vulnerability. This can be achieved by having good plans, policies, and procedures in place.

Following the overview, Mr. Slaughter led the group in an "icebreaker" exercise to refamiliarize meeting participants to various mitigation techniques. He briefly recapped the six different categories of mitigation techniques: emergency services, prevention, natural resource protection, structural projects, public education and awareness, and property protection. Each attendee was then given $20 in mock currency and asked to "spend" their mitigation money as they personally deemed appropriate among the six mitigation categories. Money was "spent" by placing it in cups labeled with each of the mitigation techniques. Upon completion of the exercise, Mr. Slaughter tabulated and shared the results with the group. The most mock money was spent on prevention, followed by emergency services. These results were compared against those from the previous plan development's ice breaker exercise. This helped demonstrate how priorities in mitigation actions have changed since the previous update.

After the icebreaker exercise, Mr. Slaughter reviewed the key objectives of the project, which are to:

- Coordinate between the two participating counties to update the regional plan
- Update the plan to demonstrate progress and reflect current conditions
- Complete the update before the existing plan expires on July 17, 2021
- Increase public awareness and education
- Maintain grant eligibility for participating jurisdictions
- Update the plan in accordance with Community Rating System (CRS) requirements, and
- Maintain compliance with State and Federal requirements

Next, he explained new elements to this update, which include the NCEM's RMT, Activity 510 compliance for CRS communities, Risk MAP, Community Wildfire Protection Plans, the NC Resilience Assessment, and EMAP compliance.

Mr. Slaughter reviewed the list of participating jurisdictions with the group, which all agreed to participate again. He also explained the planning process and specific tasks to be accomplished for the project, which include the planning process, risk assessment, capability assessment, mitigation strategy, mitigation action plan, and plain maintenance procedures. For the risk assessment portion of the

process, Mr. Slaughter asked each county to designate a point of contact to coordinate the gathering of GIS data required for the analysis. He also reviewed the list of identified hazards and the committee agreed to maintain the previous list of hazards for the two counties.

The project schedule was presented and Mr. Slaughter noted that the twelve-month schedule provided ample time to produce a quality plan and meet state and federal deadlines.

Mr. Slaughter discussed what data would need to be collected to complete the project. This includes GIS Data, Capability Assessment Revisions, a Public Participation Survey, and updates to existing Mitigation Actions.

Mr. Slaughter then reviewed the roles and responsibilities of ESP Associates, Inc, the County leads, and the participating jurisdictions. The presentation concluded with a discussion of the next steps to be taken in the project development. He encouraged meeting participants to distribute the Public Participation Survey and shared the public web link. The next HMPT meeting was scheduled for some time in early 2020 to discuss the findings of the risk and capability assessments and to begin updating existing mitigation actions and identify new goals.

August 18, 2020
Second Regional Hazard Mitigation Planning Team Meeting – Mitigation Strategy Meeting - Online Meeting

This meeting was held online because of the COVID-19 pandemic.

Nathan Slaughter, Project Manager from ESP Associates, began the meeting by welcoming the attendees and thanking them for their time and joining the online meeting. Mr. Slaughter gave an overview of the meeting agenda and asked meeting attendees to introduce themselves. He then gave a refresher on mitigation, why we plan, and the key objectives of the project. He reviewed the participating jurisdictions, project tasks and project schedule. He stated that a draft of the updated Regional Hazard Mitigation Plan would be presented in September 2020.

Mr. Slaughter then presented the findings of the risk assessment. He shared the list of all hazards that are addressed in the regional plan, and reviewed the list of hazards addressed in the North Carolina State Hazard Mitigation Plan. He discussed how the hazards in the regional plan would be revised to align with the hazards in the State Plan. This would include the addition of manmade hazards and technological hazards. He discussed a couple of caveats for the risk assessment and indicated that best available data was used. While that information is helpful, events are often under-reported, so it is important to keep the end goal in sight. The purpose of the risk assessment was shared: to compare hazards and determine which should be the focus of the mitigation actions. Finally, he mentioned to the stakeholders that it ultimately is their risk assessment, so their recommendations for adjustment are welcomed and encouraged.

Mr. Slaughter stated that since the last plan was updated, there has been one Presidential disaster declaration that has impacted the region, which helped emphasize the need to continue updating the mitigation plan.

The following Hazard Profiles and summaries of each hazard were then shared:

- FLOOD: There have also been 53 reported NFIP losses since 1978 and approximately $1.1 million in claims. There are 3 repetitive loss properties, and future occurrences are highly likely.
- HURRICANE AND COASTAL HAZARDS: 24 storm tracks have come within 75 miles of the region since 1850. Remnants of tropical systems are of greatest concern for the region. Future occurrences are likely.
- SEVERE WINTER WEATHER: 125 winter weather events have been reported for the region between 1996-2018. Future occurrences are highly likely.
- WILDFIRE: Wildfire is a hazard of concern for the region, which is one of the most at risk areas in the State. Future occurrences are likely.
- DAM FAILURE: There are 36 high hazard dams in the region. Future occurrences are unlikely.
- DROUGHT: There were 8 regional drought events between 2000 and 2018, and future occurrences are likely.
- TORNADOES: There have been 10 recorded events since 1950, causing $1.4 million in property damage. Future occurrences are likely.
- SEVERE THUNDERSTORMS: 189 severe thunderstorm events have been recorded since 1950. These events resulted 2 injuries and $2.1 million in property damages. Future occurrences are highly likely.
- LANDSLIDES: There have been 55 landslide occurrences recorded in the region. Future occurrences are highly likely.
- HAILSTORM: There have been 85 recorded events since 1950. Future occurrences are likely.
- LIGHTNING: Since 1996, there have been 14 reported occurrences, which resulted in 1 injury and nearly $2.2 million thousand in property damage. Future occurrences are highly likely.
- EARTHQUAKE: Earthquake events have taken place in the region. The strongest earthquake to impact NC was in 1916 in Skyland. Future occurrences are possible.
- INFECTIOUS DISEASE: The COVID-19 pandemic is an example of an infectious disease outbreak and future occurrences are possible.
- HAZARDOUS MATERIALS INCIDENTS: There are 3 TRI Facilities in the region. Future occurrences are possible.
- NUCLEAR EMERGENCY: There is 1 nuclear facility within 50 miles of the region (Oconee Nuclear Station in SC). No major historical occurrences were found, and future occurrences are unlikely.
- TERRORISM: Although there are a number of potential targets for terrorist in the region, future occurrences are unlikely.
- CYBER: Cyber is an emerging hazard for the region. Future occurrences are possible.
- ELECTROMAGNETIC PULSE: EMP is a low- probability hazard for the region.

In concluding the review of Hazard Profiles, Mr. Slaughter stated if anyone had additional information for the hazard profiles. Planning committee members offered the following comments:

- Severe winter weather does occur in the region but not as frequently as you might think. It is not a great hazard of concern as it is in other part of the NC mountains.
- Severe thunderstorms should be ranked higher than severe winter weather.
- “Easter weekend” storms created 14 slope movements and was as bad as the Peak Creek Slide
- Wildfire is OK as a moderate hazard of concern. Recently had a 20-acre fire that started in Georgia. The Tellico Fire in 2016 is the worst in recent years.

After the open discussion, Mr. Slaughter asked the planning committee members to call or email him with their concerns or additional comments on the risk assessment.

The results of the hazard identification process were used to generate a Priority Risk Index (PRI), which categorizes and prioritizes potential hazards as high, moderate or low risk based on probability, impact, spatial extent, warning time, and duration. The highest PRI was assigned to Severe Winter Weather, Tornadoes/Severe Thunderstorms, Flooding, Landslides and Cyber.

Mr. Slaughter then displayed maps that presented each county's social vulnerability, as documented by the Center for Disease Control. The maps present how socially vulnerable areas in each county are as compared to the rest of North Carolina. Many indicators were used to determine the social vulnerability, and the factors were grouped into four themes that were based on census-tract levels.

After a brief break, Mr. Slaughter then presented the Capability Assessment Findings. ESP Associates used a scoring system that was used to rank the participating jurisdictions in terms of capability in four major areas (Planning and Regulatory; Administrative and Technical; Fiscal; Political). Important capability indicators include National Flood Insurance Program (NFIP) participation, Building Code Effective Grading Schedule (BCEGS) score, and Community Rating System (CRS) participation.

Mr. Slaughter reviewed the Relevant Plans and Ordinances, Relevant Staff/Personnel Resources, and Relevant Fiscal Resources. All of these categories were used to rate the overall capability of the participating counties and jurisdictions. He indicated that the best-case scenario for communities was to have high capability and low vulnerability. Conversely, the worst-case scenario for communities was to have high vulnerability and low capability. Most jurisdictions are in the moderate to high range for Planning and Regulatory Capability and in the low to moderate range for Fiscal Capability. There is variation between the jurisdictions for Administrative and Technical Capability, mainly with respect to availability of planners and grant writers. Based upon the scoring methodology, it was determined that all of the participating jurisdictions have moderate or high capabilities to implement hazard mitigation programs and activities.

Mr. Slaughter then transitioned to the Mitigation Strategy portion of the presentation. He began by giving an overview of the process for updating the Mitigation Strategy and presented the existing mitigation goals for the regional plan. He asked the Regional Hazard Mitigation Planning Committee to review the goals to determine whether or not they still reflect current vulnerabilities and current mitigation priorities. The committee members agreed that the goals were still relevant and should remain the goals moving forward.

Mr. Slaughter then indicated that each participating jurisdiction would need to provide a status update for their existing mitigation actions (completed, deleted, or deferred) by September 15, 2020. Mr. Slaughter also discussed the Mitigation Action Worksheets to be completed for any new mitigation actions and requested that all worksheets be returned by September 15, 2020. Mr. Slaughter then presented sample mitigation actions for the committee members to consider to include in their plan update.

Mr. Slaughter then discussed the results of the public participation survey that was posted on several of the participating counties' and jurisdictions' websites. As of the meeting date, 64 responses had been received. Based on the preliminary results, respondents felt that infectious disease, and severe

thunderstorms posed the greatest threats to their neighborhood. Most did not live in a floodplain or have flood insurance, but 61% of all respondents did not know who to contact regarding reducing their risks to hazards.

Finally, Mr. Slaughter discussed the next steps in the planning process. These included returning mitigation action updates and delivery of a draft plan in September 2020. He again thanked the group for taking the time to attend and the meeting was adjourned.

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 citizen and community-based input provides the entire planning team with a greater understanding of local concerns and increases the likelihood of successfully implementing mitigation actions by developing community "buy-in" from those directly affected by the decisions of public officials. As citizens become more involved in decisions that affect their safety, they are more likely to gain a greater appreciation 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 city safer from the potential effects of hazards.

Public involvement in the development of the *Clay Macon Regional Hazard Mitigation Plan* was sought using two methods: (1) public survey instruments were made available in hard copy and online; and (3) copies of the draft Plan deliverables were made available for public review on county and municipal websites and at government offices. The public was provided two opportunities to be involved in the development of the regional plan at two distinct periods during the planning process: (1) during the drafting stage of the Plan; and (2) upon completion of a final draft Plan, but prior to official plan approval and adoption.

Each of the participating jurisdictions will hold public meetings before the final plan is officially adopted by the local governing bodies. These meetings will occur at different times once FEMA has granted conditional approval of the Plan. Adoption resolutions will be included in Appendix A.

2.6.1 Public Participation Survey

The Regional Hazard Mitigation Planning Team was successful in getting citizens to provide input to the mitigation planning process through the use of the *Public Participation Survey*. The *Public Participation Survey* was designed to capture data and information from residents of the Clay Macon Region that might not be able to attend public meetings or participate through other means in the mitigation planning process.

Copies of the *Public Participation Survey* were distributed to the Regional Hazard Mitigation Planning Team to be made available for residents to complete at local public offices. A link to an electronic version of the survey was also posted on each county's website. A total of 32 survey responses were

received, which provided valuable input for the Regional Hazard Mitigation Planning Team to consider in the development of the plan update. Selected survey results are presented below.

- Approximately 67 percent of survey respondents had been impacted by a disaster, mainly severe winter weather, infectious disease (COVID-19) and flooding.

- Respondents ranked Infectious Disease as the highest threat to their neighborhood (23 percent) followed by Severe Thunderstorms Flood (20 percent), Wildfire (12 percent), and Severe Winter Weather (12 percent).

- Approximately 53 percent of respondents have taken actions to make their homes more resistant to hazards and 81 percent are interested in making their homes more resistant to hazards.

- 62 percent of respondents do not know what office to contact regarding reducing their risks to hazards.

- Emergency Services, Natural Resource Protection, Structural Projects and Prevention were ranked as the most important activities for communities to pursue in reducing risks.

A copy of the survey is provided in Appendix B and a detailed summary of the survey results are provided in Appendix D.

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 beginning of the planning process for the development of this plan, the project consultant worked with each of the County Emergency Management leads to initiate outreach to stakeholders to be involved in the planning process. The project consultant sent out a list of recommended stakeholders provided from FEMA Publication 386-1 titled **Getting Started: Building Support for Mitigation Planning**. The list of recommended stakeholders is found in Appendix C of that publication (Worksheet #1: Build the Planning Team) and has been included in **Appendix D** of this plan to demonstrate the wide range of stakeholders that were considered to participate in the development of this plan. Each of the County Emergency Management leads used that list for reference as they invited stakeholders from their counties to participate in the planning process.

In addition to the efforts described above, the regional Hazard Mitigation Planning Team encouraged more open and widespread participation in the mitigation planning process by designing and distributing the *Public Participation Survey*. These opportunities were provided for local officials, residents, businesses, academia, and other private interests in the region to be involved and offer input throughout the local mitigation planning process.

2.8 DOCUMENTATION OF PLAN PROGRESS

Progress in hazard mitigation planning for the participating jurisdictions in the Clay Macon Region is documented in this plan update. Since hazard mitigation planning efforts officially began in the participating counties with the development of the initial Hazard Mitigation Plans in the late 1990s and early 2000s, many mitigation actions have been completed and implemented in the participating jurisdictions. These actions will help reduce the overall risk to natural hazards for the people and property in the Clay Macon Region. The actions that have been completed are documented in the Mitigation Action Plan found in Section 9.

In addition, community capability continues to improve with the implementation of new plans, policies and programs that help to promote hazard mitigation at the local level. The current state of local capabilities for the participating jurisdictions is captured in Section 7: *Capability Assessment*. The participating jurisdictions continue to demonstrate their commitment to hazard mitigation and hazard mitigation planning and have proven this by developing the Regional Hazard Mitigation Planning Team to update the Plan and by continuing to involve the public in the hazard mitigation 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:

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

3.1 GEOGRAPHY AND THE ENVIRONMENT

The Clay Macon Region is located in the Blue Ridge Mountains in the southwestern portion of North Carolina. The region is characterized by high mountain peaks, sloping mountainsides, and fertile creek and river valleys. An orientation map is provided as **Figure 3.1**.

The Clay Macon Region is the home of the Nantahala River, one of the most popular whitewater rafting destinations in the nation, as well as the Nantahala National Forest. The rivers, streams, waterfalls, valleys, coves, and mountains are a geographic and recreational anchor for the region. Biking, hiking, camping, boating, swimming, fishing, whitewater rafting, horseback riding, golfing, and even gem mining are all popular activities. The region has a rich history of natural, cultural, agricultural, music, and craft heritage which can be explored through historic trails, local museums, agritourism, festivals, and mountain artisan shows.

The total land area of each of the participating counties is presented in **Table 3.1**.

TABLE 3.1: TOTAL LAND AREAS OF PARTICIPATING COUNTIES

County	Total Land Area
Clay County	215 square miles
Macon County	516 square miles

The Clay Macon Region enjoys a generally mild year-round climate that is characterized by colder winters and warm summers; however, variation in elevation and topography can drastically affect local weather. The average annual temperature for this area is approximately 55˚F, with an average high of 68˚F and low of 42˚F. Typically, the warmest month in the Clay Macon Region is July and the coldest month is January. The highest recorded temperature in the region was 101˚F (in 1952) and the lowest recorded temperature was -19˚F (in 1985). Precipitation is generally well distributed throughout the year and annual totals average between 54 and 72 inches[1].

[1] State Climate Office of North Carolina.

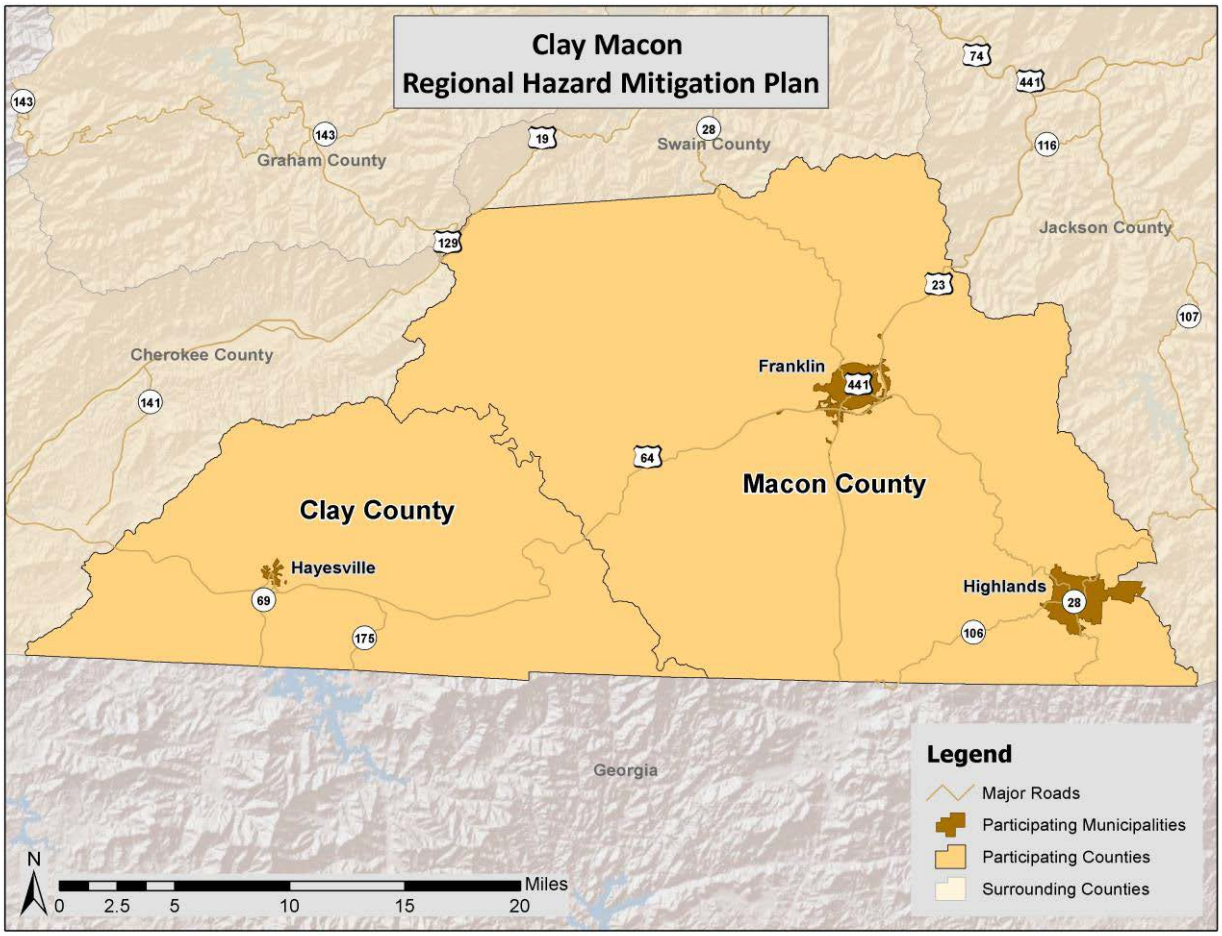
In general, the spring months are marked by unpredictable weather and changes can occur rapidly with sunny skies yielding to snow in just a few hours. Average high temperatures reach the mid-70s in May. There is a similar increase in average low temperatures, which are just above freezing in March and climb to nearly 50˚F in May.

In the summer, afternoon showers and thunderstorms are common and average temperatures increase with afternoon highs reaching the low to mid-80s in July and August. Summertime is typically moderately warm and humid, however, at higher elevations, weather tends to be more pleasant during the summer months.

September through mid-November is typified by clear skies and cooler weather that alternates between warm days and cool nights. Daytime highs are usually in the upper 70s near 80 during September but fall to around 60˚F by early November. The first frost often occurs in October and by November the lows are near freezing. During these autumn months, there are only occasional rain showers making it the driest period of the year.

Winter in the Clay Macon Region is generally moderate but extremes do occur, especially at higher elevations. Winter lows frequently drop below freezing and temperatures can be even lower at higher elevations. In the winter months, the average high temperature falls between the upper-40s and lower-50s and the average low temperature is in the mid-20s. The region averages between 7 and 14 inches of snow per year depending on altitude of the location.

FIGURE 3.1: CLAY MACON REGION ORIENTATION MAP



3.2 POPULATION AND DEMOGRAPHICS

Macon County is the largest of the two counties in terms of population. Between 2013 and 2017, the region experienced population growth. Clay County had the highest county growth rate at 4.6 percent. Population counts from the US Census Bureau for 1990, 2000, 2010 and 2018 for both of the participating counties are presented in **Table 3.2**.

TABLE 3.2: POPULATION COUNTS FOR PARTICIPATING COUNTIES

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	2018 Population Estimate	% Change 2010-2018
Clay County	7,155	8,775	10,587	11,139	5.2%
Macon County	23,499	29,811	33,922	35,285	4%

Source: United States Census Bureau

Based on the 2018 estimates, the median age of residents of the participating counties ranges from 49 to 51 years. The racial characteristics of the participating counties are presented in **Table 3.3**. Generally, whites make up the majority of the population in the region accounting for over 95 percent of the population in all Clay Macon Region Counties. Macon County has a slightly more diverse population than Clay County.

TABLE 3.3: DEMOGRAPHICS OF PARTICIPATING COUNTIES

Jurisdiction	White, Percent (2018)	Black or African American, Percent (2018)	American Indian or Alaska Native, Percent (2018)	Asian, Percent (2018)	Native Hawaiian or Other Pacific Islander, Percent (2018)	Persons of Hispanic Origin, Percent (2018) *	Two or More Races, Percent (2018)
Clay County	96.4%	1.2%	0.5%	0.3%	N/A	3.6%	1.6%
Macon County	95.4%	1.6%	0.8%	1.0%	0.1%	7.3%	1.2%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau

3.3 HOUSING, INFRASTRUCTURE, AND LAND USE

3.3.1 Housing

According to the US Census Bureau, in 2017 there were 32,921 housing units in the Clay Macon Region, the majority of which are single family homes or mobile homes. Housing information for the two participating counties is presented in **Table 3.4**. As shown in the table, both counties have a low percentage of seasonal housing units.

TABLE 3.4: HOUSING CHARACTERISTICS OF PARTICIPATING COUNTIES

Jurisdiction	Housing Units (2010)	Housing Units (2018)	Seasonal Units, Percent (2018)	Median Home Value (2013-2017)
Clay County	7,140	7,360	0.5%	$154,600
Macon County	25,425	25,653	3%	$162,000

Source: United States Census Bureau

3.3.2 Infrastructure

Transportation

There are several US highways that cross the Clay Macon Region. US Route 64 is the major east-west thoroughfare connecting the region to its neighboring counties (Cherokee and Jackson) and it also runs through Franklin and Hayesville. This highway is also part of the designated scenic byway called Waterfall Byway. Waterfall Byway winds through five counties, including Clay and Macon, and earns its

name from the 200 waterfalls that surround the route. The major north-south highway in the region is US 23/441, which connects Macon County to Tennessee and Jackson County. NC 28 is a primary state highway that also runs north to south through the Nantahala National Forest.

Within Clay County, a public transportation system made up 16 service vehicles which serves local human service agencies and the public through subscription. Macon County Transit also provides public transportation for its county's citizens through appointments on a first call first served basis. Currently, there is no rail service in the Clay Macon Region; however, the Great Smoky Mountain Railroad, which operates tourist excursions in addition to moving freight, runs just north of Macon County.

Asheville Regional Airport is the largest airport in the mountains serving the Clay Macon Region and all of Western North Carolina. The airport currently offers non-stop commercial flights on 4 airlines to 11 cities. The major airport located nearest to the region is the Charlotte Douglas International Airport, which offers non-stop commercial flights on 10 airlines to more than 140 destinations across the United States as well as to several international destinations. Other major nearby airports include the Hartsfield-Jackson Atlanta International Airport in Georgia and the Nashville Metropolitan Airport in Tennessee. An additional general aviation airport servicing the Clay Macon Region includes the Macon County Airport.

Utilities

Electrical power in the Clay Macon Region is provided by one public utility, two electricity cooperatives, and one municipality in Macon County. Duke Energy Progress provides service to Macon County and the southwest corner of Clay County. The electricity cooperatives servicing the region include Haywood Electric Membership Corporation in the southeastern corner of Macon County and Blue Ridge Mountain Electric Membership Corporation (which is a Tennessee Valley Authority distributor) in the southwestern corner of Clay County. The Town of Highlands also provides municipally-owned and operated electric service to its residents.

Water and sewer service is provided in some areas of the region by Clay County, the Town of Franklin, and the Town of Highlands, but generally municipal water systems are extremely limited in the mountains and private or shared wells and septic systems are considered the norm.

Community Facilities

There are a number of public buildings and community facilities located throughout the Clay Macon Region. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 15 fire/EMS stations, 31 law enforcement facilities, and 15 schools located within the study area.

Two hospitals are located in the Clay Macon Region (both in Macon County)[2]. The larger of the two is Angel Medical, a 59-bed general hospital located in the Town of Franklin. The Highlands-Cashiers Hospital, in the Town of Highlands, has 24 beds as well as a skilled nursing facility with 80 beds.

The Clay Macon Region contains numerous local parks, campgrounds, recreation areas, and hiking trails. These include the Nantahala National Forest, Appalachian Trail, Jackrabbit Mountain Biking and Hiking Trail, Hiwassee River, Nantahala Lake, and Chatuge Lake. These facilities offer recreational opportunities to area residents and visitors alike.

[2] Licensed Hospitals in North Carolina, 9/2018 http://www.ncdhhs.gov/dhsr/data/hllist.pdf

3.3.3 Land Use

Many areas of the Clay Macon Region are undeveloped or sparsely developed due to the mountainous terrain and the conservation of land in the Nantahala National Forest. As shown in **Figure 3.1** above, there are several small incorporated municipalities located throughout the study area, and these areas are where the region's population is generally concentrated. The incorporated areas are also where any businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area generally consist of rural residential development, agricultural uses, recreational areas, and forestland.

Local land use (and associated regulations, or lack thereof) is further discussed in *Section 7: Capability Assessment*.

3.4 EMPLOYMENT AND INDUSTRY

The early modern economy in the Clay Macon Region was built around extractive industries; such as mining, logging, and agriculture; manufacturing; and textiles. Like many other mountain towns in North Carolina, the jurisdictions in the Clay Macon Region have focused recent economic development efforts on cultural and natural heritage tourism. Second home development is another growing industry that can also help to boost the economy and promote revitalization.

According to the North Carolina Department of Commerce Labor and Economic Analysis, in 2018, Clay County's job force consisted of 4,167 workers. The top five employers in Clay County, in order, were the Clay County Board of Education, Clay County, Ingles Markets, Advanced Digital Cable, and Shoreline Healthcare Management. The average unemployment rate was 3.9 compared to the State rate of 3.7.

Macon County's total employment in all industries was 15,419 in 2018. The top five employers in Macon County were Macon County Public Schools, Drake Enterprises, Macon County, Ingles Markets, and Angel Medical Center. The average unemployment rate was 3.8 compared to the State rate of 3.7.

SECTION 4
HAZARD IDENTIFICATION

This section describes how the planning team identified the hazards to be included 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 (i.e., technological hazards, terrorism, etc.) is encouraged, though not required, for plan approval. The Clay Macon Region has included a comprehensive assessment of both types of hazards.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, Clay and Macon Counties have identified a number of hazards that are to be addressed in its Regional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from the Clay Macon Regional Hazard Mitigation Planning Team members, research of past disaster declarations in the participating counties[1], and review of the North Carolina State Hazard Mitigation Plan (2018). To maintain consistency, the Clay Macon Regional Hazard Mitigation Planning Team members voted to assess the same hazards that were identified in the most recent update of the North Carolina Hazard Mitigation Plan. Therefore, since the development of the previous hazards covered in the 2016 Clay Macon Regional Hazard Mitigation Plan is viewable in **Table 4.1**, along with a summary of the hazards assessed in this 2021 update. Readily available information from a reputable source (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: 2020 CLAY MACON HAZARDS UPDATE

2016 Clay Macon Identified Hazards		2021 Clay Macon Identified Hazards		Sub hazards covered in 2021 Plan and Explanations
Atmospheric Hazards	Drought	Drought	**Natural Hazards**	Agricultural Drought, Hydrological Drought, Meteorological Drought, Socioeconomic Drought
	Heat Wave/Extreme Heat			
	Hailstorm	Hailstorm		Assessed under "Tornadoes/Thunderstorms"
	Hurricanes and Tropical Storms	Hurricane and Coastal Hazards		High Wind associated with Hurricanes and Nor'easters, Torrential Rain, Tornadoes Associates with Hurricanes, Severe Winter Weather associated with Nor'easters
	Lightning	Lightning		Assessed under "Tornadoes/Thunderstorms"
	Tornado	Tornadoes/Thunderstorms		Hailstorm, Torrential Rain associated with Severe Thunderstorms, Thunderstorm Wind, Lightning, Waterspout, High Wind
	Severe Thunderstorm	Severe Thunderstorm		Assessed under "Tornadoes/Thunderstorms"
	Winter Storms and Freezes	Severe Winter Weather		Freezing Rain, Snowstorms, Blizzards, Wind Chill, Extreme Cold
Hydrologic Hazards	Dam and Levee Failure	Dam Failures		
	Erosion			Assessed under "Geological"
	Flooding	Flooding		
Geologic Hazards	Earthquakes	Earthquakes		
		Sinkholes		Assessed under "Geological"
	Landslide	Geological		Landslides, Sinkholes, Erosion
Other Hazards		Infectious Disease	**Other Hazards**	
	Wildfires	Wildfires		
		Radiological Emergency – Fixed Nuclear Facilities	**Technological Hazards**	Chemical, Biological, Radiological, Nuclear, Explosive
		Terrorism		
		Cyber		
		Electromagnetic Pulse		
	Hazard Materials Incident	Hazardous Substances		Hazardous Materials, Hazardous Chemicals, Oil Spill

4.2 DISASTER DECLARATIONS

Disaster declarations provide initial insight into the hazards that may impact the Clay Macon regional planning area. Since 1973, eight presidential disaster declarations have been reported in the Clay Macon Region, which can be seen in **Table 4.2** below. This includes four storms related to severe storms and flooding; two of which caused landslides and mudslides, two storms related to hurricanes or tropical storms, one storm related to severe winter weather, and one blizzard event. The most recent declaration was a result of the global pandemic caused by 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

4.3 SUMMARY OF HAZARD IMPACTS SINCE PREVIOUS PLAN

Since the approval date of the previous Clay Macon Regional Hazard Mitigation Plan in 2016, there have been 54 hazard events recorded for the region in the National Centers for Environmental Storm Events Database. 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 Appendix H.

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	7
Flash Flood	0	1
Flood	0	3
Hail	0	1
Heavy Snow	4	2
High Wind	0	1
Lightning	0	0
Strong Wind	0	0
Thunderstorm Wind	12	8
Tornado	1	0
Tropical Storm	0	0
Winter Storm	0	5
Winter Weather	0	9
TOTAL NUMBER OF REPORTED EVENTS	**17**	**37**

*The hazard types 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.

Appendix H includes detailed information about all previous historical hazard occurrence events that have occurred in the region as reported to the National Centers for Environmental Information. Some more detailed information about previous historical events can be found in Section 5: Hazard Profiles under each separate hazard profile.

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 or not 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 (and why not). 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 Regional Hazard Mitigation Council during the plan update process.

TABLE 4.4: DOCUMENTATION OF THE HAZARD EVALUATION PROCESS

Natural 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 US Forest Service National Avalanche site • Review of the NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the previous Clay Macon 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 was no included in the previous Clay Macon Hazard Mitigation Plan
Drought	**YES**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the NC State Hazard Mitigation Plan • Review of previous Clay Macon Regional Hazard Mitigation Plan	• There are reports of drought conditions in 17 of the last 19 years (2000-2019) in the Clay Macon Region, according to the North Carolina Drought Monitor. • Droughts are discussed in NC State Hazard Mitigation Plan • Drought is included in the previous Clay Macon Hazard Mitigation Plan
Hailstorm	**YES (Assessed under Tornadoes/Thunderstorms)**	• Review of FEMA's Multi-Hazard Identification and Risk	• Hailstorm events are discussed in the state plan under the Severe Thunderstorm hazard • NCEI reports 85 hailstorm events (0.75 to 2.75-inch size hail) for the Clay

Natural 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?
		Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon Hazard Mitigation Plan • Review of NOAA NCEI Storm Events Database	Macon Region between 1984 and 2019. For these events there was almost $21,600 (2020 dollars) in property damages reported. • Hail was addressed as an individual hazard in the previous Clay Macon Hazard Mitigation Plan
Excessive Heat	**NO**	• Review of NOAA NCEI Storm Events Database • Review of the North Carolina State Hazard Mitigation Plan • Review of the previous Clay Macon Hazard Mitigation Plan	• NCEI reported no extreme heat events in the Clay Macon region • The NC State Hazard Mitigation Plan includes Excessive Heat as an identified Hazard for North Carolina • Excessive heat was included in the previous hazard mitigation plans as Extreme Heat; however, no events were reported.
Hurricane and Coastal Hazards	**YES**	• Review of NC State Hazard Mitigation Plan • Analysis of NOAA historical tropical cyclone tracks and National Hurricane Center Website • Review of NOAA NCEI Storm Events Database • Review of historical presidential	• Hurricanes and coastal hazard events are discussed in the NC State Hazard Mitigation Plan • Hurricanes and coastal hazards were addressed as hurricanes and tropical storms in the previous Clay Macon Hazard Mitigation Plan. • NOAA historical records indicate 24 tropical storms or hurricane events have come within 75 miles of the Clay Macon Region since 1896. • NCEI reports 1 tropical storm event since 2004 for the Clay Macon Region. This event resulted in nearly $20,496 (2020 dollars) of reported property

Natural 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?
		disaster declarations • Review of the previous Clay Macon Hazard Mitigation Plan	damage.
Lightning	**YES (Assessed under Tornadoes/Thunderstorms)**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon Hazard Mitigation Plan • Review of NOAA NCEI Storm Events Database • Review of Vaisala's NLDN Lightning Flash Density Map	• Lightning events are discussed in the NC State Hazard Mitigation Plan as part of the Severe Thunderstorm hazard. • NCEI reports 14 lightning events for the Clay Macon Region since 1998. These events have resulted in a recorded 1 injury and $2.2 million (2020 dollars) in property damage. • Lightning is addressed as an individual hazard in the previous Clay Macon Hazard Mitigation Plan. To maintain consistency with the NC State Hazard Mitigation Plan, it will be addressed under the Tornadoes/Thunderstorms section.
Nor'easter	**NO**	• Review of the NC State Hazard Mitigation Plan • Review of the NOAA NCEI Storm Events Database • Review of the previous Clay Macon Hazard Mitigation plan	• Nor'easters are discussed in the state plan as a part of the Hurricane hazard. • NCEI does not report any Nor'easter activity for the Clay Macon Region. However, Nor'easter activity may have affected the region as severe winter storms. In this case, the activity would be reported under winter storm events. • This hazard was not addressed in the previous plan.
Tornado	**YES (Assessed under Tornadoes/Thunderstorms)**	• Review of FEMA's Multi-	• Tornado events are discussed in the NC State Hazard Mitigation Plan under

Natural 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?
		Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon Hazard Mitigation Plan • Review of NOAA NCEI Storm Events Database	Severe Thunderstorm. • Tornado events were addressed in the previous Clay Macon Hazard Mitigation Plan. • NCEI reports 10 tornado events in Clay Macon Region counties since 1965. These events have resulted in over $1.45 million (2020 dollars) in property damage with the most severe being an F1.
Severe Thunderstorm	**YES (Assessed under Tornadoes/Thunderstorms)**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon county Hazard Mitigation Plan • Review of NOAA NCEI Storm Events Database	• Severe thunderstorm events are discussed in the NC State Hazard Mitigation Plan • Severe thunderstorm events were addressed as Thunderstorm Wind/High Wind in the previous Clay Macon Hazard Mitigation Plan • NCEI reports 189 thunderstorm wind and high wind events in the Clay Macon region since 1970. These events have resulted in 2 injury and over $2.1 million (2020 dollars) in property damage.
Severe Winter Weather	**YES**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment	• Severe winter storms, including snow storms and ice storms, are discussed in the NC State Hazard Mitigation Plan. • Severe Winter Weather events were addressed as Winter Storms and Freezes in the previous Clay Macon Hazard Mitigation Plan. • NCEI reports that Clay and Macon counties have been affected by 125

Natural 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 historical Presidential disaster declarations. • Review of NOAA NCEI Storm Events Database • Review of the previous Clay Macon Regional Hazard Mitigation Plan	snow and ice events since 1996. These events resulted in no property damage and did not cause any deaths or injuries. • A blizzard event in 1996 was responsible for one of the eight disaster declarations in the Clay Macon region.
Earthquake	**YES**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon Hazard Mitigation Plan • Review of the National Geophysical Data Center • USGS Earthquake Hazards Program website	• Earthquake events are discussed in the NC State Hazard Mitigation Plan and both Clay and Macon counties are in the region with the highest vulnerability to an earthquake event in the state. • 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. • The previous Clay Macon hazard mitigation plan address earthquakes. • 49 events are known to have occurred in the region according to the National Geophysical Data Center. The greatest MMI reported was a 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 to 9%g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3%g or more.

Natural 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?
Expansive Soils	**NO**	• Review of NC State Hazard Mitigation Plan • Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of USDA Soil Conservation Service's Soil Survey • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• Expansive soils are identified in the NC State Hazard Mitigation Plan but they are not included as a top hazard for the Mountain 1 Region, which includes the Clay Macon counties. • The previous Clay Macon hazard mitigation plan did not identify expansive soils as a potential hazard. • According to FEMA and USDA sources, the Clay Macon Region is located in an area that has a "little to no" clay swelling potential.
Geological (Landslides, Sinkholes, Erosion)	**YES**	• Review of NC State Hazard Mitigation Plan • Review of USGS Landslide Incidence and Susceptibility Hazard Map • Review of the North Carolina Geological Survey database of historic landslides • Review of the previous Clay Macon Regional Hazard Mitigation Plan	• Landslide/debris flow events are discussed in the state plan and ranked as the top hazard for the Mountain 1 Region, which includes the Clay Macon counties. Additionally, the Mountain Region received the highest vulnerability score in the state. • The previous Clay Macon hazard mitigation plan addressed landslides as an individual hazard. • 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 counties also have areas of moderate incidence with high susceptibility. • Data provided by NCGS indicate 58 recorded landslide events in the Clay Macon Region. • Coastal erosion is discussed in the NC State Hazard Mitigation Plan but only for coastal areas (there is no

Natural 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?
			discussion of riverine erosion). The Clay Macon Region is not located in a coastal area. • Riverine erosion is discussed in the previous Clay Macon hazard mitigation plan.
Land Subsidence	**NO**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon Regional Hazard Mitigation Plan	• The state plan delineates certain areas that are susceptible to land subsidence hazards in North Carolina; however, the Clay Macon counties have zero vulnerability. • The previous Clay Macon hazard mitigation plan did not identify land subsidence as a potential hazard.
Tsunami	**NO**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon Regional Hazard Mitigation Plan • Review of FEMA "How-to" mitigation planning guidance (Publication 386-2,	• 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. • Tsunamis are discussed in the state plan and described as a "greater" hazard for the state. However, the Mountain Region, which includes the Clay Macon counties, scored a zero for tsunami hazard risk. • 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.

Natural 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?
		"Understanding Your Risks – Identifying Hazards and Estimating Losses).	
Volcano	**NO**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of USGS Volcano Hazards Program website • Review of the previous Clay Macon Hazard Mitigation Plan	• There are no active volcanoes in North Carolina. • There has not been a volcanic eruption in North Carolina in over 1 million years • No volcanoes are located near the Clay Macon Region.
Dam Failure	**YES**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Clay Macon Regional Hazard Mitigation Plan • Review of North Carolina Dam Safety Program's NC Dam	• Dam failure is identified as a hazard in the NC State Hazard Mitigation Plan. • The previous Clay Macon Hazard Mitigation Plan identifies Dam failure hazard as Dam and Levee Failure. • Per the NC Dam Inventory, there are 36 high hazard dams in the planning region. (High hazard is defined as "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.")

Natural 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?
		Inventory as of 11/20/19	
Flooding	**YES**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of previous Clay Macon Regional Hazard Mitigation Plan • Review of NOAA NCEI Storm Events Database • Review of historical disaster declarations • Review of FEMA DFIRM data • Review of FEMA's NFIP Community Status Book and Community Rating System (CRS)	• Floods occur in all 50 states and in the U.S. territories. • The flood hazard is thoroughly discussed in the NC State Hazard Mitigation Plan. The Clay Macon Region was found to have relatively low vulnerability compared to the state. • The previous Clay Macon hazard mitigation plan addressed flood hazard. • NCEI reports that Clay Macon Region counties have been affected by 39 floods events since 1996. These events caused an estimated $5.1 million (2020 dollars) in property damages and over $1 million in crop damages. • 4 of the 8 Presidential Disaster Declarations were flood-related and an additional two were hurricane or tropical storm-related which caused flooding issues. • Almost 4% of the Clay Macon Region is located in an identified floodplain (100- or 500-year). • All municipalities in the region participate in the NFIP; however, no jurisdictions currently participate in the CRS.
OTHER HAZARDS			
Wildfires	**YES**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard	• Wildfires occur in virtually all parts of the United States. Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases. • Wildfires are identified as a hazard in the state plan. • The previous Clay Macon Hazard

Natural 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 • Review of previous Clay Macon Regional Hazard Mitigation Plan • Review of Southern Wildfire Risk Assessment (SWRA) Data • Review of the NC Division of Forest Resources website	Mitigation plan addressed wildfire as a hazard. • A review of SWRA data indicates that there are areas of elevated concern in the Clay Macon Region. • According to the North Carolina Division of Forest Resources, the Clay Macon Region experiences an average of 56 fires each year which burn a combined 248 acres.
Hazardous Substances	**YES**	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of previous Clay Macon Hazard Mitigation Plan • Review of the NC State Hazard Mitigation Plan	• The previous Clay Macon Hazard Mitigation Plan lists the Hazardous Substances hazard as Hazardous Materials Incidents. • Review of Pipeline and Hazardous Materials Safety Administration data indicates HAZMAT incidents occurring in all of the Clay Macon counties. • EPA Toxic Release Inventory indicates HAZMAT facilities in the Clay Macon region.
Infectious Disease	**YES**	• Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Hazard Mitigation Plan	• Infectious Disease is identified as a hazard in the state plan • Although the previous regional hazard mitigation plan did not include infectious diseases as a hazard, it is assessed in this update to maintain consistency with the NC State Hazard Mitigation Plan. • Infectious Disease has caused one of the eight disaster declarations in the

Natural 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?
			Clay Macon Region.
TECHNOLOGICAL HAZARDS			
Terrorism	**Yes**	• Review of the NC State Hazard Mitigation Plan • Review of the previous Clay Macon Hazard Mitigation Plan • Review of local Official knowledge.	• Although the previous regional hazard mitigation plan did not include terrorism as a hazard, it is assessed in this update to maintain consistency with the NC State Hazard Mitigation Plan • This hazard will assess chemical, biological, nuclear, and explosive terrorism events.
Radiological Emergency – Fixed Nuclear Facilities	**Yes**	• Review of the previous Clay Macon Regional Hazard Mitigation Plan • Review of IAEA list of fixed nuclear power stations in the United States • Discussion with local officials about location of nuclear power stations	• The Oconee Nuclear Station is located closest to the Clay Macon region near Seneca, South Carolina and could impact the region. • Nuclear events can sometimes be caused by natural hazards and deserve some attention in this plan due to some areas of the region being located in the 50-Mile evacuation zone for the Oconee Nuclear Station.
Cyber	**YES**	• Review of NC State Hazard Mitigation Plan	• Changing future conditions encourage the assessment of the possibility of a cyber-attack with the increase in global technology
Electromagnetic Pulse	**YES**	• Review of NC State Hazard Mitigation Plan	• Changing future conditions encourage the assessment of the possibility of an electromagnetic pulse with the increase in global

Natural 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?
			technology

4.5 HAZARD IDENTIFICATION RESULTS

Table 4.5 provides a summary of the hazard identification and evaluation process noting which of the 24 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	☑	Radiological Emergency – Fixed Nuclear Facilities
☑	Drought	☑	Terrorism
☑	Hailstorm**	☑	Cyber
☐	Excessive Heat	☑	Electromagnetic Pulse
☑	Hurricane and Coastal Hazards	**OTHER HAZARDS**	
☑	Flooding	☑	Hazardous Substances
☑	Lightning**	☑	Wildfires
☐	Nor'easter	☑	Infectious Disease
☑	Tornadoes/Thunderstorms		
☑	Severe Winter Weather		
☑	Earthquakes		
☑	Dam Failures		
☑	Geological		
☐	Expansive Soils		
☐	Land Subsidence		
☐	Tsunami		
☐	Volcano		
☐	Storm Surge		
☐	Erosion		

☑ = Hazard considered significant enough for further evaluation in the Clay Macon Region hazard risk assessment.
** = Hazard is assessed as a sub hazard 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:

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 Clay Macon Region hazard risk assessment by creating a hazard profile. 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 the counties in the Clay Macon Region, or a participating municipality within them.

After reviewing the list of assessed hazards from a previous update, the Clay-Macon Regional Planning Team moved to amend the hazards in order to be consistent with the State of North Carolina Hazard Mitigation Plan. This required some of the hazard names to change and additional hazards were included in the assessment.

The following hazards were identified:

- **Natural**
  - Drought
  - Hurricane and Coastal Hazards
  - Tornadoes/Thunderstorms (including hailstorms and lightning)
  - Severe Winter Weather
  - Earthquakes
  - Geological (including landslides, sinkholes, and erosion)
  - Dam Failure
  - Flooding
- **Other**
  - Wildfires
  - Infectious Disease
- **Technological**
  - Hazardous Substances
  - Radiological Emergency – Fixed Nuclear Facilities
  - Terrorism
  - Cyber
  - Electromagnetic Pulse

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	
Macon County	
Franklin	Highlands

FIGURE 5.1: CLAY MACON REGION BASE MAP

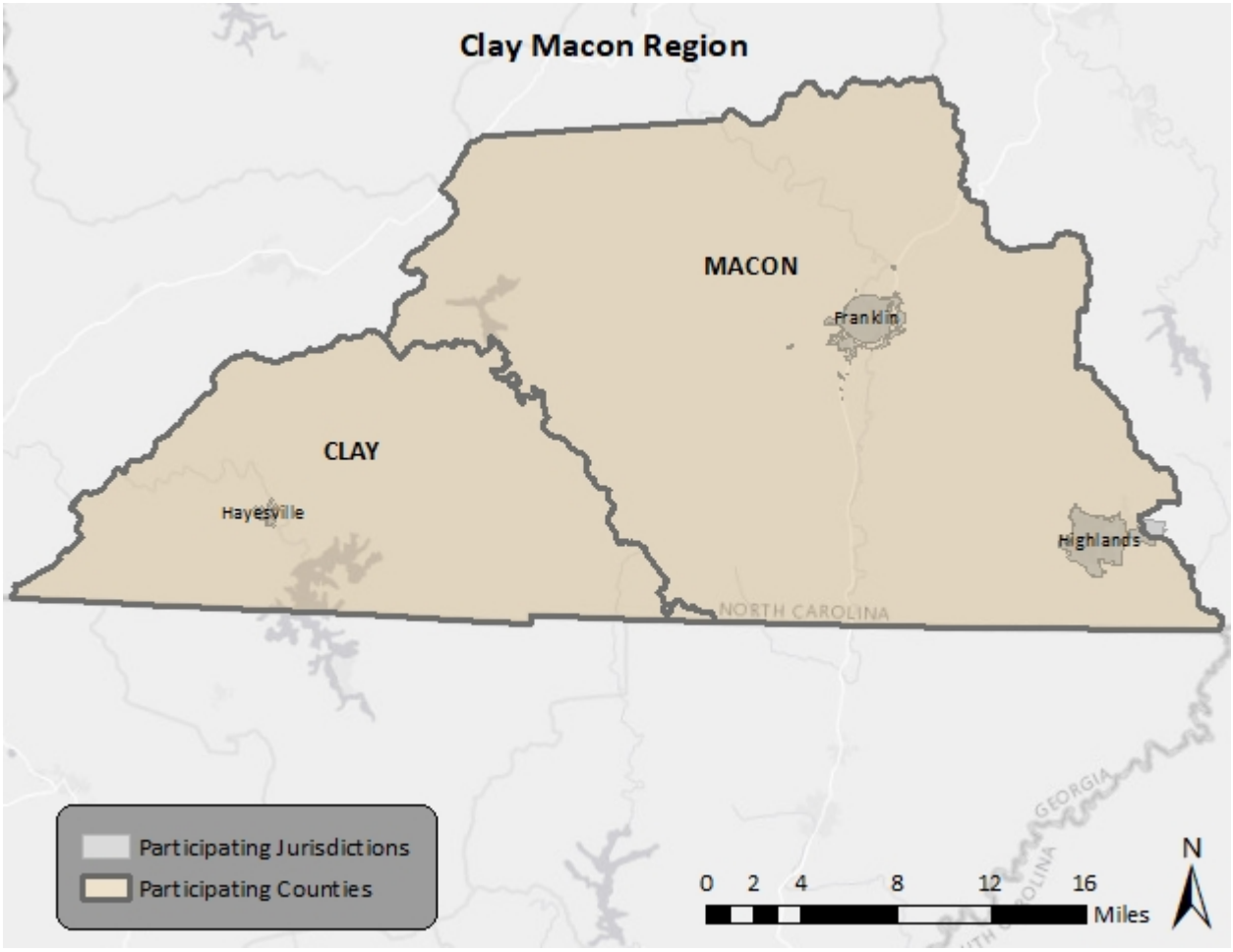


Table 5.2 lists each significant hazard for the Clay Macon Region and identifies whether or not it has been determined to be a specific hazard of concern for the three municipal jurisdictions and each of the two county's unincorporated areas. This is the based on the best available data and information from the Clay Macon Regional Hazard Mitigation Planning Team. (• = 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	Electromagentic Pulse
Clay County																
Hayesville	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Unincorporated Area	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Macon County																
Franklin	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Highlands	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Unincorporated Area	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Natural Hazards

5.3 DROUGHT

5.3.1 Background and Descriptions

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. 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 drought.

TABLE 5.3 DROUGHT CLASSIFICATION DEFINITIONS

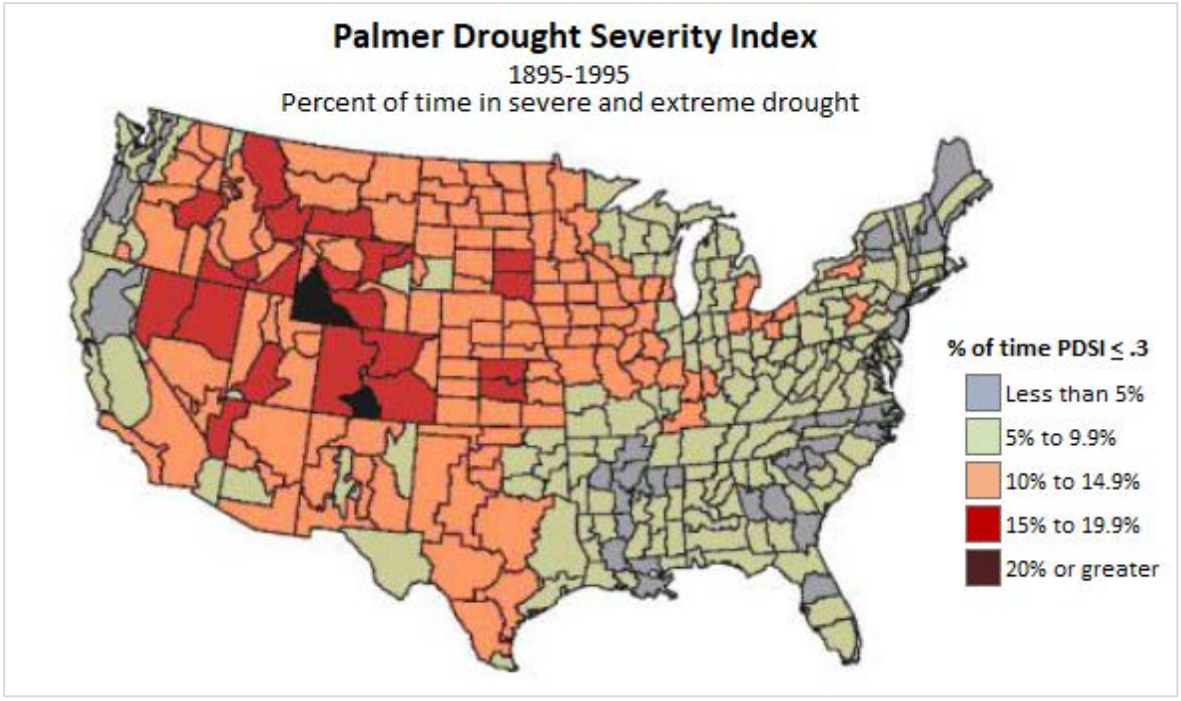
Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
Agricultural 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: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, Federal Emergency Management Agency

Droughts are slow-onset hazards, but, over time, can have very damaging affects 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 range 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 Stated, drought affects most areas of the United States, but is less severe in the Eastern United States.

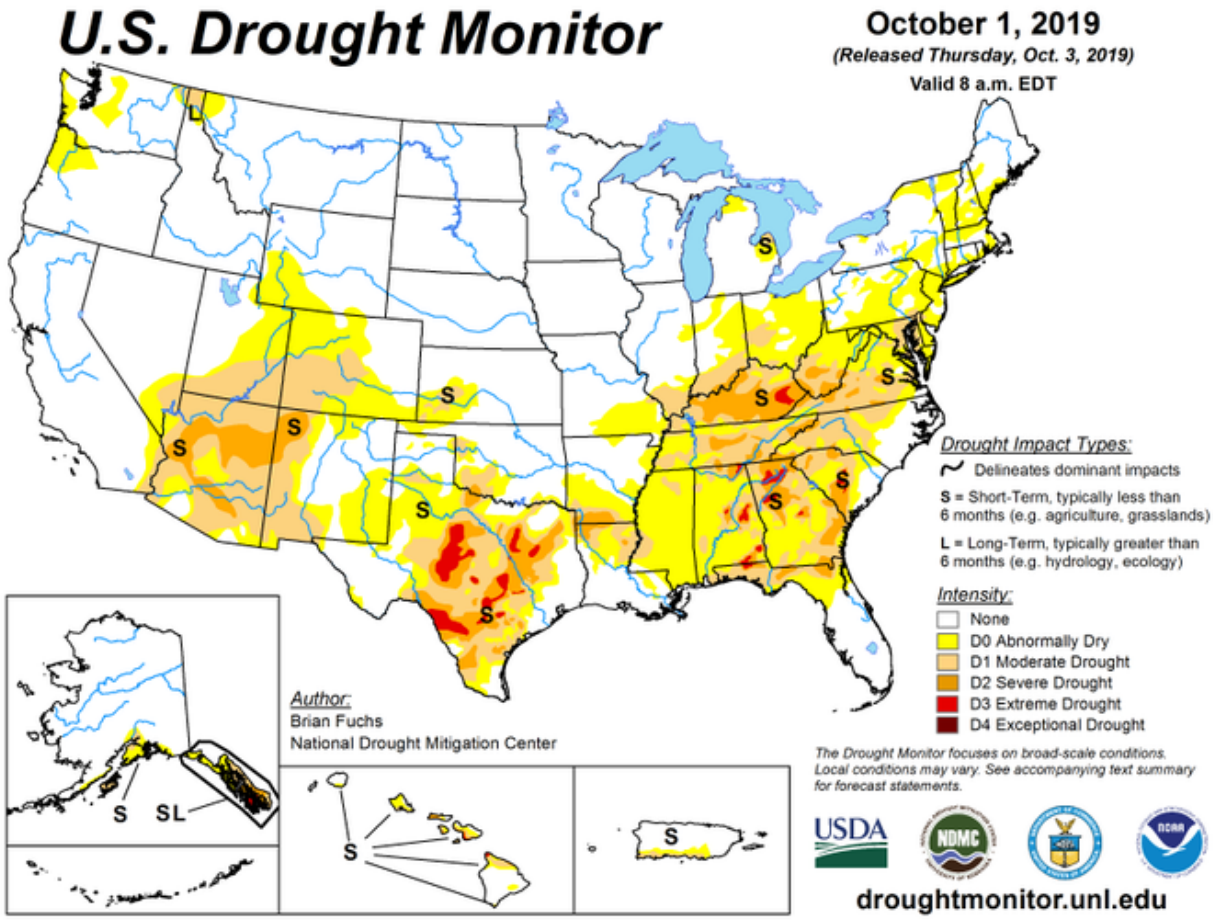
FIGURE 5.2: PALMER DROUGHT SEVERITY INDEX SUMMARY MAP FOR THE UNITED STATES



Source: National Drought Mitigation Center

The figure above is the most updated version of the Palmer Drought Severity Index; however, the US Drought Monitor is updated on a weekly basis. An archived map from the Fall of 2019 can be seen below in **Figure 5.3** to reflect more current 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 hazard. 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

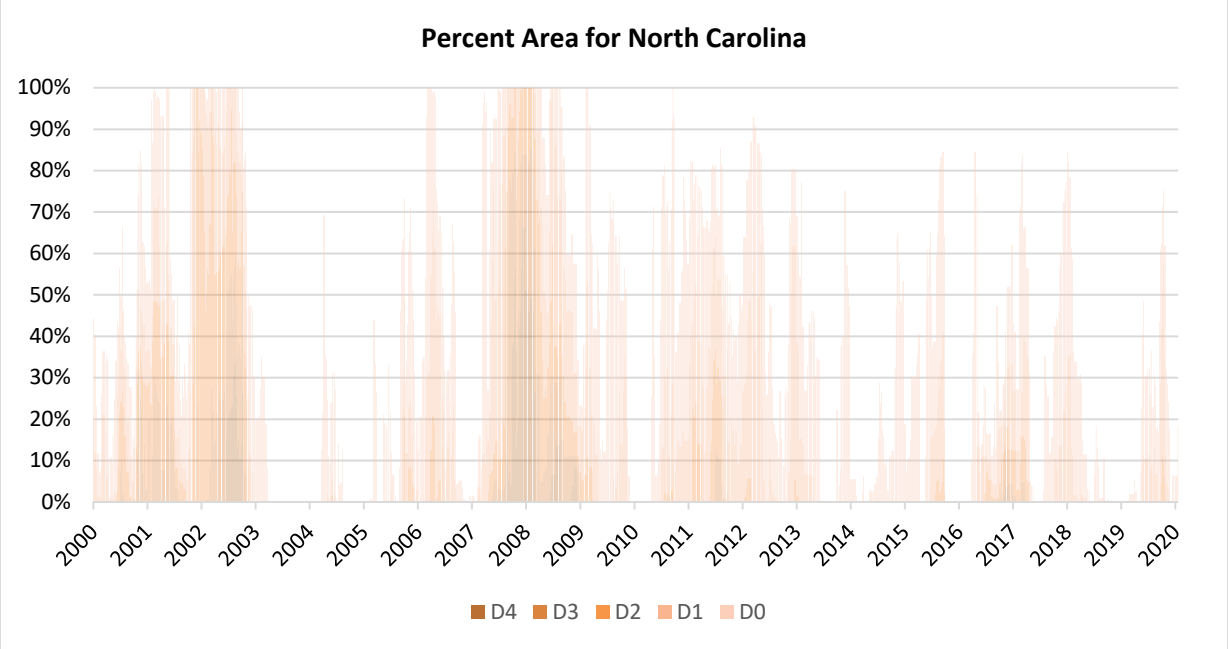
The North Carolina State Climate Office was used to ascertain historical drought events in the Clay Macon Region. The North Carolina State Climate Office reports PDSI data for North Carolina from 2000 to 2019. It classifies drought conditions using the scale set by the US Drought Monitor, which classifies 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

Data from the North Carolina Drought Management Advisory Council and 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 the week of December 11, 2007 where D4 affected 66.2% of North Carolina land. **Figure 5.4** shows the percent area of North Carolina that has experiencing drought conditions from 2000 to 2018.

FIGURE 5.4: NORTH CAROLINA DROUGHT CONDITIONS (2000-2018)



Source: NIDIS, Drought.gov, US Drought Portal

According to the North Carolina State Climate Office, the Southern Mountains Region, which includes

the Clay Macon Region, experienced moderate to extreme or exceptional drought conditions during 9 of the last 19 years (2000-2019). **Table 5.4** shows the most severe drought condition reported for each year in the Southern Mountains Region, according to PDSI classifications. In addition, **Table 5.5** presents a summary of this information. However, it should be noted that the most severe classification reported is based on monthly regional averages, and conditions in the Clay Macon Region may actually have been less or more severe than what is reported.

TABLE 5.5: SUMMARY OF DROUGHT OCCURRENCES IN THE CLAY MACON REGION

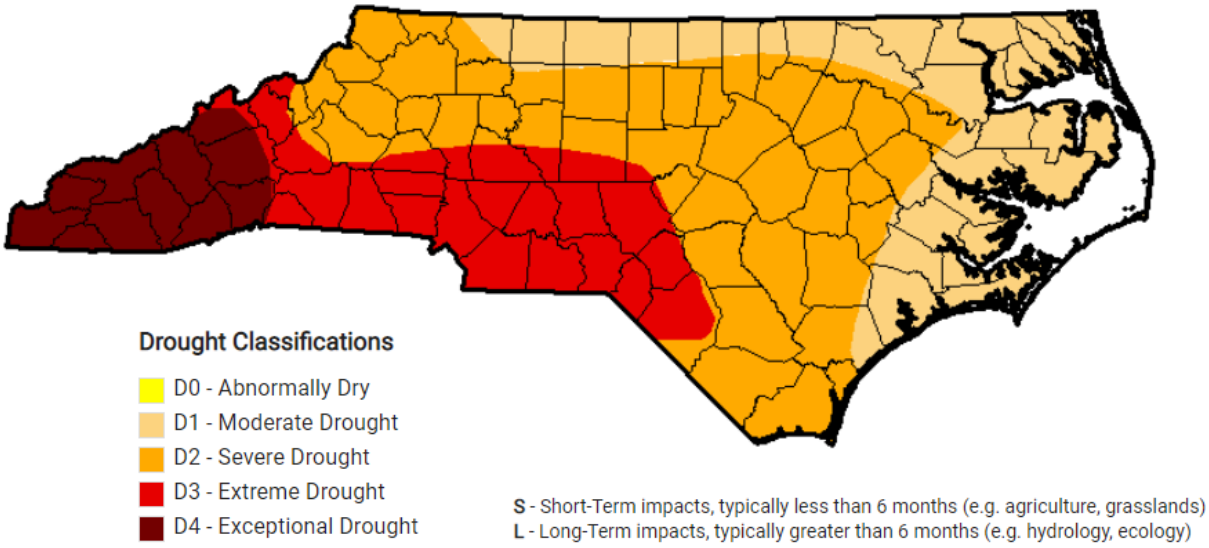
Year	Clay County	Macon County
2000	Extreme Drought	Extreme Drought
2001	Extreme Drought	Extreme Drought
2002	Extreme Drought	Exceptional Drought
2003	Normal	Normal
2004	Abnormally Dry	Abnormally Dry
2005	Abnormally Dry	Normal
2006	Moderate Drought	Severe Drought
2007	Exceptional Drought	Exceptional Drought
2008	Exceptional Drought	Exceptional Drought
2009	Severe Drought	Extreme Drought
2010	Severe Drought	Severe Drought
2011	Severe Drought	Extreme Drought
2012	Severe Drought	Extreme Drought
2013	Normal	Normal
2014	Abnormally Dry	Abnormally Dry
2015	Moderate Drought	Severe Drought
2016	Exceptional Drought	Exceptional Drought
2017	Extreme Drought	Extreme Drought
2018	Moderate Drought	Abnormally Dry
2019	Severe Drought	Severe Drought

Source: North Carolina Drought Monitor (Through December 2019)

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 number of days of low humidity and number of days with temperatures above 90 F[1]. Drought conditions can be seen in the Clay Macon region for August of 2007 in **Figure 5.5**.

[1] North Carolina Drought Management Advisory Council Activities Report - 2008

FIGURE 5.5: DROUGHT CONDITIONS FOR NORTH CAROLINA IN AUGUST 2007



Clay County

The extent of drought pressures on the regions farming and cattle operations has been extreme. According to the Clay County Farmland Preservation Committee, the county has seen a significant drop in the number of cattle and calves in inventory, which declined from 5,619 in 1997 to 2,278 in 2007[2]. This drop in cattle, as well as the overall value of farmland in Clay county, have been exacerbated by the continuous years of drought in the region.

Macon County

Macon County, located in the highlands of North Carolina, have had consistent issues accessing potable water resources during drought conditions. In communities where hay production on farms are the major crops for the county, lack of access to consistent water resources because of ongoing drought conditions would have long-term negative effects for residents.

5.3.4 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. However, historical information also indicates that there is a much lower probability for extreme, long-lasting drought conditions. The NOAA also predicts that central North Carolina to have areas of persistent drought and further drought development[3].

[2] A Farmland Protection Plan for Clay County, North Carolina – June 2010

[3] *U.S. Seasonal Drought Outlook. National Weather Service Climate Prediction Center. http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php*

5.4 HURRICANE AND COASTAL HAZARDS

5.4.1 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 counter-clockwise 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. The majority of 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 5.6**), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

TABLE 5.6: 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 (2018)

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 5.7** 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 5.7: 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

5.4.2 Location and Spatial Extent

Hurricanes, coastal hazards, and tropical storms 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 hurricane and coastal hazards.

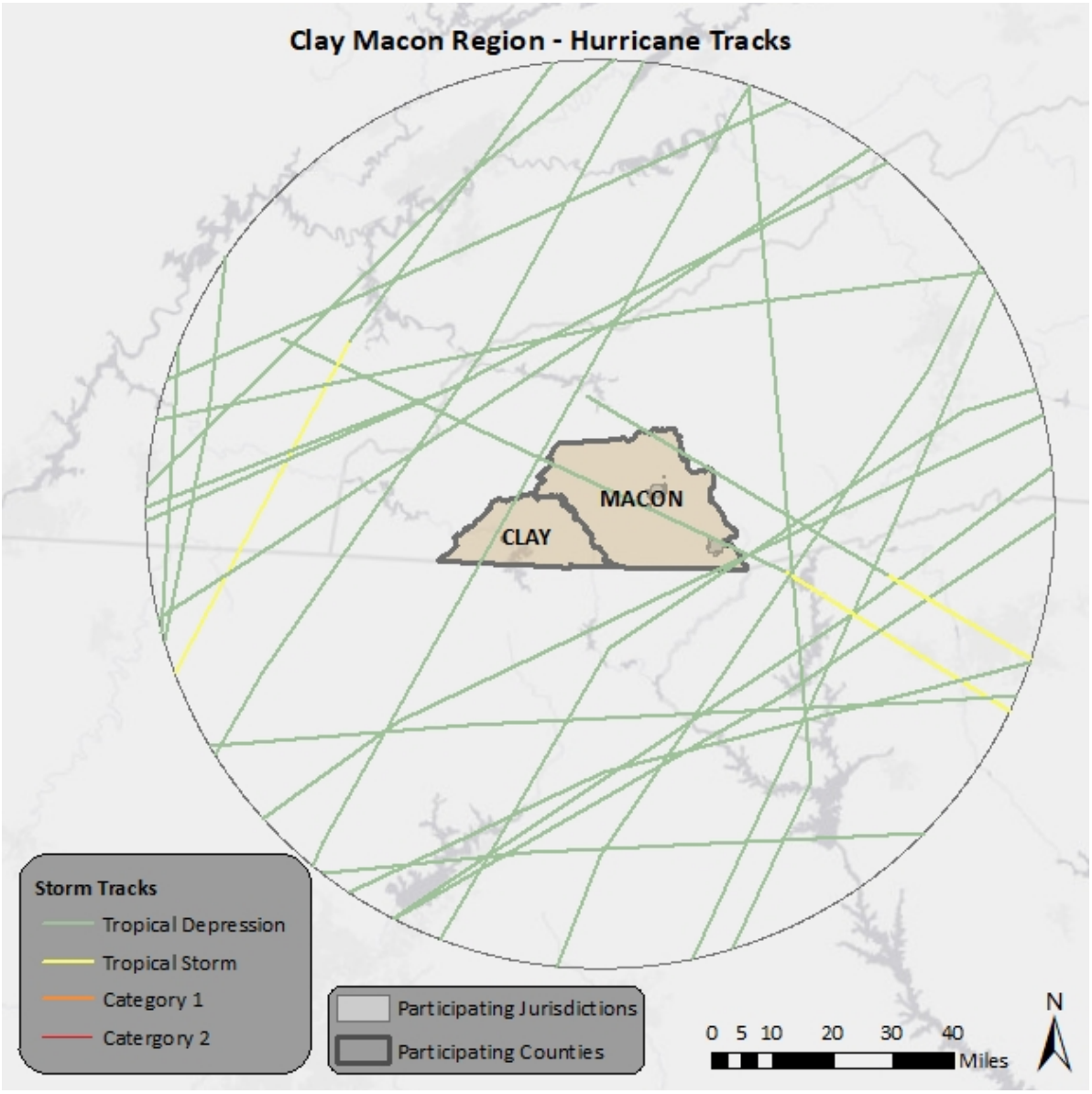
5.4.3 Historical Occurrences

According to the National Hurricane Center's historical storm track records, 24 hurricane or tropical storm tracks have passed within 75 miles of the Clay Macon Region since 1850[4].

Of the recorded storm events, five have traversed directly through the Clay Macon Region as shown in **Figure 5.6**. Furthermore, **Table 5.8** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of the Clay Macon Region) and Category of the storm based on the Saffir-Simpson Scale.

[4] 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 5.6: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF THE CLAY MACON REGION



Source: National Oceanic and Atmospheric Administration; National Hurricane Center

TABLE 5.8: HISTORICAL STORM TRACKS WITHIN 75 MILES OF THE CLAY MACON REGION (1850–2019)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
7/8/1896	UNNAMED	35	Tropical Depression
10/11/1902	UNNAMED	35	Tropical Depression
10/10/1905	UNNAMED	25	Tropical Depression
9/18/1906	UNNAMED	40	Tropical Storm
9/23/1907	UNNAMED	35	Tropical Depression
8/30/1911	UNNAMED	30	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/4/1913	UNNAMED	25	Tropical Depression
9/5/1915	UNNAMED	35	Tropical Depression
7/15/1916	UNNAMED	45	Tropical Storm
8/15/1928	UNNAMED	30	Tropical Depression
10/17/1932	UNNAMED	35	Tropical Depression
8/13/1940	UNNAMED	30	Tropical Depression
10/9/1959	IRENE	20	Tropical Depression
9/23/1975	ELOISE	55	Tropical Storm
9/8/1977	BABE	25	Tropical Depression
8/17/1985	DANNY	30	Tropical Depression
8/28/1992	ANDREW	20	Tropical Depression
8/17/1994	BERYL	20	Tropical Depression
7/23/1997	DANNY	20	Tropical Depression
7/2/2003	BILL	20	Tropical Depression
9/8/2004	FRANCES	25	Tropical Depression
9/17/2004	IVAN	25	Tropical Depression
7/7/2005	CINDY	20	Tropical Depression

Source: National Hurricane Center

The National Centers for Environmental Information did not report any events associated with a hurricane or tropical storm in the Clay Macon Region between 1950 and 2018. However, federal records indicate that five disaster declarations related to hurricanes have been made in the region as seen in **Table 5.9.**

TABLE 5.9: HURRICANE RELATED DISASTER DECLARATIONS

Year	Event	Disaster Number	Clay County	Macon County
2004	Hurricane Ivan	1553		X
2004	Tropical Storm Frances	1546		X

Source: FEMA

Flooding is generally the greatest hazard of concern with hurricane and tropical storm events in the Clay Macon Region. However, winds can also be a concern in cases where a hurricane makes landfall in South Carolina, as was the case with Hurricane Hugo in 1989.

5.4.4 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. However, the region is not immune to a major hurricane strike. The probability of being impacted is less than coastal areas, but still remains a real threat to the Clay Macon Region due to induced events like flooding and land sliding. Based on historical evidence, the probability level of future occurrence is possible (between 1 and 10 percent annual probability). Given the regional nature of the hazard, all areas are equally exposed to this hazard. However, when the region is impacted, the damage could be catastrophic, threatening lives and property throughout the planning area.

5.5 TORNADOES/THUNDERSTORMS

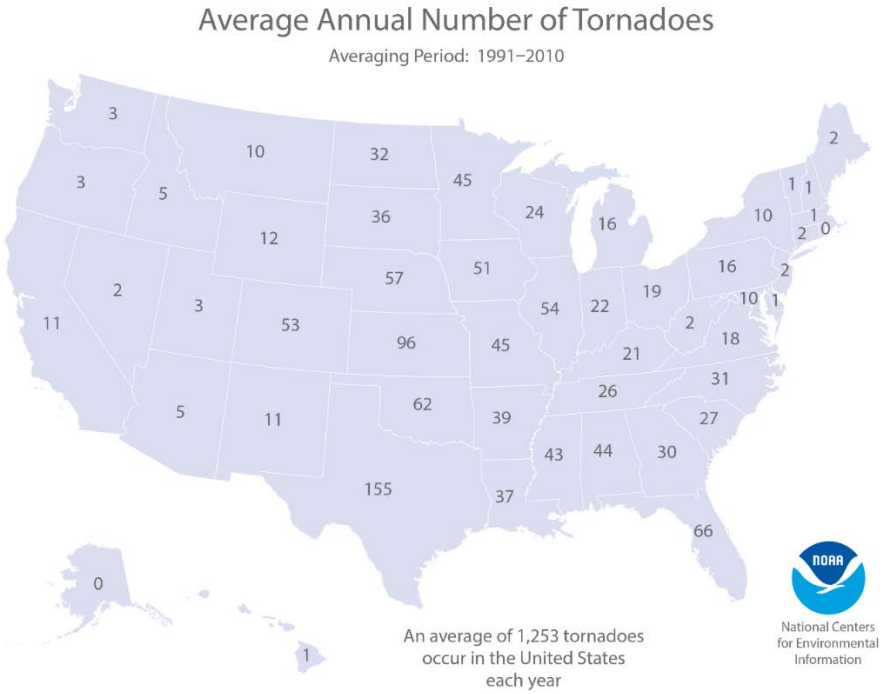
For the purposes of maintaining consistency with the State of State of North Carolina Hazard Mitigation Plan, this section will assess tornadoes and thunderstorms, which also include high winds, hailstorms and lightning.

5.5.1 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 injuries[5]. 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 5.7** shows tornado activity in the United States based on the number of recorded tornadoes per 10,000 square miles.

FIGURE 5.7: TORNADO ACTIVITY IN THE UNITED STATES



[5] NOAA, 2013.

Source: NOAA

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). Tornadic magnitude is reported according to the Fujita and Enhanced Fujita Scales. Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (**Table 5.10**). Tornado magnitudes that were determined in 2005 and later were determined using the Enhanced Fujita Scale (**Table 5.11**).

TABLE 5.10: THE FUJITA SCALE (EFFECTIVE PRIOR TO 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 sign boards.
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 forest 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 re-enforced 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 wind 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 5.11 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 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.

Source: National Weather Service

Thunderstorms

Thunderstorms can produce a variety of accompanying hazards including wind, hailstorms, and lightning[6], 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 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 singularly, 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.

[6] Lightning and hail hazards are discussed as separate hazards in this section.

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 of the Northeast coast that combines with strong pressure moving through the Ohio Valley. This creates a tight pressure gradient across the region, resulting in high winds which increase with elevation. It is common for gusts of 30 to 60 miles per hour during the winter months.

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."

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 5.12 shows the TORRO Hailstorm Intensity Scale which is a way of measuring hail severity.

TABLE 5.12: 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

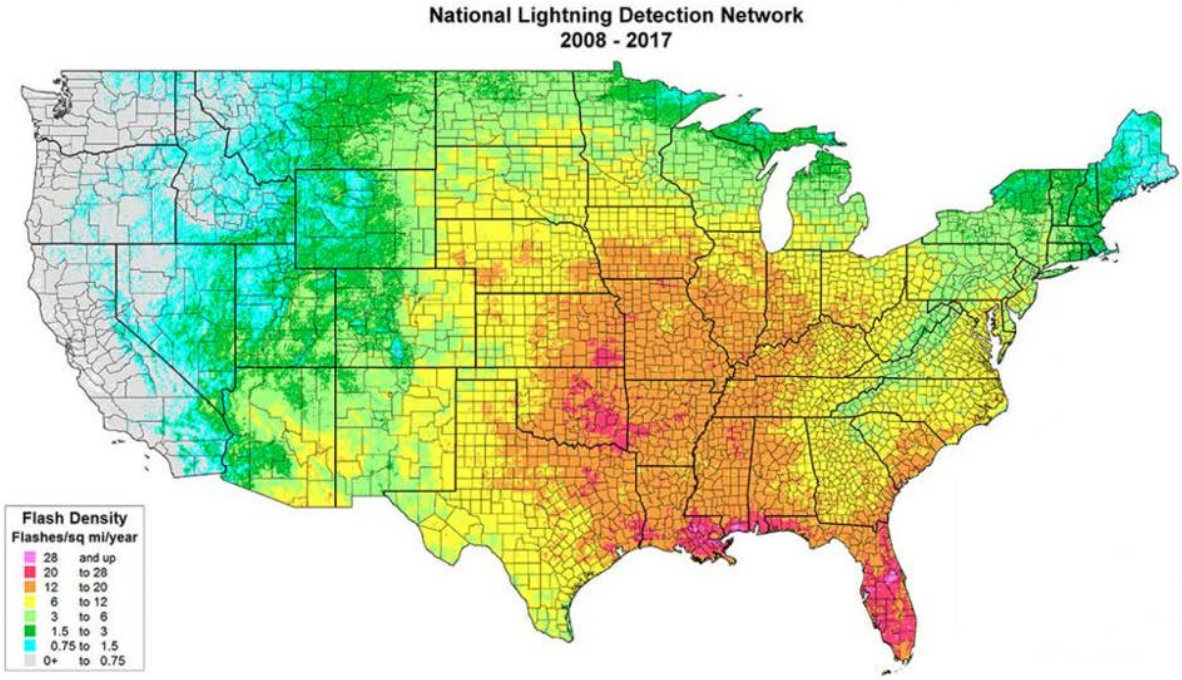
	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m²	mm to inch conversion (inches)	Typical Damage Impacts
H7	Destructive	50-**75**		2.0 – 3.0	Severe roof damage, risk of serious injuries
H8	Destructive	60-**90**		1.6 – 3.5	(Severest recorded in the British Isles) Severe damage 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			Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: http://www.torro.org.uk/site/hscale.php

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 the 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 5.8** shows a lightning flash density map for the years 2008-2017 based upon data provided by Vaisala's U.S. National Lightning Detection Network (NLDN®).

FIGURE 5.8: LIGHTNING FLASH DENSITY IN THE UNITED STATES



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

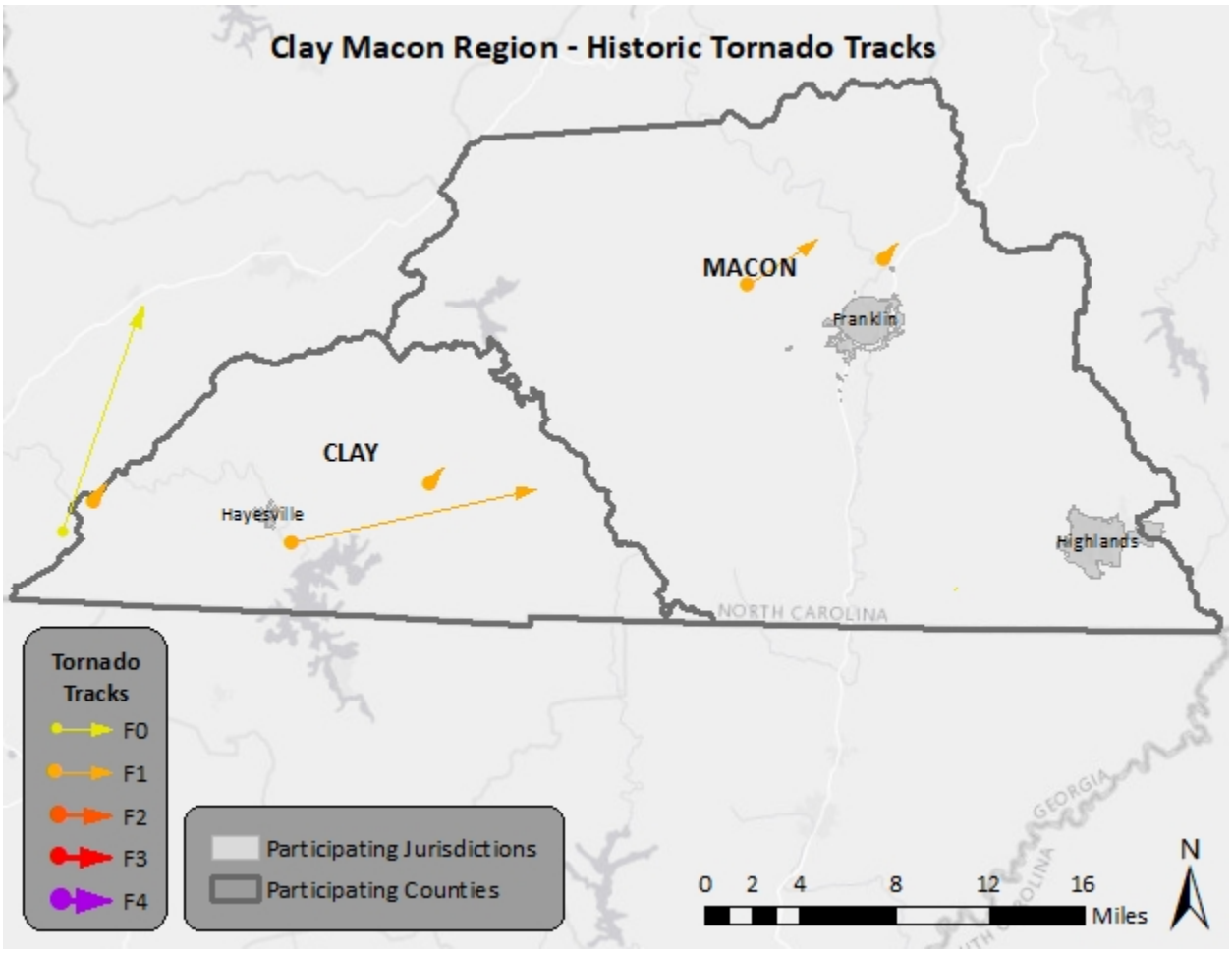
80 people each year in the United States. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities, and infrastructure largely by igniting a fire. Lightning is also responsible for igniting wildfires that can result in widespread damages to property.

5.5.2 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 5.9** 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 5.9: HISTORIC TORNADO TRACKS



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.

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.

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.

5.5.3 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 declaration in the Clay Macon.[15] According to the National Centers for Environmental Information, there have been a total of 10 recorded tornado events in the Clay Macon Region since 1965 (**Table 5.13**), resulting in over $1.4 million (2020 dollars) in property damages. 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.

TABLE 5.13: SUMMARY OF TORNADO OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2020)
Clay County	**6**	**0/0**	**$307,389**
Hayesville	1	0/0	$23,800
Unincorporated Area	5	0/0	$283,810
Macon County	**4**	**0/0**	**$1,148,875**
Franklin	1	0/0	$0
Highlands	0	0/0	$0
Unincorporated Area	3	0/0	$1,148,875
Clay Macon Regional Total	**10**	**0/0**	**$1,456,485**

Source: National Centers for Environmental Information

Thunderstorms
Severe storms have not resulted in any disaster declarations in the Clay Macon Region[7]. According to NCEI, there have been 189 reported thunderstorm wind and high wind events since 1950 in the Clay Macon Region[8]. These events caused over $2.1 million (2020 dollars) in damages. There were reports of 2 injuries and 0 fatalities. **Table 5.14** summarizes this information.

[7] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

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

TABLE 5.14: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2020)
Clay County	**78**	**0/0**	**$656,841**
Hayesville	42	0/0	$409,150
Unincorporated Area	37	0/0	$258,890
Macon County	**111**	**0/2**	**$1,483,382**
Franklin	28	0/1	$512,840
Highlands	8	0/0	$16,963
Unincorporated Area	76	0/1	$953,579
Clay Macon Regional Total	**189**	**0/2**	**$2,140,223**

Source: National Centers for Environmental Information

Hailstorms

According to the National Centers for Environmental Information, 85 recorded hailstorm events have affected the Clay Macon Region since 1950[9]. **Table 5.15** 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 $21 thousand (2020 dollars) in reported property damages. 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 5.15: SUMMARY OF HAIL OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2020)
Clay County	**16**	**0/0**	**$14,400**
Hayesville	10	0/0	$14,400
Unincorporated Area	6	0/0	$0
Macon County	**69**	**0/0**	**$7,200**
Franklin	23	0/0	$0
Highlands	9	0/0	$0
Unincorporated Area	37	0/0	$7,200
Clay Macon Regional Total	**85**	**0/0**	**$21,600**

Source: National Centers for Environmental Information

Lightning

According to the National Centers for Environmental Information, there have been a total of 14 recorded lightning events in the Clay Macon Region since 1996[10]. These events resulted in over $2.2 million (2020 dollars) in damages, as listed in summary **Table 5.16**. Furthermore, lightning was reported to be responsible for 1 injury in the Clay Macon Region. It is certain that more than 14 events have impacted the region. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

[9] These hail events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is likely that additional hail events have affected the Clay Macon Region. In addition to NCEI, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

[10] These lightning events are only inclusive of those reported by the National Centers for Environmental Information (NCEI). It is certain that additional lightning events have occurred in the Clay Macon Region. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

TABLE 5.16: SUMMARY OF LIGHTNING OCCURRENCES

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2020)
Clay County	**0**	**0/0**	**$0**
Hayesville	0	0/0	$0
Unincorporated Area	0	0/0	$0
Macon County	**14**	**0/1**	**$2,252,300**
Franklin	3	0/1	$257,000
Highlands	7	0/0	$1,481,300
Unincorporated Area	4	0/0	$514,000
Clay Macon Regional Total	**14**	**0/1**	**$2,252,300**

Source: National Centers for Environmental Information

5.5.4 Probability of Future Occurrences

Tornadoes

According to historical information, tornado events are not an annual occurrence for the region. However, given the region's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events are small in terms of size, intensity, and duration, they do pose a significant threat should the Clay Macon Region experience a direct tornado strike. The probability of future tornado occurrences affecting the Clay Macon Region is possible (1 to 10 percent annual probability).

Thunderstorms

Given the high number of previous events, it is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire planning area.

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 minor damage to property and vehicles throughout the region.

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 5 lightning flashes per square kilometer per year between 2010 and 2018. 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 minor property damages throughout the region.

5.6 SEVERE WINTER WEATHER

5.6.1 Background and Description

Severe winter weather can range from a 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 damages, 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 of 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 trees limbs and create hazardous driving conditions. Furthermore, communication and power may be disrupted for days.

5.6.2 Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. 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 often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire region has uniform exposure to a winter storm.

5.6.3 Historical Occurrences

Winter weather has resulted in one disaster declaration in the Clay Macon Region which was the Blizzard of 1996[11]. According to the National Centers for Environmental Information, there have been a total of 125 recorded winter storm events in the Clay Macon region since 1950, as shown in **Table 5.17**[12].

[11] 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*.

[12] These ice and winter storm events are only inclusive of those reported by the National Centers for Environmental Information

TABLE 5.17: SUMMARY OF SEVERE WINTER WEATHER EVENTS IN THE CLAY MACON REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2020)
Clay County	11	0/0	$0
Macon County	114	0/0	$0
Clay Macon Regional Total	**125**	**0/0**	**$0**

Source: National Centers for Environmental Information

There have been several winter weather events in the Clay Macon Region. **Appendix H** includes descriptions of recent winter storm events.

5.6.4 Probability of Future Occurrences

Winter storm events will remain a regular occurrence in the Clay Macon Region. According to historical information, the Clay Macon Region generally experiences several winter storms events each year. Therefore, the annual probability is highly likely.

(NCEI). It is likely that additional winter storm conditions have affected the Clay Macon Region. In addition, the 125 are reported by county, so many of these storms likely affected all of the counties.

5.7 EARTHQUAKES

5.7.1 Background and Description

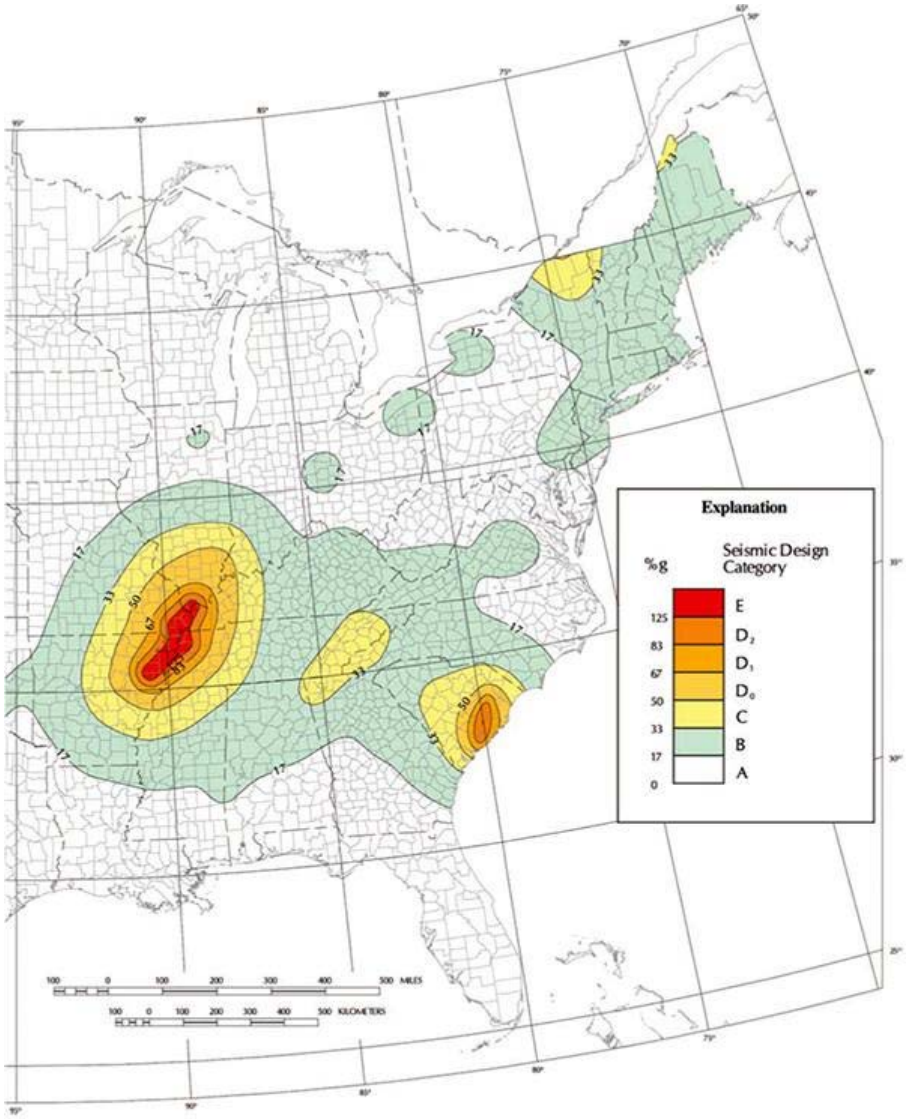
An earthquake is movement or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured 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 quick sand. In the case of liquefaction, anything relying on the substrata for support can shift, tilt, rupture, or collapse.

Most earthquakes are caused by the release of stresses 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 State does face moderate risk to less frequent, less intense earthquake events. **Figure 5.10** shows relative seismic risk for the United States.

FIGURE 5.10: 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 5.18**). 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 5.19**.

TABLE 5.18: RICHTER SCALE

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 5.19: 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

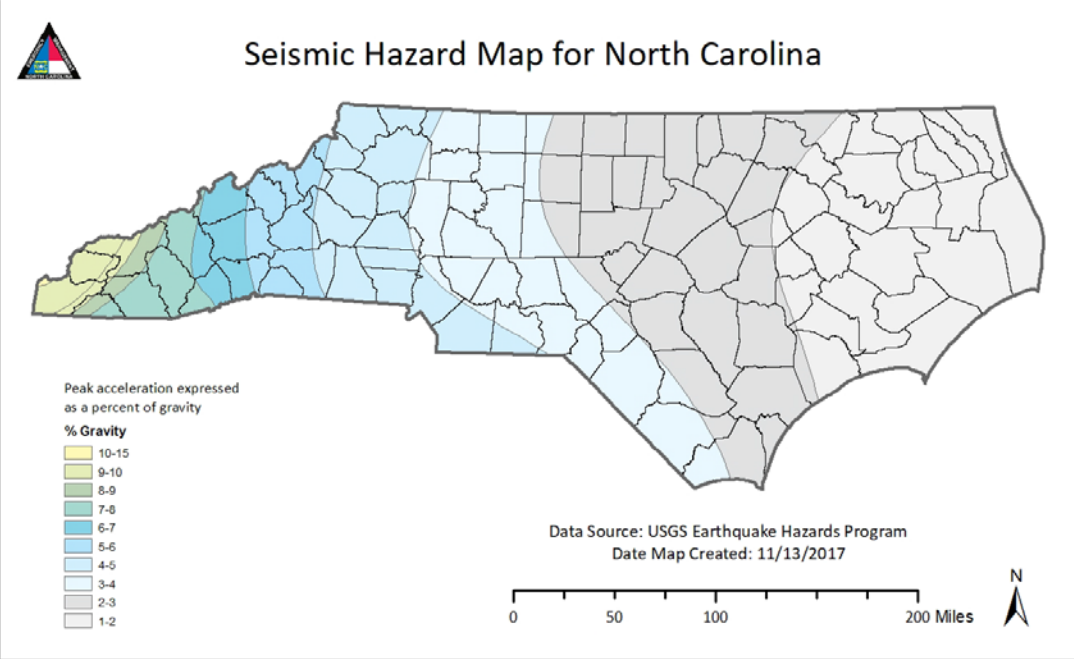
Source: Federal Emergency Management Agency

5.7.2 Location and Spatial Extent

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and 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 5.11** is a map showing geological and seismic

information for North Carolina.

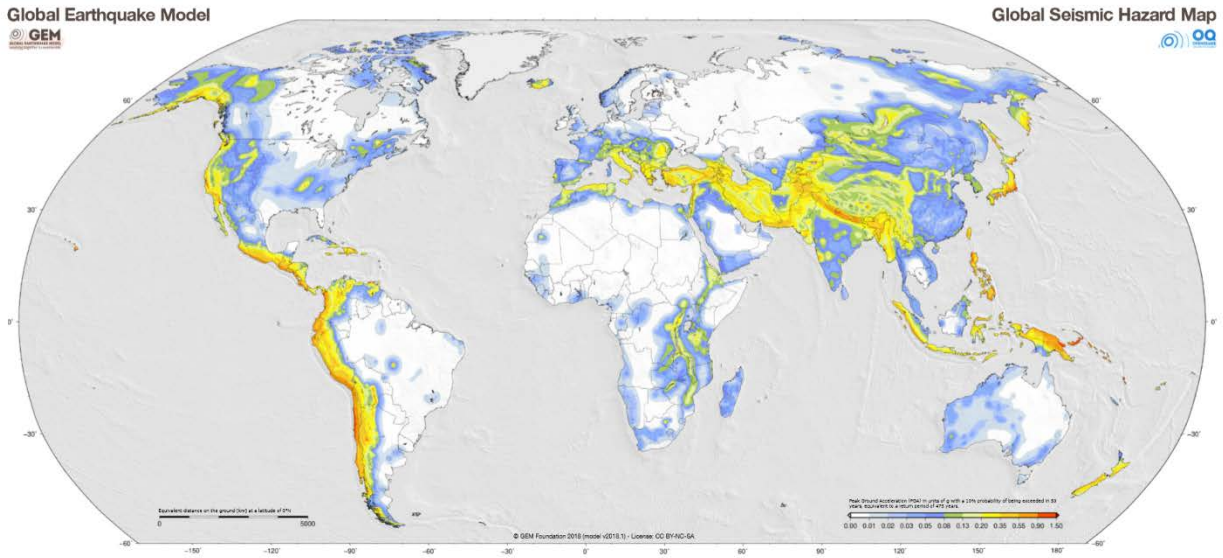
FIGURE 5.11: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



Source: North Carolina Geological Survey

Figure 5.12 shows the intensity level associated with the world and the Clay Macon Region, based on the national USGS and Global Earthquake Model (GEM). The Global Earthquake Model 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 5.12: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Source: Global Earthquake Model, 2018

5.7.3 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 5.20** provides a summary of earthquake events reported by the National Geophysical Data Center between 1638 and 1985.

TABLE 5.20: 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: National Geophysical Data Center
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.

The most recent earthquake event 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 5.21.**

TABLE 5.21: 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
08/09/20	Sparta, NC	5.1	VII	VII

Source: This information 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, CERI, Memphis State University (1983).

5.7.4 Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the Clay Macon Region is unlikely. However, it is likely that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the region. The annual probability level for the region is estimated between 10 and 100 percent (likely).

5.8 GEOLOGICAL

5.8.1 Background and Description

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

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 snow melt, 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 topple, 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, mudflows, 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 mudflow spreads over a broad area where it 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.

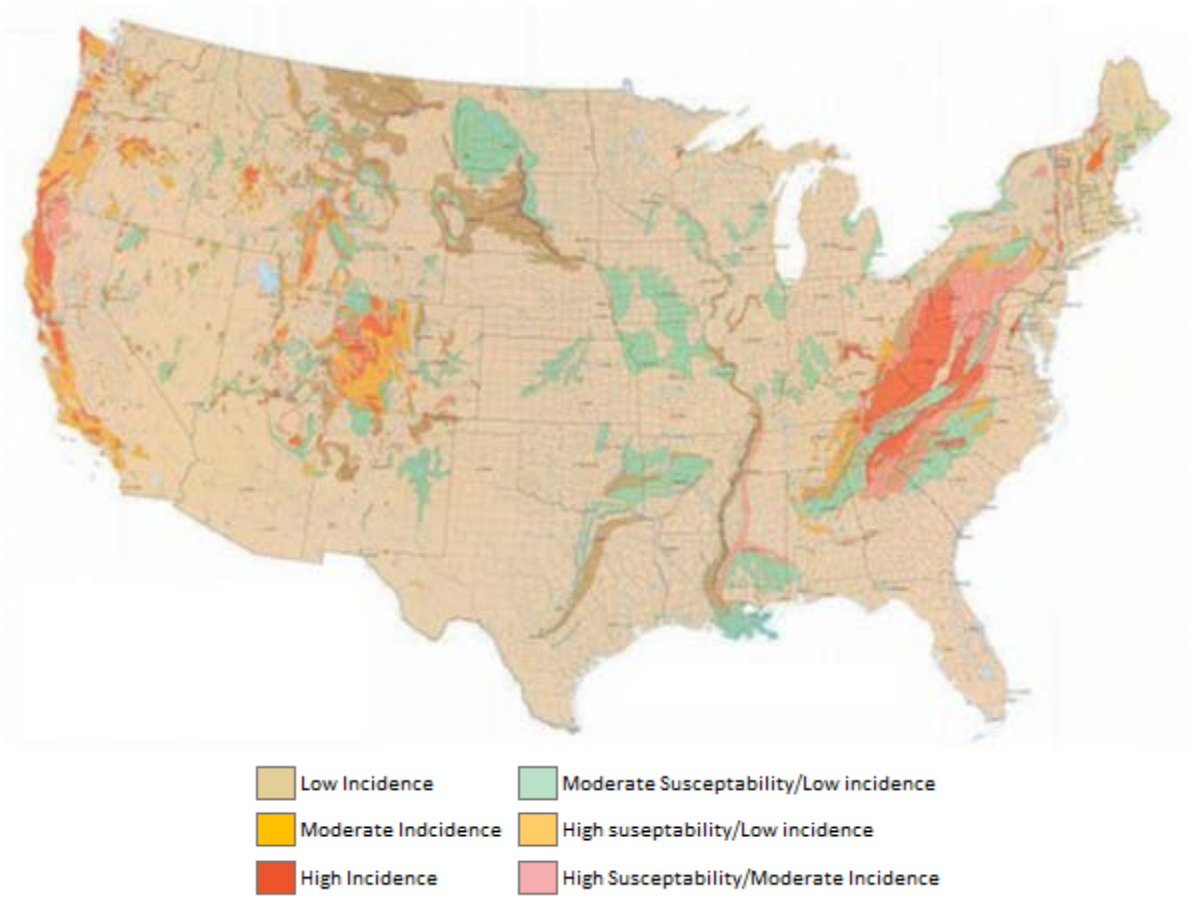
Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved 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 States[13]. **Figure 5.13** delineates areas where large numbers of landslides have occurred and areas that are susceptible to land sliding in the conterminous

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

United States[14].

FIGURE 5.13: LANDSLIDE OVERVIEW MAP OF THE UNITED STATES[15]



Source: USGS

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 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

[14] 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.

[15] 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 spaces then a sudden collapse of the land surface can occur. These collapses can be small, or, as **Figure 5.14** below shows, they can be huge and can occur where a house or road is on top[16].

FIGURE 5.14: 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 geologic, 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 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 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

[16] *Sinkholes. United States Geological Survey. Retrieved on December 14, 2017 from: https://water.usgs.gov/edu/sinkholes.html*

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 the 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.

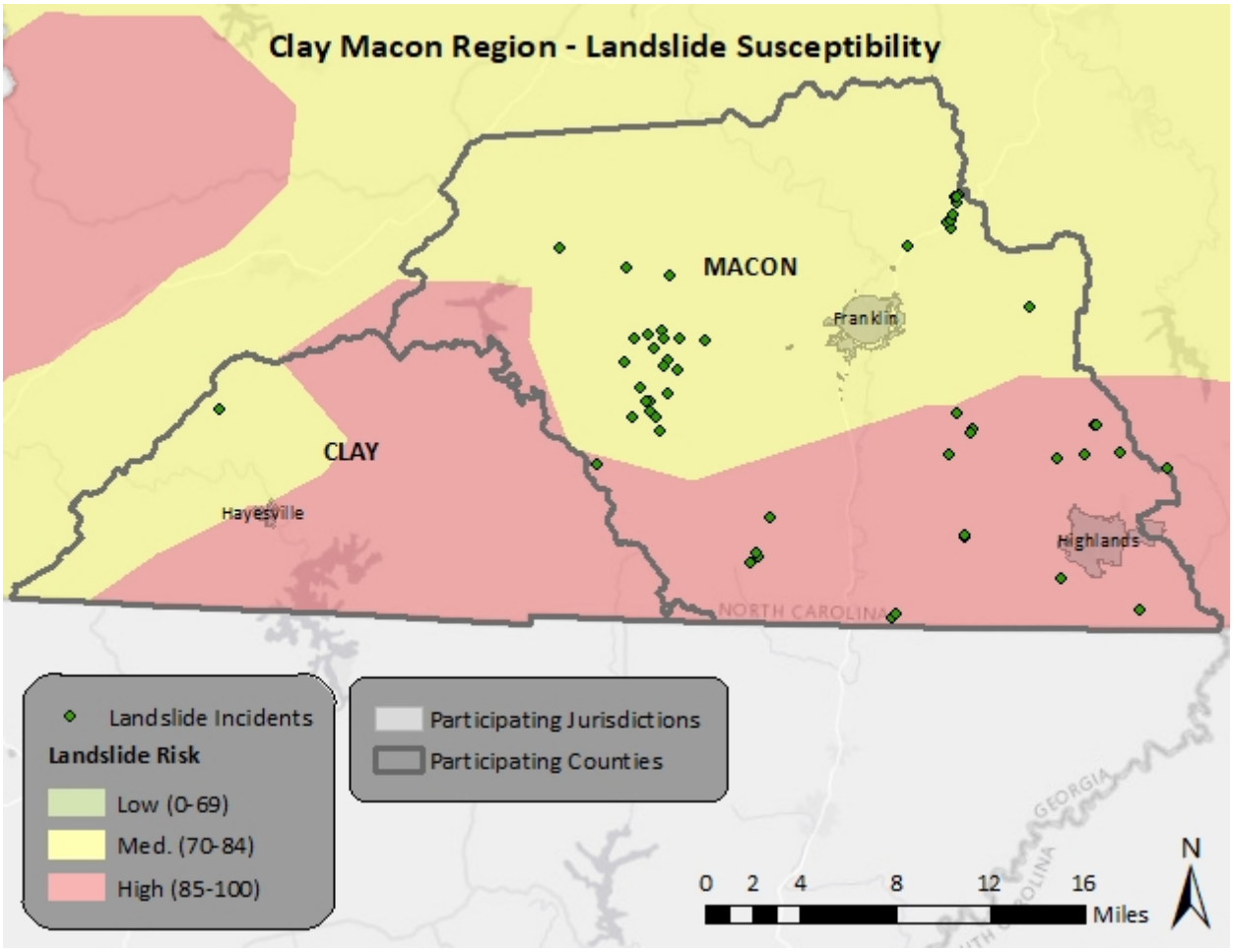
5.8.2 Location and Spatial Extent

Landslides

Landslides occur along steep slopes when the pull of gravity can no longer be resisted (often due to heavy rain). Human development can also exacerbate risk by building on previously undevelopable steep slopes and constructing roads by cutting through mountains. Landslides are possible throughout the Clay Macon Region.

According to **Figure 5.15** below, the majority of the region, has moderate landslide activity. However, there is a sizable portion of the region that has a high susceptibility, covering much of the southern portion of the region.

FIGURE 5.15: LANDSLIDE SUSCEPTIBILITY

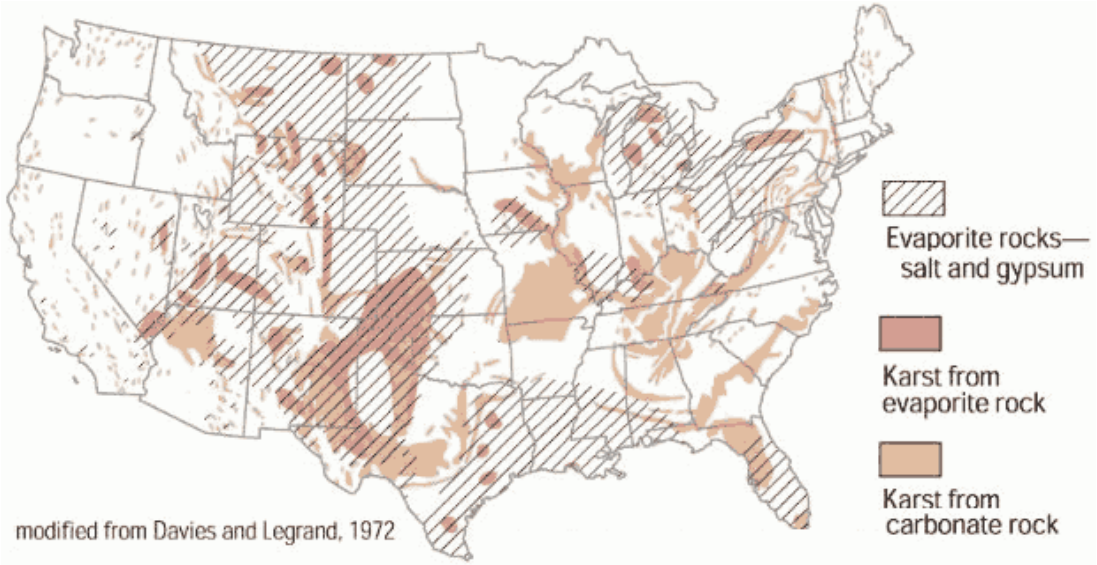


Source: USGS

Sinkholes

Figure 5.16 below shows areas of the United States where certain rock types that are susceptible to dissolution in water occur. In these areas, the formation of underground cavities can form and catastrophic sinkholes can happen. These rock types are 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 5.16: UNITED STATES GEOLOGICAL SURVEY OF KARST MODIFIED FROM DAVIES AND LEGRAND, 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.

5.8.3 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 was not previously possible also contributes to risk. **Table 5.22** presents a summary of the landslide occurrence events as provided by the North Carolina Geological Survey[17]. These incidents are depicted in **Figure 5:15** above. **Table 5.23** presents damage estimates of recent slide events provided by the North Carolina Department of Transportation.

[17] It should be noted that the North Carolina Geological Survey (NCGS) emphasized the dataset provided was incomplete. Therefore, there may be additional historical occurrences. Further, dates were not included for every event. The earliest date reported was 1978. No damage information was provided by NCGS.

TABLE 5.22: SUMMARY OF LANDSLIDE ACTIVITY

Location	Number of Occurrences
Clay County	**1**
Hayesville	1
Unincorporated Area	0
Macon County	**54**
Franklin	1
Highlands	7
Unincorporated Area	46
CLAY MACON REGIONAL TOTAL	**55**

Source: North Carolina Geological Survey

The North Carolina Department of Transportation provided event information for several recent landslide occurrences in the Clay Macon Region which can be seen in **Table 5.23** below.

TABLE 5.23: RECENT LANDSLIDE ACTIVITY

Location	Date
Clay County	
Leatherwood Rd	1990-12-23
Macon County	
SR 1135	1989-07-22
Peeks Creek	2004-09-16
Countywide (16-20 small slides/slope failures	2004-09-06 - 17
Parker Farm Road	2020-04-14

Source: North Carolina Department of Transportation

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 part of the state and in the Clay Macon region. According to a search of local media outlets across the state, the western area has experienced more than 40 sinkholes over the past 20 years. There are no historical occurrences of sinkholes 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. Several sources were vetted to identify areas of erosion in the Clay Macon Region. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Little information could be found beyond the hazard mitigation plans. Erosion was referenced in the previous Clay Macon Regional Hazard Mitigation Plan, but there was no recorded history of significant erosion events and it was found to be hazard with a negligible potential impact.

As depicted information in the narrative discussion above, the impact of erosion on the Clay Macon region is limited to those areas along water courses in the region. Vulnerability would be limited to any structures

and infrastructure (roads, bridges, etc.) that are located close to the stream banks. There is no GIS data on where erosion is occurring and noted areas of concern are limited as well.

5.8.4 Probability of Future Occurrences

Landslides

Based on historical information and the USGS susceptibility index, the probability of future landslide events is possible (1 to 10 percent probability). Local conditions may become more favorable for landslides due to heavy rain, for example. This would increase the likelihood of occurrence. It should also be noted that some areas in the Clay Macon Region have greater risk than others given factors such as steepness on slope and modification of slopes.

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, not the Clay Macon region. While many sinkholes have been relatively small, it is still unlikely (between 1 and 33.3 percent annual probability) that this region will continue to be affected in the future.

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 in Section 6: *Vulnerability Assessment*.

5.9 DAM FAILURE

5.9.1 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 approximately 80,000 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 also can 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.

5.9.2 Location and Spatial Extent

The North Carolina Division of Energy, Mineral, and Land Resources 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 5.24** explains these classifications.

TABLE 5.24: NORTH CAROLINA DAM HAZARD CLASSIFICATIONS

Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low volume roads Less than 25 vehicles per day	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 Division of Energy, Mineral, and Land Resources

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are 77 dams in the Clay Macon Region[18]. **Figure 5.16** shows the dam locations and the corresponding hazard ranking for each. Of these dams, 36 are classified as high hazard potential. These high hazard dams are summarized by county in **Table 5.25.**

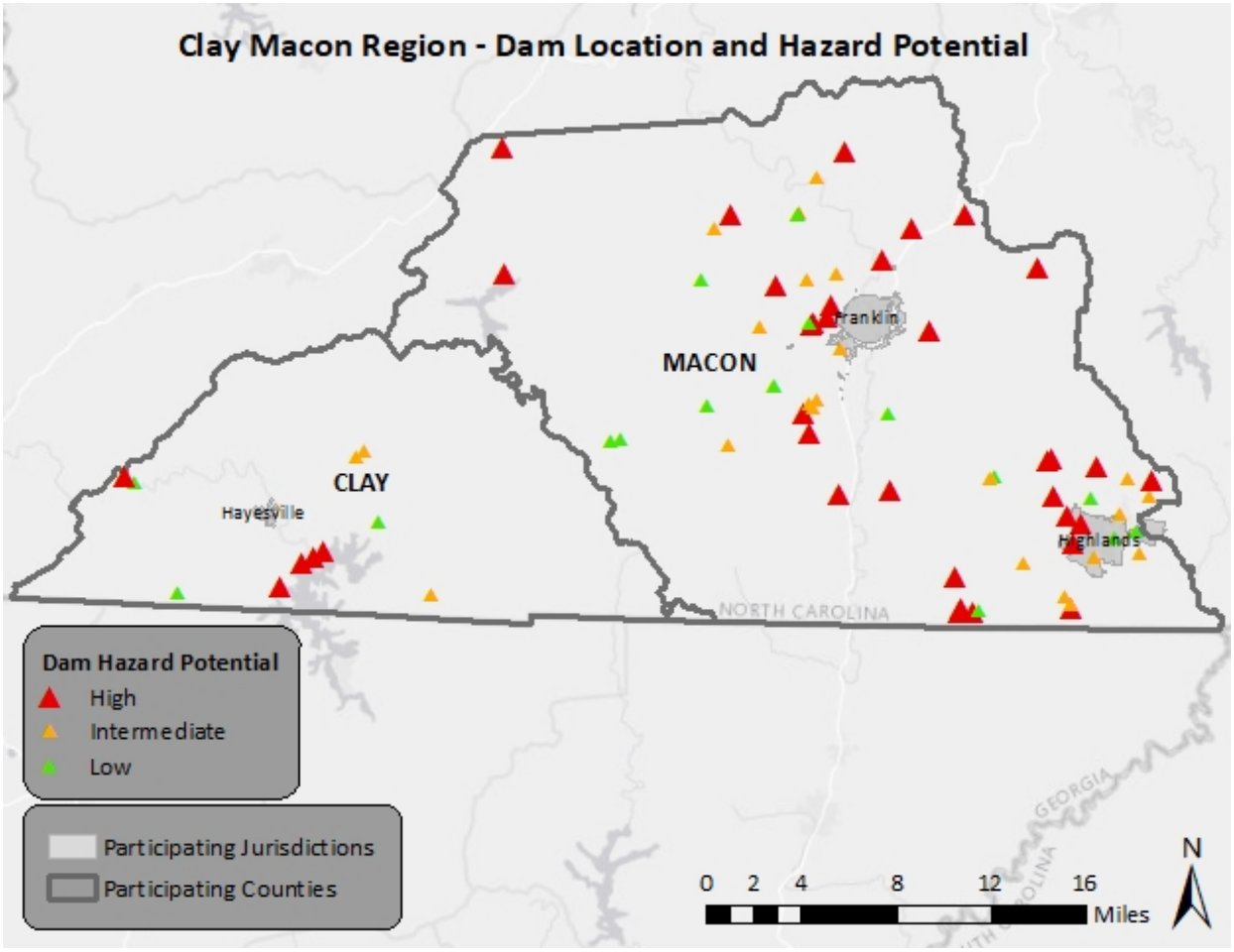
[18] The October 1, 2018 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

TABLE 5.25: SUMMARY OF HIGH HAZARD DAM LOCATIONS

Location	Number of High Hazard Dams
Clay County	**5**
Hayesville	0
Unincorporated Area	5
Macon County	**31**
Franklin	1
Highlands	6
Unincorporated Area	24
Clay Macon Regional Total	**36**

Source: North Carolina Division of Energy, Mineral, and Land Resources

FIGURE 5.16: DAM LOCATIONS AND HAZARD RISK



Source: North Carolina Division of Land Resources, 2019

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

5.9.3 Historical Occurrences

There have been 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 two dam breaches 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.

5.9.4 Probability of Future Occurrence

Given the current dam inventory and historic data, a dam breach is 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. In addition to local devastation, the region as whole would be impacted.

Inventories of statewide dam inundation data is an area that NCEM-RM is currently working hard to improve. At this time, there is geospatial data in final quality control review for 19 dams in North Carolina and that number is expected to increase significantly over the next several years. Additionally, NCEM is currently working with the USACE to acquire inundation data for 9 dams under the Corps' management. As this data becomes available, detailed assessments can be run to better determine vulnerability to dam failures. The 2025 update of this plan may include a much more robust analysis of dam failure vulnerability at the County level.

5.10 FLOODING

5.10.1 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.

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 interval.

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).

5.10.2 Location and Spatial Extent

There are areas in the Clay Macon Region that are susceptible to flood events. Special flood hazard areas in the Clay Macon Region were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM)[19]. This includes Zone A (1-percent annual chance floodplain), Zone AE

[19] The county-level DFIRM data used for Cleveland County was updated in 2008. Lincoln's County's data was updated in 2009

(1-percent annual chance floodplain with elevation), Zone X500 (0.2- percent annual chance floodplain). According to GIS analysis, of the 740 square miles that make up the Clay Macon Region, there are 24.4 square miles of land in zones A and AE (1-percent annual chance floodplain/100-year floodplain) and 27.2 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 5.26**.

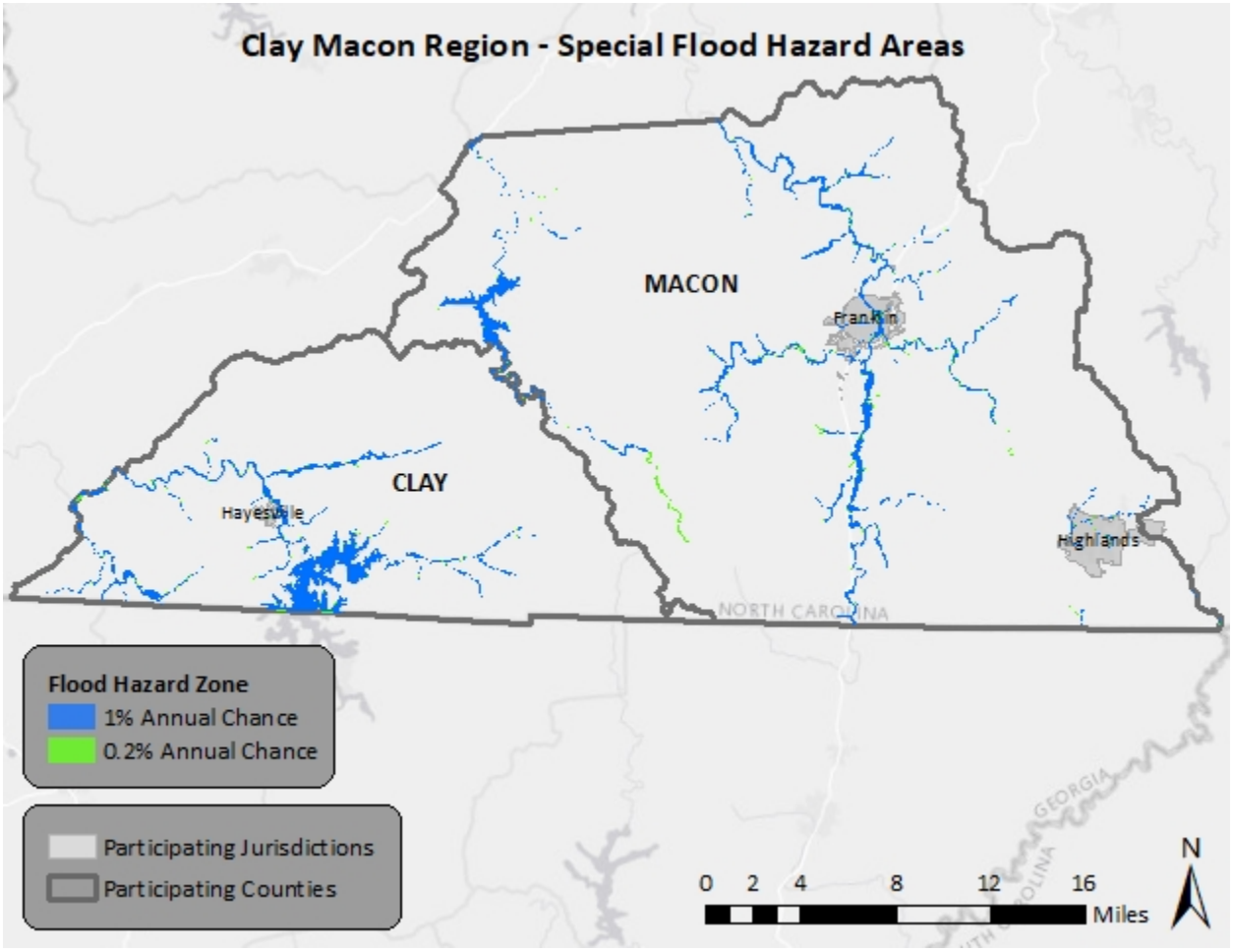
TABLE 5.26: SUMMARY OF FLOODPLAIN AREAS

Location	100-year area (square miles)	500-year area (square miles)
Clay County	11.1	11.3
Macon County	13.3	15.9
CLAY MACON REGION TOTAL	**24.4**	**27.2**

These flood zone values account for 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 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 5.17** illustrates the location and extent of currently mapped special flood hazard areas for the Clay Macon Region based on best available FEMA DFIRM data from October of 2018.

and the Gaston County data was updated in 2015.

FIGURE 5.17: SPECIAL FLOOD HAZARD AREAS



Source: Federal Emergency Management Agency

5.10.3 Historical Occurrences

Information from the National Centers for Environmental Information was used to ascertain historical flood events. The National Centers for Environmental Information reported a total of 39 events throughout the Clay Macon Region since 1993[20]. A summary of these events is presented in **Table 5.27**. These events accounted for over $5.1 million (2020 dollars) in property damage throughout the region[21].

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

[21] The total damage amount was averaged over the number of affected counties when multiple counties were involved in the flood event.

TABLE 5.27: SUMMARY OF FLOOD OCCURRENCES IN THE CLAY MACON REGION

Location	Number of Occurrences	Deaths	Injuries	Property Damage	Crop Damage
Clay County	**6**	**0**	**0**	**$954,000**	**$0**
Hayesville	1	0	0	$0	$0
Unincorporated Area	5	0	0	$954,000	$0
Macon County	**33**	**0**	**0**	**$4,165,000**	**$1,050,000**
Franklin	6	0	0	$50,500	$0
Highlands	3	0	0	$3,000	$0
Unincorporated Area	24	0	0	$4,111,500	$1,050,000
Clay Macon Regional Total	**39**	**0**	**0**	**$5,119,000**	**$1,050,000**

Source: National Centers for Environmental Information

Table 5.28 shows significant flooding events within the Clay Macon communities in the last 20 years (2000 – 2020).

TABLE 5.28: MAJOR FLOOD OCCURRENCES IN THE CLAY MACON REGION

Area	Date	Type	Property Damage	Crop Damage	Information
Clay (Zone)	6-May-03	Flash Flood	$954,000	$0	Creeks out of banks, low spots flooded, and roads closed countywide. Some tiles, private bridges flooded, and driveways damaged.
Clay (Zone)	21-Sep-09	Flood	$0	$0	Very heavy rainfall over several hours produced areal flooding from mid-morning to late afternoon in Hayesville, North Carolina. A few roads in and around Hayesville have several inches to nearly a foot of water over the road. A vast majority of the flooding was along highway 64 in Clay County. A strong system northeast into southwest North Carolina, producing rainfall over the same area. Several roads in Cherokee and Clay counties were flooded during the event.
Hayesville	2-Dec-15	Flood	$0	$0	Several roads were flooded, particularly State Routes 1303 and 1326. This was caused by persistent moisture flow and nearly stationary surface front which brought rains to the area from November 29th to December 2nd, resulting in flooding

Area	Date	Type	Property Damage	Crop Damage	Information
Franklin	26-Jul-07	Flash Flood	$50,000	$0	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. Stationary thunderstorms produced localized flash flooding over the North Carolina mountains during the late afternoon and evening hours.
Macon (Zone)	7-Sep-04	Flood	$100,000	$550,000	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 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.

Area	Date	Type	Property Damage	Crop Damage	Information
Macon (Zone)	16-Sep-04	Flood	$3,900,000	$500,000	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.
Macon (Zone)	21-Sep-09	Flood	$100,000	$0	A third round of heavy rain in two days over the southern North Carolina Mountains caused the French Broad River to go into flood west of Hendersonville. The prolonged heavy rain also caused many streams to flood, closing several roads across the southern mountains.

Source: National Information for Environmental Information

5.10.4 Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of March 2020, there have been 72 flood losses reported in the Clay Macon Region through the National Flood Insurance Program (NFIP) since 1978, totaling over $1,121,462 in claims payments. A summary of these figures for each Clay Macon county is provided in Table 5.29. 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 5.29: SUMMARY OF INSURED FLOOD LOSSES

Location	Number of Policies	Flood Losses	Claims Payments
Clay County	**132**	**22**	**$102,154**
Hayesville	14	0	$0
Unincorporated Area	118	22	$102,154
Macon County	**166**	**50**	**$1,019,308**
Franklin	14	0	$0
Highlands*	--	--	--
Unincorporated Area	152	50	$1,019,308
Clay Macon Regional Total	**298**	**72**	**$1,121,462**

*This community does not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: FEMA, NFIP

5.10.5 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. Currently there are over 140,000 repetitive loss properties nationwide.

Currently, there are 3 non-mitigated repetitive loss properties located in the Clay Macon Region, which accounted for 6 losses and more than $250,000 in claims payments under the NFIP. The average claim amount for these properties is $44,468. All three of the properties are single- family residential structures. Without mitigation these properties will likely continue to experience flood losses. **Table 5.30** presents a summary of these figures for the Clay Macon Region. Detailed information on repetitive loss properties and NFIP claims and policies can be found in the jurisdiction-specific annexes.

TABLE 5.30: SUMMARY OF REPETITIVE LOSS PROPERTIES IN THE CLAY MACON REGION

Location	Number of Properties	Number of Losses	Total Payments
Clay County	**0**	**0**	**$0**
Hayesville	0	0	$0
Unincorporated Area	0	0	$0
Macon County	**3**	**6**	**$266,806**
Franklin	--	--	--
Highlands	0	0	$0
Unincorporated Area	3	6	$266,806
Clay Macon Regional Total	**3**	**6**	**$266,806**

* These communities do not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: National Flood Insurance Program

5.10.6 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).

Other Hazards

5.11 WILDFIRES

5.11.1 Background and Description

A wildfire is any outdoor fire (i.e. grassland, forest, brush land) that is not under control, supervised, or prescribed[22]. 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 for 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 wildfire. 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.

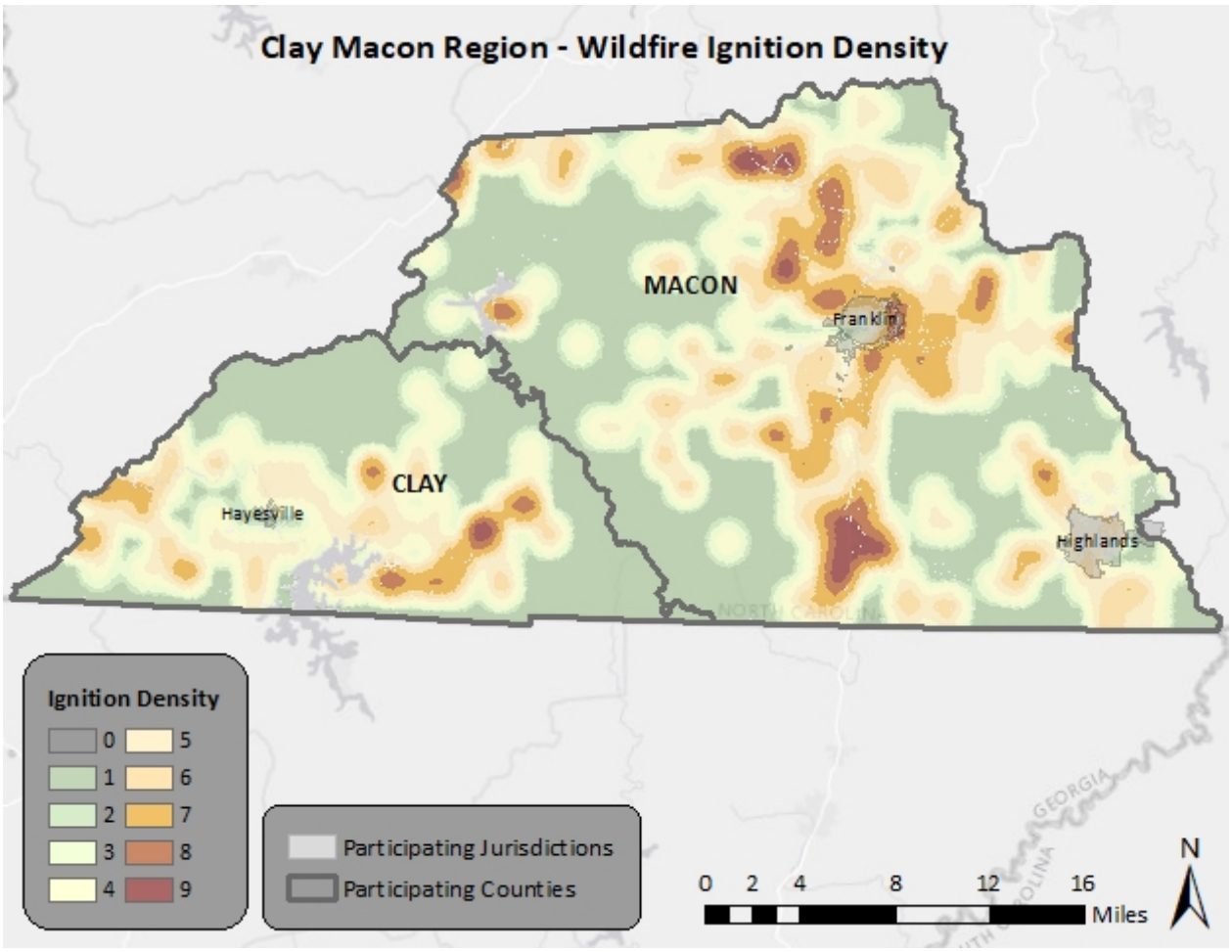
5.11.2 Location and Spatial Extent

The entire region is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-

[22] Prescription burning, or "controlled burn," undertaken by land management agencies is the process of igniting fires under selected conditions, in accordance with strict parameters.

wildland interface are particularly susceptible to fire hazard as populations border formerly undeveloped areas. **Figure 5.18** shows the Wildfire Ignition Density for the Clay Macon Region based on data from the Southern Wildfire Risk Assessment. This data represents the likelihood of wildfire igniting in the area, which is derived from historical wildfire occurrences to create an average ignition rate map.

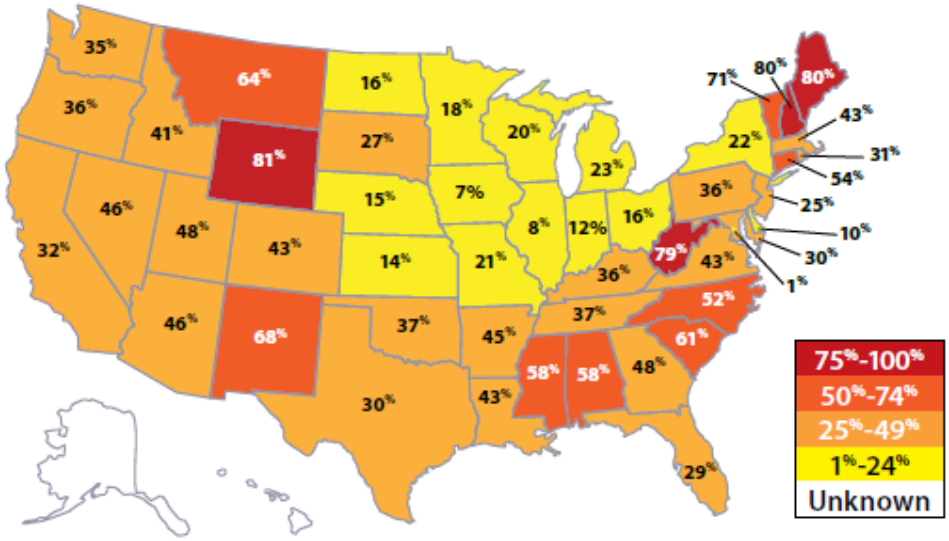
FIGURE 5.18: WILDFIRE IGNITION DENSITY



Source: Southern Wildfire Risk Assessment

Every state also has a Wildland Urban Interface (WUI), which is the rating of potential impact of wildfires 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. Below, **Figure 5.19** shows a map of each state's WUI. Based on the data from the US Department of Agriculture, 52% of homes in North Carolina lie within the WUI.

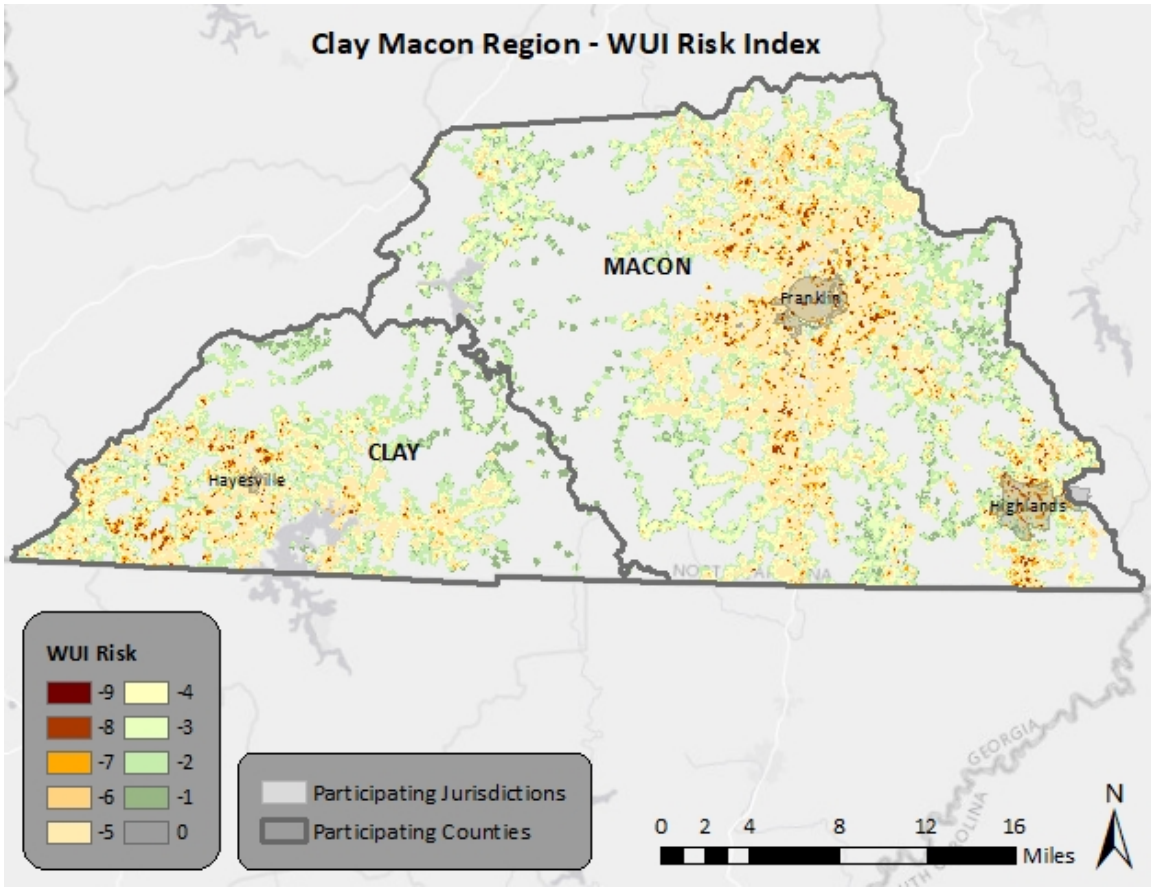
FIGURE 5.19: PERCENT OF TOTAL HOMES IN THE WILDLAND URBAN INTERFACE



Source: US Department of Agriculture

Below, **Figure 5.20** displays the WUI Risk Index for the counties in the Clay Macon Region.

FIGURE 5.20: WILDLAND URBAN INTERFACE RISK INDEX



Source: Southern Wildfire Risk Assessment

5.11.3 Historical Occurrences

Information from the National Association of State Foresters was used to ascertain historical wildfire events. The National Association of State Foresters reported that a total of 375 events that impacted an area greater than 1 acre have occurred throughout the Clay Macon Region since 2001[23]. A summary of these events is presented in **Table 5.31**. The largest of these events was the Boteler Fire which occurred in Clay County in 2016 and impacted 9,036 acres.

TABLE 5.31: SUMMARY OF WILDFIRE INCIDENTS IN THE CLAY MACON REGION (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 Center for Environmental Information

TABLE 5.32: NASF WILDFIRE INCIDENT CASES GREATER THAN 10 ACRES (2001-2018)

Fire #	County	Acres	Reported On
NCST-022-20010013	Clay	10.00	03/09/2001
NCST-022-20010020	Clay	11.00	11/07/2001
NCST-022-20040002	Clay	20.00	03/11/2004
NCST-022-20040005	Clay	20.00	03/24/2004
NCST-022-20040008	Clay	12.00	03/28/2004
NCST-022-20040010	Clay	10.00	04/04/2004
NCST-022-20040017	Clay	70.00	04/19/2004
NCST-022-20050007	Clay	25.00	03/26/2005
NCST-022-20060013	Clay	40.00	11/03/2006
NCST-022-20060015	Clay	10.00	11/18/2006
NCST-022-20070018	Clay	65.00	04/29/2007
NCST-022-20080004	Clay	10.00	02/12/2008
NCST-022-20080021	Clay	20.00	08/22/2008
NCST-022-20080026	Clay	188.00	11/11/2008
NCST-022-20110003	Clay	18.00	02/15/2011
NCST-022-20110008	Clay	20.00	03/12/2011
NCST-022-20120008	Clay	45.00	04/09/2012
NCST-022-20130001	Clay	30.00	03/27/2013
NCST-022-20140005	Clay	31.00	02/28/2014

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

Fire #	County	Acres	Reported On
NCST-022-FY2016-0004	Clay	15.19	02/08/2016
NCST-022-FY2016-0004	Clay	15.19	02/08/2016
NCST-022-FY2016-0017	Clay	25.15	03/17/2016
NCST-022-FY2016-0017	Clay	25.15	03/17/2016
NCST-022-FY2017-0022	Clay	48.02	11/23/2016
NCST-022-FY2017-0022	Clay	48.02	11/23/2016
NCST-022-FY2017-0024	Clay	9036.38	12/02/2016
NCST-056-20010058	Macon	40.00	11/12/2001
NCST-056-20010065	Macon	85.00	11/19/2001
NCST-056-20020021	Macon	100.00	03/24/2002
NCST-056-20020028	Macon	12.00	04/11/2002
NCST-056-20020037	Macon	50.00	09/10/2002
NCST-056-20040003	Macon	10.00	01/30/2004
NCST-056-20040013	Macon	35.00	02/22/2004
NCST-056-20050019	Macon	85.00	03/12/2005
NCST-056-20050017	Macon	30.00	03/12/2005
NCST-056-20060021	Macon	26.00	04/05/2006
NCST-056-20070007	Macon	75.00	02/22/2007
NCST-056-20070008	Macon	130.00	02/23/2007
NCST-056-20080028	Macon	10.00	04/20/2008
NCST-056-20080039	Macon	153.00	06/24/2008
NCST-056-20080038	Macon	22.00	06/24/2008
NCST-056-20090006	Macon	50.00	02/16/2009
NCST-056-20090012	Macon	180.00	03/08/2009
NCST-056-20090010	Macon	180.00	03/08/2009
NCST-056-20090014	Macon	20.00	03/23/2009
NCST-056-20100014	Macon	60.00	04/06/2010
NCST-056-20100020	Macon	40.00	04/18/2010
NCST-056-20100027	Macon	67.00	11/08/2010
NCST-056-20110016	Macon	17.00	04/03/2011
NCST-056-20110017	Macon	27.00	04/19/2011
NCST-056-20110018	Macon	22.00	04/24/2011
NCST-056-20140009	Macon	11.00	02/23/2014
NCST-056-20140034	Macon	81.00	04/02/2014
NCST-056-20140044	Macon	120.00	04/26/2014
NCST-056-20140047	Macon	65.00	05/02/2014

Fire #	County	Acres	Reported On
NCST-056-FY2017-0041	Macon	98.10	11/11/2016
NCST-056-FY2017-0041	Macon	98.10	11/11/2016
NCST-056-FY2017-0045	Macon	1257.48	11/02/2016
NCST-056-FY2017-0044	Macon	7450.25	11/03/2016
NCST-056-FY2017-0096	Macon	3037.94	11/23/2016
NCST-056-FY2017-0131	Macon	392.26	11/07/2016
NCST-056-FY2017-0160	Macon	27.37	03/17/2017

Source: NASF

There is no narrative information on historical wildfires to impact the Clay Macon Region found in the NCEI database, the NC State Hazard Mitigation Plan, the North Carolina Forest Service or provided by local emergency managers.

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 gusted up to 35 mph presented a challenge 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 woods worked its way along the Appalachian Trail as well. This fire did put some structures along Forest Road 69 and the Bear Cove area at risk. But fire operations created a series of buffer zones to protect these structures.

The Tellico Fire, also in 2016, started in Swain County but burned over 14,000 acres, most of which were in Macon County.

The main causes of previous wildfires in the Clay Macon Region are from debris burning (38%) and incendiary causes (20%) but they are generally smaller fires that are controlled before causing major damages.

5.11.4 Probability of Future Occurrences

Wildfire events will be an ongoing occurrence in the Clay Macon Region. The likelihood of a wildfire increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to 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 risk. For example, highly developed areas are less susceptible unless they are located near the wildland urban index boundary. The risk will also vary due to assets. Areas in the wildland urban interface will have much more property at

risk, resulting in increased vulnerability and need 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).

5.12 INFECTIOUS DISEASE

5.12.1 Background and Description

For the purposes of this plan, this section will assess infectious diseases and vector-borne diseases within the Clay Macon region.

Infectious Disease

Communicable, or infectious, diseases are conditions that result in clinically evident illness which 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 Center 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 in 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 immune-compromised 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 and 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.

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 toward outbreaks.

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.

5.12.2 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.

5.12.3 Historical Occurrences

Infectious Disease

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 COVID – 19 Pandemic disaster declaration 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.

TABLE 5.33: SUMMARY OF CONFIRMED COVID – 19 CASES IN THE CLAY MACON REGION

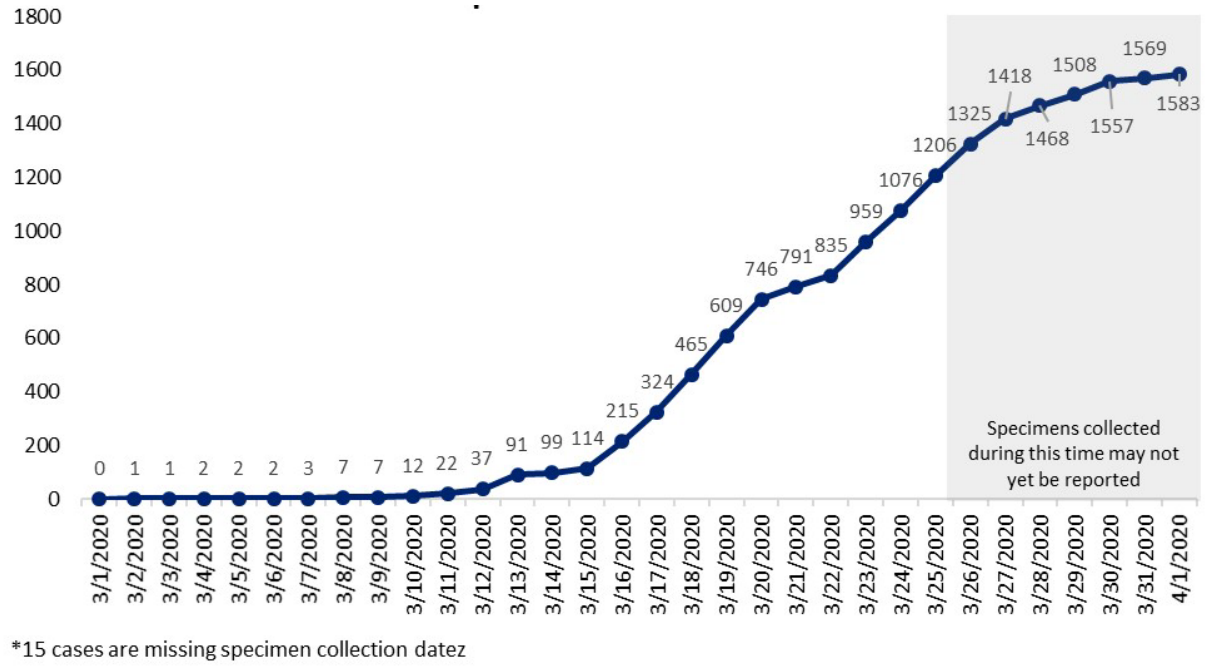
Location	Number of Cases	Number of Deaths*
Clay County	3	0
Macon County	1	0
Clay Macon Region Total	4	0

Source: North Carolina Department of Health and Human Services
** Deaths reflect deaths in persons with laboratory-confirmed COVID-19 reported by local health departments to the NC Department of Health and Human Services*

As of April 2, 2020, NC DHHS reported there were 1,857 cases of COVID – 19 in North Carolina[24]. These cases reflect cases that were tested and returned positive, including the NC State Laboratory of Public Health and reporting hospital and commercial labs. **Figure 5.21** below provides an overview of the total number of COVID-19 cases by date of specimen collection for North Carolina.

[24] https://www.ncdhhs.gov/covid-19-case-count-nc#by-counties

FIGURE 5.21: CUMULATIVE TOTAL NUMBER OF COVID-19 CASES BY DATE OF SPECIMEN COLLECTION*



*15 cases are missing specimen collection datez

Source: North Carolina Department of Health and Human Services
** All data are preliminary and might change as cases are investigated. Numbers may not sum to 100% due to rounding.*

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 dollars 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[25].

5.12.4 Probability of Future Occurrence

It is difficult to predict the future probability of infectious diseases due to the difficulty with obtaining information on this type of hazard. The most common and probable disease in the state has shown to be influenza; however, based on historical data, it is relatively unlikely (between 1 and 33.3 percent annual probability) that the Clay Macon region will experience an outbreak of infectious diseases in the future.

[25] https://www.ncdhhs.gov/news/press-releases/nc-prepared-zika-virus-risk-local-virus-carrying-mosquitoes-low

Technological Hazards

5.13 HAZARDOUS SUBSTANCES

5.13.1 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 causes[26]. 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 be extended beyond the initial area by persons, vehicles, water, wind, and possibly wildlife as well.

HAZMAT incidents can also occur as a result 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 toxological concern.

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.

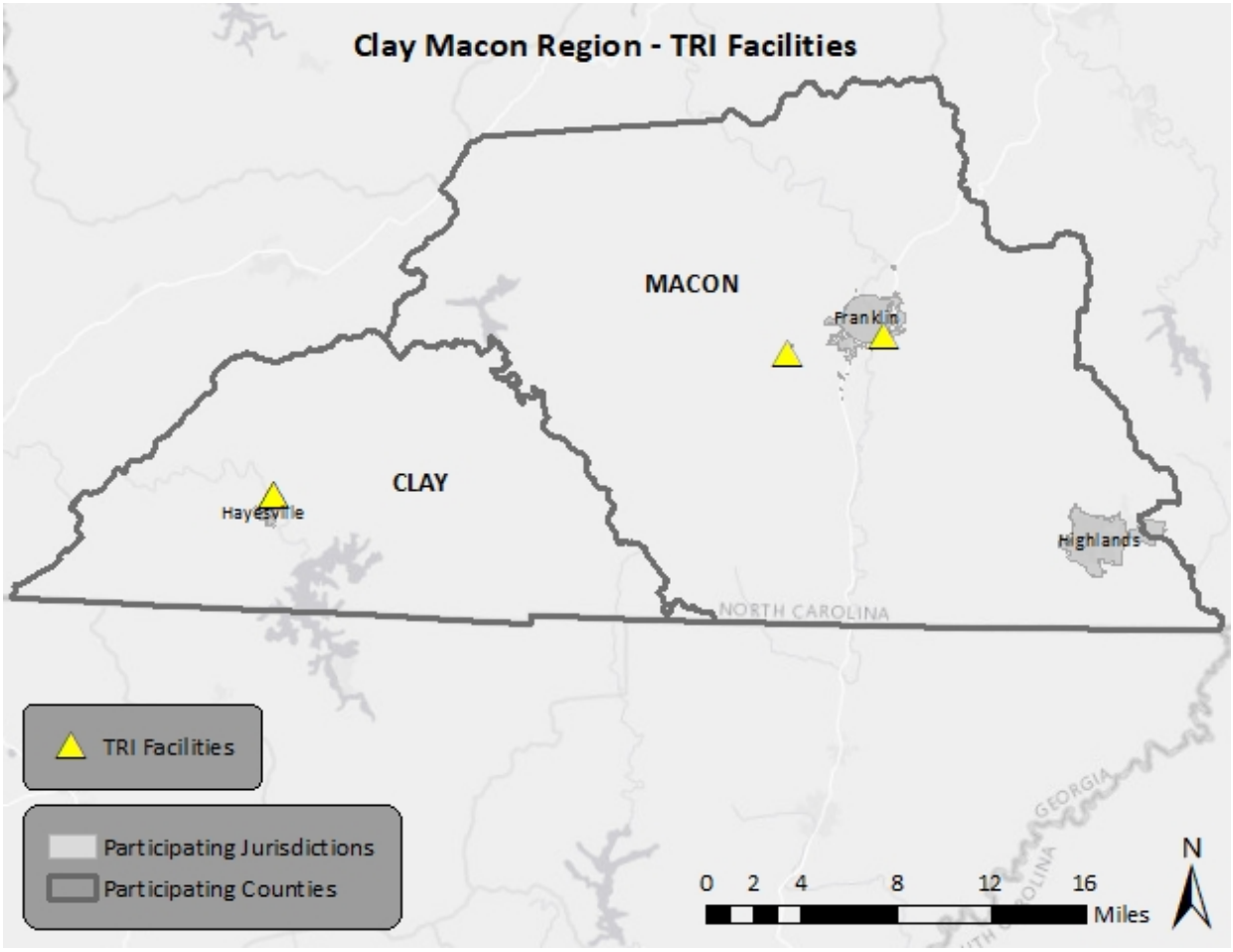
5.13.2 Location and Spatial Extent

As a result of the 1986 Emergency Planning and Community Right to Know Act (EPCRA), the 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 such activity is

[26] FEMA, 1997.

occurring. As of 2018, the Clay Macon Region has 3 TRI sites. These sites are shown in **Figure 5.22.**

FIGURE 5.22: 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 to an incident.

5.13.3 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 a hazardous material,
- the evacuation of 25 or more persons as a result of 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 galls 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, prior to 2002, a hazardous material "serious incident" was defined as follows:

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

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is an agency of the United States Department of Transportation that was established in 2004. The PHMSA maintains a database of hazardous materials incidents for communities across the United States. Summary results of their data for events that have occurred in the Clay Macon region can be found in **Table 5.34**.

TABLE 5.34: SUMMARY OF HAZMAT INCIDENTS IN THE CLAY MACON REGION

Location	Incident Occurrences	Injuries	Deaths	Type	Costs
Clay County	**0**	**0**	**0**		**$0**
Hayesville	0	0	0	n/a	$0
Unincorporated Area	0	0	0	n/a	$0
Macon County	**3**				**$0**
Franklin	1	0	0	Highway	$0
Highlands	0	0	0	n/a	$0
Unincorporated Area	2	0	0	Highway	$172,550
Clay Macon Regional Total	**3**	**0**	**0**		**$172,550**

Source: U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration

5.13.4 Probability of Future Occurrence

Given the location of 3 toxic release inventory sites in the Clay Macon Region and prior rail and roadway incidents, it is possible that a hazardous material incident may occur in the region (between 1 and 10 percent annual probability). County and municipal 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.

5.14 RADIOLOGICAL EMERGENCY – FIXED NUCLEAR FACILITIES

5.14.1 Background and Description

Although not referenced in the previous Clay Macon Regional Hazard Mitigation Plan, radiological emergencies will be assessed in this update.

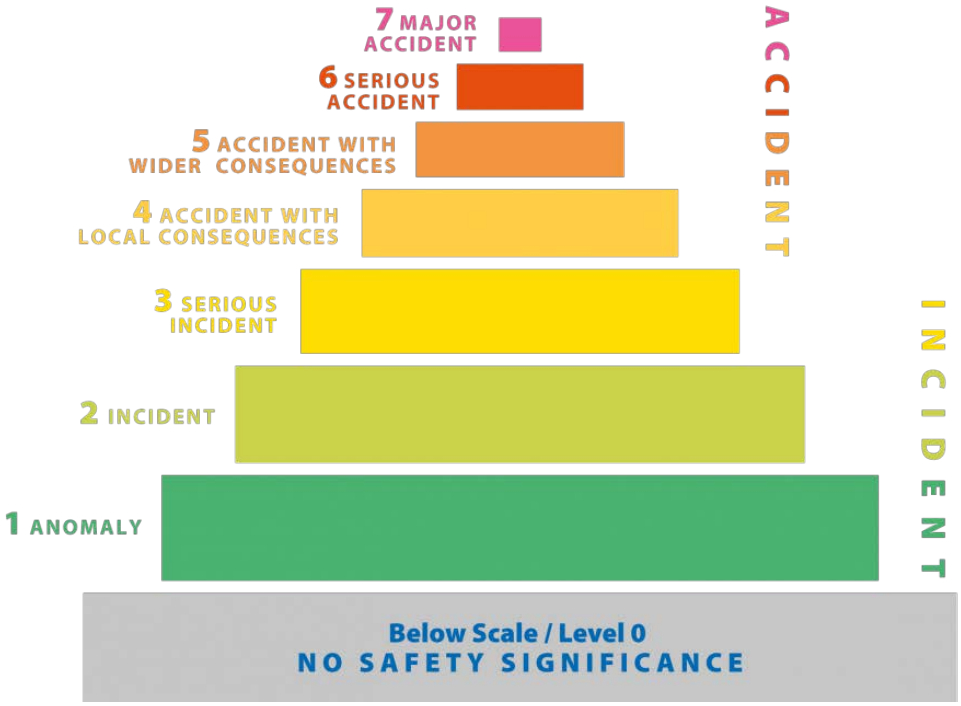
A nuclear and radiation accident is defined by the International Atomic Energy Agency as "an event that has led to significant consequences to people, the environment or the facility. Often, this type of incident results from damage to the reactor core of a nuclear power plant which can release radioactivity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

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. The plant operates with a very high level of security.

5.14.2 Location and Spatial Extent

The entire region is at risk to a nuclear incident. However, areas in the southern part of the region are more susceptible due to their proximity to the Oconee Nuclear Station. The International Atomic Energy Association 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, like 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 5.23**).

FIGURE 5.23: INTERNATIONAL NUCLEAR EVENT SCALE



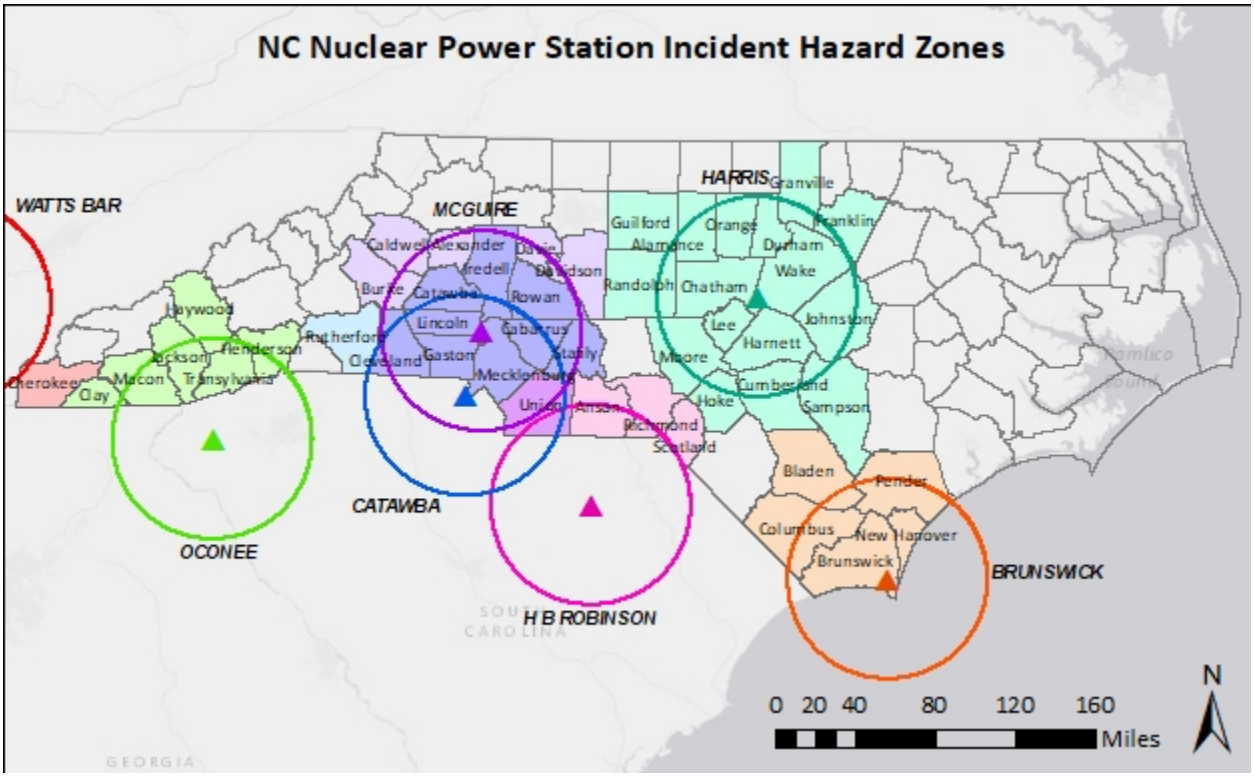
Source: International Atomic Energy Agency

The Nuclear Regulatory Commission defines two emergency planning zones around nuclear plants.

Areas located within 10 miles of the station are considered to be 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. All areas of the counties that are not located within the 10-mile radius are located within this 50-mile radius that is still considered to be at risk from a nuclear incident.

The southeastern Clay Macon Region falls within the 50-mile incident zone for the Oconee Nuclear Station, as seen in **Figure 5.24** below.

FIGURE 5.24: NORTH CAROLINA NUCLEAR POWER STATIONS AND INCIDENT HAZARD ZONES



Source: International Atomic Energy Agency

5.14.3 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.

5.14.4 Probability of Future Occurrences

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

5.15 TERRORISM

5.15.1 Background and Description

Terrorism was not referenced in the previous Clay Macon Regional Hazard Mitigation Plan, but is addressed in this update. For the purpose of this report, terrorism encompasses explosive, chemical, radiological, biological, nuclear, and other threats.

Terrorism is defined in the United States by the Code of Federal Regulations is "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, cyber-attacks (computer based), and the use of chemical, biological, nuclear and radiological weapons. For the purposes of this plan, cyber-attacks 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). As we rank these categories, considering immediate danger posed, impact, probability, technical feasibility, frequency, and historical success, they are typically ranked in the following way.

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 successful attacks.

Chemical

Chemical attacks can pose immediate danger to life and health depending upon the materials used. Chemicals are easy to access, low cost, and easy to deploy. Chemical terrorism can have high and persistent impacts to people and places. These types of attacks are probable and have enjoyed historical success.

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.

Biological

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

Nuclear

While yielding a very high impact, the Nuclear attack is extremely rare due to the fact that it is cost prohibitive and very technically difficult to achieve. This type of attack, however, could be state sponsored which makes it viable.

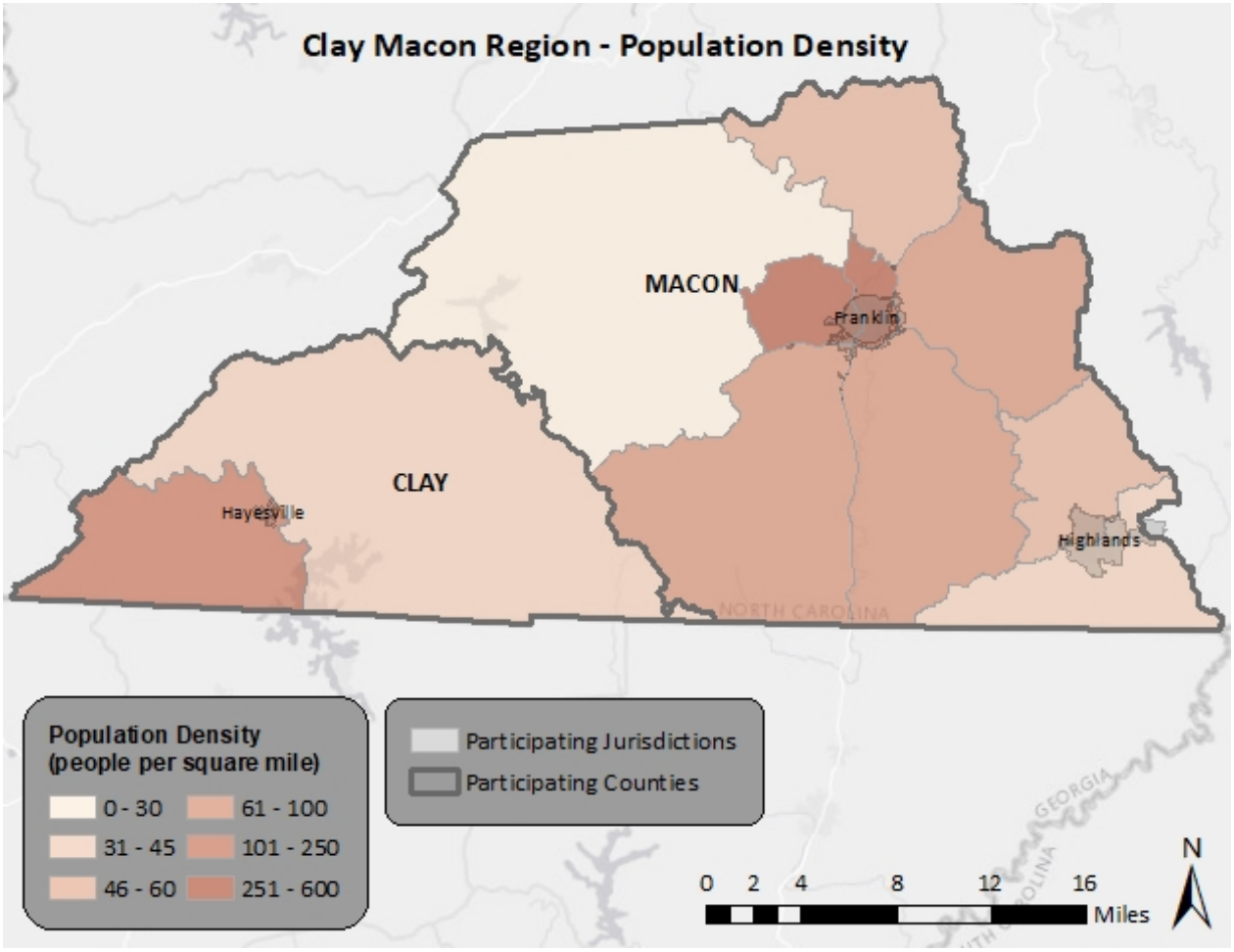
OTHER

Terrorism Hazard Assessment must also account for modern trends and changes. An additional "OTHER" category should be considered that includes small arms attacks, vehicle ramming attacks, edged weapon attacks, and incendiary attacks.

5.15.2 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 5.25** displays the population density in the Clay Macon region using census tract levels.

FIGURE 5.25: POPULATION DENSITY



Source: US Census Bureau

Furthermore, the most recent population counts of each participating county and jurisdictions can be seen in **Table 5.35** below.

TABLE 5.35: 2017 POPULATION ESTIMATES FOR THE CLAY MACON REGION

Location	2019 Population Estimate
Clay County	**11,139**
Hayesville	311
Unincorporated Area	10,828
Macon County	**35,285**
Franklin	3,845
Highlands	924
Unincorporated Area	30,516
Clay Macon Regional Total	**46,424**

Source: US Census Bureau, NC Office of State Budget and Management

5.15.3 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.

5.15.4 Probability of Future Occurrences

The Clay Macon region has experienced no major terrorist attacks, but the area's population is continuing to rise. The probability of future occurrences of a terrorist attack, while unlikely (between 1 and 10 percent annual probability) is a real possibility that the area must be prepared for.

5.16 CYBER

5.16.1 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.

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 Risk Management resources.

Cyberattacks can happen in both the public and private sector. 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 2017 Verizon Report of Data Breaching, 93% of all data breaches had a financial or espionage motive, and espionage cases are rising.

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 a security asset.
- 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 5.26 below displays nationwide cyberattack incident patterns from the 2018 Verizon Data Breach Investigations Report.

FIGURE 5.26: PERCENTAGE AND COUNTS OF INCIDENTS PER PATTERN

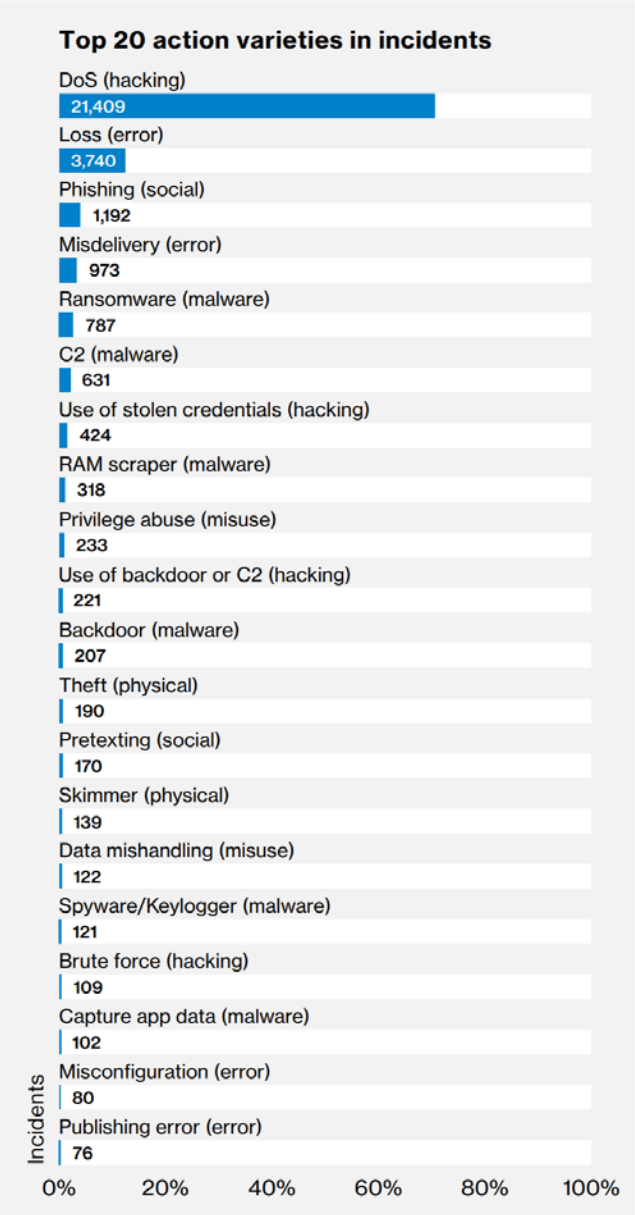


Figure 4. Top 20 threat action varieties (incidents) (n=30,362)

Source: 2018 Verizon Data Breach Investigations Report

5.16.2 Location and Spatial Extent

Cyberattacks happen all over the world and are not restricted to a certain locational boundary. They tend to affect the public industry rather than private industries.

5.16.3 Historical Occurrences

In North Carolina, 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 and coordinates cybersecurity concerns with the State Bureau of Investigation and other agencies as needed.

In 2016, North Carolina reported the highest number of cybercrimes in the "non-payment/non-delivery" sector, which can be seen in **Table 5.36** below.

TABLE 5.36: NORTH CAROLINA CYBERCRIMES AND VICTIM COUNTS IN 2018

Crime Type by Victim Count			
Crime Type	*Victim Count*	*Crime Type*	*Victim Count*
Advanced Fee	436	Identity Theft	330
BEC/EAC	430	Investment	47
Charity	11	Lottery/Sweepstakes/Inheritance	213
Civil Matter	15	Malware/Scareware/Virus	49
Confidence Fraud/Romance	432	Misrepresentation	148
Corporate Data Breach	39	No Lead Value	246
Credit Card Fraud	306	Non-payment/Non-Delivery	1,647
Crimes Against Children	28	Other	172
Denial of Service/TDos	28	Overpayment	406
Employment	391	Personal Data Breach	1,125
Extortion	1,219	Phishing/Vishing/Smishing/Pharming	947
Gambling	4	Ransomware	29
Government Impersonation	255	Re-shipping	31
Hacktivist	2	Real Estate/Rental	286
Harassment/Threats of Violence	330	Spoofing	430
Health Care Related	9	Tech Support	361
IPR/Copyright and Counterfeit	30	Terrorism	2
Descriptors*			
Social Media	902	Virtual Currency	790

Source: FBI Internet Crime Complaint Center, 2018

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

5.16.4 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, and it is considered unlikely (less than 1 percent annual probability) to experience one in the near future.

5.17 ELECTROMAGNETIC PULSE

5.17.1 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 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.

5.17.2 Location and Spatial Extent

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

5.17.3 Historical Occurrences

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

5.17.4 Probability of Future Occurrences

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

5.18 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.

5.18.1 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 EXTENT OF CLAY MACON REGION HAZARDS

Natural Hazards	
Drought	Drought extent is defined by the North Carolina Drought Monitor Classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought (page 5:5). According to the North Carolina Drought Monitor Classifications, the most severe drought condition is Exceptional. The Clay Macon region experienced Exceptional Drought occurrences 4 out of the last 19 years (2000 - 2019).
Hurricane and Tropical Storm Hazards	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table #). While no hurricanes have traversed through the region, at least 5 Tropical Storm events have. The greatest event to ever happen in the region was Tropical Storm Eloise which had a maximum wind speed of ~55 knots in the region. Although there are no reports of Hurricanes traversing through the Clay Macon region, there have been 3 Disaster Declarations in the region related to Hurricane related events.

Tornadoes/ Thunderstorms	Tornadoes: Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure #) as well as the Fujita Scale (Table #). The greatest magnitude reported was an F1, which has occurred on several occasions in the region. *Clay County*: F1 *Macon County:* F1 Thunderstorms: Thunderstorm extent is defined by the number of thunder events and wind speed reported. According to a 63-year history from the National Centers for Environmental Information, the strongest recorded wind speeds event in the Clay Macon region was reported on April 15, 2007 at 70 knots (approximately 80 mph). It should be noted that future events may exceed these historical occurrences. *Clay County*: 65 knots *Macon County*: 70 knots Lightning: According the Vaisala flash density map (Figure #), a majority of the Clay Macon Region is located in an area that experiences 1.5 to 3 lightning flashes 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 size of the hail stone. The largest hail stone reported in the Clay Macon region was 2.75 inches (reported March 28, 1984). It should be noted that future events may exceed this. *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 25.5 inches on March 13, 1993. Due to extreme variations in elevation throughout the region, extent totals will vary for each participating jurisdictions 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 (Table #) and the Modified Mercalli Intensity (MMI) scale (Table #) and the distance of the epicenter form the Clay Macon region. According to data provided by the National Geophysical Data Center, 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

<table>
<tr><td>Geological</td><td>Landslide: As noted above in the landslide profile, the landslide data provided by the North Carolina Geological Survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. However, when using the USGS landslide susceptibility index, extent can be measured with incidence, which is high for a majority of the Clay Macon region. There is also a high susceptibility throughout the region.

Sinkhole: The Clay Macon region is a relatively low risk for sinkholes. As noted above, the region has experienced about 40 sinkholes in the last 20 years.

Erosion: The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records available for the Clay Macon Region.</td></tr>
<tr><td>Dam Failure</td><td>Dam failure extent is defined using the North Carolina Division of Land Resources criteria (Table #). Of the 77 dams in Clay Macon, 36 are classified as high-hazard.
Clay County: 5
Macon County: 31</td></tr>
<tr><td>Flooding</td><td>Flood extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. The amount of land in the floodplain accounts for 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 stream gages throughout the region. While a gage does not exist for each of the participating jurisdiction, 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 stream gauge height was recorded at 17.3 feet. Additional peak discharge readings and gauge 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</td></tr>
</table>

	structure's location in the floodplain and the elevation of the structure.
Other Hazards	
Wildfires	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county. Analyzing the data by county indicates 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 were 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 were 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 regarding Zika virus. The entire Clay Macon region is susceptible to infectious diseases such as the flu, which kills hundreds of people annually.
Technological Hazards	
Hazardous Materials Incident	According to the USDOT PHMSA, the largest hazardous materials incident reported in the region was 8,000 LGA on December 12, 1979 in Franklin. It should be noted that larger events are possible.
Radiological Emergency - Fixed Nuclear Facilities	Although there is no history of nuclear accident at the Oconee Nuclear Stations, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were level 7 events on the INES, the potential for a Level 7 event at Oconee is possible
Terrorism	Although no severe terrorism attacks have been reported in the Clay Macon region, the entire area is still at risk to 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 cyber-attacks have been historically reported in the Clay Macon region. Technology usage, however, is increasing. A cyber-attack 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.

5.18.2 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 Council in gaining consensus on the determination of those hazards that pose the most significant threat to the Clay Macon counties 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 factor[27], as summarized 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:

PRI VALUE = [(PROBABILITY x .30) + (IMPACT x .30) + (SPATIAL EXTENT x .20) + (WARNING TIME x .10) + (DURATION x .10)]

According to the weighting scheme and point system applied, the highest possible value for any hazard is 4.0. When the scheme is applied for the Clay Macon Region, the highest PRI value is 3.0 (winter storm and freeze, flood, thunderstorm/high wind). Prior to being finalized, PRI values for each identified hazard were reviewed and accepted by the members of the Regional Hazard Mitigation Council who made recommendations to make changes to the final hazard rankings.

TABLE 5.38: PRIORITY RISK INDEX FOR THE CLAY MACON REGION

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	1	**30%**

[27] The Regional Hazard Mitigation Council, based upon any unique concerns or factors for the planning area, may adjust the PRI weighting scheme during future plan updates.

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
		critical facilities.		
	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	

5.18.3 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 Team. 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		Likely	Minor	Large	More than 24	More than	2.5

Hazard	Subhazard(s) Assessed	Category/Degree of Risk					
		Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
					hours	1 week	
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 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

5.19 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 Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk. 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 all of the Clay Macon Region. 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.

A more quantitative analysis to estimate potential dollar losses for each hazard has been performed

separately, and is described in Section 6: *Vulnerability Assessment*.

Table 5.40 ranks the hazards that were assessed in the update that were renamed to be consistent with the State of State of North Carolina Hazard Mitigation Plan. These conclusions were based on the PRI calculations and input from the Clay Macon Regional Planning Committee.

TABLE 5.40: 2020 CONCLUSIONS ON HAZARD RISK FOR THE CLAY MACON REGION

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

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 (*Hazard Identification and 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, including the potential impact and expected amount of damages it may cause. The primary objective of the vulnerability assessment is to quantify exposure and the potential loss estimates for each hazard. In doing so, each county and their participating jurisdictions may better understand their unique risks to identified hazards and be better prepared to evaluate and prioritize specific hazard mitigation actions.

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.

For dam failure[1], drought, infectious disease, radiological emergency, terrorism, cyber, and EMP, there was insufficient data available to conduct meaningful estimates of property damages. Therefore, a detailed vulnerability assessment could not be completed for these hazards at this time. Future updates of this plan should attempt to better quantify vulnerability for these hazards as better data is developed.

6.2 METHODOLOGY

This vulnerability assessment was conducted using two distinct methodologies: (1) a geographic information system (GIS)-based analysis; and (2) a risk modeling software analysis with results pulled from NCEM's Risk Management Tool (RMT). Each approach provides estimates for the potential impact of hazards. A brief description of the two different approaches is provided on the following pages.

6.2.1 GIS-Based Analysis

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

- Flooding
- Hazardous Substances
- Geological (Landslide)
- Wildfires

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 best available geospatial data. 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™ 10.6.1 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 located in identified hazard areas. To estimate vulnerable populations in hazard areas, digital Census 2010 data by census tract was obtained and was 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 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 delineable geographic hazard boundaries.

6.2.3 Risk Management Tool

The Risk Management Tool (RMT) was developed by NCEM-Risk Management (RM) as a tool to simplify hazard mitigation plan development into a single, automated, tool-based format to include geospatially based risk assessment data, also developed by NCEM-RM. The RMT is a twofold system used to create

[1] As noted in Section 5: *Hazard Profiles*, dam failure could be catastrophic to structures and populations in the inundation area. However, due to lack of data, no additional analysis was performed. Further, USACE and NCDEQ also complete separate dam failure plans to identify risk and response measures.

and/or update a local and state hazard mitigation plan. The two parts of the RMT are a step-by-step system that will prompt a user to input information and narrative 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 multi-return periods. The availability of multi-returns periods are based on the availability of datasets for each hazard and the degree of detail in each dataset.

The Risk Assessment produced by the Risk Tool will also identify high-risk structures in the planning area and estimate cost by types of mitigation projects (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.

Finally, the Risk Management Tool also assesses vulnerable populations, such as children and elderly persons. Data used to assess these populations is from the US 2010 Census. According to the US 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 2010.

Once all of the information was input into 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 plan, the information is already in the system.

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 to be used statewide and potentially nationwide 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:

- Hurricane 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 the prioritization. As discussed in *Section 5: Hazard Profiles,* the risk (magnitude, probability, location) of a hazard is one of the primary driving forces that helps determine the relative importance of addressing the potential impacts of a hazard. However, the assessment of a hazard's risk

is generally focused on the hazard itself and how severe or likely it could be within geographic scope of the study area. This assessment does not necessarily analyze the potential effects of that hazard on humans and the built environment. This is a critical component of planning for hazards since a hazard that does not impact human life, safety, or welfare is typically not considered as important to address through mitigation. The analysis that follows attempts to bring this consideration into the planning process by estimating the impacts on humans and the built environment and prioritizing hazards accordingly.

6.3 EXPLANATION OF DATA SOURCES

Hurricane and Coastal Hazards

NCEM's Risk Management Tool assessed vulnerable areas to the Hurricane and Coastal Hazards. For this assessment, vulnerable buildings and populations were analyzed against damages caused by hurricane winds.

Tornadoes/Thunderstorms

NCEM's Risk Management Tool analyzed the vulnerable buildings and populations to the Tornadoes/Thunderstorms hazard. Sub hazards assessed under the thunderstorms hazard include hail and lightning; however, for the purposes of this assessment, thunderstorm winds were the only risk analyzed.

Earthquakes

NCEM's Risk Management Tool assessed vulnerable areas to the earthquake hazard. 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 elderly.

Geological (Landslide)

Data from the U.S. Geological Survey was used to first determine what areas are considered high, moderate, or low susceptibility areas to the landslide hazard. Data was downloaded in an ArcGIS compatible format. This allowed the parcel data received by local governments to be layered on top of the landslide regions to assess vulnerability to landslide occurrences.

Flooding

FEMA Digital Flood Insurance Rate Maps (DFIRMs) were used to determine flood vulnerability. DFIRM data can be used in ArcGIS for mapping purposes and, they identify several features including floodplain boundaries and base flood elevations. Identified areas on the DFIRM represent some features of a Flood Insurance Rate Maps including the 100-year flood areas (1.0-percent annual chance flood), and the 500-year flood areas (0.2-percent annual chance flood). For the vulnerability assessment, local parcel data and critical facilities were overlaid on the 100-year floodplain areas and 500-year floodplain areas. This data was also supplemented with the NCEM RMT data, which assessed structure type and vulnerable populations within the floodplain areas. It should be noted that such an analysis does account for building elevation.

Wildfires

The data used to determine vulnerability to wildfires in the Clay Macon Region is based on GIS data called the Southern Wildfire Risk Assessment (SWRA). It was provided for use in this plan by the North Carolina

Division of Forest Resources. A specific layer known as the "Wildland Urban Interface" (WUI) was used to determine vulnerability of people and property. This layer uses the key input of housing density to define potential wildfire impacts to people and homes. The WUI Risk Index is then derived from a scale of -1 to -9, with the least negative impact being a -1, and uses flame length to measure fire intensity. The primary purpose of this data is to highlight areas of concern that may be conducive to mitigation actions. Many assumptions are made, making it not a true probability; however, it does provide a comparison of risk throughout the region. Data was also supplemented with the data from NCEM's RMT, which assessed vulnerable buildings, potential dollar losses of those buildings, and susceptible populations.

Hazardous Substances

Hazardous materials incidents can occur in both fixed facilities and through mobile transportation. For the fixed incident analysis, the Environmental Protection Agency's (EPA) Toxic Release Inventory (TRI) data was used. The Toxic Release Inventory is a publicly available database that contains information on toxic chemicals, releases, and other waste management activities reported annually by certain covered industry groups, as well as federal facilities. 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, transportation data including major highways and railroads were obtained from the North Carolina Department of Transportation. This data is ArcGIS compatible, lending itself to buffer analysis to determine risk.

6.4 ASSET INVENTORY

An inventory of geo-referenced assets within Clay and Macon Counties and jurisdictions was compiled in order to identify and characterize those properties potentially at risk to the identified hazards[2]. By understanding the type and number of assets that exist and where they are located in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed. Under this assessment, two categories of physical assets were created and then further assessed through GIS analysis. Additionally, social assets are addressed to determine population at risk to the identified hazards. These are presented below in Section 6.4.2.

[2] While potentially not all-inclusive for the jurisdictions in the Clay Macon region, "georeferenced" assets include those assets for which specific location data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis.

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 provided by the counties. The information has been expressed in terms of the number of parcels and total assessed value of improvements (buildings) that may be exposed to the identified hazards.

2. Critical Facilities: Critical facilities vary by jurisdiction. Each county provided data from their respective critical facilities that were used in this section. Identified critical facilities are fire stations, police stations, medical care facilities, schools, government facilities, emergency operation centers, 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 geo-referenced data becomes available for use in GIS analysis.

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

Table 6.1 lists 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)[3].

TABLE 6.1: IMPROVED PROPERTY IN THE CLAY MACON REGION

Location[4]	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Assessed Value of Improvements
Clay County	**16,812**	**$1,356,579,900**	**8,140**	**$1,248,061,852**
Hayesville	292	$10,750,600	220	$51,477,100
Unincorporated Area	16,520	$1,345,829,300	7,920	$1,196,584,752
Macon County	**44,372**	**$3,469,748,455**	**25,857**	**$5,067,143,040**
Franklin	2,536	$218,841,680	1,989	$436,419,200
Highlands	2,881	$813,459,040	2,155	$945,528,070
Unincorporated Area	38,955	$2,437,447,735	21,713	$3,685,195,770
Clay Macon Regional Total	**61,184**	**$4,826,328,355**	**33,997**	**$6,315,204,892**

Source: Local governments

The following table lists the fire stations, police stations, emergency operations centers (EOCs), medical care facilities, schools, and other critical facilities located in the Clay Macon Region. Local governments at the county level provided a majority of the data for this analysis. In addition, **Figure 6.1** shows the locations of essential 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 hazards that affect each facility. As noted previously, this list is not all inclusive and only includes information provided by the counties.

[3] Total assessed values for improvements is 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 thus potentially resulting in an inflated value exposure for an area.

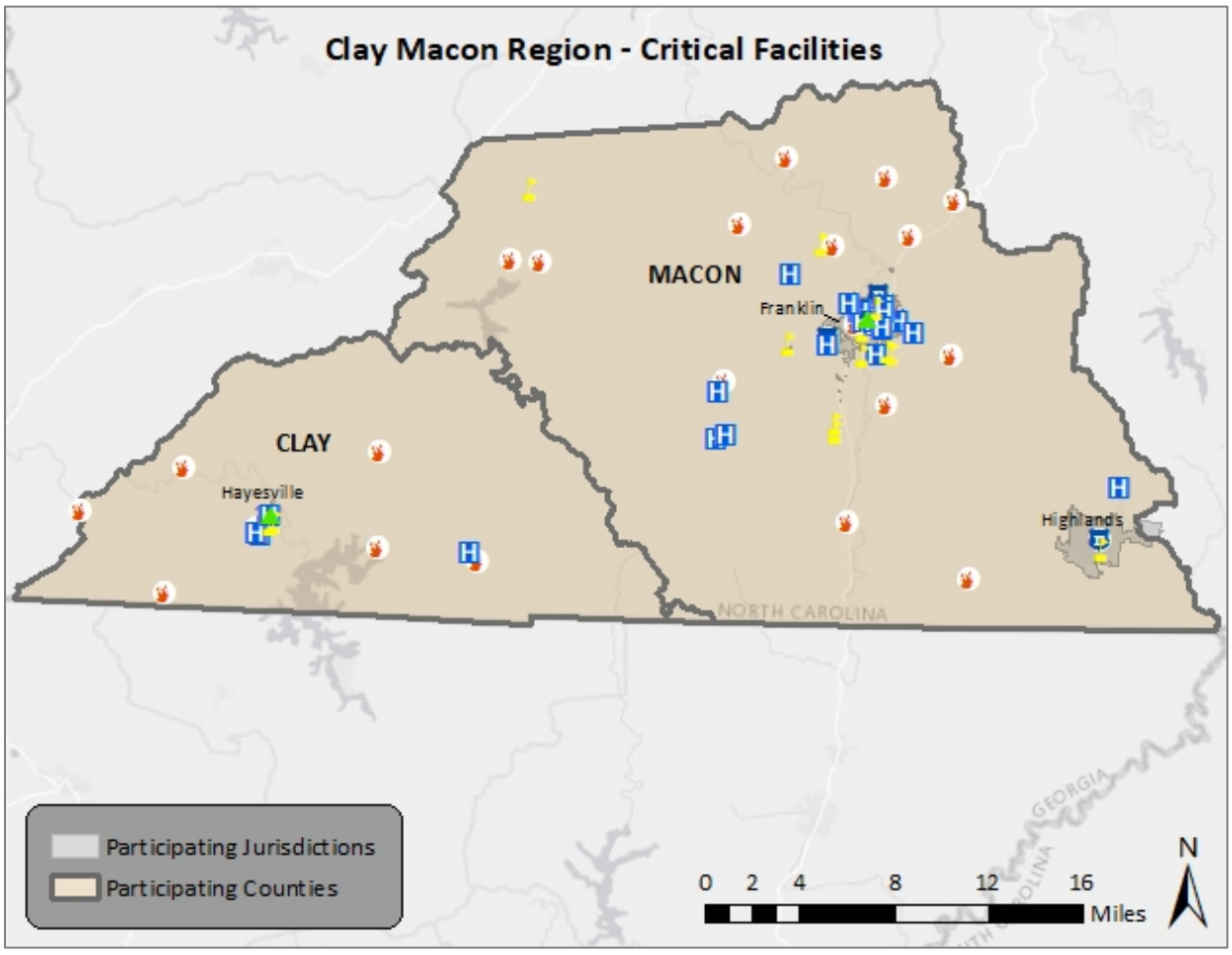
[4] Number of buildings for each county is based on the number of parcels with an improved building value greater than zero.

TABLE 6.2: CRITICAL FACILITY INVENTORY

Location	Fire/EMS Stations	Law Enforcement	Medical Facilities	Public Schools	Other
Clay County	**4**	**2**	**2**	**4**	**1**
Hayesville	2	1	2	3	1
Unincorporated Area	2	1	0	1	0
Macon County	**11**	**29**	**24**	**11**	**1**
Franklin	4	3	16	2	1
Highlands	2	1	0	1	0
Unincorporated Area	5	25	8	8	0
Clay Macon Regional Total	**15**	**31**	**26**	**15**	**2**

Source: Local governments

FIGURE 6.1: CRITICAL FACILITIES



Source: Local governments

6.4.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the Clay Macon Region that are potentially at risk to these hazards.

Table 6.3 lists the population by county according to U.S. Census 2010 population estimates. The population estimates are updated using the most recent tables dated July 1, 2018. The total population in the Clay Macon Region according to Census data is 46,424.

TABLE 6.3: TOTAL POPULATION IN THE CLAY MACON REGION

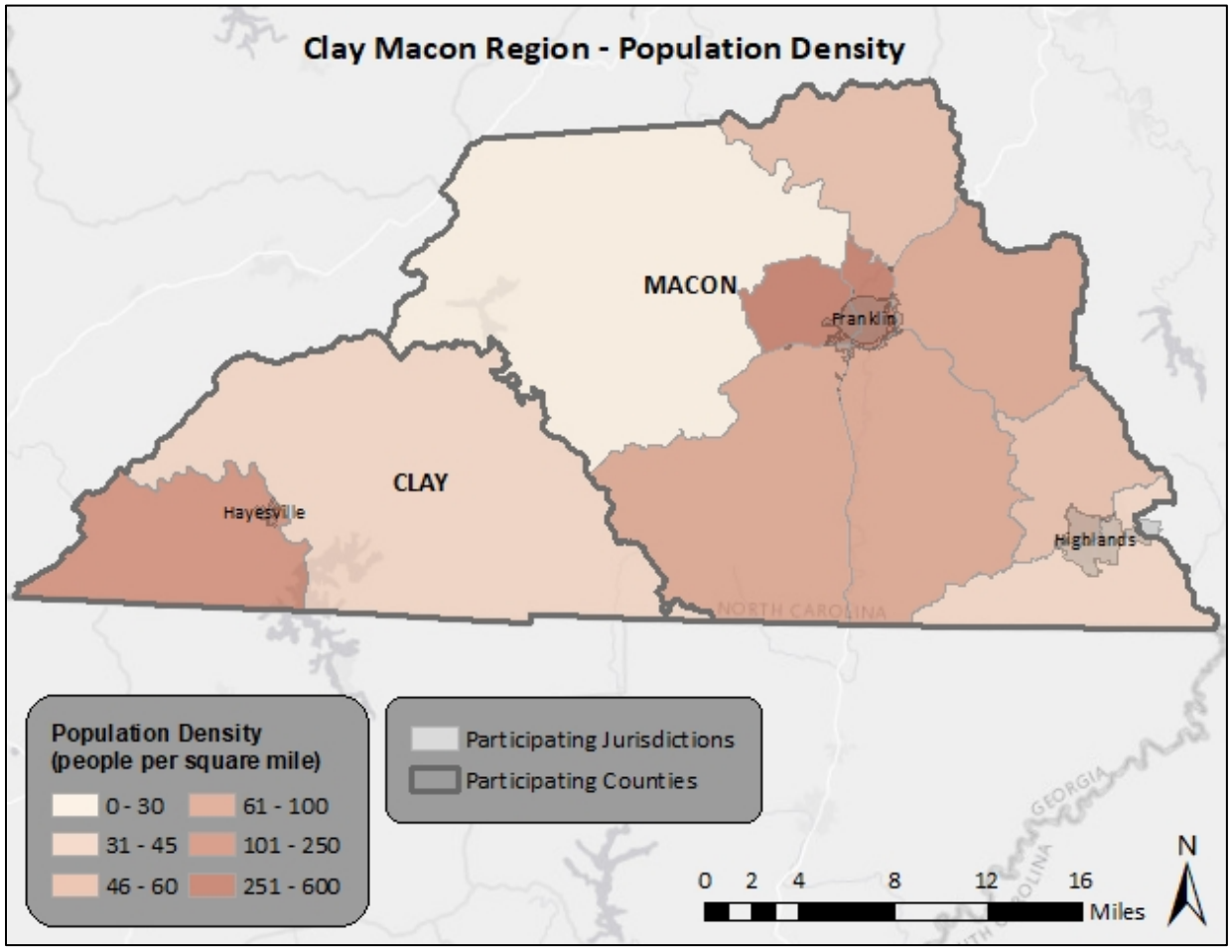
Location	2018 Population Estimates
Clay County	11,139
Macon County	35,285
Clay Macon Regional Total	**46,424**

Source: US Census Bureau

Additional population estimates are presented in Section 3: *Community Profile*.

In addition, **Figure 6.2** illustrates the population density by census tract as it was reported by the US Census Bureau in 2010 and updated with 2017 population estimates.

FIGURE 6.2: POPULATION DENSITY IN THE CLAY MACON REGION



6.4.3. Development Trends and Changes in Vulnerability

Since the previous regional hazard mitigation plan was approved (in 2015), the Clay Macon Region has experienced strong growth and development. **Table 6.4** shows the number of building units constructed since 2010 according to the US Census American Community Survey.

TABLE 6.4: BUILDING COUNTS FOR THE CLAY MACON REGION

Location	Total Housing Units (2018)	Units Built 2010 or Later	% Building Stock Built Post-2010
Clay County	**7,301**	**115**	**1.6%**
Hayesville	212	0	0.0%
Unincorporated Area	7,089	115	1.6%
Macon County	**25,515**	**407**	**1.6%**
Franklin	2,514	21	0.8%
Highlands	2,062	10	0.5%
Unincorporated Area	20,939	376	1.8%
Clay Macon Regional Total	**32,816**	**522**	**1.6%**

Source: US Census Bureau

Table 6.5 shows population growth estimates for the region from 2010 to 2018 based on the US Census Annual Estimates of Resident Population and 2018 population estimates.

TABLE 6.5: POPULATION GROWTH FOR THE CLAY MACON REGION

Location	2010	2012	2014	2016	2018	% Change 2010-2018
Clay County	10,607	10,651	10,562	10,743	11,139	5.0%
Hayesville	415	418	421	421	440	6.0%
Unincorporated Area	10,192	10,233	10,141	10,322	10,699	5.0%
Macon County	33,958	33,803	33,823	34,241	35,285	3.9%
Franklin	3,886	3,872	3,878	3,924	4,042	4.0%
Highlands	931	927	928	940	969	4.1%
Unincorporated Area	29,141	29,004	29,017	29,377	30,274	3.9%
Clay Macon Regional Total	44,565	44,454	44,385	44,984	46,424	4.2%

Source: US Census Bureau

Based on the above data, the rate of residential development and population growth in the region since 2010 has increased, most dramatically in Clay County. The overall population increased in Macon County too, and across all of the participating jurisdictions. Changes in development do impact the region's vulnerability since the last update. The greater the population, the greater the risk is that persons are impacted by hazards. It should be noted that if future development occurs in vulnerable areas, populations and infrastructure will be exposed to potential hazards.

6.5 VULNERABILITY ASSESSMENT RESULTS

As noted earlier, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results are presented here. All other hazards are assumed to impact the entire planning region (drought, hailstorm, lightning, and severe winter weather) or, due to lack of

data, analysis would not lead to credible results (sinkholes, erosion, dam failure, infectious disease, terrorism, cyber, EMP). The total region exposure for critical facilities is presented in **Table 6.25**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table 6.24.**

The hazards presented in this subsection include: hurricane and coastal hazards, tornadoes/ thunderstorms, earthquakes, landslides, flooding, wildfires, and hazardous substances.

6.5.1. Hurricane and Coastal Hazards

Historical evidence indicates that the Clay Macon Region has a significant risk to the hurricane and tropical storm hazard, mostly due to the location of the state of North Carolina as a coastal state. 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 erosion, flooding, tornadoes, and high winds, tend to be a result of hurricanes or tropical storms. These cumulative effects often make potential loss estimates difficult to calculate and track.

NCEM's Risk Management Tool analyzes hurricane winds and no other hazards often associated with hurricanes; therefore, only hurricane winds are analyzed in this section. Building and population vulnerabilities to hurricane winds in a 100-year frequency event (return period) are reported in the following **Table 6.6** and **Table 6.7**.

It is assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard.

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	**7,180**	**8,669**	**$2,522,298**	**604**	**$986,094**	**102**	**$93,664**	**9375**	**$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 6.7: POPULATION VULNERABILITY TO HURRICANE WINDS

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	**2,498**	**502**	**10,585**
Hayesville	290	58	1,230

Location	Elderly at Risk	Children at Risk	Total at Risk
Unincorporated Area	2,208	444	9,355
Macon County	**8,066**	**1,748**	**33,903**
Franklin	1,432	310	6,018
Highlands	219	47	920
Unincorporated Area	6,415	1,391	26,965
Clay Macon Regional Total	**10,564**	**2,250**	**44,488**

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

Given the equal susceptibility across the entire Clay Macon Region, it can be assumed that the entire population is at risk to the hurricane and tropical storm hazard.

CRITICAL FACILITIES

Given equal vulnerability across the Clay Macon Region, all critical facilities are considered to be at risk. Although some buildings may perform better than others in the face of such an event due to construction, age, and other factors, determining individual building response 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. A list of specific critical facilities and their associated risk can be found in **Table 6.25** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the Clay Macon Region. Hurricane events can cause substantial damage in their wake including fatalities, 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 F2 on the Fujita scale was analyzed. The Risk Management Tool analyzed this information which has been reported in **Table 6.8** and **Table 6.9**.

TABLE 6.8: BUILDING VULNERABILITY TO TORNADOES HAZARD

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	**20,424**	**22,120**	**$3,383,580,168**	**804**	**$464,334,938**	**236**	**$167,376,019**	**23,160**	**$4,015,291,126**
Hayesville	921	877	$118,708,770	125	$104,513,018	53	$41,026,754	1,055	$264,248,543
Unincorporated Area	19,503	21,243	$3,264,871,398	679	$359,821,920	183	$126,349,265	22,105	$3,751,042,583
Macon County	**10,184**	**12,702**	**$2,169,192,864**	**1,217**	**$875,100,141**	**152**	**$143,788,529**	**14,071**	**$3,188,081,534**
Franklin	2,038	1,827	$772,210,338	185	$126,512,314	20	$30,645,592	2,032	$929,368,244
Highlands	1,886	3,082	$347,540,594	553	$335,362,704	83	$81,912,503	3,718	$764,815,801
Unincorporated Area	6,260	7,793	$1,049,441,932	479	$413,225,123	49	$31,230,434	8,321	$1,493,897,489
Clay Macon Regional Total	**30,608**	**34,822**	**$5,552,773,032**	**2,021**	**$1,339,435,079**	**388**	**$311,164,548**	**37,231**	**$7,203,372,660**

Source: NCEM Risk Management Tool

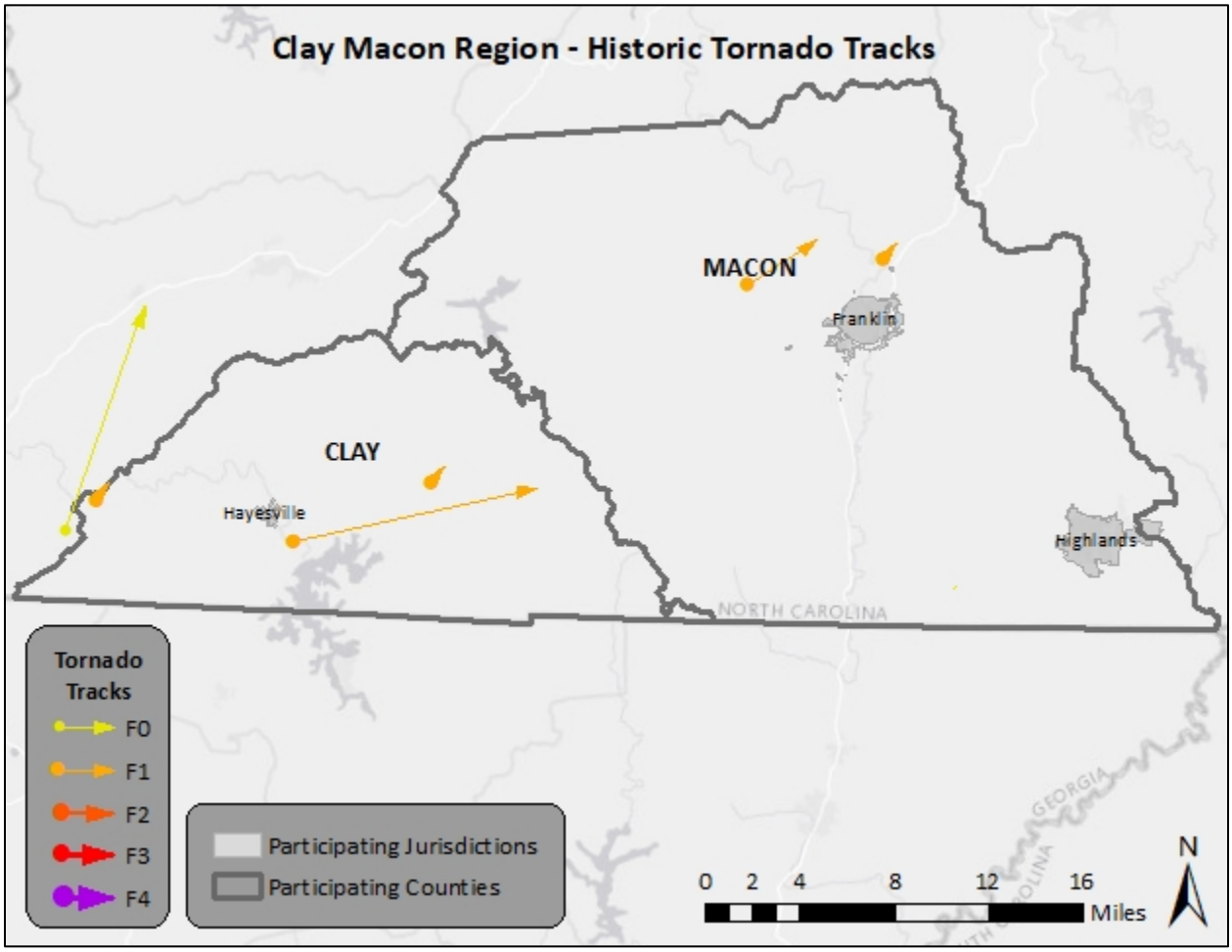
TABLE 6.9: POPULATION VULNERABILITY TO TORNADOES

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	**2,498**	**502**	**10,586**
Hayesville	290	58	1,230
Unincorporated Area	2,208	444	9,356
Macon County	**8,071**	**1,749**	**33,925**
Franklin	1,432	310	6,018
Highlands	219	47	920
Unincorporated Area	6,420	1,392	26,987
Clay Macon Regional Total	**10,569**	**2,251**	**44,511**

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 on a 50-year frequency event (return period) were analyzed. It is important to note that this data does not include damages caused by other remnants of thunderstorms, such as lightning or hail. The Risk Management Tool 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	**2,498**	**502**	**10,585**
Hayesville	290	58	1,230
Unincorporated Area	2,208	444	9,355
Macon County	**8,066**	**1,748**	**33,903**
Franklin	1,432	310	6,018
Highlands	219	47	920
Unincorporated Area	6,415	1,391	26,965
Clay Macon Regional Total	**10,564**	**2,250**	**44,488**

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

It is assumed that all existing populations and future populations are at risk to the tornadoes/ thunderstorms hazard.

CRITICAL FACILITIES

All critical facilities should still be considered at-risk to damage should an event occur. A list of all individual critical facilities in the region can be found in **Table 6.25**.

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 Risk Management Tool analyzed this information which has been reported below in **Table 6.12** and **Table 6.13**.

TABLE 6.12: BUILDING VULNERABILITY TO THE EARTHQUAKE HAZARD

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 THE EARTHQUAKE HAZARD

Location	Elderly at Risk	Children at Risk	Total at Risk
Clay County	2,498	502	10,586
Hayesville	290	58	1,230
Unincorporated Area	2,208	444	9,356
Macon County	8,071	1,749	33,925
Franklin	1,432	310	6,018
Highlands	219	47	920
Unincorporated Area	6,420	1,392	26,987
Clay Macon Regional Total	**10,569**	**2,251**	**44,511**

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

It is assumed that all existing populations and future populations are at risk to the earthquake hazard.

CRITICAL FACILITIES

All critical facilities should still be considered at-risk to minor damage should an event occur. A list of all individual critical facilities in the region can be found in **Table 6.25**.

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 potential to

damage structures. Severe impacts of earthquakes may result in debris clean-up, service disruption, building collapse, and fatalities. Specific vulnerabilities for assets will be greatly dependent on their individual 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 (Landslide)

GIS analysis was used to complete the vulnerability assessment for landslides in the Clay Macon Region. The potential dollar value of exposed land and property total can be determined using the USGS Landslide Susceptibility Index (detailed in Section 5: *Hazard Profiles*), county level tax parcel data, and GIS analysis. **Table 6.14** presents the potential at-risk property where available. All areas of the Clay Macon Region are identified as moderate or high incidence areas by the USGS landslide data. The incidence levels (high and moderate) were used to identify different areas 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		Number of Improvements at Risk		Total Value of Improvements at Risk ($)	
Incidence Level	Moderate	High	Moderate	High	Moderate	High
Clay County	**16,992**	**11,829**	**8,230**	**5,964**	**$1,265,203,972**	**$972,646,142**
Hayesville	296	289	224	217	$51,743,300	$51,193,900
Unincorporated Area	16,696	11,540	8,006	5,747	$1,213,460,672	$921,452,242
Macon County	**44,583**	**16,530**	**25,984**	**9,846**	**$5,090,819,470**	**$2,823,827,140**
Franklin	2,536	-	1,989	-	$436,419,200	$0
Highlands	2,881	2,881	2,155	2,155	$945,528,070	$945,528,070
Unincorporated Area	39,166	13,649	21,840	7,691	$3,708,872,200	$1,878,299,070
Clay Macon Regional Total	**61,575**	**28,359**	**34,214**	**15,810**	**$6,356,023,442**	**$3,796,473,282**

Source: United States Geological Survey, Local governments

SOCIAL VULNERABILITY

Given moderate to high susceptibility across the entire Clay Macon Region, it is assumed that a moderate amount of population is at risk.

CRITICAL FACILITIES

There are 35 critical facilities located in a high susceptibility area, including the following: 9 Medical facilities, 11 fire/EMS stations, 5 police stations, and 10 public schools. The remaining critical facilities are located in low incidence areas. A list of specific critical facilities and their associated risk can be found in **Table 6.25** at the end of this section.

In conclusion, a landslide 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 due to a variety of factors. For example, steep slopes and modified slopes bear a greater risk than flat areas. Specific vulnerabilities for Clay Macon assets will be greatly dependent on their individual 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

Historical evidence indicates that the Clay Macon Region is susceptible to flood events. A total of 87 flood events have been reported by the National Centers for Environmental Information since 1993, resulting in over $1.69 million (2019 dollars) in damages.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for each of the Clay Macon counties. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **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. Number of Improved Buildings	Approx. Improved Value of Buildings	Approx. Number of Parcels	Approx. Number of Improved Buildings	Approx. Improved Value of Buildings
Clay County	**2,504**	**1,332**	**$224,827,684**	**2,531**	**1,346**	**$226,101,684**
Hayesville	18	5	$417,900	18	5	$417,900
Unincorporated Area	2,486	1,327	$224,409,784	2,513	1,341	$225,683,784
Macon County	**3,529**	**2,181**	**$506,677,500**	**3,693**	**2,297**	**$524,273,670**
Franklin	307	226	$69,854,590	329	244	$73,552,770
Highlands	352	254	$117,261,900	353	257	$118,455,010
Unincorporated Area	2,870	1,701	$319,561,010	3,011	1,796	$332,265,890
Clay Macon Regional Total	**6,033**	**3,513**	**$731,505,184**	**6,224**	**3,643**	**$750,375,354**

Source: FEMA DFIRM

To assess flood risk, the NCEM Risk Management Tool (RMT) analyzed buildings located in the 1 percent chance of annual floodplains. The buildings are assessed by the type of building (commercial, residential, or public) and also assesses Pre-Firm buildings, or structures built before floodplain management regulations were adopted. This data is shown by jurisdiction in **Table 6.16**.

TABLE 6.16: BUILDING VULNERABILITY FOR THE 100-YEAR FLOODPLAIN

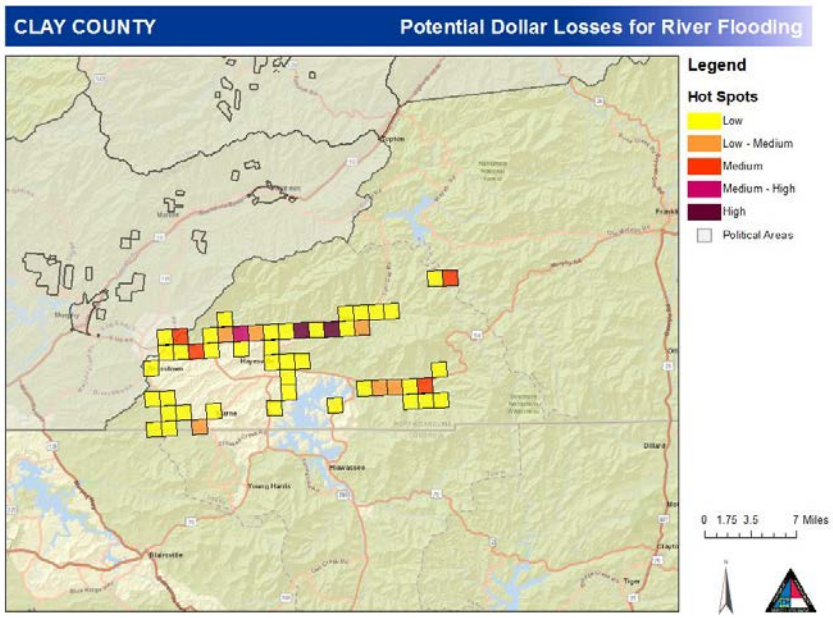
Location	Pre-Firm Buildings at Risk	Residential Buildings at Risk		Commercial Buildings at Risk		Public Buildings at Risk		Total Buildings at Risk	
		Number	Damages	Number	Damages	Number	Damages	Number	Damages
Clay County	**227**	**342**	**$2,393,715**	**7**	**$72,708**	**1**	**$6,476**	**350**	**$2,472,898**
Hayesville	23	33	$112,570	1	$2,609	0	$0	34	$115,178
Unincorporated Area	204	309	$2,281,145	6	$70,099	1	$6,476	316	$2,357,720
Macon County	**436**	**446**	**$4,830,104**	**70**	**$2,000,723**	**7**	**$191,592**	**523**	**$7,022,419**
Franklin	70	48	$1,521,698	54	$1,659,008	5	$130,041	107	$3,310,746

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
Highlands	47	46	$509,759	1	$6,987	0	$0	47	$516,746
Unincorporated Area	319	352	$2,798,647	15	$334,728	2	$61,551	369	$3,194,927
Clay Macon Regional Total	**663**	**788**	**$7,223,819**	**77**	**$2,073,431**	**8**	**$198,068**	**873**	**$9,495,317**

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 the photo, most hot spots are in an area with low vulnerability.

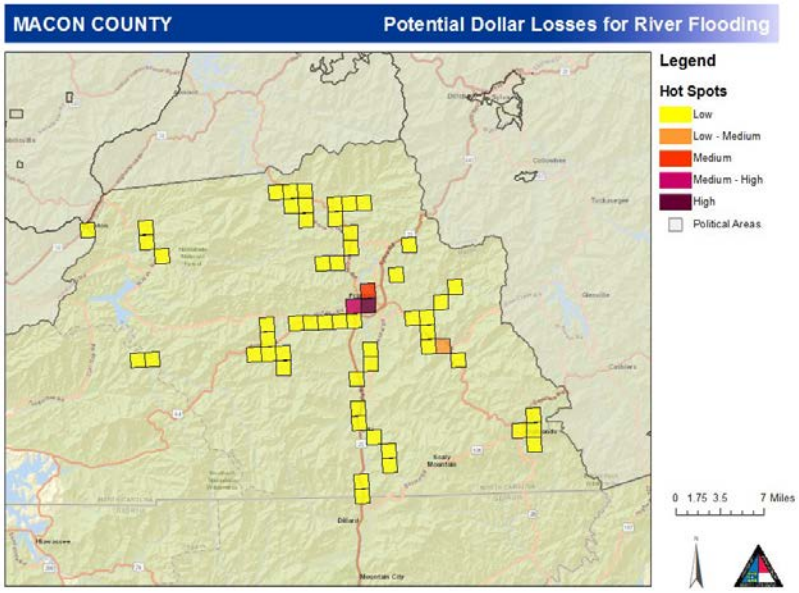
FIGURE 6.4: POTENTIAL DOLLAR LOSSES FOR FLOODING IN CLAY COUNTY



Source: NCEM Risk Management Tool

The same information for Madison County is presented below in **Figure 6.5.**

FIGURE 6.5: POTENTIAL DOLLAR LOSSES FOR FLOODING IN MACON COUNTY



Source: NCEM Risk Management Tool

Table 6.17 assesses the vulnerability of the region's population. This data is also from the RMT and analyzes the populations of elderly and children living at risk to the 1 percent annual flooding.

TABLE 6.17: POPULATION VULNERABILITY FOR 100-YEAR FLOODPLAINS

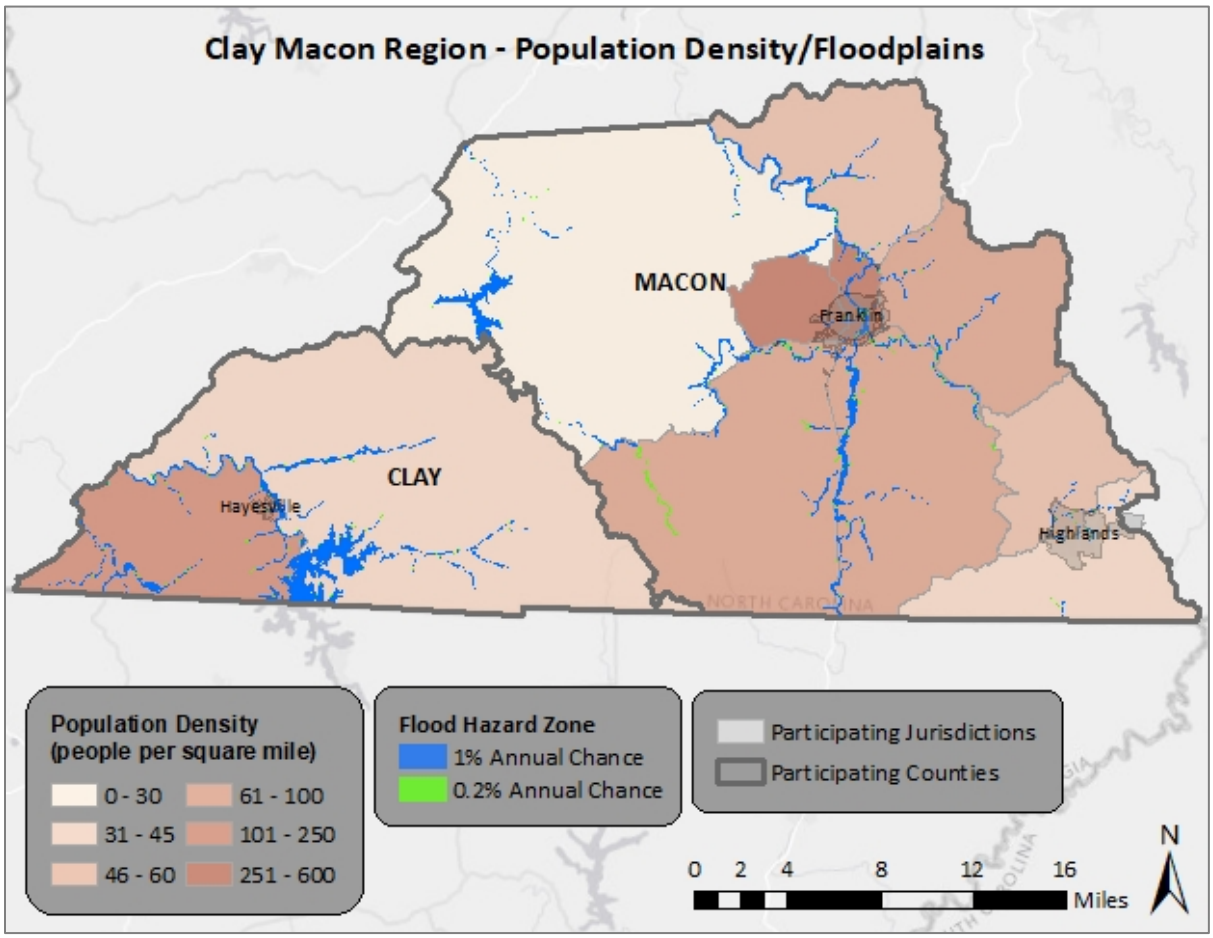
Incidence Level	Elderly at Risk	Children at Risk	Total at Risk
Clay County	**98**	**20**	**416**
Hayesville	11	2	46
Unincorporated Area	87	18	370
Macon County	**133**	**29**	**562**
Franklin	22	5	93
Highlands	5	1	23
Unincorporated Area	106	23	446
Clay Macon Regional Total	**231**	**49**	**978**

Source: NCEM Risk Management Tool

SOCIAL VULNERABILITY

Census data has not been officially updated since 2010; therefore, 2010 Census tract level population counts are outdated for this update. However, population estimates from the US Census Bureau as of July 1, 2017 were available at a jurisdictional level. This data was analyzed to present at-risk populations to the flooding hazard in the Clay Macon region and 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 4 critical facilities located in the Clay Macon Region's 1.0-percent and 2.0-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. (As previously noted, this analysis does not consider building elevation, which may negate risk.) These facilities include 2 Fire/EMS Stations in Clay County and 2 in Macon County. A list of specific critical facilities and their associated risk can be found in **Table 6.25** at the end of this section.

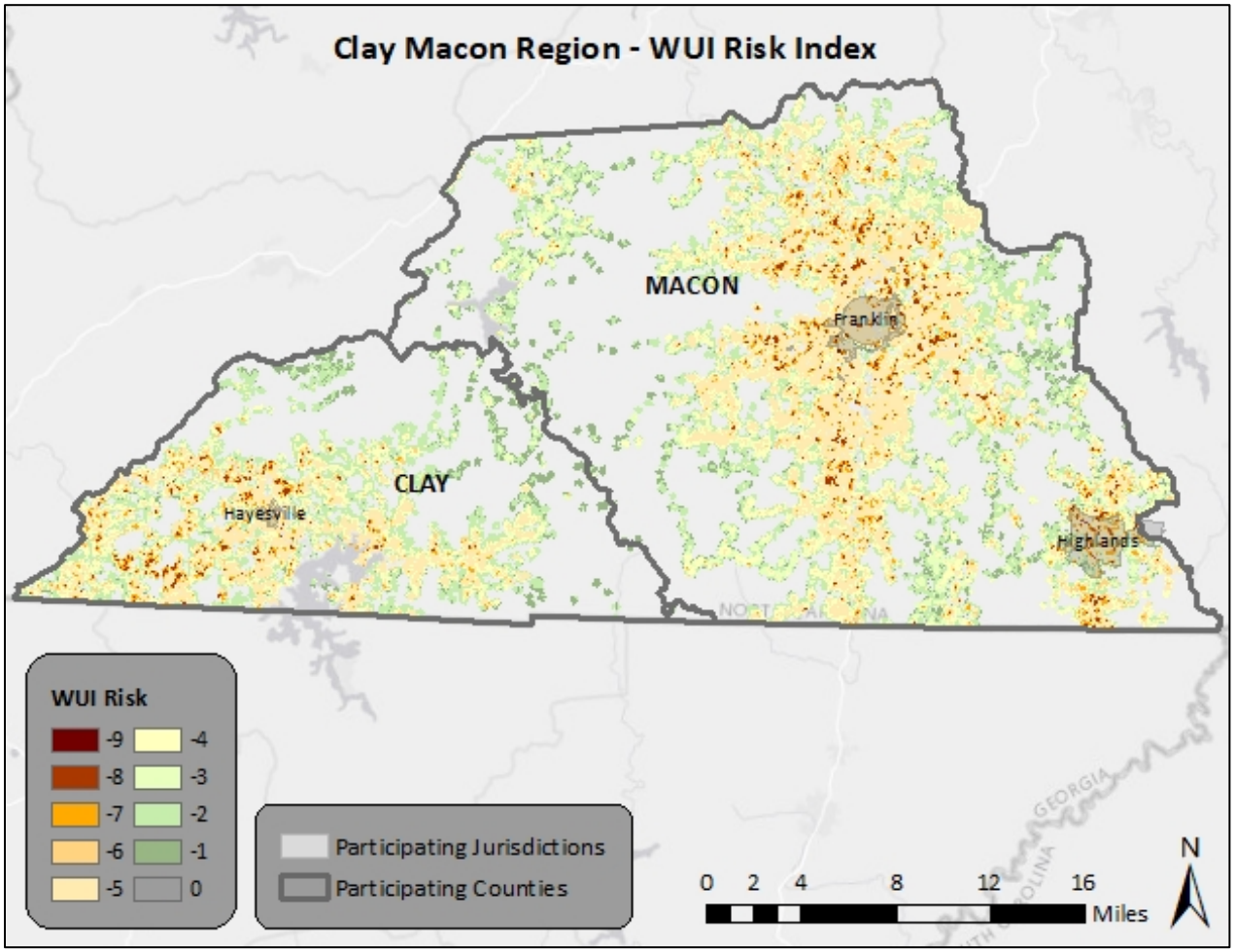
In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in the Clay Macon Region, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As 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, areas subject to repetitive flooding should be analyzed for potential 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 Wildland Urban Interface (WUI) Risk Index for the region was obtained from the Southern Wildfire Risk Assessment. The WUI uses a Response Function modeling approach and rates the

potential impact of a wildfire on people and their homes. The index ranges from -1 to -9, with -9 being the most negative impact. For example, an area with high housing density and high flame lengths are rated -9, while an area with low housing density and low flame lengths are rated -1. At-risk areas fall within the range of -7 to -9. This index was layered with parcel data using GIS analysis. **Figure 6.7** shows the WUI Risk Index for the region below.

FIGURE 6.7: WILDLAND URBAN INTERFACE RISK INDEX



Source: Southern Wildfire Risk Assessment

The region contains some lands where the value falls into the at-risk category. Overall, there is a high-to-medium wildfire ignition density risk index in the region which is somewhat than other areas in North Carolina.

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 to the wildfire hazard. Determining the exact number of people in certain wildfire zones is difficult with existing data and could be misleading.

CRITICAL FACILITIES

Few of the Clay Macon Region critical facilities are in the at-risk area (-7 or higher) for wildfires. Macon County had 3 facilities, while Clay 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	Number of At-Risk Critical Facilities
Clay County	**0**
Macon County	**3**
Clay Macon Regional Total	**3**

Source: Southern Wildfire Risk Assessment, Local governments

Additional information was provided through the NCEM Risk Management Tool (RMT). This data can be seen below in **Table 6.19** and **Table 6.20**.

TABLE 6.19: BUILDING VULNERABILITY TO THE WILDFIRE HAZARD

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 WILDFIRE HAZARD

Incidence Level	Elderly at Risk	Children at Risk	Total at Risk
Clay County	**1,842**	**370**	**7,808**
Hayesville	160	32	681
Unincorporated Area	1,682	338	7,127
Macon County	**6,702**	**1,453**	**28,175**
Franklin	1,211	262	5,091
Highlands	171	37	720
Unincorporated Area	5,320	1,154	22,364
Clay Macon Regional Total	**8,544**	**1,823**	**35,983**

Source: NCEM Risk Management Tool

6.5.7 Hazardous Substances

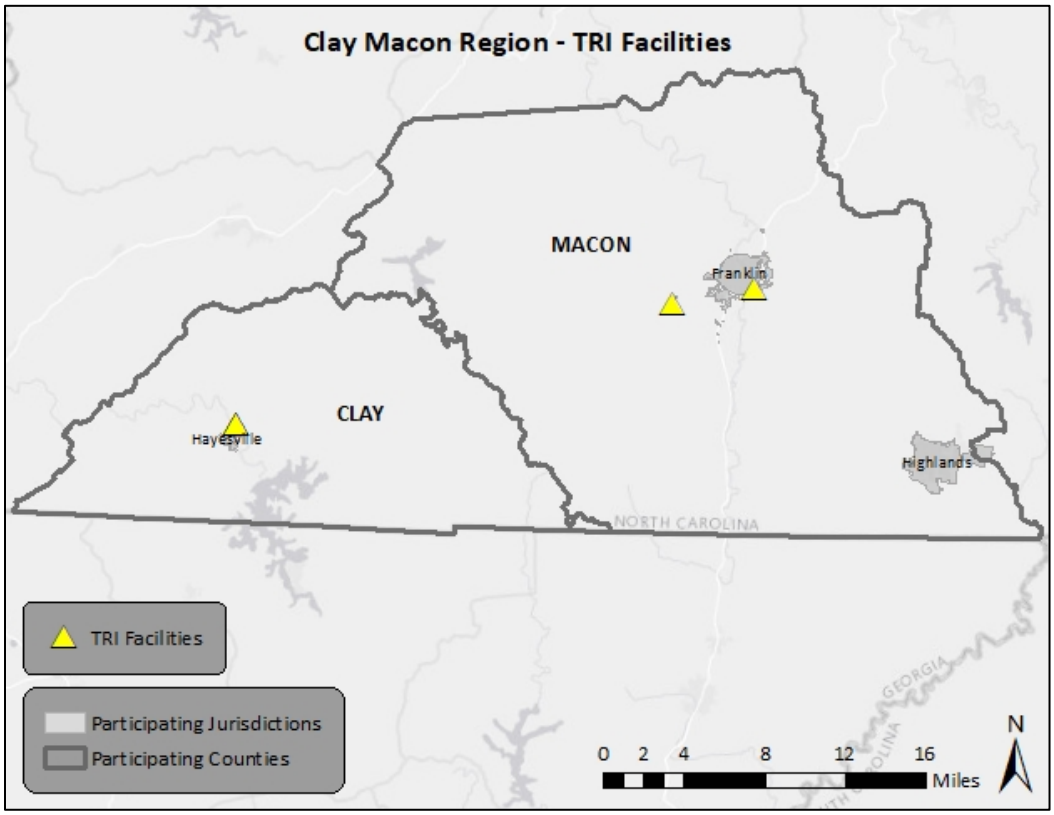
Although historical evidence and existing Toxic Release Inventory sites indicate that the Clay Macon Region is susceptible to hazardous substance events, there are few reports of damage. Therefore, a calculated annualized loss figure may not be completely reliable.

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 a 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 parcels[5]. In both scenarios, two sizes of buffers—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, geo-referenced 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 (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)[6].

FIGURE 6.8: TOXIC RELEASE INVENTORY (TRI) FACILITIES



Source: EPA

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

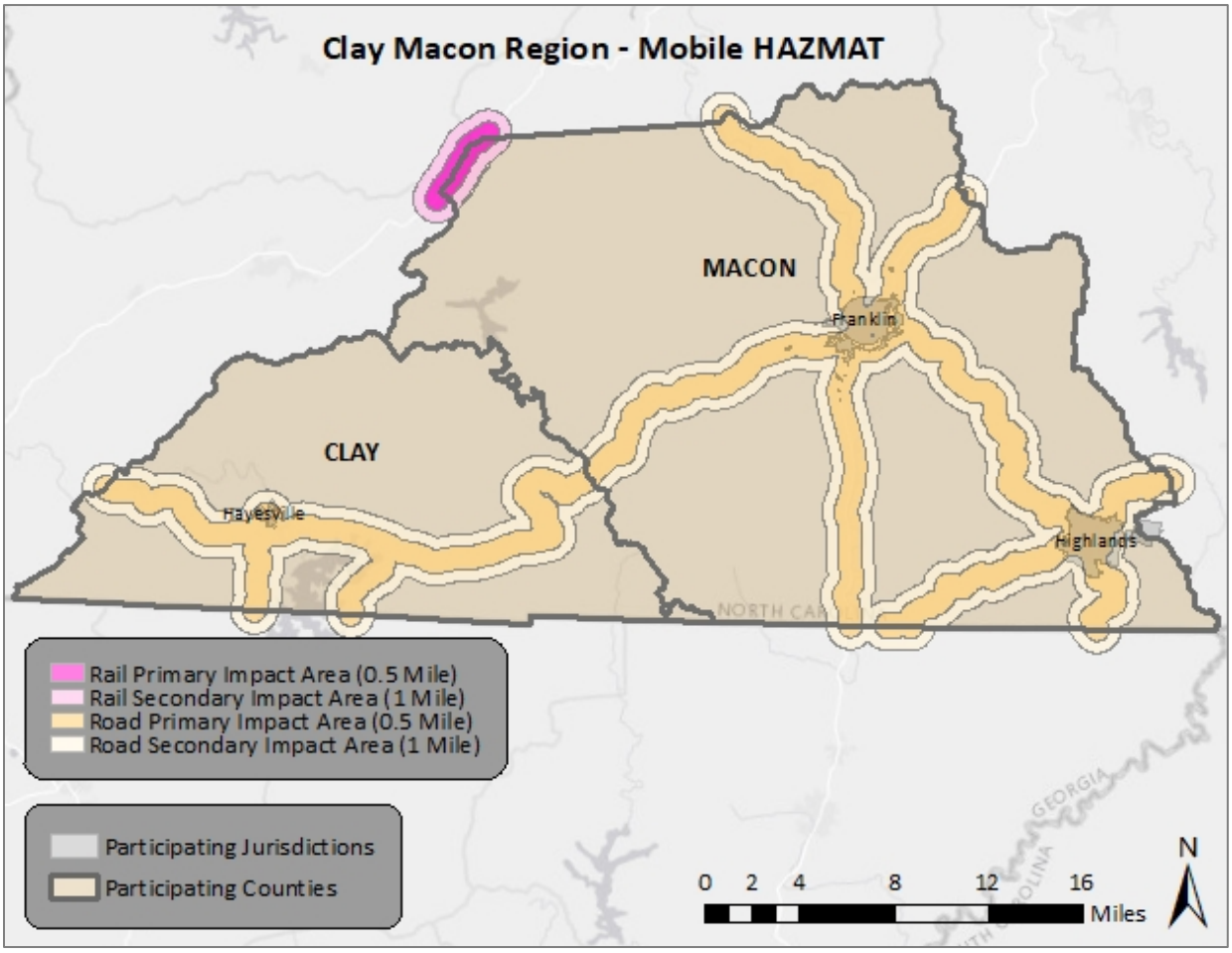
[6] Note that parcels included in the 1-mile analysis are also included in the 0.5-mile analysis.

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	**250**	**186**	**$22,812,400**	**884**	**570**	**$125,649,280**
Hayesville	52	41	$3,781,500	269	206	$29,062,800
Unincorporated Area	198	145	$19,030,900	615	364	$96,586,480
Macon County	**503**	**294**	**$77,370,610**	**1,928**	**1,377**	**$323,001,130**
Franklin	126	79	$22,368,370	595	462	$138,423,570
Highlands	0	0	$0	0	0	$0
Unincorporated Area	377	215	$55,002,240	1,333	915	$184,577,560
Clay Macon Regional Total	**753**	**480**	**$100,183,010**	**2,812**	**1,947**	**$448,650,410**

Source: EPA, Local governments

FIGURE 6.9: MOBILE HAZMAT IMPACT 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	288	216	$51,072,600	292	220	$51,477,100
Unincorporated Area	5,717	3,139	$529,798,284	9,031	4,660	$773,134,989
Macon County	**18,702**	**12,455**	**$2,838,384,070**	**27,606**	**17,704**	**$3,924,379,810**
Franklin	2,258	1,756	$396,097,750	2,534	1,987	$435,866,700
Highlands	2,552	1,920	$799,353,590	2,811	2,105	$905,995,170
Unincorporated Area	13,892	8,779	$1,642,932,730	22,261	13,612	$2,582,517,940
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, Local Governments

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	**98**	**51**	**$5,107,840**	**164**	**62**	**$7,308,790**
Franklin	0	0	0	0	0	0
Highlands	0	0	0	0	0	0
Unincorporated Area	98	51	$5,107,840	164	62	$7,308,790
Clay Macon Regional Total	**98**	**51**	**$5,107,840**	**164**	**62**	**$7,308,790**

Source: NC Department of Transportation, Local Governments

SOCIAL VULNERABILITY

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

CRITICAL FACILITIES

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 14 facilities located in a HAZMAT risk zone. The primary impact zone (0.5-mile buffer) includes 1 facility in the region, while the remaining facilities are in the secondary, 1-mile zone. A list of specific critical facilities and their associated risk can be found in **Table 6.25** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors revealed that there are 72 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 75 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 what a large percentage of critical facilities in the region are located in the smaller buffer area. A list of specific critical facilities and their associated risk can be found in **Table 6.26** at the end of this section.

In conclusion, a hazardous material 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 direction and speed of wind, volume of release, etc.

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 to 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 winter storm hazard and commercial, residential, and government owned facilities are at risk to repetitive flooding, etc).

Table 6.24 presents a summary of potential annualized loss estimates for each hazard in the Clay Macon Region. 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 measure risk for determining hazard mitigation strategies throughout the region.

TABLE 6.24: POTENTIAL ANNUALIZED LOSSES FOR THE CLAY MACON REGION

Hazard	Clay County	Macon County	Total
Drought	Negligible	Negligible	Negligible
Excessive Heat	Negligible	Negligible	Negligible
Hurricane and Coastal Hazards	$571,225	$1,435,935	$2,007,160
Tornadoes/ Thunderstorms	$281,088	$1,739,304	$2,020,392
Severe Winter Weather	Insufficient data available	Insufficient data available	Insufficient data available
Earthquakes	$108,904	$379,476	$488,380
Geological	Negligible	Negligible	Negligible
Dam Failure	Negligible	Negligible	Negligible
Flooding	$8,650	$94,364	$103,014
Wildfires	Negligible	Negligible	Negligible
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

**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 were no events that caused dollar damage or because documentation of that particular type of event is not well kept.*

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to natural hazards including drought, hurricane and coastal hazards, tornadoes/ thunderstorms, and severe winter weather. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table 6.25** 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**").

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 EMERGENCY MANAGEMENT	Emergency Operation Center	X	X	X	X	X	X			X				X	X	X		
BRASSTOWN FIRE VOLUNTEER FIRE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X	X	X		X							
CLAY COUNTY AMBULANCE SERVICE	Fire/EMS Stations	X	X	X	X	X	X			X					X	X		
CLAY COUNTY FIRE AND RESCUE SQUAD INCORPORATED	Fire/EMS Stations	X	X	X	X	X	X			X				X	X	X		
CLAY COUNTY FIRE AND RESCUE STATION 2	Fire/EMS Stations	X	X	X	X	X	X			X					X	X		
CLAY COUNTY FIRE AND RESCUE STATION 3	Fire/EMS Stations	X	X	X	X	X	X				X							
CLAY COUNTY FIRE AND RESCUE STATION 4	Fire/EMS Stations	X	X	X	X	X	X			X								
SHOOTING CREEK VOLUNTEER FIRE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X			X					X	X		
WARNE VOLUNTEER FIRE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X			X								
CLAY COUNTY SHERIFFS OFFICE / CLAY COUNTY JAIL	Law Enforcement	X	X	X	X	X	X			X				X	X	X		
Bridging the Gap of Care, Inc.	Medical Facility	X	X	X	X	X	X			X					X	X		
Good Shepherd Home Health and Hospice Agency, Inc.	Medical Facility	X	X	X	X	X	X			X					X	X		
Hayesville Group Home	Medical Facility	X	X	X	X	X	X			X				X	X	X		
Mountain Home Nursing Service, Inc.	Medical Facility	X	X	X	X	X	X			X					X	X		
Smoky Mountain Counseling Center	Medical Facility	X	X	X	X	X	X			X				X	X	X		
Hayesville Elementary	Public School	X	X	X	X	X	X			X					X	X		
Hayesville High	Public School	X	X	X	X	X	X			X					X	X		
Hayesville Middle	Public School	X	X	X	X	X	X			X					X	X		

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 MANAGEMENT	Emergency Operation Center	X	X	X	X	X	X				X				X	X		
BURNINGTOWN-IOTLA VOLUNTEER FIRE AND RESCUE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X				X							
CLARKS CHAPEL FIRE AND RESCUE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X				X							
COWEE VOLUNTEER FIRE AND RESCUE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X				X							
COWEE VOLUNTEER FIRE AND RESCUE DEPARTMENT - SUBSTATION	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
CULLASAJA GORGE FIRE AND RESCUE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
FRANKLIN FIRE AND RESCUE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X	X	X		X				X	X		
HIGHLANDS FIRE AND AMBULANCE	Fire/EMS Stations	X	X	X	X	X	X			X					X	X		
MACON COUNTY EMERGENCY MEDICAL SERVICES - FRANKLIN STATION	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
MACON COUNTY EMERGENCY MEDICAL SERVICES - NANTAHALA STATION	Fire/EMS Stations	X	X	X	X	X	X				X							
MOUNTAIN VALLEY VOLUNTEER FIRE AND RESCUE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
MOUNTAIN VALLEY VOLUNTEER FIRE AND RESCUE DEPARTMENT - SUBSTATION	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
NANTAHALA VOLUNTEER FIRE AND RESCUE DEPARTMENT	Fire/EMS Stations	X	X	X	X	X	X				X							

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)
NORTH CAROLINA DIVISION OF FOREST RESOURCES DISTRICT 9 - MACON	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
OTTO VOLUNTEER FIRE AND RESCUE	Fire/EMS Stations	X	X	X	X	X	X			X					X	X		
SKY VALLEY - SCALY MOUNTAIN VOLUNTEER FIRE AND RESCUE	Fire/EMS Stations	X	X	X	X	X	X			X					X	X		
UNITED STATES FOREST SERVICE - NANTAHALA NATIONAL FOREST WAYAH RANGER DISTRICT	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
WEST MACON FIRE AND RESCUE	Fire/EMS Stations	X	X	X	X	X	X				X				X	X		
CITY OF HIGHLANDS POLICE DEPARTMENT	Law Enforcement	X	X	X	X	X	X			X					X	X		
FRANKLIN POLICE DEPARTMENT	Law Enforcement	X	X	X	X	X	X				X				X	X		
MACON COUNTY SHERIFFS DEPARTMENT / MACON COUNTY DETENTION CENTER	Law Enforcement	X	X	X	X	X	X				X	X			X	X		
NORTH CAROLINA STATE HIGHWAY PATROL - MACON	Law Enforcement	X	X	X	X	X	X				X				X	X		
UNITED STATES FOREST SERVICE - NANTAHALA NATIONAL FOREST WAYAH RANGER DISTRICT	Law Enforcement	X	X	X	X	X	X				X				X	X		
Angel Home Health & Hospice	Medical Facility	X	X	X	X	X	X				X				X	X		
Angel Medical Center, Inc.	Medical Facility	X	X	X	X	X	X				X				X	X		
Britthaven of Franklin	Medical Facility	X	X	X	X	X	X				X				X	X		
Companion Health Care, Inc.	Medical Facility	X	X	X	X	X	X				X				X	X		
Continuum Home Care of Franklin	Medical Facility	X	X	X	X	X	X				X							
Franklin Cardiac Rehabilitation Program	Medical Facility	X	X	X	X	X	X				X				X	X		

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)
Grandview Assisted Living Services	Medical Facility	X	X	X	X	X	X				X				X	X		
Grandview Manor Care Center	Medical Facility	X	X	X	X	X	X				X				X	X		
Harrison Avenue Group Home	Medical Facility	X	X	X	X	X	X				X				X	X		
Highlands-Cashiers Hospice	Medical Facility	X	X	X	X	X	X			X		X			X	X		
Highlands-Cashiers Hospital, Inc.	Medical Facility	X	X	X	X	X	X			X		X			X	X		
Iotla Street Group Home	Medical Facility	X	X	X	X	X	X				X				X	X		
Kelley's Home Health Services	Medical Facility	X	X	X	X	X	X				X		X	X	X	X		
Lincare, Inc.	Medical Facility	X	X	X	X	X	X				X				X	X		
Macon County Department on Aging	Medical Facility	X	X	X	X	X	X				X				X	X		
Macon County Group Home	Medical Facility	X	X	X	X	X	X				X				X	X		
Rowland Home	Medical Facility	X	X	X	X	X	X				X							
Shope Therapeutic Home	Medical Facility	X	X	X	X	X	X				X							
Smoky Mountain Counseling Center	Medical Facility	X	X	X	X	X	X				X			X	X	X		
The Family Restoration Program	Medical Facility	X	X	X	X	X	X				X			X	X	X		
Wayah Counseling Services	Medical Facility	X	X	X	X	X	X				X				X	X		
West Home	Medical Facility	X	X	X	X	X	X				X				X	X		
Western Home Health Care	Medical Facility	X	X	X	X	X	X				X			X	X	X		
Yonce House	Medical Facility	X	X	X	X	X	X				X				X	X		
Cartoogechaye Elementary	Public School	X	X	X	X	X	X				X			X	X	X		
East Franklin Elementary	Public School	X	X	X	X	X	X				X				X	X		
Franklin High	Public School	X	X	X	X	X	X				X			X	X	X		
Highlands School	Public School	X	X	X	X	X	X			X					X	X		

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)
Iotla Valley Elementary	Public School	X	X	X	X	X	X				X					X		
Macon Early College High School	Public School	X	X	X	X	X	X				X				X	X		
Macon Middle School	Public School	X	X	X	X	X	X				X			X		X		
Mountain View Intermediate	Public School	X	X	X	X	X	X				X			X	X	X		
Nantahala School	Public School	X	X	X	X	X	X				X							
South Macon Elementary	Public School	X	X	X	X	X	X				X					X		
Union Academy	Public School	X	X	X	X	X	X				X				X	X		

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. It 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 conducting a 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 which goals, objectives, and/or actions are feasible based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A capability assessment helps to determine which mitigation actions are practical, and 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 carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported 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. It not only helps establish the goals and objectives for the region to pursue under this Plan, but it also ensures that those goals and objectives are realistically achievable under given local conditions.

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[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)).

7.2 CONDUCTING THE CAPABILITY ASSESSMENT

In order to facilitate the inventory and analysis of local government capabilities within the Clay Macon counties, a detailed Capability Assessment Survey was completed for each of the participating jurisdictions based on the information found in existing hazard mitigation plans and local government websites. The survey questionnaire compiled information on a variety of "capability indicators" such as existing local plans, policies, programs, or ordinances that contribute to and/or hinder the region's ability to implement hazard mitigation actions. Other indicators included information related to the communities' fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes. The current political climate, an important consideration for any local planning or decision making process, was also evaluated with respect to hazard mitigation.

At a minimum, survey results provide an extensive inventory of existing local plans, ordinances, programs, and resources that are in place or under development in addition to their overall effect on hazard loss reduction. However, the survey instrument can also serve to identify gaps, weaknesses, or conflicts that counties and local jurisdictions can recast as opportunities for specific actions to be proposed as part of the hazard mitigation strategy.

The information collected in the survey questionnaire was incorporated into a database for further analysis. A general scoring methodology was then applied to quantify each jurisdiction's overall capability.[2] According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation.

Using this scoring methodology, a total score 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 nothing more than a general assessment of local government capability. The results of this capability assessment provide critical information for developing an effective and meaningful mitigation strategy.

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 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 through the Capability Assessment Survey 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 implementation of plans, ordinances, and programs that demonstrate a local jurisdiction's commitment to guiding and managing 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

[2]The scoring methodology used to quantify and rank the region's capability can be found in Appendix B.

regulate how land is developed and structures are built; as well as protecting environmental, historic, and cultural resources in the community. Although some conflicts can arise, these planning initiatives generally present significant 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 that are in place or under development for the jurisdictions in the Clay Macon Region along with their potential effect on loss reduction. This information will help 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. Note: Throughout this entire section, a checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. And blank indicates that the community does not have the corresponding capability in place or it is not applicable. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Clay Macon Regional Hazard Mitigation Plan.

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	✓	✓	✓	✓	✓

Planning / Regulatory Tool	CLAY COUNTY	Hayesville	MACON COUNTY	Franklin	Highlands
Economic Development Plan			✓		
Historic Preservation Plan					
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					

A more detailed discussion on the region's planning and regulatory capability follows.

7.3.2 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. In reality, 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 will also be presented during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane, and certainly 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.

7.3.3 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.

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.

7.3.4 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding 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 for implementing and sustaining 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

[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.

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 their community.

Table 7.2 provides NFIP policy and claim information for each participating jurisdiction in the Clay Macon Region.

TABLE 7.2: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Total Losses	Total Payments to Date
CLAY COUNTY†	04/01/99	05/04/09	118	$31,521,900	22	$102,154
Hayesville	12/11/08	05/04/09	14	$3,006,500	0	$0
MACON COUNTY†	06/01/01	04/19/10	152	$40,749,400	50	$1,019,308
Franklin	02/23/71	04/19/10	14	$3,989,500	0	$0
Highlands	10/28/09	04/19/10	28	$8,355,300	0	$0

†Includes unincorporated areas of county only

Source: NFIP Community Status information as of 11/19/19; NFIP claims and policy information as of 7/31/19

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 a number of 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%
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.

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.

7.3.5 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 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	✓	✓	✓	✓	✓

Staff / Personnel Resource	CLAY COUNTY	Hayesville	MACON COUNTY	Franklin	Highlands
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.

7.3.6 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.	✓	✓	✓	✓	✓

7.3.7 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.).

- The previous county hazard mitigation plans identified existing ordinances that address natural hazards or are related to hazard mitigation such as emergency management,

flood damage prevention, watershed protection, soil erosion and sedimentation control, zoning, and subdivision.

- As with any local jurisdiction, the receptivity of the citizens to new policies and programs is directly related to the immediate impact to the individual. With this in mind, any proposed initiatives must be preceded by public education and involvement. As citizens become more aware of the rationale for proposed changes, it is more likely that they will show support. Over the past few years, Hayesville has made several ordinance revisions. In 2002, a system-wide comprehensive parks and recreation plan was adopted and a zoning ordinance was implemented in 2000. In Clay County, as with many municipalities, major changes will likely be met with resistance. However, incremental changes stand a better chance of success over the long term. In terms of changes to hazard mitigation there are numerous opportunities for Clay County, however, public education and progressive steps are essential for the success of any new initiatives. If the public supportive of proposed changes, the elected officials who are responsible for adopting them are more likely to show their support. Building a disaster resistant community depends primarily on involving the pubic and achieving participation. As required by FEMA for the local hazard mitigation plan, public participation is a must and, to make it true, the political climate out to be suitable.
- Macon County has completed numerous projects across the county, mainly targeting stormwater flooding hazards. These include channel excavations and improvements to local creeks and drainage ditches, roadway and culvert improvements, and the creation of detention basins. Additionally, the county is currently a participant in the NFIP and has adopted the required flood damage prevention ordinance. Macon County has also adopted Watershed Protection, Soil Erosion and Sedimentation Control, and Subdivision Ordinances. All of this demonstrates to some extent both favorable political support and willingness to adopted hazard mitigation efforts in an active manner.

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 Survey. 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.

7.5 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 Hazard Mitigation Planning Team 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 the Clay Macon Region communities 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

In the previous versions of the participating jurisdictions' hazard mitigation plans, not all actions were prioritized. In addition, there needed to be consistency among the counties and jurisdiction regarding how they prioritized their actions. Therefore, for the 2021 Clay Macon Regional plan, the Regional Hazard Mitigation Planning Team members were tasked with establishing a priority for each action at the second Planning Team meeting. 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 review[1]

[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.

- Funding availability
- Continued compliance with the NFIP

The point of contact for each county helped coordinate the prioritization process by reviewing each 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, the Clay 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 are still applicable for the region and only minor revisions to the wording of the goals were recommended. 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	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.

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

8.4 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).

8.5 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the Mitigation Actions identified in the previous Clay Macon Region county plans were evaluated to determine their 2021 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 2021 planning process. Actions identified as completed in the 2016 version 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

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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 (2021)—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**	**36**
Hayesville	9:13	36
Macon County	**9:21**	**17**
Franklin	9:25	21
Highlands	9:30	11

Clay County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Prevention								
P-1	Implement projects that promote Sustainable Development and Smart Growth	All	Moderate	Clay County Board of Commissioners	Local	2026	Reworded and deferred. Although the county has worked towards implementing projects that support sustainable development and Smart Growth, there will continue to be a need to focus on these types of projects in the future so this action will remain in the plan.	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	High	Clay County Planning	Local	2026	Reworded and deferred. The county has attempted to enforce zoning and subdivision regulations that drive growth away from high hazard areas. However, these regulations require continual maintenance to ensure property is not put at risk.	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 2026 update.
P-3	Encourage Open Space Preservation throughout the county	All	Moderate	Clay County Planning	Local	2026	Reworded and deferred. The county has recognized the need to promote open space preservation and has many areas that are designated as open space including parks and forest land. Looking forward, the county will continue to identify areas that can be preserved as open space that will help reduce risk to hazards.	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 2026 update.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
P-4	Enforce Floodplain Management Regulations	Flood	High	Clay County Planning	Local	2026	Reworded and 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.	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	Moderate	Clay County Transportation; Clay County EMS	Local	2026	Reworded and deferred. Although an official transportation and evacuation plan has not been developed, the county has made strides to define evacuation routes and identify major transportation corridors	Deferred: Transportation and Evacuation planning and a tabletop exercise have been completed regarding these topics, but this action has been put on hold at this time due to COVID. The action will be revisited during the 2026 update of the plan.
P-6	Set Government Expenditure Limitation in High Hazard Areas	All	High	Clay County Board of Commissioners; Clay County Planning	Local	2026	Reworded and deferred. In the past, the county has limited expenditures in high hazard areas, but as the county continues to grow and development takes place, it will be important for the county to continue to work on limiting expenditures on construction in known high risk areas.	Deferred: The county 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 2026 plan update.
P-7	Create a Business and Industry Plan to promote disaster planning	All	High	Clay County Planning; Clay County Chamber of Commerce	Local	2026	Reworded and deferred. County officials have a strong relationship with businesses and industry and have worked to help business leaders with becoming safer and better prepared for disasters. Nevertheless, there is still significant work to be done to prepare all local businesses for a major disaster.	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.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
P-8	Develop an Inclement Weather Plan	All	Moderate	Clay County Planning; Clay County Emergency Management; Clay County Public Works	Local	Completed	Reworded and deferred. Although the county has plans in place for what to do in the event of inclement weather, developing an official inclement weather plan has not taken place yet.	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-9	Update Comprehensive Plan	All	High	Clay County Board of Commissioners; Clay County Planning	Federal, State, Private	2026	Reworded and deferred. The county has adopted a comprehensive plan that runs through 2021. This plan will likely need to be updated roughly within the next hazard mitigation plan update cycle.	Deferred; The County has started the update of the Comprehensive Plan but COVID has delayed those efforts. This action will be revisited during the 2026 plan update.
P-10	Develop Stormwater Management Plan	Flood	Moderate	NC DENR; NRCS	Federal, State, Private	2026	Reworded and deferred. In conjunction with the state, the county has implemented some stormwater management planning and will continue to work on improving stormwater management going forward.	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 2026 plan update.
P-11	Develop a Capital Improvement Plan (CIP) to guide the major capital expenditures over a given period	All	High	Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and 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.	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.
P-12	Update the Emergency Operation Guideline	All	High	Clay County Emergency Management	Federal, State, Private	Completed	Reworded and deferred. The county has developed an Emergency Operation Guideline for action to be taken in an emergency. This plan will likely need to be updated in the next cycle of the HMP.	Completed: The EOP was rewritten over the past two years and is now up to date with all needed changes in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Property Protection								
PP-1	Require storm shelters in Mobile Home Parks	All	Low	Clay County Planning; Clay County Board of Commissioners	Local	2026	Reworded and deferred. The county has encouraged 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	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-2	Mandate Tie-downs for mobile homes and propane tanks	All	Low	Clay County Planning; Clay County Board of Commissioners	Local	Completed	Reworded and deferred. The county has implemented tie-down mandates to prevent tanks and mobile homes from being lifted by floodwaters or winds and becoming ballistic hazards	This action has been completed:
PP-3	Update Development Regulations	All	Moderate	Clay County Planning	Local	2026	Reworded and deferred. The county has updated its development regulations to help guide future development away from high hazard areas, but additional updates may be required to keep regulations up to date and appropriate.	Deferred: The county will continue to consider additional updates to keep regulations up to date and appropriate. This action will be revisited during the 2026 plan update.
PP-4	Implement Critical Facility Protection	All	High	Clay County Engineering; Clay County EMS; Utility Companies; Hospital; NCDOT	Federal, State, Private	2026	Reworded and deferred. The county has taken steps to protect critical facilities but there are many additional steps that could be taken to reduce potential risk many critical facilities in the county.	Deferred: The county 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 county pending funding and time. This action will be revisited during the 2026 update.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
PP-5	Utilize Acquisition to Allow Property Owners to Voluntarily be Removed from High Hazard Areas	All	Moderate	Clay County Planning; NCDENR; FEMA	Federal, State, Private	2026	Reworded and deferred. 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.	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	Moderate	Clay County Planning; NCDENR; FEMA	Federal, State, Private	2026	Reworded and deferred. 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 relocation of homes.	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	Moderate	Clay County Fire Department; Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and deferred. The county has a strong network o f building inspectors, but additional training on the most up to date techniques is constantly required.	Deferred: The County continues to provide training opportunities for building inspectors and supports sending them to training as needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
PP-8	Utilize Windproofing to protect structures	All	Moderate	Clay County Engineering; FEMA; Clay County Planning	Federal, State, Private	2026	Reworded and deferred. The county has encouraged the use of windproofing techniques in the past and will continue to try to implement these techniques into future designs and structures.	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	High	Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2026	Reworded and deferred. The county has recognized the need to promote open space preservation and has many parks that are designated as open space. Looking forward, the county will continue to identify areas that can be preserved as parks/open space that will help reduce risk to hazards.	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	Wetland Preservation	Flood	Moderate	Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2026	Deferred. The county has recognized the need to preserve wetlands and their natural functions as water retainers. Looking forward, the county will continue to identify areas that can be preserved to help reduce risk to hazards.	Deferred: The county continues to identify areas that can be preserved to help reduce risk to hazards, pending funding.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
NRP-3	Develop Natural Resource Protection Plan	All	Moderate	Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2026	Reworded and deferred. The county works in conjunction with the forest service on fire protection procedures, but it would like to integrate more fully into that process via a natural resource protection plan.	Deferred: The County still would like to develop a Natural Resource Protection Plan, pending time and funding.
NRP-4	Tree Limb Removal Maintenance Plan	All	Moderate	Clay County Environment, Health & Natural Resources; Clay County Fire Department	Federal, State, Private	Completed	Reworded and deferred. 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 so this action will remain in the plan.	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.
Structural Projects								
SP-1	Raise Bridges	All	Low	Clay County Engineering; FEMA; NCDOT	Federal, State, Private	2026	Reworded and deferred. The county has not taken on any bridge raising projects on its own, but DOT has implemented such projects and the county will continue to support projects that raise bridges out of harm's way.	Deferred: The county continues to coordinate with NCDOT to implement such projects (although no projects completed within the past 5 years) and the county will continue to support projects that raise bridges out of harm's way. This action will be revisited during the 2026 update.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
SP-2	Stormwater Drain Maintenance	All	Moderate	Clay County Public Works; Clay County Environment, Health & Natural Resources	Federal, State, Private	2026	Reworded and deferred. The county routinely cleans and repairs storm drains, but a more comprehensive system of drain maintenance would be useful so the county will continue to evaluate.	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	Moderate	Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Local	2026	Deferred. In the past, the county has purchased equipment to help reduce risk to future disaster events. The county will continue to look into purchases of equipment that make sense especially when grants are available.	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	High	Clay County Emergency Management; Clay County Board of Commissioners	Local	2026	Reworded and deferred. The county has worked to improve communication between local coordinators to improve response in smaller communities that may not have fire/police. This coordination has been successful, but will need to be maintained and improved going forward.	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.
ES-3	Integrate information and Communication Technology	All	High	Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and deferred. The county has made significant progress in integrating information and communication technology among all of its departments. However, this is a constantly evolving field and there will be a need to update and re-evaluate fairly consistently.	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.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
ES-4	Use Citizens in Emergency Management Functions	All	Moderate	Clay County Emergency Management	Federal, State, Private	Completed	Reworded and deferred. The county has initiated several programs such as Volunteers in Police Service Program and Medical Reserve Corps. However, there will need to be additional steps taken to more fluently integrate citizens in Emergency Management functions.	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	Moderate	Clay County Emergency Management	Federal, State, Private	2026	Reworded and deferred. Although there are systems in place for emergency transportation, the county would like to develop emergency thoroughfares for medical transportation in case of a disaster.	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	Mass Casualty Training	All	Moderate	Clay County Emergency Management	Federal, State, Private	2026	Deferred. The county has some experience in mass casualty incidents, but it would like to have additional trainings available to improve this capability.	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.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Public Education and Awareness								
PEA-1	Install Disaster Warning Systems	All	High	Clay County Emergency Management; Clay County Planning	Federal, State, Local	2026	Reworded and deferred. 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.	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	High	Clay County Emergency Management; Clay County Planning	Local	2026	Reworded and deferred. The county has designated assembly points that can be easily reached by a number of people in a short amount of time. The county will continue to evaluate these points and make changes as necessary.	Deferred: Working with the Evacuation plan to finalize these points but COVID has this stopped at the moment.
PEA-3	Implement Community Awareness Program	All	High	Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and deferred. The county has implemented 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.	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.
PEA-4	Establish Emergency Shelters	All	High	Clay County Planning; Clay County Emergency Management	Federal, State, Private	2026	Reworded and deferred. The county has established emergency shelters in a number of locations, but would like to find ways to strengthen those facilities and improve communication to citizens of their availability during disaster events.	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.

Town of Hayesville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Prevention								
P-1	Implement projects that promote Sustainable Development and Smart Growth	All	Moderate	Town of Hayesville and Clay County Board of Commissioners	Local	2026	Reworded and deferred. Although the town has worked towards implementing projects that support sustainable development and Smart Growth, there will continue to be a need to focus on these types of projects in the future so this action will remain in the plan.	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	High	Town of Hayesville and Clay County Planning	Local	2026	Reworded and deferred. The town has attempted to enforce zoning and subdivision regulations that drive growth away from high hazard areas. However, these regulations require continual maintenance to ensure property is not put at risk.	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 2026 update.
P-3	Encourage Open Space Preservation	All	Moderate	Town of Hayesville and Clay County Planning	Local	2026	Reworded and deferred. The town has recognized the need to promote open space preservation and has many areas that are designated as open space including parks and forest land. Looking forward, the town will continue to identify areas that can be preserved as open space that will help reduce risk to hazards.	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 2026 update.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
P-4	Enforce Floodplain Management Regulations	Flood	High	Town of Hayesville and Clay County Planning	Local	2026	Reworded and 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.	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	Moderate	Town of Hayesville and Clay County Transportation; Clay County EMS	Local	2026	Reworded and deferred. Although an official transportation and evacuation plan has not been developed, the town has made strides to define evacuation routes and identify major transportation corridors	Deferred: The County is leading this effort. Transportation and Evacuation planning and a tabletop exercise have been completed regarding these topics, but this action has been put on hold at this time due to COVID. The action will be revisited during the 2026 update of the plan.
P-6	Set Government Expenditure Limitation in High Hazard Areas	All	High	Town of Hayesville and Clay County Board of Commissioners; Clay County Planning	Local	2026	Reworded and deferred. In the past, the town has limited expenditures in high hazard areas, but as the town continues to grow and development takes place, it will be important for the town to continue to work on limiting expenditures on construction in known high risk areas.	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 2026 plan update.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
P-7	Create a Business and Industry Plan to promote disaster planning	All	High	Town of Hayesville and Clay County Planning; Clay County Chamber of Commerce	Local	2026	Reworded and deferred. Town officials have a strong relationship with businesses and industry and have worked to help business leaders with becoming safer and better prepared for disasters. Nevertheless, there is still significant work to be done to prepare all local businesses for a major disaster.	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	Moderate	Town of Hayesville and Clay County Planning; Clay County Emergency Management; Clay County Public Works	Local	2026	Reworded and deferred. Although the town has plans in place for what to do in the event of inclement weather, developing an official inclement weather plan has not taken place yet.	Deferred: This action is still in planning stages.
P-9	Update Comprehensive Plan	All	High	Town of Hayesville and Clay County Board of Commissioners; Clay County Planning	Federal, State, Private	2026	Reworded and deferred. The town has adopted a comprehensive plan that runs through 2021. This plan will likely need to be updated roughly within the next hazard mitigation plan update cycle.	Deferred: The Town has started the update of the Comprehensive Plan but COVID has delayed those efforts. This action will be revisited during the 2026 plan update.
P-10	Develop Stormwater Management Plan	Flood	Moderate	NC DENR; NRCS	Federal, State, Private	2026	Reworded and deferred. In conjunction with the state, the town has implemented some stormwater management planning and will continue to work on improving stormwater management going forward.	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 2026 plan update.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
P-11	Develop a Capital Improvement Plan (CIP) to guide the major capital expenditures over a given period	All	High	Town of Hayesville and Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and 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.	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.
P-12	Update the Emergency Operation Guideline	All	High	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	2026	Reworded and deferred. The town has developed an Emergency Operation Guideline for action to be taken in an emergency. This plan will likely need to be updated in the next cycle of the HMP.	Completed: The EOP was rewritten over the past two years and is now up to date with all needed changes in place.
Property Protection								
PP-1	Require storm shelters in Mobile Home Parks	All	Low	Town of Hayesville and Clay County Planning; Clay County Board of Commissioners	Local	2026	Reworded and deferred. The town has encouraged the installation of storm shelters i n Mobile Home Parks, but there is no regulation requiring these. The town will continue to evaluate implementing such regulations	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-2	Mandate Tie-downs for mobile homes and propane tanks	All	Low	Town of Hayesville and Clay County Planning; Clay County Board of Commissioners	Local	Completed	Reworded and deferred. The town has implemented tie-down mandates to prevent tanks and mobile homes from being lifted by floodwaters or winds and becoming ballistic hazards	This action has been completed:

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
PP-3	Update Development Regulations	All	Moderate	Town of Hayesville and Clay County Planning	Local	2026	Reworded and deferred. The town has updated its development regulations to help guide future development away from high hazard areas, but additional updates may be required to keep regulations up to date and appropriate.	Deferred: The Town will continue to consider additional updates to keep regulations up to date and appropriate. This action will be revisited during the 2026 plan update.
PP-4	Implement Critical Facility Protection	All	High	Town of Hayesville and Clay County Engineering; Clay County EMS; Utility Companies; Hospital; NCDOT	Federal, State, Private	2026	Reworded and deferred. The town has taken 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.	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 2026 update.
PP-5	Utilize Acquisition to Allow Property Owners to Voluntarily be Removed from High Hazard Areas	All	Moderate	Town of Hayesville and Clay County Planning; NCDENR; FEMA	Federal, State, Private	2026	Reworded and deferred. 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.	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.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
PP-6	Utilize Relocation to Allow Property Owners to Voluntarily be Removed from High Hazard Areas	All	Moderate	Town of Hayesville and Clay County Planning; NCDENR; FEMA	Federal, State, Private	2026	Reworded and deferred. 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 relocation of homes.	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	Moderate	Town of Hayesville and Clay County Fire Department; Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and deferred. The town has a strong network of building inspectors, but additional training on the most up to date techniques is constantly required.	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	Moderate	Town of Hayesville and Clay County Engineering; FEMA; Clay County Planning	Federal, State, Private	2026	Reworded and deferred. The town has encouraged the use of windproofing techniques in the past and will continue to try to implement these techniques into future designs and structures.	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	High	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2026	Reworded and deferred. The town has recognized the need to promote open space preservation and has many parks that are designated as open space. Looking forward, the town will continue to identify areas that can be preserved as parks/open space that will help reduce risk to hazards.	Deferred: The Town will continue to look for opportunities to preserve and expand parks pending funding.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
NRP-2	Wetland Preservation	Flood	Moderate	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2026	Deferred. The town has recognized the need to preserve wetlands and their natural functions as water retainers. Looking forward, the town will continue to identify areas that can be preserved to help reduce risk to hazards.	Deferred: The Town continues to identify areas that can be preserved to help reduce risk to hazards, pending funding.
NRP-3	Develop Natural Resource Protection Plan	All	Moderate	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Planning	Local	2026	Reworded and deferred. The town works in conjunction with the forest service on fire protection procedures, but it would like to integrate more fully into that process via a natural resource protection plan.	Deferred: The Town still would like to develop a Natural Resource Protection Plan, pending time and funding.
NRP-4	Tree Limb Removal Maintenance Plan	All	Moderate	Town of Hayesville and Clay County Environment, Health & Natural Resources; Clay County Fire Department	Federal, State, Private	Completed	Reworded and deferred. 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 so this action will remain in the plan.	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

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Structural Projects								
SP-1	Raise Bridges	All	Low	Town of Hayesville and Clay County Engineering; FEMA; NCDOT	Federal, State, Private	2026	Reworded and deferred. The town has not taken on any bridge raising projects on its own, but DOT has implemented such projects and the town will continue to support projects that raise bridges out of harm's way.	Deferred: The Town continues to coordinate with NCDOT to implement such projects (although no projects completed within the past 5 years) and the Town will continue to support projects that raise bridges out of harm's way. This action will be revisited during the 2026 update.
SP-2	Stormwater Drain Maintenance	All	Moderate	Town of Hayesville and Clay County Public Works; Clay County Environment, Health & Natural Resources	Federal, State, Private	2026	Deferred. The town routinely cleans and repairs storm drains, but a more comprehensive system of drain maintenance would be useful so the town will continue to evaluate.	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	Moderate	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Local	2026	Deferred. In the past, the town has purchased equipment to help reduce risk to future disaster events. The town will continue to look into purchases of equipment that make sense especially when grants are available.	Deferred: The Town will continue to look into purchases of equipment that make sense especially when grants are available.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
ES-2	Form Local coordinators and Communication Network	All	High	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Local	2026	Reworded and deferred. The town has worked to improve communication between local coordinators to improve response in smaller communities that may not have fire/police. This coordination has been successful, but will need to be maintained and improved going forward.	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.
ES-3	Integrate Information and Communication Technology	All	High	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and deferred. The town has made significant progress in integrating information and communication technology among all of its departments. However, this is a constantly evolving field and there will be a need to update and re-evaluate fairly consistently.	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	Moderate	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	Completed	Reworded and deferred. The town has initiated several programs such as Volunteers in Police Service Program and Medical Reserve Corps. However, there will need to be additional steps taken to more fluently integrate citizens in Emergency Management functions.	Completed: This is now in place as part of the County EOP. This action will be removed from future plan updates.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
ES-5	Improve Emergency Transportation	All	Moderate	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	2026	Reworded and deferred. Although there are systems in place for emergency transportation, the town would like to develop emergency thoroughfares for medical transportation in case of a disaster.	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	Mass Casualty Training	All	Moderate	Town of Hayesville and Clay County Emergency Management	Federal, State, Private	2026	Deferred. The town has some experience in mass casualty incidents, but it would like to have additional trainings available to improve this capability.	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.
Public Education and Awareness								
PEA-1	Install Disaster Warning Systems	All	High	Town of Hayesville and Clay County Emergency Management; Clay County Planning	Federal, State, Local	2026	Reworded and deferred. The town has some disaster warning systems in place, but as these technologies have improved, the town has identified this as an area that needs improvement going forward.	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	High	Town of Hayesville and Clay County Emergency Management; Clay County Planning	Local	2026	Reworded and deferred. The town has designated assembly points that can be easily reached by a number of people in a short amount of time. The town will continue to evaluate these points and make changes as necessary.	Deferred: Will be included in County Plan. See update provided by County

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
PEA-3	Implement Community Awareness Program	All	High	Town of Hayesville and Clay County Emergency Management; Clay County Board of Commissioners	Federal, State, Private	2026	Reworded and deferred. The town has implemented 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.	Deferred: Will be included in County Plan. See update provided by County
PEA-4	Establish Emergency Shelters	All	High	Town of Hayesville and Clay County Planning; Clay County Emergency Management	Federal, State, Private	2026	Reworded and deferred. The town has established emergency shelters in a number of locations, but would like to find ways to strengthen those facilities and improve communication to citizens of their availability during disaster events.	Deferred: Same as County shelters. See update provided by the County.

Macon County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Prevention								
P-1	Review and update the floodplain ordinance and ensure that new infrastructure is not built in the flood prone areas.	Flood	High	Macon County Planning, Permitting & Development	Local	2026	Deferred. The county has reviewed the floodplain ordinance, but this is something that will need to take place again during the next 5 years, so it will remain in place.	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.	Flood	High	Macon County Planning, Permitting & Development	Local	2026	Deferred. The county has identified some areas to submit requests for map updates, however, the county would like to continue to look into and evaluate areas of the floodplain going forward.	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.	Flood	Moderate	Macon County Emergency Management	HMGP, PDM	2026, As funds become available	Deferred. The county has attempted to implement this project, but it has not received grant funding and would not be able to fund it with local funding alone. Estimated cost $1,000,000. The county will continue to try to move this project forward over the next 5 years.	Deferred. No funding has been available and construction costs continue to rise.
PP-2	Work with town to remove Franklin Fire Department from floodplain.	Flood	High	Macon County Emergency Management	HMGP, USACE, 406 Mitigation	2026, As soon as funds become available	New action.	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.	Flood	High	Macon County Public Works; USACE	HMGP, PDM, USACE	2026, As soon as funds become available	Deferred. NCDOT is in the process of replacing the old town bridge which will help move towards completion of this action.	Deferred. Bridge has been replaced and project evaluated for issues prior to proceeding.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
PP-4	Protect sewage treatment plant from flood damage by erecting a concrete flood wall around the plant.	Flood	High	Macon County Public Works	HMGP, USACE, 406 Mitigation	2026, As soon as funds become available	Deferred. There has not been any action taken to protect sewage treatment plants from flood damage via a floodwall. Estimated cost $1,000,000. The county will continue to look into funding for this project.	Deferred. No funding available.
PP-5	Replace inadequately sized water mains and tanks to a size adequate for fire protection.	Wildfire	High	Macon County Public Works	Local	2026, When funding becomes available	Deferred. Water mains have not been replaced. The county would still like to address this action, but will need to find funding to do so. Estimated cost $6.7 million.	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	High	Macon County Planning, Permitting & Development	Local	2026, When funding becomes available	Deferred. The county continually works to ensure that building codes are followed and that homes are secured to the greatest extent possible. However, this is an action that will still need to be carried out in the future, so it will remain in the plan.	Deferred. Planning, Permitting and Development department ensures compliance with all building codes and local requirements.
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	Moderate	Macon County Emergency Management and Administration	Local	2026	New action.	Deferred. No funding available for purchases and no properties identified during this period that would meet the criteria. Evaluation continuing.
NRP-2	Purchase tub grinder for the disposal of storm debris	All	High	Macon County Landfill	Local; PA	Action deleted	Deferred. The county has not purchased a tub grinder for disposal of debris. Estimated cost $1,000,000. The county will continue to try to allocate funding for such a purpose.	Deleted. Contractors are able to meet the needs of the county at this time.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
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.	Flood	High	Macon County Emergency Management	HMGP, PDM, 406 Mitigation	2026, or as soon as funds become available	New action.	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	2022 or whenever funds become available.	N/A	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	High	Macon County Emergency Management	State grant	2026, or as soon as funds become available	Deferred. The county has not been able to secure a secondary source of electricity for public/emergency services buildings in the event of an unexpected power loss. The county will continue to look for ways to fund this type of project.	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	High	Macon County Emergency Management	Local	2026	New action.	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	High	Macon County Emergency Management	Local	2026	New action.	Deferred. Information placed on website and more efforts will continue to educate citizens.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
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	High	Macon County Emergency Management	Local	2026	Deferred. The county has utilized its website to inform and educate citizens about potential risks to hazards and how to mitigate these risks. Going forward, the county will continue to post pertinent information on its website, so this action will remain in place.	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	High	Macon County Emergency Management	Local	2026	Deferred. The county has utilized flyers and information sheets as a way of reaching out the public and has placed these in public buildings, making them available to the public. The county will need to update these flyers and sheets as better information becomes available, so this action will remain in place.	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 (2015)	Implementation Status (2021)
Prevention								
P-1	Town of Franklin to join the NFIP.	Flood	High	Franklin Public Works	Local	Completed:	New action.	Action complete. The Town joined the NFIP. This action will be removed from future plan updates.
PP-2	Ensure all homes are secured properly and that building codes are followed as directed to minimize risk of hazards.	All	High	Macon County Planning, Permitting & Development; Franklin Administration	Local	Completed:	Deferred. The county continually works to ensure that building codes are followed and that homes are secured to the greatest extent possible. However, this is an action that will still need to be carried out in the future, so it will remain in the plan.	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.
Property Protection								
PP-1	Elevate access road (Arthur Drake Road) “above” the floodway.	Flood	Moderate	Macon County Emergency Management	HMGP, PDM	2026, As funds become available	Deferred. The county has attempted to implement this project, but it has not received grant funding and would not be able to fund it with local funding alone. Estimated cost $1,000,000. The county will continue to try to move this project forward over the next 5 years.	Deferred. No funding has been available and construction costs continue to rise.
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.	Flood	High	Franklin Public Works; USACE	HMGP, PDM, USACE	2026, As soon as funds become available	Deferred. NCDOT is in the process of replacing the old town bridge which will help move towards completion of this action.	Deferred. Bridge has been replaced and project evaluated for issues prior to proceeding.
PP-3	Protect sewage treatment plant from flood damage by erecting a concrete flood wall around the plant.	Flood	High	Franklin Public Works	HMGP, USACE, 406 Mitigation	Deleted	Deferred. There has not been any action taken to protect sewage treatment plants from flood damage via a floodwall. Estimated cost $1,000,000. The town will continue to look into funding for this project.	The Town has decided to delete this action. It will be removed from future updates.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
PP-4	Remove Franklin Fire Department and Police Station from flood plain.	Flood	High	Franklin Public Works	HMGP, USACE, 406 Mitigation	2026, As soon as funds become available	New action.	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	High	Town of Franklin	Federal, State and Private	2021	N/A	New action
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	High	Town of Franklin	Federal, State, Private	2021	N/A	New action.
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	High	Town of Franklin	Federal, State, Private	2021	N/A	New action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
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	High	Town of Franklin	Federal, State, Private	2021	N/A	New action.
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	2026, As soon as funds become available.	Deferred. In the process of increasing capacity with an estimated completion of 2020. Estimated cost $8,000,000.	Deferred: Current facility is being expanded.
NRP-3	Purchase tub grinder for the disposal of storm debris	All	High	Macon County Landfill	Local; PA	2026, As soon as funds become available	Deferred. The town has not purchased a tub grinder for disposal of debris. Estimated cost $1,000,000. The town will continue to try to allocate funding for such a purpose.	Deleted. Contractors are able to meet the needs of the county at this time.
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	Moderate	Macon County Emergency Management and Administration; Franklin Administration	Local	2026	New action.	Deferred. No funding available for purchases and no properties identified during this period that would meet the criteria. Evaluation continuing.
Structural Projects								
SP-3	Remove sewer pump station from floodplain at Little Tennessee River and E Main St.	Flood	High	Public Works	HMGP, PDM, 406 Mitigation	Deleted	New Action.	This action is being deleted. It will be removed from future plan updates.
SP-4	Have public works clean out storm drains, ditches and culverts to help with flow of storm water.	Flood	High	Public Works	Local	Deleted	New Action.	Action deleted as this is part of ongoing maintenance conducted by Public Works.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
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.	Flood	High	Town of Franklin	Federal, State grants	2021		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.	All	High	Macon County Emergency Management, Franklin Administration	State grant	2026, or as soon as funds become available	Deferred. The town has not been able to secure a secondary source of electricity for public/emergency services buildings in the event of an unexpected power loss. The county will continue to look for ways to fund this type of project.	Deferred. Some facilities have capability of second source of power but funding inadequate to complete all buildings.
Public Education and Awareness								
PEA-1	Improve outreach by utilizing online surveys to get input from the public.	All	High	Macon County Emergency Management	Local	2026	New action.	Deferred. Some surveys complete on various aspects but still need public input.
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	High	Macon County Emergency Management	Local	2026	New action.	Deferred. Information placed on website and more efforts will continue to educate citizens.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
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	High	Macon County Emergency Management	Local	2026	Deferred. The county has utilized its website to inform and educate citizens about potential risks to hazards and how to mitigate these risks. Going forward, the county will continue to post pertinent information on its website, so this action will remain in place.	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	High	Macon County Emergency Management	Local	2026	Deferred. The county has utilized flyers and information sheets as a way of reaching out the public and has placed these in public buildings, making them available to the public. The county will need to update these flyers and sheets as better information becomes available, so this action will remain in place.	Deferred. Some information available but most success has been had from online or electronic submissions.

Town of Highlands Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Prevention								
P-1	Replace roadway culvert on Laurel Street with a bridge to alleviate flooding caused by Mill Creek.	Flood	High	Highlands Public Works	HMGP, PDM, 406 Mitigation	Completed	Deferred. This action is in process and mitigation funds are expected. Estimated cost $250,000.	Completed. Flood maps revised after this was complete
PP-2	Ensure all homes are secured properly and that building codes are followed as directed to minimize risk of hazards.	All	High	Macon County Planning, Permitting & Development; Highlands Administration	Local	2026, When funding becomes available	Deferred. The county continually works to ensure that building codes are followed and that homes are secured to the greatest extent possible. However, this is an action that will still need to be carried out in the future, so it will remain in the plan.	Deferred. Continual process with Planning, Permitting and Development along with TOH Code Enforcement
Property Protection								
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).	Earthquake	High	Highlands Public Works	Local	Completed	Deferred. This action has not been started so the town will work on this action going forward. Estimated cost $800,000.	Complete. Chlorine gas no longer used in the process.
PP-2	Replace inadequately sized water mains and tanks to a size adequate for fire protection.	Wildfire	High	Highlands Public Works	Local	2026, When funding becomes available	Deferred. Water mains have not been replaced. The town would still like to address this action, but will need to find funding to do so. Estimated cost $6.7 million.	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	Moderate	Macon County Emergency Management and Administration; Franklin Administration	Local	2026	New action.	Deferred. Funding not available

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
Structural Projects								
SP-1	Build storm water controls, such as culverts and floodwalls, in flood prone areas and continue compliance with NFIP.	Flood	High	Town of Highlands Administration	State	2026	Deferred. The town has not generally built many stormwater controls in flood prone areas. This will be a continued area of focus going forward so this action will remain in the plan.	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	High	Macon County Emergency Management, Highlands Administration	State grant	2026, or as soon as funds become available	Deferred. The town has not been able to secure a secondary source of electricity for public/emergency services buildings in the event of an unexpected power loss. The county will continue to look for ways to fund this type of project.	Deferred due to funding.
Public Education and Awareness								
PEA-1	Improve outreach by utilizing online surveys to get input from the public.	All	High	Macon County Emergency Management	Local	2026	New action.	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	High	Macon County Emergency Management	Local	2026	New action.	Deferred. Continual process as education needs change.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)	Implementation Status (2021)
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	High	Macon County Emergency Management	Local	2026	Deferred. The county has utilized its website to inform and educate citizens about potential risks to hazards and how to mitigate these risks. Going forward, the county will continue to post pertinent information on its website, so this action will remain in place.	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	High	Macon County Emergency Management	Local	2026	Deferred. The county has utilized flyers and information sheets as a way of reaching out the public and has placed these in public buildings, making them available to the public. The county will need to update these flyers and sheets as better information becomes available, so this action will remain in place.	Deferred. Most effective means of distribution now is electronic.

SECTION 10
PLAN MAINTENANCE

This section discusses how the Clay Macon Region 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

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44 CFR Requirement
44 CFR Part201.6(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. The counties in the Clay Macon Region 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, North Carolina Emergency Management's Hazard Mitigation Planning section will help coordinate the reconvening the Regional Hazard Mitigation Planning Committee for these reviews through coordination with each County's Emergency Management Departments. 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. North Carolina Emergency Management's Hazard Mitigation Planning section will help coordinate the reconvening the Regional Hazard Mitigation Planning Committee and conducting the five-year review through coordination with each County's Emergency Management Departments.

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).

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 North Carolina Emergency Management's Hazard Mitigation Planning section to coordinate the reconvening of the Regional Hazard Mitigation Planning Committee, through coordination with each County's Emergency Management Department, 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

Upon the initiation of the amendment process, representatives from Clay Macon counties will forward information on the proposed change(s) to all interested parties including, but not limited to, all directly affected County departments, residents, and businesses. Information will also be forwarded to the North Carolina Division of Emergency Management. This information will be disseminated in order to seek input on the proposed amendment(s) for no less than a 45-day review and comment period.

At the end of the 45-day review and comment period, the proposed amendment(s) and all comments will be forwarded to the Regional Hazard Mitigation Planning Committee for final consideration. The Planning Committee will review the proposed amendment along with the comments received from other parties, and if acceptable, the committee will submit a recommendation for the approval and adoption of changes to the Plan.

In determining whether to recommend approval or denial of a Plan amendment request, the following factors will be considered by the Regional Hazard Mitigation Planning Committee:

- There are errors, inaccuracies or omissions made in the identification of issues or needs in the Plan
- New issues or needs have been identified which are not adequately addressed in the Plan
- There has been a change in information, data, or assumptions from those on which the Plan is based

Upon receiving the recommendation from the Regional Hazard Mitigation Planning Committee and prior to adoption of the Plan, the participating jurisdictions will hold a public hearing, if deemed necessary. The governing bodies of each participating jurisdiction will review the recommendation from the Regional Hazard Mitigation Planning Committee (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, the governing bodies will take one of the following actions:

- Adopt the proposed amendments as presented
- Adopt the proposed amendments with modifications
- Refer the amendments request back to the Regional Hazard Mitigation Planning Committee for further revision, or
- Defer the amendment request back to the Regional Hazard Mitigation Planning Committee for further consideration and/or additional hearings

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 2015. 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 2021 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 as early as 2018 when North Carolina Emergency Management made the decision to set aside HMGP funding from Hurricane Matthew to fund 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 August of 2019 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.

RESOLUTION TO ADOPT THE 2021 UPDATE TO THE CLAY MACON REGIONAL HAZARD MITIGATION PLAN

WHEREAS, Clay County adopted the Clay Macon Regional Hazard Mitigation Plan on February 4, 2016 (hereinafter called the Plan);

WHEREAS, it is required by the Plan that the Plan be reviewed every five (5) years;

WHEREAS, the Plan has been reviewed and cyber security and infectious disease have been added to the Plan;

NOW, THEREFORE, BE IT RESOLVED that upon motion of Commissioner Dwight Penland, seconded by Commissioner Randy Nichols,

1. The Board of Commissioners of Clay County hereby adopt the 2021 update to the Clay Macon Regional Hazard Mitigation Plan;
2. The Board of Commissioners of Clay County agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan as updated.

READ AND APPROVED by vote of the members in attendance, and adopted this 5th day of August, 2021, at the regular meeting of the Clay County Board of Commissioners.

BOARD OF COMMISSIONERS

By: _____
Robert C. Peck, Chairman

ATTEST:

Betty Bradley
Clerk to the Board of County Commissioners

(SEAL)

RESOLUTION TO ADOPT THE CLAY MACON REGIONAL HAZARD MITIGATION PLAN

WHEREAS, Town of Hayesville is vulnerable to an array of hazards that can cause loss of life and damages to public and private property; and

WHEREAS, the Town of Hayesville desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

WHEREAS, it is the intent of the Town of Hayesville to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

WHEREAS, it is also the intent of the Town of Hayesville to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Hayesville; and

WHEREAS, Town of Hayesville, in coordination with Clay and Macon counties and the participating municipalities within those Counties has prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

WHEREAS, the North Carolina Emergency Management and the Federal Emergency Management Agency have reviewed the Clay Macon Regional Hazard Mitigation Plan for legislative compliance and has approved the plan pending the completion of local adoption procedures.

NOW, THEREFORE, BE IT RESOLVED that the Town of Hayesville hereby:

1. Adopts the Clay Macon Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted on May 2, 2022.

Joe Slaton, Mayor
Town of Hayesville

Attest:

Suzanne G. Hedden, Clerk
Town of Hayesville

Certified by: Suzanne G. Hedden (SEAL)
Date: May 2, 2022

RESOLUTION TO ADOPT THE
CLAY MACON REGIONAL HAZARD MITIGATION PLAN

WHEREAS, Macon County, North Carolina is vulnerable to an array of hazards that can cause loss of life and damages to public and private property; and

WHEREAS, Macon County desires to seek ways to mitigate situations that may aggravate such circumstances, and

WHEREAS, the development and implementation of a hazard mitigation plan can result in actions that reduce the long term risk to life and property from natural hazards; and

WHEREAS, it is the intent of the Macon County Board of Commissioners to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

WHEREAS, it is also the intent of the Macon County Board of Commissioners to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting Macon County; and

WHEREAS, Macon County, in coordination with Clay County, North Carolina and the participating municipalities within Macon and Clay Counties have prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

WHEREAS, the North Carolina Emergency Management and the Federal Emergency Management Agency have reviewed the Clay Macon Regional Hazard Mitigation Plan for legislative compliance and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, BE IT RESOLVED that the Macon County hereby:

1. Adopts the Clay Macon Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted on July 13, 2021.

James Tate, Chairman,
Macon County Board of County Commissioners

ATTEST:

Derek Roland,
Macon County Manager and Clerk to the Board

(Official Seal)

TOWN OF FRANKLIN

Post Office Box 1479
Franklin, North Carolina 28744
(828) 524-2516

RESOLUTION TO ADOPT THE CLAY MACON REGIONAL HAZARD MITIGATION PLAN

WHEREAS, Town of Franklin is vulnerable to an array of hazards that can cause loss of life and damages to public and private property; and

WHEREAS, the Town of Franklin desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

WHEREAS, it is the intent of the Town Council to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

WHEREAS, it is also the intent of the Town Council to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Franklin; and

WHEREAS, Town of Franklin, in coordination with Clay and Macon Counties and the participating municipalities within those counties has prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

WHEREAS, the North Carolina Emergency Management and the Federal Emergency Management Agency have reviewed the Clay Macon Regional Hazard Mitigation Plan for legislative compliance and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, BE IT RESOLVED that the Town Council of Town of Franklin hereby:

1. Adopts the Clay Macon Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Adopted on July 6, 2021.

Mayor Robert S. Scott
Town of Franklin

Attest:

Travis Tallent, Town Clerk
Town of Franklin

Certified by: _____ (SEAL)
Date: 7-6-21

THE TOWN OF
HIGHLANDS

Resolution to Adopt the Clay Macon Regional Hazard Mitigation Plan Resolution No. 2021-08-Res

WHEREAS, the Town of Highlands is vulnerable to an array of hazards that can cause loss of life and damages to public and private property; and

WHEREAS, the Town of Highlands desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the development and implementation of a hazard mitigation plan can result in actions that reduce the long-term risk to life and property from natural hazards; and

WHEREAS, it is the intent of the Board of Commissioners of the Town of Highlands to protect its citizens and property from the effects of natural hazards by preparing and maintaining a local hazard mitigation plan; and

WHEREAS, it is also the intent of the Board of Commissioners of the Town of Highlands to fulfill its obligation under North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act and Section 322: Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act to remain eligible to receive state and federal assistance in the event of a declared disaster affecting the Town of Highlands; and

WHEREAS, the Town of Highlands, in coordination with Clay and Macon counties and participating municipalities within those Counties has prepared a multi-jurisdictional hazard mitigation plan with input from the appropriate local and state officials;

WHEREAS, the North Carolina Emergency Management and the Federal Emergency Management Agency have reviewed the Clay Macon Regional Hazard Mitigation Plan for legislative compliance and has approved the plan pending the completion of local adoption procedures;

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of the Town of Highlands hereby:

1. Adopts the Clay Macon Regional Hazard Mitigation Plan; and
2. Agrees to take such other official action as may be reasonably necessary to carry out the proposed actions of the Plan.

Upon motion duly made and seconded, the Resolution was unanimously adopted by the Board of Commissioners at a regularly scheduled meeting held on the 15th day of July, 2021, in the Highlands Community Building, 71 Poplar Street, Highlands, North Carolina.

This the 15th day of July, 2021.

Patrick L. Taylor, Mayor

ATTEST:

Gilberta B. Shaheen, Town Clerk

Appendix B
Planning Tools

This appendix includes the following:

1. Blank Public Participation Survey
2. Blank Capability Assessment
3. Scoring Criteria for Capability Assessment
4. Blank Mitigation Action Worksheet

PUBLIC SURVEY
FOR HAZARD MITIGATION PLANNING

We need your help!
Clay and Macon Counties, the Towns of Franklin, Hayesville and Highlands, along with other participating stakeholders, are now working to update the region's multi-jurisdictional *Hazard Mitigation Plan*. The purpose of this Plan is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks. Upon completion, the Plan will represent a comprehensive multi-jurisdictional *Hazard Mitigation Plan* for the two-county region.

This survey questionnaire provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impact of future hazard events.

Please help us by completing this survey and returning it to:

Nathan Slaughter, ESP Associates
2200 Gateway Centre Blvd,. Suite 216
Morrisville, NC 27560

Surveys can also be emailed to nslaughter@espassociates.com

If you have any questions regarding this survey or would like to learn about more ways you can participate in the development of the *Clay Macon Regional Multi-Jurisdictional Hazard Mitigation Plan*, please contact Nathan Slaughter at 919-415-2726 or at the email address above.

This survey is also available online at:
https://s.surveyplanet.com/Cov0VHPST

1. **Where do you live?**

- ❑ Unincorporated Clay County
- ❑ Unincorporated Macon County
- ❑ Town of Franklin
- ❑ Town of Hayesville
- ❑ Town of Highlands

2. **Have you ever experienced or been impacted by a disaster?**

- ❑ Yes
- ❑ No

   a. **If "Yes," please explain:**

3. **How concerned are you about the possibility of our community being impacted by a disaster?**

- ❑ Extremely concerned
- ❑ Somewhat concerned
- ❑ Not concerned

4. **Please select the <u>one</u> hazard you think is the *highest threat* to your neighborhood:**

- ❑ Acts of Terror
- ❑ Dam / Levee Failure
- ❑ Drought
- ❑ Earthquake
- ❑ Expansive Soils
- ❑ Extreme Heat
- ❑ Flood
- ❑ Hailstorm
- ❑ Hurricane Remnants
- ❑ Land Subsidence
- ❑ Landslide
- ❑ Lightning
- ❑ Severe Winter/Ice Storm
- ❑ Severe Thunderstorm / High Wind
- ❑ Tornado
- ❑ Wildland Fire

5. **Please select the <u>one</u> hazard you think is the *second highest threat* to your neighborhood:**

- ❑ Acts of Terror
- ❑ Dam / Levee Failure
- ❑ Drought
- ❑ Earthquake
- ❑ Expansive Soils
- ❑ Extreme Heat
- ❑ Flood
- ❑ Hailstorm
- ❑ Hurricane Remnants
- ❑ Land Subsidence
- ❑ Landslide
- ❑ Lightning
- ❑ Severe Winter/Ice Storm
- ❑ Severe Thunderstorm / High Wind
- ❑ Tornado
- ❑ Wildland Fire

6. **Is there another hazard not listed above that you think is a wide-scale threat to your neighborhood?**

- ❑ Yes (please explain): _____
- ❑ No

7. Is your home located in a floodplain?

- ❑ Yes
- ❑ No
- ❑ I don't know

8. Do you have flood insurance?

- ❑ Yes
- ❑ No
- ❑ I don't know

a. If "No," why not?

- ❑ Not located in floodplain
- ❑ Too expensive
- ❑ Not necessary because it never floods
- ❑ Not necessary because I'm elevated or otherwise protected
- ❑ Never really considered it
- ❑ Other (please explain): _____

9. Have you taken any actions to make your home or neighborhood more resistant to hazards?

- ❑ Yes
- ❑ No

b. If "Yes," please explain:

10. Are you interested in making your home or neighborhood more resistant to hazards?

- ❑ Yes
- ❑ No

11. Do you know what office to contact regarding reducing your risks to hazards in your area?

- ❑ Yes
- ❑ No

12. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?

- ❑ Newspaper
- ❑ Television
- ❑ Radio
- ❑ Internet
- ❑ Mail
- ❑ Public workshops/meetings
- ❑ School meetings
- ❑ Other (please explain): _____

13. 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?

14. 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?

15. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.

Category	Very Important	Somewhat Important	Not Important
1. Prevention Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.	❑	❑	❑
2. Property Protection Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.	❑	❑	❑
3. Natural Resource Protection Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.	❑	❑	❑
4. Structural Projects Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, detention/retention basins, channel modification, retaining walls and storm sewers.	❑	❑	❑
5. Emergency Services Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.	❑	❑	❑
6. Public Education and Awareness Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials and demonstration events.	❑	❑	❑

THANK YOU FOR YOUR PARTICIPATION!

This survey may be submitted anonymously; however, if you provide us with your name and contact information below we will have the ability to follow up with you to learn more about your ideas or concerns (optional):

Name: _____

Address: _____

_____

Phone: _____ **E-Mail:** _____

Local Capability Assessment Survey

Jurisdiction/Agency: _____ **Phone:** _____

Point of Contact: _____ **E-mail:** _____

1. PLANNING AND REGULATORY CAPABILITY - Please indicate whether the following planning or regulatory tools (plans, ordinances, codes or programs) are currently in place or under development for your jurisdiction by placing an "**X**" in the appropriate box. Then, for each particular item in place, identify the department or agency responsible for its implementation and indicate its estimated or anticipated effect on hazard loss reduction (Strongly Supports, Helps Facilitate or Hinders) with another "**X**". Finally, please provide additional comments or explanations in the space provided or with attachments.

Planning / Regulatory Tool	In Place	Under Development	Department / Agency Responsible	Effect on Loss Reduction			Comments
				Strongly Supports	Helps Facilitate	Hinders	
Hazard Mitigation Plan							
Comprehensive Land Use Plan (or General, Master or Growth Mgt. Plan)							
Floodplain Management Plan							
Open Space Management Plan (or Parks & Rec./ Greenways Plan)							
Stormwater Management Plan / Ordinance							
Natural Resource Protection Plan							
Flood Response Plan							
Emergency Operations Plan							
Continuity of Operations Plan							
Evacuation Plan							
Other Plans (please explain under Comments)							

Local Capability Assessment Survey

Planning / Regulatory Tool	In Place	Under Development	Department / Agency Responsible	Effect on Loss Reduction			Comments
				Strongly Supports	Facilitates	Hinders	
Disaster Recovery Plan							
Capital Improvements Plan							
Economic Development Plan							
Historic Preservation Plan							
Floodplain Ordinance (or Flood Damage Prevention Ordinance)							
Zoning Ordinance							
Subdivision Ordinance							
Unified Development Ordinance							
Post-disaster Redevelopment / Reconstruction Ordinance							
Building Code							
Fire Code							
National Flood Insurance Program (NFIP)							
NFIP Community Rating System (CRS Program)							

Local Capability Assessment Survey

2. ADMINISTRATIVE AND TECHNICAL CAPABILITY - Please indicate whether your jurisdiction maintains the following staff members within its current personnel resources by placing an "**X**" in the appropriate box . Then, if YES, please identify the department or agency they work under and provide any other comments you may have in the space provided or with attachments.

Staff / Personnel Resources	Yes	No	Department / Agency	Comments
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				
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 Geographic Information Systems (GIS) and/or FEMA's HAZUS program				
Resource development staff or grant writers				

Local Capability Assessment Survey

3. FISCAL CAPABILITY - Please indicate whether your jurisdiction has access to or is eligible to use the following local financial resources ***for hazard mitigation purposes*** (including as match funds for State of Federal mitigation grant funds). Then, identify the primary department or agency responsible for its administration or allocation and provide any other comments you may have in the space provided or with attachments.

Financial Resources	Yes	No	Department / Agency	Comments
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: _____				

Local Capability Assessment Survey

4. POLITICAL CAPABILITY - Political capability can be generally measured by the degree to which local political leadership is willing to enact policies and programs that reduce hazard vulnerabilities in your community, even if met with some opposition. Examples may include 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 (e.g., building codes, floodplain management, etc.). Please identify some general examples of these efforts if available and/or reference where more documentation can be found.

Local Capability Assessment Survey

5. SELF-ASSESSMENT OF CAPABILITY - Please provide an approximate measure of your jurisdiction's capability to effectively implement hazard mitigation strategies to reduce hazard vulnerabilities. Using the following table, please place an "**X**" in the box marking the most appropriate degree of capability (Limited, Moderate or High) based upon best available information and the responses provided in Sections 1-4 of this survey.

	DEGREE OF CAPABILITY		
	LIMITED	**MODERATE**	**HIGH**
Planning and Regulatory Capability			
Administrative and Technical Capability			
Fiscal Capability			
Political Capability			
OVERALL CAPABILITY			

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 e-mailed 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

The *Local Mitigation Plan Review Tool* 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 community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Clay County, Hayesville, Macon County, Franklin, Highlands	**Title of Plan:** Clay Macon Regional Hazard Mitigation Plan – 2021 Update	**Date of Plan:** DRAFT – September 2020
Local Point of Contact: Nathan Slaughter **Title:** Hazard Mitigation Department Manager **Agency:** ESP Associates	**Address:** 2200 Gateway Centre Blvd., Suite 216 Morrisville, NC 27560	
Phone Number: 919-264-9582	**E-Mail:** nslaughter@espassociates.com	

State Reviewer: **Jacazza Jones**	**Title:** **Planner, NCEM Hazard Mitigation**	**Date:** **October-November 2020; December 2020**
FEMA Reviewer: **Carl Mickalonis** Edwardine S. Marrone (QC)	**Title: FEMA MT Planning Lead** NC-FIT-Mitigation Planner	**Date: 4/26/2021** 05/26/21
Date Received in FEMA Region IV	**12/21/2020**	
Plan Not Approved		
Plan Approvable Pending Adoption	05/27/21	
Plan Approved	07/16/21	

SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. 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.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 1.3, Section 2.3, 2.4, 2.4.1, 2.5, 2.6, 2.6.1, 2.7; App. D A1a: pgs. 2.5-2.13; Appendix D A1b: pg. 1.3 A1c: pg. 2.5 A1d: Appendix D A1e: pg. 2.6	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 2.4, 2.4.1, Section 2.7; App. D A2a: 2.13, Appendix D A2b: Appendx D A2c: pg.2.13, Appendix D	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 2.6, 2.6.1; App. D A3a: 2.12-2.13; Appendix D A3b: 2.12-2.13: Appendix A	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 7 7-3, 7-4 and related subsections A4a: pgs. 7.1-7.4 A4b: pgs.7.3, 10.2	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 10.3 10-4 A5a: pgs. 10.4-10.5	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 10.1, 10.2 A6a: pgs. 10.2-10.4 A6b: pgs. 10.2-10.4 A6c: pgs. 10.2-10.4 A6d: pgs. 10.2-10.4	X	
ELEMENT A: REQUIRED REVISIONS **A1.** NCEM 1st review: Town of Hayesville has no representative listed in Table 2.2. There are also two tables labeled Table 2.1 and 2.2, respectively. ESP Response: Added representative from Hayesville and corrected duplicated table numbering. **A1.** NCEM 2nd review: Contractor's revisions accepted as meeting criteria **A2.** NCEM 1st review: no revisions identified			
A3. NCEM 1st review: no revisions identified **A4.** NCEM 1st review: no revisions identified **A5.** NCEM 1st review: no revisions identified **A6.** NCEM 1st review: no revisions identified			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 4; Section 5 and all subsections B1a: Section 5 B1b: Pages 4.1, 4.5—4.6 B1c: Section 5, Appendix H B1d: N/A	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 5 and all relevant subsections; Appendix H B2a: 4.3—4.4, Section 5, Appendix H B2b: Section 5 B2c: Section 5, Appendix H	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 5; Section 6 and relevant subsections B3a: Section 5 and Section 6 B3b: Section 5 and Section 6	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 5.10.5 Page 5.49	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met

ELEMENT B: REQUIRED REVISIONS

B1. Infectious Disease listed twice in Hazard Identification table {Table 4.5; page 4:17 (pg 44 of PDF)}. Topography referenced twice in first sentence of third paragraph under erosion {Section 5.8.1; page 5:34 (PDF 77)}.
ESP Response: Corrected.

Floodplain Area Summary table 5.26 {page 5:44; PDF page 87} incorrectly totals the 500-year area – 26.2 vs 27.2 total miles in the Clay/Macon Region. This figure will also have to be updated in the preceding sentence that references the table.
ESP Response: Corrected.

B1. NCEM 2nd review: Contractor's revisions accepted as meeting criteria

B2. 'Exceptional Drought' and 'Extreme Drought' mis colored for 2016 & 2017 {ref: Table 5.5; page 5:9 (page 52 of PDF)}. Can sentences 3 and 4 in 5.3.4 be combined {i.e. 'However, historical information *and reports* also indicate that there is a much lower probability…'?} unless they're actually supposed to be written as conflicting statements.
ESP Response: Corrected.

Storm Categories ranging from 20 to 55 is confusing; are these relative or comparable to the Saffir-Simpson Scale? {Ref: Table 5.8; page 5:13 and 14 (page 56 and 57 of PDF)}. Tropical Storm typed as "Florence" instead of 'Frances' {Table 5.9; page 5:14 (page 57 of PDF)}.
ESP Response: Corrected.

Font changes size in 5.5.4 under Hailstorms.
ESP Response: Corrected.

No damage estimates included in Table 5.23 of landslide occurrences {page 5:38; 81 of PDF}.
ESP Response: Corrected.

Appears to be discrepancy in NFIP claims payments in Table 5.29 for Clay County {page 5.49; 92 of PDF}. Is there an explanation available from the source data?
ESP Response: Corrected table.

B2. NCEM 2nd review: Contractor's revisions accepted as meeting criteria

B3. Critical Facilities (i.e. County Fire & Rescue Departments and EMS Stations) listed in duplicate in Vulnerability Assessment table {table 6.25 pages 6:27-32; (PDF 149-154)}.
ESP Response: Removed duplicates.

B3. NCEM 2nd review: Contractor's revisions accepted as meeting criteria

B4. NCEM 1st review: no revisions identified

***Sub-Elements B1-B3 reviewed and noted on Hazard Profile tab of supplemental Excel spreadsheet. Each hazard feature {extent, previous occurrences, probability and impact} deemed as 'met'. JLJ**

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 7 and all relevant subsections 7.1—7.14	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 5.10.3 Section 7.3.4 7.4, 7.9, 7.11, 9.4, 9.14, 9.25	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 8.2 C3a: 8.4 C3b: 8.4	X	
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 §201.6(c)(3)(ii))	Section 8.3-8.4; Section 9.2 C4a: 9.1—9.32 C4b: 9.1—9.32 C4c: 9.1—9.32	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 8.1.1; Section 9.2 C5a: 8.2 C5b: 8.2—8.3; 9.3—9.32 C5c: 9.3—9.32	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 10.1 C6a: 10.2 C6b: 10.1 C6c: 10.2 C6d: 10.2 C6e: 10.2	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
ELEMENT C: REQUIRED REVISIONS **C1.** NCEM 1st review: no revisions identified **C2.** NFIP specifically mentioned in §5.10.4 and 10.5 vs 5.10.3 {the coordinating location provided by the PRT}. Table of flood loss totals incorrectly referenced on page 5:48 {bottom of page 91 of the PDF} as Table 5.28 vs 5.29. Statement regarding CRS participation, referencing total active NFIP policies {top bullet on PDF page 165; draft page 7:11} states: "*The program would be most beneficial to Macon County and Clay County, which have 167 and 125 NFIP policies, respectively.*" These policy numbers are from the previous RHMP draft, have they not increased in the previous 5 years? ESP Response: Table of flood loss totals corrected. Corrected/updated reference to number of flood insurance policies in Macon and Clay Counties. **C2.** NCEM 2nd review: Contractor's revisions accepted as meeting criteria **C3.** 'Clay' misspelled as 'Cay' in first paragraph of Mitigation Goals {§8.2 page 8:3; PDF 173} . Same section also mentions previous two mitigation plans and later, the previous *four* mitigation plans – please clarify. ESP Response: Corrected and revised wording of that entire section. **C3.** NCEM 2nd review: Contractor's revisions accepted as meeting criteria **C4.** The words: "the action" appear twice in the bullet describing the *Implementation Schedule* element of the Mitigation Action Plan {Section 9.1; page 9:1; PDF 179}. ESP Response: Corrected Mitigation Action P-12 for the Town of Hayesville doesn't include Hazard Addressed. ESP Response: Corrected **C4.** NCEM 2nd review: Contractor's revisions accepted as meeting criteria **C5.** §8.1.1 references the previous RHMP draft rather than the current – "*Therefore, for the 2015 Clay Macon Regional plan, the Regional Hazard Mitigation Planning Team members were tasked with establishing a priority for each action at the second Planning Team meeting.*" ESP Response: Corrected **C5.** NCEM 2nd review: Contractor's revisions accepted as meeting criteria **C6.** NCEM 1st review: no revisions identified **Sub-Element C4 reviewed and noted on Mitigation Actions tab of supplemental Excel spreadsheet. Each participating jurisdiction deemed to have 'met' required number of actions. JLJ**			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 3.3.3 Pg. 6.9	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 9, Appendix E 9.3—9.32	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 8.5 8.5; 9.3--9.32	X	

ELEMENT D: REQUIRED REVISIONS

D1. NCEM 1st review: no revisions identified

D2. NCEM 1st review: no revisions identified

D3. NCEM 1st review: no revisions identified

ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Pending NCEM and FEMA review and APA status.		X
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Pending NCEM and FEMA review and APA status.		X

ELEMENT E: REQUIRED REVISIONS

E1: No adoption documentation included. Per the FEMA Local Plan Review Guide, "the plan must include documentation of plan adoption, usually a resolution by the governing body or other authority" (pg.28).

E2: No participating jurisdiction has adopted the plan. Per the FEMA Local Plan Review Guide, "Each jurisdiction that is included in the plan must have its governing body adopt the plan prior to FEMA approval, even when a regional agency has the authority to prepare such plans" (pg.29).

7/16/21 Town of Franklin provided adoption documentation.

7/23/21 Macon Co provided adoption documentation.

10/4/21 Adoption documentation was provided by the following:

- Clay County
- Town of Highlands

05/03/22 Adoption documentation was provided by the Town of Hayesville.

ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or	Met	Not Met
ELEMENT F: REQUIRED REVISIONS Please include a broad statement explaining that blank cells in data tables throughout the plan indicates there's no current data available {ref: tables 7.1 and 7.4 of Capability Assessment as examples} or incorporate a "null" symbol such as '-' indicating a particular component does not apply to the respective community. ESP Response: Added note in Section 7 NCEM 2nd review: Contractor's additions accepted as meeting suggested revision Statement regarding NC ISAC seems to be incomplete under Historical Occurrences of Cyber events. Ref: Section 5.16.3; draft page 5:69; PDF page 112. ESP Response: Revised wording NCEM 2nd review: Contractor's additions accepted as meeting suggested revision			

SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

The plan does a good job of documenting how they met each element in each section, per the CFR requirement. For example, per 44 CFR 201.6(b)(1) and 201.6(c)(1), the plan must document how the public was involved in the planning process during the drafting stage. In this plan, there is a particular section corresponding to this requirement, with a detailed explanation of how this requirement was met. It's commendable in this Regional Plan that the process included utilities, DOT, and the Health Department; these could be useful partners in mitigation and provide useful information in plan and project development.

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*

- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

The plan's risk assessment is detailed explaining and clearly justifying why certain hazards were chosen for profiling. Some required elements were easily met, like previous occurrences in Appendix H.

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

The plan uses a table that's clear regarding what the mitigation action is, what priority it is, hazard it addresses, who will pay for it, and the status. Graphing the actions like this will allow the community to see how the actions correspond to their planning efforts, and able to come up with projects for HMA funding when the opportunity arises. In the Capability Assessment, there are many tables showing the planning tools where the HMP can be incorporated. Like the Mitigation Actions, listing the tools out is a great way to show the community how the plan can be integrated into existing mechanisms for increased risk reduction.

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*

- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

The description of the changes in development that have occurred in hazard-prone areas relative to increase or decrease in vulnerability can be improved by explicitly mentioning specifics. For example, completed acquisition mitigation projects that decreased vulnerability may be included in the description. How has the development impacted risk to the identified hazards? Has it remained the same because of strong land use planning mechanisms?

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

Many items in the Mitigation Strategy were funding-dependent; however, some community planning tools like buffers, zoning, stronger building codes, "Smart Growth" principles, and stricter floodplain management may be able to be implemented without much funding. FEMA does offer much guidance regarding building codes. The EPA's Regional Resiliency Toolkit can be a resource to increase community resilience.

Smart Growth: https://www.epa.gov/smartgrowth/smart-growth-illustrated

Building Codes: Building Codes Save: A Nationwide Study of Loss Prevention | FEMA.gov

Regional Resiliency Toolkit: Regional Resilience Toolkit | Smart Growth | US EPA

SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1	Clay County	County					Y	Y	Y	Y	Y	
2	Hayesville	Town					Y	Y	Y	Y	Y	
3	Macon County	County					Y	Y	Y	Y	Y	
4	Franklin	Town					Y	Y	Y	Y	Y	
5	Highlands	Town					Y	Y	Y	Y	Y	

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

AGENDA

Clay Macon Regional Hazard Mitigation Plan Update
Project Kickoff Meeting
October 29, 2019
10:00 AM – Noon

1) **Introductions**

2) **Mitigation Refresher**

3) **Icebreaker Exercise**

4) **Project Overview**
   a) Key Objectives
   b) Project Tasks
   c) Project Schedule

5) **Roles & Responsibilities**
   a) ESP Associates
   b) County Leads
   c) Participating Jurisdictions/Stakeholders

6) **Next Steps**
   a) Initiate data collection efforts
   b) Begin public outreach
   c) Discuss next Hazard Mitigation Planning Team meeting

7) **Questions, Issues or Concerns**

AGENDA

Clay Macon Regional Hazard Mitigation Plan
Mitigation Strategy Workshop
August 18, 2020
10:00AM - Noon

1) Introductions

2) Mitigation Recap

3) Project Schedule

4) Risk Assessment Findings

a) **Hazard Identification**
b) **Hazard Profiles**
c) **Hazard Vulnerability Assessment**

5) Capability Assessment Findings

6) Mitigation Strategy

7) Summary of Public Involvement

8) Plan Maintenance

9) Next Steps

Clay Macon Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

October 29, 2019

10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
Dakota Ingram	Clay County Water & Sewer	Hayesville, NC	828-389-1361	dakotaclayco@gmail.com
Anthony Stillwell	Clay County Building Dept + Flood Plain Management	Hayesville, NC	828-389-0974	astillwell@claync.us
Ricky Lancaster	Clay County Emergency Management	Hayesville NC	828-361-1120	rlancaster@claync.us
Brittany Wingate	Clay County Em Assistant	Hayesville NC	828-360-2985	bwingate@claync.us
Mark Hill	NCDOT - Maintenance Macon / Clay	Franklin, NC Hayesville, NC	828-524-2517 828-389-8532	mehill3@ncdot.gov
Brian Burch	NCDOT - Div 14	Sylva, NC	828-586-2141 828-226-1777	brianburch@ncdot.gov
Amber Jones	Clay Co Env Health/ Health Department	Hayesville, NC	828-389-8326 personal - 706 781 9956	amberjones@clayhdnc.us
Justin Setser	Town of Franklin	Franklin, NC	828-524-2516 X 311	jsetser@franklinnc.com

Clay Macon Regional Hazard Mitigation Plan Update
Project Kickoff Meeting

October 29, 2019

10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
Warren Cabe	Macon County EM	Franklin NC	828 349 2067	wcabe@maconnc.org
Travis Waldroop	Macon Co. Fire Services	Franklin NC	828 349-2067	twaldroop@maconnc.org
Todd Seagle	Macon Co EM	Franklin NC	828-349-2067	tseagle@maconnc.org
Jeff Gregory	Macon Co NCDOT	Franklin NC	828-524-2517	
Charles Markey	Clay Co NCDOT	Hayesville NC.	828-389-8552	
Stephanie Johnson	Clay Co. P.H. Disaster Preparedness	Hayesville NC	828 389 6052	stephanie.johnson@clay#1nc.us

Clay Macon Regional Hazard Mitigation Plan

Mitigation Strategy Meeting 8/18/20 Online Microsoft Teams Meeting Attendance List

Full Name	User Action	Timestamp
Nathan Slaughter	Joined	8/18/2020, 9:53:30 AM
Hill, Mark E	Joined	8/18/2020, 9:55:45 AM
Justin Setser (Guest)	Joined	8/18/2020, 9:57:32 AM
Justin Setser (Guest)	Left	8/18/2020, 9:57:37 AM
Justin Setser (Guest)	Joined	8/18/2020, 9:57:37 AM
Baker, Carl	Joined	8/18/2020, 9:58:05 AM
Warren (Guest)	Joined	8/18/2020, 9:59:05 AM
Warren (Guest)	Left	8/18/2020, 11:21:35 AM

Neighboring Jurisdictions for the Clay Macon Region

Jurisdiction	Name	Title	Email
Jackson County	Todd Dillard	EM Director	todddillard@jacksonnc.org
Swain County	David Breedlove	EM Director	davidb@swaincountync.gov
Graham County	Larry Hembree	EM Director	larry.hembree@grahamcounty.org
Cherokee County	Robin Caldwell	EM Director	robin.caldwell@cherokeecounty-nc.gov
Rabun County	Micahel Mazarky	EM Director	Michael.Mazarky@rabuncounty.ga.gov
	L. Neely	Planning	lneely@rabuncounty.ga.gov
Towns County	Brandon Wall	EM Director	ema@townscountyga.com
Union County	David Dyer	EM Director	ucfd@uniongov.com
		Building and Development Dept	ucpermit@uniongov.com

Nathan Slaughter

From: Nathan Slaughter
Sent: Monday, September 21, 2020 12:37 PM
To: todddillard@jacksonnc.org; davidb@swaincountync.gov; larry.hembree@grahamcounty.org; robin.caldwell@cherokeecounty-nc.gov; Michael.Mazarky@rabuncounty.ga.gov; lneely@rabuncounty.ga.gov; ema@townscountyga.com; ucfd@uniongov.com; ucpermit@uniongov.com; skrein@oconeesc.com; communitydevelopmentinfo@oconeesc.com
Subject: NOTIFICATION: Clay Macon Regional Hazard Mitigation Plan

Importance: Low

Good afternoon

You are receiving this email because a neighboring County (Clay and Macon County NC), along with the municipalities within those counties and other participating partners, are now working to update the region's multi-jurisdictional *Regional Hazard Mitigation Plan* as required by the Federal Emergency Management Agency (FEMA). The purpose of this plan is to identify and assess the region's hazard risks and determine strategies for how to best minimize or manage those risks. Upon completion, the plan will represent a comprehensive multi-jurisdictional *Hazard Mitigation Plan* for the two-county region.

You are being notified of this planning process for two purposes:

1. FEMA requires that **neighboring jurisdictions** be provided an opportunity to be involved in the planning process.

2. You may want to contribute information to these jurisdictions to consider as they update their hazard mitigation plan.

I serve as the Project Manager for the update of the plan. Please let me know if you would like to contribute information, be invited to any upcoming meetings in the development of the plan or if you would like to receive a copy of the draft plan.

Should you have any questions about the *Clay Macon Regional Hazard Mitigation Plan*, please do not hesitate to contact me. Thank you for your time!

Nathan Slaughter, AICP, CFM
Department Manager – Hazard Mitigation
ESP Associates, Inc.
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Morrisville, NC 27560
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919.678.1070 | Office
919.244.9536 | Cell

MACON COUNTY

Franklin ▪ Highlands ▪ Nantahala ▪ Otto, NORTH CAROLINA

Tuesday, November 5, 2019

Google Custom Search | Search

HOME | Your Government | County Agencies | Public Safety | Online Services | For Residents | For Businesses | For Visitors | Public Announcements

MOST POPULAR RESOURCES

DIRECTORY

DSS

SENIOR SERVICES

TAX & MAPPING

GIS mapping

Public Health

EMPLOYEE EMAIL

Advisory Boards & Committees

Commissioner Videos

Welcome to the Official Website of Macon County, North Carolina.

As one of the fastest growing counties in North Carolina, **Macon County** strives to serve our citizens, business community and those visiting the area with the most up-to-date resources possible. Macon County Government is dedicated to continually seeking ways to improve the services we provide to our community. Our website is one of those services.

This **online portal to Macon County North Carolina Government** will allow you to learn more about our agencies, download an official form, search for map, open a business or visit us, it's all here at MaconNC.org.

Use the menu at the top of the page to browse through the many resources provided. Our most popular links are located to the left and provide you a quick way to navigate to these services and resources.

Thank you for visiting and come back soon as the content of this website is updated often.

US Census Bureau

United States Census

Clay and Macon Counties, along with other participating stakeholders, are now working to update the region's multi-jurisdictional Hazard Mitigation Plan. The purpose of this Plan is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks. Upon completion, the Plan will represent a comprehensive multi-jurisdictional Hazard Mitigation Plan for the two-county region.

This survey questionnaire provides an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impact of future hazard events.

Click for Hazard Mitigation Survey

There are many downloadable resources on our site that require Adobe Acrobat Reader. If you need this program, click here for a free download.

Medicaid is changing in North Carolina. Cick this link to learn more about NC Medicaid Managed Care.

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@MaconCo911

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Macon County North Carolina 911
October 31 at 3:17 PM ·

We need your help!

Clay and Macon Counties, along with other participating stakeholders, are now working to update the region's multi-jurisdictional Hazard Mitigation Plan. The purpose of this Plan is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks. Upon completion, the Plan will represent a comprehensive multi-jurisdictional Hazard Mitigation Plan for the two-county region.

This survey questionnaire ... See More

S.SURVEYPLANET.COM
Clay Macon Regional Hazard Mitigation Plan - Public Survey

5.0 **5 out of 5** · Based on the opinion of 6 people

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Page created - August 9, 2017

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We need your help! Please take a few moments to complete a brief online survey below to help us identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks:
https://s.surveyplanet.com/Cov0VHPST
1988 CLAY COUNTY LIONS CLUB

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Clay County Health Department
October 31 at 11:05 AM ·

We need your help! Please take a few moments to complete a brief online survey below to help us identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks: https://s.surveyplanet.com/Cov0VHPST
We appreciate your time! Thank you for helping us prepare our Hazard Mitigation Plan!
Clay and Macon Counties, the Towns of Franklin, Hayesville and Highlands, along with other participating stakeholders, are now working to update the region's multi-jurisdictional Hazard Mitigation Plan. The purpose of this Plan is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks. Upon completion, the Plan will represent a comprehensive multi-jurisdictional Hazard Mitigation Plan for the two-county region.

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Clay Macon Regional Hazard Mitigation Plan - Public Survey

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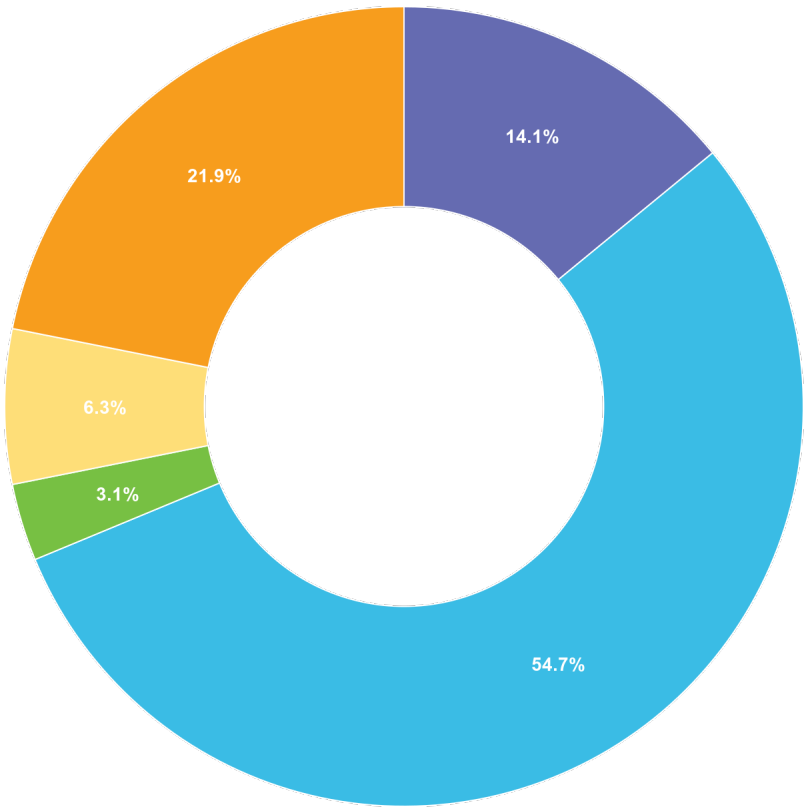
Clay Macon Regional Hazard Mitigation Plan - Public Survey

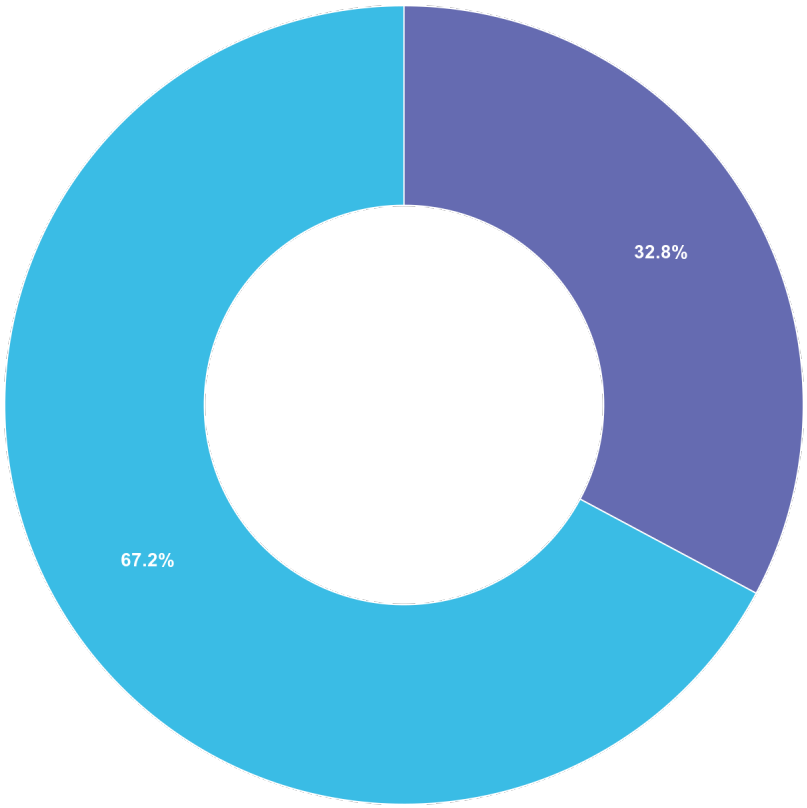
Q1 1\. Where do you live?*



Answered: 64 **Unanswered:** 0

Choice	Total
Hayesville	9
Franklin	35
Highlands	2
Unincorporated Clay County	4
Unincorporated Macon County	14

Q2 2\. Have you ever experienced or been impacted by a disaster in Clay or Macon County?*



Answered: 64 **Unanswered:** 0

	Choice	Total
●	Yes	21
●	No	43

Q3 3\. If "Yes," please explain.

Wednesday, April 15, 2020, 9:20 PM UTC

The day Duke Energy opened the dam gates with no warning to anyone and it washed out the road, trapped people along the roads below the Dam and caused extensive damage to the bridges.

Wednesday, April 1, 2020, 5:23 PM UTC

Peeks Creek

Sunday, March 22, 2020, 10:46 PM UTC

Was hired then next day go in with what they needed to finish they told me they can't

---

Friday, March 20, 2020, 7:55 PM UTC

Recently, the COVID-19, just the panic and shut down of business. My brother lost his job of 20 years

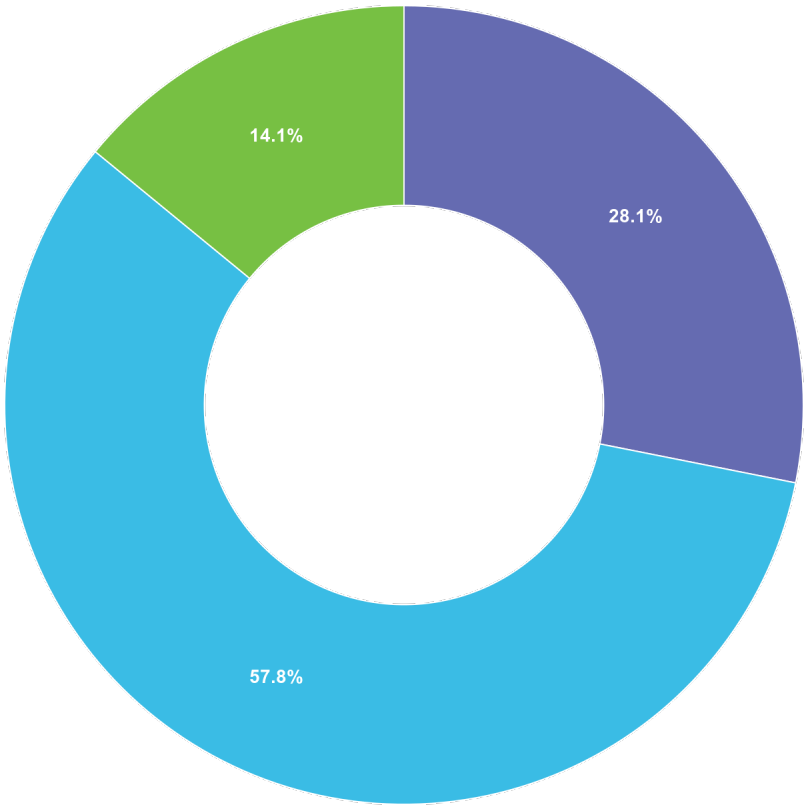
---

Wednesday, March 18, 2020, 6:20 PM UTC

1993 blizzard. Snowed in for a week.

Answered: 17 **Unanswered:** 47

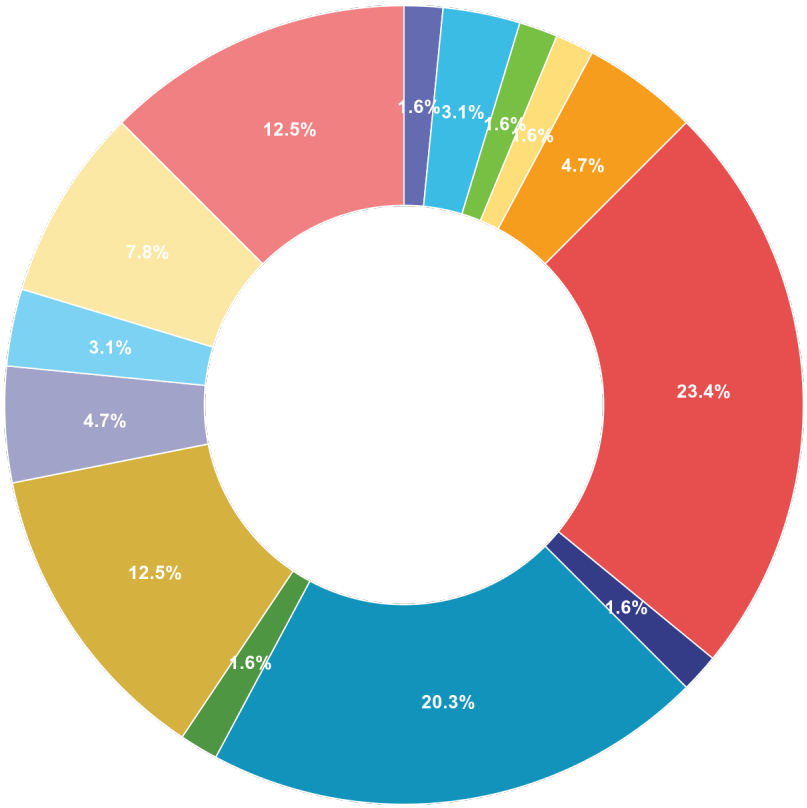
Q4 4\. How concerned are you about the possibility of your community being impacted by a disaster?*



Answered: 64 **Unanswered:** 0

	Choice	Total
	Extremely concerned	18
	Somehwat concerned	37
	Not concerned	9

Q5 5\. Please select the **one** hazard you think is the highest threat to your neighborhood:*

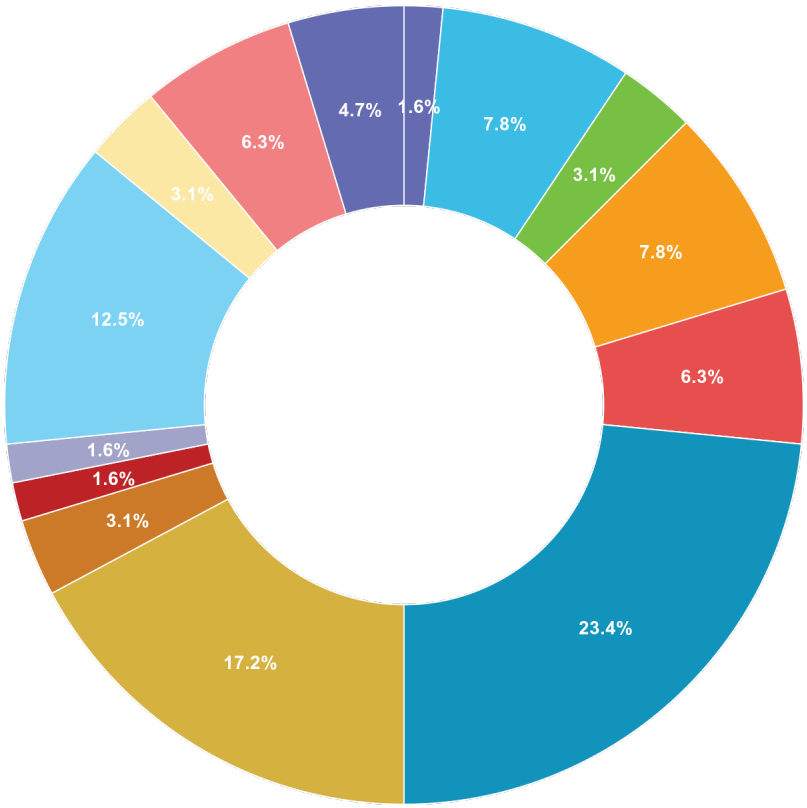


Answered: 64 **Unanswered:** 0

	Choice	Total
	Cyber Attack	1
	Drought	2
	Electromagnetic Pulse (EMP)	1
	Excessive Heat	1
	Hazardous Substances	3
	Infectious Disease	15
	Lightning	1
	Severe Thunderstorms/High Winds	13
	Terrorism	1
	Wildfire	8

Choice	Total
Dam Failure	0
Earthquakes	0
Erosion	3
Flooding	2
Hurricane and Coastal Hazards	0
Landslides	5
Radiological Emergency	0
Severe Winter Weather	8
Tornadoes	0

Q6 6\. Please select the **one** hazard you think is the second highest threat to your neighborhood:*



Answered: 64 **Unanswered:** 0

	Choice	Total
	Cyber Attack	1
	Drought	5
	Electromagnetic Pulse (EMP)	2
	Excessive Heat	0
	Hazardous Substances	5
	Infectious Disease	4
	Lightning	0
	Severe Thunderstorms/High Winds	15
	Terrorism	0
	Wildfire	11

Choice	Total
Dam Failure	2
Earthquake	1
Erosion	1
Flooding	8
huricane and Coastal Hazards	0
Landslides	2
Radiological Emergency	0
Severe Winter Weather	4
Tornado	3

Q7 7\. Are there any other hazards that you feel pose a wide-scale threat to your community? If so, please explain:

Saturday, August 15, 2020, 11:55 PM UTC

excessive speeds on winding roads

Wednesday, August 12, 2020, 1:15 AM UTC

eruption of yellowstone super volcano

Monday, July 13, 2020, 1:33 PM UTC

landslides

Friday, May 1, 2020, 7:56 PM UTC

I live in the county 13 miles from the town. of Franklin my concern is the lack of current information via the web.
and the lack of control of visitors to the county since the declare of emergency the has been a influx out of state
plates with no way of knowing if the ones I see have any reason for being here

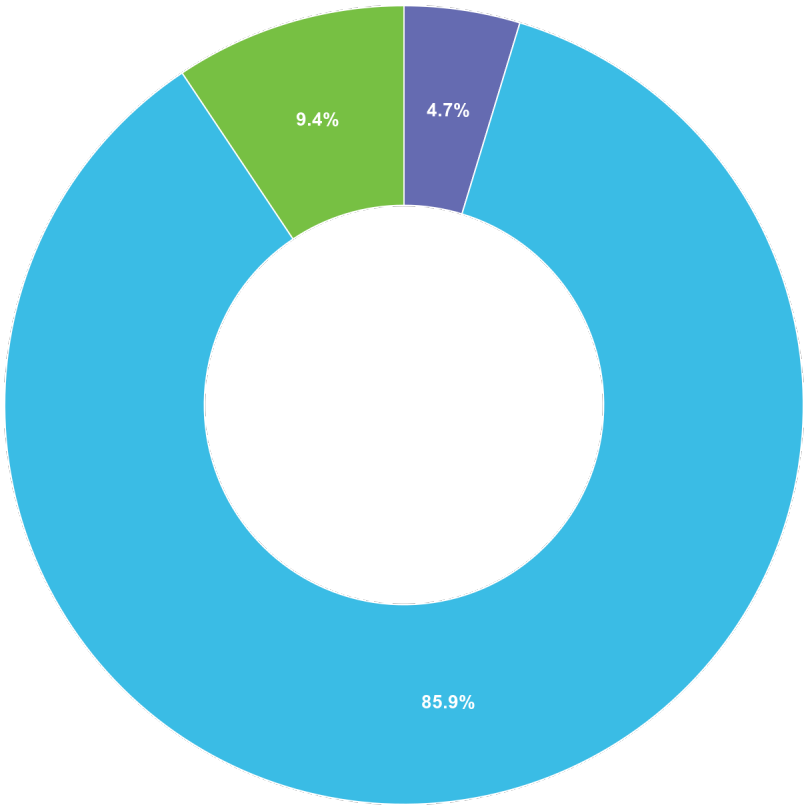
---

Thursday, April 23, 2020, 12:27 PM UTC

Natural pandemics

Answered: 28 **Unanswered:** 36

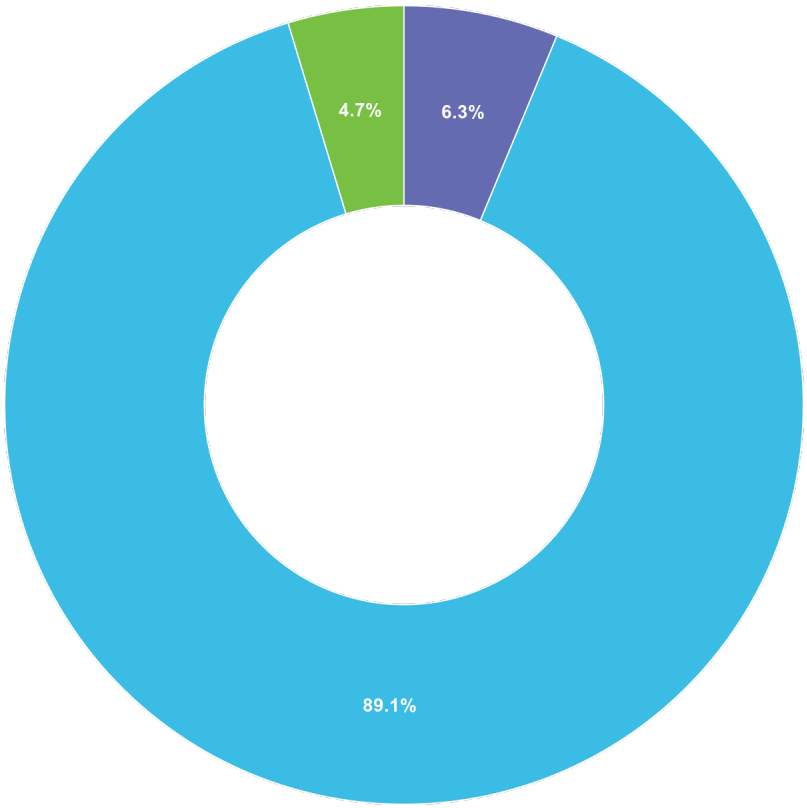
Q8 8\. Is your home located in a floodplain?*



Answered: 64 **Unanswered:** 0

	Choice	Total
●	Yes	3
●	No	55
●	I'm not sure	6

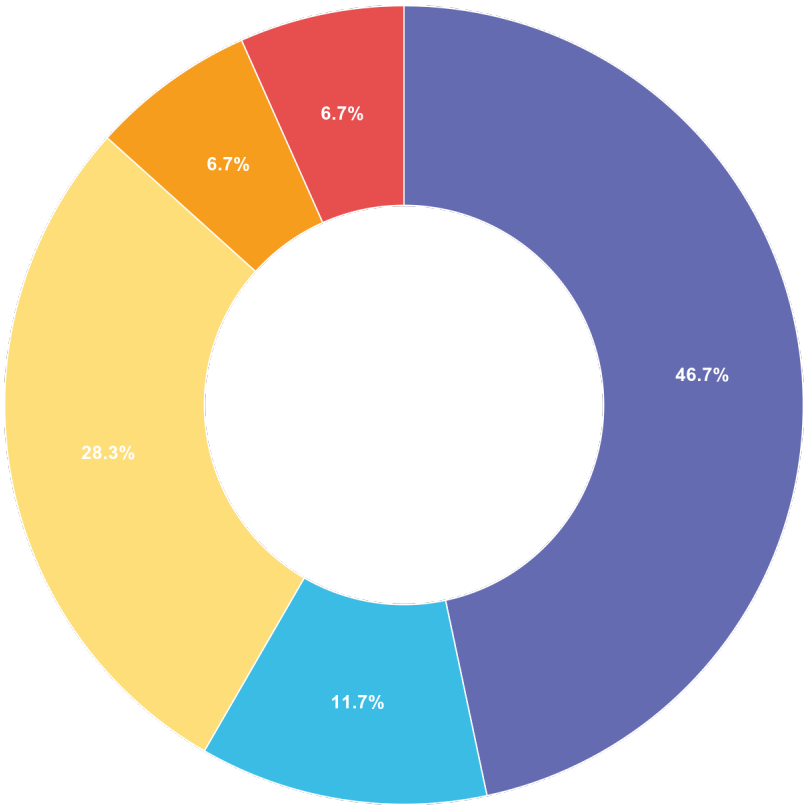
Q9 9\. Do you have flood insurance?*



Answered: 64 **Unanswered:** 0

	Choice	Total
●	Yes	4
●	No	57
●	I'm not sure	3

Q10 10\. If you do not have flood insurance, why not?



Answered: 60 **Unanswered:** 4

Choice	Total
Not located in floodplain	28
Too expensive	7
Not necessary because it never floods	0
Not necessary becasue I am elevated or otherwise protected	17
Never really considered it	4
Other	4

Q11 11\. If "Other," please explain:

Friday, February 7, 2020, 4:34 PM UTC

According to FEMA maps, i'm in the floodplain, but according to licensed NC surveyors, I am not. But, the maps are law in Macon County. This is one reason I don't support restrictive legislation on landowners, because sometimes the data used is incorrect and the landowner cannot do anything about it. County regulators, unfortunately, seem to be content having an adversarial relationship with landowners.

Wednesday, January 29, 2020, 9:51 PM UTC

rent home

Saturday, December 14, 2019, 2:09 AM UTC

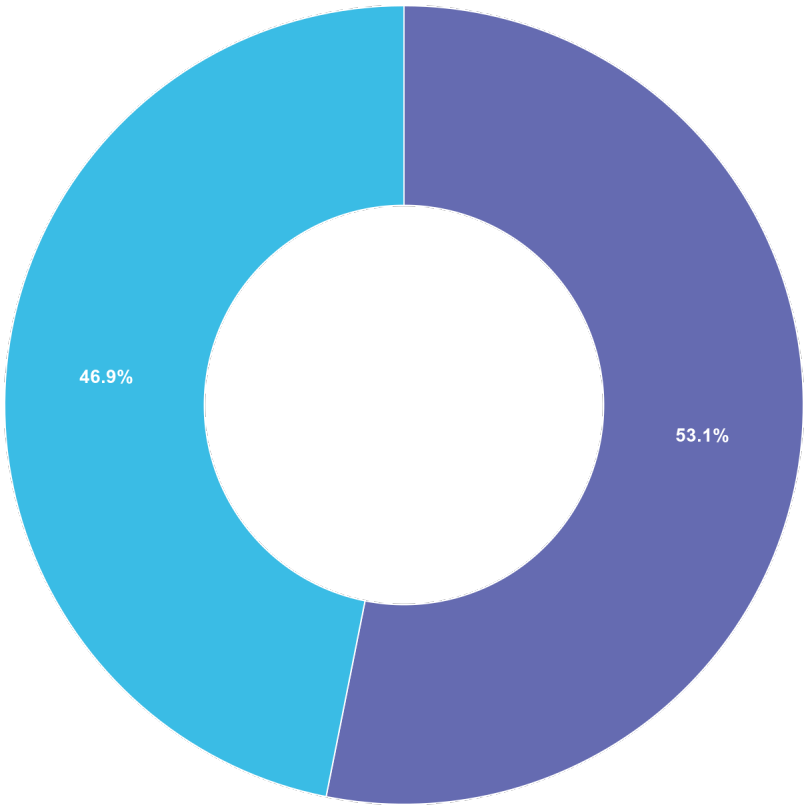
Flood maps are incorrect

Wednesday, November 6, 2019, 1:41 PM UTC

I am not in flood area

Answered: 4 **Unanswered:** 60

Q12 12\. Have you taken any steps to make your home or neighborhood more resistant to hazards?*



Answered: 64 **Unanswered:** 0

	Choice	Total
●	Yes	34
●	No	30

Q13 13\. If "Yes," please explain:

Wednesday, August 12, 2020, 1:15 AM UTC

our friend, curtis griffith, dug out the trench next to the house to allow water to flow in a heavy rain.

Friday, May 1, 2020, 7:56 PM UTC

cutting back limbs to close to my house

Thursday, April 23, 2020, 12:27 PM UTC

Removal of dangerous jack pines. Minimizing soil erosion.

Wednesday, April 15, 2020, 9:20 PM UTC

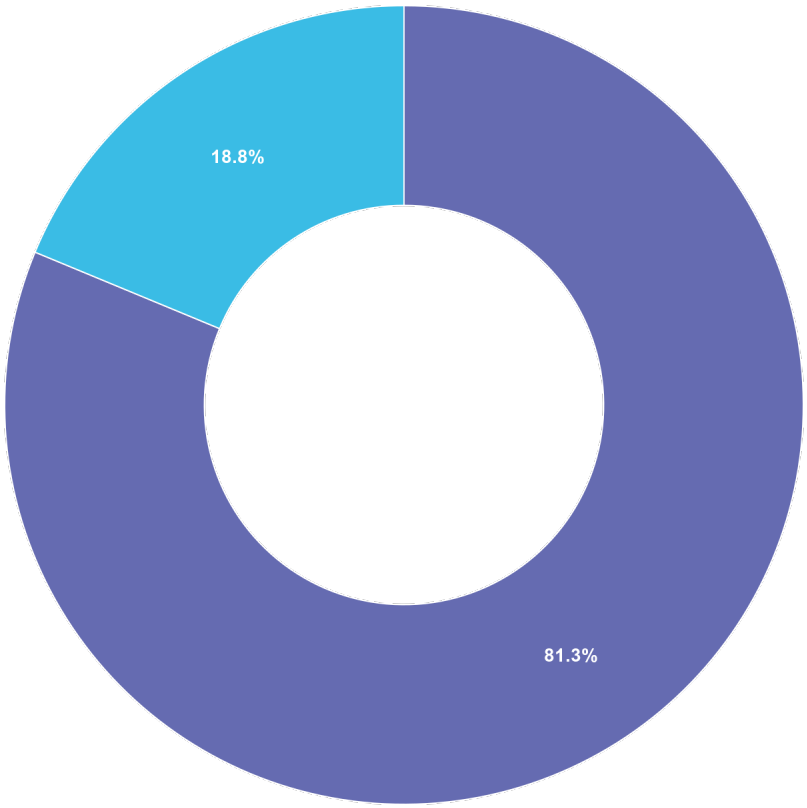
Steel Foundation and elevation

Monday, March 30, 2020, 7:37 PM UTC

Trimming or removing trees that would be high risk during windstorms (ie pines that are overhanging the house)

Answered: 25 **Unanswered:** 39

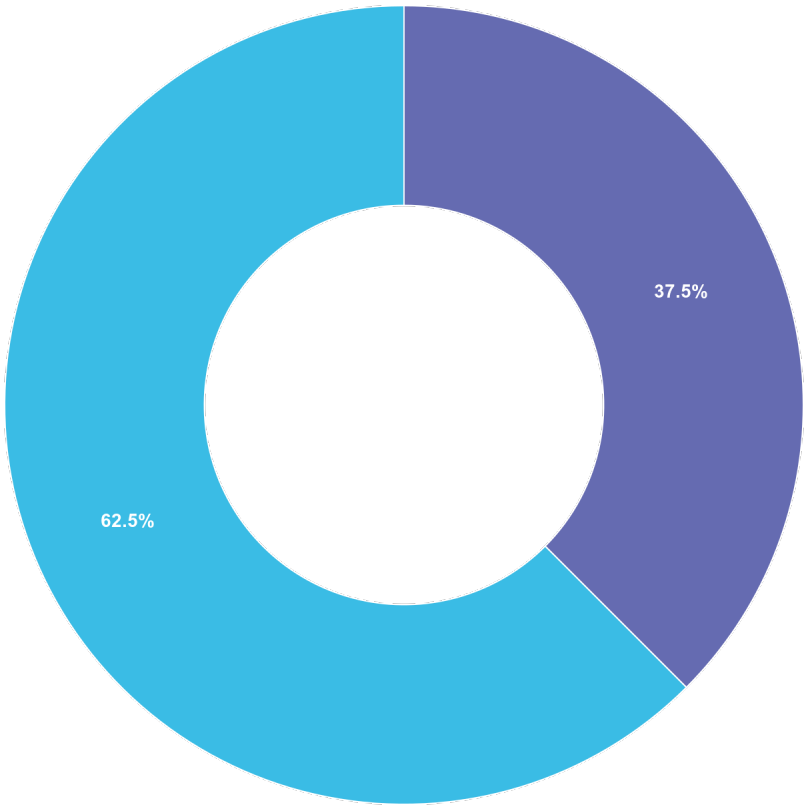
Q14 14\. Are you interested in making your home or neighborhood more resistant to hazards?*



Answered: 64 **Unanswered:** 0

	Choice	Total
●	Yes	52
●	No	12

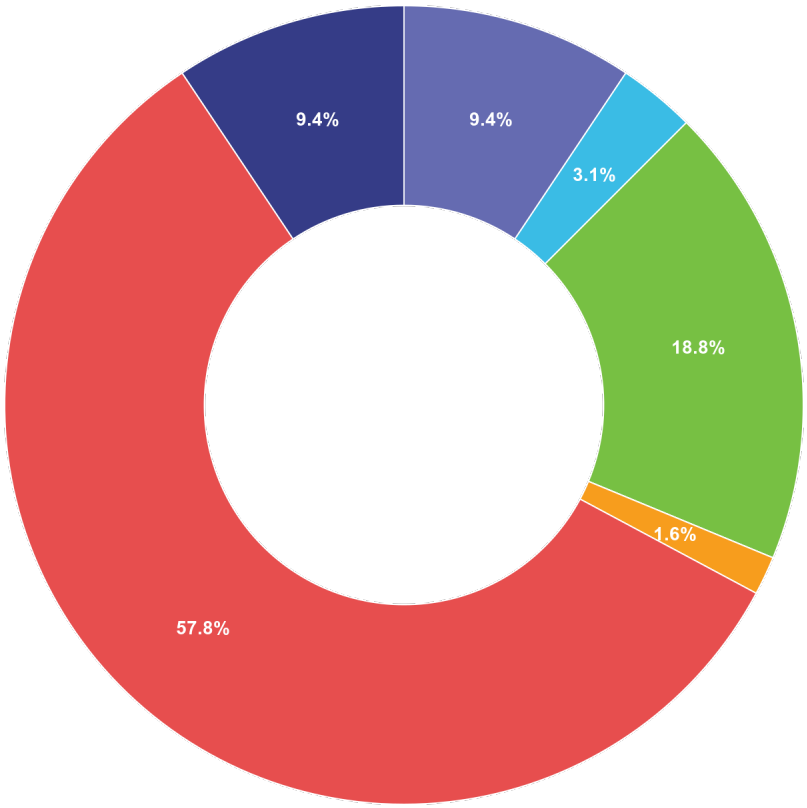
Q15 15\. Do you know what office to contact to find out more information about how to reduce your risks to hazards in your area?*



Answered: 64 **Unanswered:** 0

	Choice	Total
●	Yes	24
●	No	40

Q16 16\. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?*



Answered: 64 **Unanswered:** 0

	Choice	Total
	Newspaper	6
	Radio	2
	Mail	12
	School Meetings	0
	Television	1
	Internet (including social media)	37
	Public Workshops/Meetings	6

Q17 17\. Are there any other ways you prefer to receive information? If so, please explain:

Wednesday, May 27, 2020, 1:23 AM UTC

Newspaper or email.

Friday, May 1, 2020, 7:56 PM UTC

none i know of

Wednesday, April 1, 2020, 5:23 PM UTC

No

Sunday, March 22, 2020, 10:46 PM UTC

News

Wednesday, March 18, 2020, 6:20 PM UTC

Phone

Answered: 19 **Unanswered:** 45

Q18 18\. 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?

Saturday, August 15, 2020, 11:55 PM UTC

speed control on the roads.

Wednesday, August 12, 2020, 1:15 AM UTC

i simply do not know

Wednesday, May 27, 2020, 1:23 AM UTC

Landslide mapping overlay on county GIS map.

Friday, May 1, 2020, 7:56 PM UTC

better control of the Amount of construction and heavy truck transit in and out.

Thursday, April 23, 2020, 12:27 PM UTC

Assemble experts for assesing the problem areas and addressing the potential hazards in a timely fashion. Disseminate correct and consistant information to residents, to help keep people safe.

Answered: 39 **Unanswered:** 25

Q19 19\. 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:

Wednesday, August 12, 2020, 1:15 AM UTC

again have no idea

Friday, May 1, 2020, 7:56 PM UTC

I live on ledford branch road trucks and cars run at speeds of over 20 mph were 25 is a little to high.

Thursday, April 23, 2020, 12:27 PM UTC

Yes. Addressing the current pandemic of April 23, 2020, I am concerned about the boarders of western NC with GA. Macon county is second homes and vacation spots to Georgians. How can we expect to be safe with potential influx, who don't have to be tested? How will you track self quarrentined Gaorgians?

Wednesday, April 1, 2020, 5:23 PM UTC

Citizen Awareness

Training

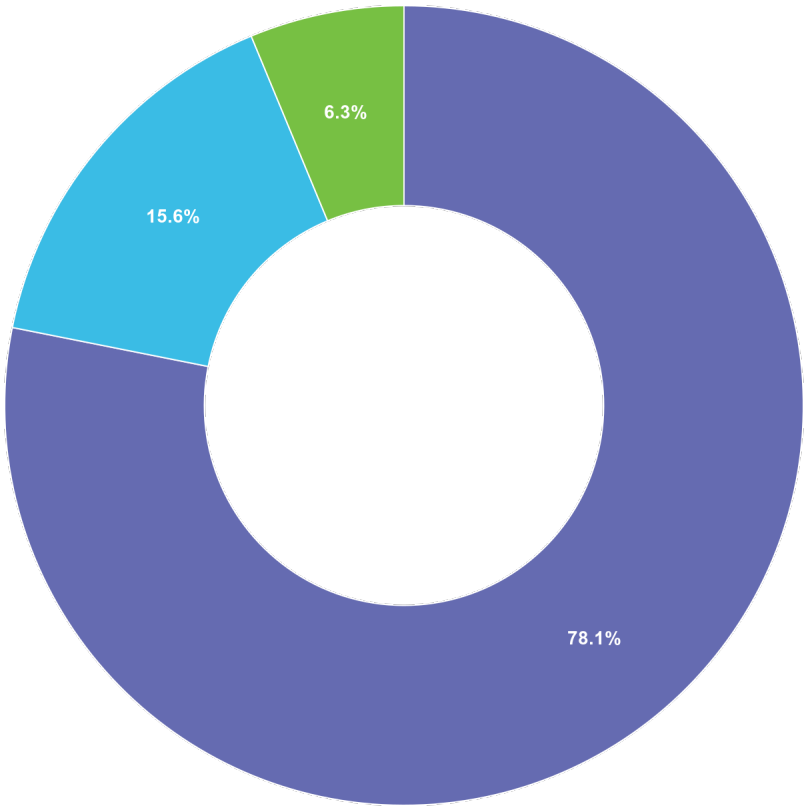
Wednesday, March 18, 2020, 6:20 PM UTC

More surveillance of flood risk with some proactive measures taken. For example, cut down trees by the river that show a potential to fall during high winds or flooding.

Answered: 16 **Unanswered:** 48

Q20 A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. In the next six questions, please tell us how important you think each one is for your community to consider pursuing.

20\. **Prevention** - Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.*

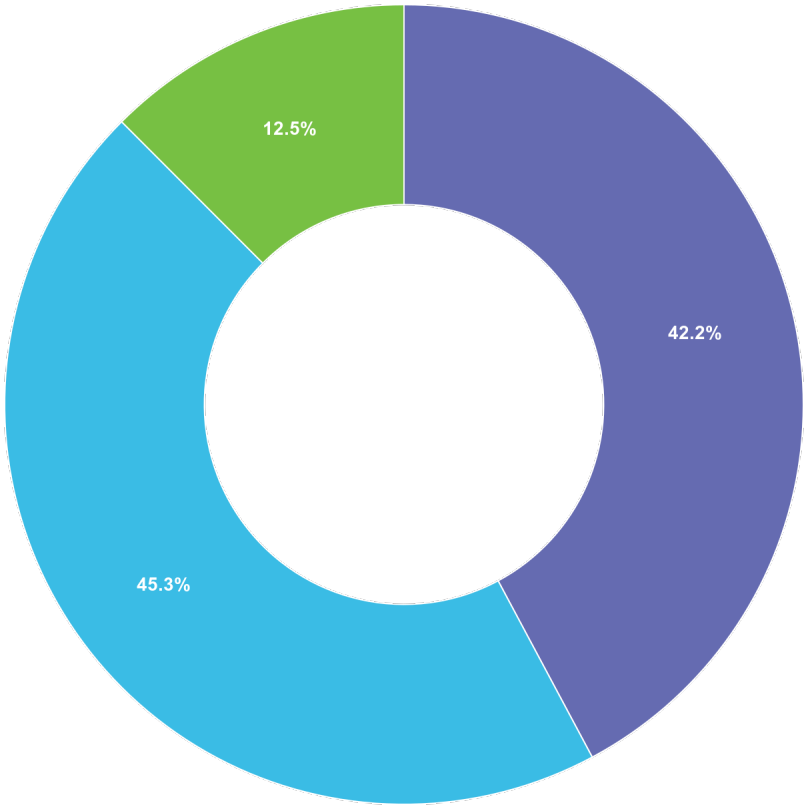


Answered: 64 **Unanswered:** 0

Choice	Total
Very important	50
Somewhat important	10
Not important	4

Q21 21\. **Property Protection** - Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area.

(Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.)*

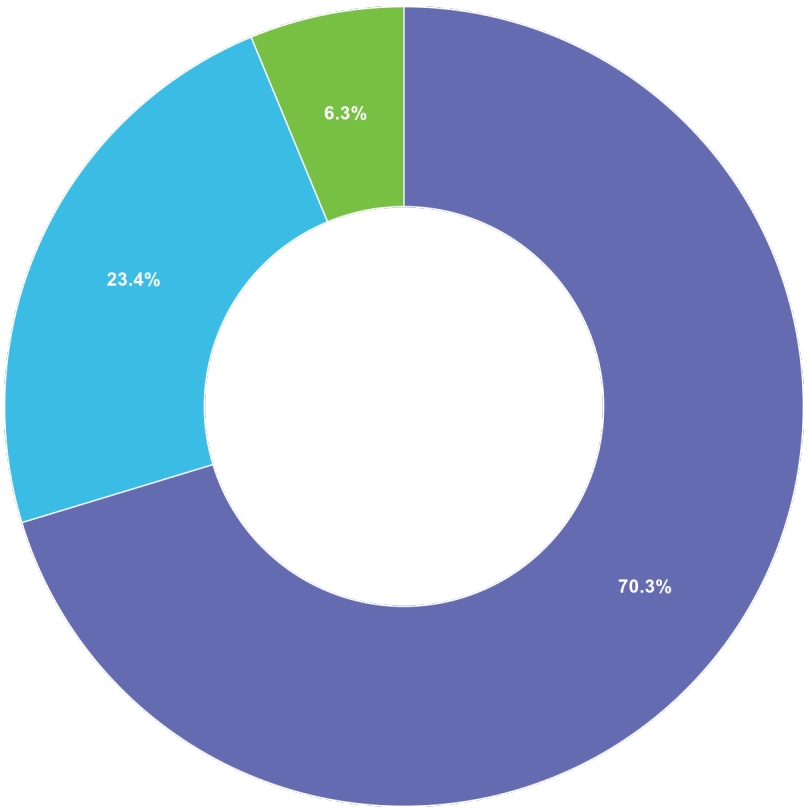


Answered: 64 **Unanswered:** 0

Choice	Total
Very important	27
Somewhat important	29

Choice	Total
Not important	8

Q22 22\. **Natural Resource Protection** - Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. (Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.)*

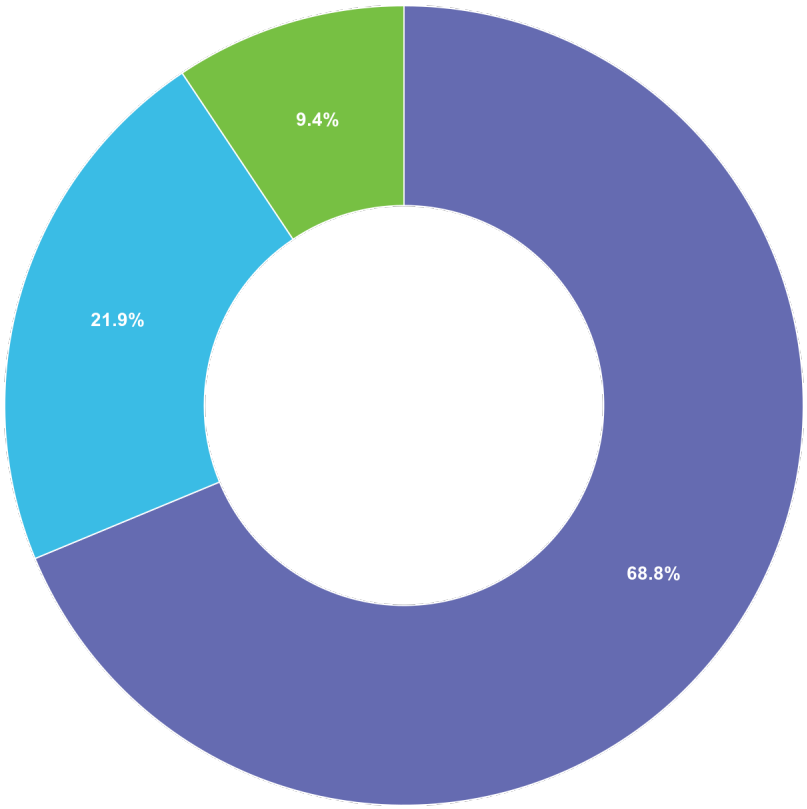


Answered: 64 **Unanswered:** 0

Choice	Total
Very important	45
Somewhat important	15
Not important	4

Q23 23\. **Structural Projects** - Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard.

(Examples include dams, levees, detention/retention basins, channel modification, retaining walls and storm sewers.)*

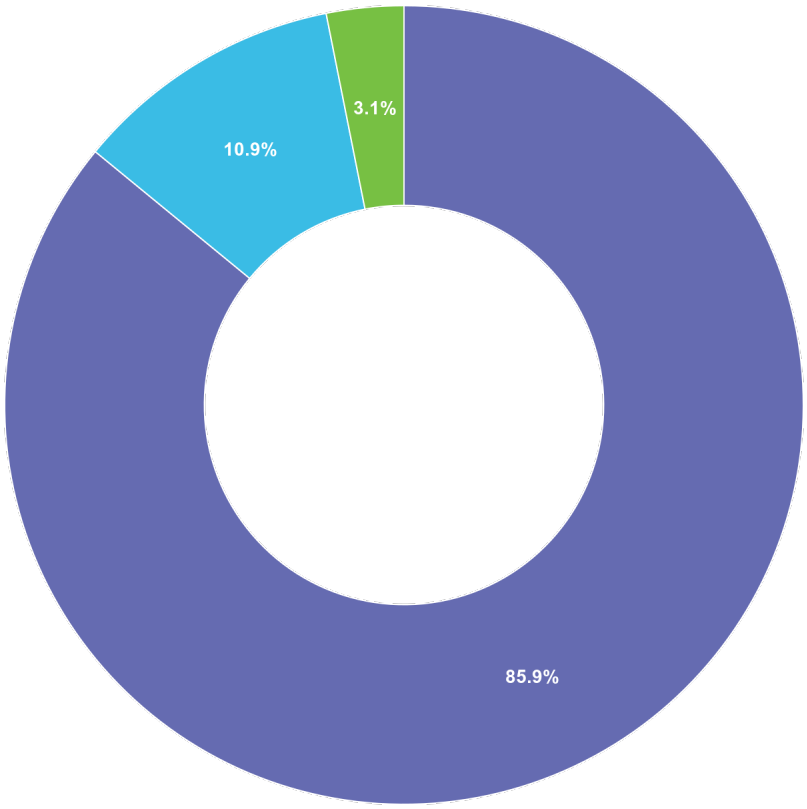


Answered: 64 **Unanswered:** 0

Choice	Total
Very important	44
Somewhat impotant	14
Not important	6

Q24 24\. **Emergency Services -** Actions that protect people and property during and immediately after a hazard event.

(Examples include warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.)*



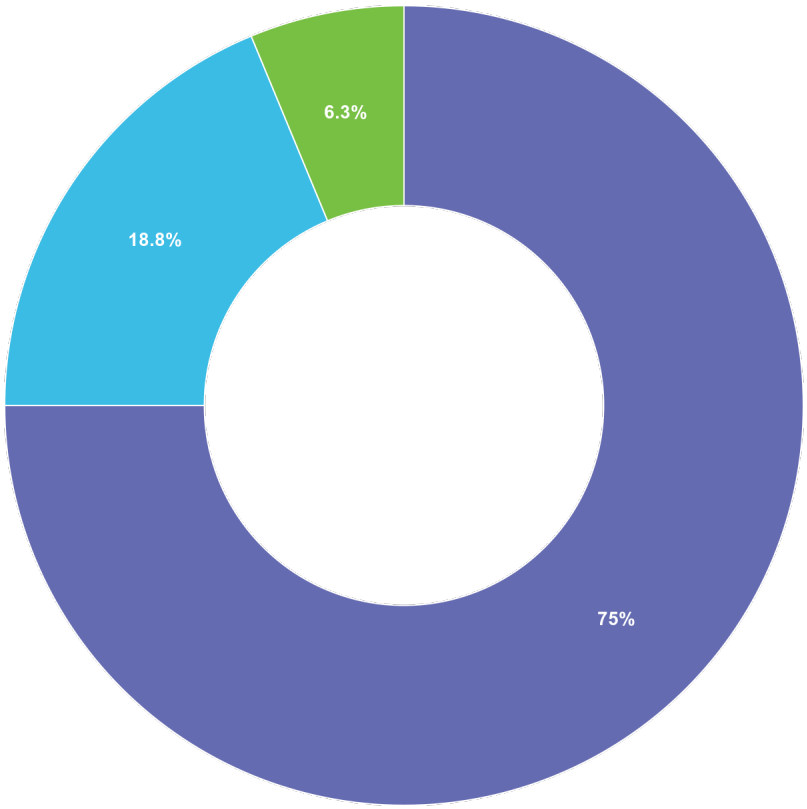
Answered: 64 **Unanswered:** 0

	Choice	Total
●	Very important	55
●	Somewhat important	7
●	Not important	2

Q25 25\. **Public Education Awareness** - Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property.

(Examples include outreach projects schools education programs, library materials and

demonstration events.)*



Answered: 64 **Unanswered:** 0

	Choice	Total
●	Very important	48
●	Somewhat important	12
●	Not important	4

Q26 This survey may be submitted anonymously; however, if you provide us with your name and contact information below, we will have the ability to follow up with you to learn more about your ideas or concerns. (Optional)

Saturday, August 15, 2020, 11:55 PM UTC

Dean Bartlett 444 Ledford Branch Road 28734 828 349 4879

Friday, May 1, 2020, 7:56 PM UTC

Dean Bartlett

Dean29685@mail. com

444 LEADFORD BRANCH ROAD Franklin nc

Thursday, April 23, 2020, 12:27 PM UTC

Lynne Johnson Jlynne50@yahoo.com

Wednesday, April 15, 2020, 9:20 PM UTC

Mickey Youmans

912-596-5259 cell

Mickey@NantahalaRiverLodge.net

Monday, March 30, 2020, 7:37 PM UTC

Erin McGill

emcgilldvm@gmail.com

Answered: 13 **Unanswered:** 51

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 (2015)
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.

Town of Hayesville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-13	Smart Growth	All		Town of Hayesville and 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.

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

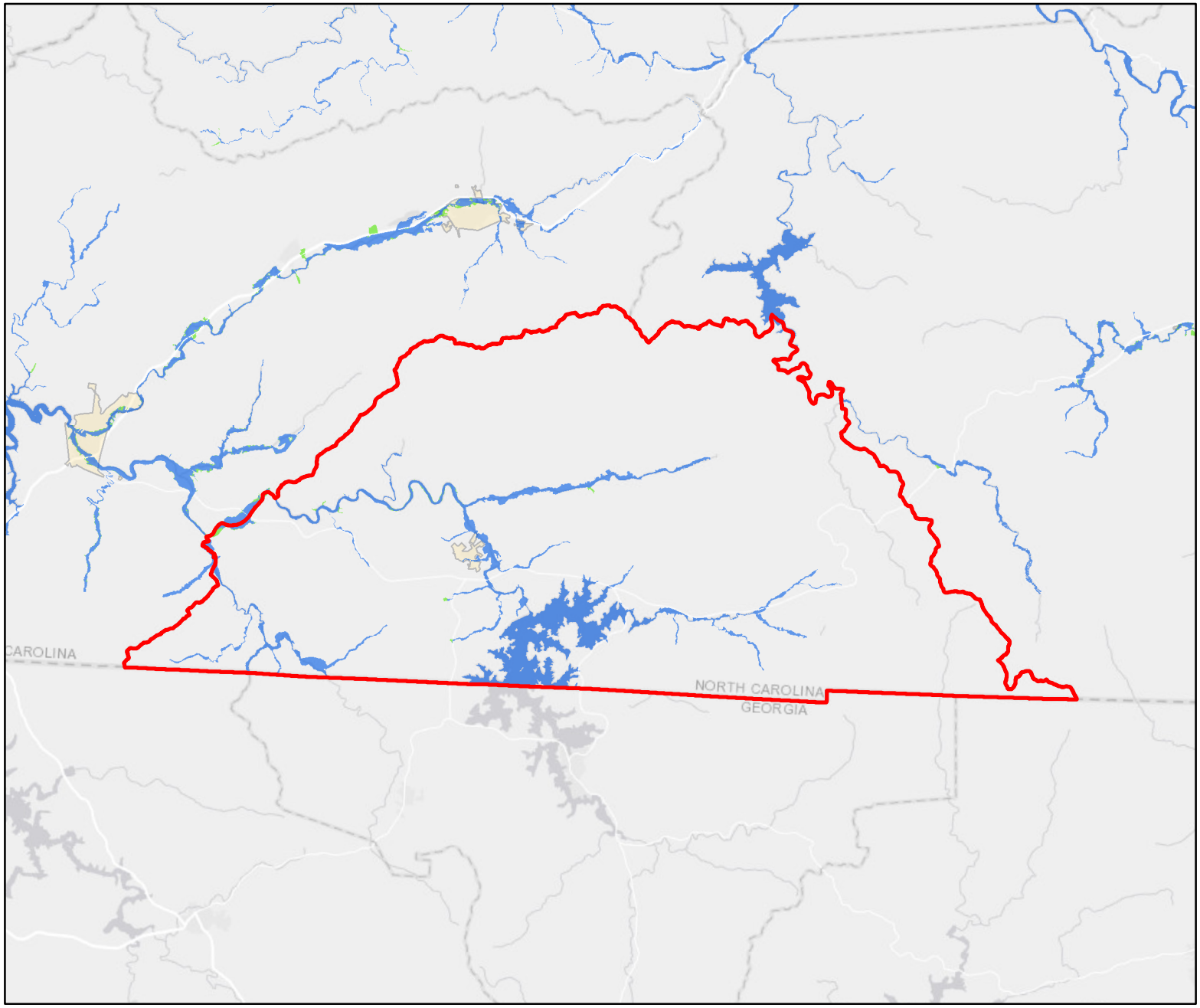
Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Natural Resource Protection							
NRP-1	Increase size/capacity of waste water treatment plant.	Drought	High	Franklin Public Works	CDBG; EPA; 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							
	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.
Natural Resource Protection							
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

Clay County - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

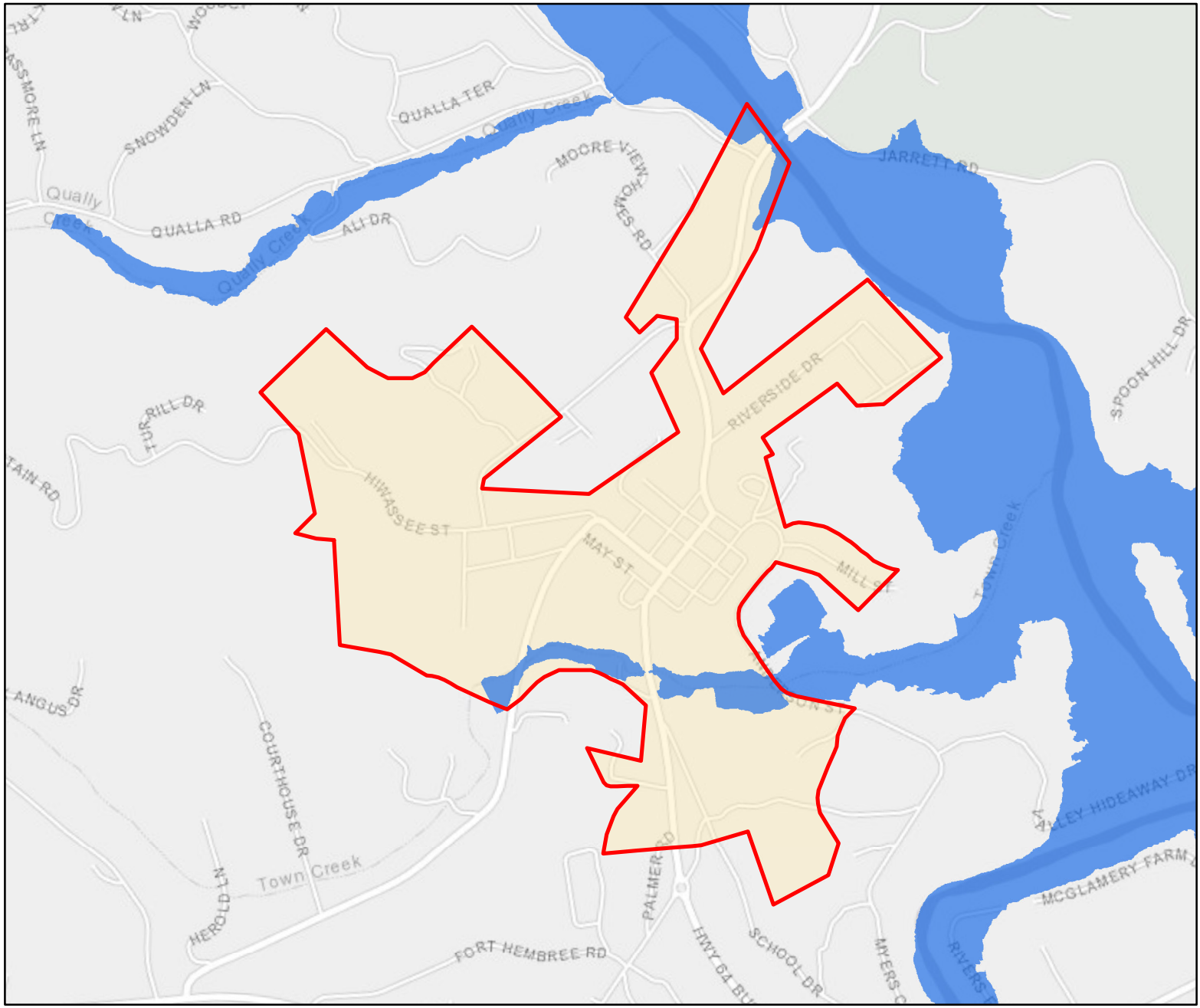
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 2.75 5.5 11 Miles

N

Hayesville - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

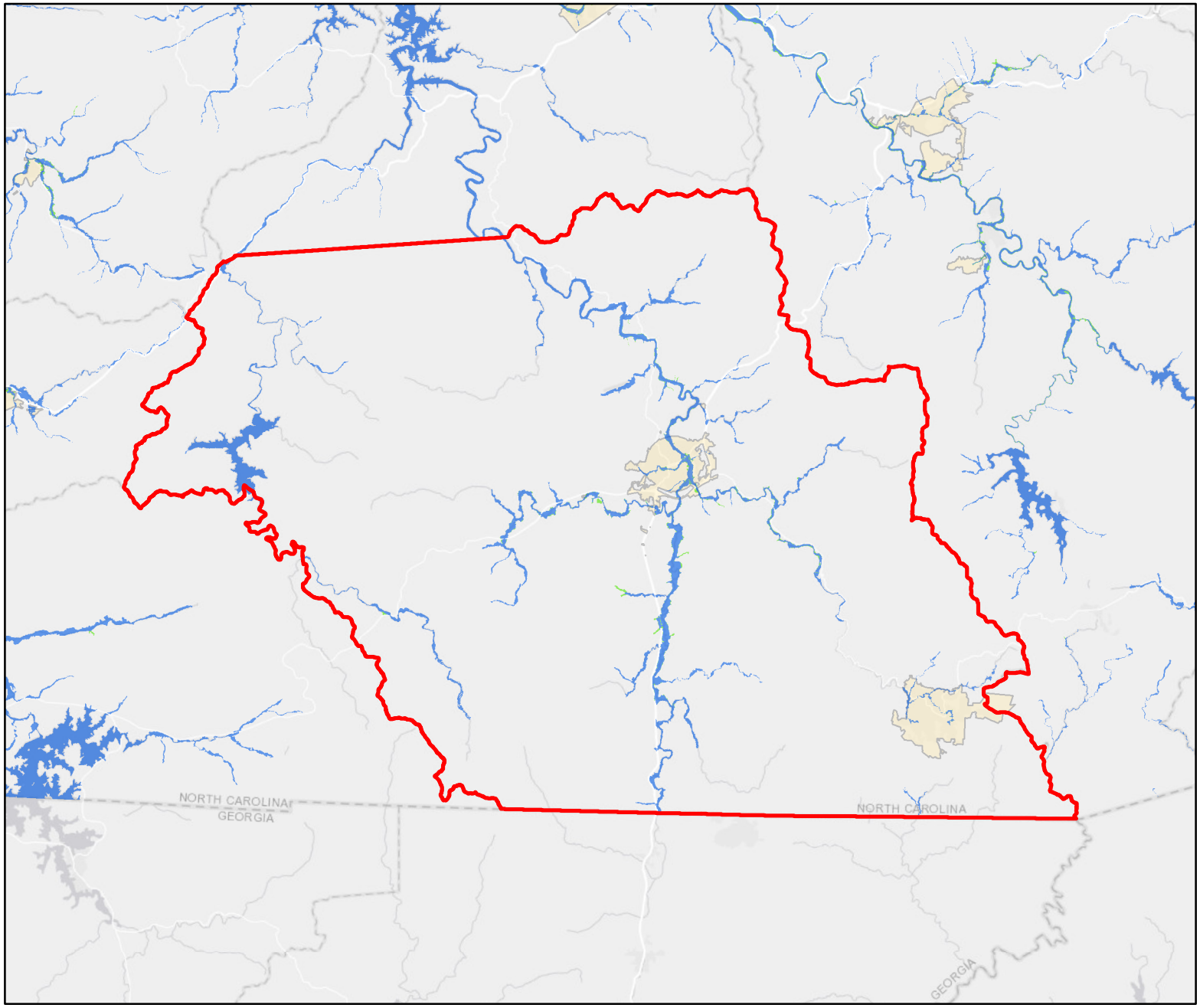
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.125 0.25 0.5 Miles

N

Macon County - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

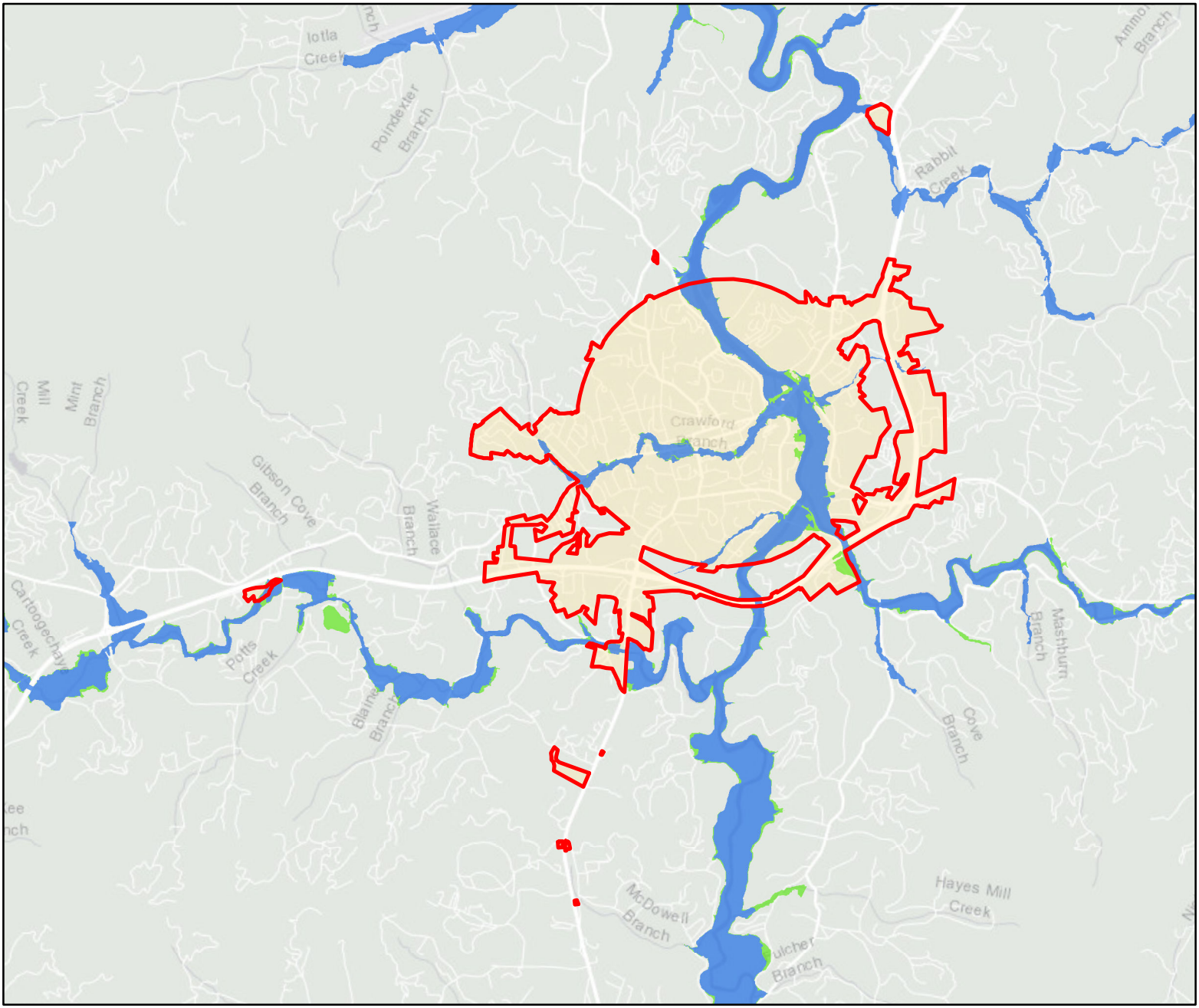
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 3.25 6.5 13 Miles

N

Franklin - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

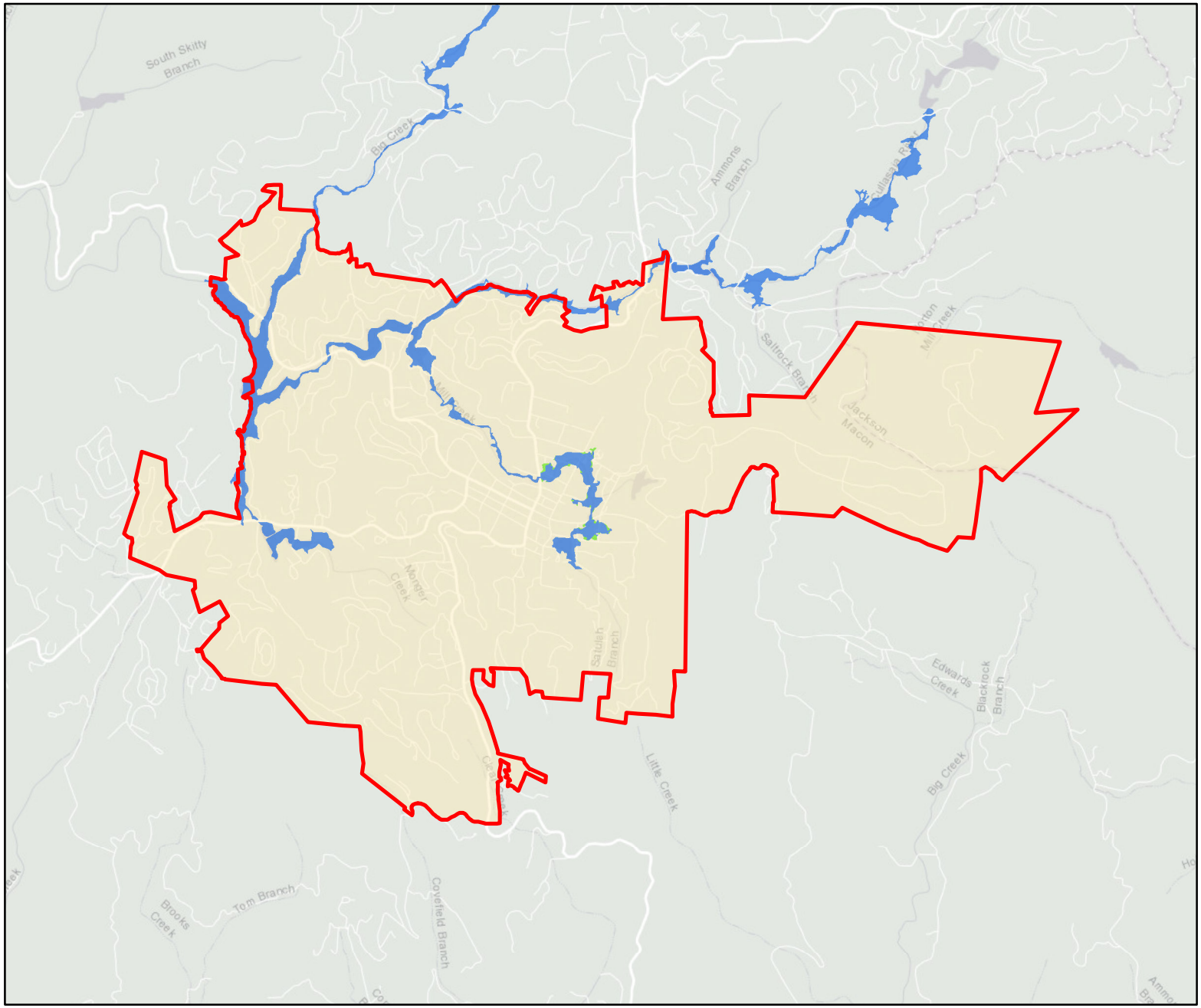
- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

Data Source: North Carolina Floodplain Mapping Program

0 0.5 1 2 Miles

N

Highlands - Flood Hazard Areas



Legend

- County Boundary
- Municipal Boundary
- Major Roads

Flood Zone

- 100 Year Flood Zone
- 500 Year Flood Zone
- Coastal Flood Zone

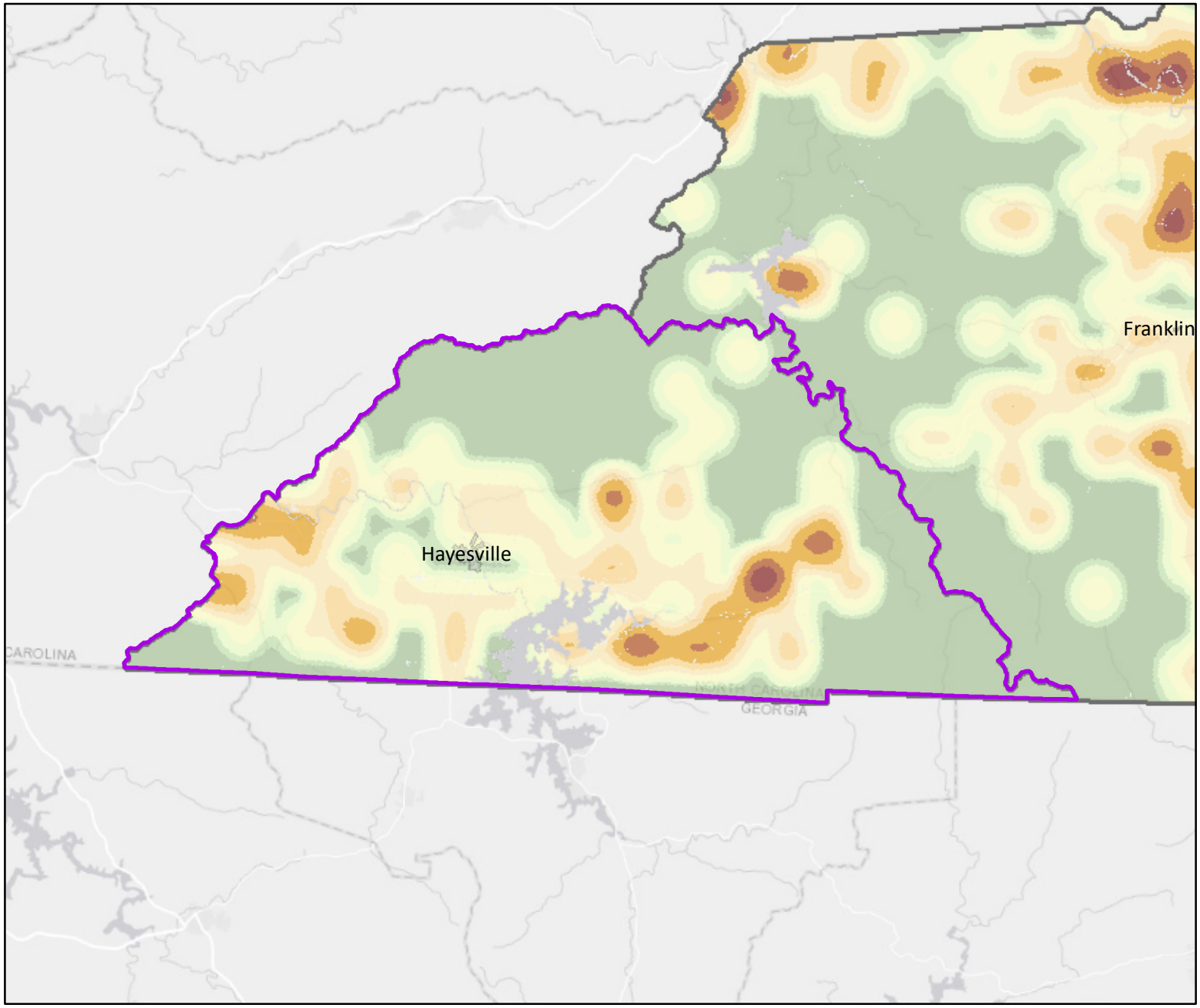
Data Source: North Carolina Floodplain Mapping Program

0 0.425 0.85 1.7 Miles

N

Appendix G
Wildfire Hazard Maps

Clay County - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

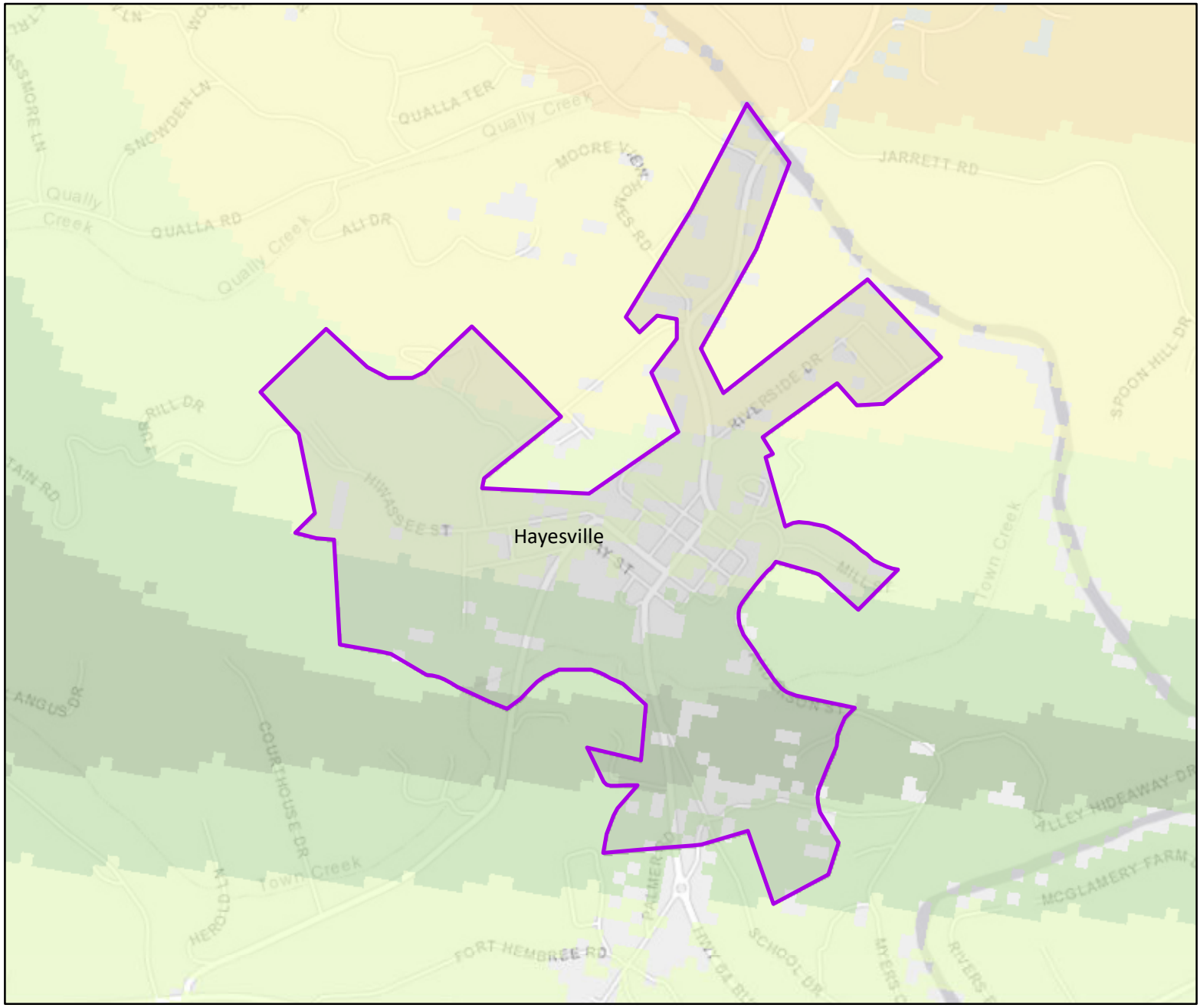
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 2.75 5.5 11 Miles

N

Hayesville - Wildfire Ignition Density



Legend

- Municipal Boundary
- County Boundary

Wildfire Ignition Density Index

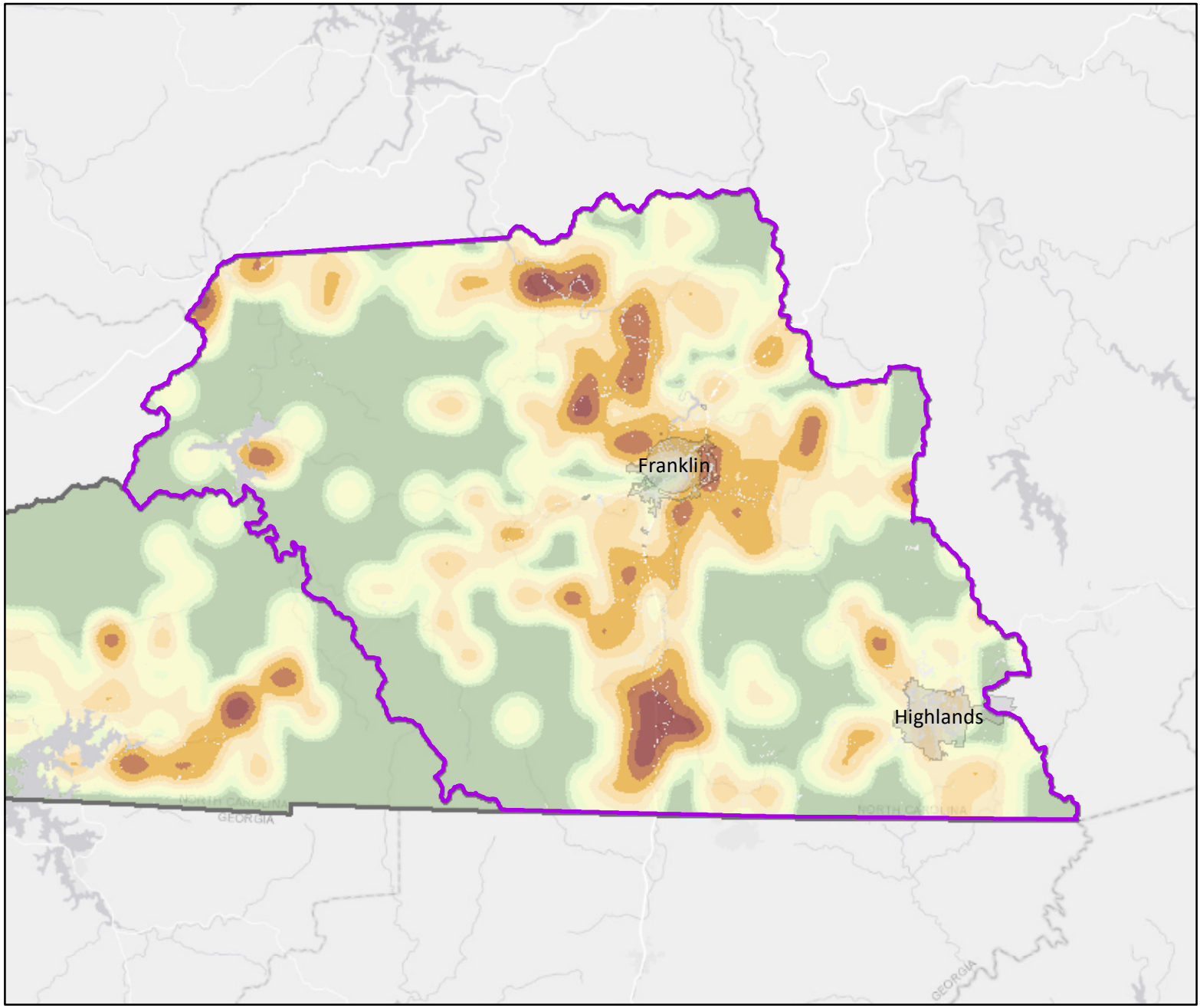
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.125 0.25 0.5 Miles

N

Macon County - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

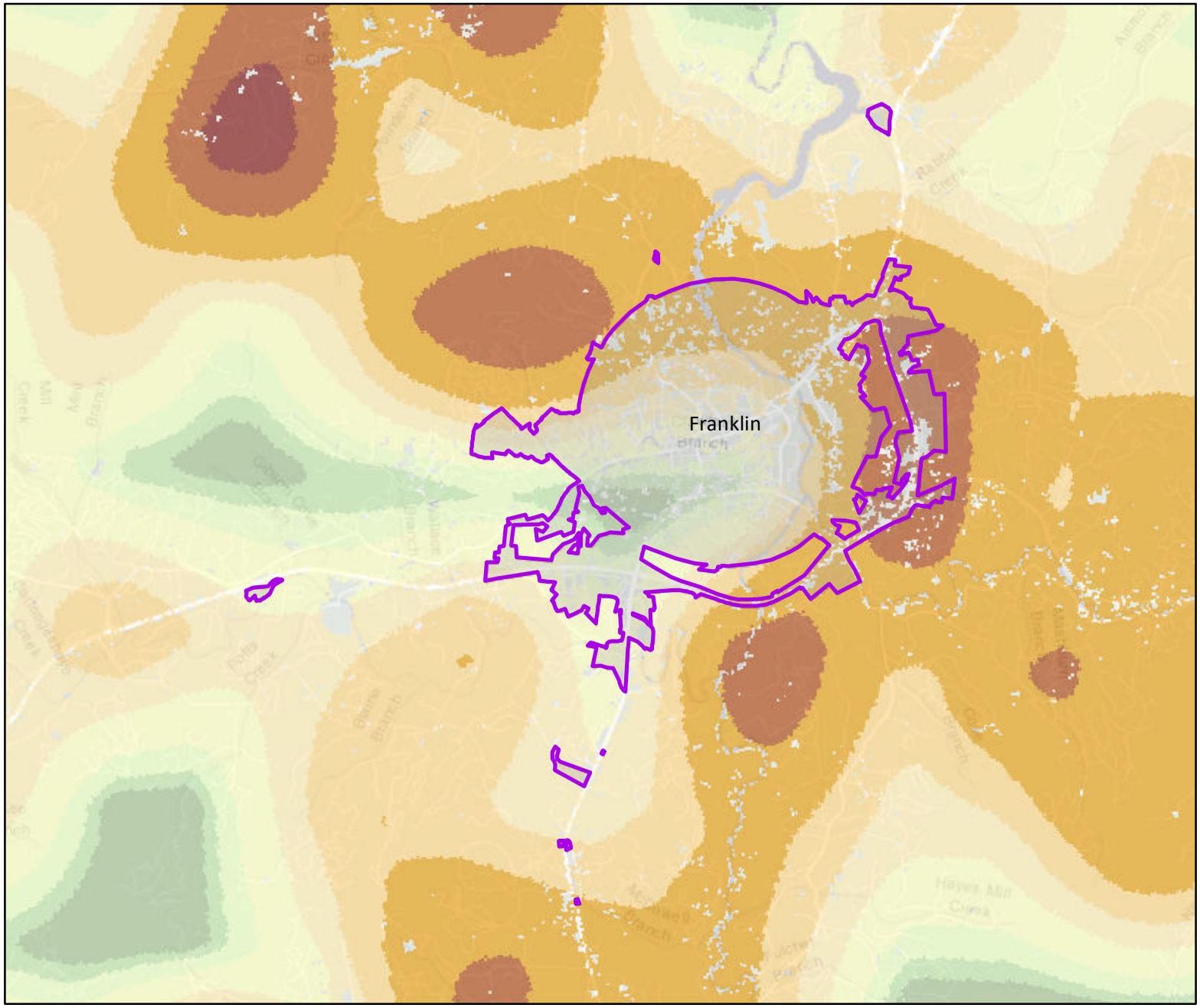
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 3.25 6.5 13 Miles

N

Franklin - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

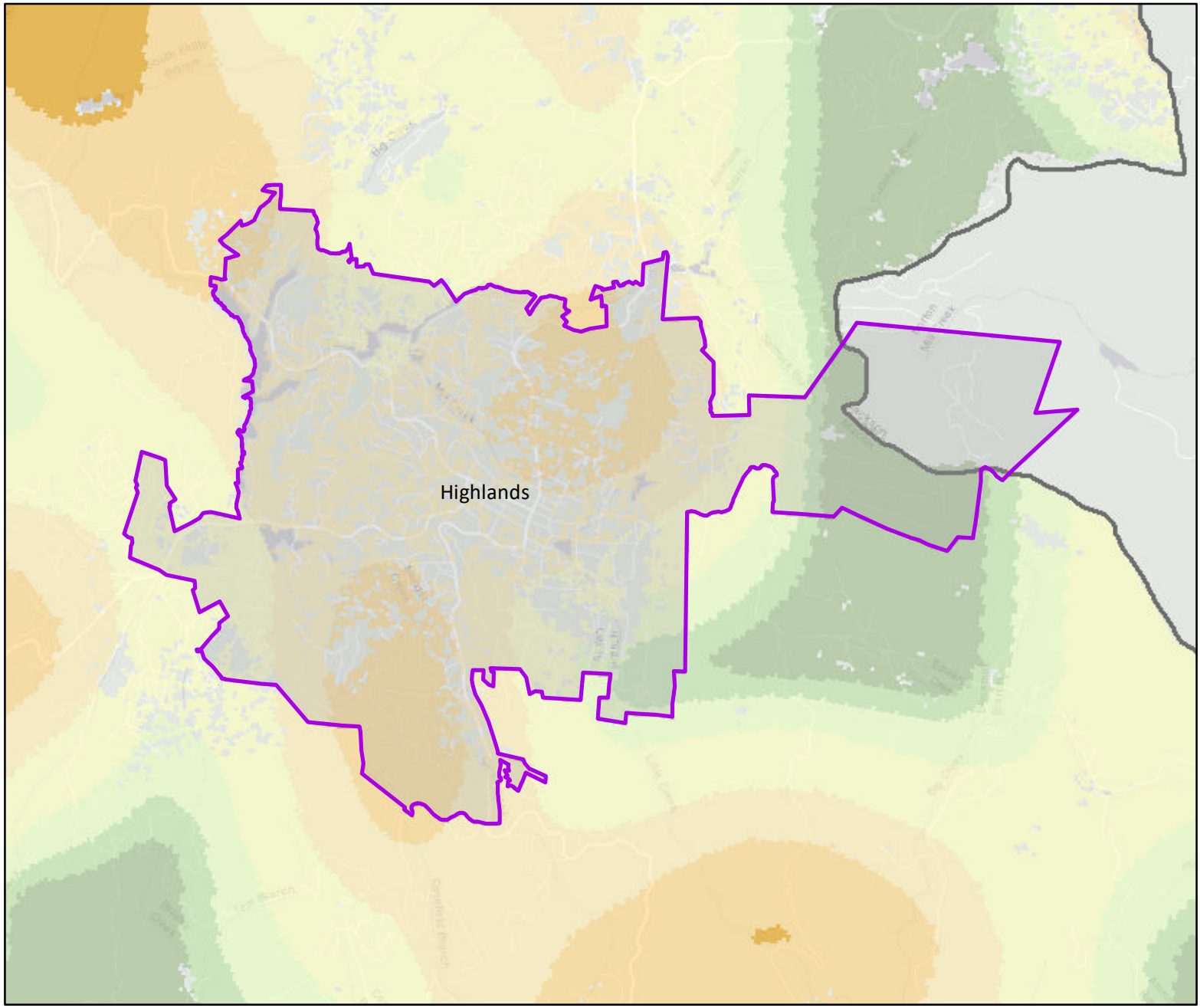
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Highlands - Wildfire Ignition Density



Legend

Municipal Boundary

County Boundary

Wildfire Ignition Density Index

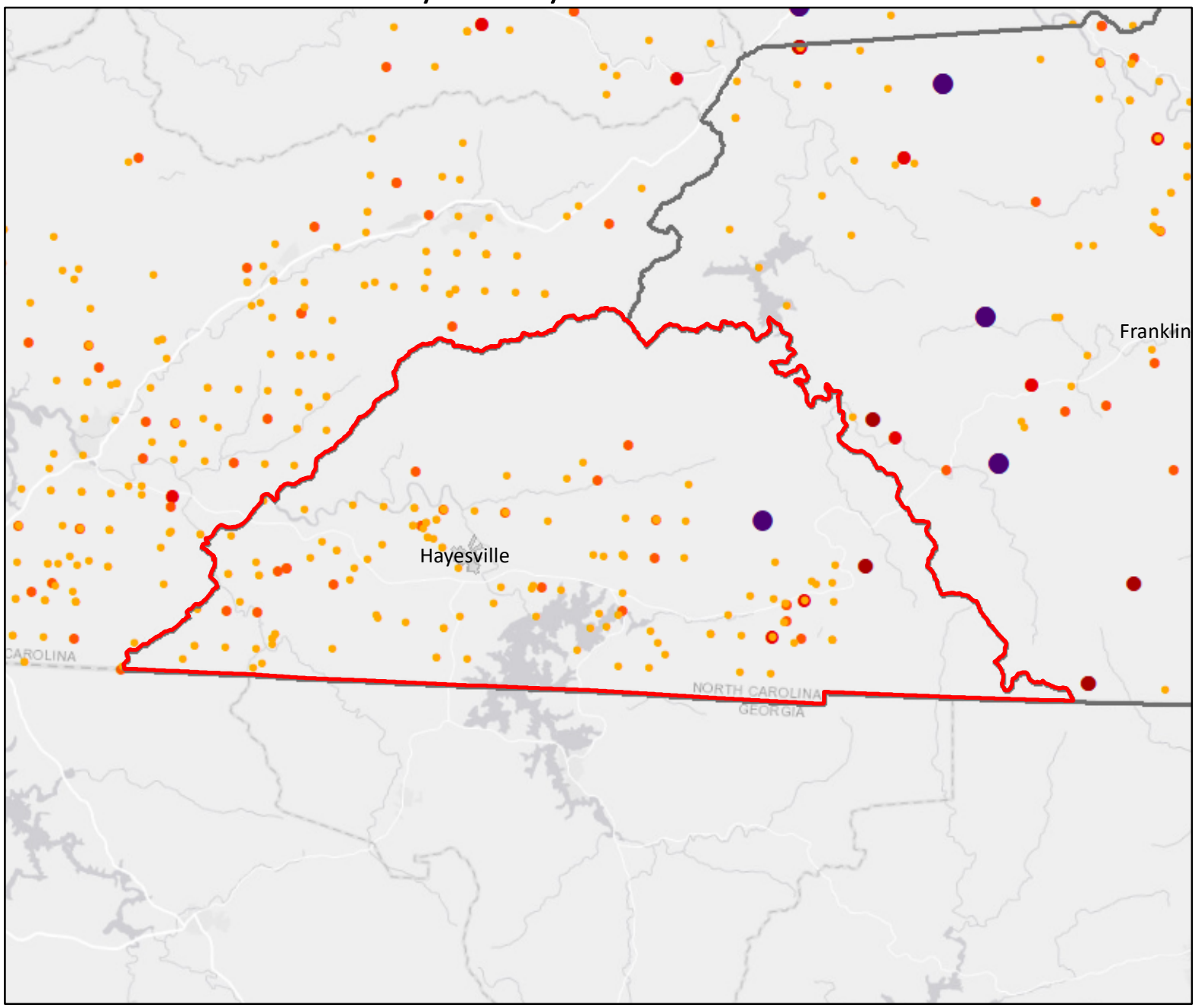
0 1 2 3 4 5 6 7 8 9

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.425 0.85 1.7 Miles

N

Clay County - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

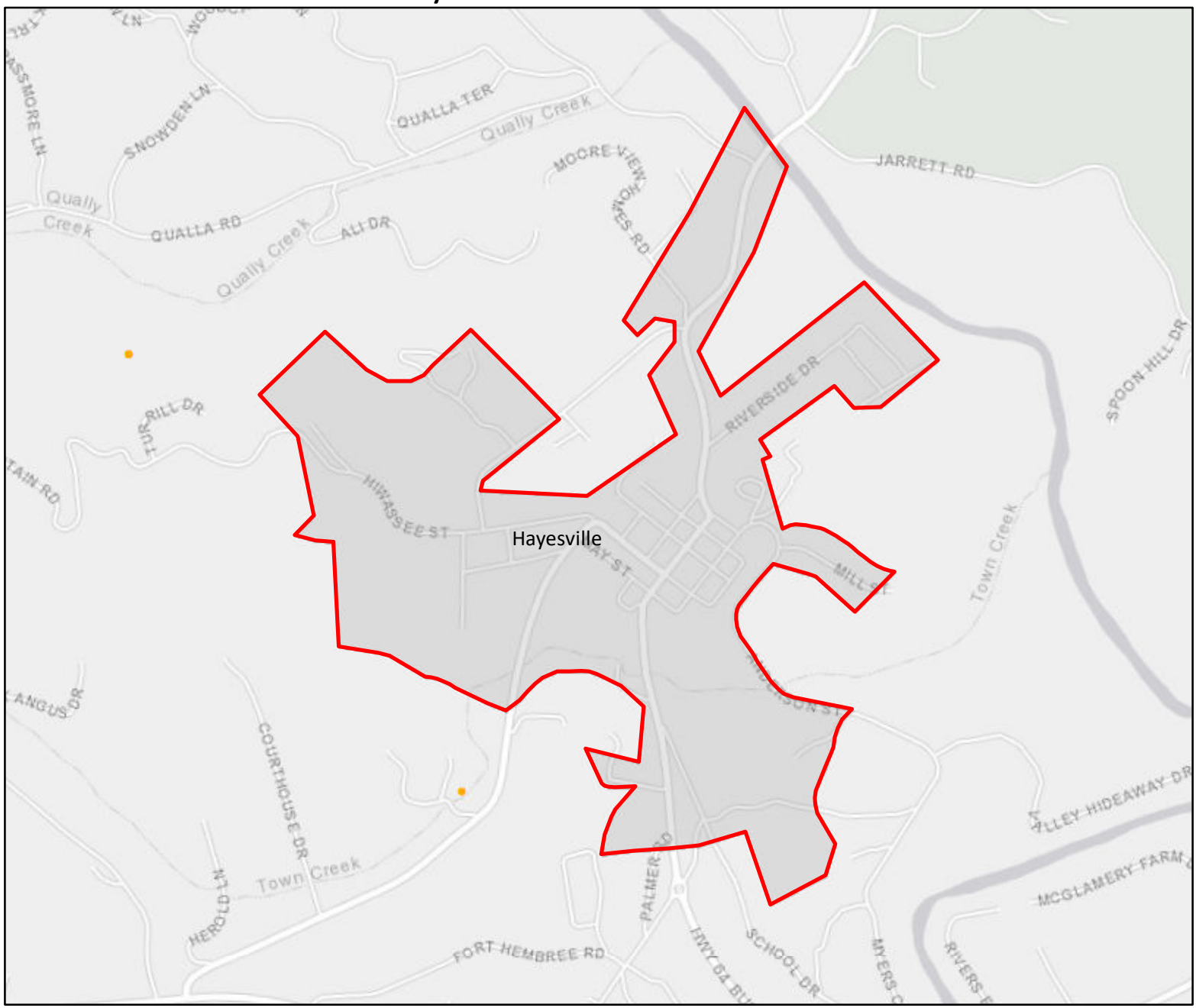
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 2.75 5.5 11 Miles

N

Hayesville - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

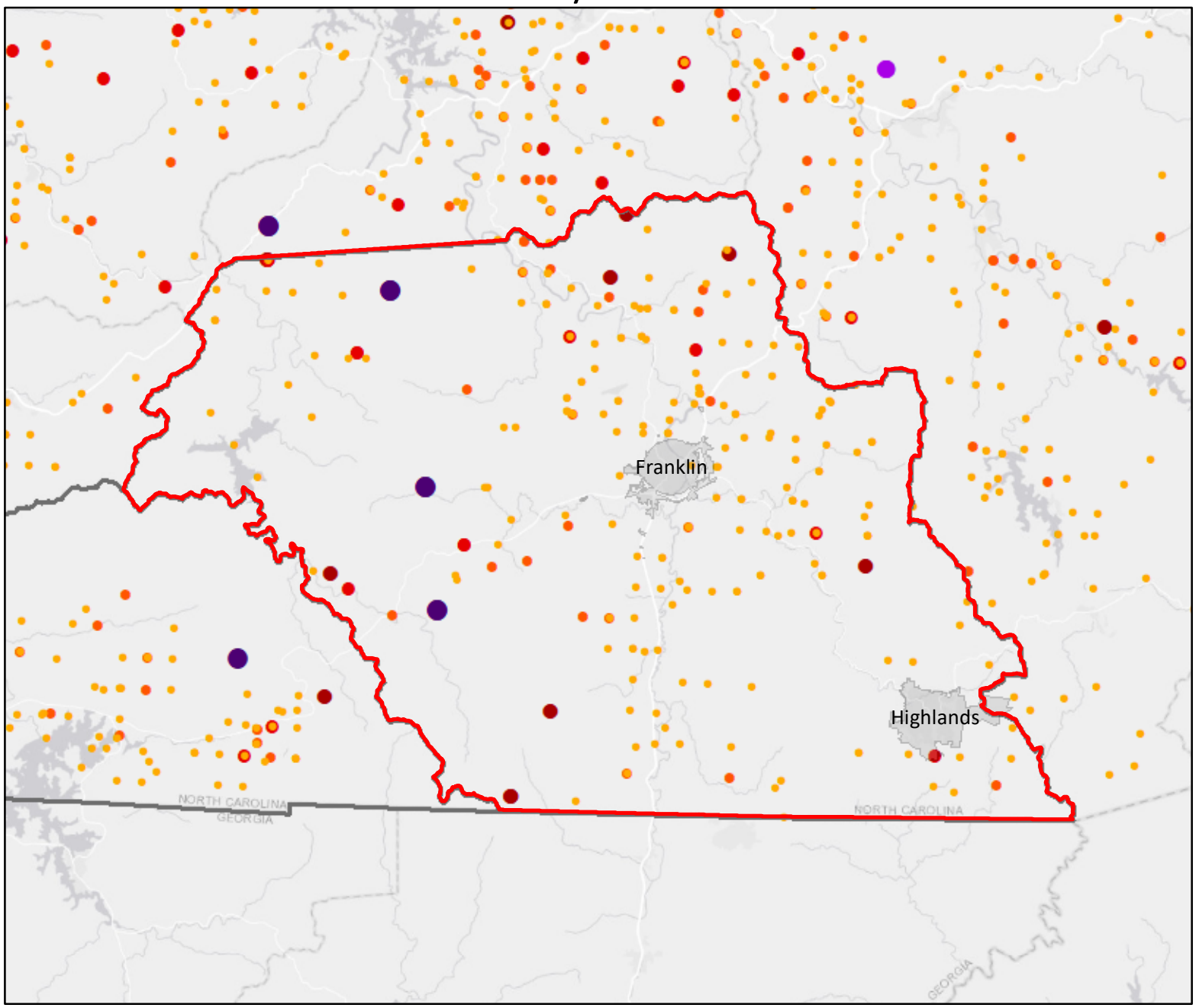
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.125 0.25 0.5 Miles

N

Macon County - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

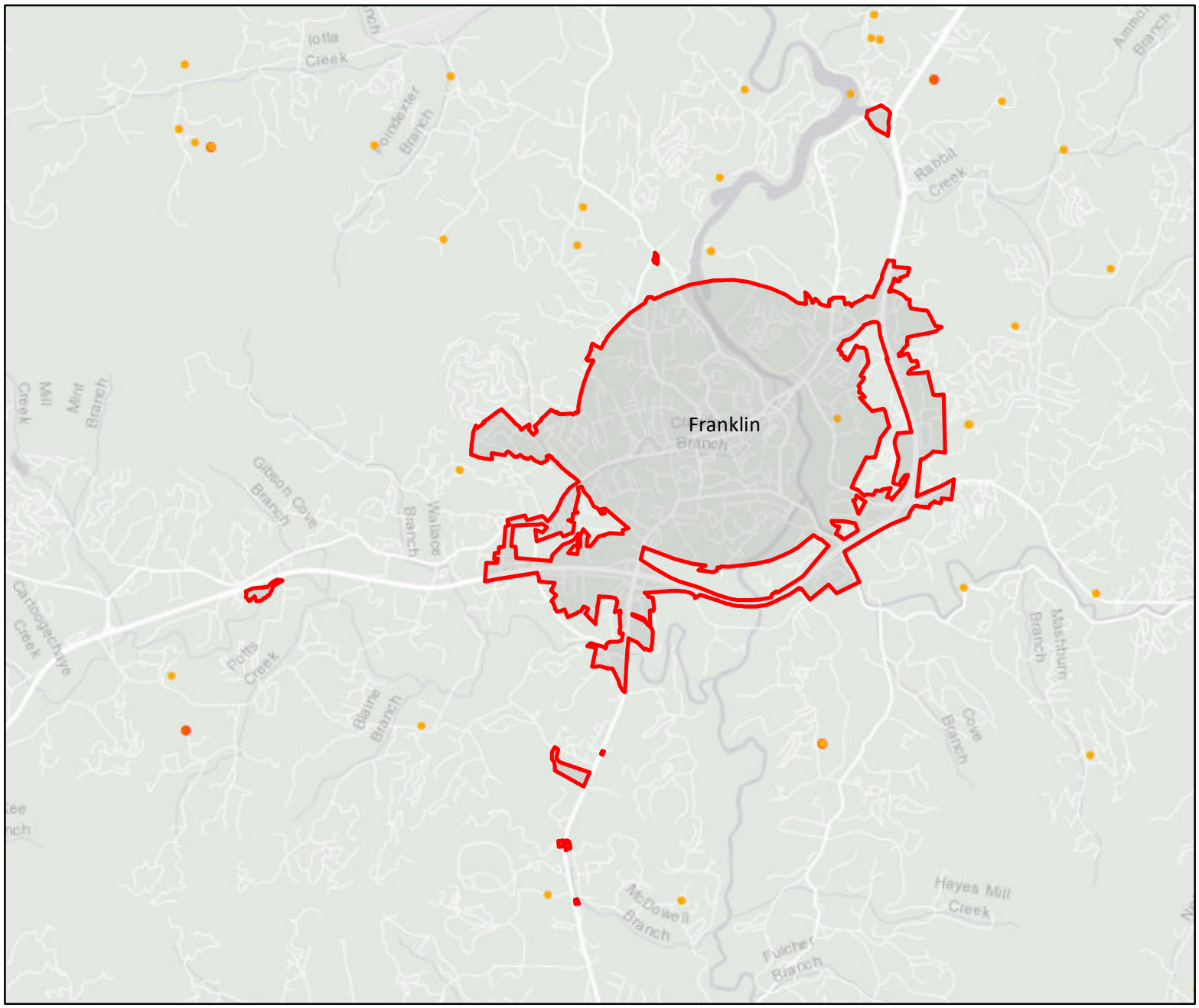
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 3.25 6.5 13 Miles

N

Franklin - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

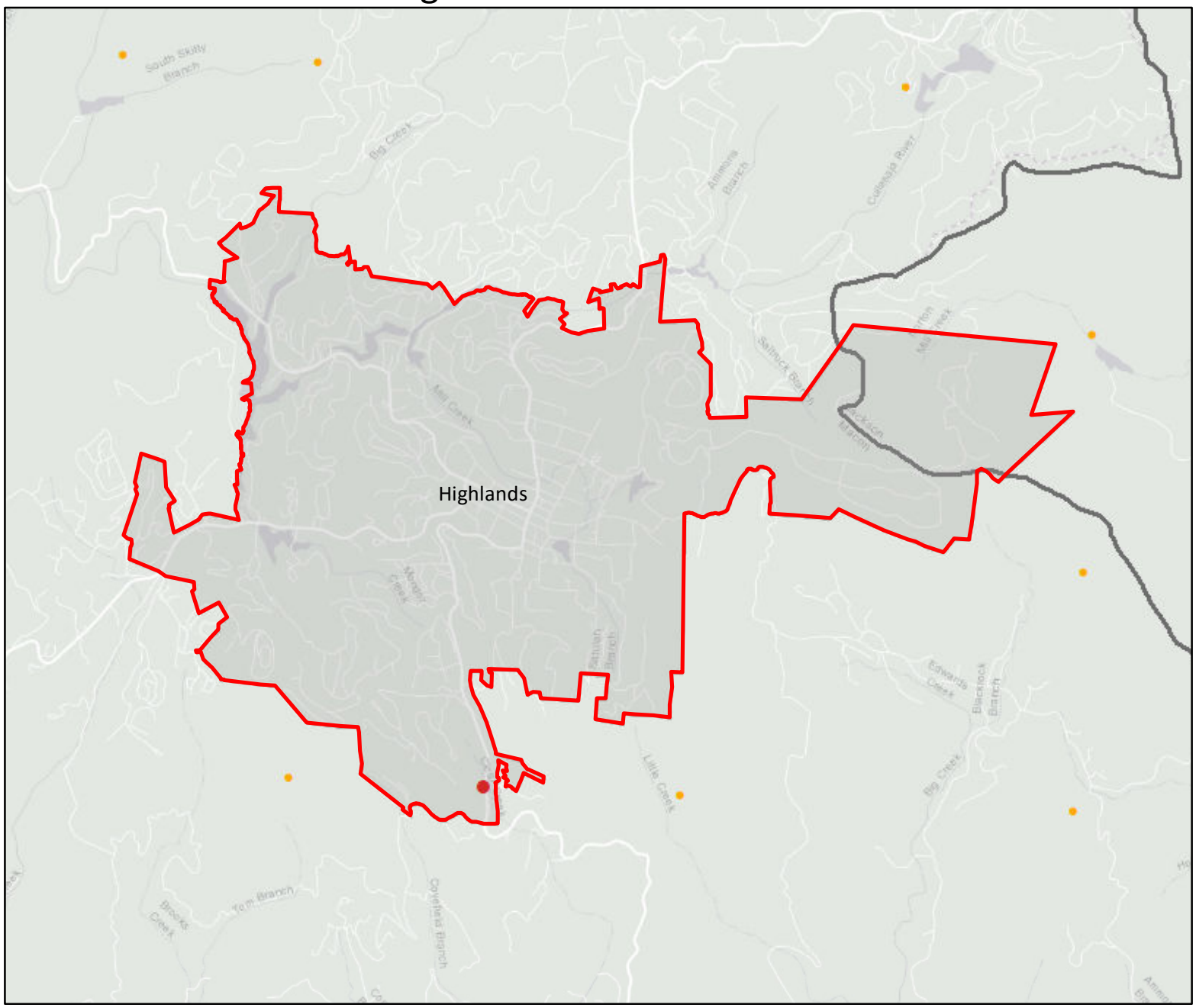
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Highlands - Wildfire Events



Legend

- Municipal Boundary
- County Boundary

Acres Impacted

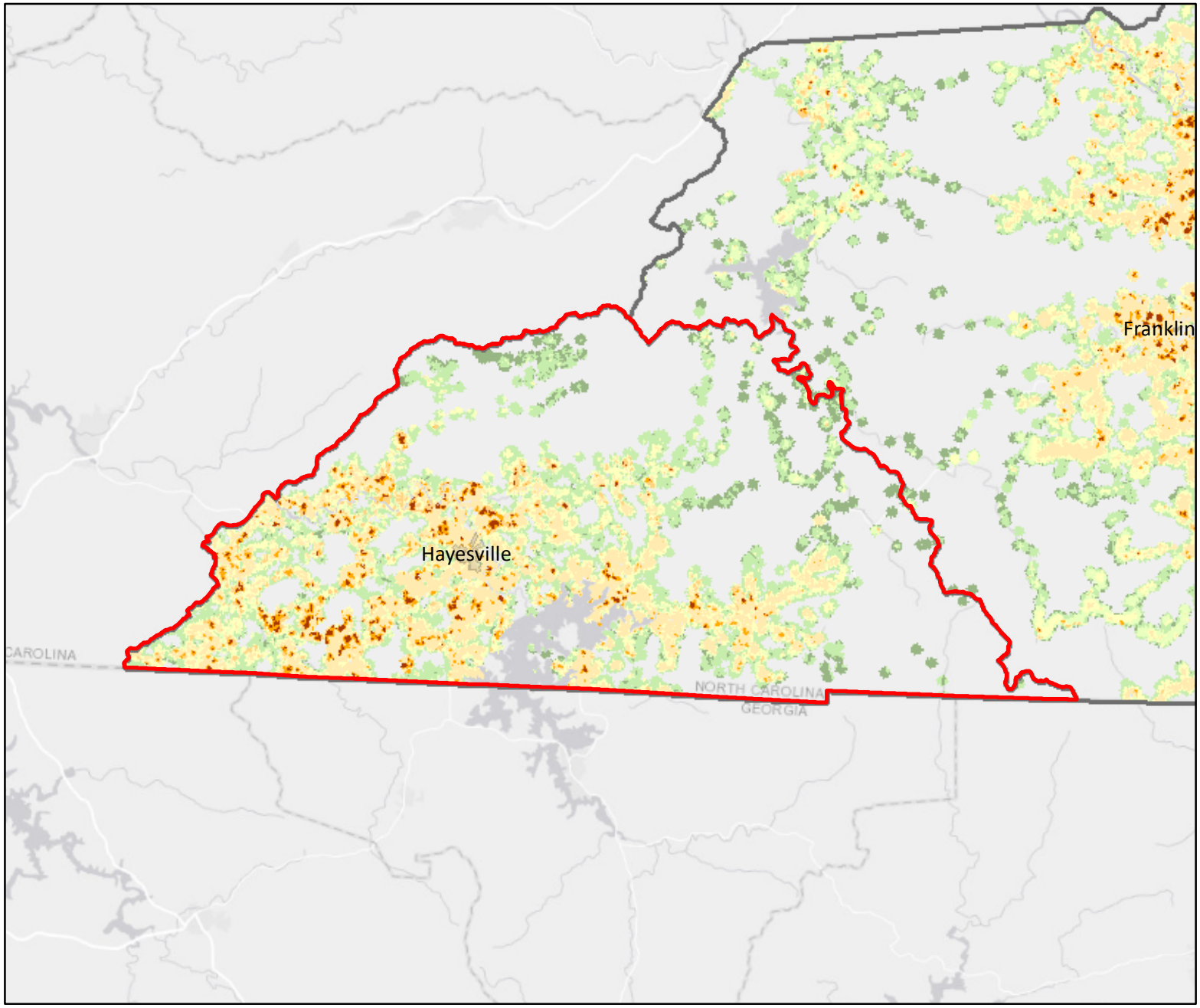
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- >1000

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.425 0.85 1.7 Miles

N

Clay County - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

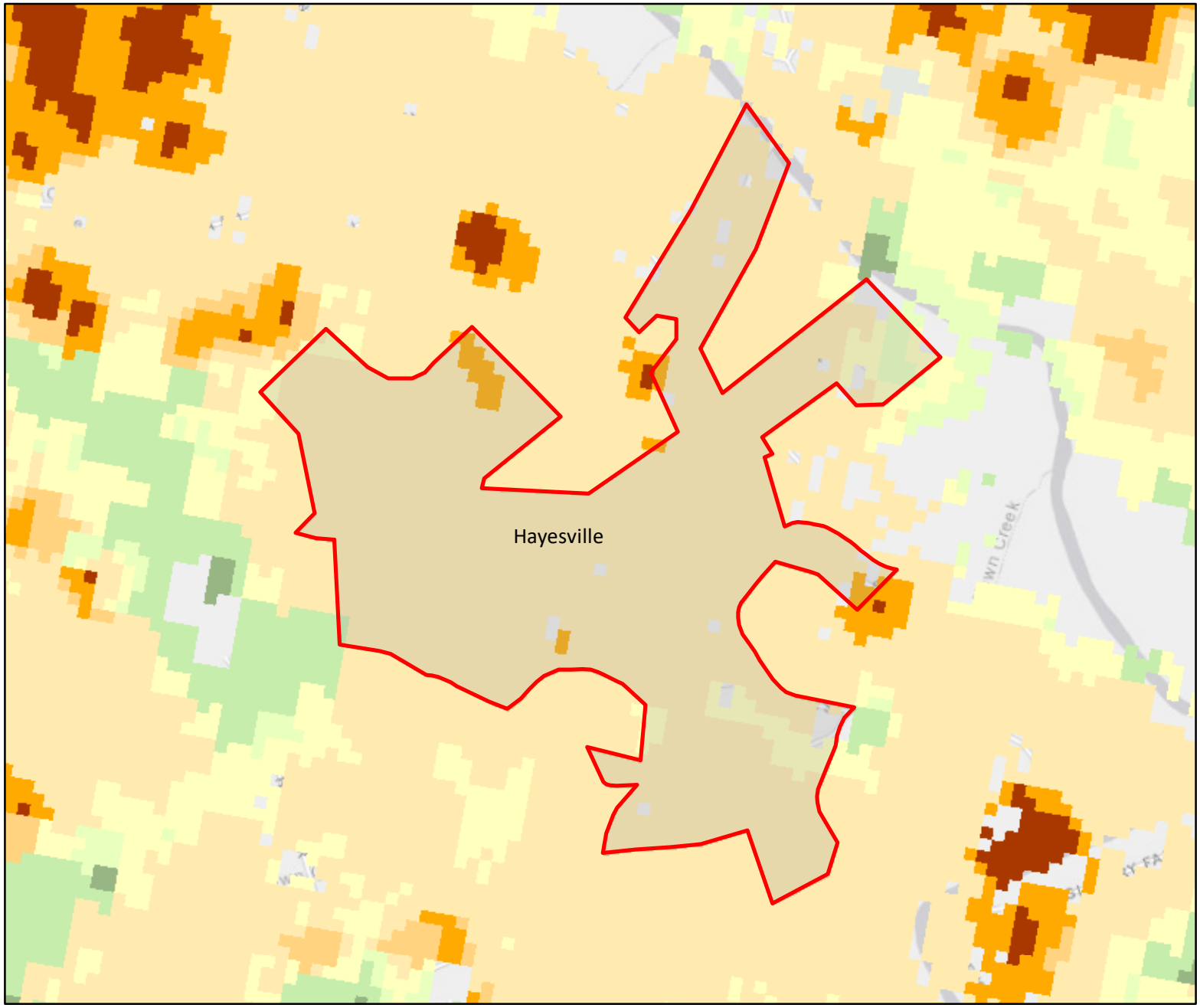
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 2.75 5.5 11 Miles

N

Hayesville - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

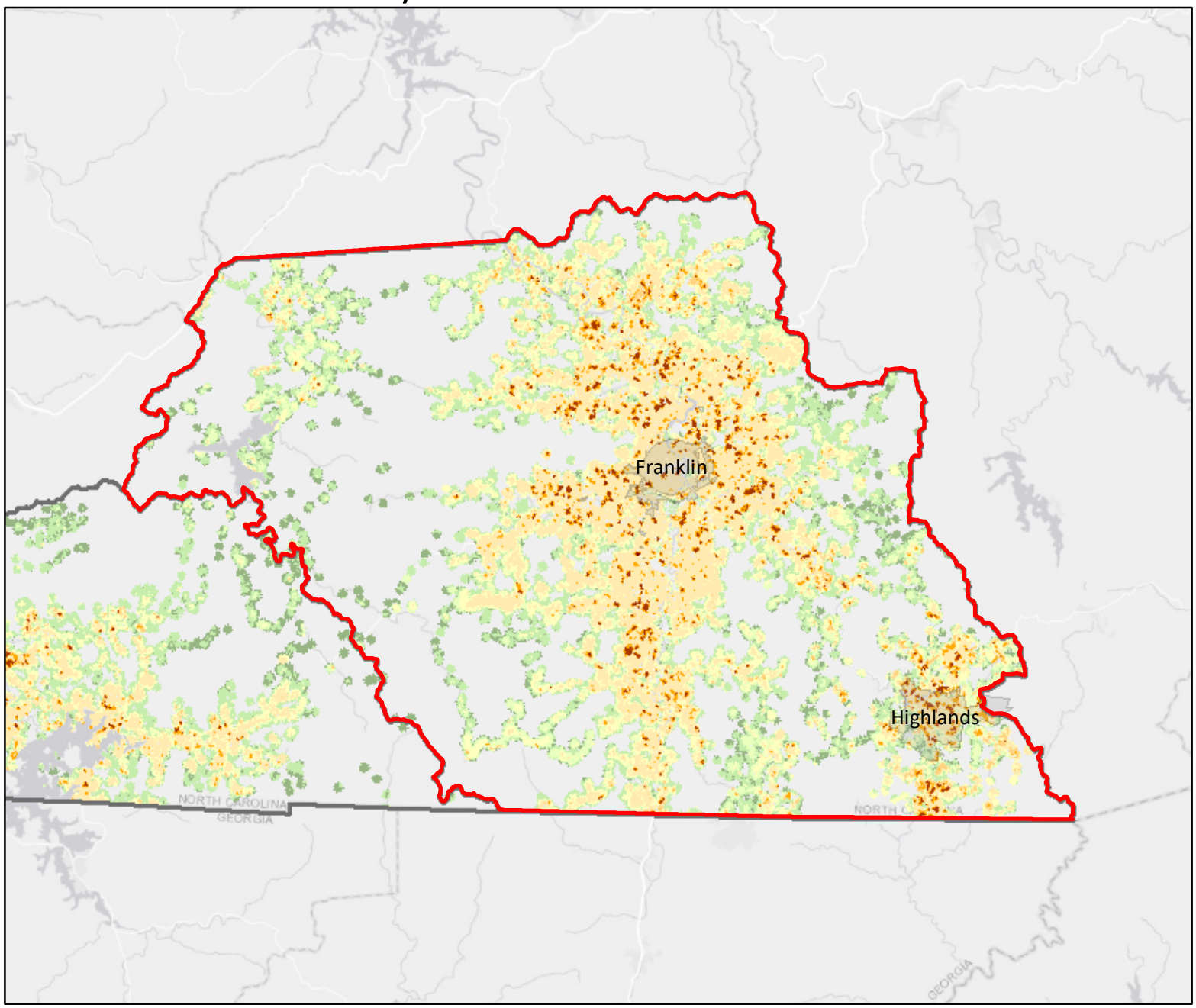
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.125 0.25 0.5 Miles

N

Macon County - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

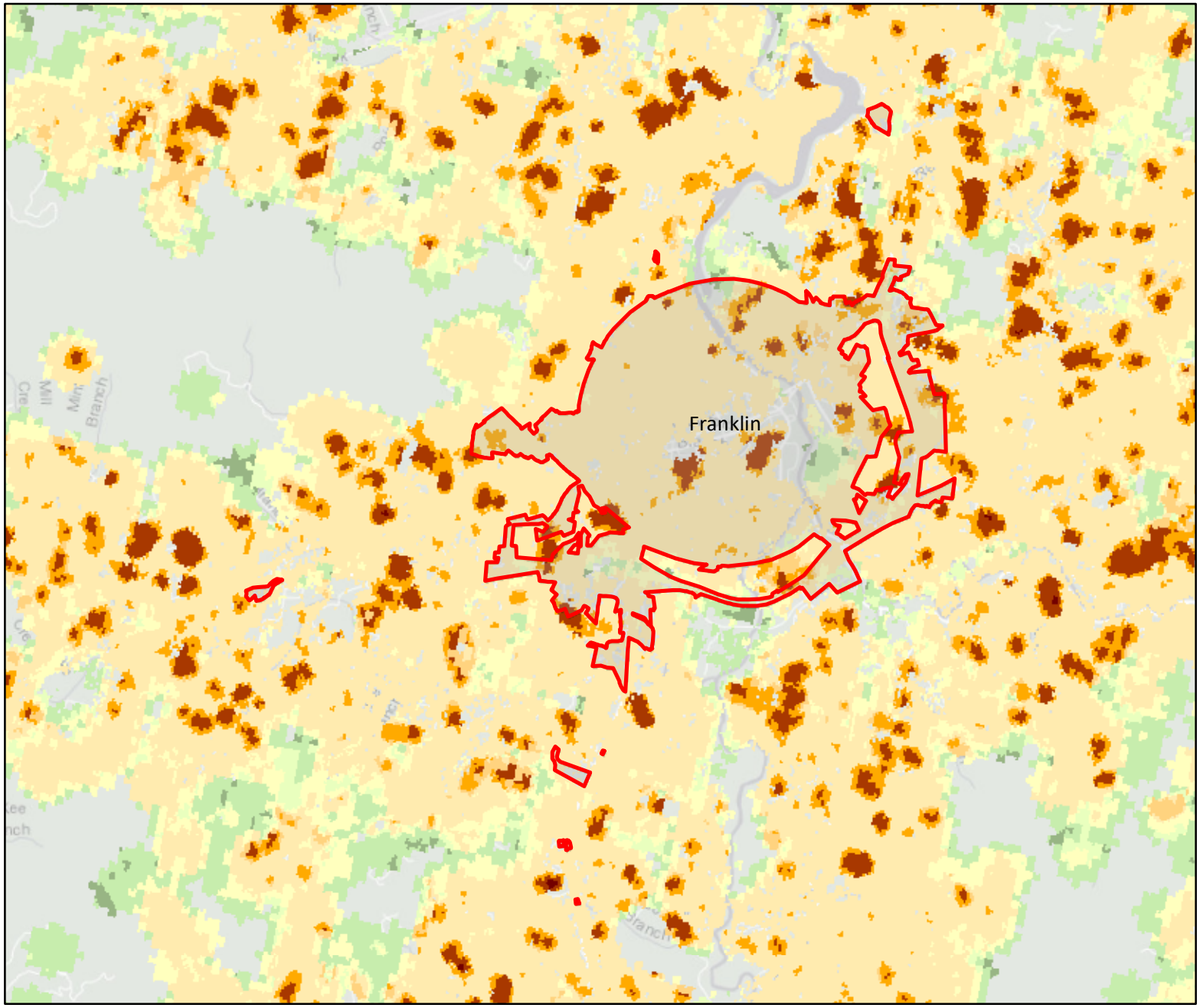
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 3.25 6.5 13 Miles

N

Franklin - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

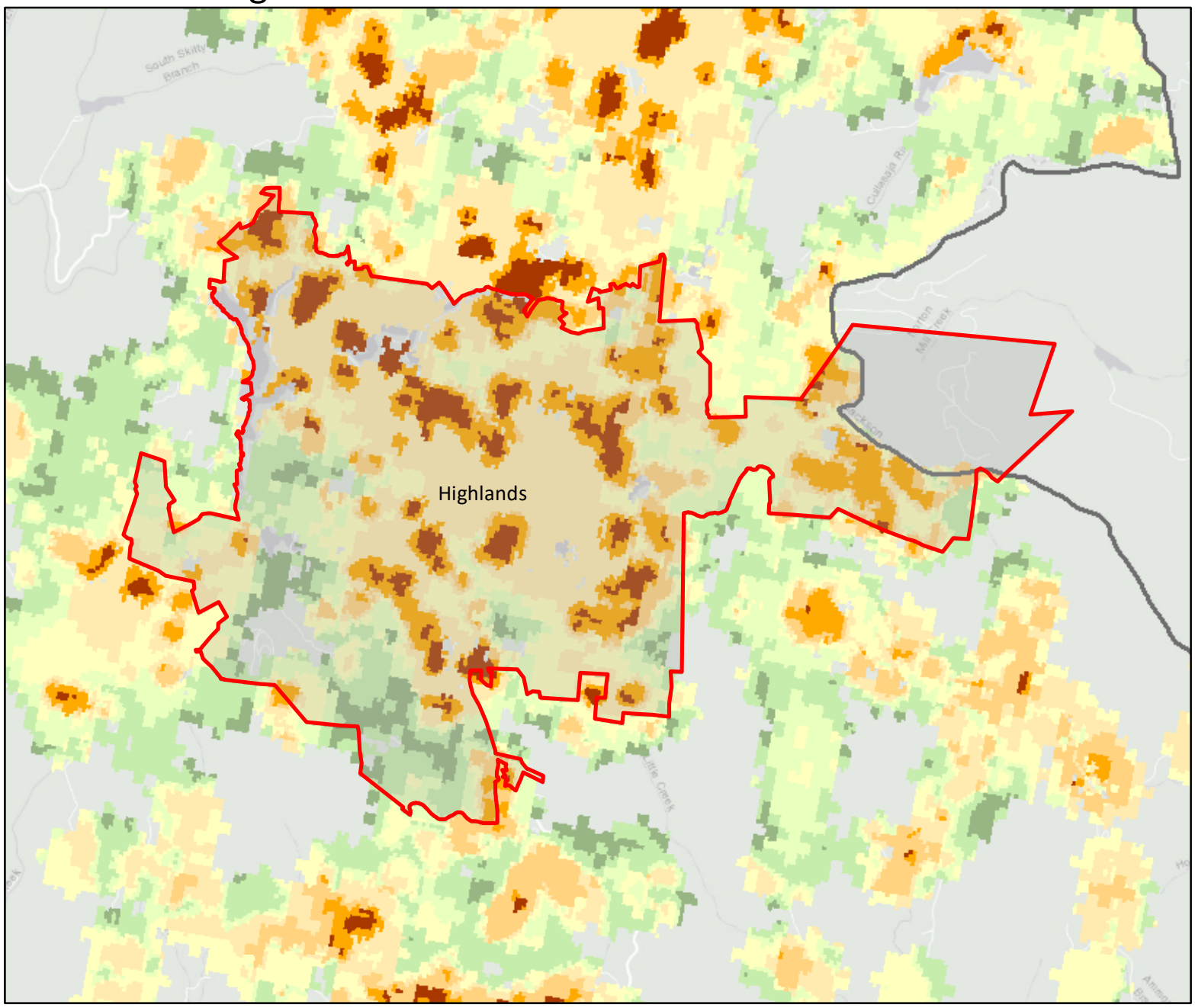
0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS
WILDFIRE RISK ASSESSMENT PORTAL

0 0.5 1 2 Miles

N

Highlands - Wildland Urban Interface Risk Index



Legend

Municipal Boundary

County Boundary

WUI Risk Index

0 Low -3 -6 -9 High

Data Source:SOUTHERN GROUP OF STATE FORESTERS WILDFIRE RISK ASSESSMENT PORTAL

0 0.425 0.85 1.7 Miles

N

Appendix H:
NCEI Storm Event Data

This section of the Plan includes the historic storm event data as reported to the National Centers for Environmental Information.

- H.1 – Drought
- H.2 – Flood
- H.3 – Hail
- H.5 – Heavy Rain
- H.6 – Heavy Snow
- H.7 – Ice Storm
- H.8 – Lightning
- H.9 – Tornado
- H.10 – Thunderstorm
- H.11 – Winter Storm

TABLE H.1: DROUGHT EVENTS (2000-2019)

Date	Description
7/1/1998	Dry weather continued through much of the month of July, affecting crops during the critical part of the growing season. Corn and other vegetables sustained the most damage, but a dollar amount was not available at the time of this writing.
10/1/1998	The drought which began during the summer continued through October. The only significant rainfall during the month occurred on the 7-8th. Cities and counties began to restrict water usage and streamflows for several mountain locations were reduced to the lowest seen in 50 years.
11/1/1998	Dry weather persisted into the late fall with rainfall deficits between 5 and 10 inches. This affected late season crops and caused water shortages. Water usage restrictions were initiated in many communities.
8/1/1999	The drought worsened during the month of August as high evaporation rates and little rainfall occurred. The most severe conditions by the end of the month had developed in the foothills and piedmont. Water restrictions began in several communities, and for some, the first time in memory. Hay and late crops dried up in many counties. Ponds and wells began to dry up as well, affecting homeowners, farmers, and businesses such as nurseries. In addition, boaters were running aground on recreational lakes due to low water levels.
9/1/1999	Rainfall continued to be scarce across much of western North Carolina through the month of September, prolonging the drought conditions which existed all summer. However, some areas in the piedmont picked up some rain from the remnants of Hurricane Dennis early in the month and from Hurricane Floyd itself two weeks later. Although this rain brought some relief, more wells ran dry and many more areas began mandatory water restrictions.
10/1/1999	The return of some rainfall as well as lower evaporation rates due to the change of seasons, resulted in the drought easing somewhat. Drought classifications were lowered in some cases, and some places lifted water restrictions. However, the drought had not ended by the end of the month.
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	

Date	Description
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 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

Date	Description
	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 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.

Date	Description
	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 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 fof 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: EXTREME COLD/WIND CHILL (2000-2019)

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.

TABLE H.3: FLOOD EVENTS (2000-2019)

Location	Date	Description
Clay Macon		
COUNTYWIDE	1/7/1998	Heavy rain fell over extreme southwest North Carolina causing creeks and streams to rise above bankfull. Many roads, intersections and low spots were partially covered with water.
WARNE	9/21/2009	Very heavy rainfall over several hours produced areal flooding from mid morning to late afternoon in Hayesville, North Carolina. A few roads in and around Hayesville, North Carolina had several inches to nearly a foot of water over the road. The vast majority of the flooding was along highway 64 in Clay county.
HAYESVILLE	12/2/2015	Flooding of several roads was reported, particularly State Routes 1303 and 1326.
Macon County		
Unincorporated Area	1/18/1996	An extremely strong cold front, preceeded by heavy rain all day, moved through the mountains, foothills and piedmont during the night. Heavy rain and flooding accompanied the storm system. Several inches of rain fell across the mountains during the day. At Rosman, the French Broad River flooded causing some evacuations in the downtown area.
Unincorporated Area	1/19/1996	An extremely strong cold front, preceded by heavy rain all day, moved through the mountains, foothills and piedmont during the night.
Unincorporated Area	1/26/1996	Prolonged rain became heavier following the ice. the rain increased into the night when some thunderstorms moved in from the west. Rainfall became excessive, more then 3 and 4 inches in some cases, causing flooding to begin by mid evening. At Asheville the flooding caused a wall to collapse onto several parked cars causing extensive damage. Numerous roads were closed around the mountains and foothills. Several major rivers flooded including the French Broad and the Oconoluftee. Evacuations were required in several counties because of flooding. In this event the flooding was not severe in the northern mountains.
Unincorporated Area	9/28/1996	
Unincorporated Area	9/27/2002	The Cullasaja River flooded part of Highway 64 near Highlands.
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.
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 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

Location	Date	Description
		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.
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.
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.
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 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.
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 aboout 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.

TABLE H.4: HAIL EVENTS (2000-2019)

Location	Date	Size	Description
Clay County			
Unincorporated Area	6/7/1985	1.75	
Unincorporated Area	6/7/1985	1.75	
Unincorporated Area	4/15/1987	1.5	
BRASSTOWN	1/5/1997	0.75	3/4 inch hail reported by county sheriff.
PINELOG	5/7/1998	1.75	
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	Law enforcement personnel reported thunderstorms produced penny-size hail in Hayesville.
HAYESVILLE	5/26/2011	1	Pea to quarter size hail occurred.
TUSQUITEE	6/9/2011	1.75	Law enforcement personnel reported thunderstorms produced golfball-size hail in Tusquitee.
HAYESVILLE	6/15/2011	1.75	Law enforcement personnel reported thunderstorms produced dime to golfball-size hail in Hayesville.
HAYESVILLE	4/26/2012	1.75	Law enforcement personnel reported thunderstorms produced golfball-size hail in Hayesville.
Macon County			
Unincorporated Area	3/28/1984	2.75	
Unincorporated Area	6/7/1985	1	
Unincorporated Area	3/15/1989	0.75	
Unincorporated Area	3/19/1992	0.88	
Nantahala	2/21/1993	0.75	
Countywide	3/31/1993	1	
Highlands	3/31/1993	0.75	
Nr Franklin	5/14/1995	1.5	
Franklin	6/15/1995	0.88	
Franklin	6/16/1995	0.75	
Franklin	6/17/1995	0.75	
BURNING TOWN	4/20/1996	0.75	
FRANKLIN	4/20/1996	1	
GOLD MINE	6/21/1997	1.5	A couple of severe thunderstorms developed in the mountains in the afternoon causing large hail south of Franklin and blowing down trees between Marshall and Hot Springs. A number of trees and power lines were downed at several locations in the foothills and piedmont. The most damage occurred in Hickory where numerous trees and power lines were downed. Caldwell county was hit hard. A cabinet shop and contents burned after

Location	Date	Size	Description
			being struck by lightning. Thunderstorm winds caused some damage, then high winds following the storm caused trees to fall in the Cajah's Mountain area. Lightning caused a fire in Buncombe county which destroyed a home.
HIGHLANDS	5/6/1999	1	Two lines of strong and severe thunderstorms moved across the mountains during the early morning hours, causing a considerable amount of wind damage. One severe thunderstorm spawned a weak tornado in the city of Asheville around sunrise. Along the 2 mile damage path, 500 trees were downed, many on homes and vehicles. A garage was destroyed, roofs were blown partially off a couple buildings, a school roof was damaged, and some condos were condemned from tree damage. Elsewhere in the mountains, damaging thunderstorm winds of nearly 70 mph at times blew numerous trees down, many on houses and cars. A few thousand people were left without power. In addition to damaging wind, a few reports of dime to quarter size hail were received. Intense lightning in Robbinsville knocked out the Graham county 911 system for the entire day, and wind gusts near 55 mph blew numerous small limbs onto power lines which resulted in additional power outages across the county.
OTTO	5/7/1999	0.75	Strong to severe thunderstorms developed for the second day in a row across the mountains and produced more wind damage and large hail. Dime to half dollar size hail was reported. Winds between 58 and 69 mph downed many trees, some across roads. A particularly violent wind gust in Roaring Creek smashed patio furniture, damaged the roof of a home, blew out vents from underpinning, and cracked blocks on the corner of a building. In addition, a mudslide occurred on old US Highway 64, six miles west of Franklin in 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.
AQUONE	6/20/2002	0.75	Reported near Lake Nantahala.
FRANKLIN	6/20/2002	1.5	
FRANKLIN	7/1/2002	0.75	
SCALY	7/2/2002	1	Hail damaged at least one vehicle.
FRANKLIN	5/15/2003	0.75	
FRANKLIN	7/13/2003	0.88	
HIGHLANDS	7/22/2003	1	Hail fell on Main St.
SCALY	3/27/2005	0.88	
FRANKLIN	5/10/2005	0.88	
HIGHLANDS	8/5/2005	1.75	
OTTO	4/2/2006	0.75	
FRANKLIN	4/3/2006	0.75	
OTTO	4/3/2006	0.75	
FRANKLIN	4/19/2006	0.75	
FRANKLIN	4/20/2006	0.88	
FRANKLIN	4/20/2006	1.5	
FRANKLIN	4/20/2006	1	
FRANKLIN	4/20/2006	1	
FRANKLIN	5/13/2006	1.25	Reported on the north side of Lake Nantahala.
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.

Location	Date	Size	Description
FRANKLIN	8/24/2007	1	Hail ranged in size from dimes to quarters.
FRANKLIN	8/24/2007	2	Reported in the Burningtown Community.
HIGHLANDS	5/20/2008	1	Wind-driven dime to quarter size hail covered the ground.
CULLASAJA	8/5/2009	0.75	Penny size hail was reported in the Cullasaja community.
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	Small hail, up to the size of pennies, reportedly covered the ground.
SEALY MTN	4/27/2011	1	Quarter size hail reported in the Scaly Mountain area.
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.
FAIRVIEW	5/26/2011	1	Quarter size hail fell along Winding Stairs Rd in the far northwest part of the county.
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.
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.
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.
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.
HIGHLANDS	6/1/2011	1	Quarter size hail fell on Wildwood Dr.
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, tracking a little to the north of a weak cold front. Several of the storms produced large hail.
HIGHLANDS	6/9/2011	1	Quarter size hail was reported on Walhalla Rd.
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	Hail up to golf ball size fell in the Nantahala Lake area.
ELLNAY	3/2/2012	2	Hail between golf ball and baseball size was reported in the Cullasaja area.
FRANKLIN ARPT	3/2/2012	1.75	Hail up to the size of golf balls was reported on the north side of Franklin.
HIGDONVILLE	4/5/2012	0.75	Pea to penny size hail fell east of Franklin.
ELLNAY	4/26/2012	1	A CoCoRaHS observer reported a second period of quarter size hail 7 miles east of Franklin.
ELLNAY	4/26/2012	1	Quarter size hail was measured about 7 miles east of Franklin.
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.
SHOOKVILLE	7/5/2012	1	Dime to quarter size hail was reported on Lost Horse Trail.
ELLIJAY	5/20/2013	1	Hail up to the size of half dollars was reported.

Location	Date	Size	Description
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	Spotter reported hail near Franklin.
TERESITA	6/19/2014	1.5	Forest Service ranger reported ping pong ball size hail in the Cartoogechaye area.
RAINBOW SPGS	3/27/2017	0.75	Public reported penny size hail.

TABLE H.5: HEAVY RAIN EVENTS (2000-2019)

Location	Date	Description
MACON COUNTY	6/4/2002	Heavy rain caused trees to fall onto roads and also resulted in some mudslides.
MACON COUNTY	11/25/1999	A strong storm system moving through the southeastern U.S. caused locally heavy rain (up to 7 inches in a small part of the mountains) and gusty winds. The result was standing water on highways and roads, some minor flooding of small streams, and several downed trees. There were numerous traffic accidents during this part of the holiday weekend as a result of the rain. The Davidson and French Broad Rivers flooded slightly in Transylvania county, causing some brief road closures.
MACON COUNTY	12/19/2002	Heavy rain caused a few North Carolina mountain streams to rise to near bank full. In addition, the wet soil combined with gusty winds to cause some drought weakened trees to fall across the area.
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.
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.
HIGHLANDS	8/17/1996	Lightning caused several structure fires in eastern Burke county. Heavy rains in the mountains of Macon county caused mud slides which closed roads.

TABLE H.6: HEAVY SNOW EVENTS (2000-2019)

Location	Date	Description
Clay County		
Unincorporated Area	3/19/1996	Heavy wet snow caused numerous power outages.
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 inches was measured at Hayesville.
Unincorporated Area	12/8/2017	A snowfall total of 6.6 inches was measured three miles southeast of Tusquitee.
Macon County		
Unincorporated Area	12/18/1996	Heavy snow accumulated 3 to 5 inches with 6 inches at high elevations in the mountains.
Unincorporated Area	1/10/1997	Heavy snow fell in the mountains resulting in accumulations of 3 to 6 inches. The highest totals were reported from Graham and Jackson counties. Over 200 car wrecks were reported in western North Carolina during the snow. Icy roads the next morning contributed to many accidents with one indirect fatality near Statesville, well away from the high accumulations of precipitation.
Unincorporated Area	12/27/1997	Snow accumulated in general, up to 3 inches across the mountains, except for some of the higher elevations, where 4-6 inches were common.
Unincorporated Area	12/29/1997	Snow moved north across the foothills and piedmont during the morning and became heavy north and west of the Charlotte area before ending in the middle of the afternoon. Snowfall ranged between 1 and 4 inches across the southern foothills and southern piedmont, to 4-8 inches across the northern foothills and northwest piedmont. In addition, Macon county in the southern mountains received up to 5 inches of snow before the middle of the morning. There were hundreds of traffic accidents and a few thousand people in the foothills were without power for a while.
Unincorporated Area	12/29/1997	Snow began during the day of the 29th and lasted well into the 30th as a strong storm system moved northeast through the Carolinas. Snowfall ranged from 2-6 inches in the lower elevations, to generally 4-12 inches in the higher elevations. Some of the highest peaks ended up with between 15 and 23 inches.
Unincorporated Area	1/18/1998	Snow fell across mainly the high elevations of the mountains and northern foothills. The snow began lightly, accumulating at least 1-3 inches across the entire area by the early morning of the 19th. However, several high elevation locations began to receive heavy snow by midnight. Before the snow ended at 6 am on the 19th, some of these locations had between 4 and 7 inches.
Unincorporated Area	1/27/1998	A deep cut-off low drifted across western North Carolina, drawing abundant moisture into air just cold enough to support snow. A heavy wet snow began in the pre-dawn hours on the 28th and

Location	Date	Description
		moved north across the mountains. Snow accumulated quickly during the day, before tapering to a light snow in the evening. Light snow continued into the following morning, especially north of Asheville. Snowfall totals ranged from 4 to 8 inches at lower elevations to between 1 and 3 feet at high elevations. To make matters worse, strong winds combined with the snow to create near blizzard conditions at times in the higher elevations. Tens of thousands of people were without power for up to 3 days as numerous trees and power lines were downed. Thousands of motorists were stranded on roads and highways. Interstate 40 through the mountains was closed for several hours and the National Guard had to be called in to rescue people stranded on the highway.
Unincorporated Area	1/31/1999	Portions of the central and southern mountains received a more prolonged period of moderate to heavy wet snow, mixed at times with sleet and freezing rain, which accumulated to between 4 and 6 inches by early evening. Light snow continued in some places until midnight.
Unincorporated Area	3/26/1999	A deep cold core low pressure center in the mid and upper levels of the atmosphere moved slowly across the Southern Appalachians during the day, triggering heavy snow accompanied by thunder at times. Most areas received 2 to 4 inches of heavy wet snow. However, a small area consisting of Swain, northern Jackson, northern Haywood and Madison counties received between 4 and 10 inches of snow. The heavy snow ended for most of the counties around 1 pm. Although Buncombe and Yancey counties continued to experience the heavy snow until around 5 pm.
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.
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

Location	Date	Description
		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	
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	
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 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.

Location	Date	Description
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 cost 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 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

Location	Date	Description
		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.

TABLE H.7: ICE STORM EVENTS (2000-2019)

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.
Macon County	
1/9/1997	-

TABLE H.8: LIGHTNING EVENTS (2000-2019)

Location	Date	Description
Macon County		
HIGHLANDS	6/2/1998	A cluster of thunderstorms moved southeast across the southwestern mountains of North Carolina early on the 3rd. One thunderstorm became severe as it crossed Jackson county and blew many trees down across the county. Scattered power outages occurred as well, although mainly in the Caney Fork community. A new water treatment plant in Highlands was put out of commission for 2 days by a severely damaging lightning strike.
CULLASAJA	6/4/1998	Lightning ignited a fire that destroyed a house and its contents.
HIGHLANDS	6/10/1998	A warm front pushing north through western North Carolina helped initiate heavy rain and severe thunderstorms during the morning of the 10th. Many reports of trees down and large hail were received from the western piedmont. A car was blown off the road near Kings Creek. Chicken houses were damaged near Taylorsville allowing ten thousand chickens to run free. Numerous trees were uprooted in Monroe and wind blown golf ball size hail broke windows and damaged cars. Heavy rain in a short period of time resulted in some urban flooding from the Belmont and Mount Holly areas, to the south side of Charlotte. Numerous roads were flooded and several motorists required rescue in different parts of the city. Lightning severely damaged a church in Millersville, but no damage estimate was available. Several homes were struck by lightning in the Charlotte area, causing extensive damage. In Wingate, one house was severely damaged and two others minorly damaged by lightning. Lastly, a lightning strike in Highlands ignited a fire that burned a large house and its contents, including a Corvette. No damage estimates were given.
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 nereby 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 EVENTS (2000-2019)

Location	Date	MPH	Description
Clay County			
Unincorporated Area	6/6/1985		
Unincorporated Area	6/7/1985		
Unincorporated Area	6/7/1985		
Hayesville	4/15/1993		
COUNTYWIDE	4/20/1996		Numerous trees downed across county and several small buildings damaged.
COUNTYWIDE	5/25/1996		There were numerous reports of downed trees and hail throughout the county.
HAYESVILLE	7/4/1997		Large trees and powerlines down.
HAYESVILLE	5/6/1999		Trees down.
WARNE	7/5/1999		Trees down.
FIRES CREEK	8/13/1999		Trees down.
HAYESVILLE	2/13/2000		Trees down.
HAYESVILLE	8/2/2002		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	A few trees and powerlines down in western half of county. Reported by Blue Ridge Mountain Power Co.
HAYESVILLE	8/5/2005	60	Two trees down near of Hayesville.
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.

Location	Date	MPH	Description
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 from Hayesville to Shooting Creek and Chatuga Lake and old Highway 64.
HAYESVILLE	6/17/2009	60	Law enforcement personnel reported numerous trees downed by thunderstorm winds in Hayesville and countywide.
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.
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.
SHOOTING CREEK	6/25/2010	52	The utility company personnel reported 1 tree and powerlines downed by thunderstorm winds in Shooting Creek.
TUSQUITEE	6/25/2010	52	The utility company personnel reported 1 tree and powerlines downed by thunderstorm winds in Tusquitee.
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.

Location	Date	MPH	Description
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.
Macon County			
Unincorporated Area	6/20/1970	0	
Unincorporated Area	1/25/1975	0	
Unincorporated Area	10/13/1983	0	
Unincorporated Area	7/26/1986	0	
Unincorporated Area	8/27/1992	0	
Unincorporated Area	2/21/1993	0	Damage occurred to a mobile home and porch off Highway 19-74.
FRANKLIN	1/5/1997	50	
HIGHLANDS	1/5/1997	50	Severe thunderstorms moved in from Tennessee and caused damaging winds. Most locations above had trees down along with some downed power lines and power outages. At Whittier a resident reported their home shook violently in the wind for about 15 minutes. At Dillsboro, near Sylva, the carts in a discount store's parking lot were scattered.
NEAR HIGHLANDS	2/21/1997	50	
BEECHERTOWN	7/4/1997	50	Severe thunderstorms moved into the mountains from Tennessee in the early evening on the Fourth, before moving into or redeveloping in the foothills and western piedmont later in the evening. Damaging winds raked much of western North Carolina, downing trees and power lines, and a few reports of hail as large a golf balls were reported. Several counties reported trees and power lines down countywide, often blocking roads and damaging homes and/or vehicles. Outflow from the storms propagated southeast into the Charlotte metro area before midnight, producing gusty winds between 35 and 45 mph for a short period of time. Dollar amounts for much of the damage were not available at the time of this writing.
FRANKLIN	7/4/1997	50	Extensive damage occurred near Burningtown due to trees falling on homes and vehicles. Power was out for much of the night.
HIGHLANDS	7/4/1997	50	Severe thunderstorms moved into the mountains from Tennessee in the early evening on the Fourth, before moving into or redeveloping in the foothills and western piedmont later in the evening. Damaging winds raked much of western North Carolina, downing trees and power lines, and a few reports of hail as large a golf balls were reported. Several counties reported trees and power lines down countywide, often blocking roads and damaging homes and/or vehicles. Outflow from the storms propagated southeast into the Charlotte metro area before midnight, producing gusty winds between 35 and 45 mph for a short period of time. Dollar amounts for much of the damage were not available at the time of this writing.

Location	Date	MPH	Description
AQUONE	6/21/1998	50	A few storms became severe as they moved east across the southern mountains during the early afternoon. A tree fell on a car and others were blocking a road in Macon county. In addition to downed trees in Cashiers, excessive rain in a short period of time caused flash flooding across the southern part of Jackson county that resulted in a bridge on Hwy 281 being washed out.
FRANKLIN	6/21/1998	50	A few storms became severe as they moved east across the southern mountains during the early afternoon. A tree fell on a car and others were blocking a road in Macon county. In addition to downed trees in Cashiers, excessive rain in a short period of time caused flash flooding across the southern part of Jackson county that resulted in a bridge on Hwy 281 being washed out.
HIGHLANDS	1/23/1999	58	Unseasonably warm, moist air and strong winds through a deep layer of the atmosphere combined to produce a line of thunderstorms along a cold front advancing east across North Carolina. Numerous trees and power lines were downed. Light structural damage occurred in Macon county.
COWEE	5/6/1999	50	Two lines of strong and severe thunderstorms moved across the mountains during the early morning hours, causing a considerable amount of wind damage. One severe thunderstorm spawned a weak tornado in the city of Asheville around sunrise. Along the 2 mile damage path, 500 trees were downed, many on homes and vehicles. A garage was destroyed, roofs were blown partially off a couple buildings, a school roof was damaged, and some condos were condemned from tree damage. Elsewhere in the mountains, damaging thunderstorm winds of nearly 70 mph at times blew numerous trees down, many on houses and cars. A few thousand people were left without power. In addition to damaging wind, a few reports of dime to quarter size hail were received. Intense lightning in Robbinsville knocked out the Graham county 911 system for the entire day, and wind gusts near 55 mph blew numerous small limbs onto power lines which resulted in additional power outages across the county.
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.
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	8/10/2000	50	Large trees were blown down across roads.
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.
FRANKLIN	10/24/2001	50	Sheriff's Department reported trees and power lines down countywide -- starting in the west.
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.

Location	Date	MPH	Description
FRANKLIN	7/13/2003	52	
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.
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.
COWEE	5/20/2008	50	Several trees blown down in the Cowee area.
FRANKLIN	5/20/2008	50	Several trees snapped on Bailey Rd during a microburst.
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.
BEECHERTOWN	6/19/2011	55	Multiple trees were blown down from the Nantahala community, to the Cowee community, to near the city of Franklin.
ELLIJAY	6/19/2011	50	Multiple trees were blown down along highway 70 north of Marshall, including in the Walnut community.
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.

Location	Date	MPH	Description
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.
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.
NORTON	6/24/2018	50	Law enforcement reported a few trees and power lines blown down near Otto.
WAYAH DEPOT	6/24/2018	50	County comms reported two trees blown down.
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.

TABLE H.10: TORNADO EVENTS (2000-2019)

Location	Date	Scale	Description
Clay County			
Unincorporated Area	1/10/1965	F1	
Unincorporated Area	12/25/1974	F1	
Unincorporated Area	12/25/1974	F1	
Unincorporated Area	2/25/1980	F0	
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	
Unincorporated Area	7/29/1976	F1	
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 (2000-2019)

Date	Description
	Clay County
1/10/1997	An arctic cold front and associated upper level disturbance swept through the southern Appalachians. Snowfall amounts ranged between 2 and 3 inches.
12/30/1997	A series of fast-moving upper level disturbances moved across southwest North Carolina, causing heavy snow shower activity. Amounts were generally 4 to 8"
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
	Macon County
3/9/1999	Strong low pressure moved north through the Mississippi River Valley with associated moisture streaming north across the Southeastern States. Cold, dry air was already in place across western North Carolina and caused a mixture of heavy sleet, snow and freezing rain across much of the mountains. Much of the above counties received 1 to 2 inches of sleet before the precipitation changed to snow and added another couple of inches. The Highlands area in Macon county received 4 to 5 inches of snow.
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 Cherohala 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 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.