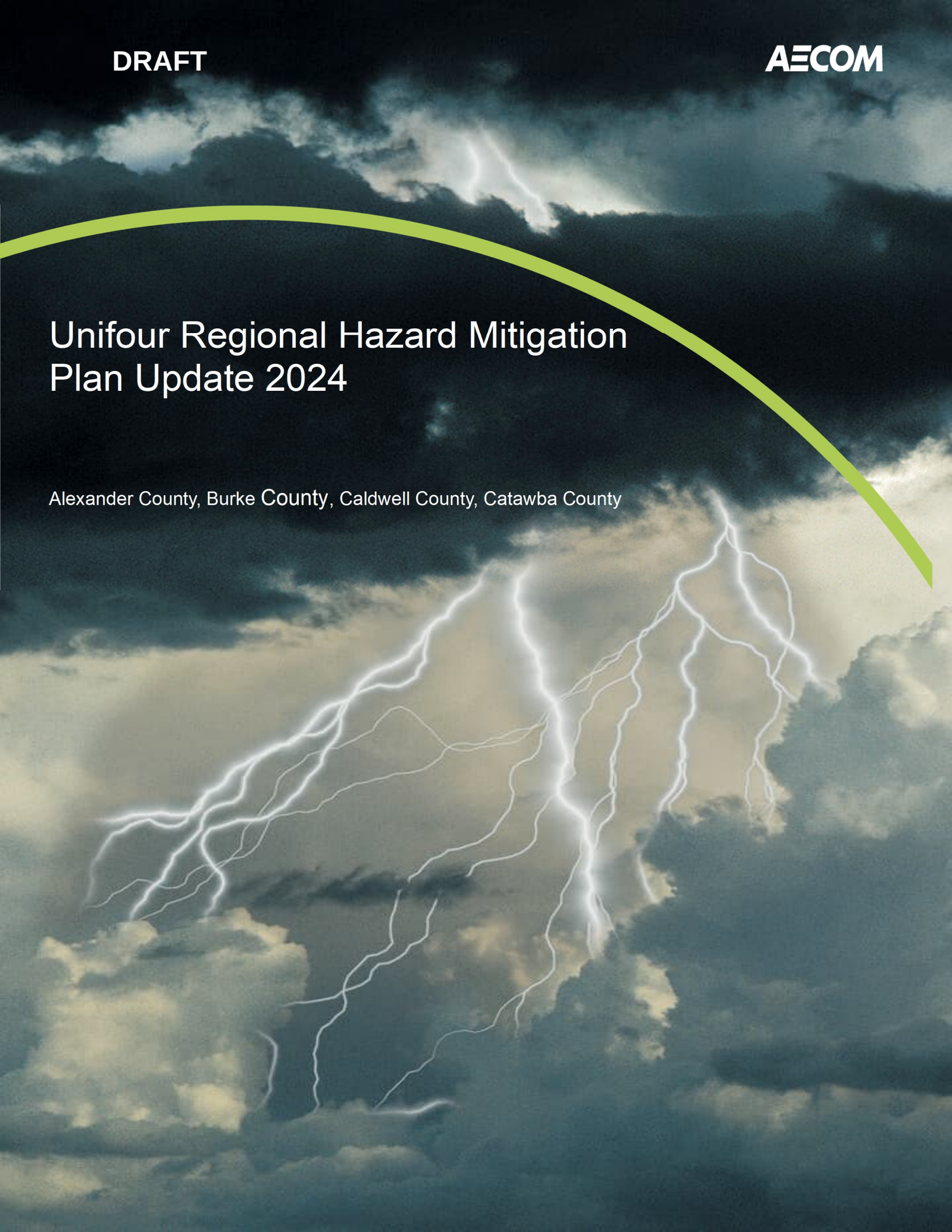
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AECOM

Unifour Regional Hazard Mitigation Plan Update 2024

Alexander County, Burke County, Caldwell County, Catawba County



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Section 1. Introduction

This section provides a general introduction to the Hazard Mitigation Plan It consists of the following five subsections:

1.1 Background

1.2 Purpose and Vision

1.3 Scope

1.4 Authority

1.5 Plan Overview

1.1 Background

Natural hazards, such as floods, tornadoes, and severe winter storms 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 region, comprised of Alexander, Burke, Caldwell and Catawba counties, is vulnerable to a wide range of natural hazards. These hazards threaten the life and safety of the Region's residents and have the potential to damage or destroy both public and private property and disrupt the local economy and overall quality of life.

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 damaging effects of natural 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 called hazard mitigation. Hazard mitigation is defined by the Federal Emergency Management Agency (FEMA) as, "Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards."

Hazard mitigation techniques include structural measures and non-structural measures. Structural measures include activities such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards. Non-structural measures include activities like adopting sound land use policies and creating 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 made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and soon. Therefore, it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease overall hazard vulnerability in the planning area.

One of the most effective means that a community can use to implement a comprehensive approach to hazard mitigation is to develop, adopt, and update, as needed, a local hazard mitigation plan. A mitigation plan establishes the broad local vision and guiding principles for reducing hazard risk, and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities. The Unifour Regional HMP (hereinafter referred to as "Hazard Mitigation Plan" or "Plan") is an effective means to incorporate hazard mitigation principles and practices into the routine government activities and functions of the 4 counties and 28 municipalities participating in this Plan. At its most inner core, the Plan recommends specific actions to protect our built environment from the forces of nature and to protect the residents of the region 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 region's future vulnerability to identified hazards.

The Plan is designed to be a living document, with implementation and evaluation procedures included to help achieve meaningful objectives and successful outcomes over time.

Disaster Mitigation Act of 2000

To reduce the Nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act by invoking new and revitalized approaches to mitigation planning. Section 322 of the Act emphasizes the need for state and local 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 government applying for federal mitigation grant funds. 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 declared disaster. This Plan was prepared in coordination with FEMA and the North Carolina Division of Emergency Management (NCEM) to ensure that it meets all applicable planning requirements. This includes conformance with FEMA's latest Local Mitigation Planning Handbook (released March 2013) and Local Mitigation Plan Review Guide (released October 2011). A Local Hazard Mitigation Plan Update Checklist, found in Appendix E, provides a summary of FEMA and NCEM's current minimum standards of acceptability and notes the location within the Plan where each planning requirement is met.

1.2 Purpose and Vision

The general purpose of this Hazard Mitigation Plan is:

- To protect life and property by reducing the potential for future damages and economic losses that result from natural hazards;
- To qualify for additional grant funding, in both the pre-disaster and post-disaster environment;
- To speed recovery and redevelopment following future disaster events;

- To sustain and enhance existing governmental coordination in the Plan Region and demonstrate a firm local commitment to hazard mitigation principles; and
- To comply with federal and state requirements for local hazard mitigation plans.

A Unifour Hazard Mitigation Planning Committee was created, consisting of representatives from each of the 28 participating jurisdictions, to develop a regional plan. This committee made a vision statement to guide the regional planning process and give all participating jurisdictions a common focal point for discussion, coordination, and development of the Plan.

Vision Statement

Through a coordinated regional planning effort, create and implement an effective hazard mitigation plan that will identify and prioritize risk reduction measures for natural hazards to protect the health, safety, quality of life, environment, and economy of the planning area.

The general purpose of this Hazard Mitigation Plan is:

1. To protect life and property by reducing the potential for future damages and economic losses that result from natural hazards;
2. To qualify for additional grant funding, in both the pre-disaster and post-disaster environment;
3. To speed recovery and redevelopment following future disaster events;
4. To sustain and enhance existing governmental coordination in the planning area and demonstrate a firm local commitment to hazard mitigation principles; and
5. To comply with federal and state requirements for local hazard mitigation plans.

1.3 Scope

This Hazard Mitigation Plan will be updated and maintained to continually address those hazards determined to be of high and moderate risk through the detailed vulnerability assessment for the plan area (see Section 4: 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 to the plan area The geographic scope (i.e., the “planning area”) for the Plan includes all incorporated and unincorporated areas of Alexander, Burke, Caldwell and Catawba counties. This includes the following 28 local government jurisdictions:

Alexander County

- Town of Taylorsville

Burke County

- City of Morganton
- Town of Connelly Springs
- Town of Drexel
- Town of Glen Alpine
- Town of Hildebran
- Town of Rutherford College

- Town of Valdese

Caldwell County

- City of Lenoir
- Town of Cajah's Mountain
- Town of Gamewell
- Town of Granite Falls
- Town of Hudson
- Town of Rhodhiss
- Town of Sawmills
- Village of Cedar Rock

Catawba County

- City of Claremont
- City of Conover
- City of Hickory
- City of Newton
- Town of Brookford
- Town of Catawba
- Town of Long View
- Town of Maiden

1.4 Authority

This Hazard Mitigation Plan has been adopted by all participating counties in accordance with the authority and police powers granted to counties as defined by the State of North Carolina (N.C.G.S., Chapter 153A). This Hazard Mitigation Plan has also been adopted by all participating incorporated municipal jurisdictions under the authority granted to cities and towns as defined by the State of North Carolina (N.C.G.S., Chapter 160A). Copies of all local resolutions to adopt the Plan are included in Appendix F.

This Plan was developed in accordance with current state and federal rules and regulations governing local hazard mitigation plans. The Plan shall be monitored and updated on a routine basis to maintain compliance with the following 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) and by FEMA's Interim Final Rule published in the Federal Register on February 26, 2002, at 44 CFR Part 201.
- North Carolina General Statutes, Chapter 166A: North Carolina Emergency Management Act, as amended by Senate Bill 300: An Act to Amend the Laws Regarding Emergency Management as Recommended by the Legislative Disaster Response and Recovery Commission (2001).

1.5 Plan Overview

This Hazard Mitigation Plan is divided into eight major sections, each of which is described briefly below. The Plan also includes several appendices for additional or supplemental items not included in the main body of the Plan, including multiple appendices with various detailed tables of natural hazard impacts which can been seen in the list of tables within each appendix.

This Introduction (Section 1) provides background on hazard mitigation planning and the Disaster Mitigation Act of 2000, and defines the purpose, scope, and authority of the Plan as adopted by all participating jurisdictions. It also provides the following outline of each section making up the Plan.

The Planning Process, (Section 1) provides background on hazard mitigation planning and the Disaster Mitigation Act of 2000, and defines the purpose, scope, and authority of the Plan as adopted by all participating jurisdictions. It also provides the following outline of each section making up the Plan.

The Planning Process, found in Section 2, fully documents the process by which the region prepared this regional hazard mitigation plan as an update to its four existing county level plans. This includes a description of the key steps involved in the processes followed, who was involved (i.e., the members of the Hazard Mitigation Planning Committee) and full descriptions of community meetings and workshops, how the public and other stakeholders were notified and involved, and how each of the municipal jurisdictions participated in the process.

The Planning Area Profile, located in Section 3, describes the general makeup of the region, including its counties and local municipalities, including relevant geographic, demographic, and economic characteristics. In addition, building characteristics and land use patterns are discussed along with general historical disaster data. This baseline information provides context for the region-wide planning area and thereby assists the planning team in recognizing the social, environmental, and economic factors that play a role in determining community vulnerability to natural hazards.

The Risk Assessment, found in Section 4, serves to identify, analyze, and assess the region's overall risk to natural hazards. The Risk Assessment also attempts to define any hazard risks that may uniquely or exclusively affect the individual municipal jurisdictions. The Risk Assessment, builds on available historical data from past hazard occurrences, establishes detailed profiles for each hazard, and culminates in a hazard risk ranking based on conclusions about the frequency of occurrence, spatial extent, and potential impact of each hazard. In essence, the information generated through the Risk Assessment, serves a critical function as communities seek to determine the most appropriate mitigation actions to pursue and implement—enabling communities to prioritize and focus their efforts on those hazards of greatest concern and those structures or areas facing the greatest risk(s).

The Capability Assessment, located in Section 5, provides a comprehensive examination of the Plan Area and the participating municipalities' capacity to implement meaningful mitigation strategies and identifies existing 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 detailed survey questionnaires for local officials 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 (such as participation in the National Flood Insurance Program) in establishing a successful and sustainable community hazard mitigation program. The Community Profile, Risk Assessment, and Capability Assessment collectively serve as a basis for determining the goals for the Hazard Mitigation Plan, each contributing to the development, adoption, and implementation of a meaningful plan.

The Mitigation Strategy, found in Section 6, consists of regional goal statements as well as specific mitigation actions for each local government jurisdiction participating in the planning process, along with a set of regional mitigation actions to be implemented by the Hazard Mitigation Planning Committee. The Mitigation Strategy provides the foundation for detailed Mitigation Action Plans, found in Section 7, that link specific mitigation actions for each jurisdiction 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 short-term and immediate actions that will guide day-to-day decision-making and project implementation.

In addition to the identification and prioritization of mitigation projects, emphasis is placed on the use of program and policy alternatives to help make the Plan Area less vulnerable to the damaging forces of nature 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 hazard mitigation policies and programs with complimentary community goals related to housing, economic development, downtown revitalization, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

The Plan Maintenance Procedures, found in Section 8, includes the measures each participating jurisdiction will take to ensure the Plan’s continuous long-term implementation. The procedures also include how the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

Section 2: Planning Process

This section of the Plan describes the mitigation planning process undertaken by the region in preparing the 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 Plan Region
2.3 Preparing the Regional Plan
2.4 Hazard Mitigation Planning Committee
2.5 Meetings and Workshops
2.6 Involving the Public
2.7 Involving Stakeholders
2.8 Documentation of Plan Progress

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 results in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve short-term planning objectives and a long-term community vision. To ensure the functionality of each mitigation action, responsibility is assigned to a specific individual, department, or agency along with a schedule for its implementation. 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.

Mitigation planning offers 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, mitigation planning is 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 pre-disaster investments 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 residents, businesses, and industries to re-establish themselves in the wake of a disaster, getting the community economy back on track more quickly and with less interruption.

The benefits of mitigation planning go beyond solely reducing hazard vulnerability. 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 consider other existing community goals or initiatives that will help complement or hinder their future implementation.

2.2 History of Hazard Mitigation Planning in the Plan Region

All four counties participated in the creation of the Unifour Regional Hazard Mitigation Plan in 2014. The FEMA approval date for the previous plan was 2019. All four counties participated in the update of the Unifour Regional Hazard Mitigation Plan in 2024. The FEMA approval date for this plan is 2024. The counties, along with a list of their participating municipalities, are listed below.

Alexander County

- Alexander County
- Town of Taylorsville

Burke County

- Burke County
- Town of Connelly Springs
- Town of Drexel
- Town of Glen Alpine
- Town of Hildebran
- City of Morganton
- Town of Valdese
- Town of Rutherford College

Caldwell County

- Caldwell County
- Town of Cajah’s Mountain
- Village of Cedar Rock
- Town of Gamewell
- Town of Granite Falls
- Town of Hudson
- City of Lenoir
- Town of Rhodhiss
- Town of Sawmills

Catawba County

- Catawba County
- Town of Brookford
- Town of Catawba

- City of Claremont
- City of Conover
- City of Hickory
- Town of Long View
- Town of Maiden
- City of Newton

No new jurisdictions have joined the planning process since the plan was adopted, and all jurisdictions that participated in previous planning efforts have agreed to participate in this regional planning effort. The specific process of moving forward with one regional approach is described in more detail in the following subsections.

2.3 Preparing the Regional Plan

Element A1. *Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))*

Hazard mitigation plans are required by FEMA to be updated every five years for the jurisdictions covered under them to remain eligible for federal mitigation and public assistance funding.

Hazard mitigation plans are required by FEMA to be updated every five years for the jurisdictions covered under them to remain eligible for federal mitigation and public assistance funding. To simplify and enhance planning efforts for the jurisdictions in the Unifour Region, Alexander, Burke, Caldwell, and Catawba counties made the decision to move forward with the creation of the Unifour Regional Hazard Mitigation Plan. This regional approach allows resources to be shared amongst the participating jurisdictions and eases the administrative duties of all the participants by combining the four existing county level plans, and the requirements for the five-year plan update, into one coordinated regional planning process.

To help prepare the Unifour Regional Hazard Mitigation Plan, AECOM was hired as a consultant to provide professional mitigation planning services. To meet requirements of the NFIP's Community Rating System, the region ensured that the planning process was facilitated under the direction of a professional planner, Kelly Keefe, CFM, from AECOM who served as the lead planner for this project.

Per the contractual scope of work, the consultant team followed the mitigation planning process recommended by FEMA and recommendations provided by North Carolina Division of Emergency Management (NCEM) mitigation planning staff. The *Local Hazard Mitigation Plan Review Tool*, found in Appendix E, 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 Interim Final Rule as published in the Federal Register on February 26, 2002, in Part 201 of the Code of Federal Regulations (CFR). The planning team used FEMA's *Local Mitigation Planning Handbook* (released March 2023) for reference as they completed the Plan.

The process used to prepare this Plan included six major steps completed over about six months beginning in March 2024. Each of these planning steps resulted in critical work products and outcomes that collectively make up the Plan.

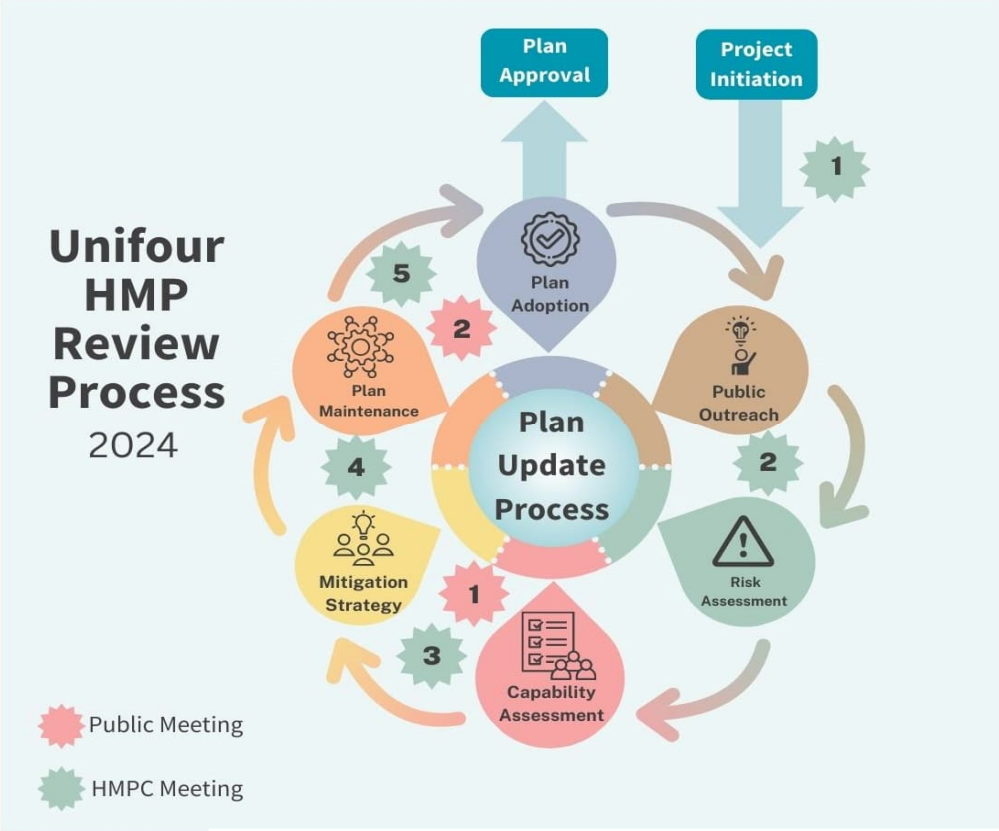


Figure 2-1: Mitigation Planning Process for the Plan Area

Task Type	Task	Date Completed
Meeting	Kickoff	February 7, 2024
Meeting	Planning Overview	April 11, 2024
Workshop	Capabilities Assessment	May 13, 2024
Deadline	Capabilities Assessments	August 14, 2024
Public Meeting	Mitigation Goal & Stakeholder Review	June 12, 2024
Workshop	Mitigation Actions	July 9, 2024
Deadline	Mitigation Actions	August 14, 2024
Deadline	HMP Draft Review & Distribution	September 18, 2024
Deadline	Stakeholder Review Deadline	October 2, 2024
Submit	Final Draft Submitted to FEMA	October 9, 2024

Table 2-1: Mitigation Meetings Schedule

Element A1-a: *Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved?*

Jurisdiction	HMP Meeting Attendance	Alternate Participation	Mitigation Action Updates	Capabilities Assessment	Participation Details
Alexander County	Yes	**----**	Updated	Updated	**Meeting Attendance:** 2/7/2024, 2/16/2024, 4/11/2024, 6/12/2024, 7/9/2024
Town of Taylorsville	Yes	----	Updated	Updated	**Meeting Attendance:** 2/16/2024
Burke County	Yes	----	Updated	Updated	**Meeting Attendance:** 2/7/2024, 2/16/2024, 4/11/2024, 7/9/2024
Town of Connelly Springs	No	One-on-One Participation	No Updates Made	No Updates Made	**Mitigation Actions and Capabilities Assessment Responses** were used in this plan from the 2019 Unifour HMP Update.
Town of Drexel	Yes	-----	Updated	Updated	**Meeting Attendance:** 4/11/2024
Town of Glen Alpine	No	One on One Participation	Yes	Yes	Participated in the update process via email (See Appendix G).
Town of Hildebran	Yes	----	Updated	Updated	**Meeting Attendance:** 4/11/2024, 6/12/2024, 7/9/2024
City of Morganton	Yes	----	Updated	Updated	**Meeting Attendance:** 7/9/2024
Town of Rutherford College	Yes	----	Updated	Updated	**Meeting Attendance:** 6/12/2024
Town of Valdese	Yes	----	Updated	Updated	**Meeting Attendance:** 4/11/2024, 7/9/2024
Catawba County	Yes	---	Updated	Updated	**Meeting Attendance:** 2/7/2024, 2/16/2024, 4/11/2024, 6/12/2024, 7/9/2024
Town of Brookford	No	One-on-One Participation	Updated	No Updates Made	**One-on-one Participation** in the update process via email (See Appendix G); **Capabilities Assessment** responses used in this HMP were from the 2019 Unifour HMP Update.
Town of Catawba	Yes	---	No Updates Made	No Updates Made	**Meeting Attendance:** 4/11/2024, 6/12/2024 7/9/2024; **Mitigation Actions and Capabilities Assessment Responses** in this plan are from the 2019 Unifour HMP Updates.
City of Claremont	No	One-on-One Participation	Updated	Updated	**One-on-one Participation** in the update process via email (See Appendix G);

Jurisdiction	HMP Meeting Attendance	Alternate Participation	Mitigation Action Updates	Capabilities Assessment	Participation Details
City of Conover	No	One-on-One Participation	Updated	No Updates Made	**Capabilities Assessment** responses used in this HMP were from the 2019 Unifour HMP Update; No correspondence with Jurisdiction
City of Hickory	Yes	----	Updated	Updated	**Meeting Attendance:** 2/16/2024, 4/11/2024, 6/12/2024, 7/9/2024
Town of Long View	Yes	---	Updated	Updated	**Meeting Attendance:** 4/11/2024, 6/12/2024
Town of Maiden	Yes	---	Updated	Updated	**Meeting Attendance:** 6/12/2024
City of Newton	Yes	----	No Updates Made	Updated	**Meeting Attendance:** 6/12/2024, 7/9/2024; **Mitigation Action Status** responses used in this 2024 HMP were from the 2019 Unifour HMP Update.
Caldwell County	Yes	-----	Updated	Updated	**Meeting Attendance:** 2/7/2024, 4/11/2024, 6/12/2024, 7/9/2024
Town of Cajah's Mountain	No	One-on-One Participation	No Updates Made	No Updates Made	**Mitigation Actions and Capabilities Assessment Responses** in this plan are from the 2019 Unifour HMP Update; No Correspondence with jurisdiction
Village of Cedar Rock	Yes	-----	Updated	Updated	**Meeting Attendance:** 6/12/2024
Town of Gamewell	Yes	-----	Updated	Updated	**Meeting Attendance:** 4/11/2024
Town of Granite Falls	Yes	----	No Updates Made	Updated	**Meeting Attendance:** 6/12/2024
Town of Hudson	Yes	----	Updated	Updated	**Meeting Attendance:** 2/16/2024, 4/11/2024, 6/12/2024, 7/9/2024
City of Lenoir	Yes	----	Updated	Updated	**Meeting Attendance:** 7/9/2024
Town of Rhodhiss	Yes	---	Updated	Updated	**Meeting Attendance:** 4/11/2024
Town of Sawmills	Yes	----	No Updates Made	No Updates Made	**Meeting Attendance:** 6/12/2024; **Mitigation Actions and Capabilities Assessment Responses** in this plan are from the 2019 Unifour HMP Updates.

Table 2- 2: Participation Summary by Jurisdiction

2.3.1 Plans, Studies, Reports, and Technical Information

This plan was developed utilizing a wide range of technical information, plans, studies, and reports which helped inform the updates to the Unifour Regional HMP. Each source was utilized in varying capacities, but information is cited throughout each section of the Unifour Regional HMP where applicable. Some of the Plans, Studies, Reports, and Technical Information used to guide and inform this HMP update include:

- Federal Emergency Management Administration (FEMA) National Risk Index (NRI) and NRI Technical Documentation
- North Carolina Historic Preservation Office & North Carolina Department of Natural and Cultural Resources: HPOWEB 2.0
- National Oceanic and Atmospheric Administration's (NOAA) National Weather Service 80-Year List of Severe Weather Fatalities
- NOAA and National Center for Environmental Information (NCEI) Storm Events Database
- National Interagency Fire Center Wildland Fire Interagency Geospatial Services
- State of North Carolina 2023 Hazard Mitigation Plan
- U.S. Geological Survey Earthquake Catalog
- U.S. Census Bureau Census Information
- Alexander County 2045 Comprehensive Plan
- Blueprint Burke Strategic Use Plan
- Caldwell County Comprehensive Plan
- Catawba County Comprehensive Plan
- National Register of Historic Places (U.S. National Park Service) Database
- FEMA Local Mitigation Planning Handbook

A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))

2.4 Hazard Mitigation Planning Committee

To guide the development of this Plan, the Unifour counties (Alexander County, Burke County, Caldwell County, and Catawba County) created the Unifour Hazard Mitigation Planning Committee (HMPC). This committee represented a community-based planning team made up of representatives from various county departments and municipalities and other key stakeholders identified to serve as critical partners in the planning process.

Beginning in March 2024, the planning committee members engaged in regular discussions as well as local meetings and planning workshops to discuss and complete tasks associated with preparing the Plan; including an email campaign to invite various stakeholders such as local/regional agencies and neighboring communities to participate in the planning process. This working group coordinated 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 email distribution list.

Specifically, the tasks assigned to the Unifour Hazard Mitigation Planning Committee included:

- Participate in hazard mitigation planning committee meetings and workshops
- Provide best available data as required for the *Risk Assessment* portion of the Plan;
- Complete the *Local Capability Assessment Survey* and provide copies of any mitigation or hazard-related documents for review and incorporation into the Plan;
- Support the development of the *Mitigation Strategy* portion of the Plan, including the design and adoption of a regional vision statement, regional mitigation goal statements, and regional mitigation actions;
- Review the existing mitigation actions from each county's previous plan, provide an update on those previously adopted mitigation actions, and propose new mitigation actions for their department/agency for incorporation into the updated regional Plan;
- Review and provide timely comments on all study findings and draft plan deliverables; and
- Support the adoption of the Unifour Regional Hazard Mitigation Plan.

Element A1. *Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))*

Table 2-3 lists the members of the HMPC responsible for participating in the development of the Plan. Committee members are generally listed by jurisdiction in Table 2-3 for ease of organizing and presenting the information, but it should be noted that the committee worked extremely well as one regional unit thinking beyond traditional jurisdictional boundaries to focus on the mitigation planning issues and tasks at hand. For all jurisdictions unable to attend the meetings in person, they were represented by their County Lead Coordinator and maintained communication to participate, review and make decisions about plan data. The County Lead Coordinators are Daniel Fox and Amy Bucknum, Alexander County; Michael Willis and Marti Blanton, Burke County; Vic Misenheimer, Caldwell County; Jason Williams, Catawba County.

Jurisdiction	Organization	Name	Title
ALEXANDER COUNTY			
Alexander County	Alexander County	Daniel Fox (**County Lead**)	Emergency Services Director
Alexander County	Alexander County	Brian Burgess	Alexander County Emergency Services Director
Alexander County	Alexander County	Greg Foster	911 Director
Alexander County	Alexander County	Seth Harris	Planner
Alexander County	Alexander County	Mark Howell	Alexander County Emergency Services
Town of Taylorsville	Alexander County	Doug Gillispie	Town Assistant
Town of Taylorsville	Taylorsville Police Dept.	Mike Millsaps	Chief of Police
BURKE COUNTY			
Burke County	Burke County	Mike Willis **(County Lead)**	Emergency Management Director

Jurisdiction	Organization	Name	Title
Burke County	Burke County	Marti Blanton **(County Lead)**	Emergency Management Planner
Burke County	Town of Drexel	Bill Carroll	Town Manager
Burke County	City of Morganton	Mario Sclarandis	City Engineer
Burke County	City of Morganton	Wendy Smith	Director
Town of Connelly Springs	Town of Connelly Springs	Tamara Brooks	Town Clerk
Town of Glen Alpine	Town of Glen Alpine	Sherri Farris	Town Clerk
Town of Hilderbran	Town of Hilderbran	Thomas Drum	Town Manager
Town of Rutherford College	WPCOG	Johnny Wear	Planner
Town of Valdese	Town of Valdese	Teresa Kinney	Town Planner
Town of Valdese	Town of Valdese	Larry Johnson	Town Planner
Town of Valdese	Town of Valdese	Truman Walton	Fire Chief/Emergency Management
Town of Morganton	Town of Morganton	Wendy Smith	Director
Town of Drexel	Town Drexel	Bill Carroll	Manager
CALDWELL COUNTY			
Caldwell County	Caldwell County	Vic Misenheimer **(County Lead)**	Emergency Management Director
Caldwell County	Caldwell County	Trevor Key	Collettsville Fire
Caldwell County	Caldwell County EMS	Jonathan Cook	Caldwell County EMS Paramedic
Caldwell County	Caldwell County	Kim McGee	Planner
Caldwell County	Grace Chapel Fire Department	Travis Davenport	Grace Chapel Firefighter Department
Caldwell County	Caldwell County Sheriffs Office	Kevin Bean	Major
Caldwell County	Caldwell County Environmental Health	Jordan Cramer	UNC Healthcare Administrator
Caldwell County	UNC Health Department	Chaiyo Vang	Public Health Educator/Preparedness Coordinator
Caldwell County	Caldwell County Environmental Health	James Stewart	Administrator
Caldwell County	Caldwell County	Shelley Stevens	Planning Director
Caldwell County	Yokefellow Inc.	Sharon Harmon	Minister
Caldwell County	Caldwell County Schools	Andy Puhl	Assistant Superintendent for Auxiliary Services
City of Lenoir	Lenoir Fire	Kenny Nelson	Deputy Chief
City of Lenoir	City of Lenoir	Hannah Williams	Planning Director

Jurisdiction	Organization	Name	Title
Town of Cajahs Mountain	Town of Cajahs Mountain	Randy Feierbend	Town Manager
Town of Gamewell	Town of Gamewell	Bonnie Cauldle	Town Administrator
Town of Granite Falls	Town of Granite Falls	Greg Wilson	Planner
Town of Granite Falls	Town of Granite Falls	Brian Bennet	Fire Chief
Town of Hudson	Town of Hudson	Jonathan Greer	Town Manager
Town of Rhodhiss	Town of Rhodhiss	Rick Justice	Town Manager
Town of Sawmills	Town of Sawmills	Chase Winebarger	Manager
Village of Cedar Rock	Village of Cedar Rock	Daniel Odom	Western Piedmont Council of Governments (WPCOG)
CATAWBA COUNTY			
Catawba County	Catawba County	Jason Williams **(County Lead)**	Emergency Management Coordinator
Catawba County	Catawba County	Chris Timberlake	Assistant Planning Director
Catawba County	Emergency Services	Bryan Blanton	Emergency Services Director
Catawba County	Emergency Services	Frank Ballentine	Emergency Management Project Specialist
Catawba County	Catawba County Schools	Dan Moore	Assist. Supervisor of Operations
Catawba County	Catawba County Schools	Devin Houston	Assist. Director of Maintenance
City of Claremont	City of Claremont	Jason Brown	City Manager
City of Conover	City of Conover	Tom Hart	City Manager
City of Hickory	City of Hickory	Sam Abernethy	Civil Engineer
City of Hickory	City of Hickory	Caleb Bynum **(City Lead)**	Utilities Engineer
City of Hickory	City of Hickory	Cal Overby	Principal Planner
City of Newton	City of Newton	Alex Fulbright	Planning Director
Town of Brookford	Town of Brookford	Marshall Eckard	Manager
Town of Catawba	Town of Catawba	Danny Hipps	Manager
Town of Long View	Town of Long View	Charles Mullis	Planner
Town of Maiden	Town of Maiden	Blake Wright	Planning Director
	Western Council of Governments	Curt Willis	Emergency Management Coordinator for WPCOG

Jurisdiction	Organization	Name	Title
	Appalachian State University	Jason Marshburn	Director of Environmental Health, Safety, and Emergency Management
	Samaritans Purse	Jodi Yoder	Program Manager
Hickory and High The High Country	Salvation Army	Majors Karla and Ricky Perez	Corps Officers
Hickory and High The High Country	Salvation Army	Sindy Connell	High Country Service Center Director
	Red Cross	Scott Loudermelt	Executive Director Blue Ridge Piedmont
	Ashure Ministry	Kristal Manning	Executive Director

Table 2-3: Members of the Hazard Mitigation Planning Committee

Multi-jurisdictional Participation

The Plan Area Hazard Mitigation Plan includes four counties and 24 incorporated municipalities. To satisfy multi-jurisdictional participation requirements, each county and its participating jurisdictions were required to perform the following tasks via in person engagements and/or electronic data exchanges:

- Participate in mitigation planning meetings and workshops;
- Complete the Local Capability Assessment Survey;
- Provide an update on previously adopted mitigation actions;
- Review drafts of the Plan Area Hazard Mitigation Plan; and
- Adopt their updated local Mitigation Action Plan.

Each jurisdiction participated in the planning process and each jurisdiction has developed and adopted a local Mitigation Action Plan unique to that will be updated over time per the Plan Maintenance Procedures described in Section 8.

Ensuring Complete Stakeholder Participation in the Planning Process

Throughout the planning process, all jurisdictions were invited to participate through invitations to designated representatives and HMPC members listed in Table 2.1 to virtual, in-person, and hybrid HMPC meetings described below. All jurisdictions in Table 2.1 and listed in Section 2.2 were invited and contributed to the plan update process by attending meetings, but the jurisdictions of Connelly Springs, Glen Alpine, Brookford, Claremont, Conover, and Cajah's Mountain were unable to attend the scheduled meetings and were involved in the planning process by engaging in one-on-one communications with planners. This was the preferred method of participation for the jurisdictions mentioned as opposed to meeting attendance. Documentation of one-on-one communication can be provided upon request.

2.5 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. Meeting sign-in sheets, images and other attachments for each meeting below can be found in Appendix F.

The following is a summary of the key meetings and workshops held by the HMPC during the Plan's development. In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency. For example, completing the *Local Capability Assessment Survey* or seeking approval of specific mitigation actions for their department or agency to undertake and include in their *Mitigation Action Plan.* Public meetings are summarized in Section 2.6.

1. HMPC Meeting: February 16, 2024

The Project Kickoff meeting was initiated by Jason Williams, Catawba County Emergency Management Coordinator, and was led by Kelly Keefe (AECOM Lead Planner) and Mckenzie Houston (AECOM Mitigation Planner). This meeting consisted of a detailed overview of the project, a review and discussion of the previous regional mitigation plan, an explanation of the process to be followed for updating the previous plan and integrating content from other resources, an open discussion session, and an explanation of next steps.

The meeting began with a brief welcome and opportunity for each of the 28 attendees to introduce themselves to the group. Emphasis was placed on identifying what jurisdiction or organization each participant was there to represent, as there were representatives from the 28 participating jurisdictions, the WPCOG, other state and local stakeholders, and AECOM. As part of this recognition process, a spreadsheet was passed around for representatives to designate one “Designated Local Jurisdiction Lead” to serve as a primary point of contact for each participating jurisdiction for the duration of the project.

The project overview explained the purpose of the planning process. It also covered the geographic scope of the project, the proposed schedule for the project, and a detailed breakdown of the key project tasks. The roles and responsibilities for AECOM, Caldwell County as the lead local agency, and for all participating jurisdictions were also covered. These roles and responsibilities were presented as follows:

AECOM

- Oversee, manage, and document the completion of all key project tasks
- Monthly progress reports

Catawba County

- Serving as lead coordinating agency
- Designation of local project manager

- Assistance with the collection of documents, data, and other information
- Logistics for project meetings
- Hosting and managing project website
- Responding to general questions or inquiries from the public or stakeholders
- Coordinating with participating jurisdictions

All participating jurisdictions

- Designate local jurisdiction lead
- Attend Hazard Mitigation Planning Committee meetings
- Coordination between counties, municipalities, and local stakeholders
- Data collection and information sharing
- Mitigation strategy development (*Mitigation Action Plans*)
- Assist with public outreach
- Review and comment on draft plan materials
- Adopt the plan

A discussion was also facilitated to discuss ways that existing resources could be leveraged, such as existing plans, studies, and reports; existing data and information; local knowledge sharing; and other resources. Three primary planning resources were also introduced to the HMPC at this time: The *Local Mitigation Planning Handbook*, *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*, and *Integrating Hazard Mitigation into Local Planning*, all recent publications from FEMA providing mitigation planning guidance.

Emphasis was also placed on the need for effective communication throughout the project. This included an overview of the planning team's organization and the idea that municipal jurisdictions would coordinate first through their Designated Local Jurisdiction Lead who would in turn coordinate with the Designated Local Jurisdiction Lead for that county, who would in turn coordinate with the overall local project leads, Jason Williams with Catawba County. Active participation and responsiveness were also stressed due to the aggressive schedule to complete the plan in the desired timeframe.

A detailed discussion also centered on GIS data collection needs and the process to be followed for collecting and submitting the needed data (which was to follow the chain of communication described in the paragraph above). Emphasis was placed on the need for the GIS data to be submitted in a readily usable format and to be the best data readily available.

The committee was also given an overview of a Public Outreach Strategy that would be developed between HMPC Meeting #1 and HMPC Meeting #2. The goals of the Public Outreach Strategy were stated as:

- Generate public interest;
- Solicit citizen input; and
- Engage additional partners in the planning process.

Specific opportunities for public participation were identified as being two in-person open public meetings, the creation of a public project information website, a web-based public participation survey, and use of social media (Facebook, Twitter, RSS, and other various options).
Next steps were defined as assignment of Designated Local Jurisdiction Leads (to be completed as soon as possible); open the online Public Participation Survey (to be completed as soon as possible); finalize Public Outreach Strategy (to be completed as soon as possible); prepare preliminary risk assessment decisions, analysis, and map templates (to be completed as soon as possible); and prepare for HMPC Meeting #2 (to be held April 11, 2024).

2. HMPC Meeting: April 11, 2024

This meeting was held in Newton, NC at 25 Government Drive and was available for In-person or remote attendance. The meeting was led by McKenzie Houston and Kelly Keefe from AECOM.

The meeting started with a brief introduction and was followed by discussions concerning the need for a designated leader for each community that can coordinate with the Core Planning Team, which will be sent on a spreadsheet by AECOM. The goal is that the planning team spreadsheet should be filled out by the end of next week. It was announced that Marti Blanton will be the lead for Burke County.

In the meantime, attendees were asked to consider stakeholders to invite and suggestions for the upcoming public survey. The live survey will contain 18 questions and will need to be pushed out to the residents and the market for each jurisdiction. It was suggested that we initially try to gather responses to the survey for 4-6 weeks to determine the response level and adjust the survey if necessary to reduce the number of questions to improve responses. AECOM will contact each county lead to put the survey out on social media to improve public outreach.

Next, the public outreach strategy was discussed along with the goal, which is to engage additional partners in the planning process by identifying specific opportunities for participation. There will need to be two meetings that follow FEMA guidelines for stakeholder engagement, and changes to the previous methods of compliance will be discussed. Previous methods of engagement that adhered to FEMA guidelines included online meetings through Facebook during the pandemic, but it was proposed that the next meeting would be a hybrid format with an in-person option. For the in-person meeting location, we need to identify a central location for a meeting place in the region and determine the mode of delivery for the online option that is most compatible with everybody's jurisdiction. For this meeting, there needs to be a one-page fact sheet that can inform residents and stakeholders who attend the public meetings about the Plan and the revision process.

The guidance for stakeholders has been updated by FEMA and will need to include a wider range of stakeholders during the public outreach process than in previous reviews. Additional required stakeholder groups will include neighboring communities, businesses, academia, and nonprofit groups. The public participation survey will go live for the public on 4/12/24 and the community representatives were asked what the best way to disperse the survey would be. One

county suggested adding a raffle for survey participants to incentivize responses to the survey as an example of a way to increase engagement.

AECOM will meet with the HMPC to gather input on each of the sections of the Plan and the planning team will receive feedback by dividing the plan into sections, allowing community representatives to make the reviewing process less intense or tedious. The HMPC members and stakeholders will also provide perspectives on the hazard mitigation issues that face the community along with potential resolutions for the issues discussed.

The Unifour Hazards were then discussed and included an overview of Hazard ID & Risk Assessment, Capability Assessment, and Risks summary processes. These were described as including the following elements:

- Factual basis for prioritizing mitigation activities
- Identification and Description of Hazards
- Identification of assets
- Risk assessment
- Vulnerability summary

The mitigation projects that are included in the HMP are extensive and may include projects that aren't currently in progress or feasible. Capability assessments will be sent out to every county and the number of questions has been reduced by AECOM. Virtual online workshops to assist jurisdictions with completing the capability assessment will not be required but will be dedicated to helping the representatives understand and complete the questions, while also having a designated time to have specific questions answered that will assist with completing the capability assessment.

Next in the meeting, the 2019 Plan maintenance procedures were described to involve yearly plan updates which happened sometimes but not all the time. To be able to complete yearly plan updates there were questions asked to get an idea of what adjustments could be made to improve the procedures in the future. This included:

- Asking whether there are times when the four counties get together or if there could be a procedure update on the agenda for meetings where the four counties are already together, instead of organizing an entirely separate meeting.
- Potentially holding meetings after each natural disaster event
- Annual status plan updates that can be sent to the Core Planning Team for each jurisdiction's Mitigation Action Plan to evaluate the effectiveness of its implementation.

It was noted that there would be an Excel spreadsheet that includes all existing mitigation actions so that they can be filtered to the area of interest when reviewing. There was discussion of the need to reevaluate how often and when there should be plan maintenance meetings in the future.

Next, there was an update on the plan sections, draft review, and questions for open discussion. It was requested that while reviewing and commenting reviewers should leave on the track changes feature so that reviewers can see what changes or suggested changes are being made. Other discussion points included:

- Are there potential opportunities for this plan update?
- Are there potential barriers or obstacles to the plan update?
- If a representative can't be at a meeting it is requested that the representative reach out to the Core Team which will provide the information through email. This is because FEMA occasionally goes through and checks the attendance sheet and will ask how they participated If they were not included in a meeting.

NCEM recommends that each community not limit the mitigation actions they will include in the plan, because often NCEM and FEMA will look at the HMP for prioritization when communities seek funding for projects. It is also recommended that each area should conduct outreach to other municipalities or counties to make sure that they are accounting for everything that should be in the plan in terms of mitigation actions. Additionally, there is new funding that is set aside for BRIC for community and capacity building, so communities do not need to be as worried about the pool of funding about the higher costs of larger projects and the higher costs associated with planning larger projects.
NCEM also expressed that it is trying to do a better job of reaching out to historically underserved populations and that the county representatives should think about underserved populations in their jurisdictions. Art organizations were mentioned as an excellent way to engage underserved populations and usually have facilities that can be used for meetings or protection from hazards. FEMA and NCEM won’t judge based on the success of outreach, but each jurisdiction will be judged based on the level of effort put into outreach attempts. It was also recommended that having state grant representatives attend the mitigation actions discussions at the next meetings could be an excellent opportunity to start building out some of the grant applications for mitigation actions while maximizing the use of time.

Next data needs and next steps were discussed. Data needs highlighted the following categories:

- Critical Facilities Assets
- Repetitive Loss Property Data
- Dam inundation zones and high-hazard dams
- Local capability assessments
- Data discrepancies from previous HMPs to identify what can be improved
- Hazard history costs and impacts
- Picture and video of hazards, damages, and mitigation projects

The next steps were discussed, and the following were highlighted as priority actions:

- Designated local leads are to serve as the primary point of contact for each jurisdiction for the duration of the project
- Identification of additional stakeholder invitations to represent underserved populations and a broader range of stakeholder groups

- Capability assessments should be completed, but it was emphasized that it is acceptable to not have specific plans or ordinances for each category within the assessment.
- There is a possibility for a virtual capability workshop in May where we go over 68 questions on the capability assessment, what they mean, and how to answer each one.
- The next hybrid meeting in June 2024 could become a public meeting.
- The HMPC Actions Workshop in July 2024 means that each jurisdiction:
- Should Provide edits for the HMPC
- Is encouraged to review other communities' HMPC actions to get a perspective of regional activities.
- It is recommended that each jurisdiction link its HMP on its website to increase accessibility to the plan
- FEMA will often check that links are live
- FEMA will often require proof that public meetings were available and that they all had a chance to comment on the plan.

3. HMPC Meeting: June 12, 2024

The Mitigation Strategy Workshop was initiated by Kenneth Teague, Caldwell County Emergency Management Coordinator, and was led by Kelly Keefe (AECOM Lead Planner) with assistance from McKenzie Houston and Peyton Campbell. This meeting consisted of a detailed overview of the draft risk assessment and draft capability assessment results, an update on public outreach, discussion of the regional vision statement, an exercise to formulate regional mitigation goals and regional mitigation actions, and an explanation of next steps.

The meeting began with a brief welcome and opportunity for each of the 23 attendees to introduce themselves to the group.

The meeting continued with an overview of the draft risk assessment findings. The hazards addressed included: flood; erosion; dam/levee failure; drought/extreme heat; thunderstorm, lightning, and hail; tornado; winter weather; hurricane and tropical storm; landslide; earthquake; sinkhole; and wildfire. For each hazard the following information was shared: hazard maps, tables of at-risk buildings and infrastructure, and historical hazard occurrences. Complete inventories and maps were shown for demographic data, parcels and buildings, critical facilities, infrastructure elements, high potential loss properties, and historic properties. The technical information shared during this portion of the presentation is too extensive to share in this section.

The next portion of the presentation consisted of an overview of the draft capability assessment findings. Participation in the Local Capability Assessment Survey was the results centered on findings in the areas of planning and regulatory capability, administrative and technical capability, fiscal capability, education and outreach capability, political capability, and a community self-assessment. The point system and overall capability assessment score for the Region were presented to the group along with a ranking of local capability by jurisdiction. All this information is presented in its final form in the Capability Assessment section (Section 5).

An update on the Public Participation Survey was also provided just before a working lunch. At the time of the meeting, 363 online surveys had been started and preliminary notes and

indications from these surveys were presented to the group. In general, the input being provided by the public was consistent and in-line with the discussions and decisions being made by the HMPC. A reminder was also issued that the second public meeting would be held that evening (April 4, 2019) at the Caldwell County Social Services building where the workshop was currently being held.

2.6 Involving the Public

A key component of any mitigation planning process is 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 planning area safer from the potential effects of hazards.

Element A3. *Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))*

Public involvement in the development of the Unifour Regional Hazard Mitigation Plan was sought using various methods including open public meetings, an interactive public information website, a project information fact sheet with contact information, a public participation survey, and by making copies of draft Plan documents available for public review on county websites and at government offices. Public meetings were held 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. These public meetings were held at a central location to the planning area to ensure that citizens from each of the four participating counties had reasonable access to the opportunity to participate in-person in the planning process. The public participation survey (discussed in greater detail in subsection 2.6.1) was made available online via the project information website, each county's website, through web links forwarded via email and newspaper articles, Facebook, Twitter, etc., and in hardcopy form at the first public meeting. For more information about meeting invitations, see Appendix F.

Additionally, the Public were given the opportunity to provide input about their preferences in terms of hazard mitigation actions in the public survey (Section 2.6.1), which was presented to the representatives of each jurisdiction to consider and incorporate into their planning when updating and or adding mitigation actions for the HMP update.

Public Meeting 6-12-24 (11:30-12:30pm)

The Public Meeting was held at 25 Government Drive in Newton, NC and was open to in-person and online attendees. This meeting went over the additional stakeholder and engagement requirements for this plan update, the Unifour Regional Mitigation Goals, Public Survey Results, and an overview of the remainder of the HMP update process. The meeting also went over the mitigation action goals and the social equity questionnaire. No members of the public attended, though there was robust participation in the online survey.

Final Plan Public Participation Summary

Need to update when we allow the public to comment or participate in the final draft review

2.6.1 Public Participation Survey

The Unifour Natural Hazard Mitigation Public Participation Survey was made available on and remained available until August 16, 2024, per the Public Outreach Strategy, and there were 579 responses as of August 16, 2024. The survey results are in a summary report found in Appendix D. The results of the public feedback were presented to representatives of each jurisdiction that attended the HMPC meeting on June 12, 2024, where preliminary results were presented before the survey response deadline on August 16, 2024. From this, representatives were given the opportunity to further review the results to understand how the public survey results could be involved in the planning process and how their feedback could be considered or included in the plan.

The following list is a high-level summary of the dominant responses obtained from the survey:

1. **72.44% of respondents said they have been personally impacted by a disaster.**
2. **The percentage of respondents that stated that they had been impacted by natural disaster(s) in the following graph**



Figure 2-2: Hazards experienced by respondents in the public participation

3. **Respondents reported that the most difficult factors in recovering from natural disasters that they have experienced were:**
    1. Direct Damage to Property – 35.90%
    2. Financial – 27.75%
    3. Emotional – 16.42%
    4. Other – 10.83%
    5. Long Recovery Time – 10.05%
    6. Loss of Possessions – 5.69%

4. **The percentage of respondents said that they were "very concerned" about the following hazards are:**
    1. Thunderstorm/Hail/Lightning – **44.44%**
    2. Flood – **21.83%**
    3. Wildfire – **25.40%**
    4. Drought/Extreme Heat – **19.29%**
    5. Winter Weather – **17.08%**
    6. Hurricane – **16.31%**
    7. Sinkhole – **9.21%**
    8. Erosion – **7.19%**
    9. Dam/Levee Failure – **3.97%**
    10. Landslide – **3.09%**
    11. Earthquake – **3.24%**

5. **The following percentage of respondents said that they considered the following community assets to be the "most vulnerable" to natural hazards:**
    1. People: Loss of Life and/or Injuries – **52.41%**
    2. Infrastructure – **17.53%**
    3. Economic – **11%**
    4. Cultural and Historic - **5.31%**
    5. Governance: (Ability to maintain order and/or provide public amenities and services) – **5.79%**

6. **The percentage below represents the portion of respondents that the statement was "very important":**
    1. Protecting critical facilities (For example, hospitals, police stations, and fire stations etc.) – **91.10%**
    2. Strengthening emergency services – **84.79%**
    3. Protecting and reducing damage to utilities – **74.87%**
    4. Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses – **56.79%**
    5. Preventing development in hazard areas – **52.88%**
    6. Enhancing the function of natural features (For example, streams, wetlands, etc.) – **36.84%**
    7. Protecting historical and cultural landmarks – **18.31%**

7. **The following represents the portion of respondents who think the local government should take that step to reduce or eliminate risks of future natural hazard damages:**
    1. Protect Power Lines – **82.14%**
    2. Keep storm drains clear – **76.88%**
    3. Education and Awareness Activities – **77.06%**
    4. Emergency Preparedness Kits – **74.26%**
    5. Assist Vulnerable Populations - **67.78%**
    6. Restrict Development in Floodplain Areas – **68.13%**
    7. Reduce Stormwater Runoff – **54.47%**
    8. Floodproof Your Home or Business – **33.63%**
    9. Elevate Your Home or Business – **13.49%**

8. **The following percentages represents the portion of respondents that consider the following community-wide activities as "Very Important" to reduce natural hazard risks:**
    1. Local Plans and Regulations (Government policies or codes that influence the way land and buildings are developed and built.) – **72.90%**
    2. Education and Awareness Programs (Actions that inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them) – **72.11%**
    3. Structure and Infrastructure Projects (Modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area) – **70.00%**
    4. Natural Systems Protection (Actions that minimize damage and losses and preserve or restore the functions of natural systems) – **68.89%**
    5. Other Types of Actions (Actions that are related to mitigation in ways that make sense to the local government that do not fall into one of the categories above) – **38.08%**

9. **When asked what the most effective ways to receive information about how to make your home or neighborhood more resistant to natural hazards, the most results were the following answers in order of most to least percentage of respondents:**
    1. Internet (Social Media) – **76.49%**
    2. Mobile Messages/Alerts – **68.42%**
    3. Internet (Web Pages) – **54.74%**
    4. Mail – **42.68%**
    5. Television News – **37.19%**
    6. Public Meetings/Workshops – **31.05%**
    7. Radio Programs – **21.23%**
    8. Television Ads – **18.42%**
    9. Newspaper – **22.46%**
    10. Local Government Channel – **18.95%**
    11. Radio Ads – **17.02%**

10. **Of all survey takers, only 9.39% reported that they had flood insurance, while 81.57% reported that they did not and 9.04% reported that they didn't know if they had flood insurance or not.**

11. **Respondents who reported they did not have flood insurance were asked why they did not have flood insurance, and the following were the most common responses:**

    1. The house isn't located in a floodplain **- 66.12%**
    2. Flood insurance is too expensive – **10.06%**
    3. I don't think its necessary because it never floods – **1.64%**
    4. I don't think it's necessary because I'm elevated or otherwise protected – **12.32%**
    5. I don't think it's necessary because I have homeowners' insurance – **2.67%**
    6. I never really considered it – **7.19%**

12. **The following are responses to the activities that respondents have done in the last year to prepare for natural hazards:**

    1. Prepared your home by installing smoke detectors on each level of the house – **92.48%**
    2. Talked with members in your household about what to do in the case of a natural disaster – **74.96%**
    3. Developed a "Household/Family Emergency Plan" to decide what everyone would do in the event of a disaster – **53.32%**
    4. In the last year, someone in your household has been trained in first aid or CPR – **54.36%**
    5. Attended meetings or received written information on natural disasters or emergency preparedness – **41.46%**
    6. Prepared a "Disaster Supply Kit" with extra food, water, batteries, or other emergency supplies – **40.77%**
    7. Discussed or created a utility shutoff procedure in the event of a natural disaster – **31.82%**

13. **Most respondents reported that they lived in a**
    1. Single Family Home – **84.75%**
    2. Manufactured Home – **10.46%**
    3. Apartment (5 or more units in structure) **– 2.30%**
    4. Apartment (3-4 units in the structure) – **0.89%**
    5. Condominium – **0.53%**
    6. Duplex **– 1.06%**

The results of the survey were presented to members of the HMPC at HMPC Meeting on June 12, 2024, so that public opinion could be factored into final changes and additions to each jurisdiction's Mitigation Action Plan.

2.7 Involving Stakeholders

The Unifour Hazard Mitigation Planning Committee included various stakeholders beyond the representatives from each participating jurisdiction. These included representatives from the American Red Cross, Salvation Army, Samaritan's Purse, Duke Energy, Frye Regional Medical Center (FRMC), UNC Health, Appalachian State University and the State of North Carolina Forest Service. Input from additional stakeholders, including neighboring communities, was welcomed through the open public meetings and online survey. Neighboring communities included: Watauga, Rutherford, McDowell, Lincoln, Iredell and Clevland counties. If any additional stakeholders representing other agencies and organizations participated in the Public Participation Survey, that information is unknown due to the anonymous nature of the survey.

Required stakeholders were invited to comment on the HMP draft and were also invited to all public meetings held throughout the review process. Required stakeholders invited to participate in the planning process include, but are not limited to, the following (See Appendix F for correspondence and invitations for stakeholders and Table 2-3 for the representatives of each organization):

Local And Regional Agencies Involved In Hazard Mitigation Activities

- Alexander County Emergency Management
- Alexander County Emergency Servies
- Caldwell County EMS
- Catawba County Emergency Management
- NCEM Area Coordinators
- NCEM Hazard Mitigation Planning
- Caldwell County Emergency Management
- Burke County Emergency Management
- FEMA Region 4 Community Planning

Agencies that regulate development

- Catawba County Planning Department
- Alexander County Planning Department
- Caldwell County Planning Department
- Burke County Planning Department
- WPCOG Planning Department
- City of Hickory Utilities
- Town of Rutherford College Planning
- Town of Granite Falls Planning
- Town of Sawmills Planning
- Town of Long View Planning
- Lenoir Planning
- City of Newton Planning
- Town of Maiden Planning
- City of Hickory Planning
- Town of Valdese Planning

Neighboring communities

- Iredell County
- Cleveland County
- McDowell County
- Lincoln County
- Rutherford County
- Watauga County

Businesses, academia, and other private interests

- Catawba County Schools
- Appalachian State University
- Western Piedmont Community College in Morganton
- Catawba Valley Community College in Hickory
- Caldwell Community College and Technical Institute (CCC&TI)

Non-profit organizations including community-based organizations may include:

Faith Based Organizations, Disability services agencies, NGOs, Rural Support Agencies, Health and Social Services Departments, Housing agencies and housing advocacy groups

- Ashure Ministry
- Salvation Army
- Red Cross
- Samaritans Purse
- Greater Hickory Cooperative Christian Ministry
- Caldwell County Environmental Health
- Caldwell County Health Department
- Yokefellow Inc.
- UNC Healthcare

2.8 Documentation of Plan Progress

Progress in hazard mitigation planning for the participating jurisdictions in the Unifour 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 early 2000s, many mitigation actions have been completed and implemented in the participating jurisdictions. These actions will help reduce the overall risk of natural hazards for the people and property in the Unifour Region. The completed actions are documented in the Capability Assessment in Section 5 and completed actions can also be found in the Mitigation Action Plans Section 7.

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 5: *Capability Assessment*. The participating jurisdictions continue to demonstrate their commitment to hazard mitigation and hazard mitigation planning and have proven this by reconvening the Hazard Mitigation Planning Committee to update and combine the previous hazard mitigation plans into

this regional plan and by continuing to involve the public in the hazard mitigation planning process.

Section 3: Planning Area Profile

This section gives an overview of the planning region defined as the planning area for this Plan. It consists of the following five subsections:

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

3.1 Geography and the Environment

The Unifour Region is comprised of the four counties in the Catawba Valley region of western North Carolina: Alexander County, Burke County, Caldwell County, and Catawba County. The Unifour Region is the same as the “Hickory-Lenoir-Morganton Metropolitan Statistical Area” as defined by the U.S. Census Bureau.

Alexander County's main geographic feature is the Brushy Mountains, a deeply eroded spur of the Blue Ridge Mountains to the west. They rise from 300 to 1,000 feet (about the height of the Empire State Building) above the surrounding countryside and dominate the county's northern horizon. The highest point in Alexander County is Hickory Knob with an elevation of 2,560 feet (about twice the height of the Empire State Building) above sea level. Barrett Mountain, an isolated mountain ridge, is in the western portion of the county. The remainder of Alexander County's terrain consists of gently rolling countryside.

The varied landscape of Burke County ranges from the Blue Ridge escarpment to the rolling plains of the western piedmont. Table Rock, a prominent peak in Burke County in the east rim of Linville Gorge, is part of the Pisgah National Forest and has been described as “the most visible symbol in the region.” The county has abundant natural resources including South Mountains State Park, Pisgah National Forest and the Linville Gorge Wilderness Area, the Catawba River, the Johns River, the Henry River, Table Rock Mountain, the Blue Ridge Parkway, and the 3,000-acre expansion of the Lake James State Park. These natural resources offer excellent recreational opportunities and attract visitors from across the southeastern United States.

Caldwell County is divided into three distinct geographic sections: the Blue Ridge Mountains, which dominate the northern and western parts of the county; the gently rolling Piedmont country in the middle and southern parts of the county; and the Brushy Mountains, an isolated remnant of the Blue Ridge Mountains. The Brushy Mountains run across much of Caldwell County's eastern section. Hibriten Mountain, located within the city limits of Lenoir, the county's largest city, marks the western end of the Brushy Mountain range. In the western part of the county is the Wilson Creek area.

Catawba County is in the foothills of the Blue Ridge Mountains. It is in the region referred to as the Upper Piedmont Plateau, more commonly known as the “foothills.” The county's elevation averages 995 feet, ranging from a high of 1,780 feet at Bakers Mountain in the west-central portion of the county to a low of 705 feet where the Catawba River leaves the county. The county’s landscape can be described as “rolling” with broad ridges and some short steep slopes. Geologically, Catawba County

lies within the Inner Piedmont Belt comprised mostly of metamorphic and intrusive rocks. About 45.5% of the county's acreage is wooded, of which 98% is privately owned.

The Catawba River, which is influential to all four counties in the planning area, begins in the Blue Ridge Mountains and flows 225 miles into Lake Wateree in South Carolina. The river is an extraordinary eco-system that provides habitat for 50 fish species, 160 bird species, and 120 tree species. The river also serves as a source of electric power, provides recreational opportunities for residents and tourists, and is one of the major economic foundations of the region. It transects Burke County, creates the southern borders of Caldwell and Alexander counties, and the northern and eastern borders of Catawba County.

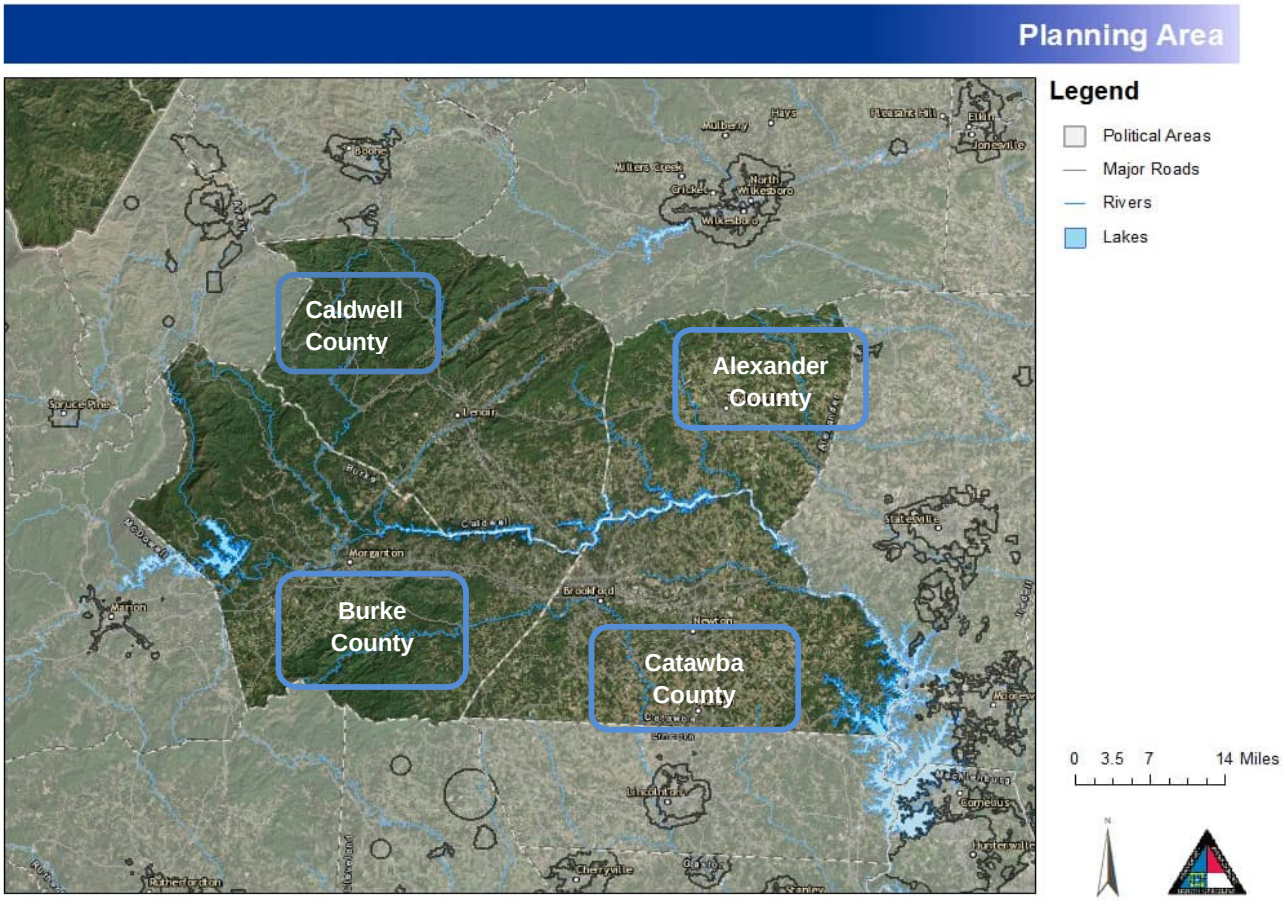


Figure 3- 1: Planning Area

County	Total Land Area (sq mi)	Total Water Area (sq mi)	Total Area (sq mi)
Alexander	260	3	263
Burke	506	8	514
Caldwell	472	3	475
Catawba	401	15	416
TOTAL PLAN AREA	**1,639**	**29**	**1,668**

Table 3-1: Total Land and Water Area for the Planning Area

3.2 Basin Description

Table 3- 2, “Basin Description”, contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin #	Primary Flooding Source	Description of Affected Area	DA (sq mi)
South Fork Catawba	03050102	South Fork Catawba River	The South Fork Catawba River Basin begins in the southeast portion of Burke County and continues to drain portions of Catawba, Gaston, and Lincoln Counties before ending at the Catawba River.	660.7
South Yadkin	03040102	South Yadkin River	The South Yadkin River Basin begins in Alexander and Wilkes Counties and drains southeast through Yadkin and Iredell Counties and ends in Davie and Rowan Counties at the confluence with the Yadkin River.	906.4
Upper Broad	03050105	Broad River	The Upper Broad River Basin begins with the Green River in the southwest corner of Henderson County and drains significant portions of Buncombe, Cleveland, McDowell, Polk, and Rutherford Counties before following the Broad River into South Carolina.	2477.9
Upper Catawba	03050101	Catawba River	The Upper Catawba River Basin headwaters are in the Appalachian Mountains (Avery, Caldwell, McDowell, and Watauga Counties) and drains through the Piedmont region (Gaston and Mecklenburg Counties) of North Carolina, ending in York County, South Carolina.	2357
Upper New	05050001	New River	The Upper New River Basin headwaters begin with the North and South Fork of the New River in Watauga County and then drains northeast through Ashe and Alleghany Counties and into Virginia, where the New River continues to Ohio.	2943.7
Upper Yadkin	03040101	Yadkin River	The Upper Yadkin River Basin headwaters are in Caldwell and Watauga County. The basin then follows the Yadkin River east, draining Surry and Yadkin Counties before turning south and draining Davidson and Davie Counties.	2454.8
Watauga, North Carolina, Tennessee	06010103	Watauga River	The Watauga River Basin drains Avery and Watauga Counties and follows the Watauga River west into Tennessee and into Boone Lake.	868.4

Table 3- 2: Basin Description

3.3 Population and Demographics

Catawba County, Alexander County, Caldwell County, and Burke County have a total population size of 372,203 according to the 2023 population estimate[1]. Catawba County has the largest population of the four participating counties with 164,645 residents and the City of Hickory is the largest city in the planning area with 44,415 residents[2]. Alexander County has an estimated 38,746 residents with the largest Town being the Town of Taylorsville (2,273 residents), Burke County has 88,338 residents with largest jurisdiction as the City of Morganton (17,708 residents), and Caldwell County with 80,574 residents and the largest jurisdiction is the City of Lenoir[3]. Between 2010 and 2020 Catawba County experienced a 3.68% population increase, Alexander County has had a 4.22% population increase, Burke County has had decrease of 3.96%, and Caldwell County a decrease of 2.76%. The jurisdictions that had the largest population decrease between 2010 and 2020 was the Town of Taylorsville with a 44.49% decrease in population. The three jurisdictions that experienced the most population growth between 2010 and 2020 were the Town of Rhodhiss (158.96%), the Town of Hudson (70.13%), and the Town of Long View (21.69%). Population counts from the U.S. Census Bureau for 2000, 2010, 2020, and 2023 population estimate for each of the participating counties and jurisdictions are presented in Table 3- 3.

Jurisdiction	2000 Census Population	2010 Census Population	2020 Census Population	2023 Population Estimate	% Change 2010-2020
Alexander County					
Alexander County (Unincorporated Area)	29,712	33,016	36,444	36,473	0.08%
Town of Taylorsville	3,904	4,180	2,320	2,273	-44.49%
Subtotal Alexander	**33,616**	**37,196**	**38,764**	**38,746**	**4.22%**
Burke County					
Burke County (Unincorporated Area)	47,174	49,470	58,221	58,207	0.02%
City of Morganton	23,049	22,546	17,474	17,708	-24.96%
Town of Connelly Springs	1,861	1,659	1,529	1,538	-7.84%
Town of Drexel	5,641	5,506	1,760	1,769	-0.45%
Town of Glen Alpine	1,574	1,964	1,529	1,525	-22.15%
Town of Hildebran	1,742	1,945	1,679	1,678	-13.68%
Town of Rutherford College	1,426	1,502	1,226	1,217	-18.38%
Town of Valdese	4,901	4,387	4,689	4,699	6.88%
Subtotal Burke	**89,148**	**90,912**	**87,570**	**88,338**	-3.69%

Jurisdiction	2000 Census Population	2010 Census Population	2020 Census Population	2023 Population Estimate	% Change 2010-2020
Caldwell County					
Caldwell County (Unincorporated Area)	31,638	34,680	39,813	40,945	14.8%
City of Lenoir	20,691	20,837	19,352	18,238	-7.67%
Town of Cajah's Mountain	2,748	2,789	2,722	2,698	-2.4%
Town of Gamewell	3,794	4,043	3,702	3,704	-8.43%
Town of Granite Falls	6,742	7,104	4,965	4,914	-30.11%
Town of Hudson	5,253	6,431	3,780	3,767	70.13%
Town of Rhodhiss	62	385	997	985	158.96%
Town of Sawmills	6,082	6,380	5,020	5,025	-21.32%
Village of Cedar Rock	312	294	301	298	2.38%
Subtotal Caldwell	**77,322**	**82,943**	**80,652**	**80,574**	**-2.76%**
Catawba County					
Catawba County (Unincorporated Area)	61,731	70,017	83,891	86,265	19.82%
City of Claremont	1,720	1,957	1,692	1,729	-13.54%
City of Conover	7,958	9,669	8,421	8,635	-12.91%
City of Hickory	46,238	48,481	43,490	44,415	-10.29%
City of Newton	13,737	14,214	13,148	13,399	-7.5%
Town of Brookford	444	371	442	431	19.14%
Town of Catawba	1,324	1,152	702	719	-39.06%
Town of Long View	4,134	4,181	5,088	5,207	21.69%
Town of Maiden	4,910	4,964	3,736	3,845	-24.74%
Subtotal Catawba	**141,685**	**155,006**	**160,610**	**164,645**	**3.62%**
TOTAL PLAN AREA	**340,502**	**364,124**	**374,495**	**372,203**	**2.85%**

Table 3- 3: Population Counts for Participating Jurisdictions

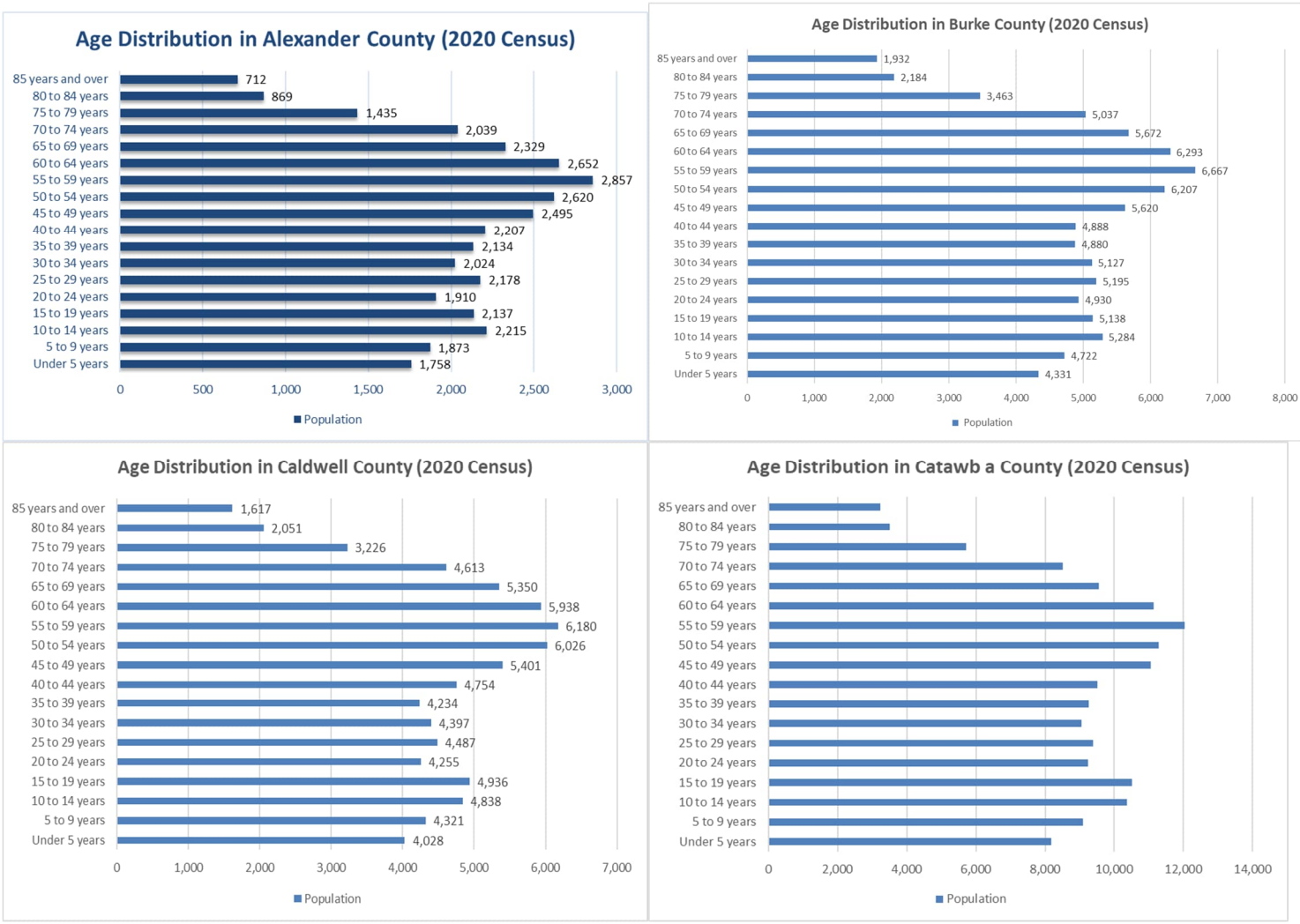


Figure 3-2: Age Distributions in the Unifour Counties from the 2020 Census

Based on the 2020 Census, the median age for residents is 42.7 years in Catawba County, 45.1 years in Caldwell County, 44.2 years in Burke County, and 44.5 years in Alexander County. The racial characteristics of the participating counties are presented in Table 3-4. Generally, whites make up most of the population of the Region, accounting for almost 89% percent of the Region's population.

County	White Persons	Black Persons	Other Race	Persons of Hispanic Origin*
Alexander	90.3%	5.9%	1.9%	5.5%
Burke	85.9%	6.5%	5.5%	7%
Caldwell	90.9%	5.4%	1.7%	6.5%
Catawba	83.1%	9%	5.7%	10.8%

Table 3-4: Demographics of participating counties from the 2020 Census[4]

3.4 Housing, Infrastructure, and Land Use

3.4.1 Housing

According to the U.S. Census Bureau, there are 163,144 housing units in the Unifour Region, most of which are single family homes (according to the 2020 census). Housing information for the four participating counties is presented in Table 3-5. As shown in Table 3-5, Catawba County has the highest number of housing units compared to the other counties. Alexander County has the least. In terms of median home value, Catawba County has the highest and Caldwell County has the lowest.

County	Housing Units (2023)	Median Home Value (2018-2022)
Alexander	16,349	$169,300
Burke	40,862	$155,500
Caldwell	37,647	$158,300
Catawba	74,397	$194,000
TOTAL/AVERAGE PLAN	**169,255**	**$169,275**

Table 3-5: Housing Characteristics from the 2020 U.S. Census Bureau[5]

3.4.2 Infrastructure

Major roads in the planning area include I-40, US 64, US 70, US 221, US 321, NC 10, NC 16, NC 18, NC 90, NC 114, NC 126, NC 127, NC 150, NC 181, and NC 268. Hickory Regional Airport is the primary commercial aviation airport in the region. It was served by commercial airlines until 2005.

National protected areas in the planning area include Blue Ridge Parkway and Pisgah National Forest.

Colleges and universities in the planning area include Appalachian Center at Hickory, Appalachian Center at Lenoir, Appalachian Center at Morganton, Catawba Valley Community College Alexander Campus, Catawba Valley Community College in Hickory, Gardner-Webb University Hickory Center, Lenoir-Rhyne University in Hickory, N.C. Center for Engineering Technologies, and Western Piedmont Community College in Morganton.

3.4.3 Current and Future Land Use

Alexander County

Current land use in Alexander County can be characterized as being mainly “residential” or “vacant.” Given the county’s rural and agricultural history, these land use patterns are not surprising. Unlike other counties in the Unifour Region, Alexander County is the only county with a single municipality. Taylorsville, the County seat, is the center of its local government services and its low population also reflects the county’s rural heritage. Most of the land in Alexander County is devoted to residential uses. Of the nearly 160,800 acres (about twice the area of Athens, Georgia) in the county, 96% is occupied by residential uses or is vacant and could be used for residential purposes. To state the

opposite, only slightly more than 1,000 of the county's 24,300 land parcels are designated for uses other than residential, mostly industrial or commercial. In terms of future land use in Alexander County, future policymakers should continue to think about the amount of land currently zoned residential, especially in the RA-20 Zoning District, and used primarily for agriculture. These parcels represent land that could potentially be subdivided into residential uses in the coming decades. While market forces drive these decisions, existing data provides some indication of development pressures across the Unifour Region.

The population of Alexander County is expected to decrease by 0.3% between 2022 and 2042, with the largest percentage of the population (38.2%) within the 25-54 age range, the second largest in the 65 and older range (20.9%), the third largest between 0 and 17 (18.9%), followed by the 55-64 range (14.2%), and the lowest percentage between ages 18 and 24 (7.8%). According to the County Comprehensive Plan[6], an increased population and new residents can provide benefits such as a larger tax base, increased workforce, and attract new businesses and industries. To support the growth and development of the County, the Comprehensive Plan outlines future use goals to improve coordination between land use and transportation planning, affordable housing options, and increase the amount of natural resource protection and open spaces. Therefore, the land development policies will be designed to encourage necessary growth and concentrated development where appropriate while protecting environmentally sensitive areas, rural communities, and agricultural land.

Some of the goals of development that relate to future and current land use for Alexander County include the following:

- **Land Use:** Adopt land use regulations that are clear, equitable, and reasonably focused on addressing the needs of Alexander County; Promote the development of a diversified and balanced mix of land uses in the County; Direct growth to areas where essential services and infrastructure are present, and protect sensitive natural areas and key historic/cultural resources from extensive development; Aim to mitigate common negative impacts of new development; Encourage and develop land use regulations that help to promote and preserve Alexander County's sense of place.

- **Transportation:** Improve aesthetics, function, and capacity of community gateways and corridors; Enhance the county's infrastructure to support active transportation, such as walking and biking; Enhance public transportation options in appropriate areas of Alexander County; Make strategic investments and secure NCDOT funding for known transportation issues throughout the County.
- **Economic Development:** Increase the number of job opportunities and increase the employment rate in the county; Diversify the county's economic base to reduce reliance on a single industry; Enhance the County's infrastructure and facilities to support economic development; Work to make Alexander County more competitive when attracting industry
- **Housing:** Promote safe, stable housing opportunities for County residents to support upward mobility and reduce homelessness/houselessness; Preserve and improve the quality of existing housing units in the County; Encourage the development of a range of housing types and densities in the County. According to the Burke County Blueprint Burke Strategic Use Plan[7], growth and development in Burke County are projected to be predominantly located around the incorporated areas along the I-40 corridor and US 70 urban corridor, where there is water and sewer infrastructure in place to support further development. The Couty aims to encourage the tourism

industry by developing destinations and enhancing the existing natural and historic locations in collaboration with the Burke County Tourism Board and municipalities.

Burke County

To promote mixed-use development and attract various business types, Burke County aims to promote mixed development in urban areas along with promoting single-family development around NC 126, NC 18, and NC 64. Conditional zoning options will be considered to allow a wide range of uses within the region where there is already sufficient infrastructure available to support future development. Additionally, Burke County seeks to promote the use of vacant or underutilized structures by developing an inventory of vacant structures to encourage the expansion or relocation of businesses within or into Burke County.

To encourage people to relocate to Burke County, the County aims to develop policies that encourage higher-density development projects along I-40 and US 70 or places with existing infrastructure that can readily support the development of new housing. To encourage relocation and attract new arrivals, new housing and convenient housing options, such as short-term rental apartments, should be at or above 2% growth per year along with the increase in affordable home-ownership programs. There is also a growing trend of second home development in the area around Lake James and the Jonas Ridge Community in the northwest portion of the county. Small area plans have been completed for the I-40 corridor and the watershed around Lake James. In some cases, growth and development result in the alteration of natural topographic features that affect the extent of flooding and the floodplain's boundary.

To accommodate population growth, the County aims to bring the I-40 interchanges up to USDOT standards with funding from the NCDOT and MPO. Public transportation options should be expanded by extending passenger and cargo rail services between Burke County and areas in western NC, along with planning to offer fixed-rail public transportation services that coordinate with the expansion of pedestrian and bike infrastructure within the County and linkage between activity centers. Infrastructure expansion should be enhanced by the expansion of broadband and network infrastructure which will be encouraged by reducing construction costs of service extension and development of policies that promote higher-density development where adequate infrastructure exists.

To support the development of agriculture, Burke County aims to develop a voluntary agricultural district and encourage a local food movement, aiming to attract young farmers or encourage smaller farms to remain in production and preserve farmland. To encourage the utilization of recreation opportunities, the County aims to expand the existing trails and greenways while encouraging the development of multi-use facilities to appeal to a wider range of residents and visitors. The County also wishes to expand its inter-jurisdictional and local recreation opportunities and expand the existing programs.

Caldwell County

According to the Caldwell County Comprehensive Plan[8], the County is expected to increase its population by 11.7% between 2017 and 2037, but the loss of 24- to 44-year-olds between 2000 and

2010 will lead to a decline in the 45-59 age groups by 2037. Caldwell County aims to attract new residents through various goals that will support development and alter current and future land use goals. In terms of undeveloped land in Caldwell County that could potentially be developed for allowable uses, as of January 2020 there were approximately 116,458.49 acres of agricultural or undeveloped land, 7.6 acres of commercial land, 1,168.52 acres of industrial land, 2,410.03 acres of institutional or office land, 1,130.3 acres of open space or parks, 67,736.2 acres of residential land, and 57,338.34 acres of undeveloped land under local, State, or Federal Ownership.

Some of the County's recommendations for future development include:

- **Transportation:** Maintain a good working relationship with NCDOT and the WPCOG to coordinate land use and transportation planning for new and updated roadway corridors; Incorporate adopted plans to create a community-oriented environment that encourages walking, while also supporting other modes of transportation.
- **Resources and services:** Incorporate adopted plans to create a community-oriented environment that encourages walking, while also supporting other modes of transportation; Maintain relationships with water and sewer providers on future public water and sewer projects to demonstrate cooperation for prospective industries such as housing developments which increase revenue and/or property values.
- **Economic Development:** Promote economic development strategies to help recruit viable businesses and service industry activities; Create amenities that attract new residents, tourism and young adult populations back into the region; Inventory available properties throughout the County and encourage commercial development projects in appropriate areas.
- **Land Use:** Update zoning and subdivision regulations to ensure they are compatible for the designated land uses outlined in this plan; Incorporate land use design standards that enhance the aesthetics along Highway 321 and the gateways into the County; Update zoning regulations to encourage a diversity of housing options to better house the new and existing workforce and attract multiple incomes and generations.

To encourage centralized development, Caldwell County has developed a Future Land Use Node pattern to encourage single or multi-family housing, commercial, and industrial development. The location of the nodes can be found in Figure 3-3.

Land Use Node Icon Color	Land Use Node	Description
	Countryside	The Countryside node is intended to be a low-development intensity node that provides limited, basic services to residents in rural areas of the County. These nodes are largely located in areas where conservation of natural areas and farmland is highly valued, such as Wilson Creek.
	Crossroads	The Crossroads node is a low-development intensity node that focuses commercial development around the main corners of the intersection. This node also encourages residential development extending out from the intersection. These nodes are largely

Land Use Node Icon Color	Land Use Node	Description
		located in more populated areas of the County between more heavily developed areas and incorporated jurisdictions
	Village Neighborhood	The Village Neighborhood node is a medium-development intensity node that is intended to allow for “community” development in unincorporated areas. This node largely focuses on encouraging residential development along with supporting centralized commercial, civic and park space. These nodes are anchored by a school and include areas such as Happy Valley and Collettsville.
	Commercial Corridor	The Commercial Corridor node is a high-development intensity node that is intended to provide primary commercial development along established transportation corridors with large traffic volumes. This node also encourages the development of multi-family residential units. These nodes are located in areas along major highways such as U.S. Highway 321 and U.S. Highway 64.
	Industrial Center	The Industrial Center node is a high development intensity node that is intended for light and heavy industrial parks or campuses. These nodes are located in areas of existing industrial development or have access to major highways.

Table 3-6: Caldwell County Land Use Node Types

Catawba County

The goal of the Catawba County Comprehensive Plan[9] is to “establish a balanced and deliberate approach to future development in Catawba County that preserves those aspects of life which make it a desirable place to live while supporting quality, focused development in appropriate areas.” The population has been steadily increasing with a percent change of population between 2010 and 2022 at 5.3% and is projected to increase by 15.8% between 2022 and 2042. The age group that is projected to increase the most between 2022 and 2042 is the 85 years and over category, expected to increase by 136.1%, followed by the 75 years to 84 years category which is expected to increase by 66.3% between 2022 and 2042. The age groups that are expected to decrease the most between 2022 and 2042 are the 20 to 24 years (-6.5% projection) category and the 55 to 59 years of age category (-6.2% projection).

The current land use of Catawba County, encompassing 177,557 acres, includes 94% residential use zoning, with the remaining 6% of land zoned for industrial, commercial, planned development, and other uses. Between 2019 and 2023 there were 296 non-residential construction permits issued, 156 of which were new construction and 140 were additions to existing structures. To determine where development should be centralized, the County utilized a Future Land Use Node planning system which is aimed to establish key areas of development and organize future development:

Land Use Node Icon Color	Land Use Node	Description
	Rural Commercial	This district provides small areas for offices, services, and retail uses, all designed in scale with surrounding residential uses.
	Office Institutional	This district provides small areas for offices, schools, and lightly traveled commercial uses, all designed in scale with surrounding residential uses.
	Mixed-Use	The Mixed-Use nodes is intended for multifamily, mixed use and commercial development around specific locations with standards for building form, design, signage, landscaping, parking access management and appearance related to pedestrian-scale development.
	Highway Commercial	This district provides areas for regional highway-oriented business, office, service and civic uses.
	US 321 Transition	This district provides areas for regional highway-oriented business to transition with a focus on maintaining compatibility between different land uses.

Table 3- 7: Future Land Use Nodes for Catawba County from the Catawba County Comprehensive Plan (March 2024)

While Catawba County is becoming more developed and urban, it still consists of many rural and farmlands. As described in Catawba County's Farm & Food Sustainability Plan (2013), Catawba County has a cropland acreage of approximately 36,600 acres with 14,100 acres of woodland. The total "farmland" of 71,906 acres represents approximately 28 percent of the county's land area. These non-urban uses represent approximately 210 square miles: roughly half of the county. Furthermore, nearly half of the county's population is now located within incorporated areas. These numbers seem to paint a picture of a changing county; one with a generous amount of rural, undisturbed land and one with several emerging centers of human activity. Catawba County has seven small area plans completed from 2000 to 2005, which serve as County long-range plans. All have a goal of rural preservation which came from citizen input during a series of community meetings.

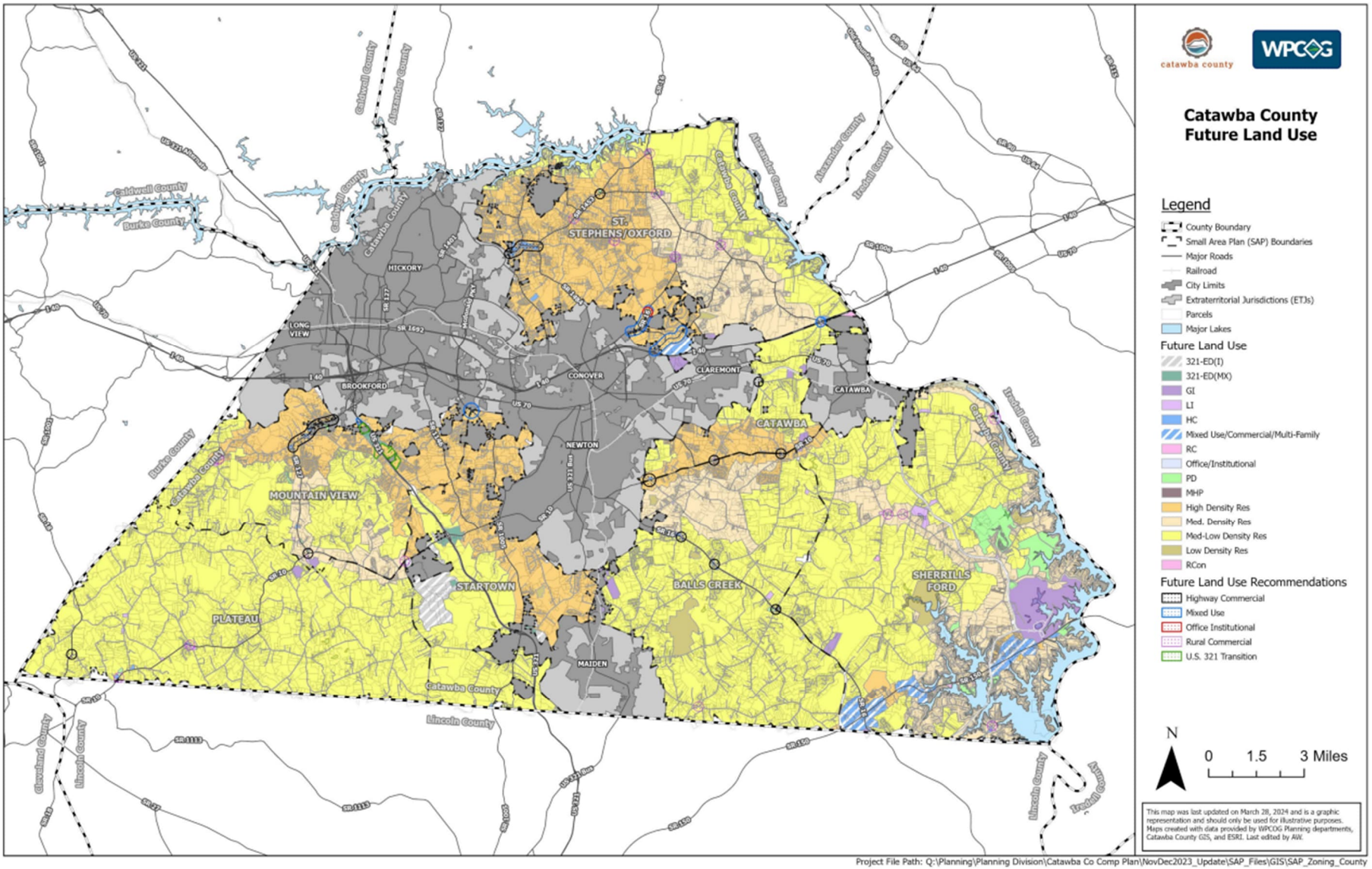


Figure 3- 3: Catawba County Comprehensive Plan Future Land use Map from the Comprehensive Plan (March 2024)

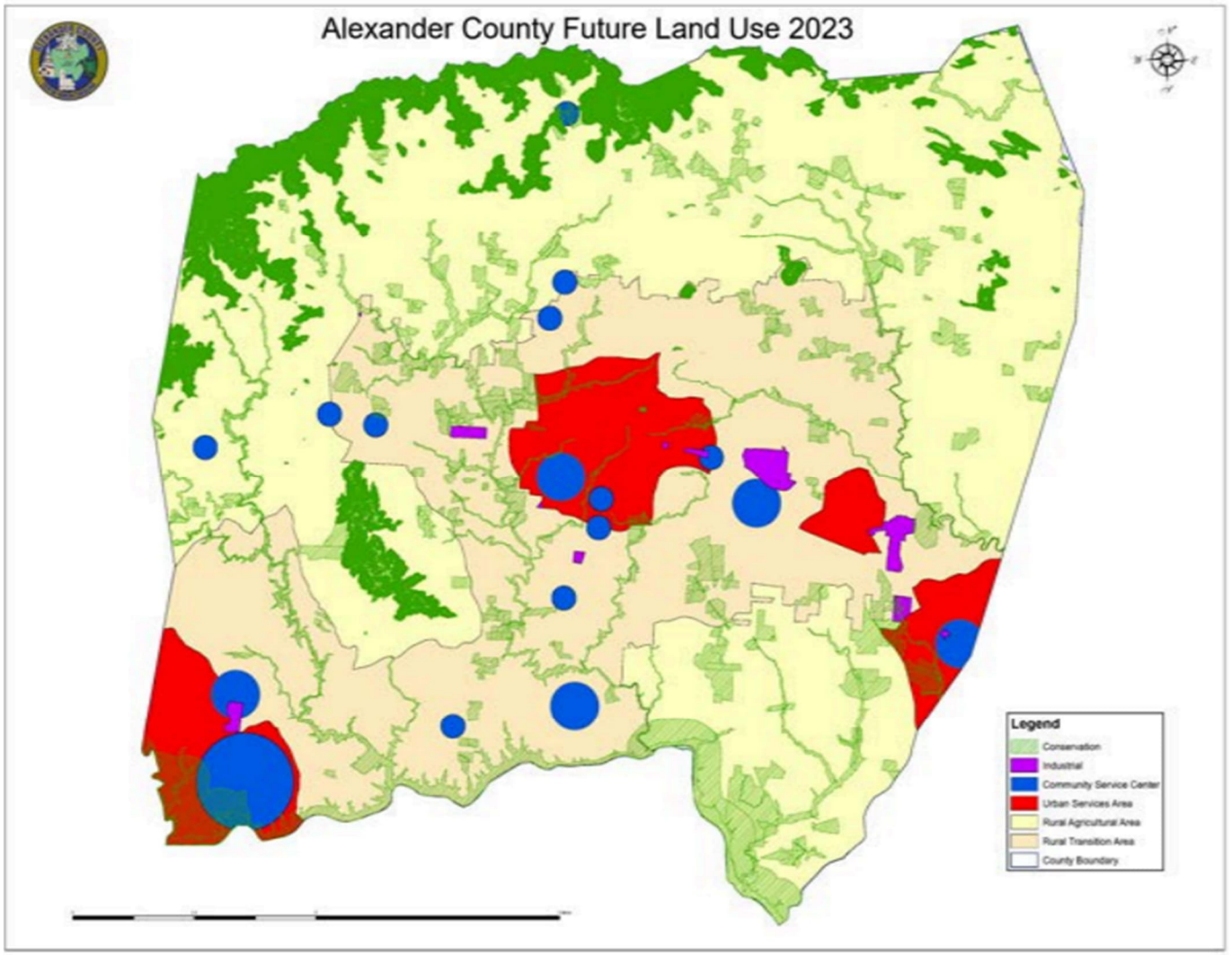


Figure 3- 4: Alexander County Future Land Use Plan from the 2045 Comprehensive Plan

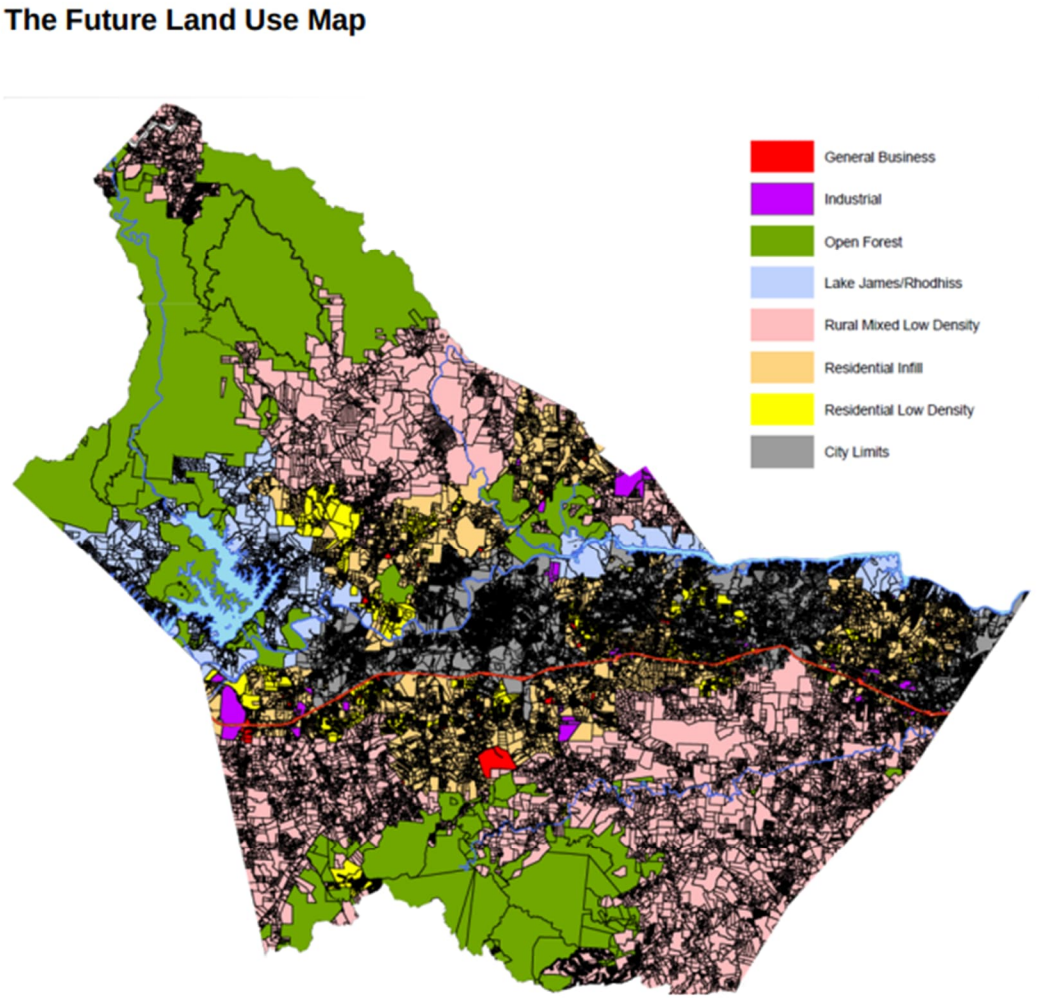


Figure 3- 5: Future Land Use Map from the Blueprint Burke Strategic Use Plan 2022-2023

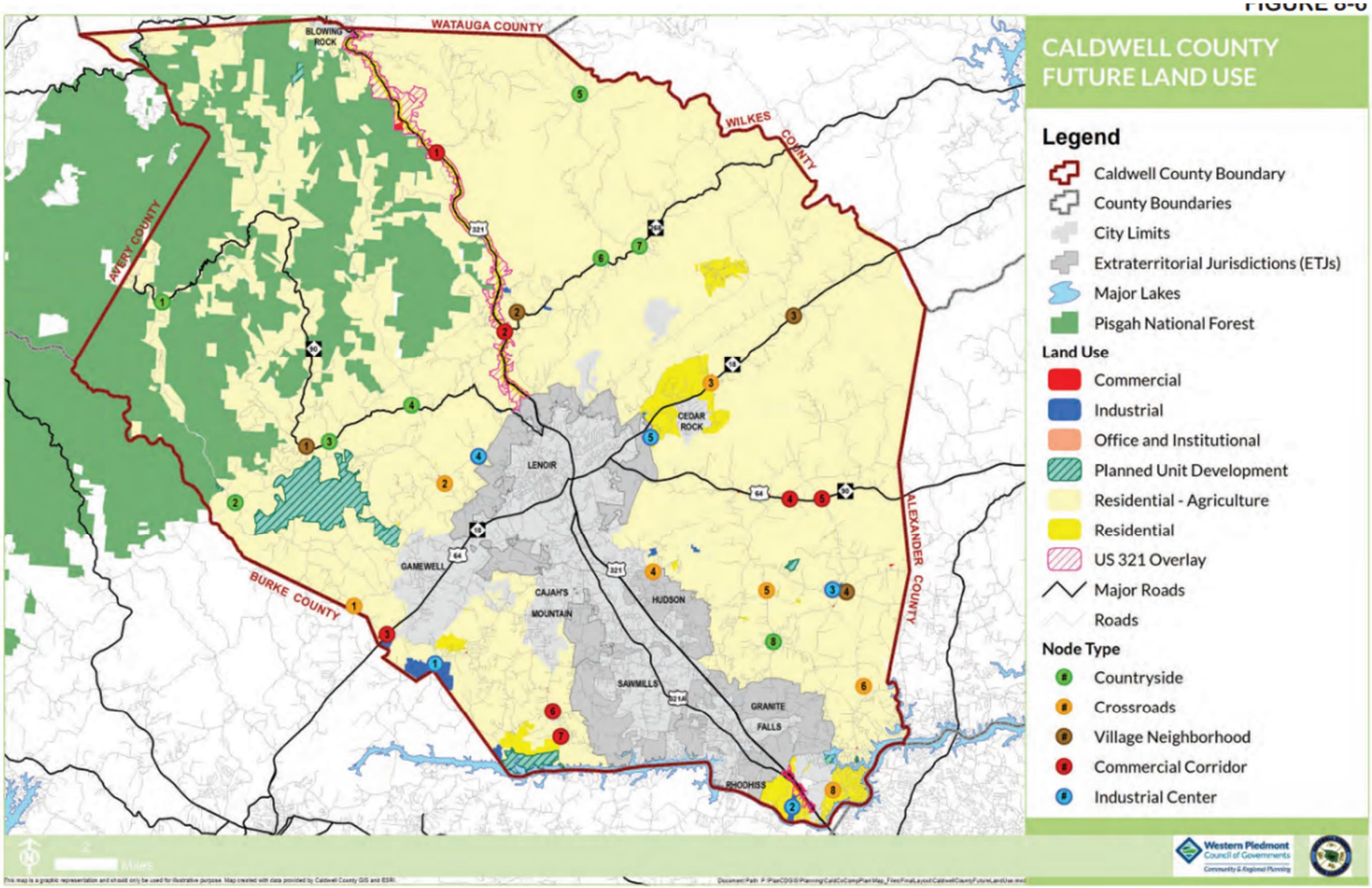


Figure 3- 6: From the Caldwell County Comprehensive Plan 2020

3.4.4 Historic Properties

Historic property counts including districts, buildings, and other cultural resources as shown in Table 3-8 were derived from a combination of sources consisting of the NC Historic Preservation Office and participating jurisdictions. A full list of historic districts, properties, structures, and buildings can be found in Appendix B.

Jurisdiction	Districts	Buildings and Landmarks	Structure or Other	Total Acres
Alexander County	0	2	0	1.35
Burke County	31	32	1	1,219.45
Caldwell County	15	17	1	1,941.66
Catawba County	28	37	2	1,501.9
TOTAL	**74**	**88**	**4**	**4664.36**

Table 3-8: Historic Property Counts by Jurisdiction[10]

3.5 Employment and Industry

The Hickory area in Catawba County is home to many leading manufacturers of furniture, fiber optic cable, and pressure-sensitive tape. It is estimated that 60% of the nation's furniture used to be produced within a 200-mile radius of the City of Hickory. 40% of the world's fiber optic cable is made in the Hickory area. The Hickory area is additionally known as a datacenter corridor and is home to large datacenters operated by Apple and Google. Hickory is the retail hub of the foothills and Unifour Region and is home to the largest shopping mall in the region, Valley Hills Mall.

[1] US Census Bureau. (2024, August 14). *Census.gov | U.S. Census Bureau homepage*. Census.gov. https://www.census.gov/
[2] US Census Bureau. (2024, August 14). *Census.gov | U.S. Census Bureau homepage*. Census.gov. https://www.census.gov/

[3] US Census Bureau. (2024, August 14). *Census.gov | U.S. Census Bureau homepage*. Census.gov. https://www.census.gov/
[4] US Census Bureau. (2024, August 14). Census.gov | U.S. Census Bureau homepage. Census.gov. https://www.census.gov/
[5] US Census Bureau. (2024, August 14). *Census.gov | U.S. Census Bureau homepage*. Census.gov. https://www.census.gov/
[6] Alexander County. (2024). Alexander County 2045 Comprehensive Plan. https://alexandercountync.gov/pdf/comprehensive-plan.pdf
[7] Burke County. (2022). Blueprint Burke Strategic Use Plan. In Burke County. Retrieved July 24, 2024, from https://www.burkenc.org/DocumentCenter/View/298/Blueprint-Burke---Burke-County-Land-Use-Plan?bidId=
[8] Caldwell County & Western Piedmont Council of Governments. (2020). Caldwell County Comprehensive Plan. In *Caldwell County, NC*. Caldwell County. Retrieved July 24, 2024, from https://caldwellcountync.org/DocumentCenter/View/490/Comprehensive-Plan-PDF
[9] Catawba County. (2024). Catawba County Comprehensive Plan. Retrieved July 25, 2024, from https://www.catawbacountync.gov/site/assets/files/10579/catawba_county_draft_03_28_2024.pdf
[10] National Register Database and Research - National Register of Historic Places (U.S. National Park Service). (n.d.). https://www.nps.gov/subjects/nationalregister/database-research.htm#table

Section 4: Risk Assessment

This section comprises the risk assessment portion of the Plan Area Hazard Mitigation Plan, including identification of hazards, hazard profiling and analysis, and assessment of vulnerability. It consists of the following six subsections:

4.1 Overview
4.2 Hazard Selection
4.3 Methodologies and Assumptions
4.4 Inventory of Community Assets
4.5 Hazard Profiles, Analysis, and Vulnerability

4.1. Overview

The Disaster Mitigation Act of 2000 requires that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. Each hazard was evaluated to determine its probability of future occurrence and potential impact. A vulnerability assessment was conducted for each hazard using either quantitative or qualitative methods depending on the available data, to determine its potential to cause significant human and/or monetary losses. A consequence analysis was also completed for each hazard.

Each hazard is profiled in the following format:

Hazard Description

This section provides a description of the hazard, including discussion of its speed of onset and duration, as well as any secondary effects followed by details specific to the Unifour planning area. It also includes details about hazard characteristics, types of the hazards, causes, and affected areas.

Location

This section includes information on the hazard's physical extent, with mapped boundaries where applicable. This includes location description, and maps where applicable, for reported natural hazard events and where the hazards are likely to occur.

Extent

This section includes information on the hazard extent in terms of magnitude, describe how the severity of the hazard can be measured. Where available, the most severe event on record used as a frame of reference. This also includes historical occurrences of the hazard, extent of events, and the definition of the extent of the hazard within the planning area.

Historical Occurrences

This section contains information on historical events, including the location and consequences of all past events on record within or near the planning area. This includes records from local sources and national sources such as the NCDC Storm Events Database Records, National Geophysical Data Center/World Data Service (NGDC/WDS) Significant Earthquake Database, FEMA's National Inventory of Dams, and the US Drought Monitor.

Probability of Future Occurrence

This section gauges the likelihood of future occurrences based on past events and existing data. The frequency is determined by dividing the number of events observed by the number of years on record and multiplying by 100. This provides the percent chance of the event happening in any given year according to historical occurrence (e.g. 10 winter storm events over a 30-year period equates to a 33 percent chance of experiencing a severe winter storm in any given year). The likelihood of future occurrences is categorized into one of the classifications as follows:

- **Highly Likely** – Near or more than 100 percent chance of occurrence within the next year
- **Likely** – Between 10 and 100 percent chance of occurrence within the next year (recurrence interval of 10 years or less)
- **Possible** – Between 1 and 10 percent chance of occurrence within the next year (recurrence interval of 11 to 100 years)
- **Unlikely** – Less than 1 percent chance or occurrence within the next 100 years (recurrence interval of greater than every 100 years

A risk assessment is performed to determine the potential impacts of hazards on the people, built and natural environments, and economy of a given planning area. The Risk Assessment provides the foundation for the rest of the mitigation planning process, which is focused on identifying and prioritizing actions to reduce risk to hazards. In addition to informing the Mitigation Strategy, the Risk Assessment can also be used to establish emergency preparedness and response priorities, for land use and comprehensive planning, and for decision making by elected officials, city and county departments, businesses, and organizations in the community.

A typical risk assessment consists of three primary components. Some form of hazard identification process needs to take place, followed by a detailed profiling of the hazards that will be addressed in the plan. Then the profiled hazards are assessed to determine the vulnerability of the planning area to each hazard being addressed. It is also important to document key details regarding the methodologies and assumptions used to perform the risk assessment, the asset inventories used to perform the risk assessment, and finally conclusions on hazard risk. The conclusions on hazard risk essentially consist of a prioritized ranking of hazards of concern.

This risk assessment was completed using data from North Carolina Emergency Management's Risk Management Tool Suite (RMT): The power of a centralized data clearinghouse realized. NCEM's Risk Management Tool (RMT) is a web-based suite of tools designed to provide enhanced mitigation planning, preparedness assessment, and resiliency assessment capabilities to communities. This web-enabled system is three unique tools in one, all based on the same core geodatabase. This new RMT GBD functions as a data clearinghouse feeding multiple unique applications such as the Hazard Mitigation Planning Tool, the Resiliency Assessment Tool, and the Preparedness Assessment Tool. In the following sections of the plan, all data pulled from the NCEM iRISK database is listed as "GIS Analysis".

Vulnerability and NRI Risk Index Values

In addition to other methods of probability calculations and analysis, the NRI Risk Index was used to demonstrate vulnerability to various natural hazards. The NRI quantifies types of vulnerabilities for avalanches, coastal flooding, cold wave, drought, earthquake, hail, heat wave, hurricane, ice storm, landslide, lightning, riverine flooding, strong wind, tornado, tsunami, volcanic activity, wildfire, and winter weather in terms of Expected Annual Loss (EAL), Exposure, Historic Loss Ratio (HLR), and Frequency. The NRI Risk Index Values were used to represent each county's vulnerability to natural hazards.

The NRI also uses risk ratings to describe a community's relative risk of hazards in relation to all other communities at the same level. The risk ratings range between very high, relatively high, relatively moderate, relatively low, and very low, but can also be rated with no expected annual losses or not applicable if there isn't enough data to accurately determine the community's risk of hazards. The scores a community receives to quantify its risks of hazards range from 0 to 100, where the higher the risk score, the higher the risk of the community to experience that natural hazard.

This risk assessment will also utilize data from FEMAs National Risk Index (NRI) to represent a generalized measure of risk and potential negative impacts of a natural hazard event based on the expected annual loss of a community, the social vulnerability value of a community, and a community's resilience value. These components help define risk based on a community's risk relative to other communities at the same level, utilizing the variables that represent the susceptibility of social groups to negative impacts of natural hazards and variables that represent the community's ability to prepare, adapt, and recover from disruptions related to natural hazards. The NRI dataset is an online tool built by FEMA in collaboration with stakeholders and partners in academia, state governments, local governments, federal agencies, and private industries. The NRI is used by decision makers and the public to improve understanding of natural hazard risks and actions that can reduce risk in a specific community. More information about the NRI can be found in Section 4.3.1 and Section 4.7.

Climate Change

4.2. Hazard Selection

The Plan Area is vulnerable to a wide range of natural hazards that threaten life and property. Current regulations and interim guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards.

Upon a thorough review of the full range of natural hazards covered in the existing mitigation plans for the four participating counties in the Plan area, the hazards suggested under FEMA mitigation planning guidance, and the hazards addressed in the North Carolina State Hazard Mitigation Plan, the participating jurisdictions in the Plan Area have identified 15 hazards that are to be addressed in the Plan Area. These hazards were identified through an extensive process that included input from Hazard Mitigation Planning Committee (HMPC) members.

Table 4-1lists the full range of natural hazards initially considered for inclusion in the Plan. This table includes a total of 15 individual hazards and documents the evaluation process used for determining which of the initially identified hazards were considered significant enough for further evaluation in the Risk Assessment For each hazard considered, the table indicates whether the hazard was identified as a significant hazard to be assessed further, 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 Considered	Hazard Type (Natural, Intentional, Accidental)	Was this hazard considered significant/appropriate enough to be addressed in the plan at this time?	How was this determination made?	Why was this determination made?
River Flooding	Natural	Yes	The threat of damage and loss of life is of sufficient concern to warrant study.	By consensus of the planning committee
Levee Failure	Natural	Yes	The threat of damage and loss of life from the failure of a dam or levee is of sufficient concern to warrant study.	By consensus of the planning committee
Wildfire	Natural	Yes	The threat of damage and loss of life is of sufficient concern to warrant study.	By consensus of the planning committee
Tornado	Natural	Yes	The threat of damage and loss of life is of sufficient concern to warrant study.	By consensus of the planning committee
Earthquake	Natural	Yes	The threat of damage and loss of life is of sufficient concern to warrant study.	By consensus of the planning committee
Landslide	Natural	Yes	The threat of damage and loss of life is of sufficient concern to warrant study.	By consensus of the planning committee
Snow	Natural	Yes	The threat of damage and loss of life from winter weather is of sufficient concern to warrant study.	By consensus of the planning committee
Dam Failure	Natural	Yes	The threat of damage and loss of life from the failure of a dam or levee is of sufficient concern to warrant study.	By consensus of the planning committee
Hail	Natural	Yes	The threat of property damage from hail is of sufficient concern to warrant study.	By consensus of the planning committee
Drought	Natural	Yes	The threat of damage and loss of life is of sufficient concern to warrant study.	By consensus of the planning committee
Hurricane Winds	Natural	Yes	Despite the inland location of the planning area, hurricanes and tropical storms are of sufficient concern to warrant study.	By consensus of the planning committee
Ice	Natural	Yes	The threat of damage and loss of life from winter weather is of sufficient concern to warrant study.	By consensus of the planning committee
Thunderstorm Winds	Natural	Yes	The threat of damage from thunderstorms is of sufficient concern to warrant study.	By consensus of the planning committee
Erosion	Natural	Yes	The threat of damage from erosion is of sufficient concern to warrant study.	By consensus of the planning committee
Sinkholes	Natural	Yes	Due to local concerns and recent occurrences.	By consensus of the planning committee

Table 4-1: Documentation of the Hazard Selection Process

The final list of hazards to be presented in the Plan, as agreed upon by the HMPC, is as follows:

Natural Hazard

- River Flooding
- Levee Failure
- Wildfire
- Tornado
- Earthquake
- Landslide

- Snow
- Dam Failure
- Hail
- Drought
- Hurricane Winds
- Ice
- Thunderstorm Winds
- Erosion
- Sinkholes

The table below represents how hazards are listed in the NC State HMP compared to how they are listed in this Plan.

Unifour Regional HMP Hazard List	NC State HMP Hazard List
River Flooding	Flooding
Levee Failure	Not Addressed
Wildfire	Wildfires
Tornado	Tornadoes/Thunderstorm
Earthquake	Earthquakes
Landslide	Landslide/Rock Fall
Snow	Severe Winter Weather
Dam Failure	Dam Failure
Hail	Tornadoes/Thunderstorm
Drought	Drought
Hurricane Winds	Hurricanes and Coastal Hazards
Ice	Severe Winter Weather
Thunderstorm Winds	Tornadoes/Thunderstorm
Erosion	Not Addressed
Sinkholes	Sinkholes

Another consideration in the selection of the hazards to be addressed in the Plan is the history of major disaster declarations in the planning area. According to the FEMA Disaster Declarations web page, there have been 46 major disaster declarations issued in the state of North Carolina since 1974 (see Table 4-2)

Event	Declaration Date	Declaration Number	County(s) in the Planning Area Declared
Tornadoes	04/12/1974	DR-428	Burke, Caldwell
Drought And Freezing	03/02/1977	EM-3033	Catawba
Drought	08/11/1977	EM-3049	Alexander, Burke, Caldwell, Catawba
Severe Storms, Flooding	11/09/1977	DR-542	Burke, Caldwell, Catawba
Tornadoes	05/17/1989	DR-827	Catawba
Hurricane Hugo	09/25/1989	DR-844	Alexander, Burke, Caldwell Catawba
Severe Snowfall And Winter Storm	03/17/1993	EM-3110	Alexander, Burke, Caldwell, Catawba
Blizzard	01/13/1996	DR-1087	Alexander, Burke, Caldwell, Catawba
Storms/Flooding	02/23/1996	DR-1103	Alexander, Burke, Caldwell, Catawba
Severe Ice Storm	12/12/2002	DR-1448	Alexander, Burke, Caldwell, Catawba
Tropical Storm Frances	09/10/2004	DR-1546	Alexander, Burke, Caldwell, Catawba
Hurricane Ivan	09/18/2004	DR-1553	Burke, Caldwell
Hurricane Katrina Evacuation	09/05/2005	EM-3222	Alexander, Burke, Caldwell, Catawba
Severe Winter Storms And Flooding	02/02/2010	DR-1871	Burke, Caldwell
Severe Storms, Flooding, Landslides, And Mudslides	09/25/2013	DR-4146	Burke, Caldwell
Severe Storms, Flooding, Landslides, And Mudslides	10/29/2013	DR-4153	Catawba
Chestnut Knob Fire	11/19/2016	DR-5164	Burke

Event	Declaration Date	Declaration Number	County(s) in the Planning Area Declared
Hurricane Florence	4/15/2018	EM-3401	Burke, Caldwell, Catawba, Alexander
Hurricane Dorian	9/3/2019	EM-3423	Burke, Caldwell, Catawba, Alexander
Covid-19	3/13/2020	EM-3471	Burke, Caldwell, Catawba, Alexander
Covid-19 Pandemic	1/20/2020	DR-4487	Burke, Caldwell, Catawba, Alexander
Severe Storms, Tornadoes, And Flooding	2/6/2020	DR-4543	Alexander
Hurricane Isaias	07/31/2020	EM-3534	Burke, Caldwell, Catawba, Alexander
Tropical Storm Eta	11/12/2020	DR-4588	Burke, Caldwell, Alexander
Hurricane Ian	10/01/2022	EM-3586	Burke, Caldwell, Catawba, Alexander

Table 4-2: Major Disaster Declarations for Burke, Caldwell, Catawba, and Alexander counties from 1974 to 2023 from the Federal Emergency Management Agency.

As shown in Table 4-2, the earliest major disaster declaration to occur in the planning area was in 1974 and the last were in 2013. The 46 major disaster declarations shown above cover the hazards of flood, hurricane/tropical storm, severe storms, severe winter weather, and tornado relevant to the planning area. This history of disaster declarations is consistent with the hazards identified by the HMPC to be addressed in the Plan. The overall scores for the counties within Unifour for the FEMA National Risk Index (NRI) can be found in Table 4-3 and more information about the NRI can be found in Section 4.3.1. with the NRI Data and Methodology Overview.

Hazard	Component	Catawba County	Burke County	Caldwell County	Alexander County
Riverine Flooding	**Risk Score**	57.6	72.2	47.6	14.9
	Risk Rating	**Relatively Low**	**Relatively Low**	**Relatively Low**	**Very Low**
	EAL	$541,000	$934,000	$312,00	$37,000
Wildfire	**Risk Score**	59.2	60	62.2	47.6
	Risk Rating	**Very Low**	**Very Low**	**Very Low**	**Very Low**
	EAL	$62,000	$57,000	$312,000	$27,000
Tornado	**Risk Score**	89.2	74.8	66.7	48.2
	Risk Rating	**Relatively Moderate**	**Relatively Moderate**	**Relatively Low**	**Relatively Low**
	EAL	$5.2 Million	$2.2 Million	$1.6 Million	$872,000
Earthquake	**Risk Score**	83.6	69.1	72.6	54.7
	Risk Rating	**Relatively Low**	**Relatively Low**	**Relatively Low**	**Very Low**

Hazard	Component	Catawba County	Burke County	Caldwell County	Alexander County
	EAL	$1.1 Million	$338,000	$407,000	$145,000
Landslide	**Risk Score**	92.3	94	98	49
	Risk Rating	**Relatively Moderate**	**Relatively Moderate**	**Relatively High**	**Relatively Low**
	EAL	$150,000	$182,000	$560,000	$22,000
Snow / Winter Weather	**Risk Score**	68.7	56.5	54.8	33.8
	Risk Rating	**Relatively Moderate**	**Relatively Low**	**Relatively Low**	**Relatively Low**
	EAL	$62,000	$57,000	$55,000	$24,000
Hail	**Risk Score**	91.1	70.9	67.7	68.2
	Risk Rating	**Relatively Moderate**	**Relatively Low**	**Relatively Low**	**Relatively Low**
	EAL	$992,000	$224,000	$198,000	$205,000
Drought	**Risk Score**	86.1	86	76.6	73.8
	Risk Rating	**Relatively Moderate**	**Relatively Moderate**	**Relatively Low**	**Relatively Low**
	EAL	$379,000	$342,000	$183,000	$140,000
Hurricane	**Risk Score**	75.1	63.8	63.9	61
	Risk Rating	**Relatively Low**	**Relatively Low**	**Relatively Low**	**Very Low**
	EAL	$1.9 Million	$537,000	$555,000	$430,000
Ice / Ice Storm	**Risk Score**	98.2	97.2	96.4	92
	Risk Rating	**Very High**	**Very High**	**Very High**	**Relatively High**
	EAL	$2 Million	$1.4 Million	$1.3 Million	$612,000
Strong Wind	**Risk Score**	86.9	62.4	86	64.2
	Risk Rating	**Relatively Moderate**	**Relatively Moderate**	**Relatively Moderate**	**Relatively Moderate**
	EAL	$1.1 Million	$411,000	$1 Million	$464,000
Lightning	**Risk Score**	76.9	94.3	88.6	76
	Risk Rating	**Relatively Moderate**	**Relatively High**	**Relatively Moderate**	**Relatively Moderate**
	EAL	$219,000	$726,000	$416,000	$213,000

Table 4-3: Overview of Risk Ratings, Risk Scores, and Expected Annual Loss for Hazards based on the NRI Data

4.3. Methodologies and Assumptions

Certain assumptions are inherent in any risk assessment. For the Unifour Regional HMP, three primary assumptions were discussed by the HMPC from the beginning of the risk assessment process: (1) that the best readily available data would be used, (2) that the hazard data selected for use is reasonably accurate for mitigation planning purposes, and (3) that the risk assessment will be regional in nature with local, municipal-level data provided where appropriate and practical.

Vulnerability Assessment

This section quantifies, to the extent feasible using best available data, assets at risk to natural hazards and potential loss estimates. People, properties and critical facilities, and environmental assets that are vulnerable to the hazard are identified. Future development is also discussed in this section, including how exposure to the hazard may change in the future or how development may affect hazard risk. The vulnerability assessments followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (August 2001). The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard. Data used to support this assessment included the following:

- Geographic Information System (GIS) datasets, including building footprints, topography, aerial photography, and transportation layers.
- Hazard layer GIS datasets from state and federal agencies.
- Written descriptions of inventory and risks provided by the State Hazard Mitigation Plan; and
- Written descriptions of inventory and risks provided by the previous Hazard Mitigation Plan.
- Exposure and vulnerability estimates provided by the North Carolina Emergency Management IRISK database.
- Crop insurance claims by cause from USDA's Risk Management Agency

NCEM's IRISK database incorporates county building footprint and parcel data. Footprints with an area less than 500 square feet were excluded from the analysis. To determine if a building is in a hazard area, the building footprints were intersected with each of the mapped hazard areas. If a building intersects two or more hazard areas (such as the 1-percent-annual-chance flood zone and the 0.2-percent-annualchance flood zone), it is counted as being in the hazard area of highest risk. The parcel data provided building value and year built. Building value was used to determine the value of buildings at risk. Year built was used to determine if the building was constructed prior to or after the community had joined the NFIP and had an effective FIRM and building codes enforced.

Census blocks and Summary File 1 from the 2020 Census were used to determine population at risk. This included the total population, as well as the vulnerable elderly and children age groups. To determine population at risk, the census blocks were intersected with the hazard area. To better determine the actual number of people at risk, the intersecting area of the census block was calculated and divided by the total area of the census block to determine a ratio of area at risk. This ratio was applied to the population of the census block. For example, a census block has a population of 400 people. Five percent of the census block intersects the 1-percent-annual-chance flood hazard area. The ratio estimates that 20 people are then at risk within the 1-percent-annual-chance flood hazard area (5% of the total population for that census block).

Two distinct risk assessment methodologies were used in the formation of the vulnerability assessment. The first consists of a quantitative analysis that relies upon best available data and technology, while the second approach consists of a qualitative analysis that relies on local knowledge and rational decision making. The quantitative analysis involved the use of NCEM's IRISK database, which provides modeled damage estimates for flood, wind, and wildfire hazards.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Where hazard risk cannot be distinctly quantified and modeled, other information can be collected regarding the hazard area, such as the location of critical facilities.

The following list provides key points by hazard type that are relevant to understanding the risk assessment presented in this section:

Wildfire

- Wildfire hazard areas were determined using the Wildland Fire Susceptibility Index (WFSI)
    - Areas with a WFSI value of 0.01 – 0.05 were at moderate risk
    - Areas with a WFSI value greater than 0.05 were at high risk.
    - Areas with a WFSI value less than 0.01 were considered to not be at risk.
- The WFSI data used for the wildfire risk analysis is a value between 0 and 1. It was developed consistent with the mathematical calculation process for determining the probability of an acre burning. The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the state have this value determined consistently, it allows for comparison and ordination of areas of the state as to the likelihood of an acre burning.
- Building footprints were received from all four participating counties. To refine the results, footprints with an area less than 500 square feet were excluded from the analysis. To determine if a building is in a hazard area, the building footprints were intersected with each of the hazard areas. If a building intersects two or more hazard areas, it is in the hazard area of highest risk.
- Parcels were received from all four participating counties. This data provided building value and year built. Building value was used to determine the value of buildings at risk.
- Census blocks and Summary File 1 from the 2020 Census were used to determine population at risk. This included the total population, as well as the vulnerable elderly and children age groups. To determine population at risk, the census blocks were intersected with the hazard area. To better determine the actual number of people at risk, the intersecting area of the census block was calculated and divided by the total area of the census block to determine a ratio of area at risk. This ratio was applied to the population of the census block. For example, a census block has a population of 400 people. Five percent of the census block intersects a high wildfire hazard area. The ratio estimates that 20 people are at risk within that hazard area (5% of the total population for that census block).
- There can be multiple buildings on one parcel. However, the parcel only provides one value for building value and year built, and it is not known from the provided data if the building value is cumulative or for the primary structure on the parcel. For the analysis, building value was only counted once per parcel, regardless of the number of structures.

This was done to prevent grossly over-estimating the value of buildings at risk. For example, a parcel has three buildings with a value of $300,000. If two of those buildings intersect the high-risk area, the assumed building value at risk is $300,000 not $600,000. Even though only two out of three buildings are at risk, there is no way to determine the individual value of each building, so the building value for the whole parcel is counted. The value at risk is also the value of the entire building and does not consider the value of contents.

Winter Weather

- Winter storm maps are an interpolation of recorded values (historical maximums and 30-year-average) derived from individual point locations.

4.3.1. NRI Data and Methodology Overview

Each natural hazard that is included in the FEMA National Risk Index has associated risk values, risk scores, and risk ratings which are representative of the county or census tracts vulnerability to a natural hazard compares to other communities at the same level. In order to more thoroughly represent the risk to natural hazards that a community has compared to other communities at the same level, the NRI will be used to represent a community-based risk comparison outlined with risk values, ratings, and scores which are defined in Table 4-4 below. For more information about the methodology and datasets used in the NRI calculations, please refer to the NRI Technical Documentation[1].

Term	Definition or Equation	
Annualized Frequency	Number of Recorded Events / Period of Record	
Historic Loss Ratio	**LRB** = Loss / Exposure	
	Loss	Loss, by consequence type (Building, population, or agriculture), experienced from each hazard occurrence documented in the data source
	Exposure	The total value, by consequence type (Building, population, or agriculture), estimated to be exposed to the hazard occurrence
Social Vulnerability	The susceptibility of social Groups to the adverse impacts of natural hazards including disproportionate death, injury, loss, or disruption of livelihood	
	Data Source	Center for Disease Control and Prevention (CDC) / Agency for Toxic Substances and Disease Registry (ATSDR) Social Vulnerability Index (SVI)
Community Resilience	The ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.	
	Data Source	University of South Carolina's Hazards and Vulnerability Research Institute (HVRI)'s Baseline Resilience Indicators for Communities (HVRI BRIC)
Expected Annual Loss	Represents the average economic loss in dollars resulting from natural hazards each year. It is calculated for each hazard type and quantifies loss for relevant consequence types: buildings, people, and agriculture	

Term	Definition or Equation	
	Equation	Exposure X Annualized Frequency X Historic Loss Ratio
Risk Value	Values for Risk and EAL in dollars, representing the community's average economic loss from natural hazards each year.	
Risk Score	Scores represent the national percentile ranking of the community's component value compared to all other communities at the same level, at the county or census tract level.	
Risk Rating	Ratings in one of five qualitative categories that describe the community's component value in comparison to all the other communities at the same level. These range from "Very Low" to "Very High".	
	Very High	80th to 100th percentile
	Relatively High	60th to 80th percentile
	Relatively Moderate	40th to 60th percentile
	Relatively Low	20th to 40th percentile
	Very low	0th to 20th percentile

Table 4-4: NRI definitions from the NRI Technical Documentation.

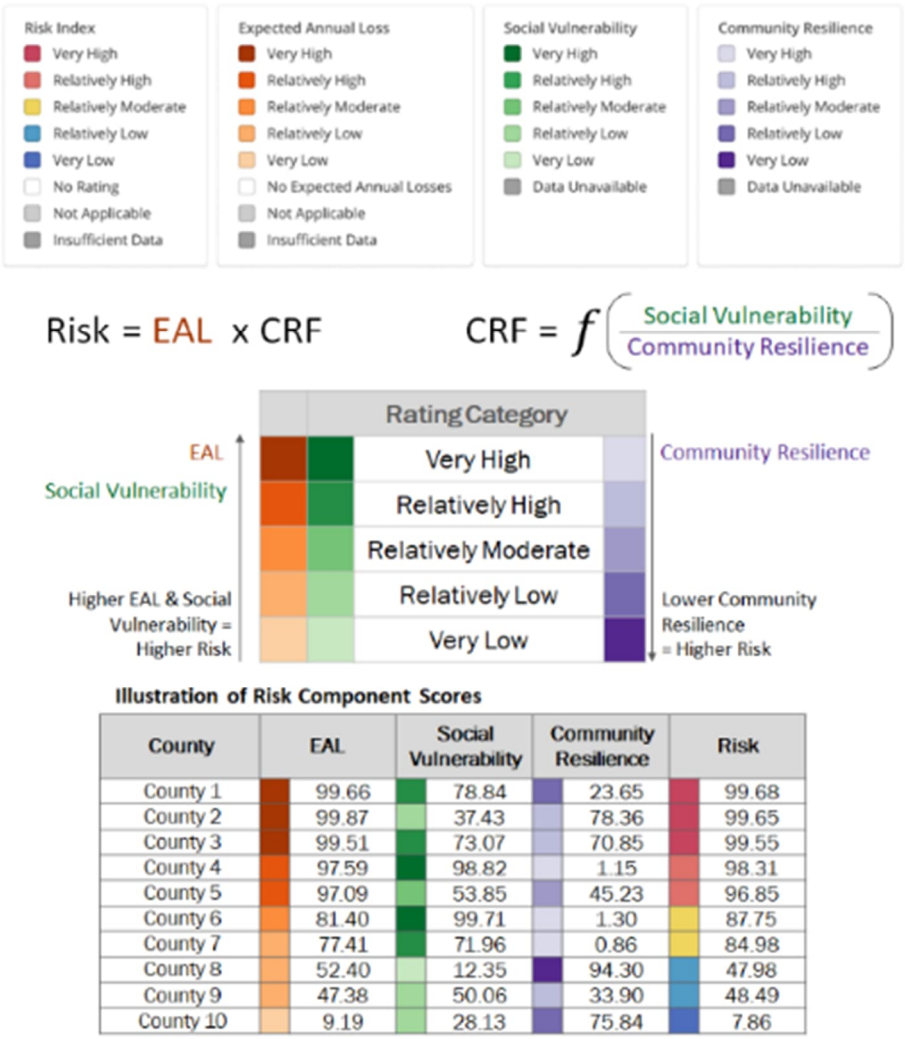


Illustration of Risk Component Scores

County	EAL	Social Vulnerability	Community Resilience	Risk
County 1	99.66	78.84	23.65	99.68
County 2	99.87	37.43	78.36	99.65
County 3	99.51	73.07	70.85	99.55
County 4	97.59	98.82	1.15	98.31
County 5	97.09	53.85	45.23	96.85
County 6	81.40	99.71	1.30	87.75
County 7	77.41	71.96	0.86	84.98
County 8	52.40	12.35	94.30	47.98
County 9	47.38	50.06	33.90	48.49
County 10	9.19	28.13	75.84	7.86

Figure 4-1: NRI rating legend and illustration of risk component scores from the NRI Technical Documentation

County	Risk Index EAL		Risk Index Social Vulnerability		Risk Index Community Resilience	
	Rating	Score	Rating	Score	Rating	Score
Alexander	Very Low	30.73	Relatively High	60.12	Relatively Low	27.63
Caldwell	Relatively Low	56.67	Relatively High	70.88	Relatively Low	37.65
Burke	Relatively Low	64.59	Relatively High	74.57	Relatively Low	35.2
Catawba	Relatively Low	77.73	Relatively High	68.08	Relatively Moderate	55.06

Table 4-5: NRI Overall Risk Index, Social Vulnerability, and Community Resilience Ratings and Scores

4.4. Inventory of Community Assets

Each participating jurisdiction assisted in the identification of assets to be used for analysis to determine what assets may be potentially at risk to the hazards covered in the Plan. These assets are defined broadly as anything that is important to the function and character of the community. For the purposes of this Risk Assessment, the individual types of assets include:

- Population

- Parcels and Buildings
- Critical Facilities
- Infrastructure
- High Potential Loss Properties
- Historic Properties

Although all assets may be affected by certain hazards (such as hail or tornadoes), some assets are more vulnerable because of their location (e.g., the floodplain), certain physical characteristics (e.g., slab-on-grade construction), or socioeconomic uses (e.g., major employers).

4.4.1. Population

The population counts shown in Table 4-6 are derived from 2020 census data and include a breakdown of two subpopulations assumed to be at greater risk to natural hazards than the "general" population: elderly (ages 65 and older) and children (under the age of 5). Density shows population density per square mile, along with the distribution of potentially at-risk populations, across the planning area.

Jurisdiction	2020 Census Population	Elderly (Age 65 and Over)	Children (Age 5 and Under)
Alexander County (Unincorporated Area)	25,330	7,384	1,758
Town of Taylorsville	11,114	1,971	537
Subtotal Alexander	**36,444**	**9,355**	**2,295**
Burke			
Burke County (Unincorporated Area)	57,684	11,959	2,724
City of Morganton	17,474	3,430	1,058
Town of Connelly Springs	1,529	339	47
Town of Drexel	1,760	439	71
Town of Glen Alpine	1,529	300	78
Town of Hildebran	1,679	322	70
Town of Rutherford College	1,226	343	48
Town of Valdese	4,689	1,156	235
Subtotal Burke	**87,570**	**18,288**	**4,331**
Caldwell			
Caldwell County (Unincorporated Area)	40,813	8,664	1,931
City of Lenoir	18,352	3,723	1,056
Town of Cajah's Mountain	2,722	707	122
Town of Gamewell	3,702	806	192

Town of Granite Falls	4,965	961	275
Town of Hudson	3,780	765	203
Town of Rhodhiss	997	143	68
Town of Sawmills	5,020	966	275
Village of Cedar Rock	301	122	6
Subtotal Caldwell	**80,652**	**16,857**	**4,028**
Catawba			
Catawba County (Unincorporated Area)	83,891	15,901	4,088
City of Claremont	1,692	316	94
City of Conover	8,421	1,812	428
City of Hickory	43,490	8,275	2,242
City of Newton	13,148	2,498	753
Town of Brookford	442	101	23
Town of Catawba	702	138	25
Town of Long View	5,088	865	296
Town of Maiden	3,736	595	222
Subtotal Catawba	**160,610**	**30,501**	**8,171**
TOTAL PLAN AREA	**365,276**	**75,001**	**18,825**

Table 4-6: Population Counts with Vulnerable Population Breakdown from the 2020 Census.

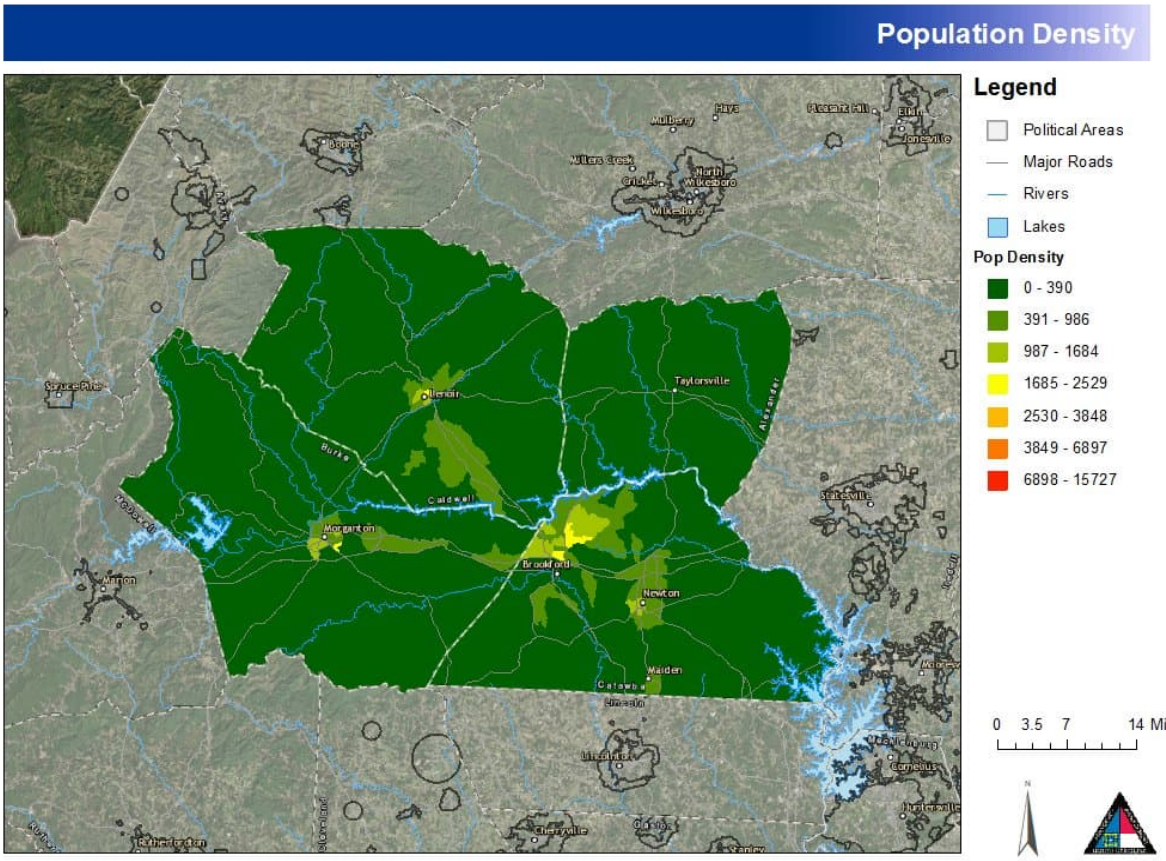


Figure 4-2: Population Density

4.4.2. Parcels and Buildings

The parcel counts, building counts, and building values shown in Table 4-7represent the built environment inventories used for the analyses included in the Risk Assessment. To provide a more accurate reflection of buildings that contain livable space and/or commercial, industrial, or other uses, all building footprints less than 500 square feet have been eliminated from the counts and analysis.

Jurisdiction	Number of Developed Parcels	Number of Undeveloped Parcels	Building Count	Building Value	Number of Pre-FIRM Buildings
Alexander					
Alexander County (Unincorporated Area)	17,971	7,874	24,663	$3,840,434,043	0
Town of Taylorsville	0	0	2,824	$856,433,184	0
Subtotal Alexander	**17,971**	**7,874**	**27,487**	**$4,696,867,227**	**0**
Burke					
Burke County (Unincorporated Area)	333	304	28,091	$2,232,053,874	29
City of Morganton	195	144	10,727	$1,772,443,185	4
Town of Connelly Springs	0	1	889	$63,845,104	0

Jurisdiction	Number of Developed Parcels	Number of Undeveloped Parcels	Building Count	Building Value	Number of Pre-FIRM Buildings
Town of Drexel	8	2	2,949	$309,763,169	1
Town of Glen Alpine	5	10	1,086	$81,890,752	0
Town of Hildebran	13	5	1,069	$137,930,831	0
Town of Rutherford College	0	0	827	$93,523,599	0
Town of Valdese	48	48	2,132	$428,687,357	4
Subtotal Burke	**18,573**	**8,388**	**75,257**	**$9,817,005,098**	**38**
Caldwell					
Caldwell County (Unincorporated Area)	477	335	20,774	$1,707,933,363	19
City of Lenoir	407	171	10,316	$1,482,757,665	58
Town of Cajah's Mountain	2	2	1,350	$118,985,723	0
Town of Gamewell	37	29	2,062	$145,493,182	1
Town of Granite Falls	13	22	3,394	$601,795,107	0
Town of Hudson	41	40	3,116	$349,667,781	1
Town of Rhodhiss	0	0	490	$32,914,533	0
Town of Sawmills	45	29	3,234	$266,030,835	0
Village of Cedar Rock	2	2	135	$35,687,645	0
Subtotal Caldwell	**19,597**	**9,018**	**120,128**	**$14,558,270,932**	**117**
Catawba					
Catawba County (Unincorporated Area)	782	608	50,060	$4,638,045,955	11
City of Claremont	11	8	1,351	$188,796,219	0
City of Conover	112	58	5,089	$738,362,172	4
City of Hickory	516	257	22,507	$3,764,227,757	29
City of Newton	202	122	7,657	$890,405,966	1
Town of Brookford	29	12	304	$13,048,710	2
Town of Catawba	38	18	1,016	$67,585,895	1
Town of Long View	50	24	2,716	$186,187,111	3
Town of Maiden	25	18	3,230	$508,315,681	0
Subtotal Catawba	**21,362**	**10,143**	**214,058**	**$25,553,246,398**	**168**
TOTAL PLAN	**21,362**	**10,143**	**214,058**	**$25,553,246,398**	**168**

Table 4-7: Parcel and Building Counts and Values by Jurisdiction

4.4.3. Critical Facilities

Jurisdiction	Day Care	EMS	EOCs	Fire Stations	Govt. Buildings	Hospitals	Law Enforcement	Schools	Senior Care	Shelters
Alexander County (Unincorporated Area)	**8**	**1**	**0**	**9**	**6**	**0**	**0**	**9**	**3**	**9**
Taylorsville	5	1	1	1	15	0	2	2	2	2
Subtotal Alexander	*25*	*2*	*1*	*10*	*21*	*1*	*2*	*10*	*5*	*11*
Burke County (Unincorporated Area)	**27**	**2**	**0**	**17**	**7**	**0**	**0**	**12**	**6**	**12**
Connelly Springs	-	0	0	1	-	0	***	0	0	0
Drexel	-	0	0	1	-	0	1	1	1	2
Glen Alpine	-	1	0	1	-	0	1	1	0	1
Hildebran	-	1	0	1	-	0	***	1	1	1
Morganton	-	2	1	3	-	1	4	11	5	10
Valdese	3	1	0	2	1	1	1	3	1	1
Rutherford College	-	0	0	2	-	1	***	3	0	1
Subtotal Burke	*-*	*7*	*1*	*27*	*-*	*2*	*7*	*30*	*14*	*28*
Caldwell County (Unincorporated Area)	**26**	**1**	**0**	**6**	-	**0**	**0**	**11**	**1**	**12**
Cajah's Mountain	0	1	0	1	1	0	0	0	1	0
Cedar Rock	0	0	0	0	0	0	0	0	0	0
Gamewell	7	1	0	1	1	0	0	2	0	2
Granite Falls	6	1	0	1	1	0	1	2	1	2
Hudson	5	1	0	1	1	0	2	5	0	3
Lenoir	24	1	2	3	11	1	2	6	7	7
Rhodhiss	0	0	0	2	0	0	1	0	0	0
Sawmills	6	0	0	1	1	0	0	1	0	2
Subtotal Caldwell	*74*	*6*	*2*	*15*	*16*	*1*	*6*	*27*	*10*	*28*
Catawba County (Unincorporated Area)	**54**	**4**	**0**	**17**	**1**	**0**	**1**	**18**	**1**	**19**
Brookford	0	0	0	0	1	0	1	0	0	0
Catawba	3	1	0	1	1	0	1	1	0	1
Claremont	4	0	0	1	1	0	1	1	0	2

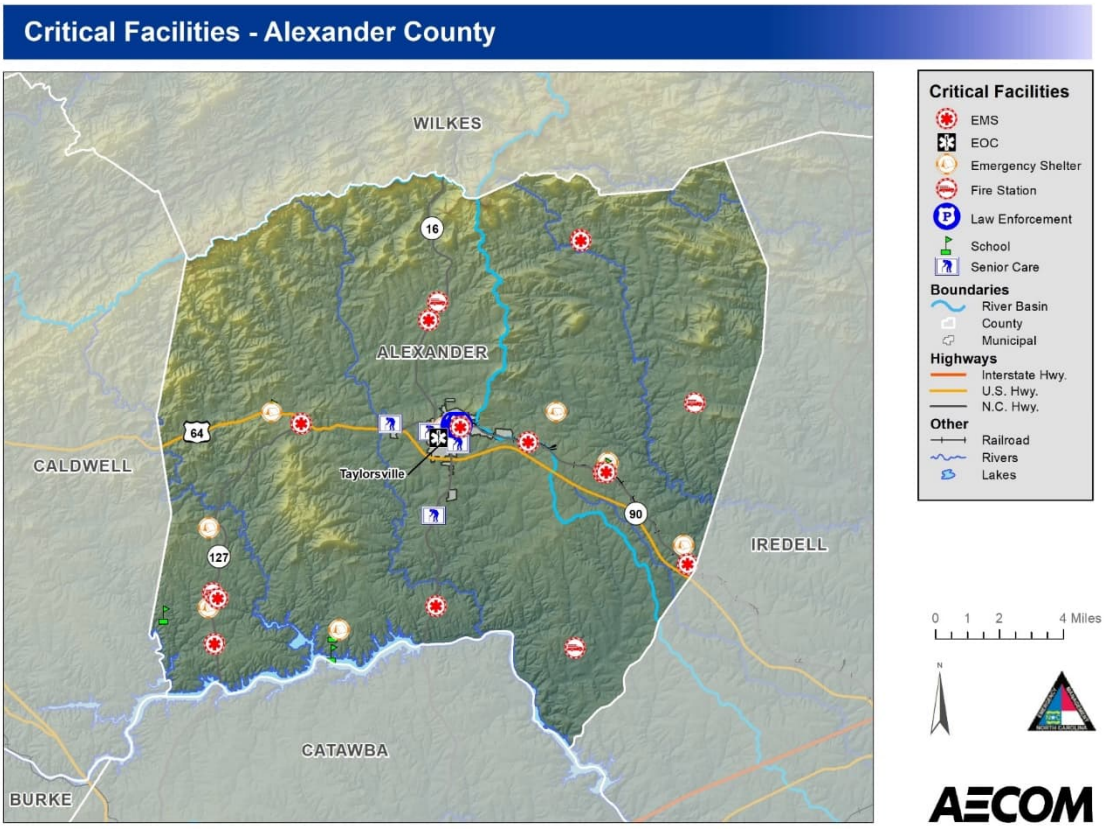
Jurisdiction	Day Care	EMS	EOCs	Fire Stations	Govt. Buildings	Hospitals	Law Enforcement	Schools	Senior Care	Shelters
Conover	12	0	0	3	1	0	1	1	4	1
Hickory	39	1	1	7	1	2	1	9	8	12
Long View	5	0	0	1	1	0	1	2	0	2
Maiden	5	0	0	2	1	0	1	3	0	2
Newton	17	1	1	3	1	0	2	5	3	6
Subtotal Catawba	*139*	*7*	*1*	*31*	*9*	*2*	*9*	*40*	*16*	*45*
TOTAL UNIFOUR	**238**	**22**	**5**	**85**	**46**	**6**	**26**	**107**	**45**	**112**

Table 4- 8: Critical Facilities Counts by Jurisdiction ***** may not be updated – please provide input where applicable***

Source: Numbers supplied by participating jurisdictions and derived from alternate sources via NC IRISK.
**** A facility exists but a GPS point location for GIS analysis is not currently available.*

A table of healthcare facilities, names, addresses, and facility type is in Appendix B. Names and addresses of law enforcement, Fire stations, and EMS located in Appendix B.

Figure 4-3: Critical Facilities in Alexander County



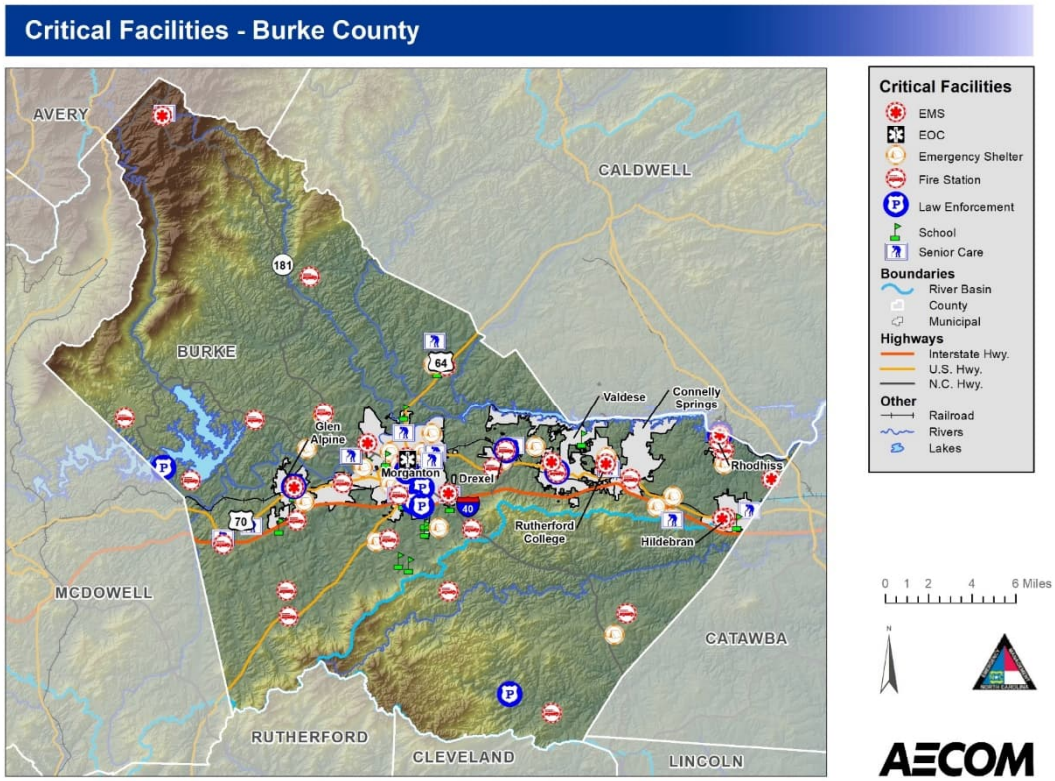


Figure 4-5: Critical Facilities in Burke County

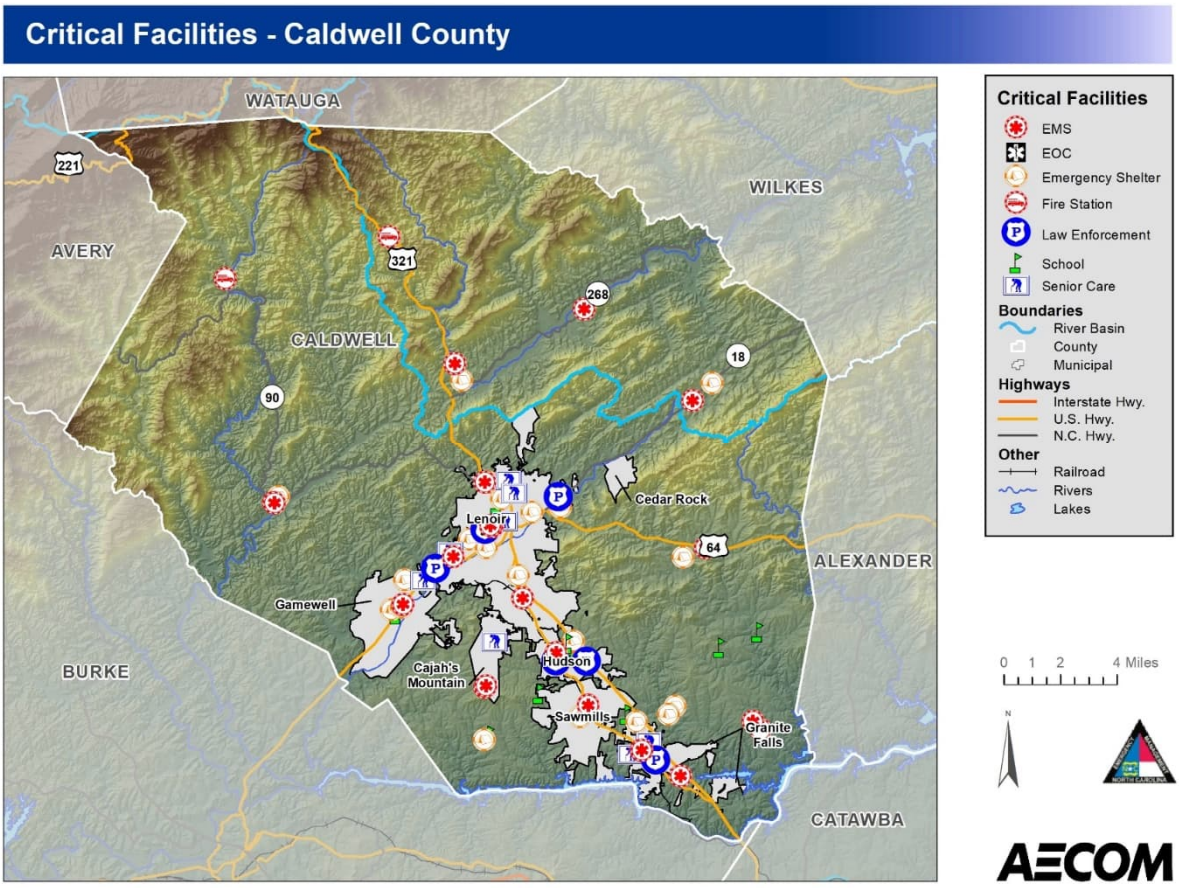


Figure 4-4: Critical Facilities in Caldwell County

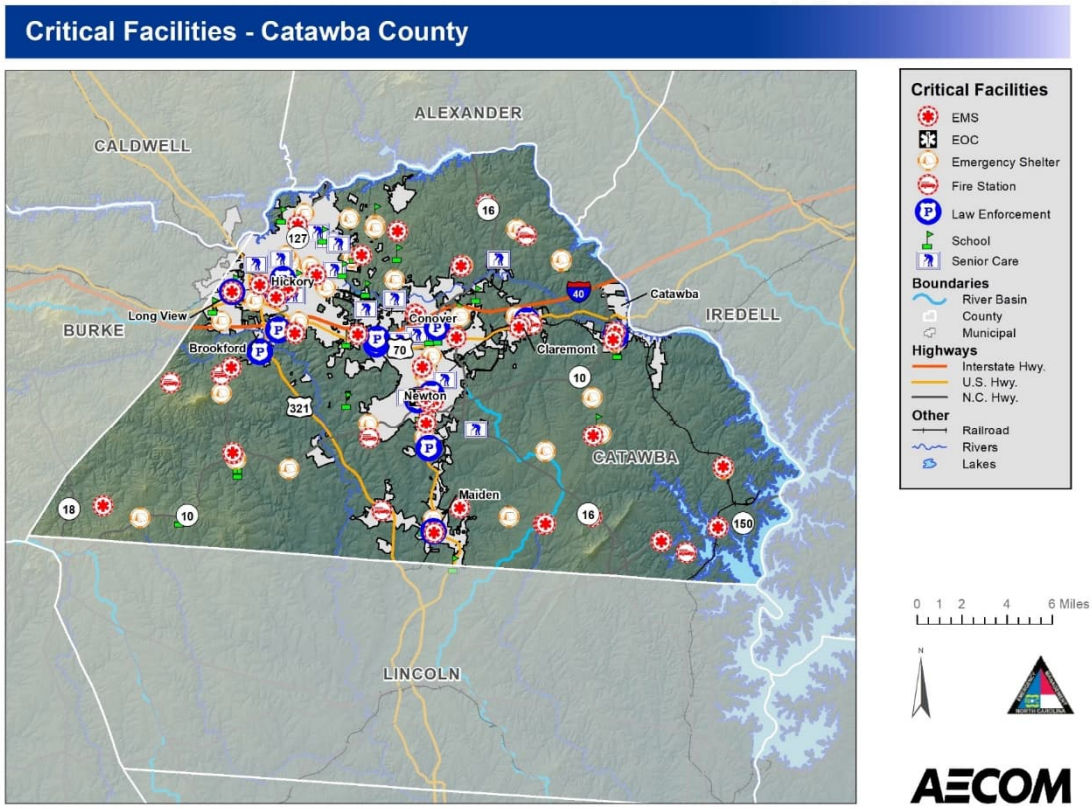


Figure 4-6: Critical Facilities in Catawba County

4.4.4. Infrastructure

Certain infrastructure elements as shown in Table 4-9 were identified for analysis. These include major roads, railroads, power plants, water/wastewater facilities, and water/wastewater lines.

Jurisdiction	Major Roads[1]	Railroad[2]	Energy (Power Plants)	Water (Treatment Facilities)	Water / Wastewater Lines
Alexander					
Alexander County (Unincorporated Area)	51.8	8.0	1	0	384.6
Town of Taylorsville	4.3	1.7	1	0	43.5
Subtotal Alexander	**56.1**	**9.7**	**2**	**0**	**428.1**
Burke					
Burke County (Unincorporated Area)	139.5	18.0	1	0	362.8
City of Morganton	31.4	7.7	1	0	307.2
Town of Connelly Springs	2.1	1.8	0	0	8.2
Town of Drexel	0.6	1.0	1	0	30.2
Town of Glen Alpine	1.2	1.3	0	0	15.6

2The major roads and railroads accounted for in this table are the same as those depicted on the “Community Profile” map found in Section 2.

3Does not include inactive/abandoned railroads.

Jurisdiction	Major Roads[1]	Railroad[2]	Energy (Power Plants)	Water (Treatment Facilities)	Water / Wastewater Lines
Town of Hildebran	1.9	1.9	1	0	34.6
Town of Rutherford College	3.2	2.5	0	0	21.1
Town of Valdese	2.5	0.6	1	0	103.2
Subtotal Burke	**182.4**	**34.8**	**5**	**0**	**882.9**
Caldwell					
Caldwell County (Unincorporated Area)	95.8	1.5	1	0	317.6
City of Lenoir	21.2	12.1	1	1	337.1
Town of Cajah's Mountain	0.0	0.0	0	0	31.1
Town of Gamewell	3.2	0.0	0	0	9.8
Town of Granite Falls	6.1	3.2	1	1	96.2
Town of Hudson	7.5	2.5	0	0	72.9
Town of Rhodhiss	0.0	0.6	0	0	8.6
Town of Sawmills	4.4	2.4	0	0	20.1
Village of Cedar Rock	0.0	0.0	0	0	6.3
Subtotal Caldwell	**138.2**	**22.3**	**3**	**2**	**899.7**
Catawba					
Catawba County (Unincorporated Area)	119.2	41.3	1	1	0.0
City of Claremont	2.6	3.9	0	0	0.0
City of Conover	17.8	9.1	1	0	0.0
City of Hickory	32.2	11.7	1	0	1,417.0
City of Newton	14.6	4.9	1	0	0.0
Town of Brookford	1.6	0.0	0	0	0.0
Town of Catawba	2.3	5.1	0	0	0.0
Town of Long View	5.0	2.2	0	0	11.1
Town of Maiden	6.0	0.0	1	1	0.0
Subtotal Catawba	**201.3**	**78.2**	**5**	**2**	**1,428.1**
TOTAL PLAN	**578.0**	**145.0**	**15**	**4**	**3,638.8**

Table 4-9: Infrastructure Counts and Measurements (in Miles) by Jurisdiction

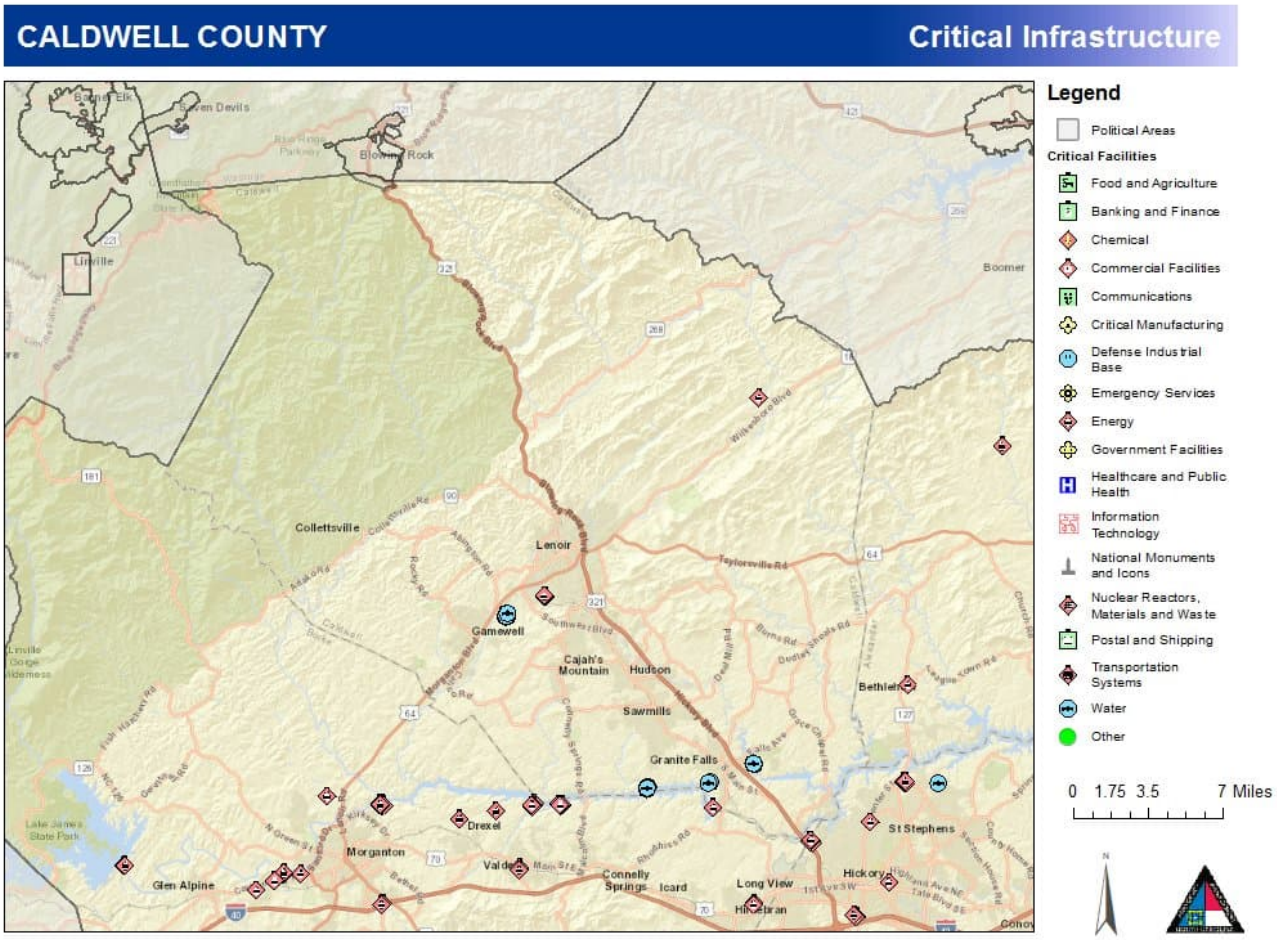


Figure 4- 8: Critical Infrastructure in Caldwell County

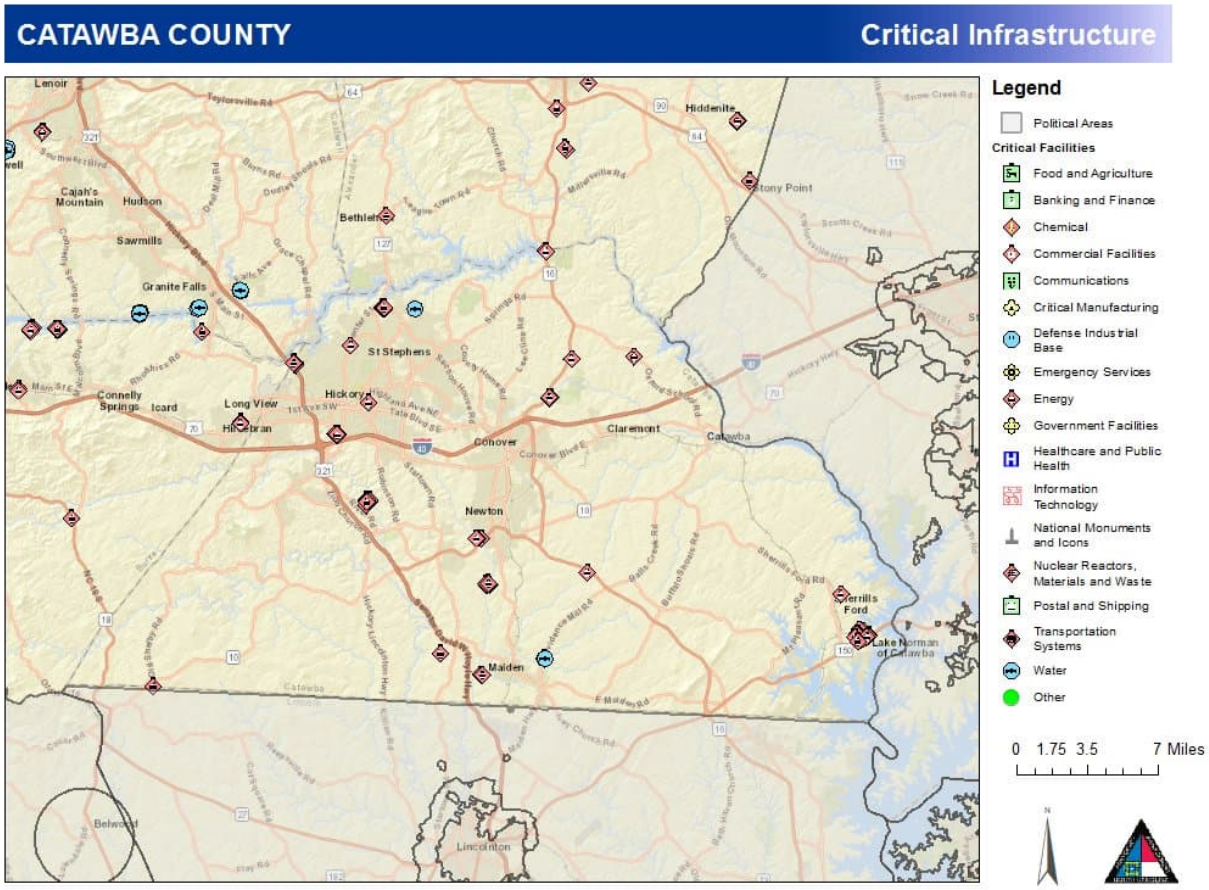


Figure 4- 7: Critical Infrastructure in Catawba County

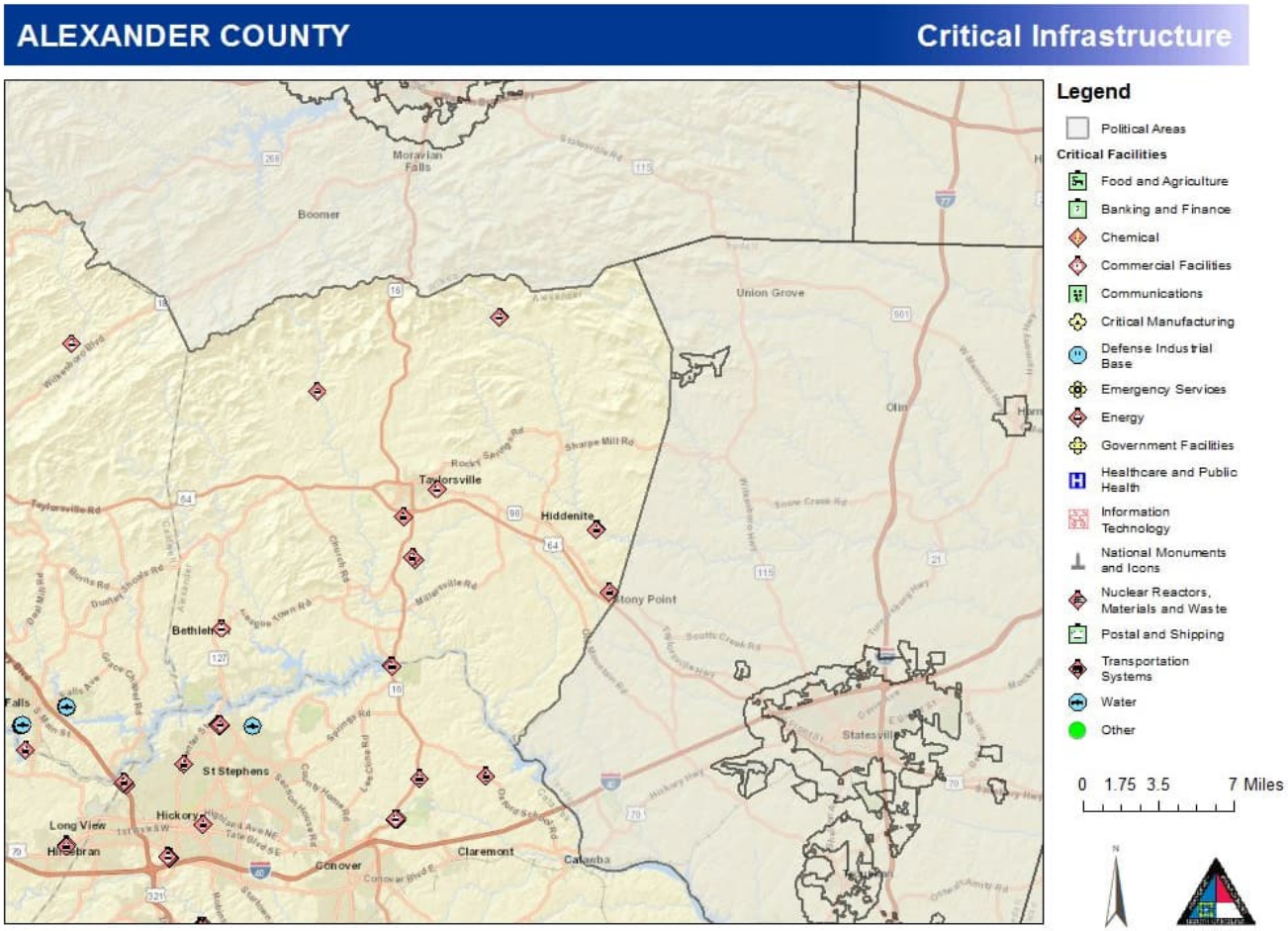


Figure 4- 9: Critical Infrastructure in Alexander County

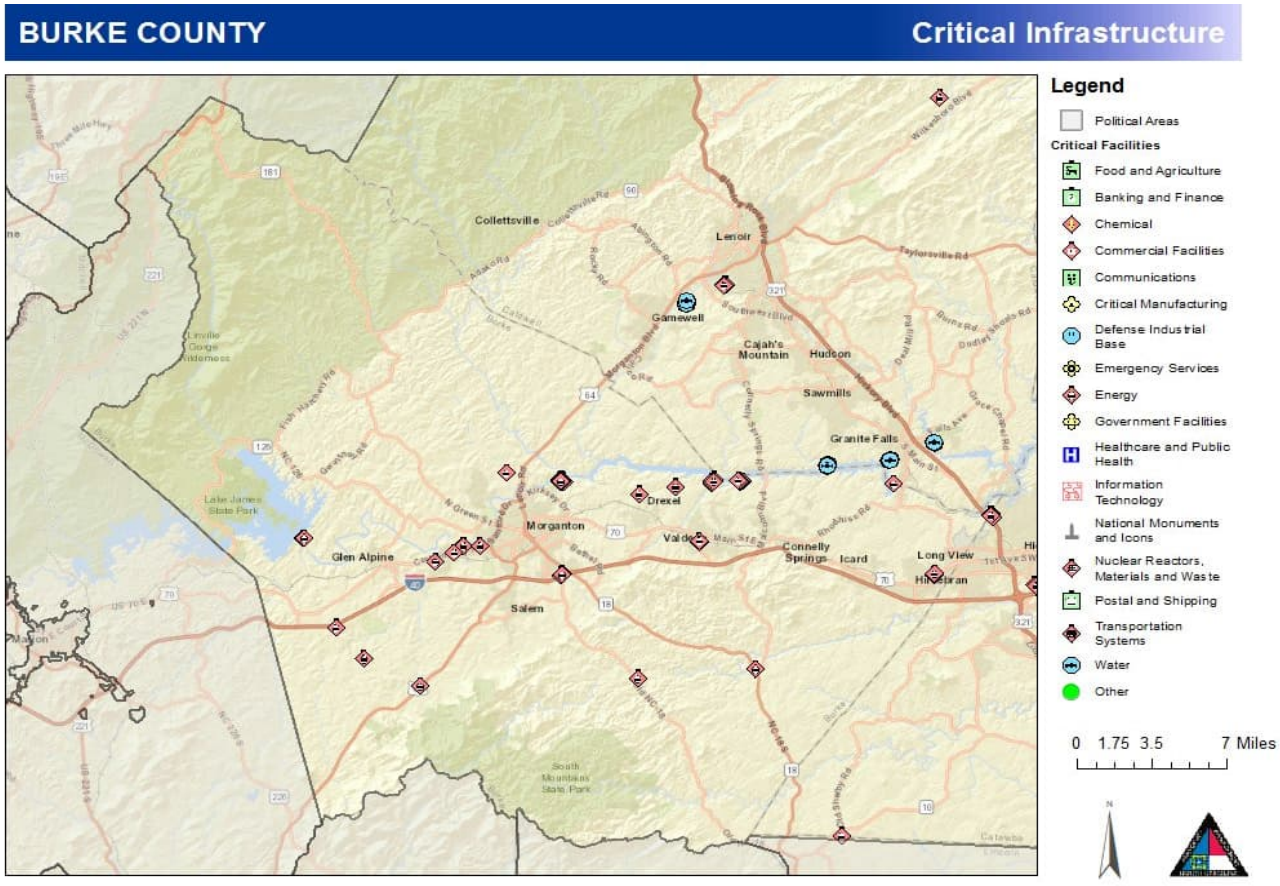


Figure 4- 10: Critical Infrastructure in Burke

4.4.5. Historic Properties

Historic property counts including districts, buildings, and other cultural resources as shown in Table 4-10 were derived from a combination of sources consisting of the NC Historic Preservation Office and participating jurisdictions.

Jurisdiction	Districts	Buildings and Landmarks	Other
Alexander County	0	2	0
Burke County	10	2	0
Caldwell County	3	17	2
Catawba County	16	45	2
TOTAL PLAN	**29**	**1**	**4**

Table 4-10: Historic Property Counts by Jurisdiction

Source: NC Historic Preservation Office HPOWEB 2.0[2] individual resources that have been listed on the National Register of Historic Places (NR) or district registered on the National Register of Historic Districts (NRHD).

4.4.6. NRI Social Vulnerability and Community Resilience

County	Social Vulnerability Score (Percentile)	Social Vulnerability Rating	Community Resilience Score (Percentile)	Community Resilience Rating
Alexander	60.12	Relatively High	27.63	Relatively Low
Burke	74.57	Relatively High	35.2	Relatively Low
Caldwell	70.88	Relatively High	37.65	Relatively Low
Catawba	68.08	Relatively High	55.06	Relatively Moderate

Table 4- 11: NRI Social Vulnerability, Community Resilience, and overall Risk Ratings and Scores for Catawba, Alexander, Caldwell, and Burke County

4.5. Hazard Profiles, Analysis, and Vulnerability

As stated in subsection 4.2, the following hazards are addressed in this Risk Assessment and are presented in the following order in the subsections to follow:

Natural Hazard

- River Flooding

- Levee Failure
- Wildfire
- Tornado
- Earthquake
- Landslide
- Snow
- Dam Failure
- Hail
- Drought
- Hurricane Winds
- Ice
- Thunderstorm Winds
- Erosion
- Sinkholes

4.5.1. River Flooding

Flooding is the most frequent and costly of all the natural hazards in the United States and has caused 8,616 fatalities since 1940 and 103 deaths in the last 10 years[3]. Approximately 75 percent of presidentially declared disasters result from flood-related natural hazard events[4]. Taken as a whole, more frequent, localized flooding problems that do not meet federal disaster declaration thresholds ultimately cause most damages across the United States.

Floods are generally the result of excessive precipitation, and can be characterized as follows: general floods, in which precipitation occurs over a given river basin for a long period of time; and flash floods, which are the product of heavy localized precipitation falling in a short time over a given location. The severity of a flood event is determined by the following factors: a combination of stream and river basin topography and physiography, hydrology, precipitation and weather patterns, recent soil moisture conditions, and the degree of vegetative clearing in and around flood-prone areas.

General floods may last for several days or even weeks. 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 a stream or river. Coastal flooding is typically a result of storm surge, wind- driven waves, and heavy rainfall produced by hurricanes, tropical storms, nor'easters, and other large coastal storms. Urban flooding occurs where man-made 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 localized area or by heavy rains associated with hurricanes and tropical storms. Flash flooding can also occur due to accelerated snow melt, a dam or levee failure, or from a sudden release of water held by an ice jam. Although flash flooding occurs often along mountain streams, it is also common in

urbanized areas where much of the ground is covered by impervious surfaces. Flash flood waters can move at very high speeds and “walls” of water have been known to reach heights of 10 to 20 feet. Flash flood waters and the accompanying debris can uproot trees, roll boulders, destroy buildings, and obliterate bridges and roads.

The periodic flooding of lands including and adjacent to rivers, streams, and shorelines, referred to as the 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. As the magnitude of a hypothetical flood scenario increases the recurrence interval increases. That is, the greater the magnitude of a given event, the less likely it will occur over time.

Floodplains are delineated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by a 10-year flood (should it occur) and the 100-year floodplain by the 100-year flood. Flood frequencies such as the 100-year flood are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence (expressed as a percent) each year of a flood event of a given magnitude. For example, the 100-year flood has a 1 percent chance of occurring in any given year.

4.5.1.1. River Flooding Hazard Analysis

There are numerous rivers and streams flowing through the planning area. When heavy or prolonged rainfall events occur, these rivers and streams are susceptible to some degree of flooding. There have been several past flooding events throughout the planning area, ranging widely in terms of location, magnitude, and impact. The most frequent flooding events have been localized in nature, resulting from heavy rains in a short period of time over urbanized areas that are not able to adequately handle stormwater runoff. These events typically do not threaten lives or property and do not result in emergency or disaster declarations, therefore historical data is limited to the larger, most notable events.

4.5.1.2. Methodologies and Assumptions

The following list provides key points by hazard type that are relevant to understanding the risk assessment presented in this section:

- Pre-FIRM buildings have been selected as a subset of at-risk buildings following the assumption that structures built prior to the community joining the National Flood Insurance Program (NFIP) are likely to be at greater risk than post-FIRM buildings.

- Effective FEMA DFIRM data was used for the flood hazard areas. Flood zones used in the analysis consist of Zone AE (1-percent-annual-chance flood), Zone AE Floodway, and the 0.2-percent-annual-chance flood hazard area.

- Building footprints were received from all four participating counties. To refine the results, footprints with an area less than 500 square feet were excluded from the analysis. To determine if a building is in a hazard area, the building footprints were intersected with each of the mapped hazard areas. If a building intersects two or more hazard areas (such as the 1-percent-annual-chance flood zone and the 0.2-percent-annual-chance flood zone), it is counted as being in the hazard area of highest risk.

- Parcels were received from all four participating counties. The parcel data provided building value and year built. Building value was used to determine the value of buildings at risk. Year built was used to determine if the building was constructed prior to or after the community had joined the NFIP and had an effective FIRM and building codes enforced.

- Census blocks and Summary File 1 from the 2020 Census were used to determine population at risk. This included the total population, as well as the vulnerable elderly and children age groups. To determine population at risk, the census blocks were intersected with the hazard area. To better determine the actual number of people at risk, the intersecting area of the census block was calculated and divided by the total area of the census block to determine a ratio of area at risk. This ratio was applied to the population of the census block. For example, a census block has a population of 400 people. Five percent of the census block intersects the 1-percent-annual-chance flood hazard area. The ratio estimates that 20 people are then at risk within the 1-percent-annual-chance flood hazard area (5% of the total population for that census block).
- Limitations: There can be multiple buildings located on one parcel. However, the parcel only provides one value for building value and year built, and it is not known from the provided data if the building value is cumulative or for the primary structure on the parcel. For the analysis, building value was only counted once per parcel, regardless of the number of structures. This was done to prevent grossly over-estimating the value of buildings at risk. For example, a parcel has three buildings with a value of $300,000. If two of those buildings intersect the 1-percent-annual-chance flood hazard area, the assumed building value at risk is $300,000 not $600,000. Even though only two out of three buildings are at risk, there is no way to determine the individual value of each building, so the building value for the whole parcel is counted. The value at risk is also the value of the entire building, and does not consider flood damage based on elevation, number of floors, or

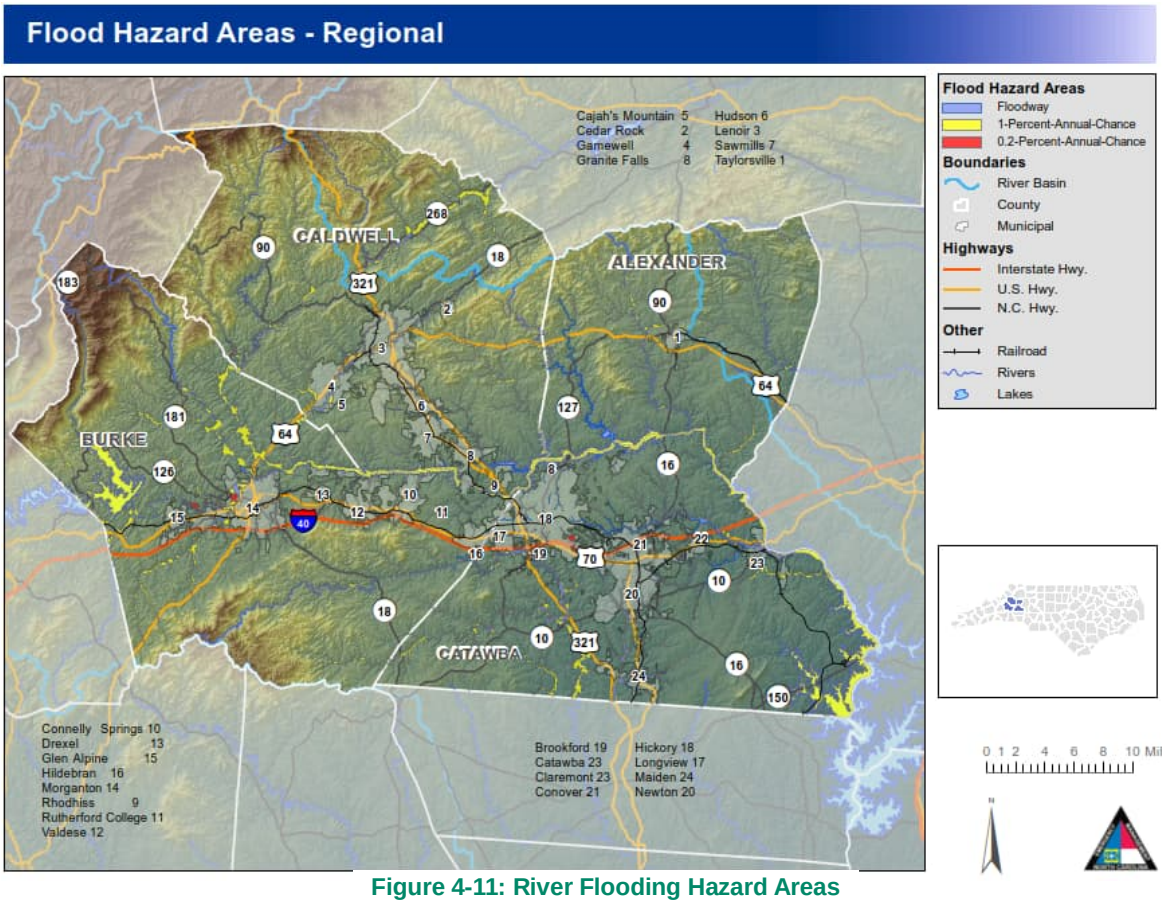


Figure 4-11: River Flooding Hazard Areas

4.5.1.3. Location within the Planning Area

The below figures show the boundaries of the floodway, 1-percent-annual-chance, and 0.2-percent-annual-chance floods, based on effective DFIRM data. These are the three mapped flood hazard areas used as the basis for this analysis.

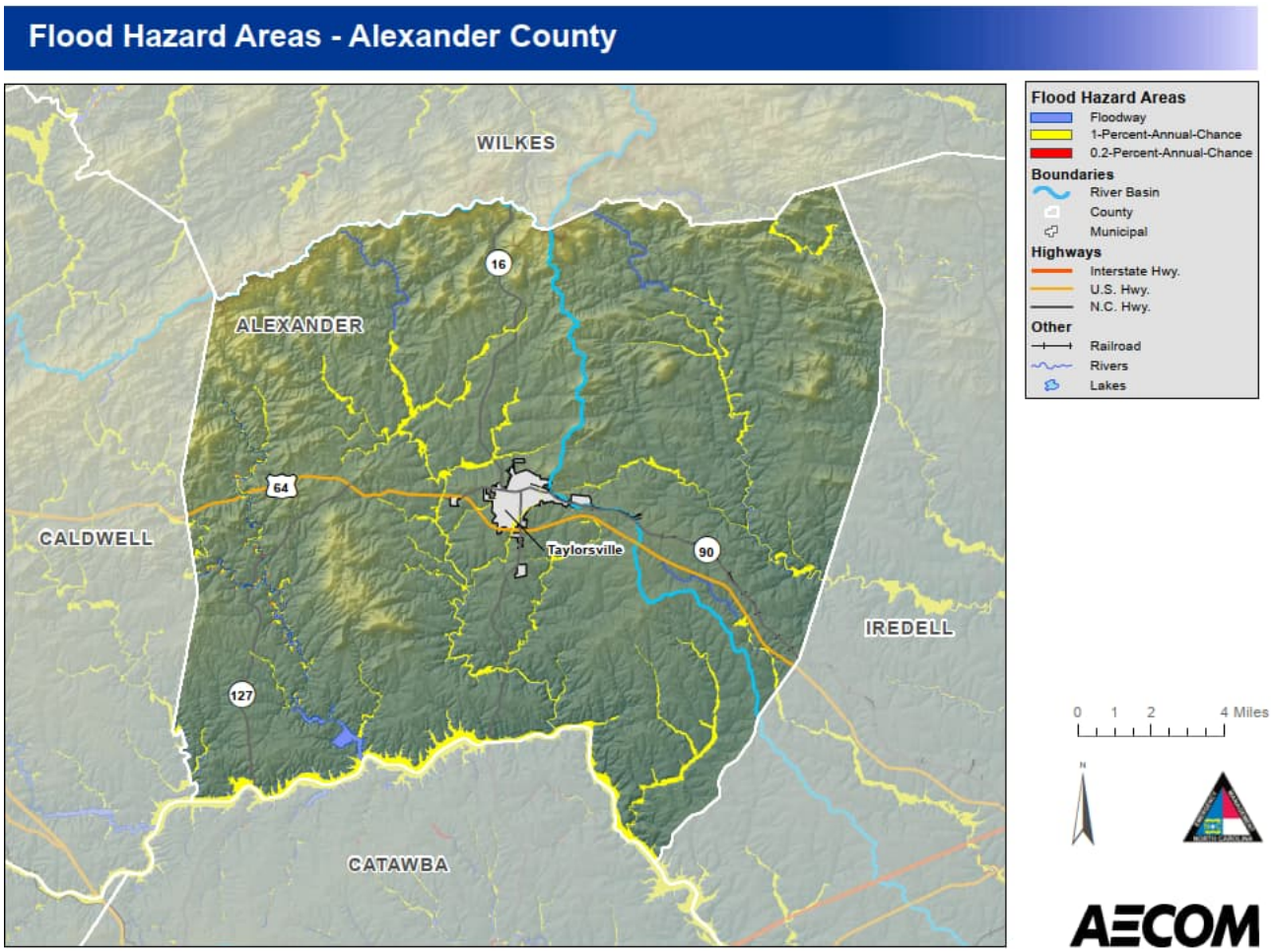


Figure 4- 13: River Flooding Hazard Area for Alexander County

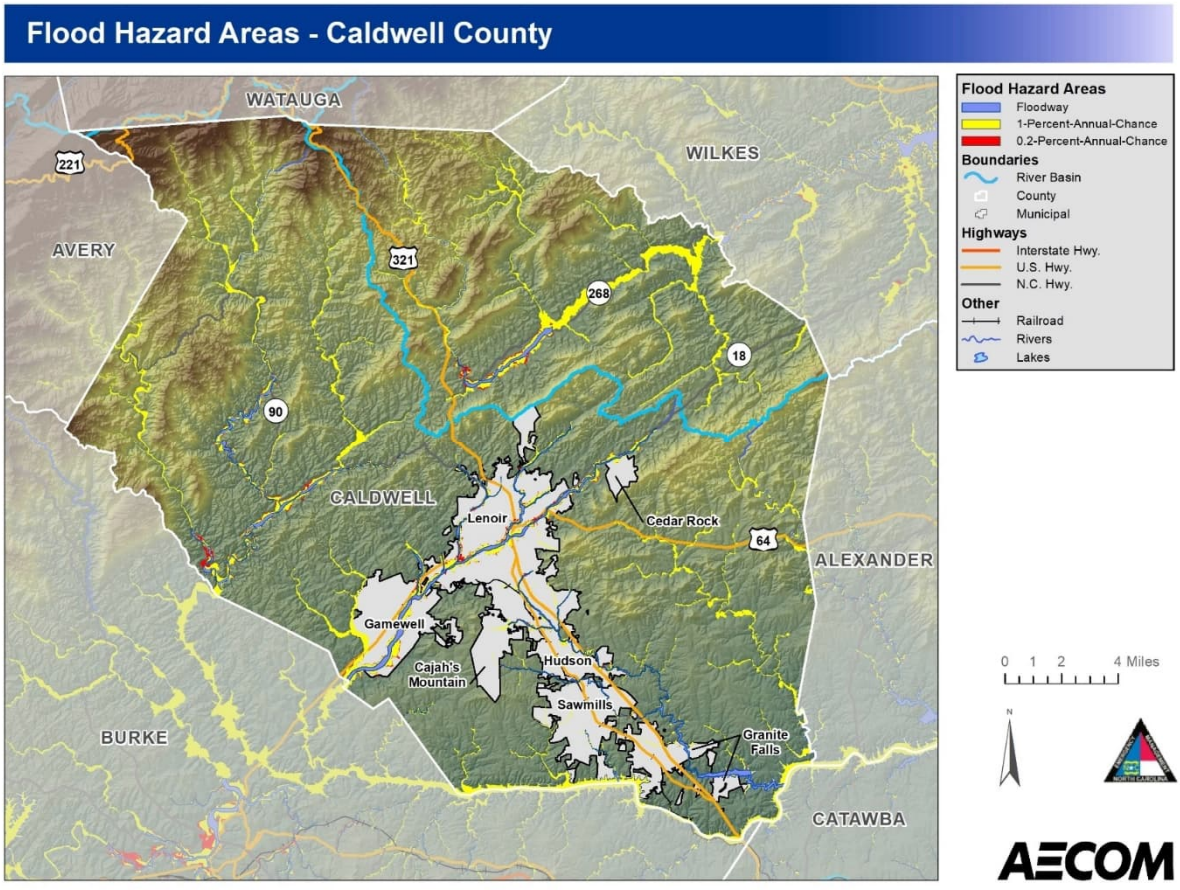


Figure 4- 12: River Flooding Hazard Areas for Caldwell County

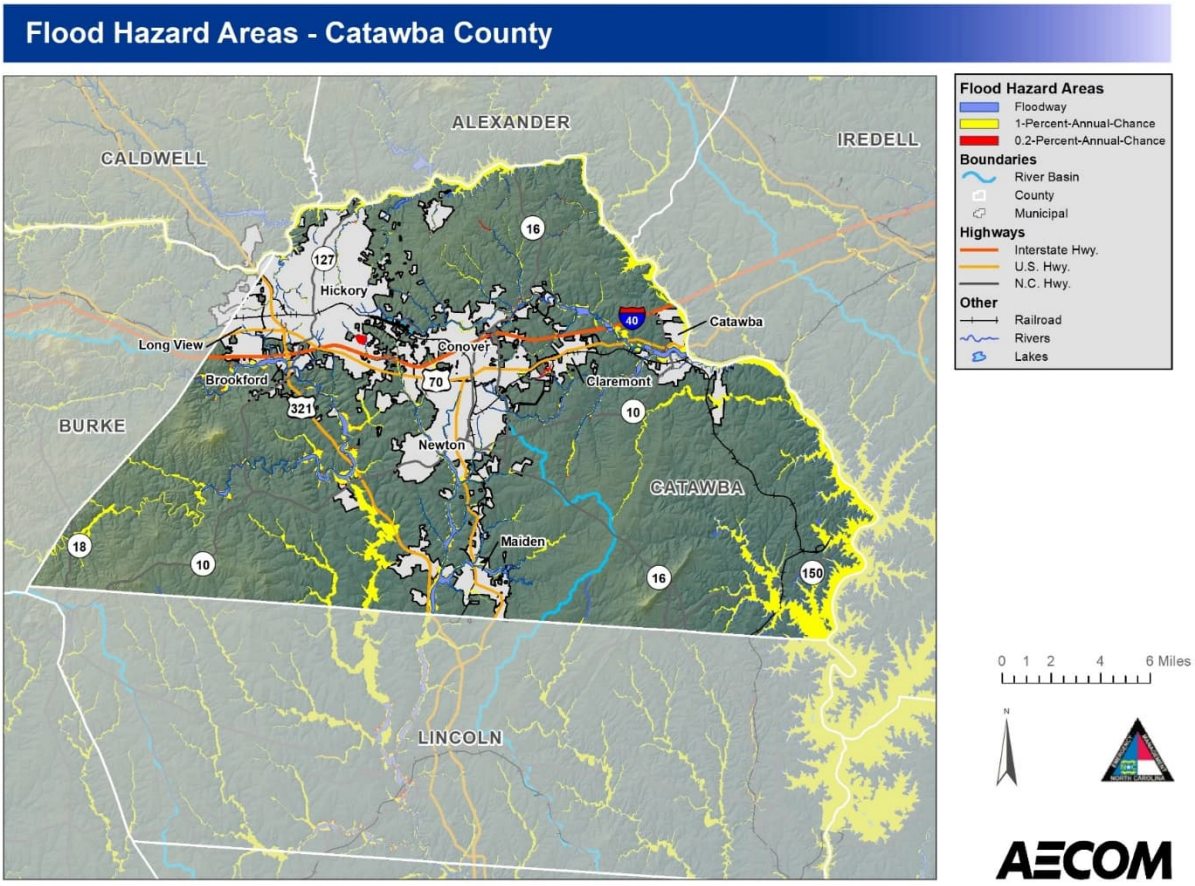


Figure 4- 15: River Flooding Areas for Catawba County

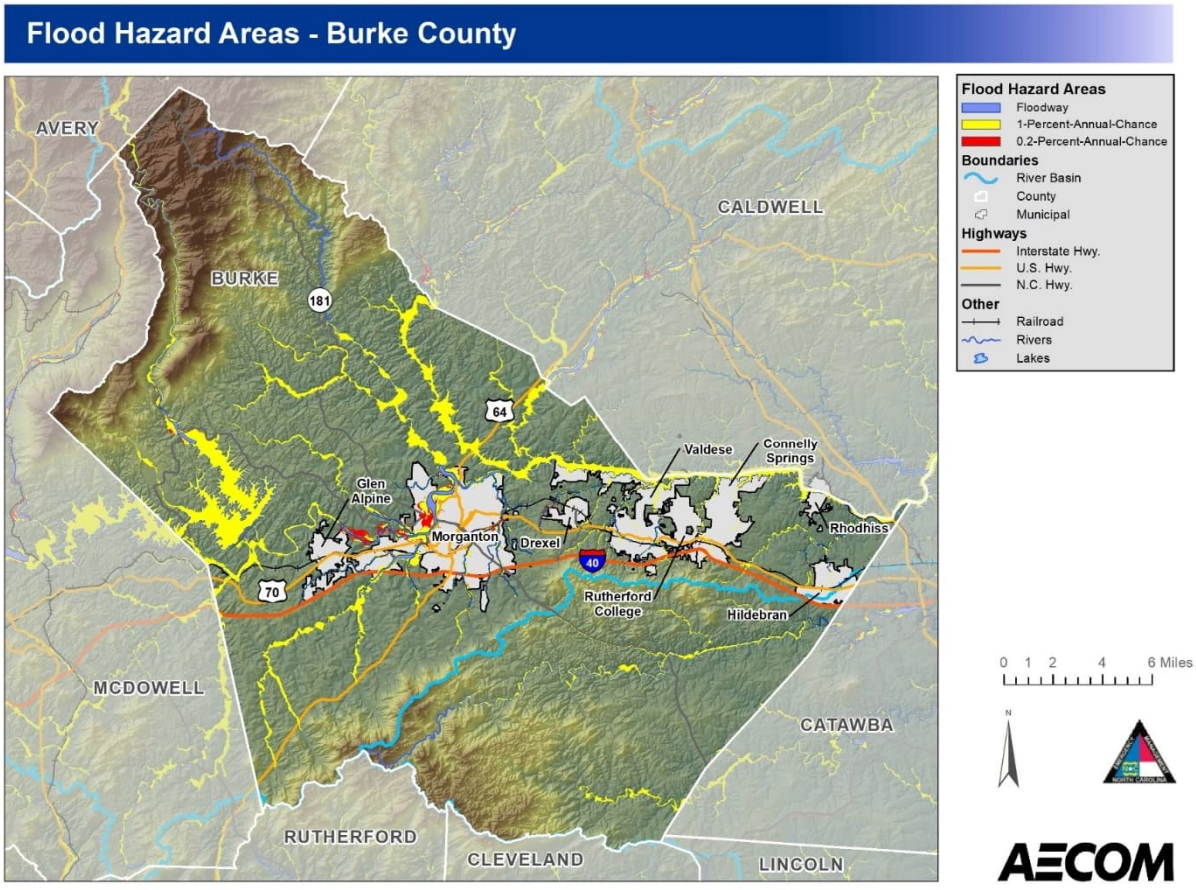


Figure 4- 14: River Flooding Areas for Burke County

4.5.1.4. Extent (Magnitude and Severity)

Definition:

Flood Extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. Flood depth and velocity are recorded via the USGS stream gages throughout the region.

Extent Event:

Table 4-12 provides peak river stage data according to USGS which shows the highest recorded peak river stage for all jurisdictions.

Jurisdiction	Flood Extent
Alexander County	**995.91 ft** (19.91 ft NGVD29 Datum +976 ft, 10/16/1964, USGS)
Town of Taylorsville	**18.63 ft** NGVD29 (no datum conversion listed, 8/10/1970, USGS)
Burke County	**1028.7 ft** (26.3 ft NGVD29 Datum +1002.4 ft, 9/9/2004, USGS)
City of Morganton	No USGS Data, Highest BFE **1331.1 ft***
Town of Connelly Springs	No USGS Data, Highest BFE **1213 ft***
Town of Drexel	No USGS Data, Highest BFE **1037.9 ft***
Town of Glen Alpine	No USGS Data, Highest BFE **1103.4 ft***
Town of Hildebran	No USGS Data, Highest BFE **947 ft***
Town of Rutherford College	**1028.7 ft** (26.3 ft NGVD29 Datum +1002.4 ft, 9/9/2004, USGS)
Town of Valdese	No USGS Data, Highest BFE **1128.2 ft***
Caldwell County	No USGS Data, Highest BFE **1277.9 ft***
City of Lenoir	**1,104.4 ft** (22 ft NGVD29 Datum +1082.4 ft 8/13/1940, USGS)
Town of Cajah's Mountain	No USGS Data, Highest BFE **1259.5 ft***
Town of Gamewell	No USGS Data, Highest BFE **1160.6 ft***
Town of Granite Falls	No USGS Data, Highest BFE **1051.7 ft***
Town of Hudson	No USGS Data, Highest BFE **1161.4 ft***
Town of Rhodhiss	No USGS Data, Highest BFE **1181.7 ft***
Town of Sawmills	**24.14 ft** NGVD29 (no datum conversion listed, 8/7/1973, USGS)
Village of Cedar Rock	No USGS Data, Highest BFE **1140.7 ft***

Jurisdiction	Flood Extent
Catawba County	**1,101.18 ft** (23.18 ft NGVD29 Datum +1078 ft 8/10/1970, USGS)
City of Claremont	**919.31 ft** (29.2 ft NGVD29 Datum + 890.11 ft 8/13/1940, USGS)
City of Conover	No USGS Data, Highest BFE **921.3 ft***
City of Hickory	**790.59 ft** (44.1 ft NGVD29 Datum +746.49 ft, 7/16/1916, USGS)
City of Newton	No USGS Data, Highest BFE **936.1 ft***
Town of Brookford	No USGS Data, Highest BFE **1002.5 ft***
Town of Catawba	No USGS Data, Highest BFE **1115.8 ft***
Town of Long View	No USGS Data, Highest BFE **1119.4 ft***
Town of Maiden	No USGS Data, Highest BFE **857.5 ft***

Table 4-12: USGS Peak River Stage Data[3]

It is worth noting that this is based on available records from existing river gages and may not represent the worst flooding in the Region's history. Similarly, a database of high-water marks is not available for all areas of the Region for comparison, validation, or further reliable research on the magnitude of historical occurrences.

4.5.1.5. Historical Occurrences

The following historical occurrences ranging from 2018 – 2024 have been summarized based on the National Climatic Data Center (NCDC) Storm Events database, and full event summaries appear in Appendix A in table along with a separate table of flooding events from 2018-2024 from the NCDC Storm Events Database[5]. It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

County	Jurisdiction	2018 - 2023		2012 - 2017		2018 - 2023	
		Total Losses	Average losses Per year [+]	Total Losses	Average Losses Per Year	Total Injuries	Total Deaths
Alexander	Bethlehem	$11,000	$2,200	$0		0	0
	Taylorsville	$2,000	$400			0	0
	Vashti	$450,000	$90,000			0	6
	All Healing Springs	$10,000	$2,000			1	1
	Taylorsville Airport	$1,000	$200			0	0

[3] Statements in Table 4.12 marked by an "*" for municipalities where BFE data was used since no USGS data was available.

County	Jurisdiction	2018 - 2023		2012 - 2017		2018 - 2023	
		Total Losses	Average losses Per year +	Total Losses	Average Losses Per Year	Total Injuries	Total Deaths
	Total	**$474,000**	**$94,800**	**$0**		**1**	**7**
	% Change of Total Losses (2018 – 2023 vs 2012 -2017)			**N/A**			
Burke	Joy	$56,000	$11,200	$30,000	$6,000	0	0
	Glen Alpine	$1,000	$200	$60,000	$12,000		
	Table Rock	$3,000	$600	$0	$0		
	Pleasant Grove	$1,000	$200	$0	$0		
	Calvin	$50,000	$10,000	$0	$0		
	Brindletown	$25,000	$5,000	$0	$0		
	Chesterfield	$10,000	$2,000	$2,000	$400		
	Enola	$10,000	$2,000	$0	$0		
	Morganton	$0		$110,000	$22,000		
	Bridgewater	$0		$5,000	$1,000		
	Oak Hill	$0		$500	$100		
	Total	**$156,000**	**$31,200**	**$207,500**	**$41,500**	**0**	**0**
	% Change of Total Losses (2018 – 2023 vs 2012 -2017)			**-24.82%**			
Caldwell	Edgemont	$96,000	$19,200	$80,000	$16,000	0	0
	Yadkin Valley	$7,000	$1,400	$0			
	Collettsville	$2,500	$500	$51,000	$10,200		
	Lenoir	$12,000	$2,400	$0			
	Globe	$100,000	$20,000				
	Whitnel	$1,000	$200				
	Richland	$50,000	$10,000	$5,000	$1,000		
	Valmead	$5,000	$1,000	$0			
	Warrior	$0		$300,000	$60,000	0	0
	Abingdon						
	Mortimer			$300,000	$60,000		
	Hartland			$5,000	$1,000		
	Total	**$273,500**	**$54,700**	**$741,000**	**$148,200**	**0**	**0**
	% Change of Total Losses (2018 – 2023 vs 2012 -2017)			**-63.09%**			
Catawba	Brookford	$5,000	$1,000	$0		0	0
	Longview	$51,000	$10,200	$3,000	$600		
	Catawba	$810,000	$162,000	$0			
	Oyama	$11,000	$2,200	$900,500	$180,100		
	Conover	$10,000	$2,000	$0			
	Propst Crossroads	$1,500	$300	$0			

County	Jurisdiction	2018 - 2023		2012 - 2017		2018 - 2023	
		Total Losses	Average losses Per year +	Total Losses	Average Losses Per Year	Total Injuries	Total Deaths
	Drums Crossroads	$500	$100	$0			
	Hickory	$50,000	$10,000	$1,801,500	$360,300		
	Claremont	$0		$3,020,000	$604,000		
	Total	**$939,000**	**$187,800**	**$5,725,000**	**$1,145,000**	**0**	**0**
	% Change of Total Losses (2018 – 2023 vs 2012 -2017)			**-83.60%**			
All Counties	**Total**	**$1,842,500**	**$368,500**	**$6,673,500**	**$1,334,700**	**1**	**7**
	Percent Change of Property Damages (2018-2023 Total vs 2012-2017 Total)			**-72.39%**			

Table 4- 13: Comparison of flooding and flash flooding property damage, reported injuries, and reported deaths from 2018-2023 to average total losses and total losses from 2012-2017 according to the NCDC Storm Events Database[6]. **Average Losses for the last 5 years*

Historical Occurrences of River Flooding from 2018-2023 can be found in Appendix A.

Between 2012 and 2023, there have been $8,516,000 in property damages reported, with most damages reported between 2012 to 2017 totaling $6,673,500. The total property damages reported from 2018 to 2023 is 72.39% less than the property damages reported between 2012 to 2017, with the largest reduction of damages reported in Catawba county which had an 83.6% decrease in total flooding damages, which could be due to an unusually severe flooding event between 2012 and 2017.

4.5.1.6. Flooding Events from 2018-2023:

According to the NCDC Storm Events Database, there has been $1,842,500 of damage in the Unifour counties between 2018 and 2023 attributed to flooding and flash flooding, with 7 deaths and 1 injury reported. Appendix A provides a summary of historical flood events from 2018-2023 and historical information by participating jurisdiction for the 5 most notable events for each county. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction

The following events are summaries from the NCDC Storm Events Database[7] and are the most destructive events of flash flooding or flooding between 2018 and 2023 for Alexander, Burke, Catawba, and Caldwell County:

Alexander County (11/2/2020)

Tropical Cyclone Eta moved from the eastern Gulf of Mexico, across the northern Florida peninsula, to off the South Carolina coast throughout the 11th and 12th. Tropical moisture streaming into the Carolinas throughout this time resulted in development of heavy rainfall, with

widespread rainfall amounts of 4 to 6 inches, with locally higher amounts across the foothills and Piedmont of North Carolina. This resulted in areas of flash flooding and main stem river flooding, some of which was significant, resulting in multiple fatalities and significant damage.

- Emergency manager reported major flash flooding developed throughout Alexander County after up to 9 inches of rain fell in 24 hours, with around half of that falling in a 3-hour period prior to daybreak on the 12th. The most significant flooding occurred along the South Yadkin River in the Hiddenite area. Multiple recreational vehicles and campers were swept down the river from a campground off Princess Ln. Five people, ages ranging from 1 to 76, drowned and 31 more people required rescue from rapidly rising flood water. Otherwise, most of the creeks and streams in the central and northeast part of the county overflowed onto at least one road, with more than 50 roads closed at some point during the event.
- Although heavy rainfall tapered off across Alexander County throughout the morning, runoff from the earlier excessive rain continued to cause elevated stream levels and localized high-water conditions to persist into the afternoon. A portion of a bridge over the South Yadkin collapsed on Cheatham Ford Rd during this time. Part of another bridge was washed out on Hopewell Church Rd (over Mill Creek). A 64-year-old man was killed when he drove his vehicle over the collapsed bridge. At least two other bridges were also compromised.
- **Total Property Damage:** $450,000
- **Total Deaths:** 6
- **Total Injuries:** 1

Burke County (6/8/2019) –

A moist upslope flow developing north of a stationary front resulted in widespread showers and thunderstorms developing across western North Carolina during the evening of the 8th into the overnight and early morning hours of the ninth. Four to seven inches of rain, with locally higher amounts of 10 inches or more falling over the northern foothills resulted in flash flooding in multiple areas. The widespread nature of the excessive rainfall within the Catawba River watershed caused the river to rise to levels not seen in almost 80 years in the western Piedmont, with flooding persisting in some areas through the 10th. Meanwhile, a brief, weak tornado developed across Rutherford County.

- Although heavy rainfall began tapering off across Burke County during the late evening hours high water conditions persisted well into the overnight hours across central and eastern portions of the county. Meanwhile by the early morning hours a stream gauge on the Johns River in the northwest part of the county exceeded its established flood stage indicating flooding of several roads along the stream and some of its tributaries.
- Multiple sources reported flash flooding developed across portions of northern Burke County when as much as 6 inches of rain fell across the area in just a few hours. Flooding began on the Highway 64 corridor when a portion of the highway had to be closed in the Chesterfield community due to flood water. Antioch Rd was also flooded by Lower Creek in this same area. Water from Canoe Creek was also reportedly

flowing over Highway 226. Smith Branch overflowed its banks in the Connelly Springs area, flooding some houses on Woodlawn Dr. A nursing home was evacuated in the Rutherford College area after a small unnamed tributary overflowed its banks. A tributary of Henry Fork flooded a portion of Woodland Hill Rd in Hildebrand, which undermined the structural integrity of the road and prompted voluntary evacuations.

- **Total Property Damage:** $54,000

Caldwell County (4/13/2020) –

A strong storm system impacted the Southeast, resulting in an area of widespread heavy rain and embedded strong to severe thunderstorms that moved across western North Carolina during the late night and early morning hours. Localized flash flooding, some of which was quite significant developed across the mountains. Isolated severe weather also occurred, mainly in the form of damaging wind gusts. Strong southerly gradient winds also caused some damage across mainly the high elevations of western North Carolina.

- Emergency manager reported flash flooding developed along multiple creeks across northwest Caldwell County after 4 to 6 inches of rain fell, mostly in less than 8 hours. Anthony Creek overflowed its banks in the Globe community, washing out a low water crossing. Wilson Creek washed out several low waters crossing on Brown Mountain Beach Rd. Johns River inundated Old Johns River Rd in several locations. Buffalo Creek and several of its tributaries also inundated low water crossing in the far northern part of the county. A stream gauge on the Yadkin River near Patterson exceeded its established flood stage, indicating flooding of low-lying roads and minor flooding of some structures in the Happy Valley community.
- **Total Property Damage:** $100,000

Catawba County (11/12/2020) -

Tropical Cyclone Eta moved from the eastern Gulf of Mexico, across the northern Florida peninsula, to off the South Carolina coast throughout the 11th and 12th. Tropical moisture streaming into the Carolinas throughout this time resulted in development of heavy rainfall, with widespread rainfall amounts of 4 to 6 inches, with locally higher amounts across the foothills and Piedmont of North Carolina. This resulted in areas of flash flooding and main stem river flooding, some of which was significant, resulting in multiple fatalities and significant damage.

- A stream gauge on the Catawba River at Lookout Shoals Dam indicated major flash flooding developed just upstream of the dam after 5 to 8 inches of rain fell throughout the Catawba basin, with the bulk of that falling in only a 3-hour period between midnight and sunrise on the 12th. Numerous homes were inundated and damaged, with numerous residents evacuated along the western shores of Lookout Shoals Lake. This was the second major flood event along this portion of the Catawba in less than two years (June 2019), and the second highest crest on record at Lookout Shoals (August 1940).
- A stream gauge on Henry Fork exceeded its established flood stage after 3.5 to 5 inches of rain fell over Catawba County, with much of that falling during a three-hour

period on the morning of the 12th. Several roads along the stream were inundated and closed.

- **Total Property Damage:** $511,000

Section 5: *Capability Assessment* lists the number of insured losses and total claims payments for historical flood damages in each jurisdiction as recorded under the NFIP. Table 4-14below provides the NFIP entry date for each participating jurisdiction. As explained in subsection 4.3, the NFIP entry date for each jurisdiction was used to determine buildings that were built pre - FIRM and are therefore assumed to be at greater risk to the flood hazard.

Jurisdiction	NFIP Entry Date
Alexander County (Unincorporated Area)	02/01/91
Town of Taylorsville	12/18/07
Burke County (Unincorporated Area)	06/17/91
City of Morganton	02/19/87
Town of Connelly Springs	06/17/91
Town of Drexel	08/19/86
Town of Glen Alpine	06/17/91
Town of Hildebran	09/05/07
Town of Rutherford College	06/17/91
Town of Valdese	07/03/86
Caldwell County (Unincorporated Area)	08/16/88
City of Lenoir	08/16/88
Town of Cajah's Mountain	08/16/88
Town of Gamewell	08/16/88
Town of Granite Falls	08/16/88
Town of Hudson	08/16/88
Town of Rhodhiss	07/03/86
Town of Sawmills	08/16/88
Village of Cedar Rock	08/16/88

Jurisdiction	NFIP Entry Date
Catawba County (Unincorporated Area)	09/03/80
City of Claremont	09/05/07
City of Conover	09/03/80
City of Hickory	08/03/81
City of Newton	09/03/80
Town of Brookford	12/18/79
Town of Catawba	09/03/80
Town of Long View	09/03/80
Town of Maiden	09/03/80

Table 4-14: NFIP Entry Dates *from Federal Emergency Management Agency Community Status Book Report: Communities Participating in the National Flood Program, August 2024*

4.5.1.7. Probability of Future Occurrences

According to the NRI, there is a Relatively Low Expected Annual Loss (EAL) when compared to the rest of the US for riverine flooding in Caldwell, Catawba, and Burke County. But there is a Very Low EAL in Alexander County compared to the rest of the US, with a risk score percentile of 14.8 and an expected annual frequency of 0.4 events per year. There is more variation in risk scores and EAL scores at the census tract level when compared to the county level, which can be seen in Figure 4- 16below, where there is significantly more variation in risk index ratings and scores across each county within census tracts.

County	Expected Annual Loss	Risk Index Rating	Risk Score Percentile	Expected Annual Frequency (Events per Year)
Alexander	$37,000	Very Low	14.9	0.4
Caldwell	$310,000	Relatively Low	47.6	2.3
Catawba	$541,000	Relatively Low	57.6	1
Burke	$934,000	Relatively Low	72.2	2

Table 4- 15: NRI Risks of Riverine Flooding, Expected Annual Loss, and Risk Score Percentile[8]

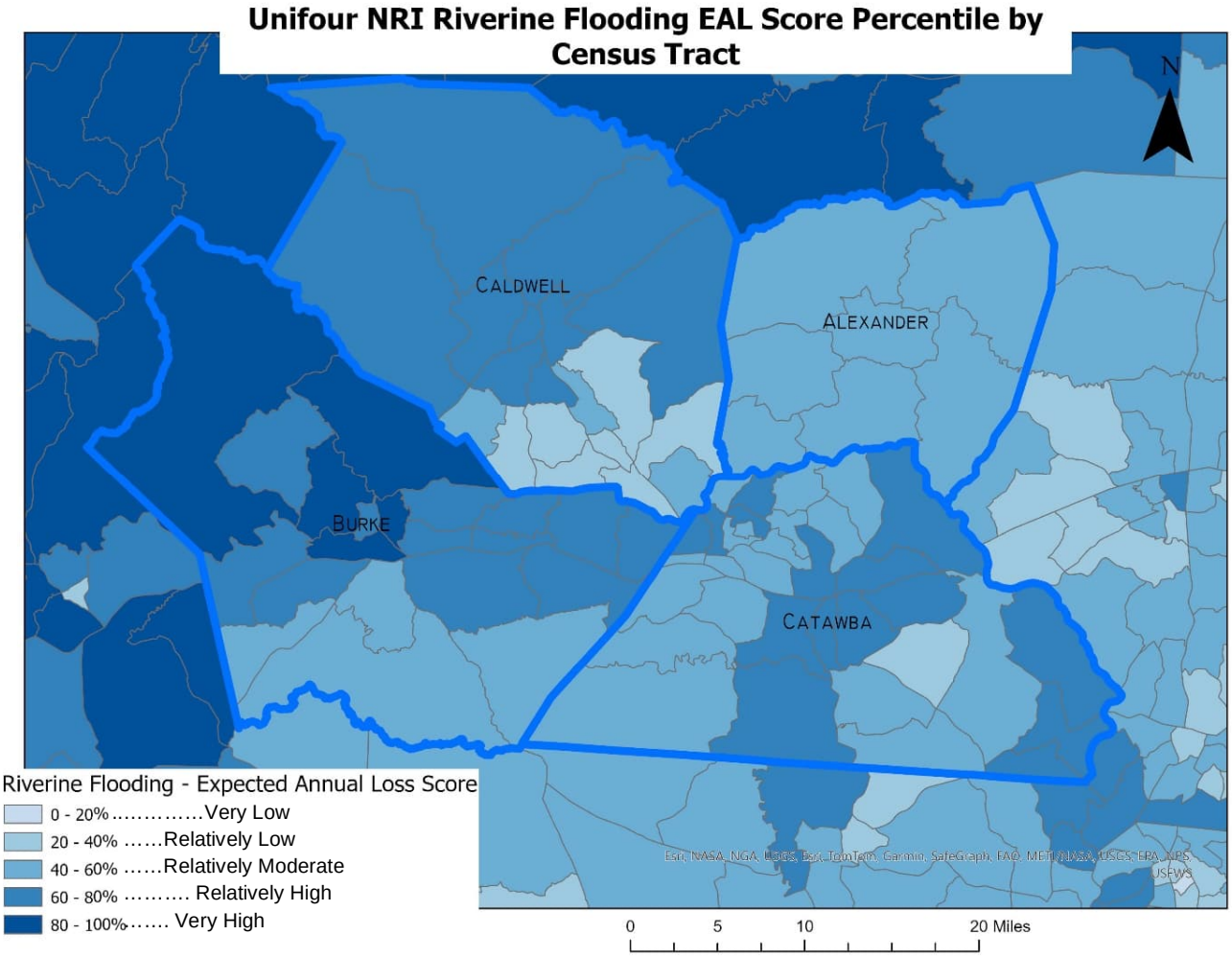


Figure 4- 16: Expected Annual Loss Score Percentile by Census Tract for Riverine Flooding Risk

Based on the analyses performed in IRISK, the probability of future River Flooding is shown in the table below, by jurisdiction.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences:

- Low - Less Than 1% Annual Probability
- Medium - Between 1% And 10% Annual Probability
- High - More Than 10% Annual Probability

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	Low

Jurisdiction	IRISK Probability of Future Occurrence
Burke County (Unincorporated Area)	Medium
Caldwell County (Unincorporated Area)	Medium
Catawba County (Unincorporated Area)	Low
City of Claremont	Low
City of Conover	Medium
City of Hickory	Low
City of Lenoir	Medium
City of Morganton	Low
City of Newton	Medium
Town of Brookford	Medium
Town of Cajah's Mountain	Medium
Town of Catawba	Low
Town of Connelly Springs	Low
Town of Drexel	Medium
Town of Gamewell	Low
Town of Glen Alpine	Low
Town of Granite Falls	Medium
Town of Hildebran	Low
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Low
Town of Rhodhiss	Low
Town of Rutherford College	Low
Town of Sawmills	Medium
Town of Taylorsville	Low

Jurisdiction	IRISK Probability of Future Occurrence
Town of Valdese	Low
Village of Cedar Rock	Medium

4.5.1.8. River Flooding Hazard Vulnerability

In order to quantify potential future flood hazard vulnerability, a similar detailed GIS analysis of the study area as completed for current flood vulnerability (described above) was performed using best available GIS data including the future Community 100-year Floodplain to identify the number and value of existing structures that may be located in future flood hazards areas as expanded due to anticipated "build-out" conditions (i.e., fully developed according to zoning and future land use projections). To quantify potentially at-risk properties, all buildings of at least 600 square feet (eliminating those that are likely accessory structures versus habitable buildings) that intersected with delineated future floodplain areas were identified. The exposure analysis does not include any estimates for new structures that will be constructed and located in the floodplain, as it is assumed that new construction will be protected against the 100-year flood according to local development regulations that include reference to future Community 100-year Floodplain maps.

4.5.1.9. Climate Change

In the future, warmer temperatures and changes in frequency of heavy precipitation due to climate change are likely to increase the impacts and frequency of river flooding. The Climate Science Special Report, Fourth National Climate Assessment, stated with high confidence that the frequency and intensity of heavy precipitation events are projected to continue to increase over the 21st century. The increased likelihood of extreme precipitation events due to climate change will result in greater risks of flash flooding and impacts from stormwater runoff throughout the State of North Carolina. While there may be less precipitation overall, in the long term the rainfall that does occur will likely be during more intense events that may result in increasing number of inland flooding incidents.

Inland flooding depends not only on extreme precipitation but also on characteristics of the land surface, including land use and development, land cover, and soil moisture conditions. It also depends on whether deliberate adaptive measures are implemented proactively. While it is likely that the frequency and severity of inland flooding will increase because of increases in the frequency and intensity of extreme precipitation, the uncertainty associated with these additional factors tends to lower the level of certainty with which more detailed predictions can be made.

County	Agriculture Exposure	Population Exposure	Population Equivalence	Building Exposure	Total exposure Value *(including population equivalent value)*
Alexander	$6,661,899	192.58	$2,233,903,237	$47,641,667	$2,288,206,803
Burke	$19,205,283	732.92	$8,501,834,055	$180,253,631	$8,701,292,969
Caldwell	$10,472,371	1,559.81	$18,093,831,226	$568,843,914	$18,673,147,511
Catawba	$4,759,968	1,130.28	$13,111,298,873	$238,537,373	$13,354,596,213
Total	**$41,099,521**	**3,615.59**	**$41,940,867,391**	**$1,035,276,585**	**$43,017,243,496**

Table 4-16: provides the NRI exposure, the representative value by category potentially exposed to a natural hazard occurrence, data for buildings, population, and agriculture for riverine flooding

County	Jurisdiction	Number of Repetitive Losses (NFIP)	Number of Severe Repetitive Loss Properties (NFIP)	Number of Total Losses	Most Recent Date of Loss
Alexander	Taylorsville	1	0	2	11/12/2020
Alexander County Total		1	0	2	-
Burke	Burke County	1	0	2	5/6/2013
Burke County Total		1	0	2	-
Caldwell	Collettsville	2	0	5	6/9/2019
	Edgemont	1	0	2	6/9/2019
	Lenoir	5	0	10	10/14/2014
	Granite Falls	1	0	3	11/12/2020
Caldwell County Total		9	0	22	-
Catawba	Newton		1	1	6/9/2019
	Hickory	6	0	18	8/15/2020
	Conover	4	1	10	11/11/2020
	Claremont	10	3	29	11/12/2020
	Catawba County	3	1	12	11/12/2020
Catawba County Total		23	6	70	-
Area Total		34	6	96	-

Table 4- 17: Total NFIP Repetitive Loss, Severe Repetitive Loss Properties, and Number of Total Losses.

County	City	Single Family Resident	Non-Residential Building	Non-Residential Business	Single Family Residential Building
Caldwell County	Lenoir	2		3	
	Collettsville	1			1
	Edgemont	1			
	Granite Falls	1			
Burke County	Nebo			1	
Catawba County	Catawba	3			1
	Claremont	9			2
	Conover	2			2
	Hickory	6	1		
	Newton	1			
Alexander	Taylorsville		1		

Table 4- 18: Types of NFIP Multiple Loss Properties by Occupancy Type

4.5.2. Levee Failure

Levee failure is the collapse, breach, or other failure of a levee structure or system resulting in flooding. Levee failure can result from natural events, human-induced events, or a combination of the two. The most common cause of levee failure is prolonged rainfall that produces flooding. Failures due to other natural events such as hurricanes, earthquakes, or landslides are significant because there is generally little or no advance warning.

4.5.2.1. Location within the Planning Area

There are numerous levees and floodwalls within the planning area. When hurricanes and tropical storms occur, these areas are susceptible to some degree of flooding. There have been a number of past flooding events throughout the planning area, ranging widely in terms of location, magnitude, and impact. Levees are not currently mapped in this area; will update mitigation strategy and actions to include levee locations and mapping in future plan updates.

4.5.2.2. Extent (Magnitude and Severity)

Hazard Classification	Description	Quantitative Guidelines
Low	1) Interruption of road service, low volume roads 2) Economic damage	1) Less than 25 vehicles per day 2) Less than $30,000

Hazard Classification	Description	Quantitative Guidelines
Intermediate	1) Damage to highways, interruption of service 2) Economic damage	1) 25 to less than 250 vehicles per day 2) $30,000 to less than $200,000
High	1) Probable loss of human life due to breached roadway or bridge on or below the dam 2) Economic damage	1) Probable loss of 1 or more human lives 2) More than $200,000

Table 4- 19: Hazard Classification of Levee Failures

4.5.2.3. Historical Occurrences

There are no records of historical levee failure occurrences in or affecting the planning area.

4.5.2.4. Probability of Future Occurrences

Based on the analyses performed in IRISK, the probability of future Levee Failure is shown in the table below, by jurisdiction.

4.5.2.5. Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low - Less Than 1% Annual Probability
- Medium - Between 1% And 10% Annual Probability
- High - More Than 10% Annual Probability

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Low**
Burke County (Unincorporated Area)	**Low**
Caldwell County (Unincorporated Area)	Low
Catawba County (Unincorporated Area)	Low
City of Claremont	Low
City of Conover	Low
City of Hickory	Low
City of Lenoir	Low

Jurisdiction	IRISK Probability of Future Occurrence
City of Morganton	Low
City of Newton	Low
Town of Brookford	Low
Town of Cajah's Mountain	Low
Town of Catawba	Low
Town of Connelly Springs	Low
Town of Drexel	Low
Town of Gamewell	Low
Town of Glen Alpine	Low
Town of Granite Falls	Low
Town of Hildebran	Low
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Low
Town of Rhodhiss	Low
Town of Rutherford College	Low
Town of Sawmills	Low
Town of Taylorsville	Low
Town of Valdese	Low
Village of Cedar Rock	Low

4.5.2.6. Levee Failure Hazard Vulnerability

The effects of a levee failure are exacerbated when the failure occurs abruptly or with little warning and if it results in deep, fast-moving water through highly developed areas. The worst-case scenario for a levee failure in Unifour Region would be the complete failure of the levee systems. If this occurred during a flood with a 1 percent annual chance of occurrence, the failure would lead to effects consistent with those described in Section 4.5.1 (Riverine Flooding) There is a fundamental limitation in the data available for vulnerability assessment for the levee failure hazard in the planning area. Any mitigation actions developed for this hazard therefore should be based on addressing data limitations, education and awareness programs, and/or any jurisdiction-specific concerns that may be addressable through an appropriate mitigation project.

4.5.2.7. Climate Change

Climate and weather pattern changes are expected to lead to more severe storm events, which are likely to increase the risk of levee overtopping, structural damage, or other failures. In addition, levee structures designed to current standards may not be sufficient to handle future climate change-driven conditions arising from more intense rainfall. Since the likelihood of levee failure depends on factors in addition to climate considerations, detailed projections of future changes in the frequency of levee failures cannot be made with any degree of confidence.

4.5.3. Wildfire

A wildfire is any fire occurring in a wildland area (i.e., grassland, forest, brush land) except for fire under prescription. Wildfires are part of the natural management of the Earth's ecosystems but may also be caused by natural or human factors. 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.

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. Wildland fires are usually signaled by dense smoke that fills the area for miles around.

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.

Fire 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 disasters (hurricanes, tornadoes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. Forest damage from hurricanes and tornadoes may block interior access roads and fire breaks, pull down overhead power lines, or damage pavement and underground utilities.

Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high fire hazard areas. 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 the inferno that can sweep through the brush and timber and destroy property in minutes.

4.5.3.1. Wildfire Hazard Analysis

Methodologies and Assumptions

The following list provides key points by hazard type that are relevant to understanding the risk assessment presented in this section:

- Wildfire hazard areas were determined using the Wildland Fire Susceptibility Index (WFSI). These include: 1) Areas with a WFSI value of 0.01 – 0.05 were considered to be at moderate risk. 2) Areas with a WFSI value greater than 0.05 were considered to be at high risk. 3) Areas with a WFSI value less than 0.01 were considered to not be at risk.
- The WFSI data used for the wildfire risk analysis is a value between 0 and 1. It was developed consistent with the mathematical calculation process for determining the probability of an acre burning. The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the state have this value determined consistently, it allows for comparison and ordination of areas of the state as to the likelihood of an acre burning.
- Building footprints were received from all four participating counties. To refine the results, footprints with an area less than 500 square feet were excluded from the analysis. To determine if a building is in a hazard area, the building footprints were intersected with each of the hazard areas. If a building intersects two or more hazard areas, it is considered to be in the hazard area of highest risk.
- Parcels were received from all four participating counties. This data provided building value and year built. Building value was used to determine the value of buildings at risk.
- Census blocks and Summary File 1 from the 2010 Census were used to determine population at risk. This included the total population, as well as the vulnerable elderly and children age groups. To determine population at risk, the census blocks were intersected with the hazard area. To better determine the actual number of people at risk, the intersecting area of the census block was calculated and divided by the total area of the

census block to determine a ratio of area at risk. This ratio was applied to the population of the census block. For example, a census block has a population of 400 people. Five percent of the census block intersects a high wildfire hazard area. The ratio estimates that 20 people are at risk within that hazard area (5% of the total population for that census block).

- There can be multiple buildings on one parcel. However, the parcel only provides one value for building value and year built, and it is not known from the provided data if the building value is cumulative or for the primary structure on the parcel. For the analysis, building value was only counted once per parcel, regardless of the number of structures. This was done to prevent grossly over-estimating the value of buildings at risk. For example, a parcel has three buildings with a value of $300,000. If two of those buildings intersect the high-risk area, the assumed building value at risk is $300,000 not $600,000. Even though only two out of three buildings are at risk, there is no way to determine the individual value of each building, so the building value for the whole parcel is counted. The value at risk is also the value of the entire building and does not take into account the value of contents.

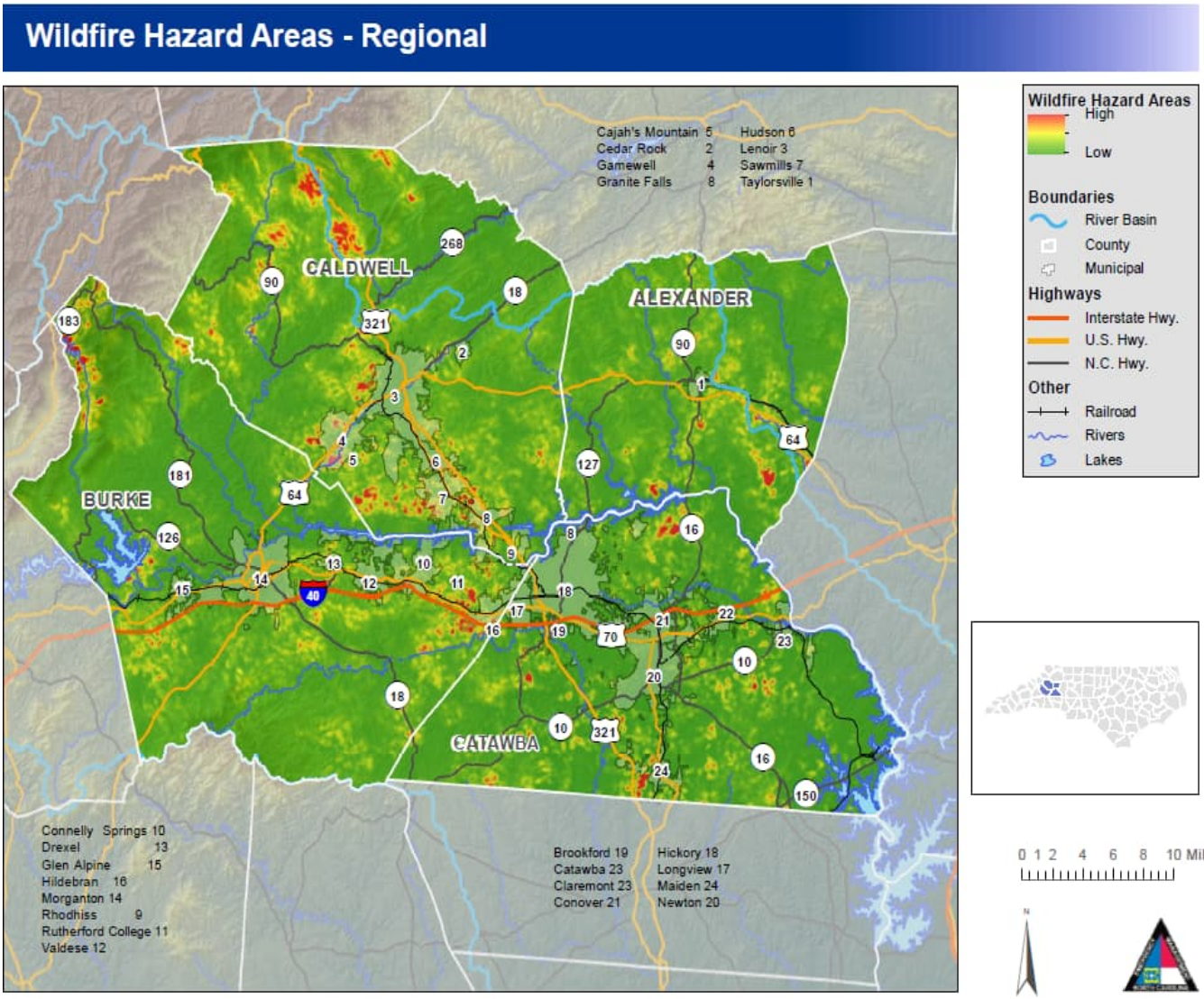


Figure 4-17: Wildfire Hazard Areas

4.5.3.2. Location within the Planning Area

In an effort to identify specific potential wildfire hazard areas within the planning area, a GIS-based data layer called the Wildland Fire Susceptibility Index (WFSI) was obtained from the North Carolina Division of Forest Resources (NCDFR). The WFSI is a component layer derived from the Southern Wildfire Risk Assessment (SWRA), a multi-year project to assess and quantify wildfire risk for the 13 Southern states. The WFSI is a value between 0 and 1. It was developed consistent with the mathematical calculation process for determining the probability of an acre burning. The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the planning area have this value determined consistently, it allows for comparison and ordination of areas as to the likelihood of an acre

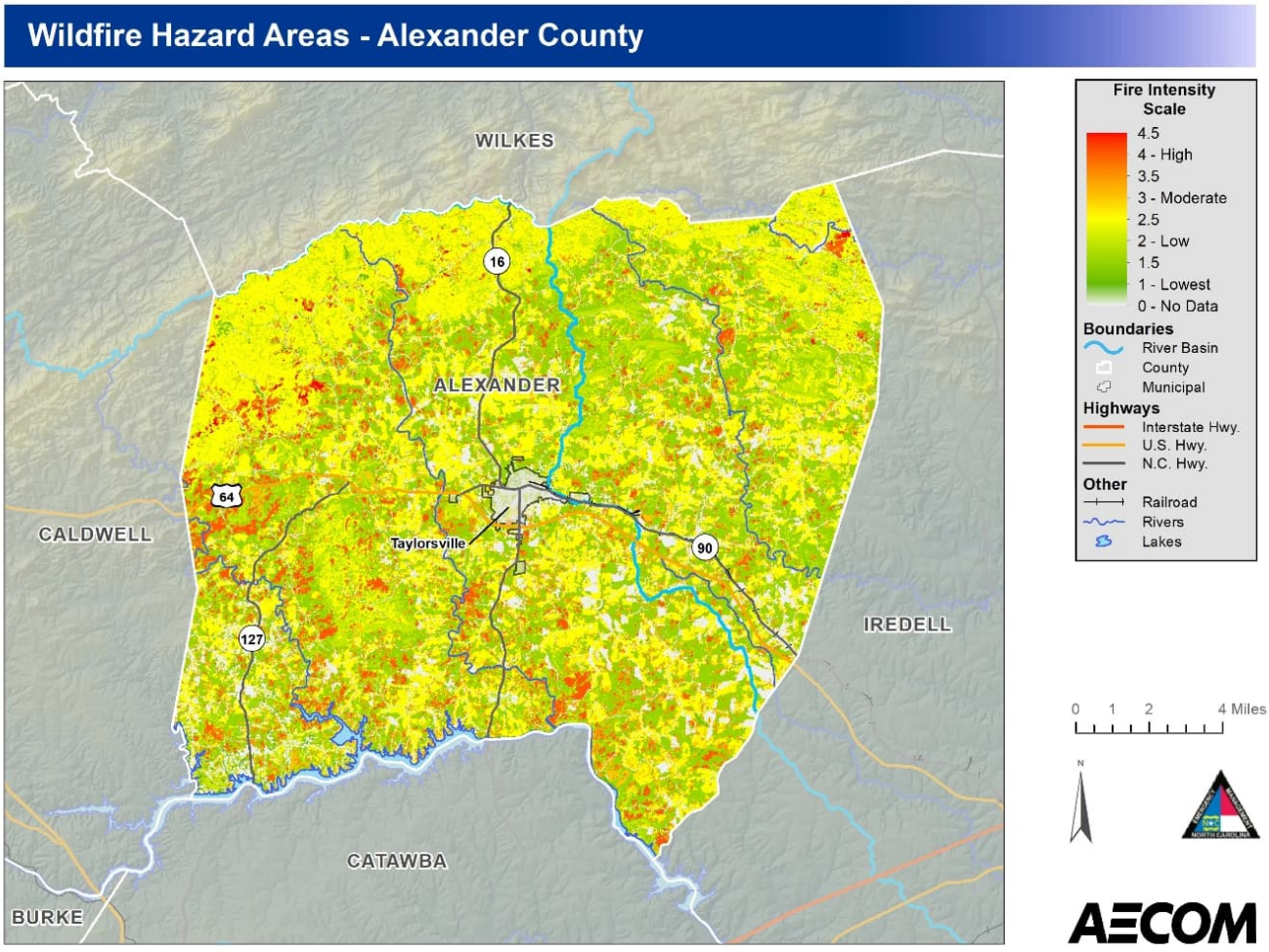


Figure 4- 18: Wildfire Hazard Areas in Alexander County

burning.

Figure 4-17 illustrates the level of wildfire potential for the planning area based on the WFSI data provided by NCDFR. Areas with a WFSI value of 0.01–0.05 were considered to be at

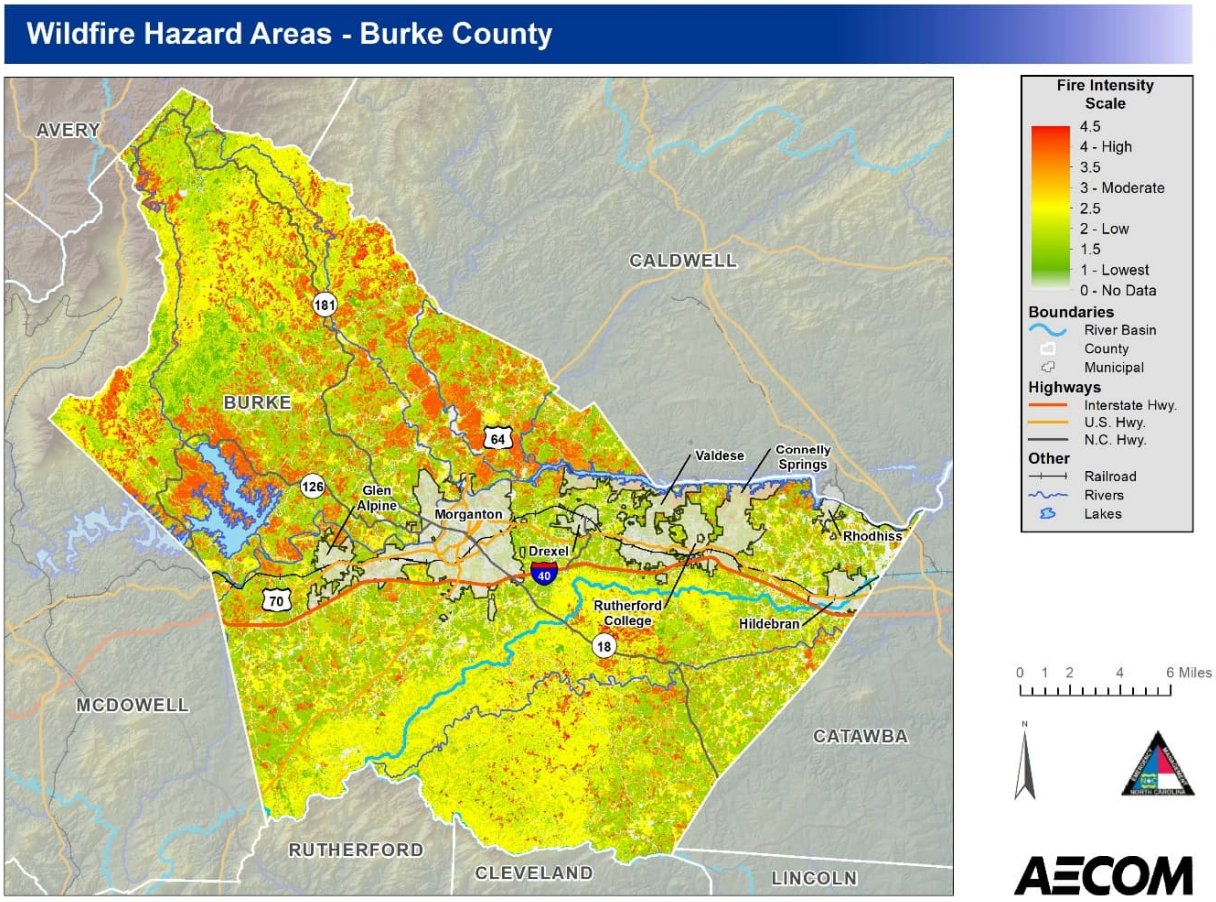


Figure 4- 19: Wildfire Hazard Areas in Burke County

moderate risk to the wildfire hazard. Areas with a WFSI value greater than 0.05 were considered to be at high risk to the wildfire hazard. Areas with a WFSI value less than 0.01 were considered to not be at risk to the wildfire hazard.

4.5.3.3. Definition:

The average size of wildfires in the Unifour Region is typically small.

4.5.3.4. Extent Event:

Wildfire data was provided by the National Interagency Fire Center and is reported by county.

4.5.3.5. Historical Occurrences

There have been 35 incidents of wildfire reported to the National Interagency Fire Center[9] between 2014 and 2024. The reported causes of the fires varied, with 9 starting from undetermined causes, 21 starting because of humans, and 5 starting from natural causes. The total estimated costs were approximately $6,063,696 and the reported fires burned over 13,285.95 acres, with the average number of acres burned per year for the last ten years at 1,328 acres.

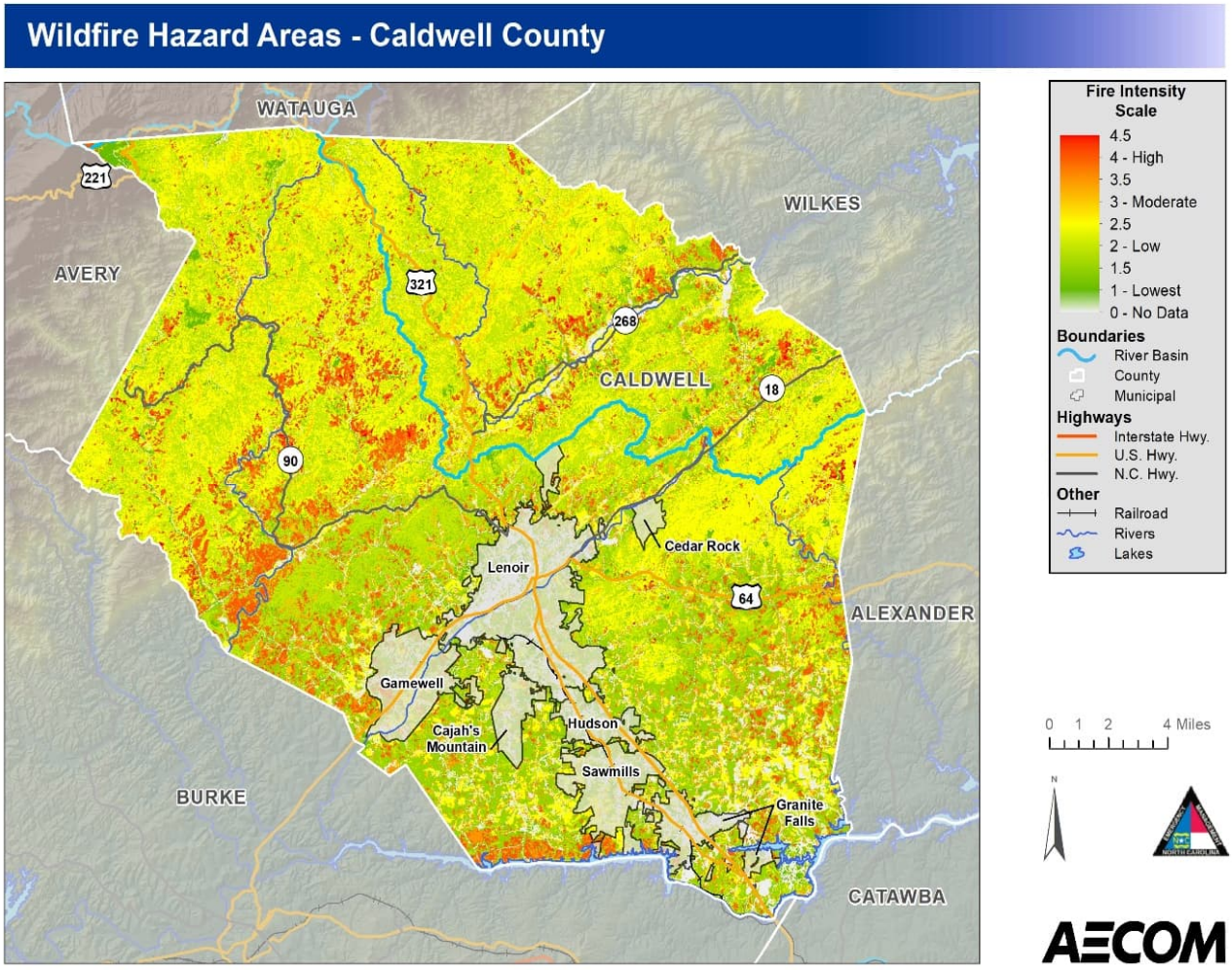


Figure 4- 20: Wildfire Hazard Areas in Caldwell County

County	2018-2023	2018-2023		
	5-Year Average Number of Fires	5-Year Average Number of Acres Burned	Total Number of Wildfires	Total Acres Burned
Alexander	0	0	0	0
Burke	3	18.79	15	21.95
Caldwell	0.6	19.14	3	74
Catawba	0	0	0	0
TOTAL	**3.2**	**19.19**	**16**	**95.95**

Table 4-20: Incident summary from incidents between 2023 and 2018 from the National Interagency Fire Center[10]

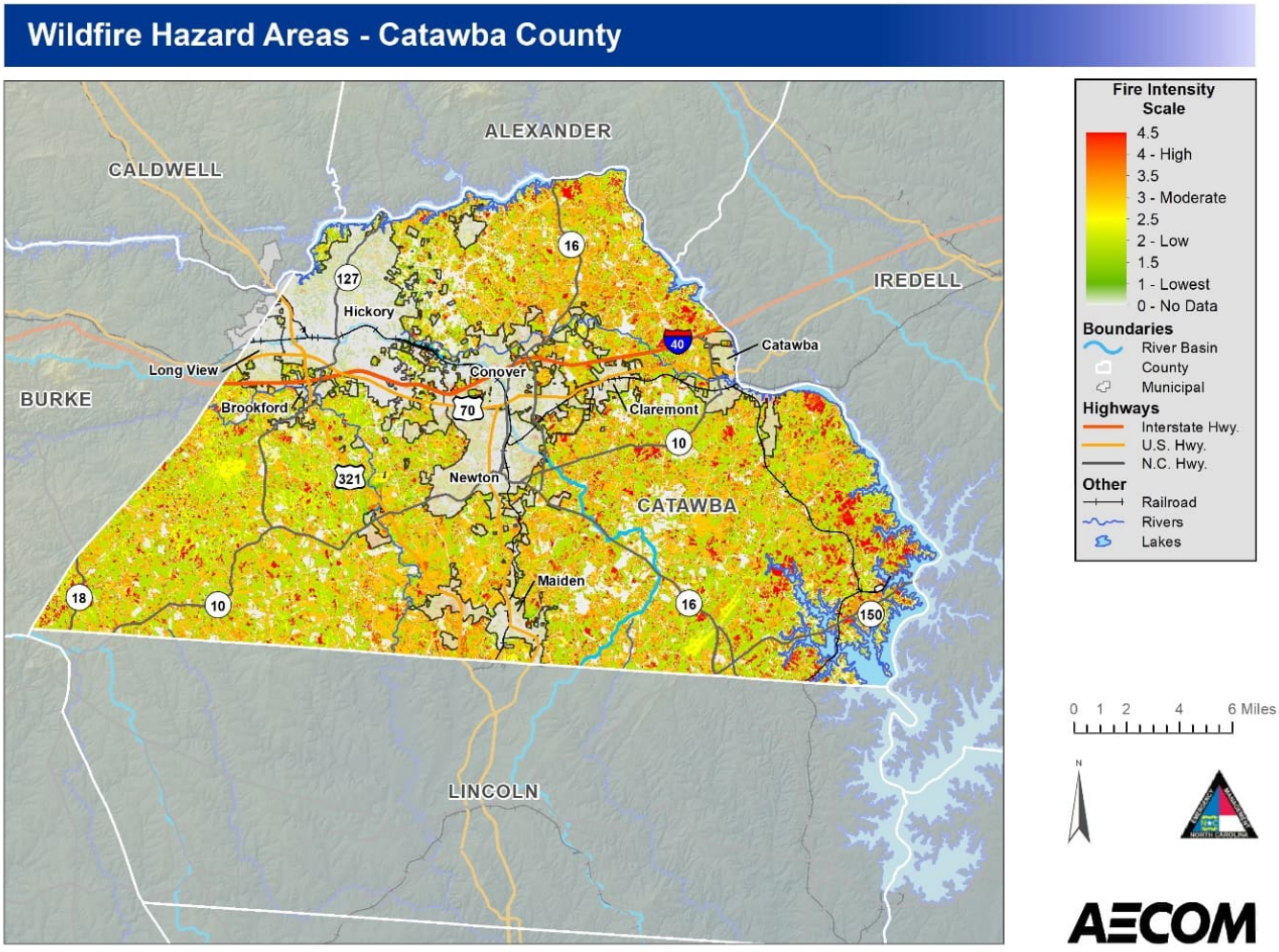


Figure 4- 21: Wildfire Hazard Areas in Catawba County

Incident Name	Discovery Date	Fire Out Date	County	City	Fire Cause	Acres	Estimated Cost
Chestnut Knob	11/6/2016		Burke	Morganton	Undetermined	6435	$4,600,000
White Creek	3/16/2017	4/13/2017	Burke		Natural	5500	$937,840
Blue Gravel	4/11/2015	4/24/2015	Burke		Undetermined	521	$264,194
Silver Creek	12/13/2014		Burke		Undetermined	300	$3,362
Henry Fork	4/15/2024		Burke	Salem	Undetermined	211	$3,000
Upper Creek	6/7/2016	7/2/2016	Burke		Natural	169	$250,000
Corn Field	3/17/2018	3/22/2018	Caldwell		Human	42	
Rackett Branch	3/5/2022	3/17/2022	Caldwell		Human	30	
McNab	4/18/2017	4/28/2017	Burke		Human	25	
Babel Tower	4/25/2023	8/8/2023	Burke		Natural	12	

Table 4- 21: Significant reported wildfires between 2014 and 2024 in the Unifour Counties according to the National Interagency Fire Center[11]

4.5.3.6. Probability of Future Occurrences

County	EAL	Risk Index Rating	Frequency (% Chance per Year)	Historic Loss Ratio
Alexander	$27,000	Very Low	0.016%	Relatively Low
Burke	$64,000	Relatively Low	0.034%	Relatively Low
Caldwell	$76,000	Very Low	0.029%	Relatively Low
Catawba	$62,000	Very Low	0.007%	Relatively Low

Table 4-22: NRI Frequency, Risk Rating, and Historic Loss Ratio for Wildfires

Based on the analyses performed in IRISK, the probability of future Wildfire is shown in the table below, by jurisdiction.

4.5.3.7. Climate Change

According to the North Carolina Climate Science Report, higher annual and seasonal average temperatures and associated increases in drying rates will lead to an increased likelihood of conditions conducive to wildfires.

While there has been a long-term upward trend in the number of wildfires in North Carolina, the total acreage burned has shown a downward trend. Increases in the number of wildfires will nevertheless pose a major risk for human health and emergency services, putting more lives at risk of fire related injuries, fatalities, and property losses. It is likely that future droughts in their

multiple forms in North Carolina will be more frequent and intense due to higher temperatures leading to increased evaporation, therefore, it is likely the frequency of climate conditions

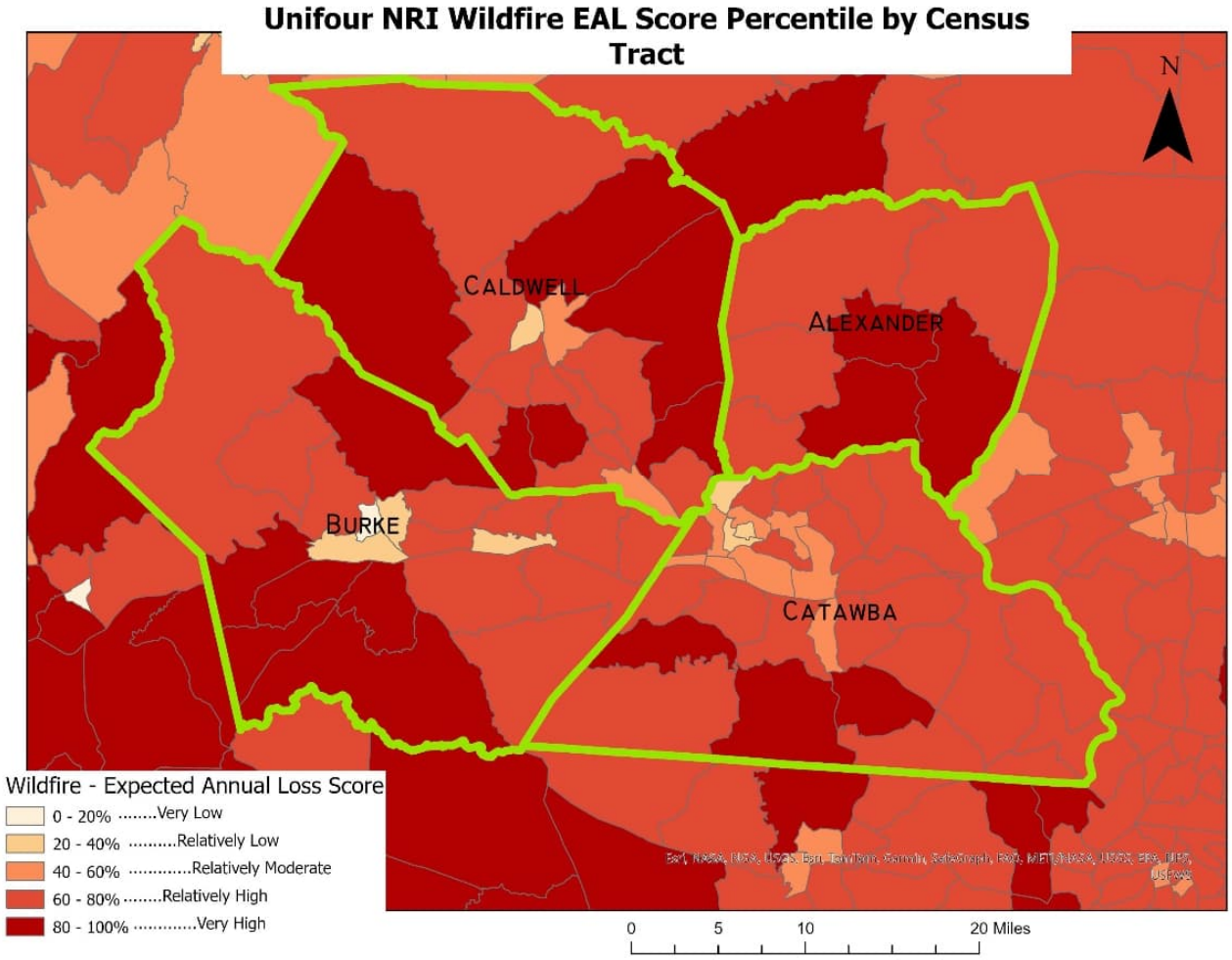


Figure 4-22:Unifour NRI Wildfire EAL Score by Census Tract

conducive to wildfires in North Carolina will increase.

Wildfire risk is greatest among potentially underserved communities in the southern and western regions of the state due to large wildland areas and limited warning and response capabilities. The North Carolina State Hazard Mitigation Plan lists Burke and Catawba Counties in the Unifour Region among those counties likely to be most affected by an increased risk from wildfires.

4.5.3.8. Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low - Less Than 1% Annual Probability
- Medium - Between 1% And 10% Annual Probability

- High - More Than 10% Annual Probability

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	Medium
Burke County (Unincorporated Area)	Medium
Caldwell County (Unincorporated Area)	Medium
Catawba County (Unincorporated Area)	Medium
City of Claremont	Low
City of Conover	Low
City of Hickory	Low
City of Lenoir	Low
City of Morganton	Low
City of Newton	Low
Town of Brookford	Low
Town of Cajah's Mountain	Medium
Town of Catawba	Medium
Town of Connelly Springs	Medium
Town of Drexel	Medium
Town of Gamewell	Medium
Town of Glen Alpine	Low
Town of Granite Falls	Medium
Town of Hildebran	Medium
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Medium
Town of Rhodhiss	Low

Jurisdiction	IRISK Probability of Future Occurrence
Town of Rutherford College	**Medium**
Town of Sawmills	**Low**
Town of Taylorsville	**Medium**
Town of Valdese	**Low**
Village of Cedar Rock	**Low**

4.5.3.9. Wildfire Hazard Vulnerability

Wildfires can cause significant damage to property and threatens the lives of people who are unable to evacuate wildfire-prone areas. Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high wildfire hazard areas. Further, 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.

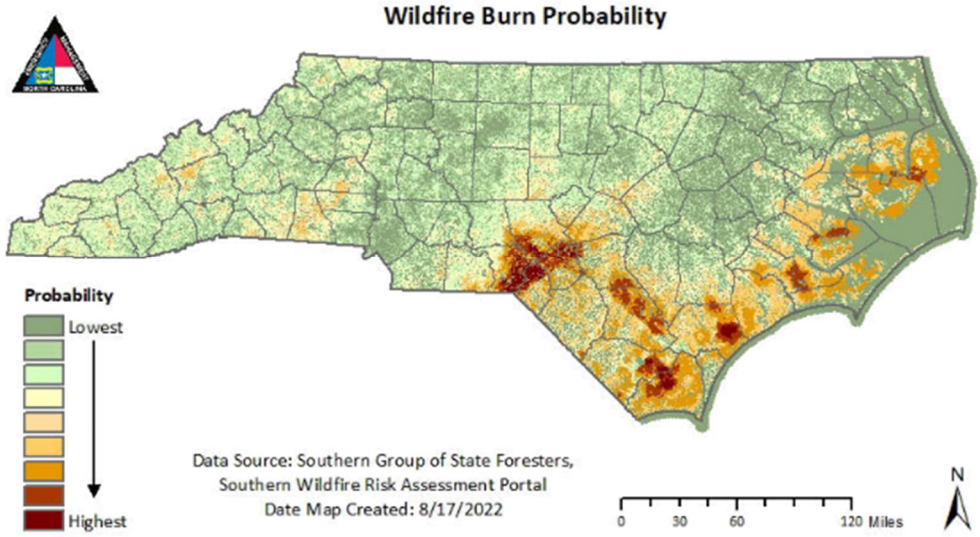


Figure 4-23: Wildfire Burn Probability for NC from the 2023 NC HMP

Wildfires can result in severe economic losses. 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, such as reduced air quality by means

of wildfire smoke and ash. The areas of the state with the largest wildfire hazard occurrence that are also within the most exposed regions. Many areas in the eastern and western part of the state have high risk for wildfire since there are large, forested areas in these regions. However, some counties in the central part of the state also have higher risk. Still, a county's exposure score plays a major role and counties with high exposure and high wildfire risk score highest. Figure 4-23 shows wildfire hazard vulnerability scores by county for the state of North Carolina.

Figure 4-23 shows the areas in NC with a high probability of experiencing wildfires according to the Southern Wildfire Risk Assessments Burn Probability Index updated in 2022.[12]

A vulnerability score was determined for each of the hazard categories on a county-by-county basis by adding a county's score for a particular hazard risk category to its total exposure score as depicted in the Table 4-23 below. Each county was assigned a quantitative hazard risk score for each hazard category based on a 1-5 scale. This score was determined by using natural (Jenks) breaks in the overall data for the state. Therefore, the exposure score for each county is relative to each of the other counties in the state. Similarly, the exposure of each county was determined for each hazard by utilizing natural breaks and assigning a score based on a 1-10 scale. The scores for each exposure category were added together to give us a total exposure score. This total exposure score was then added to each respective risk score to produce a score for vulnerability based on each of the hazard risk categories.

The Wildland Urban Interface (WUI) Risk Index Layer is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes. The WUI Risk Index for Unifour is displayed in the Table 4-23 below, respectively. The WUI Risk Rating is derived using a Response Function modeling approach which involves assigning a net change in the value to a resource or asset based on susceptibility to fire at different intensity levels, such as flame length. The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1. To calculate the WUI Risk Rating, the WUI housing density data was combined with Flame Length data and response functions were defined to represent potential impacts. The response functions were defined by a team of experts based on values defined by the SWRA Update Project technical team. By combining flame length with the WUI housing density data, you can determine where the greatest potential impact to homes and people is likely to occur.

Jurisdiction	WUI Risk Index Assessment (-9 Major to -1 Minor)	Vulnerability (Wildfire Risk Low to High)
Alexander County	Minor to Major Impact; -1 to -8	Low to Moderate

Taylorsville	Moderate to Major Impact; -5 to -8	Low to Moderate
Burke County	Minor to Major Impact; -1 to -8	Low to Moderate
Connelly Springs	Minor to Moderate Impact; -2 to -5	Low to Moderate
Drexel	Moderate to Major Impact; -5 to -8	Very Low to Moderate
Glen Alpine	Minor to Major Impact; -1 to -8	Low to Moderate
Hildebran	Moderate Impact -5	Very Low to Low
Rhodhiss	Moderate to Major Impact; -5 to -8	Very Low to Moderate
Morganton	Moderate to Major Impact; -4 to -8	Very Low to Moderate
Rutherford College	Moderate to Major Impact -4 to -7	Very Low to Moderate
Valdese	Minor to Major Impact; -2 to -7	Very Low to Low
Caldwell County	Minor to Major Impact; -1 to -8	Low to Moderate
Cajah's Mountain	Moderate to Major Impact; -5 to -7	Very Low to Moderate
Cedar Rock	Minor to Moderate Impact; -1 to -5	Low
Gamewell	Moderate to Major Impact; -5 to -8	Low to High
Granite Falls	Moderate to Major Impact; -5 to -8	Low to Moderate
Hudson	Moderate to Major Impact; -5 to -8	Low to Moderate
Sawmills	Moderate to Major Impact; -5 to -7	Low to Moderate
Catawba County	Minor to Major Impact; -1 to -8	Low to High
Brookford	Moderate to Major Impact; -5 to -7	Low to Moderate
Catawba	Moderate to Major Impact; -5 to -8	Low to Moderate
Claremont	Moderate to Major Impact; -4 to -8	Low to Moderate
Conover	Moderate to Major Impact; -4 to -8	Low to Moderate
Hickory	Moderate to Major Impact; -5 to -8	Low to Moderate
Longview	Moderate to Major Impact; -5 to -7	Low to Moderate
Maiden	Moderate to Major Impact; -5 to -8	Low to Moderate
Newton	Moderate to Major Impact; -5 to -8	Low to Moderate

Table 4-23: WUI Risk Index Assessment for each jurisdiction. *Source: North Carolina State Hazard Mitigation Plan 2023*

4.5.3.10. NRI Risk Values

County	Expected Annual Loss	Frequency % Chance per Year	Risk Index Value	Risk Index Score
Alexander	$27,000	0.016%	Very Low	47.6
Burke	$64,000	0.034%	Very Low	60
Caldwell	$76,000	0.029%	Very Low	62.2
Catawba	$62,000	0.007%	Very Low	59.2

Table 4-24: NRI Expected Annual Loss, Frequency, Risk Index Value, and Risk Index Score for Wildfires.

Table 4-24 represents the NRI exposure values for each county, where exposure is defined as "the representative value of buildings (in dollars), population (in both people and population equivalence dollars), or agriculture (in dollars) potentially exposed to a natural hazard occurrence". Table 4-25 below represents the value of agriculture, value of buildings, and amount of people, with a population equivalence value, that are potentially vulnerable to wildfires.

County	Agriculture Value	Population Amount	Population Equivalence Value	Building Value	Total Value (With Population Equivalence Value)
Alexander	$12,650,115	2,180.76	$25,296,867,060	$379,833,873	$25,689,351,048
Burke	$4,597,847	2,861.79	$33,196,799,615	$328,994,710	$33,530,392,172
Caldwell	$3,601,662	3,339.27	$38,735,532,747	$526,553,187	$39,265,687,596
Catawba	$7,914,444	14,105.36	$163,622,226,553	$2,913,887,050	$166,544,028,047
Total Value	**$28,764,068**	**22,487**	**$260,851,425,975**	**$4,149,268,820**	**$265,029,458,863**

Table 4-25: Exposure values for Wildfires from the NRI

4.5.4. Tornado

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 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 to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and can cause extreme destruction and turning normally harmless objects into deadly missiles.

Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 death(s) and 1,500 injuries (NOAA, 2002). They are more likely to occur during the spring and early summer months of March through June and can occur at any time of day but are 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.

Storm Category	Damage Level	3 Second Gust (mph)	Description of Damages	Photo Example
EF0	GALE	65–85	Some damage to chimneys; breaks branch off trees; pushes over shallow-rooted trees; damages to sign boards	
EF1	WEAK	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 might be destroyed.	
EF2	STRONG	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	
EF3	SEVERE	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.	
EF4	DEVASTATING	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.	
EF5	INCREDIBLE	200+	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.	

Table 4- 26: Enhanced Fujita Scale for Tornadoes. Source: NOAA and FEMA

Waterspouts are weak tornadoes that form over warm water and are most common along the Gulf Coast and southeastern states. Waterspouts occasionally move inland, becoming tornadoes that cause damage and injury. However, most waterspouts dissipate over the open

water causing threats only to marine and boating interests. Typically, a waterspout is weak and short-lived, and because they are so common, most go unreported unless they cause damage.

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 damages to structures of light construction such as residential homes (particularly mobile homes) and tend to remain localized in impact. Table 4- 26 shows the Enhanced Fujita Scale for Tornadoes which was developed to measure tornado strength and associated damages.

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. Figure 4- 24shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles.

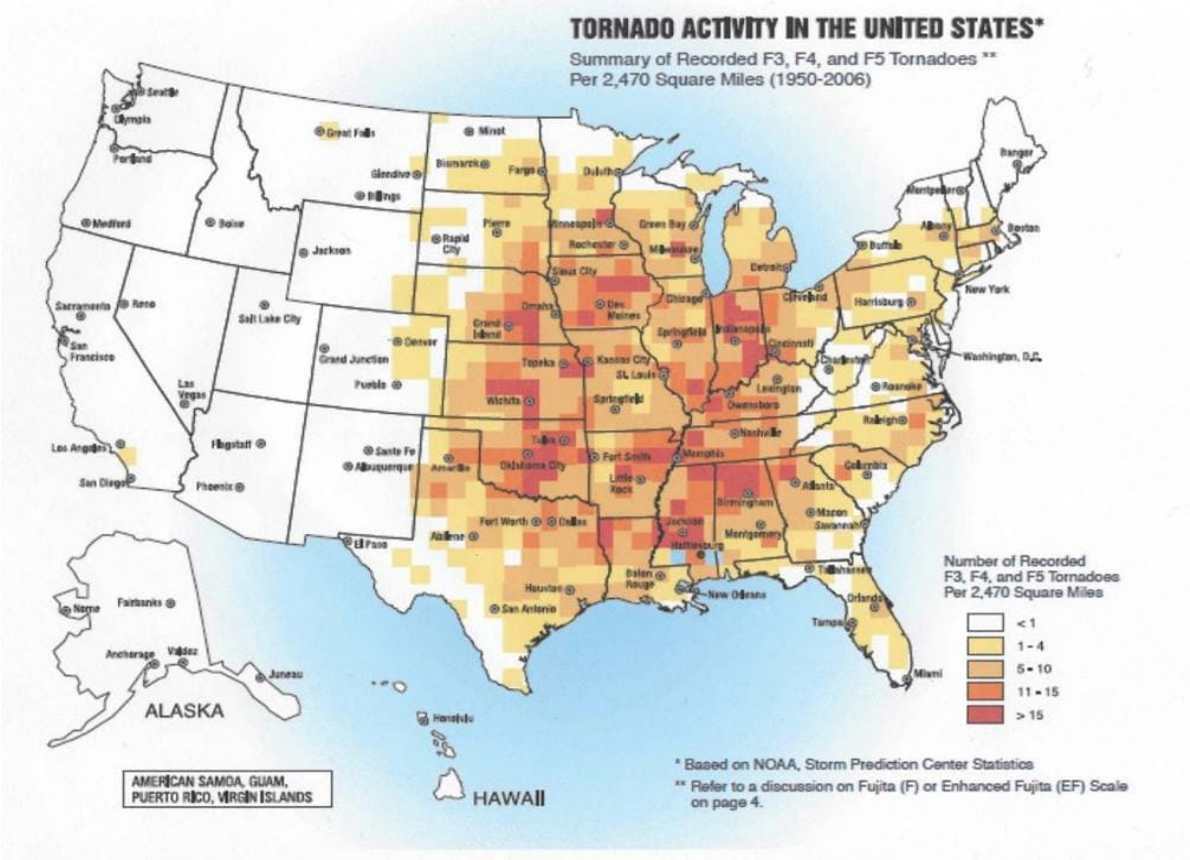


Figure 4- 24: Tornado Activity in the United States. Source: American Society of Civil Engineers

The tornadoes associated with tropical cyclones are most frequent in September and October when the incidence of tropical storm systems is greatest. This type of tornado usually occurs around the perimeter of the storm, and most often to the right and ahead of the storm path or

the storm center as it comes ashore. These tornadoes commonly occur as part of large outbreaks and generally move in an easterly direction.

4.5.4.1. Location within the Planning Area

Tornadoes are unpredictable manifestations and are not isolated to a specific geographic location. Therefore, it is assumed that the entire planning area is exposed to this hazard.

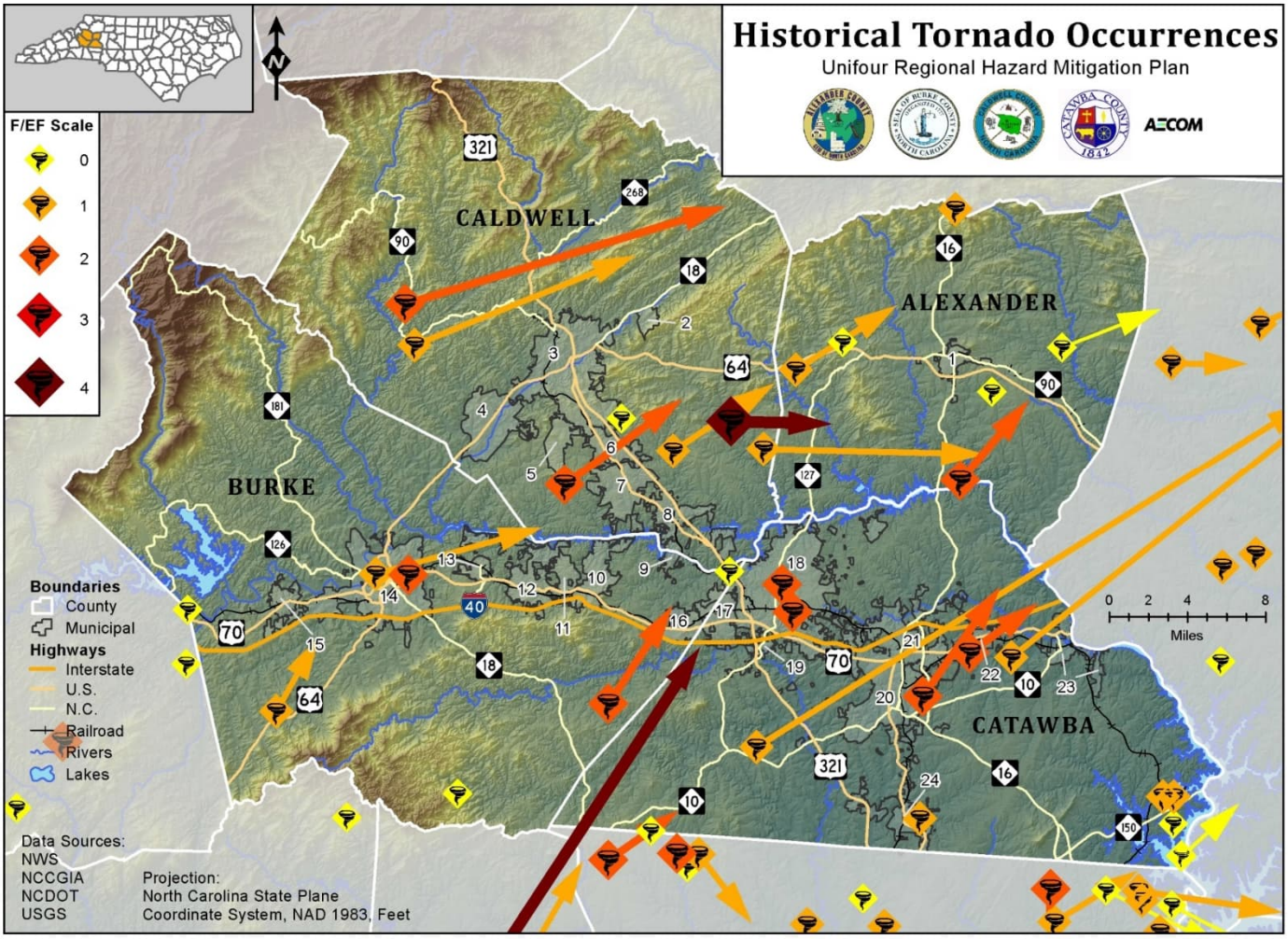


Figure 4-25: Historic Tornado Point Locations and Damage Paths in the Unifour Region (1951-2019)

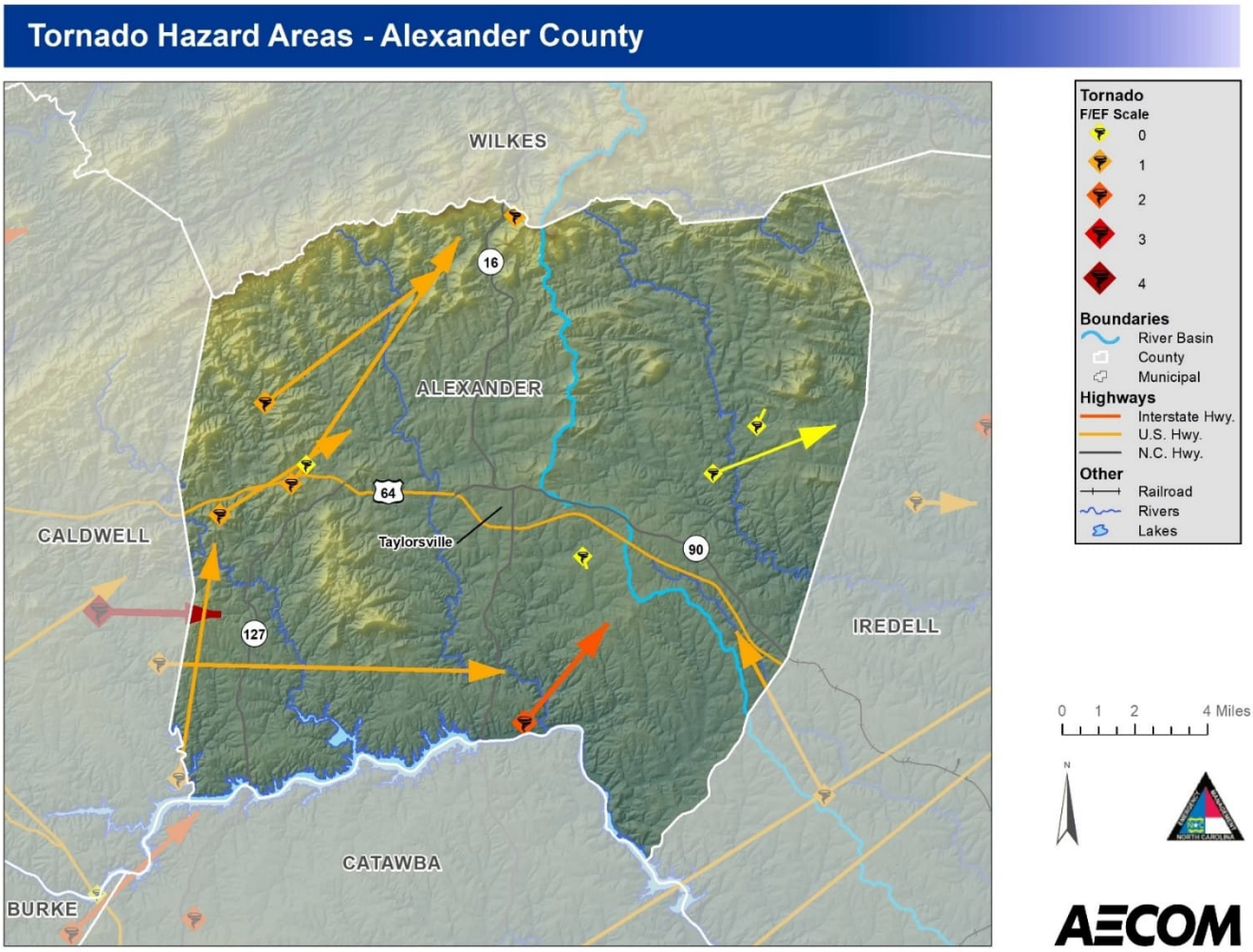


Figure 4- 27: Tornado Hazard Areas for Alexander County

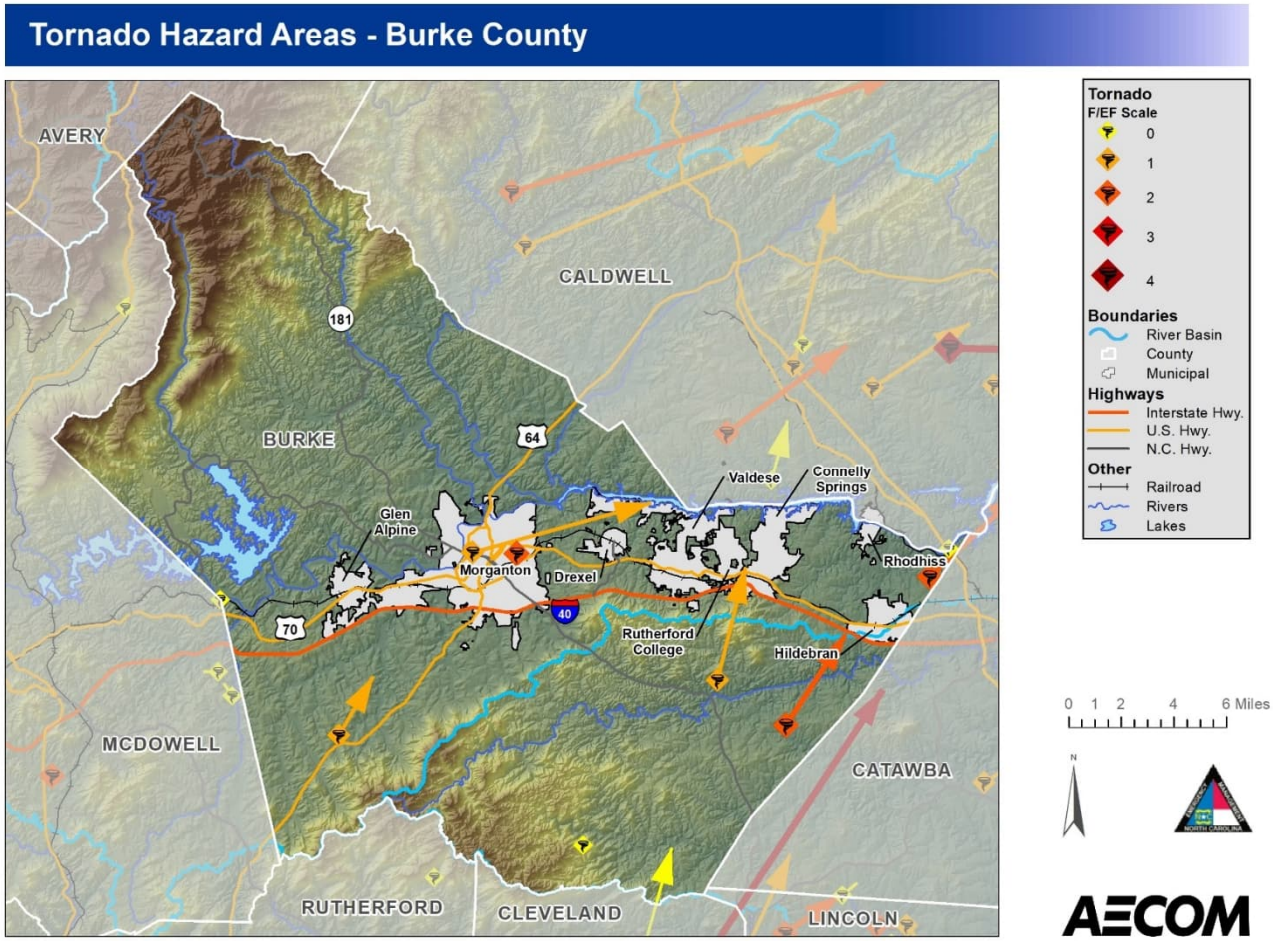


Figure 4- 26: Tornado Hazard Areas for Burke County

Tornado Hazard Areas - Caldwell County

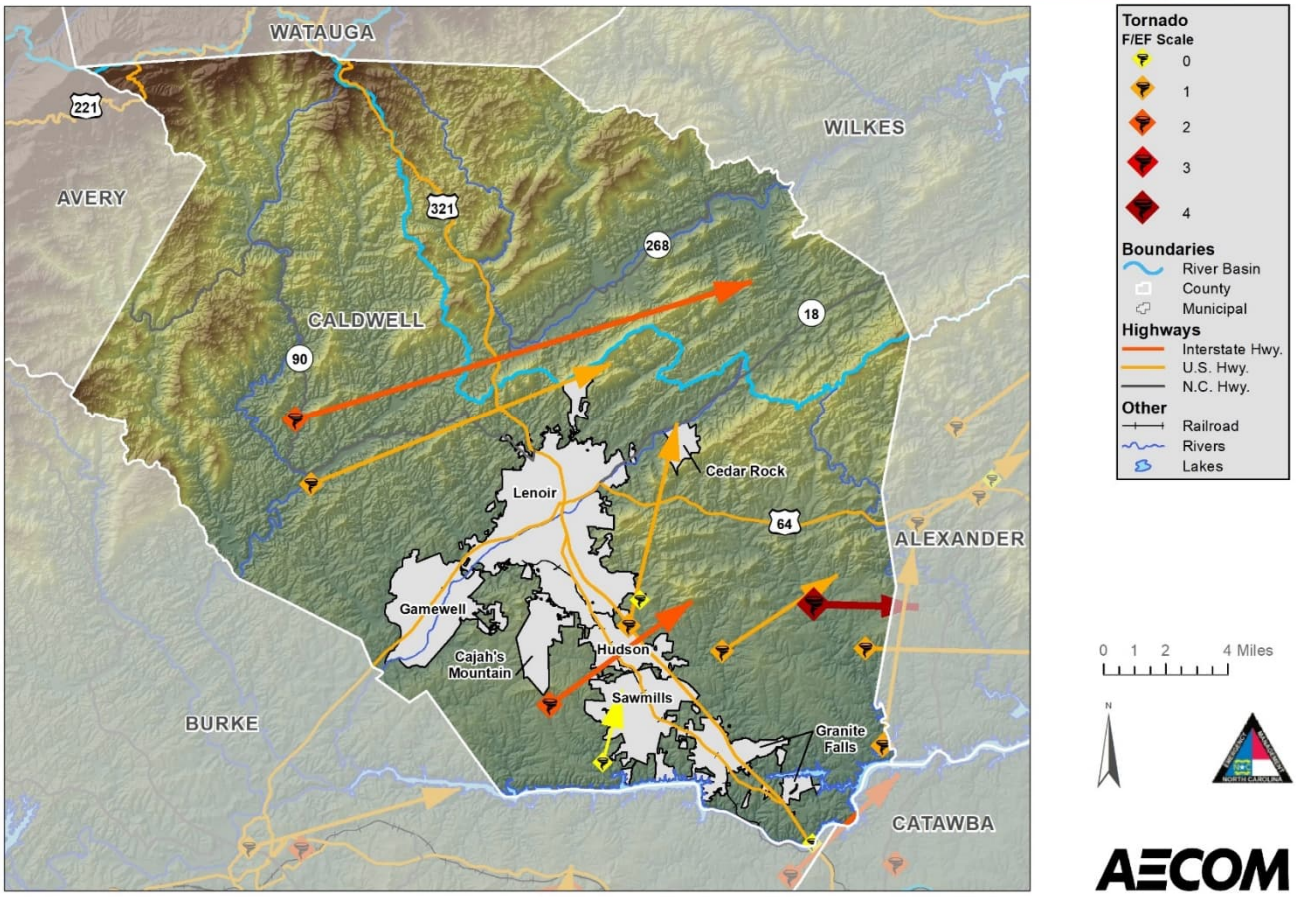


Figure 4- 28: Tornado Hazard Areas for Caldwell County

Tornado Hazard Areas - Catawba County

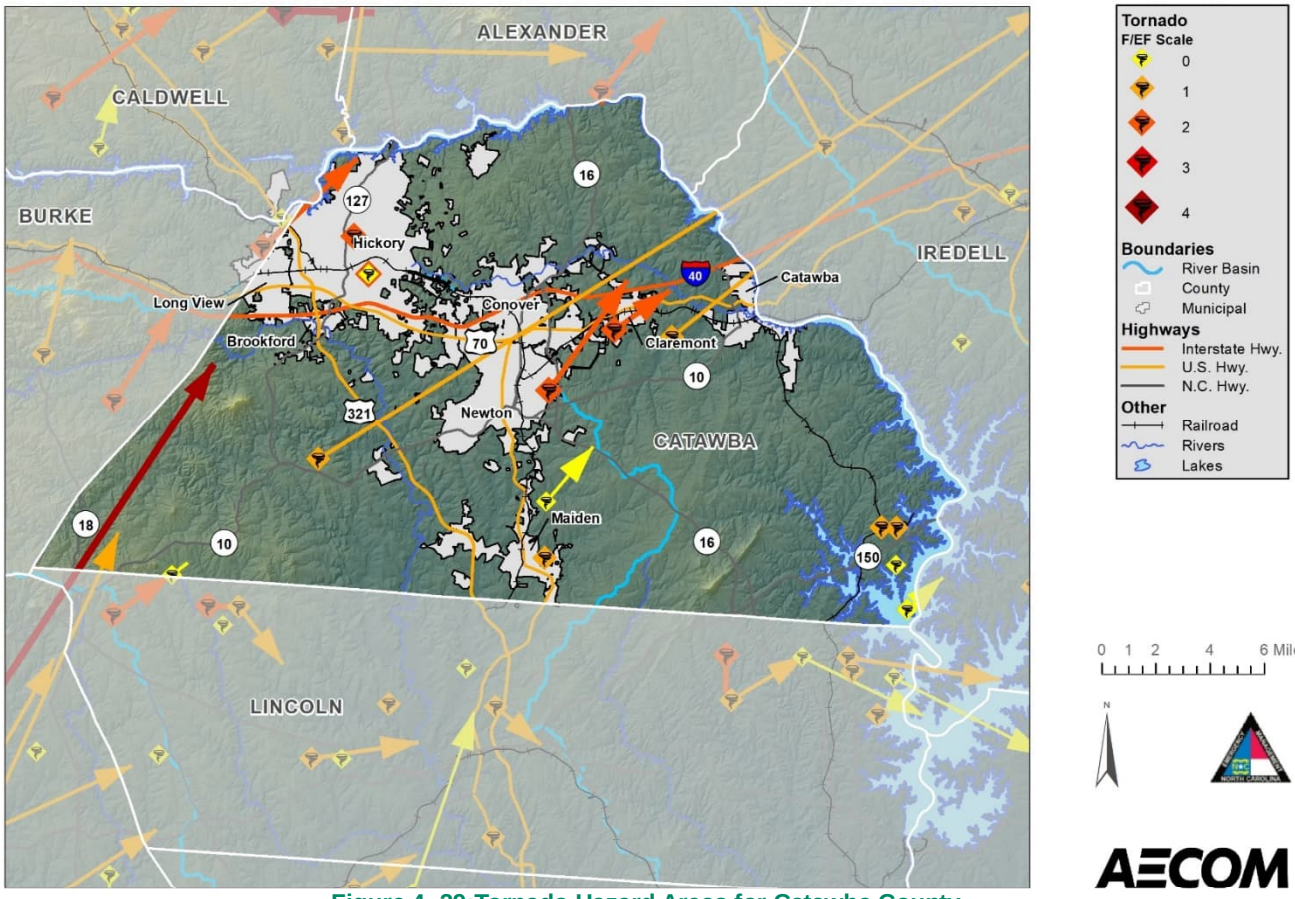


Figure 4- 29:Tornado Hazard Areas for Catawba County

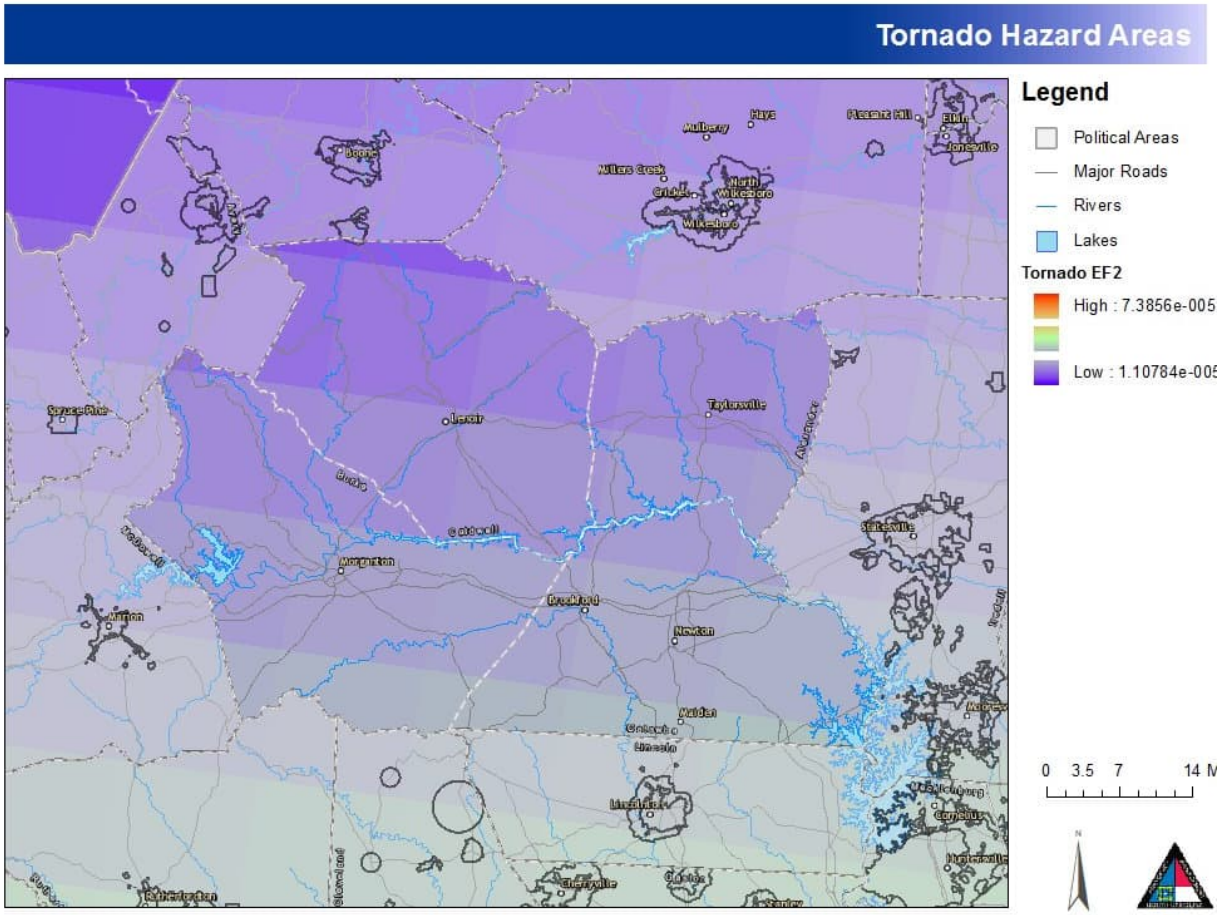


Figure 4- 31: Tornado Hazard Areas (Depicting Probability High-Low)

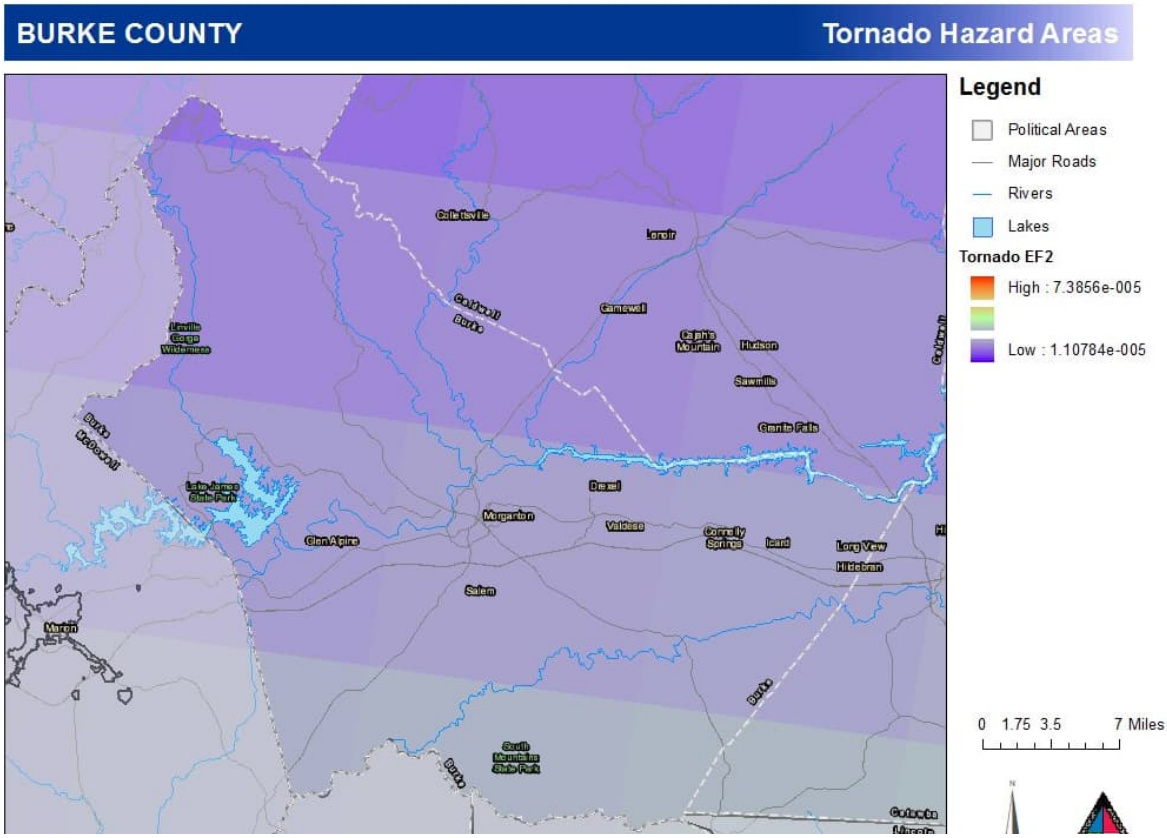


Figure 4- 30: Tornado Hazard Areas (Depicting Probability High-Low) for Burke County

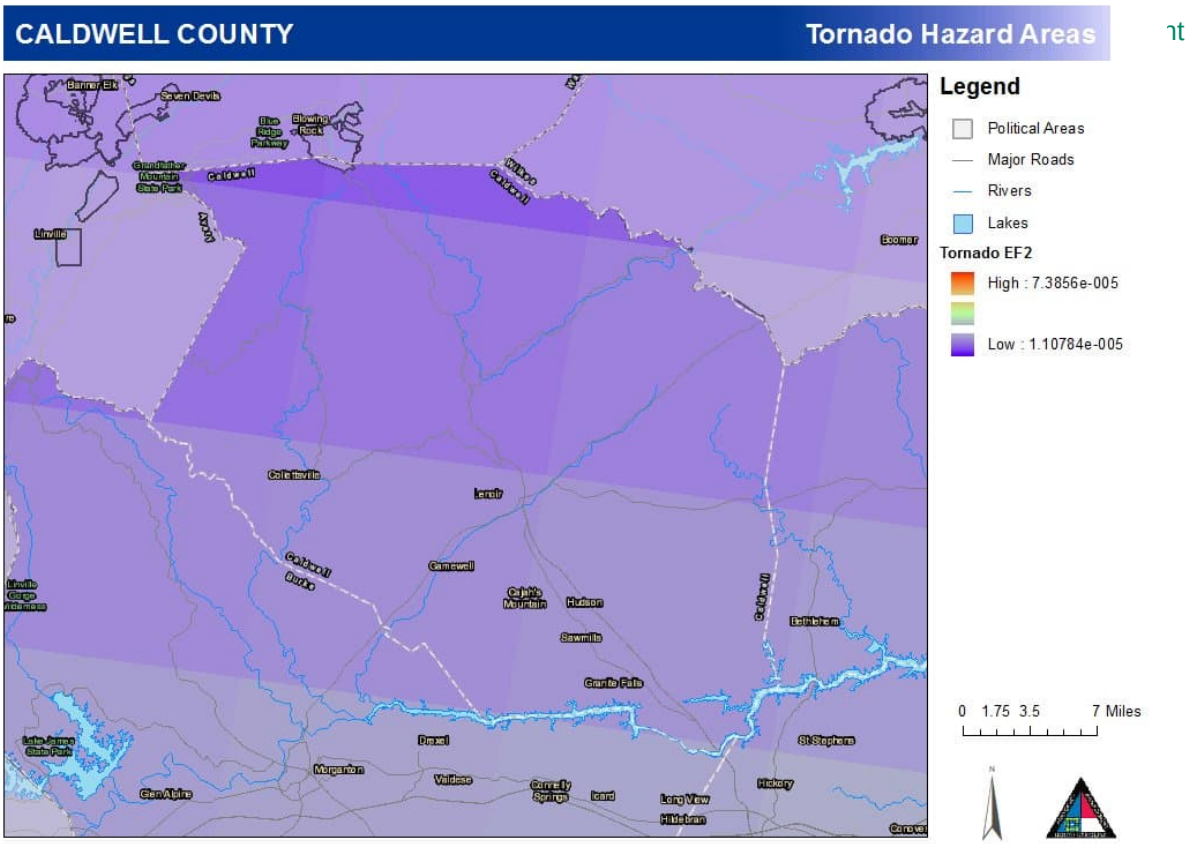


Figure 4- 32: Tornado Hazard Areas (Depicting Probability High-Low) for Caldwell County

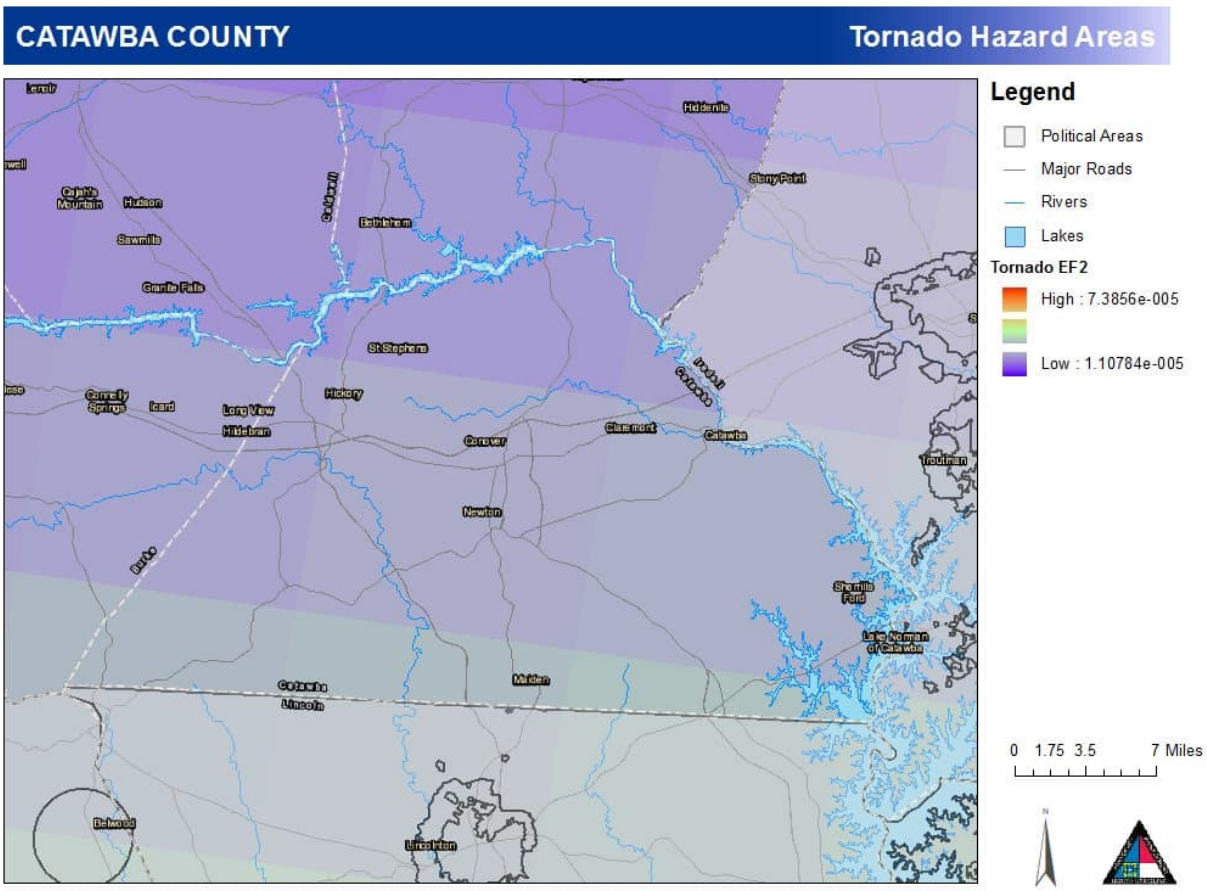


Figure 4- 33: Tornado Hazard Areas (Depicting Probability High-Low) for Catawba County

4.5.4.2. Extent (Magnitude and Severity)

Definition:

Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA as well as the Fujita/Enhanced Fujita Scale.

Extent Event:

Tornadoes of any magnitude and severity are possible within the planning area. Since 1951, the highest magnitude tornado to impact the Unifour Region has been an F4 on the Fujita Scale for Tornado Damage which has occurred on 05/05/1989 in Catawba County (Unincorporated Area) and on 05/07/1998 in Caldwell County (Unincorporated Area). The following table provides the highest recorded events in the jurisdictions below.

Location	Date	Magnitude
Alexander County (Unincorporated Area)	03/05/83	F1
Burke County (Unincorporated Area)	09/27/10	EF1
Burke County (Unincorporated Area)	10/08/17	EF1
City of Morganton	05/24/79	F2
Caldwell County (Unincorporated Area)	05/07/98	F4
Town of Hudson	07/09/77	F0
Town of Sawmills	10/08/17	EF0
Catawba County (Unincorporated Area)	05/05/89	F4
City of Claremont	10/26/10	EF2
City of Hickory	08/09/51	F2
City of Newton	08/18/54	F2
Town of Maiden	05/23/73	F1

4.5.4.3. Historical Occurrences

Between 2013 and 2023, there have been 14 reports of tornados in the Unifour Counties which have a total associated property damage value of $2,506,000 and no injuries or deaths reported to be associated with the tornados.

County	Location	Date	Magnitude	Reported Property Damage
Catawba	Duan	5/1/2017	EF0	$10,000
Burke Co.	Camp Creek	10/8/2017	EF0	$1,000
	Connelly Springs		EF1	$150,000
Caldwell	Baton		EF0	$10,000
	Hudson		EF1	$300,000
Catawba	Plateau	10/23/2017	EF0	$0
Burke	Hickory Municipal Airport		EF2	$1,500,000
Catawba	Longview		EF1	$500,000
Caldwell	Grace Chapel			$0
Alexander	Bethlehem			$0
	All Healing Springs			$0
	Smith's Store	4/19/2019	EF0	$5,000
	Stony Pt	8/17/2021	EF1	$5,000
	All Healing Springs	3/23/2022	EF1	$25,000

Table 4-27: Tornados Reported by the NCDC Storm Events Database between 2013-2023 in the Unifour Counties[13]

The historical occurrences ranging from 2013 to 2023 have been identified based on the NCDC Storm Events database (Table 4-27) and can be viewed in the NCDC Storm Events Database. It should

be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded, or unreported events may have occurred within the planning area during this timeframe.

According to the NCDCs Storm Event Database, between 1950 and 2023 there have been 50 recorded instances of tornados in the Unifour Counties. These 50 reported events have caused an

estimated $52,618,500 in property damage, $0 in crop damages, 0 deaths, and 17 injuries. The highest magnitude tornado on record is an EF4 and The lowest magnitude tornado on record is an EF0.

4.5.4.4. Probability of Future Occurrences

County		Alexander	Catawba	Burke	Caldwell
EAL	**Value**	$872,000	$5.2 Million	$2.2 Million	$1.6 Million
	Rating	Relatively Low	Relatively Moderate	Relatively Moderate	Relatively Low
Risk Index	**Score**	48.2	89.2	74.8	66.7
	Rating	Relatively Low	Relatively Moderate	Relatively Moderate	Relatively Low
Frequency (Events per Year)		0.1	0.2	0.2	0.2
Historic Loss Ratio		Relatively Moderate	Relatively Moderate	Relatively Moderate	Relatively Low

Table 4- 28: Tornado NRI EAL Values, Ratings, Risk Index Score and Rating, Frequency, and Historic Loss Ratio for Unifour Counties

Based on the analyses performed in IRISK, the probability of future Tornado is shown in the table below, by jurisdiction.

4.5.4.5. Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low - Less Than 1% Annual Probability of Ef2 Event
- Medium - Between 1% And 10% Annual Probability of Ef2 Event
- High - More Than 10% Annual Probability of Ef2 Event

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Low**
Burke County (Unincorporated Area)	**Low**
Caldwell County (Unincorporated Area)	**Low**
Catawba County (Unincorporated Area)	**Low**
City of Claremont	**Low**

Jurisdiction	IRISK Probability of Future Occurrence
City of Conover	Low
City of Hickory	Low
City of Lenoir	Low
City of Morganton	Low
City of Newton	Low
Town of Brookford	Low
Town of Cajah's Mountain	Low
Town of Catawba	Low
Town of Connelly Springs	Low
Town of Drexel	Low
Town of Gamewell	Low
Town of Glen Alpine	Low
Town of Granite Falls	Low
Town of Hildebran	Low
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Low
Town of Rhodhiss	Low
Town of Rutherford College	Low
Town of Sawmills	Low
Town of Taylorsville	Low
Town of Valdese	Low
Village of Cedar Rock	Low

4.5.4.6. Tornado Hazard Vulnerability

All the inventoried assets in the Unifour Region are exposed to potential tornado activity. Any specific vulnerability of individual assets would depend greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future updates.

4.5.4.7. Climate Change

As reported by the North Carolina State Hazard Mitigation Plan, the National Aeronautics and Space Administration (NASA), predicts that tornado events in the future are likely to become more frequent in the southeastern USA because of weather extremes. While the number of annual days of which weather conditions were favorable for tornadoes decreased from 1979 to 2020 across the southern parts of the traditional 'Tornado Alley' in the central part of the continental USA, an increase was observed from the Mississippi Valley across much of the Southeast over the same period.

County	Agriculture Exposure	Population Exposure	Population Equivalence	Building Exposure	Total exposure Value *(including population equivalent value)*
Alexander	$202,258,636	36,437.00	$422,669,200,000	$6,490,937,927	$429,362,396,563
Burke	$93,436,823	87,532.00	$1,015,371,200,000	$13,643,350,490	$1,029,107,987,313
Caldwell	$55,120,539	80,586.00	$934,797,600,000	$15,099,673,534	$949,952,394,073
Catawba	$88,641,140	160,509.00	$1,861,904,400,000	$37,175,998,799	$1,899,169,039,939
Total	**$439,457,138**	**$365,064**	**$4,234,742,400,000**	**$72,409,960,750**	**$4,307,591,817,888**

Table 4- 29: NRI Exposure Values and Vulnerability for Tornados

Tornado potential is measured by an index that NASA created called the Convective Available Potential Energy (CAPE) index. This measures how warm and moist the air is, which is a major contributing factor in tornado formation. NASA projects that by the period of 2072-2099 the CAPE in the Unifour Region will increase by 300-400J/kg, which places it in the area likely to experience the second greatest increase in CAPE in the United States. This indicates that there will potentially be even more frequent tornadoes in the Unifour Region going forward.

The North Carolina Climate Science Report also suggests that the overall occurrence of tornadoes will likely increase due to climate change throughout the State. Since the 1970s, the United States has experienced a decrease in the number of days per year on which tornadoes occur but an increase in the number of tornadoes that form on such days. In other words, the frequency of days with large numbers of tornadoes (tornado outbreaks) appears to be increasing, with the result that the total number of tornadoes per year may be increasing.

Hurricanes are in some instances associated with the production of tornadoes. Stronger hurricanes resulting from the effects of climate change would in theory be more prone to produce tornadoes due

to a stronger wind field, but there is very low confidence in this projection due to the limited research results to date.

4.5.5. Earthquake

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

Most earthquakes are caused by the release of stresses accumulated because 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. These plate borders generally follow the outlines of the continents, with the North American plate following the continental border with the Pacific Ocean in the west but following the mid-Atlantic trench in the east. As earthquakes occurring in the mid-Atlantic trench usually pose little danger to humans, the greatest earthquake threat in North America is along the Pacific Coast.

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.

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 (see Table 4- 30). 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 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, with a I corresponding to imperceptible (instrumental) events, IV corresponding to moderate (felt by people awake), 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 4- 30.

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
Less than 3.5	Generally, not felt but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 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 greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Table 4- 30: Richter Scale.

Source: North Carolina Division of Emergency Management

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	Instrumental	Detected only on seismographs	
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<5.4
VII	Very Strong	Mild Alarm; walls crack; plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction: trees fall; ground rises and falls in waves	>8.1

Table 4- 31: Modified Mercalli Intensity Scale for Earthquakes

Source: North Carolina Division of Emergency Management

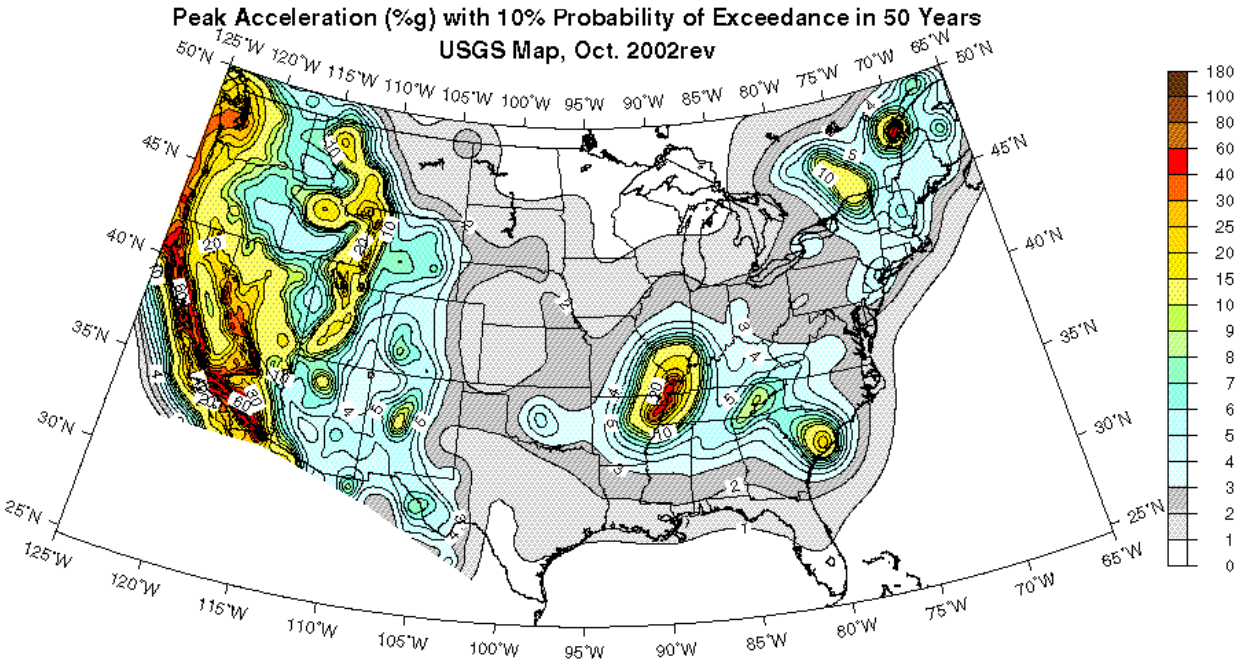


Figure 4- 34: Peak Acceleration with 10 Percent Probability of Exceedance in 50 Years

Source: United States Geological Survey

Figure 4- 34 shows the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change

in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards.

4.5.5.1. Earthquake Hazard Analysis

Location within the Planning Area

The below figures show peak ground acceleration and historic earthquake epicenters for the state of North Carolina and relevant surrounding areas.

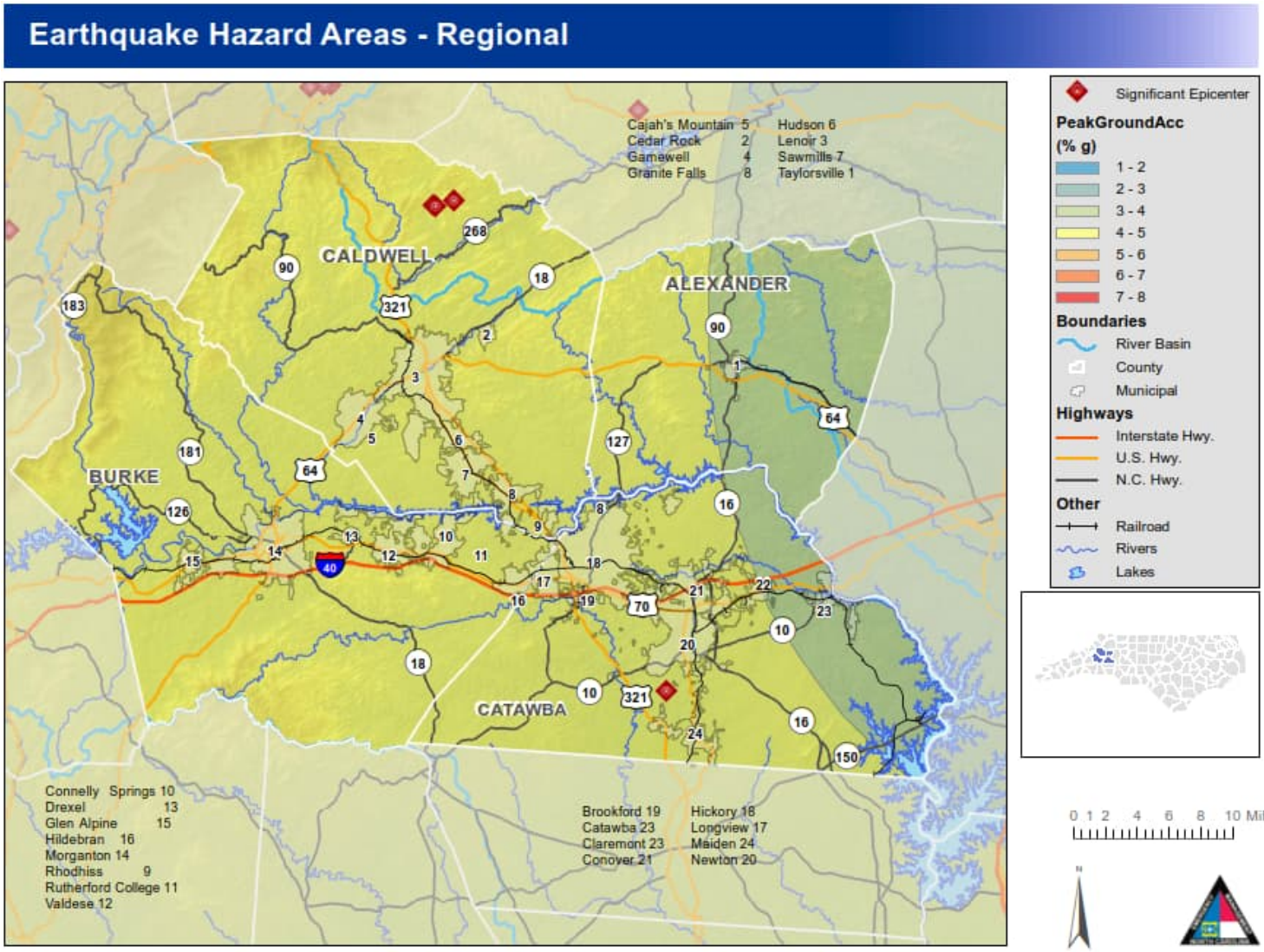


Figure 4- 35: Earthquake Hazard Areas

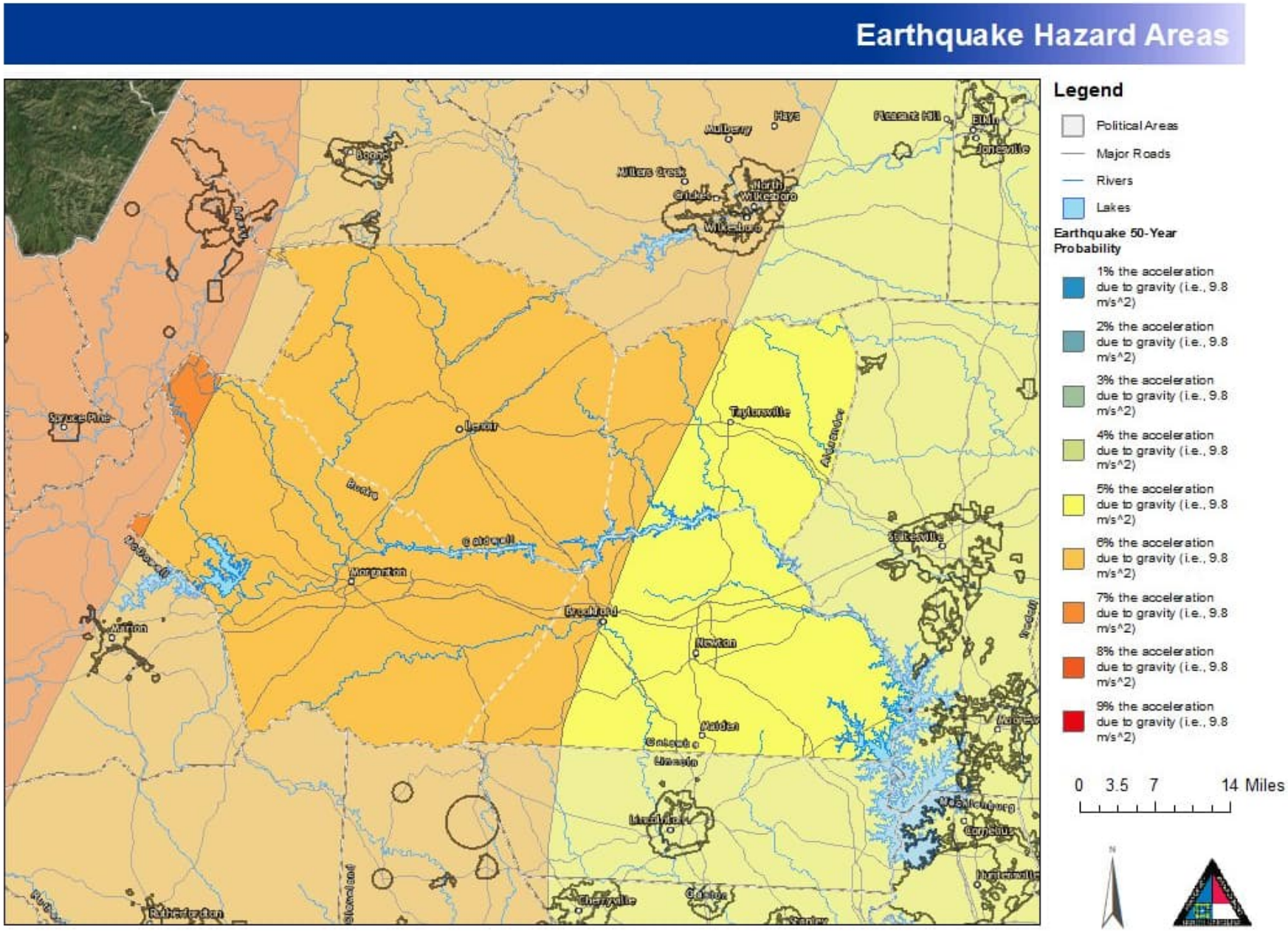


Figure 4- 36: Earthquake Hazard Areas

Earthquake Hazard Areas - Burke County

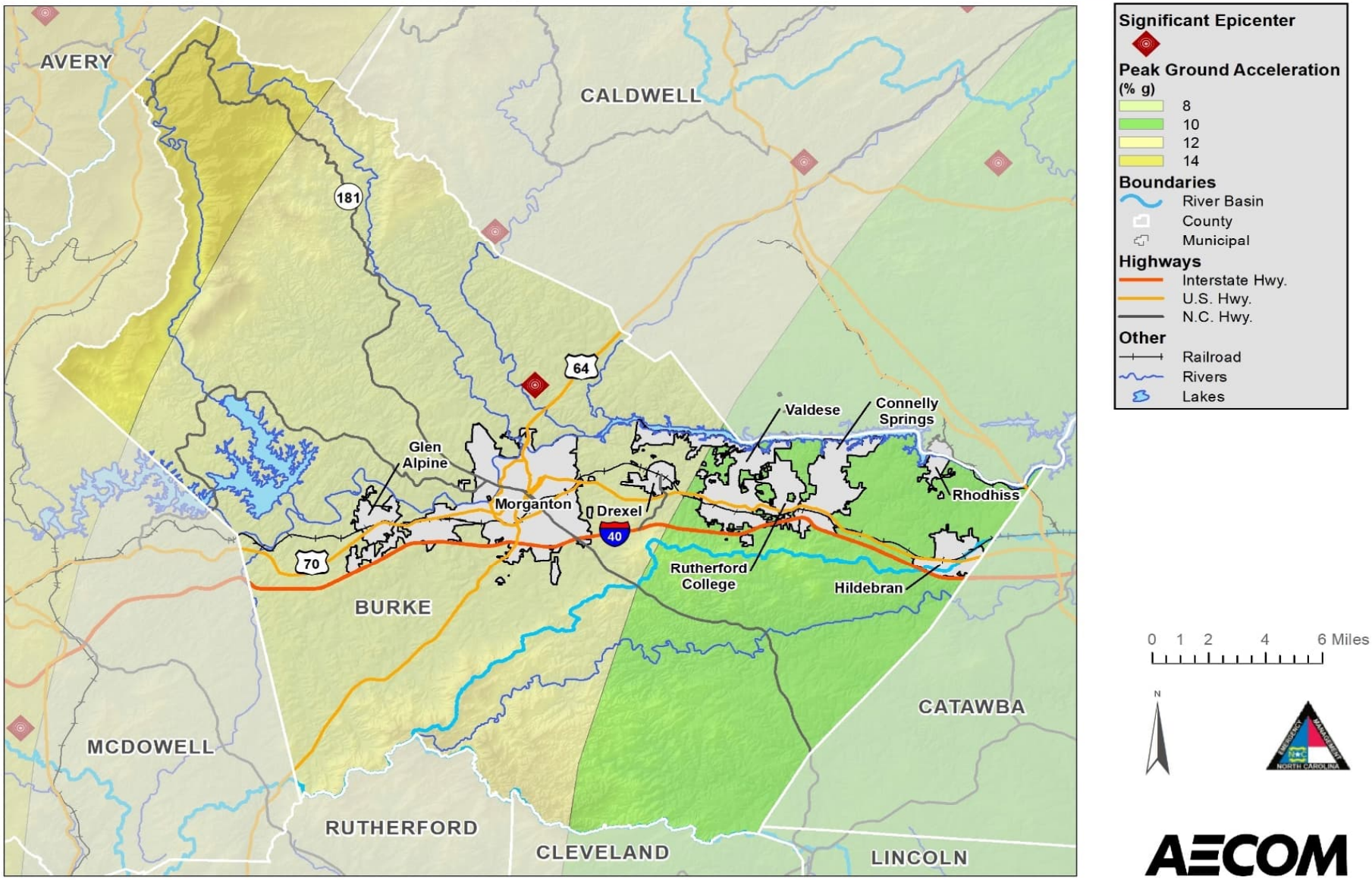


Figure 4- 37: Earthquake Hazard Areas

Earthquake Hazard Areas - Caldwell County

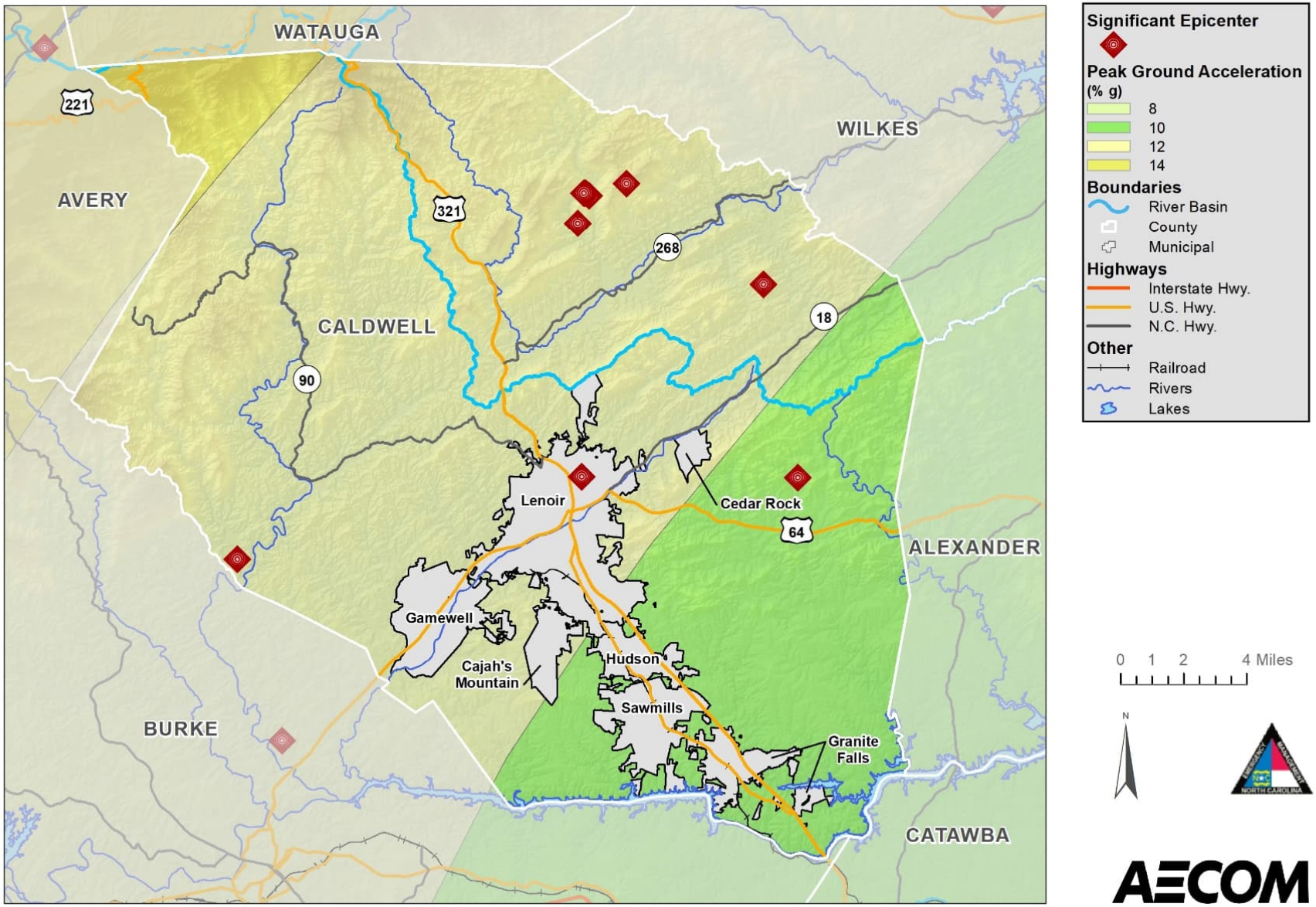


Figure 4-38: Earthquake Hazard Areas

Earthquake Hazard Areas - Alexander County

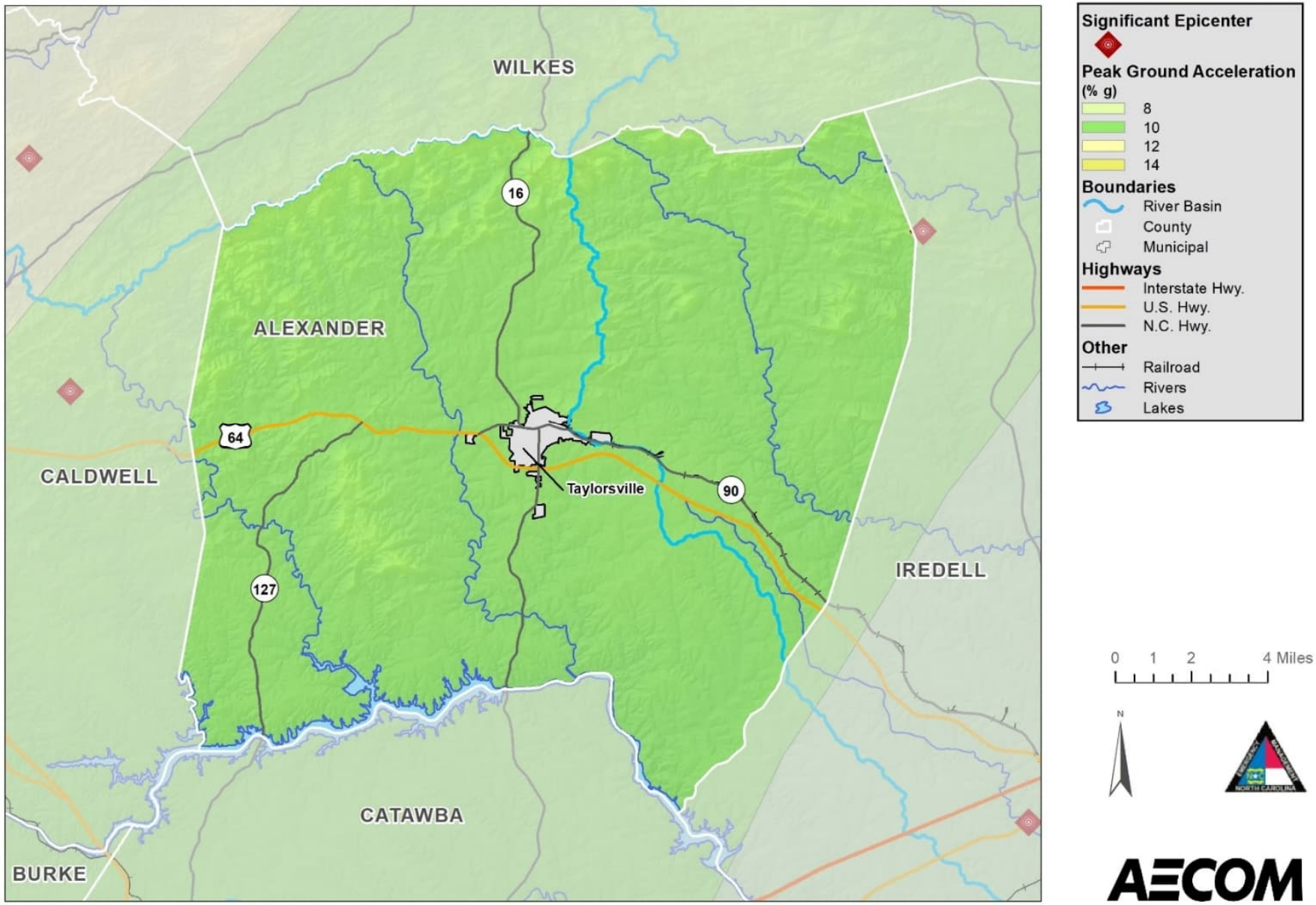


Figure 4-39: Earthquake Hazard Areas

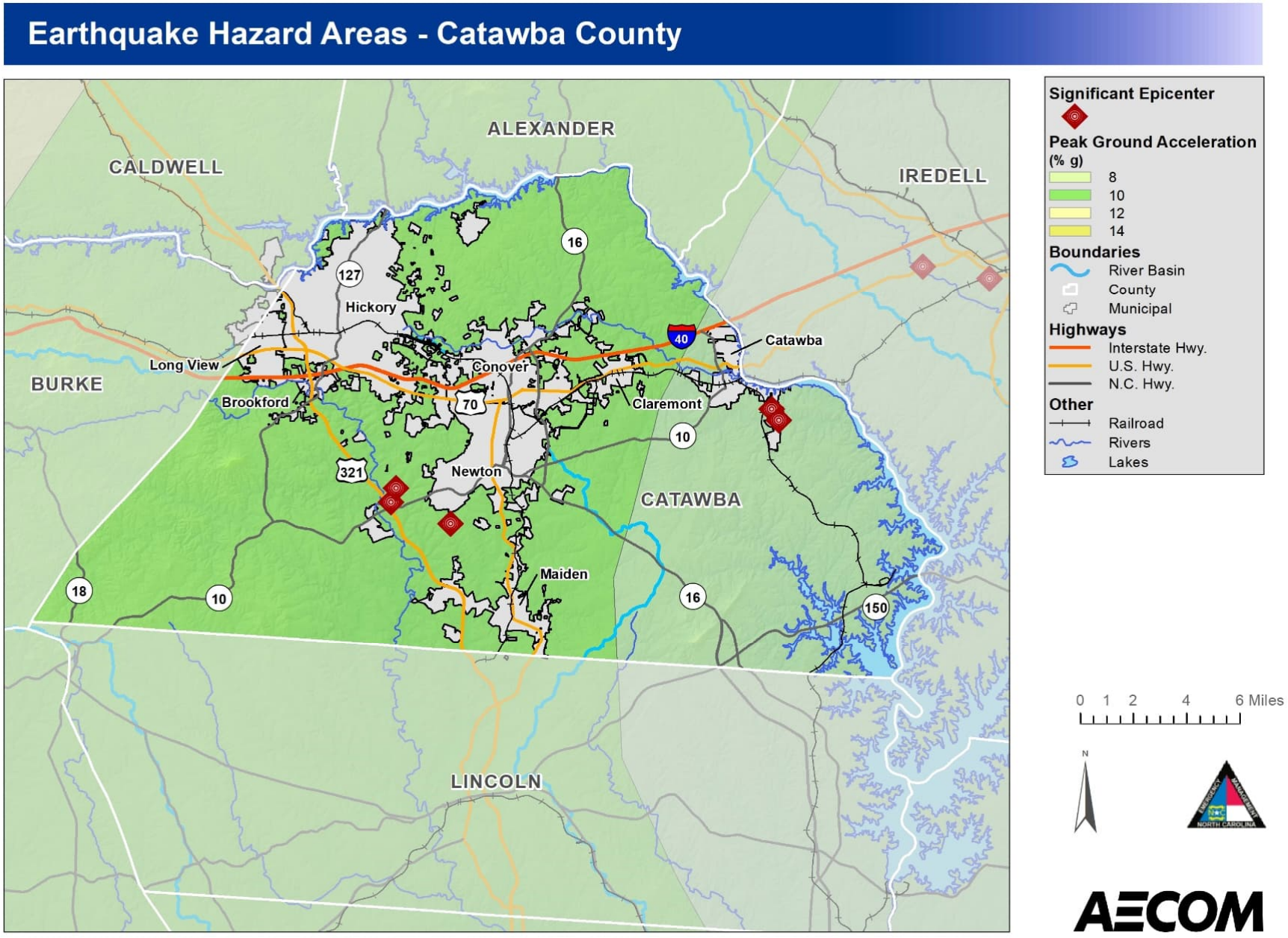


Figure 4-40: Earthquake Hazard Areas

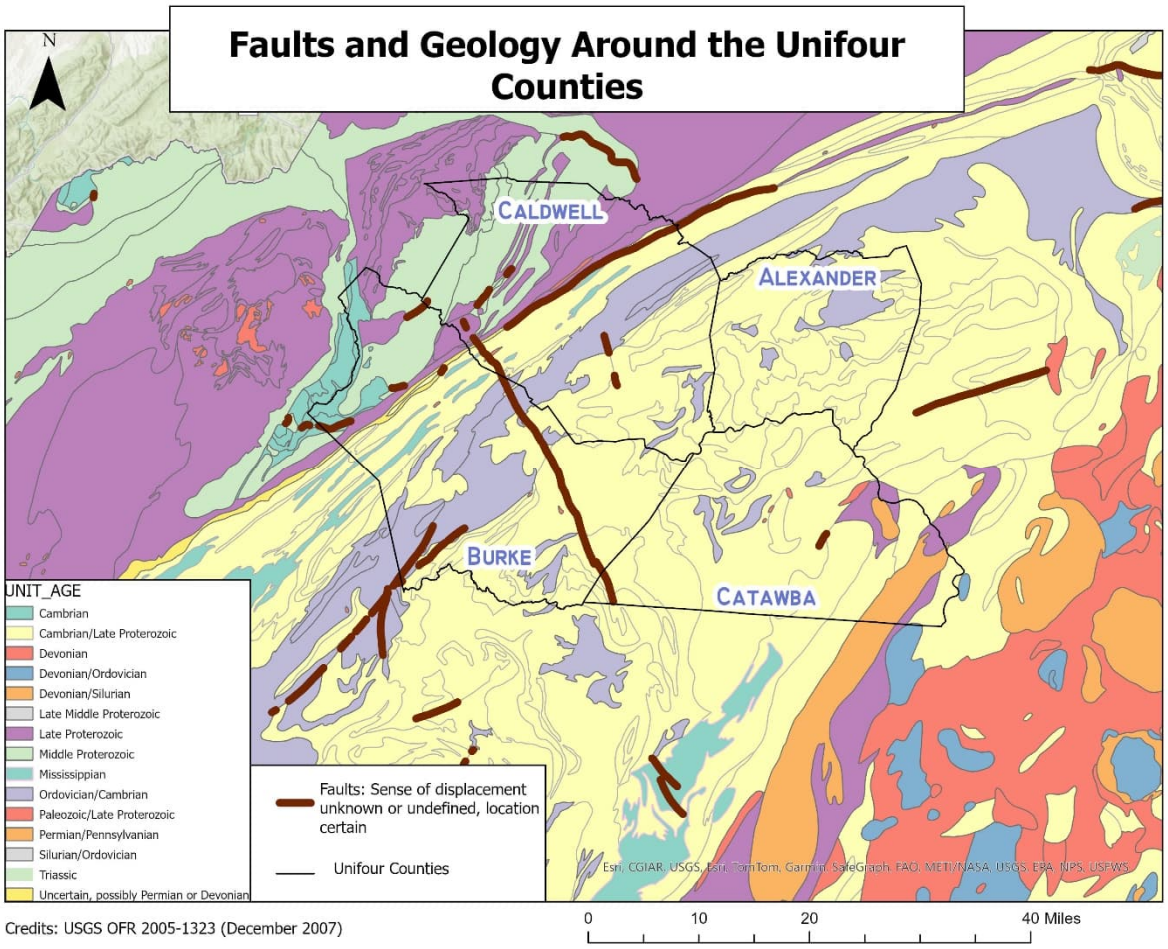


Figure 4- 41: Faults and Geological age of areas in and around the Unifour Counties

4.5.5.2. Extent (Magnitude and Severity)

Definition:

Earthquake extent can be measured by the Richter Scale and the Modified Mercalli Intensity (MMI) scale.

Extent Event:

The most severe earthquake felt in the Unifour Region since the mid-1800s was a six (VI) on the Modified Mercalli Intensity Scale. This event occurred in 1886, the effects of which were reported specifically in the City of Hickory which was 337 miles from the epicenter of the earthquake. The effects of this magnitude earthquake typically include trees swaying, suspended objects swinging, and objects falling off shelves. Earthquakes of greater magnitude may be possible within the region; however, this is known to be the greatest severity currently on record.

4.5.5.3. Historical Occurrences

Date	Location	Intensity (MMI)	Details
09/01/1886	Hickory	VI	337 miles from epicenter
02/21/1916	Hickory	V	107 miles from epicenter
08/26/1916	Newton	IV	42 miles from epicenter
11/03/1928	Newton	III	130 miles from epicenter
05/13/1957	Claremont	IV	76 miles from epicenter
05/13/1957	Conover	IV	70 miles from epicenter
05/13/1957	Hickory	V	59 miles from epicenter
05/13/1957	Maiden	IV	73 miles from epicenter
05/13/1957	Newton	IV	71 miles from epicenter
09/13/1976	Long View	II	109 miles from epicenter

Table 4-32: Modified Mercalli Intensity Scale for Earthquakes

Source: National Geophysical Data Center/World Data Service (NGDC/WDS) Significant Earthquake Database.

Date	Magnitude+	Closest County	Closest City	Approximate Distance from City (miles)
2023-06-04	3.24 md	Burke	Glen Alpine	62.4
2023-05-23	2.76 md	Burke	Glen Alpine	61.7
2022-12-08	2.69 md	Burke	Glen Alpine	49.5
2022-10-25	2.59 md	Alexander	Taylorsville	46.8

Date	Magnitude[+]	Closest County	Closest City	Approximate Distance from City (miles)
2021-11-21	2.56 md	Caldwell	Lenoir	56.2
2021-08-17	2.65 md	Burke	Morganton	4.5
2021-02-12	2.79 md	Burke	Glen Alpine	45
2021-02-04	2.56 md	Alexander	Taylorsville	39.5
2020-10-25	2.81 md	Alexander	Taylorsville	41.5
2020-10-01	2.63 md	Caldwell	Cedar Rock	38.5
2020-08-11	2.87 md	Alexander	Taylorsville	38.5
2020-08-09	5.1 mw	Alexander	Taylorsville	38.4
2020-08-09	2.62 md	Alexander	Taylorsville	39
2019-09-12	2.54 md	Burke	Glen Alpine	90
2019-08-18	2.51 md	Burke	Glen Alpine	48
2019-03-26	2.61 md	Burke	Glen Alpine	92
2018-06-10	2.68 md	Alexander	Taylorsville	24

Table 4- 33: Earthquakes reported by the USGS between 2023 and 2018 within 100 miles of the Unifour Counties[14]

[+]Magnitude Types[15]:

- Mw= *Computed for all M5.0 or larger earthquakes worldwide, but generally robust for all M5.5 worldwide. Provides consistent results to M~4.5 within a regional network of high-quality broadband stations. Authoritative USGS magnitude if computed*.
    - 4 or larger
- Md = *Based on the duration of shaking as measured by the time decay of the amplitude of the seismogram. Sometimes the only magnitude available for very small events, but often used (especially in the past) to compute magnitude from seismograms with "clipped" waveforms due to limited dynamic recording range of analog instrumentation, which makes it impossible to measure peak amplitudes. Computed by NEIC but only published when there is no other magnitude available.*

- 4 or smaller

4.5.5.4. Probability of Future Occurrences

County		Alexander	Catawba	Burke	Caldwell
EAL	**Value**	$145,000	$1.1 Million	$338,000	$407,000
	Rating	Very Low	Relatively Low	Relatively Low	Relatively Low
Risk Index	**Score**	54.7	83.6	69.1	68.5
	Rating	Very Low	Relatively Low	Relatively Low	Very Low
Frequency (% Chance per Year)		0.046%	0.049%	0.058%	0.054%
Historic Loss Ratio		Relatively Low	Relatively Moderate	Relatively Low	Relatively Low

Table 4- 34: NRI Earthquake EAL, Risk Index, Frequency, and Historic Loss Ratio

Based on the analyses performed in IRISK, the probability of future Earthquake is shown in the table below, by jurisdiction.

4.5.5.5. Climate Change

Some recent studies have suggested that climate change may cause more earthquakes by increasing the weight of water on the earth's crust and destabilizing cracks and faults, leading to more seismic activity. However, this is only assumed to be a potential issue in areas that are more seismically volatile than the southeastern USA, and it is unlikely to impact the Unifour Region. Neither the current North Carolina State Hazard Mitigation Plan nor the North Carolina Climate Science report consider that climate change may increase the probability of earthquakes in the State.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low - Less Than 1% Annual Probability Of 500-Year Earthquake
- Medium - Between 1% And 10% Annual Probability Of 500-Year Earthquake
- High - More Than 10% Annual Probability Of 500-Year Earthquake

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Low**

Jurisdiction	IRISK Probability of Future Occurrence
Burke County (Unincorporated Area)	Low
Caldwell County (Unincorporated Area)	Low
Catawba County (Unincorporated Area)	Low
City of Claremont	Low
City of Conover	Low
City of Hickory	Low
City of Lenoir	Low
City of Morganton	Low
City of Newton	Low
Town of Brookford	Low
Town of Cajah's Mountain	Low
Town of Catawba	Low
Town of Connelly Springs	Low
Town of Drexel	Low
Town of Gamewell	Low
Town of Glen Alpine	Low
Town of Granite Falls	Low
Town of Hildebran	Low
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Low
Town of Rhodhiss	Low

Jurisdiction	IRISK Probability of Future Occurrence
Town of Rutherford College	Low
Town of Sawmills	Low
Town of Taylorsville	Low
Town of Valdese	Low
Village of Cedar Rock	Low

4.5.5.6. Earthquake Hazard Vulnerability

Vulnerability for earthquake for the area is considered, in relative terms, to be limited should a significant earthquake event occur. The following tables provide loss estimates for the 500-, 1,000- and 2,500- year return periods based on probabilistic scenarios. Loss data was provided by NCEM's IHRM Program. These estimates include structural, contents and inventory losses for agricultural, commercial, education, government, industrial, religious and residential building occupancy types. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all buildings located within the 100-year floodplain) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator a community may have more difficulties recovering from an event. These loss estimates do not include income losses, such as lost wages, rental expenses, relocation costs, etc. that can occur following an earthquake. All future structures and infrastructure built in the Unifour region will be vulnerable to seismic events and may also experience damage not accounted for in these estimated losses. Contents value for all buildings located within the 100-year floodplain) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator a community may have more difficulties recovering from an event. These loss estimates do not include income losses, such as lost wages, rental expenses, relocation costs, etc. that can occur following an earthquake. All future structures and infrastructure built in the Unifour will be vulnerable to seismic events and may also experience damage not accounted for in these estimated losses.

County	**Agriculture Exposure**	**Population Exposure**	Population Equivalence	**Building** Exposure	Total exposure Value ***(including population equivalent value)***
Alexander	*N/A*	36,444.00	$422,750,400,000	$6,490,861,000	$429,241,261,000
Burke		87,570.00	$1,015,812,000,000	$13,643,108,000	$1,029,455,108,000
Caldwell		80,652.00	$935,563,200,000	$15,099,454,000	$950,662,654,000
Catawba		160,610.00	$1,863,076,000,000	$37,175,602,000	$1,900,251,602,000
Total	*N/A*	365,276.00	4,237,201,600,000.00	72,409,025,000.00	4,309,610,625,000.00

Table 4- 35: Exposure values and vulnerability from the NRI for earthquakes

Table 4- 35 represents the agricultural, population number and equivalence, building, and total exposure value in terms of USD and population number.

4.5.6. Landslide

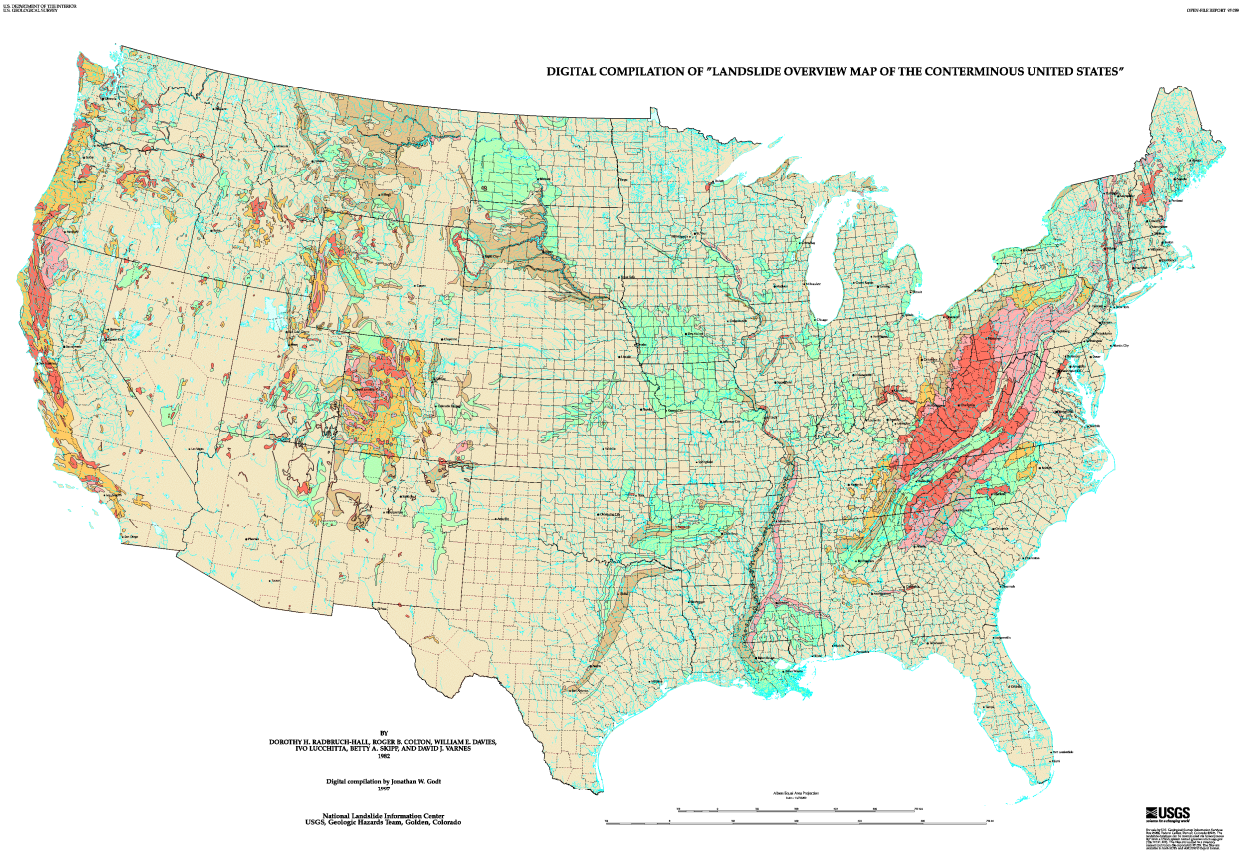
A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion,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

In the United States, it is estimated that landslides cause up to $2 billion in damages and from 25 to 50 death(s) annually. Globally, landslides cause billions of dollars in damage and thousands of death(s) and injuries each year. Figure 4- 42 delineates areas where large numbers of landslides have occurred and areas which are susceptible to landslides in the conterminous United States. 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 .



EXPLANATION

LANDSLIDE INCIDENCE

- Low (less than 1.5% of area involved)
- Moderate (1.5%-15% of area involved)
- High (greater than 15% of area involved)

LANDSLIDE SUSCEPTIBILITY/INCIDENCE

- Moderate susceptibility/low incidence
- High susceptibility/low incidence
- High susceptibility/moderate incidence

Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding 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 landsliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

Figure 4- 42: Landslide Overview Map of the Conterminous United States

Source: United States Geological Survey

4.5.6.1. Landslide Hazard Analysis

Figure 3-42 North Carolina Landslide Risk Areas

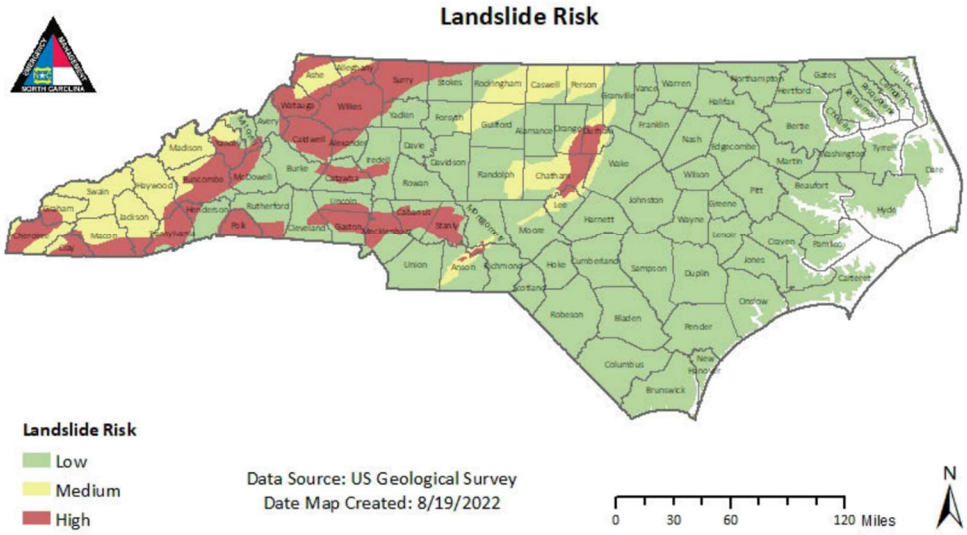


Figure 4- 43: Landslide Risk in NC from the State Hazard Mitigation Plan (2023)

4.5.6.2. Location within the Planning Area

The below figures show information developed by the United States Geological Survey (USGS) which depicts areas of landslide incidence and susceptibility. This information suggests that there is some significant potential risk that is not supported by any historical data or detailed landslide hazard mapping presently available for the planning area. In addition, the figures show slope and average annual precipitation data for the plan area.

Landslide Hazard Areas - Regional

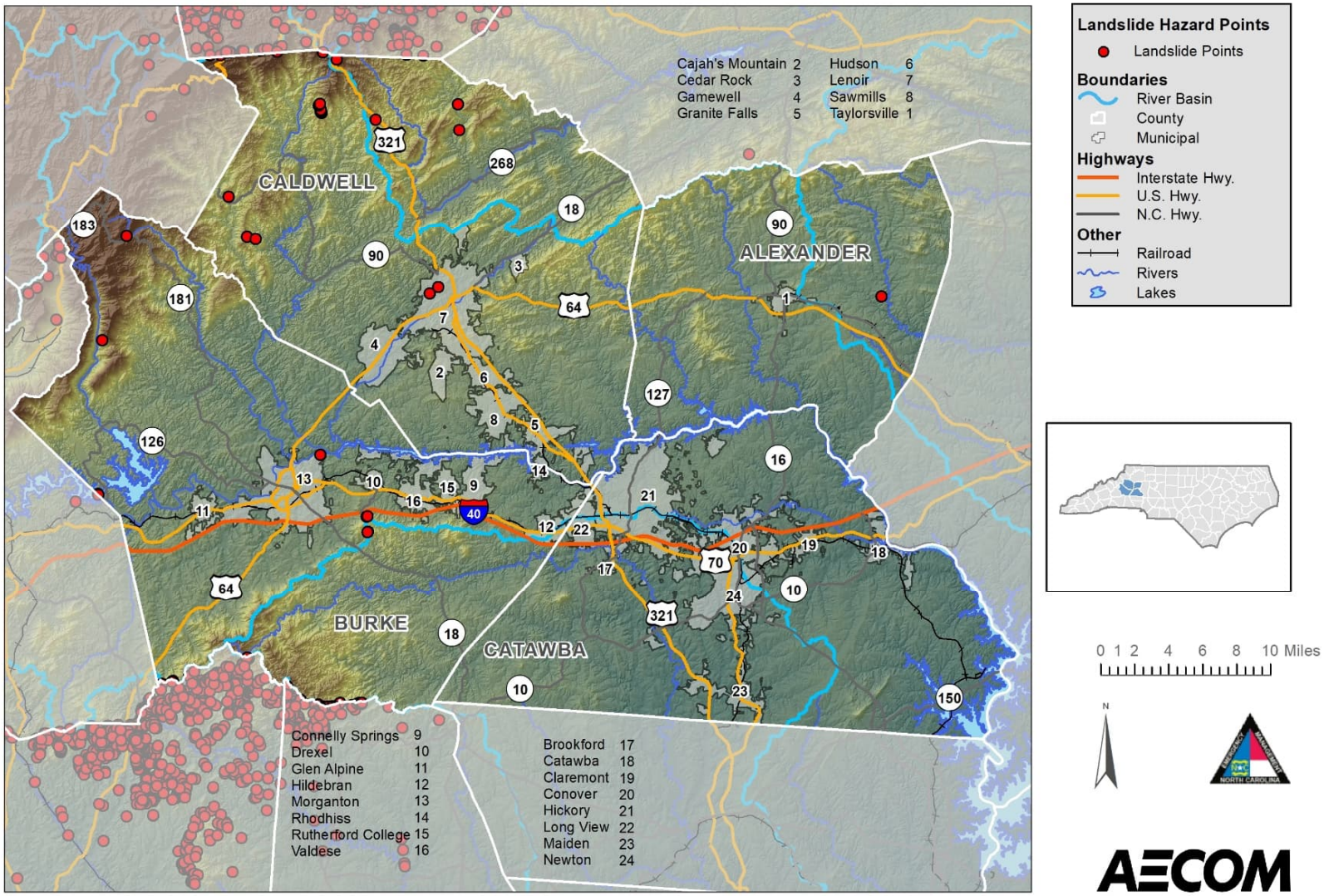


Figure 4- 44: Landslide Hazard Areas

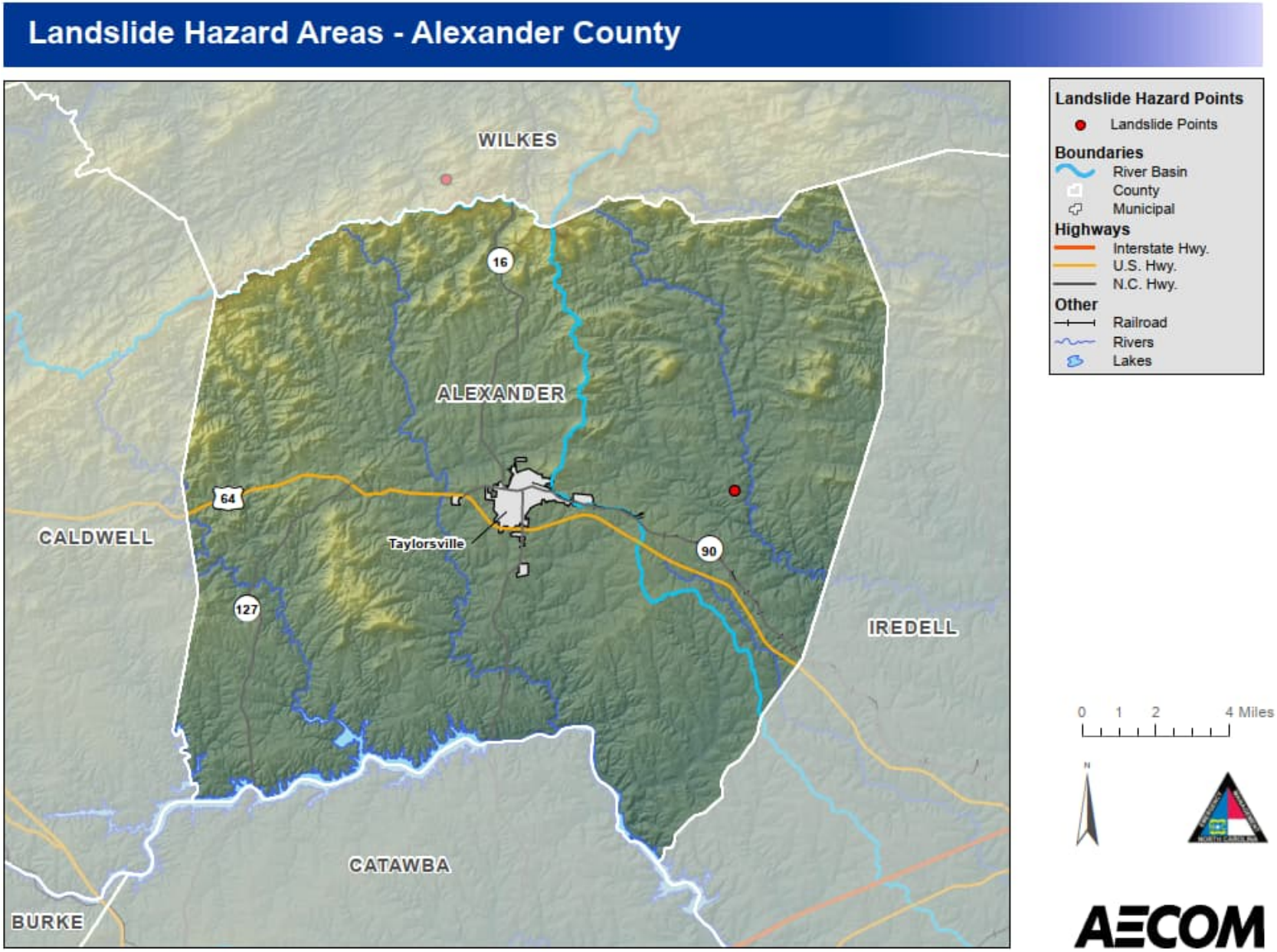


Figure 4- 45: Landslide Hazard Areas for Alexander County

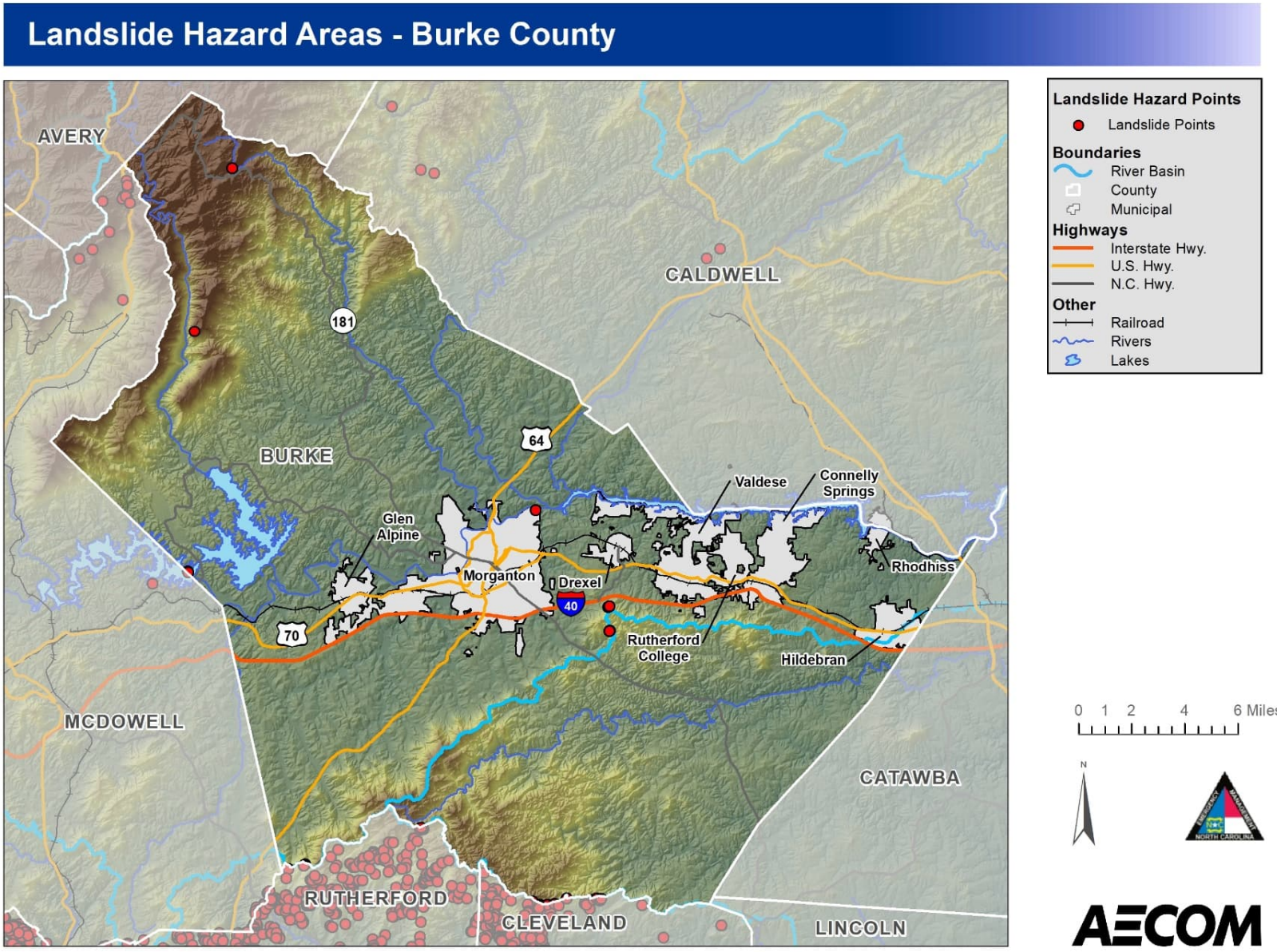


Figure 4- 46: Landslide Hazard Areas for Burke County

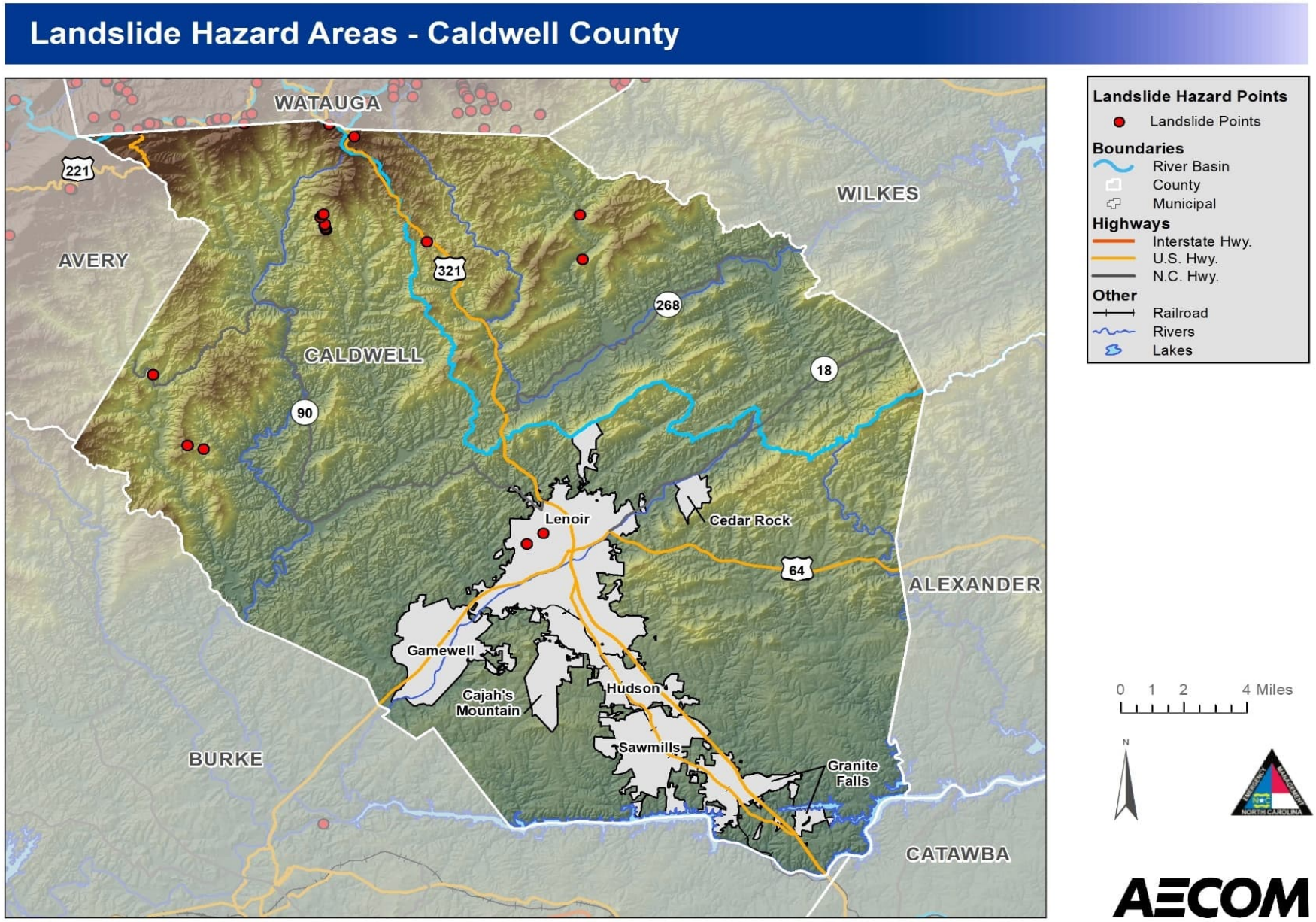


Figure 4- 47: Landslide Hazard Areas for Caldwell County

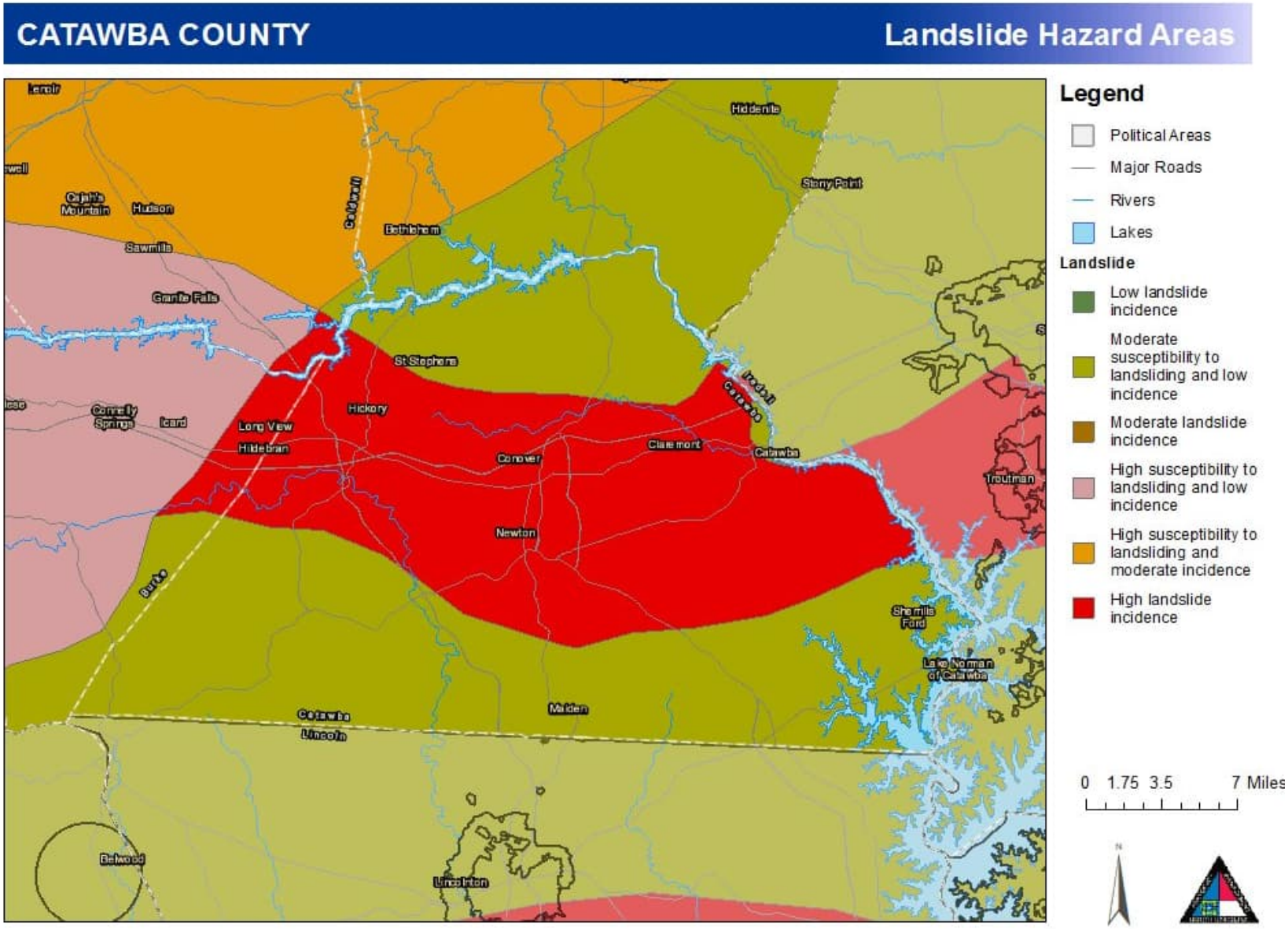


Figure 4- 48: Landslide Hazard Areas for Catawba County

4.5.6.3. Extent (Magnitude and Severity)

Definition:

Landslide data is provided from United States Geological Survey (USGS).

Extent Event:

The magnitude and severity of landslides can vary greatly depending on terrain and other highly localized factors. There were four anecdotal reported landslides in the Unifour Region, however there is no data available on the severity of these landslides as they were provided by local knowledge through the Hazard Mitigation Planning Committee. Mitigation strategy regarding landslide identification and mapping will be considered in future mitigation actions for the Unifour Region.

4.5.6.4. Historical Occurrences

Table 4- 36 provides a summary of this historical information by participating jurisdiction. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

County	Location	Movement Date	Rate	Type	Slope Configuration	Fatalities
Alexander	**Hiddenite**	9/17/2014	Rapid (>5m/sec)	Fall	Cut Slope – Not road Related	1
Burke	**Morganton**	12/9/2016		Slide	Embankment – Not road related	0
	Marrion	10/2/2019				
	Valdese	12/8/2020		Flow	Road Embankment	
	Valdese	1/20/2020	Slow (>1.6 m / Year)	Slide	Road Cut	
	Ashford	1/30/2020		Flow	Unmodified	
	Linville Falls	1/22/2024				
	Linville Falls	1/31/2024		Flow		

County	Location	Movement Date	Rate	Type	Slope Configuration	Fatalities
	Linville Falls	2/12/2024		Flow	Unmodified	
Caldwell	**Globe**	1/21/2015	Extremely Rapid (>5m/sec)	Flow	Road Embankment	0

Table 4- 36: Landslide Points and available related data recorded by the NC Department of Environmental Quality for Caldwell, Burke, and Alexander County (No reported events for Catawba County Available)[16]

4.5.6.5. Probability of Future Occurrences

The probability of future Landslide is shown in the table below, by jurisdiction:

County		Alexander	Catawba	Burke	Caldwell
EAL	Value	$22,000	$150,000	$182,000	$560,000
	Rating	Relatively Low	Relatively Moderate	Relatively Moderate	Relatively High
Risk Index	Score	49	92.3	94	98
	Rating	Relatively Low	Relatively Moderate	Relatively Moderate	Relatively High
Frequency (Events per Year)		0	0	0	0.2
Historic Loss Ratio		Very Low	Very Low	Very Low	Very Low

Table 4- 37: NRI Landslide EAL, Risk Index Values, Frequency, and Historic Loss Ratio

4.5.6.6. Climate Change

The increasing intensity of rainfall events anticipated because of climate change will likely lead to an increase in the number and extent of global landslide occurrences. However, there is very little readily available evidence or studies that indicate a significant increase in landslide activity is likely in the Unifour Region. The current North Carolina State Hazard Mitigation Plan does not suggest that climate change may increase the increase the probability of earthquakes in North Carolina outside the mountainous regions in the western part of the state.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Medium**

Jurisdiction	Probability of Future Occurrence
Burke County (Unincorporated Area)	Medium
Caldwell County (Unincorporated Area)	Medium
Catawba County (Unincorporated Area)	High
City of Claremont	High
City of Conover	High
City of Hickory	High
City of Lenoir	Medium
City of Morganton	Medium
City of Newton	High
Town of Brookford	Medium
Town of Cajah's Mountain	Medium
Town of Catawba	High
Town of Connelly Springs	Medium
Town of Drexel	Medium
Town of Gamewell	Medium
Town of Glen Alpine	Medium
Town of Granite Falls	Medium
Town of Hildebran	High
Town of Hudson	Medium
Town of Long View	High
Town of Maiden	Medium
Town of Rhodhiss	Medium

Jurisdiction	Probability of Future Occurrence
Town of Rutherford College	**Medium**
Town of Sawmills	**Medium**
Town of Taylorsville	**Medium**
Town of Valdese	**Medium**
Village of Cedar Rock	**Medium**

4.5.6.7. Landslide Hazard Vulnerability

Sufficient hazard information is not currently available with which to conduct a detailed vulnerability assessment. In addition, any specific vulnerability of individual assets would depend on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates. Mitigation strategy regarding landslide identification and mapping will be considered in future mitigation actions for the Region.

County	Agriculture Exposure	Population Exposure	Population Equivalence	**Building** Exposure	Total exposure Value ***(including population equivalent value)***
Alexander	*N/A*	36,444.00	$422,750,400,000	$6,490,861,000	$429,241,261,000
Burke		45,828.35	$531,608,893,634	$6,939,551,997	$538,548,445,631
Caldwell		43,002.41	$498,827,936,038	$8,693,517,302	$507,521,453,340
Catawba		58,367.72	$677,065,519,369	$13,751,638,365	$690,817,157,735
Total		**183,642.48**	**$2,130,252,749,041.00**	**$35,875,568,664.00**	**$2,166,128,317,706.00**

Table 4- 38: Landslide NRI Exposure data and vulnerability summary

4.5.7. Snow

A winter storm 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. Some winter storms may be large enough to affect several states, while others may affect only a single community. Many winter storms are accompanied by low temperatures and heavy and/or blowing snow, which can severely impair visibility.

4.5.7.1. Snow Hazard Analysis

In general, winter weather events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation, all of which may create locally hazardous conditions regardless of the magnitude of the overall event. Blizzards, the most dangerous of all winter storms, combine heavy snowfall, low temperatures, and winds of at least 35 mph, reducing visibility to only a few yards. Blizzards have been reported in several counties in western North Carolina.

4.5.7.2. Location within the Planning Area

Winter weather, including blizzards, frosts/freezes, heavy snow and sleet, are widespread atmospheric conditions that are not isolated to a specific geographic location. Therefore, it is assumed that the entire planning area is exposed to this hazard. However, it is possible to map average annual snowfall and greatest one-day snowfall as an indicator of where severe conditions have been observed historically in the plan Area.

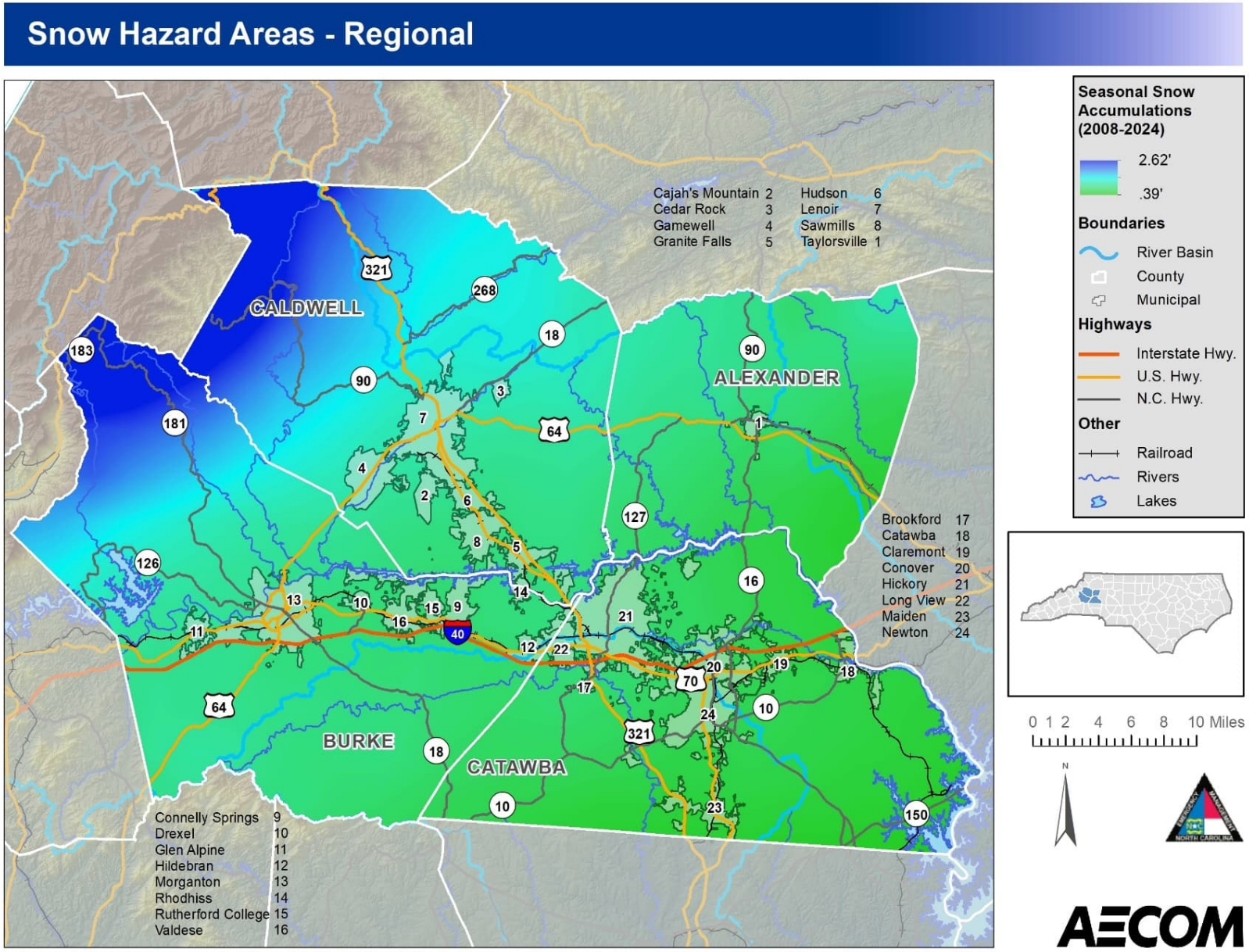


Figure 4- 49: Snow Hazard Areas

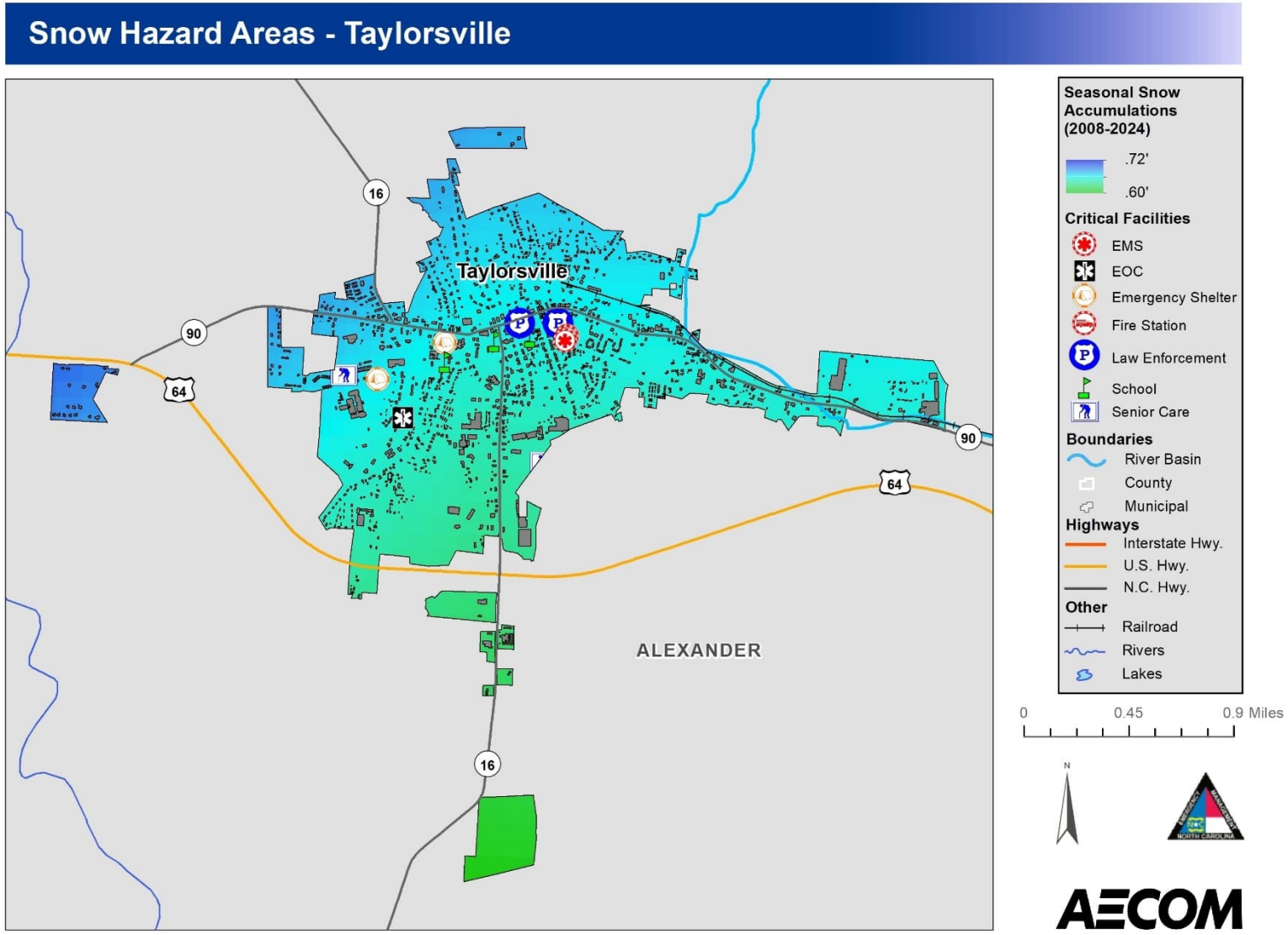


Figure 4- 50: Snow Hazard Areas for Taylorsville

Snow Hazard Areas - Connelly Springs

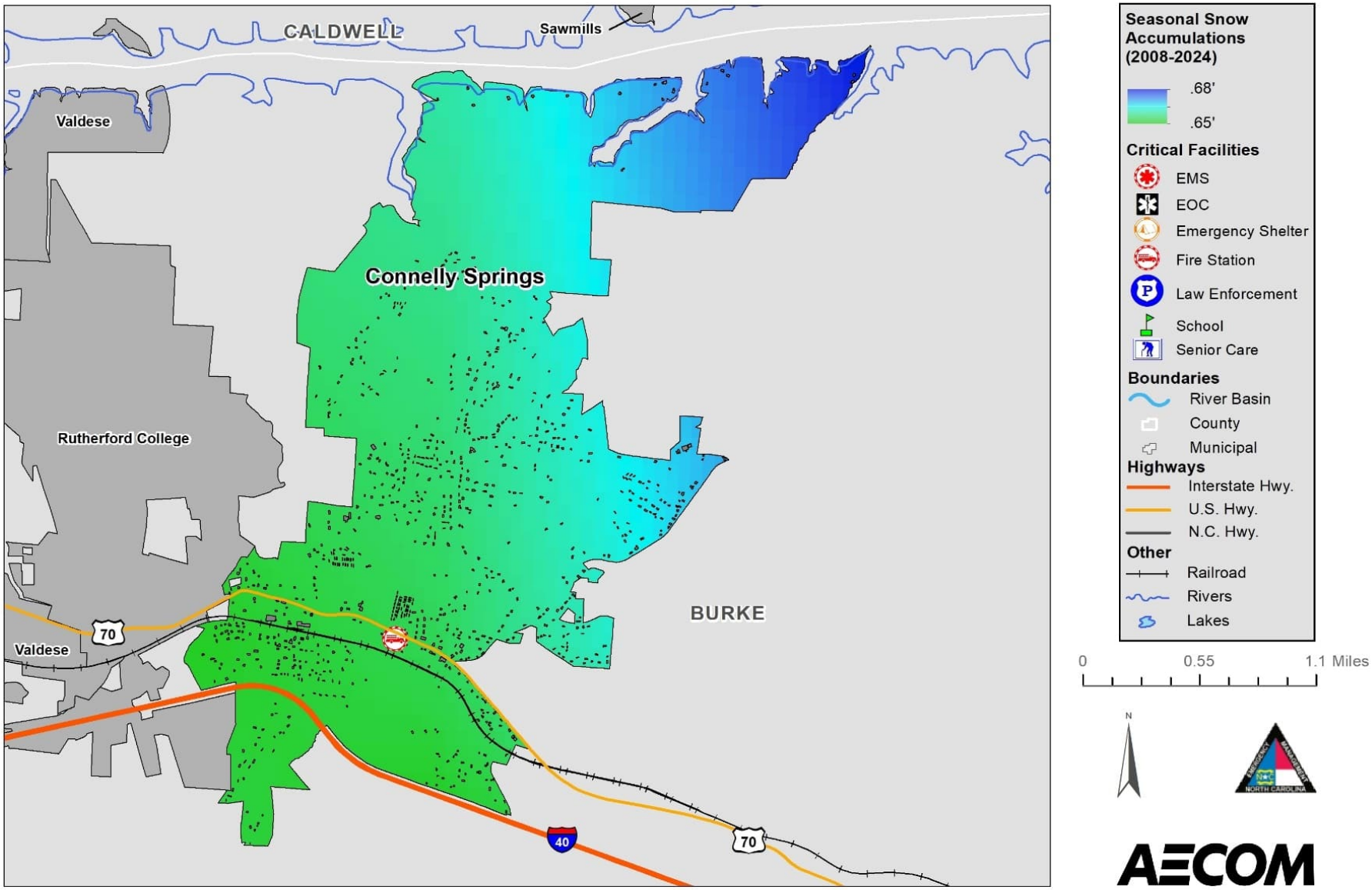


Figure 4- 51: Snow Hazard Areas Connely Springs

Snow Hazard Areas - Drexel

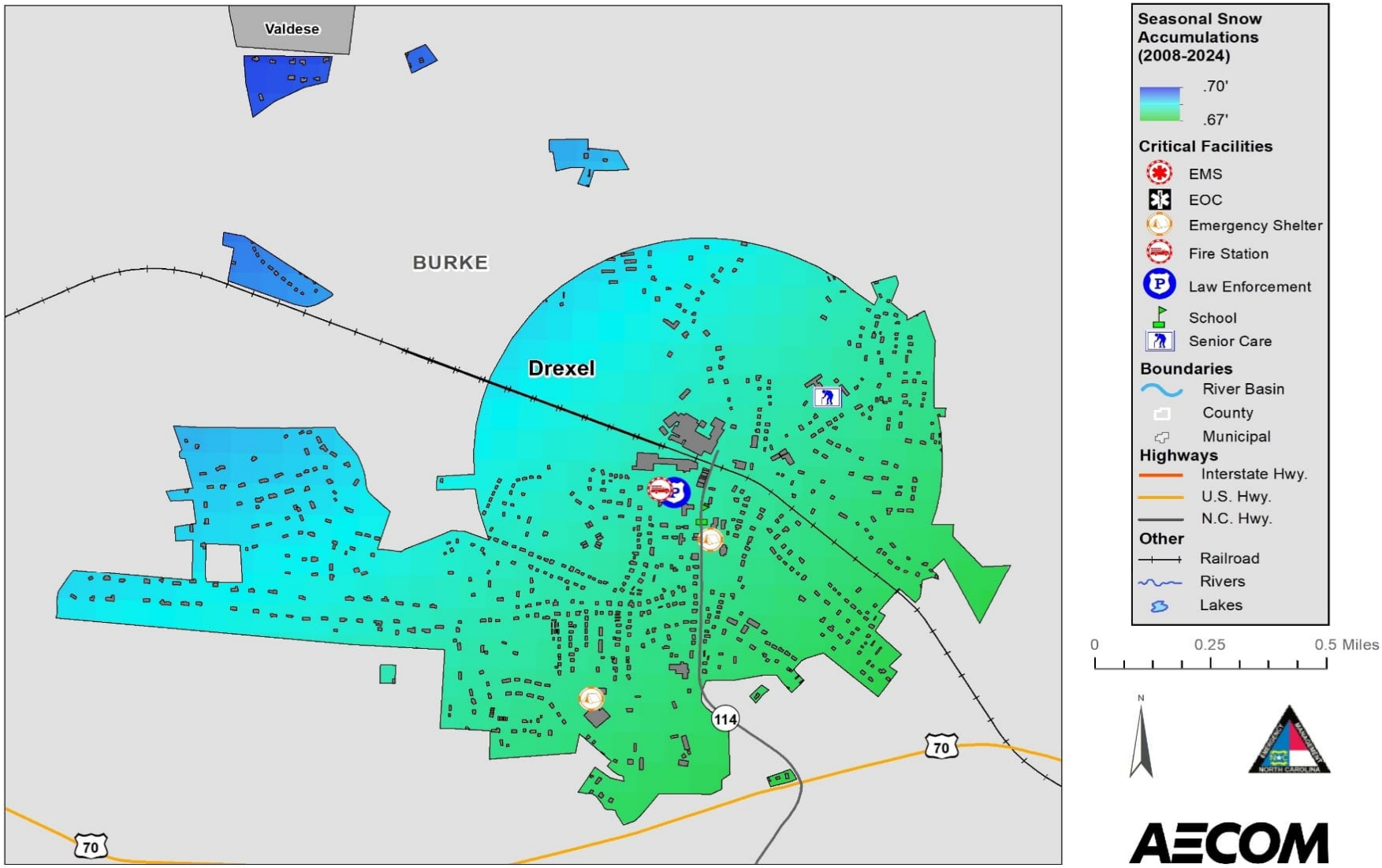


Figure 4- 52: Snow Hazard Areas for Drexel

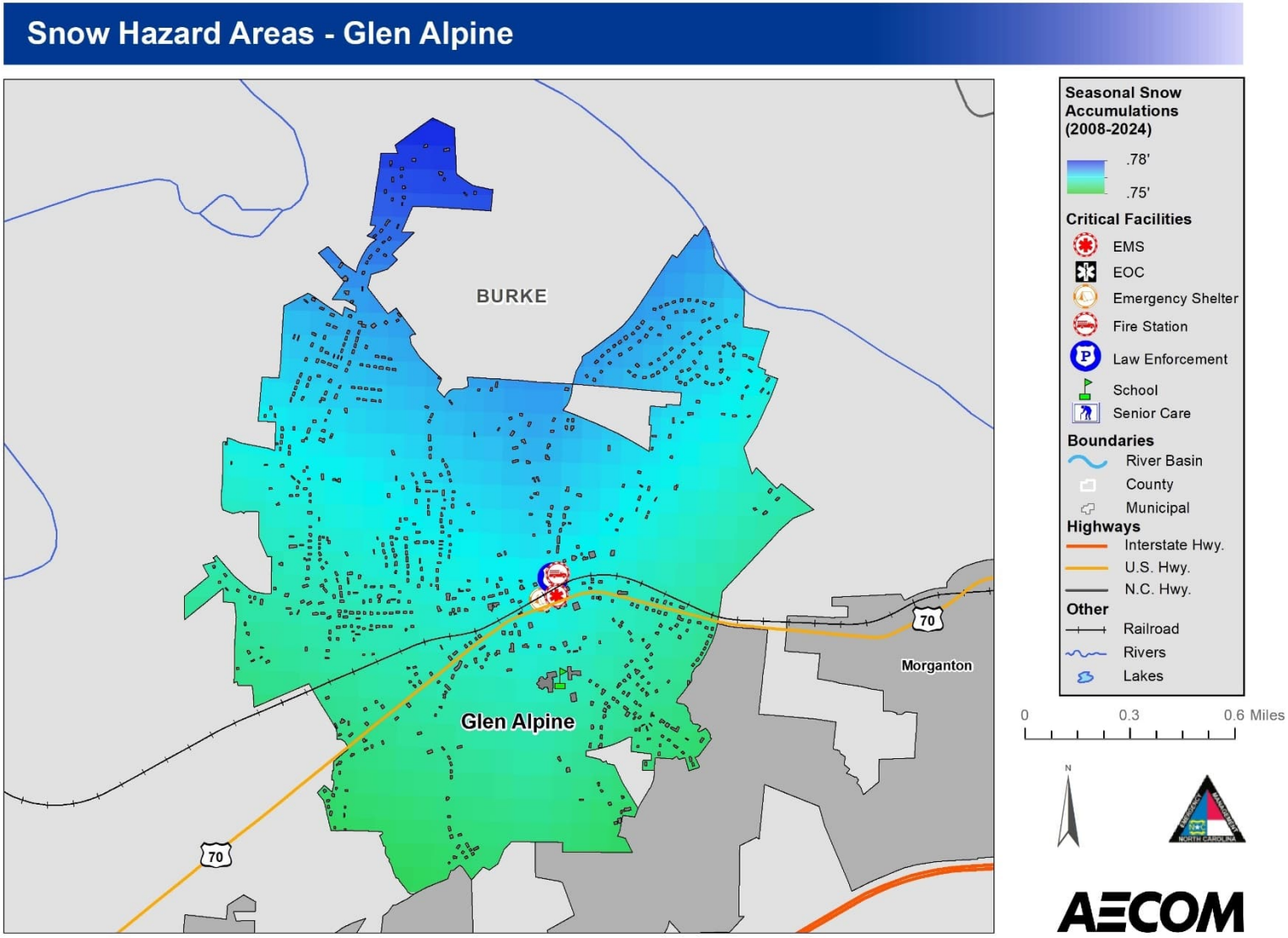


Figure 4- 53: Snow Hazard Areas for Glen Alpine

Snow Hazard Areas - Hildebran

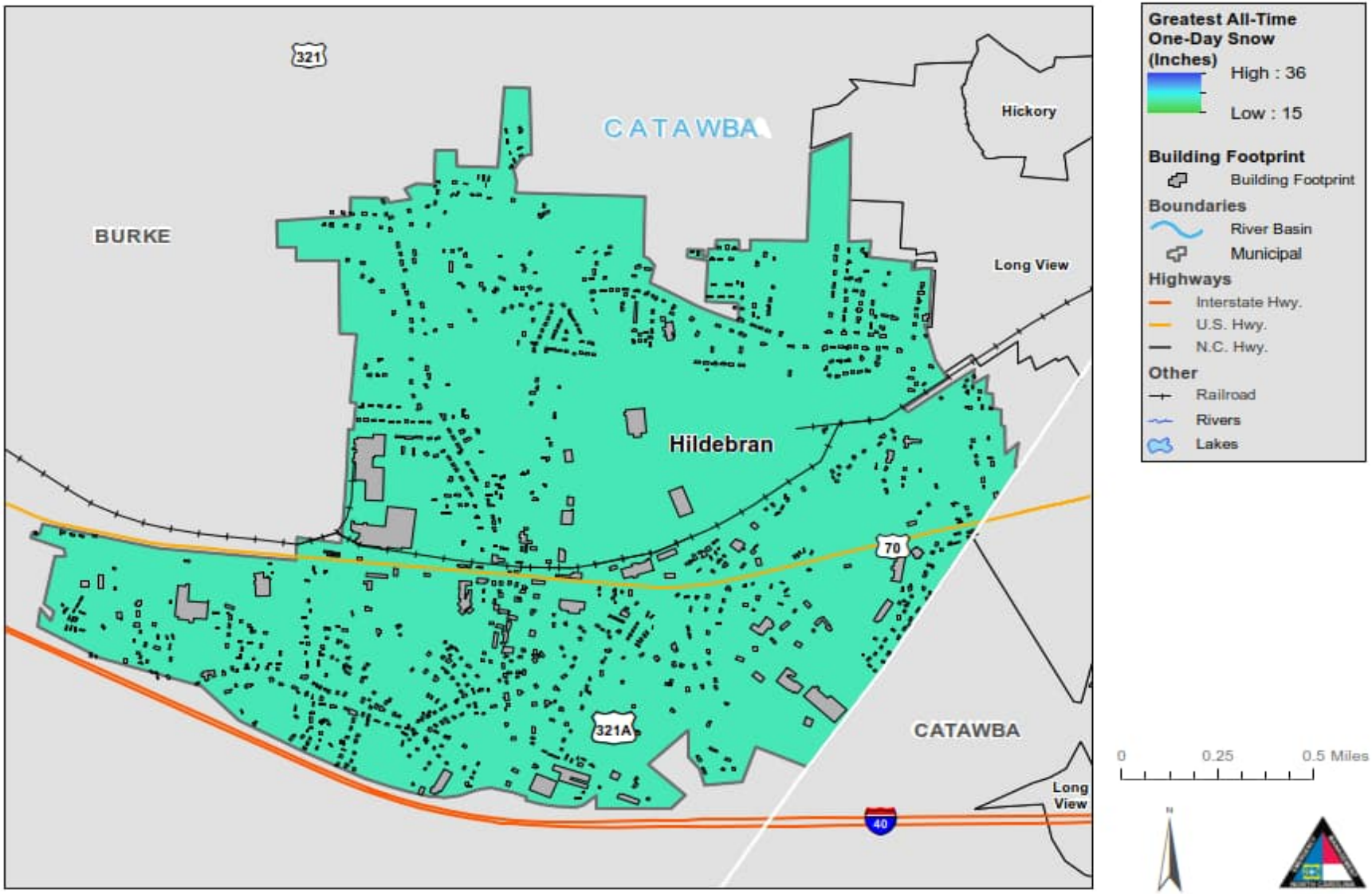


Figure 4- 54: Snow Hazard Areas for Hildebran

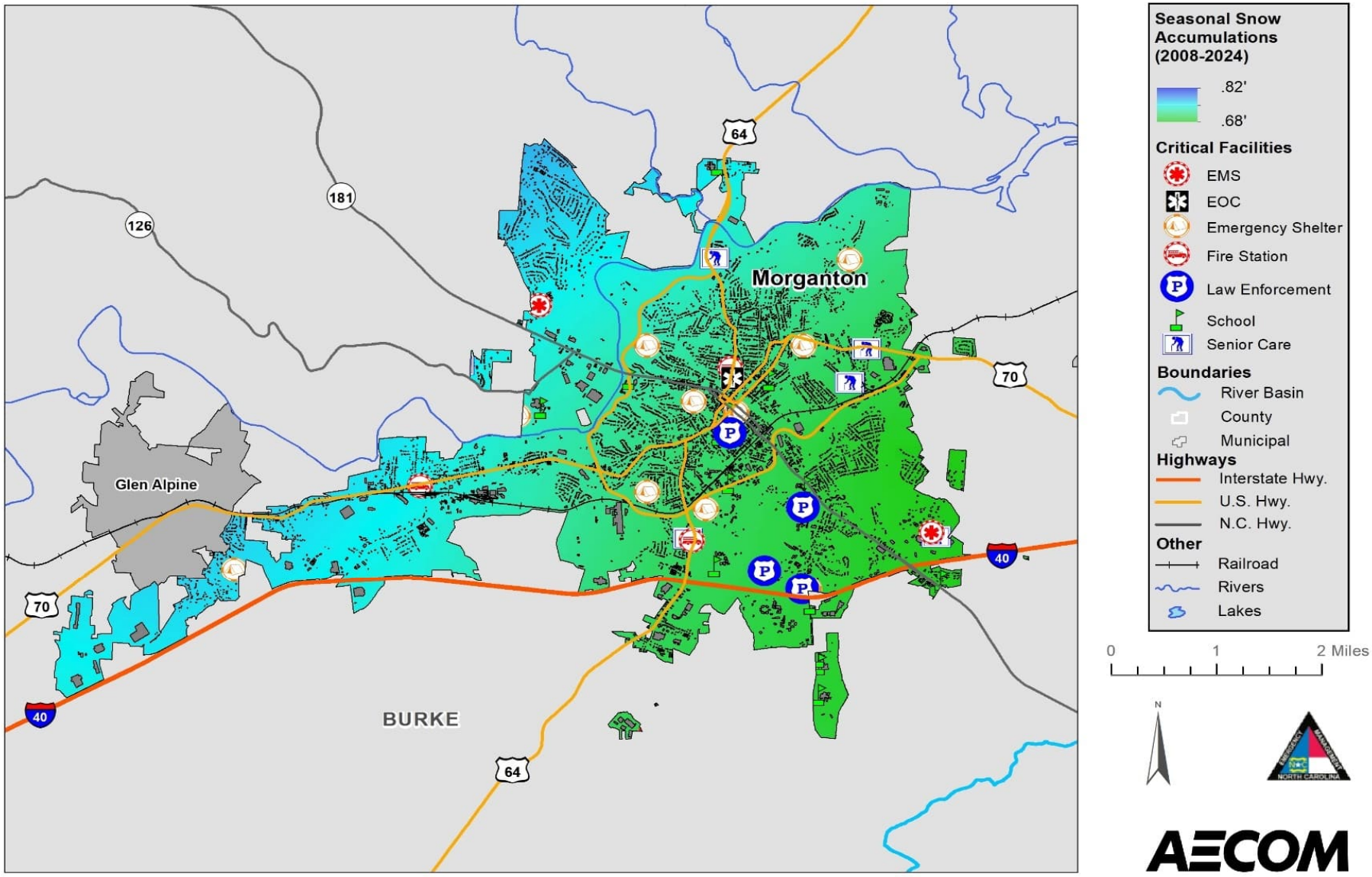


Figure 4- 55: Snow Hazard Areas for Morganton

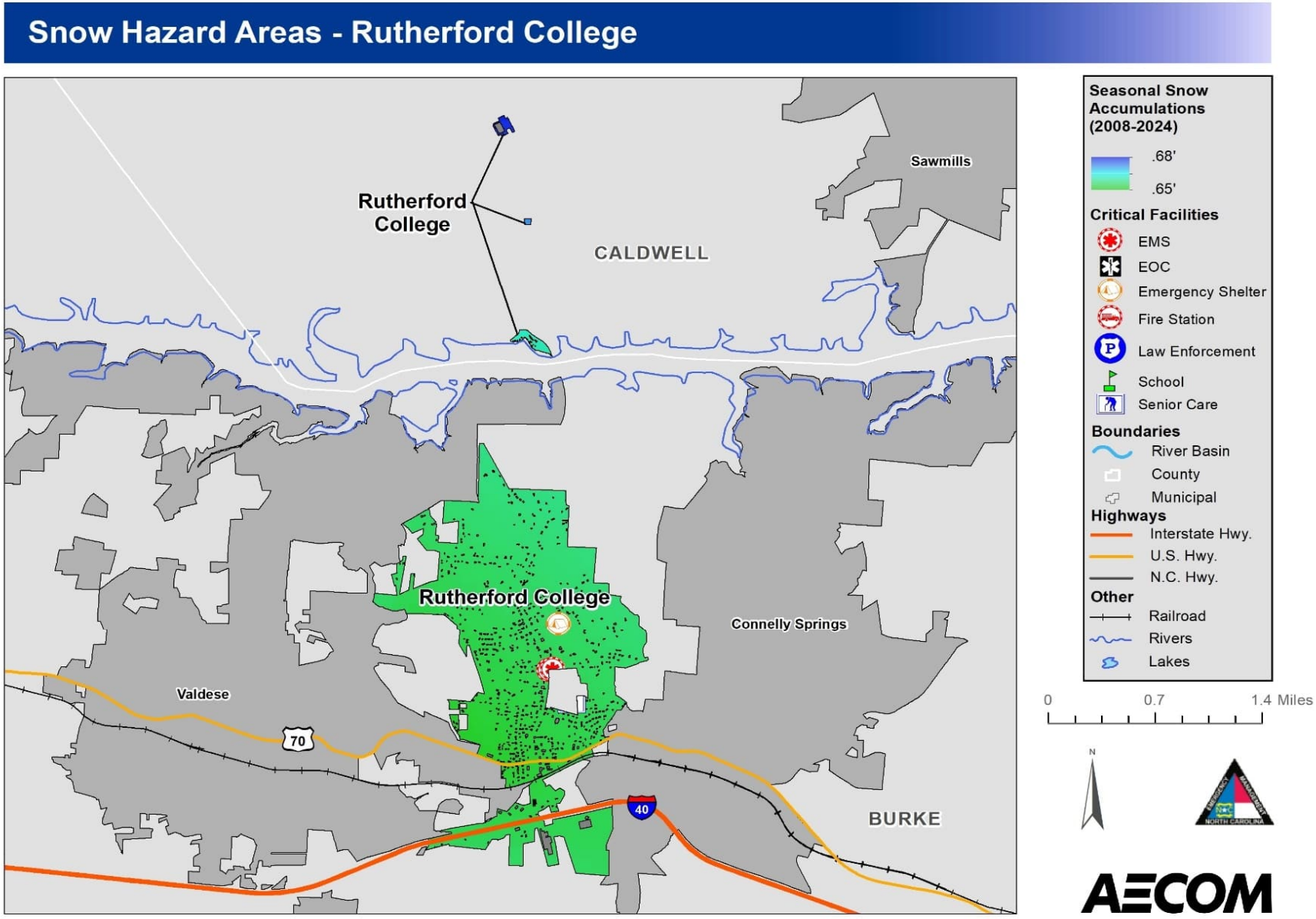


Figure 4- 56: Snow Hazard Areas for Rutherford College

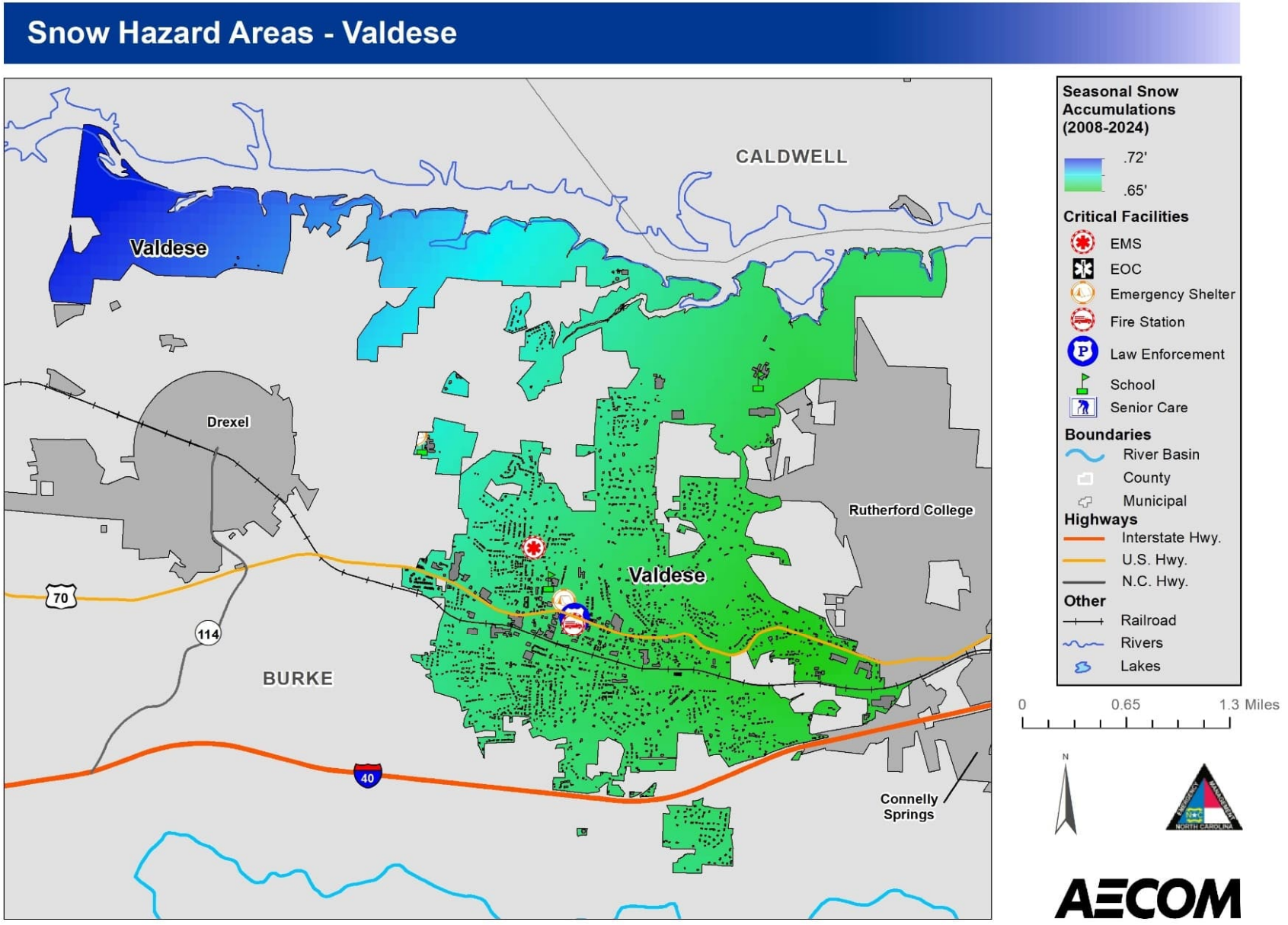


Figure 4- 57: Snow Hazard Areas for Valdese

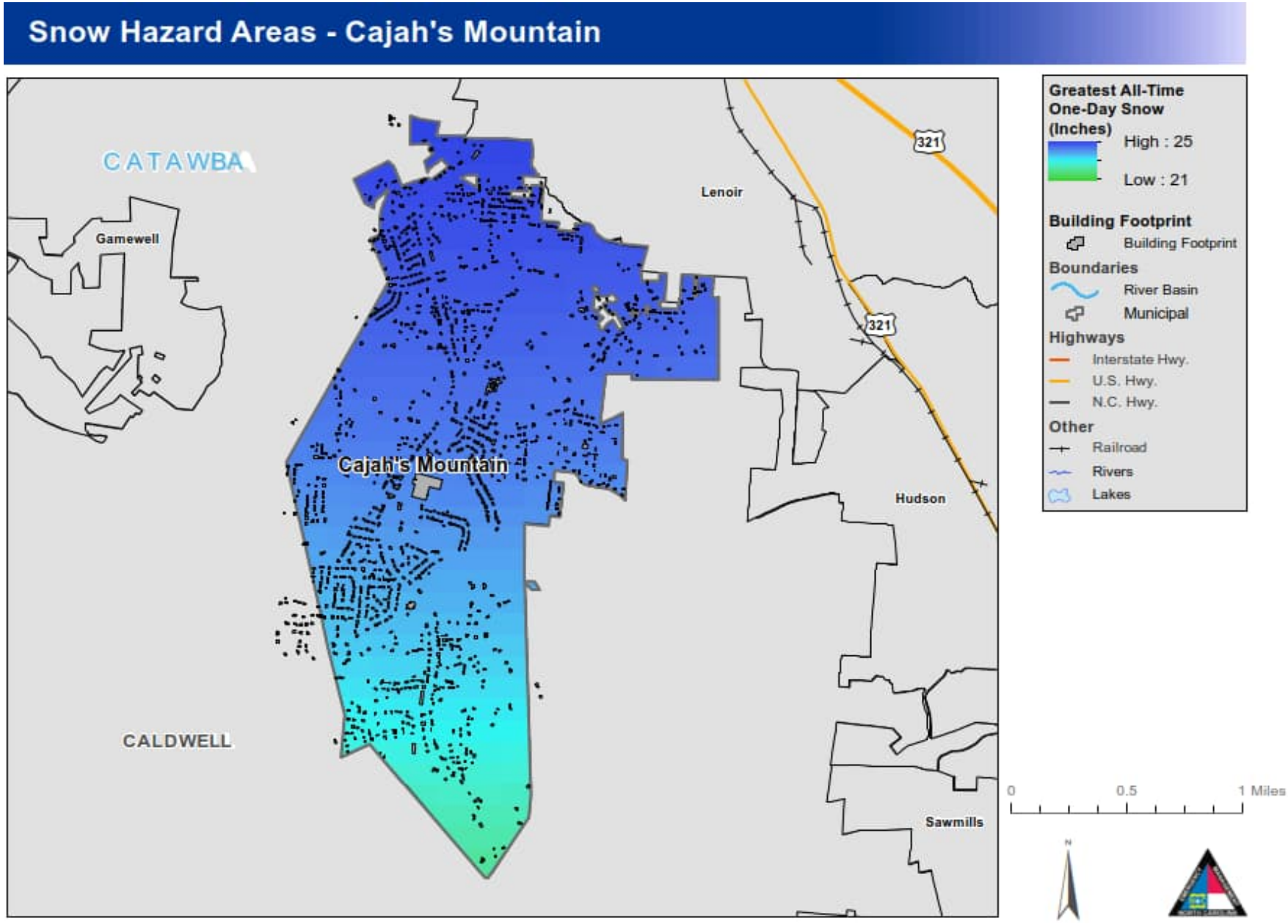


Figure 4- 58: Snow Hazard Areas for Cajah's Mountain

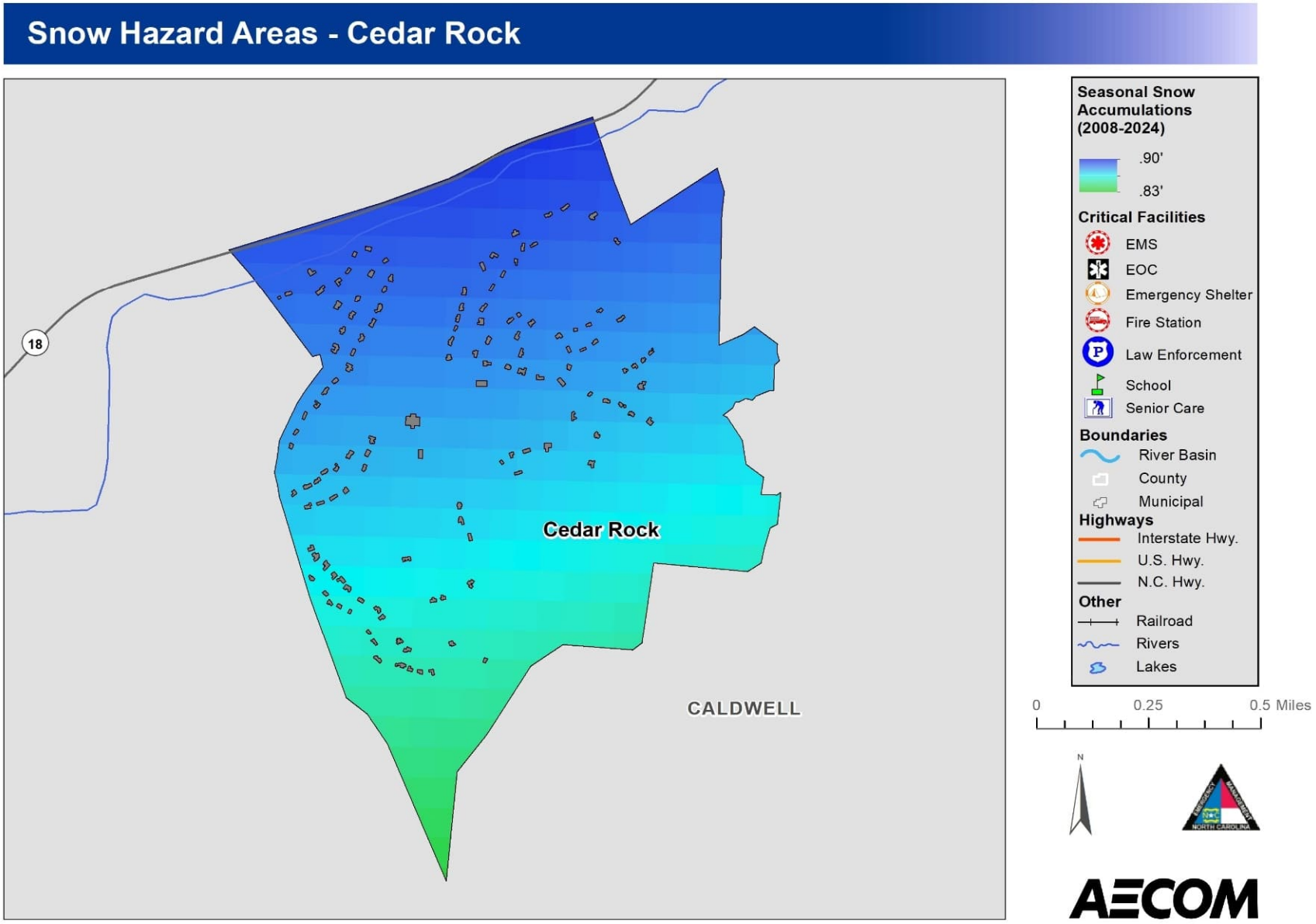


Figure 4- 59: Snow Hazard Areas for Cedar Rock

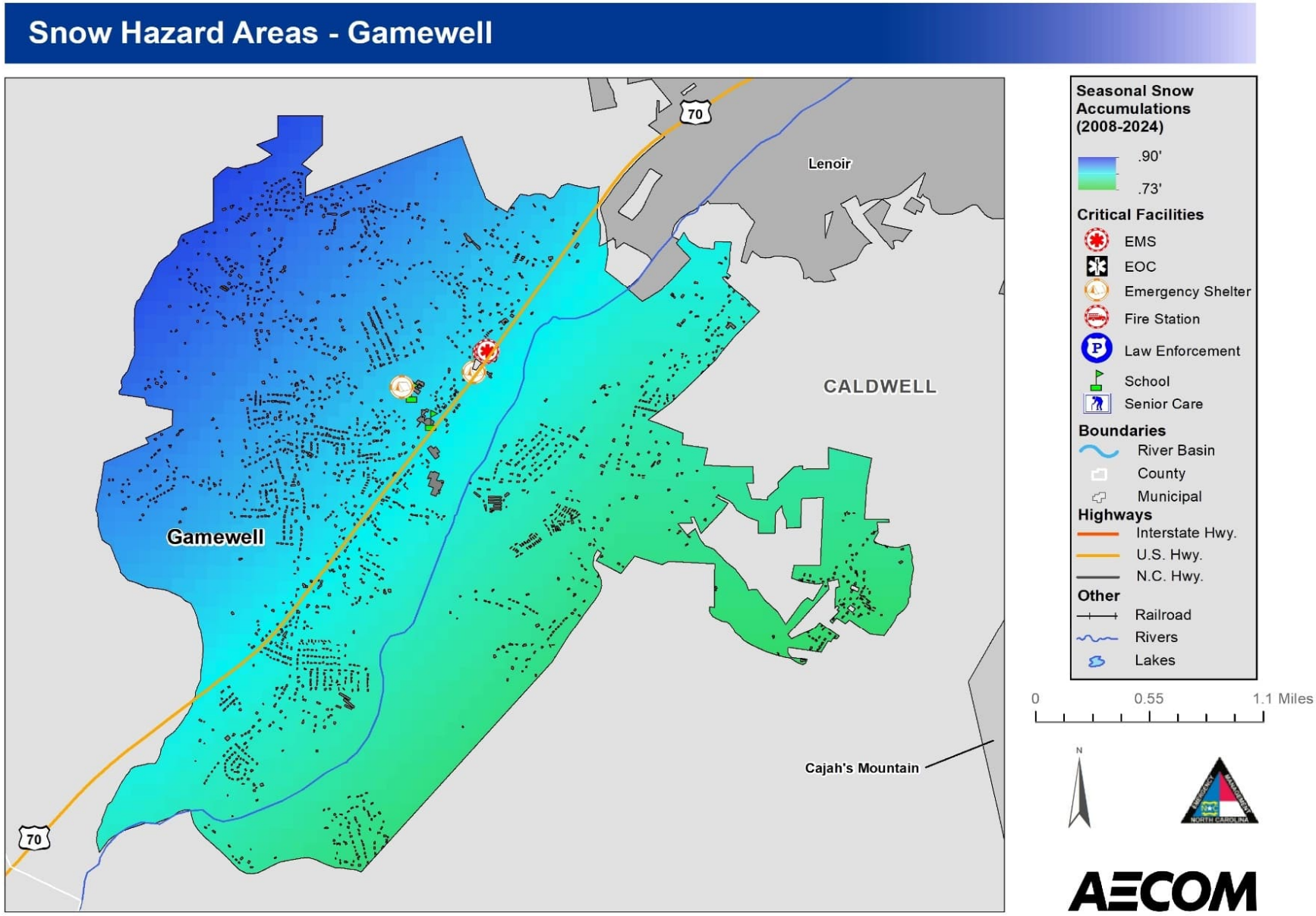


Figure 4- 60: Snow Hazard Areas for Gamewell

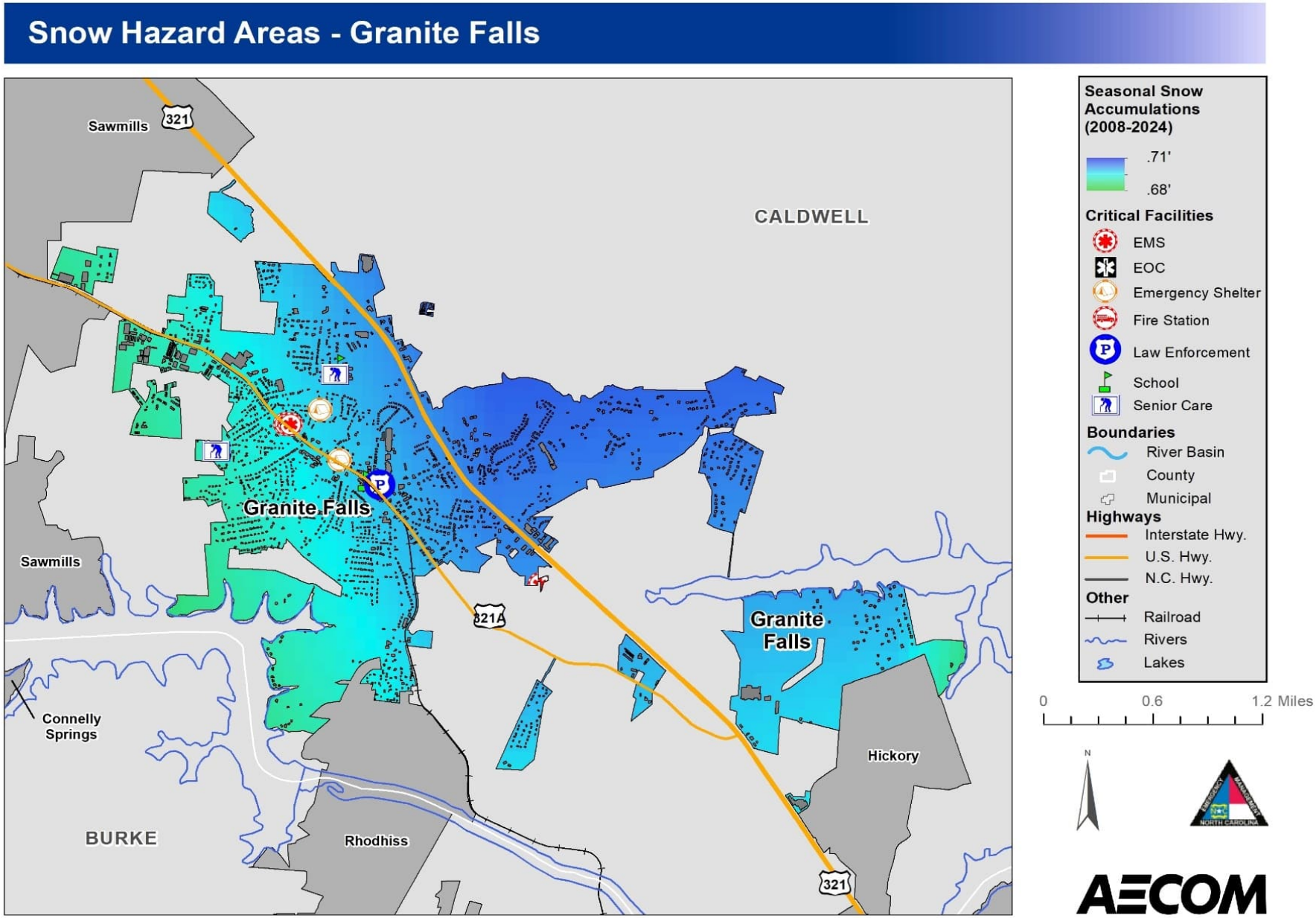


Figure 4- 61: Snow Hazard Areas for Granite Falls

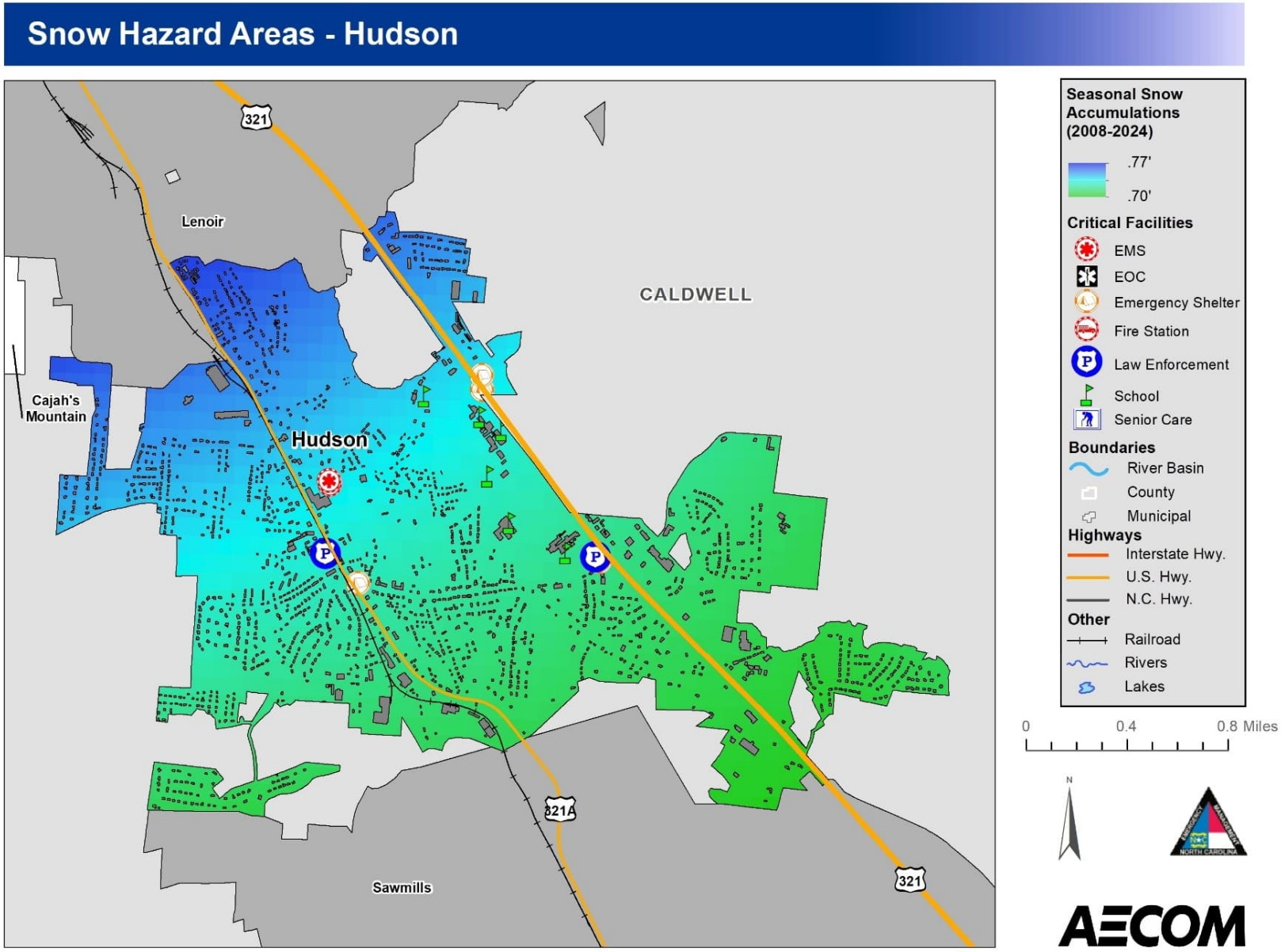


Figure 4- 62: Snow Hazard Areas for Hudson

Snow Hazard Areas - Lenoir

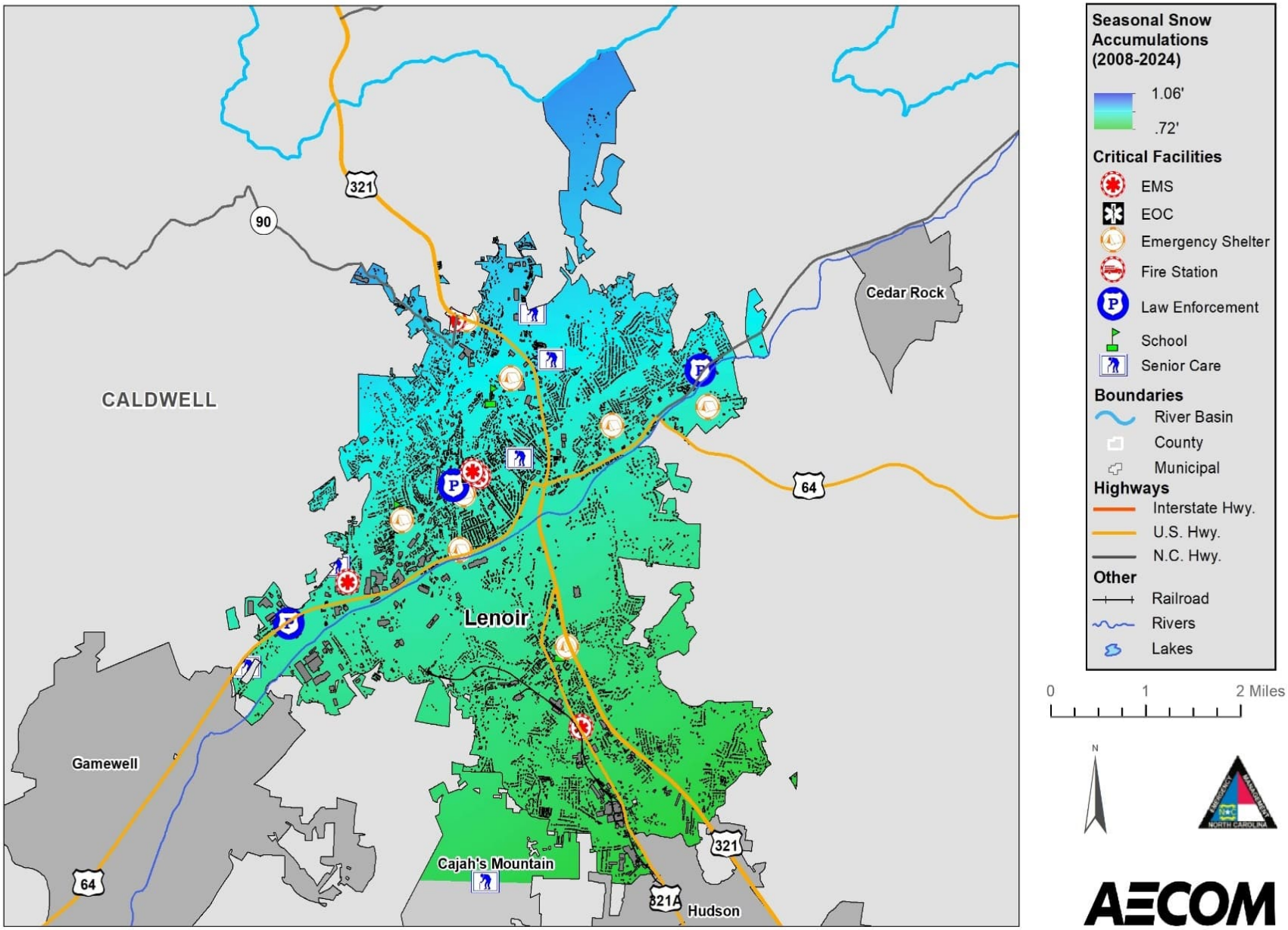


Figure 4- 63: Snow Hazard Areas for Lenoir

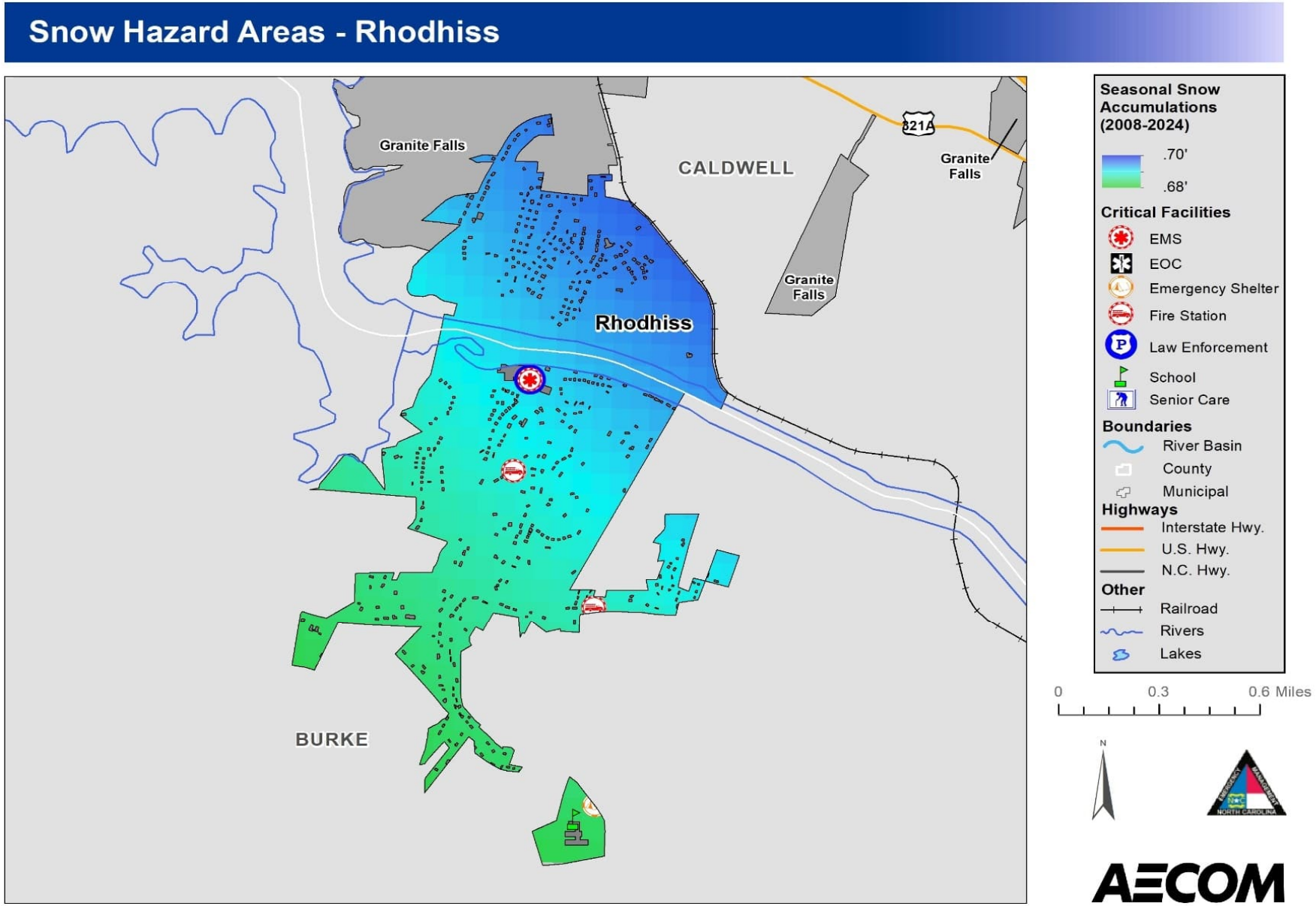


Figure 4- 64: Snow Hazard Areas for Rhodhiss

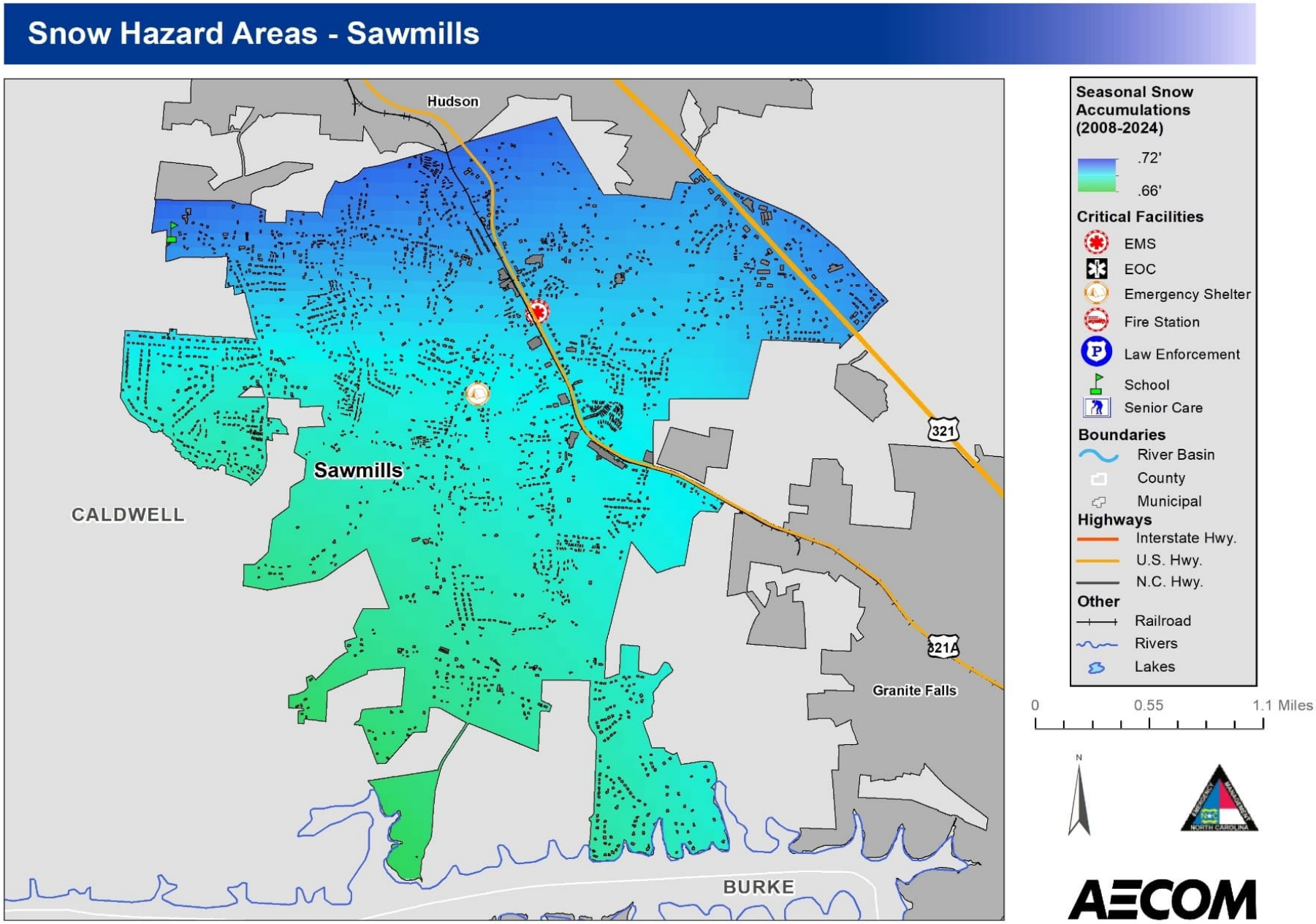


Figure 4- 65: Snow Hazard Areas for Sawmills

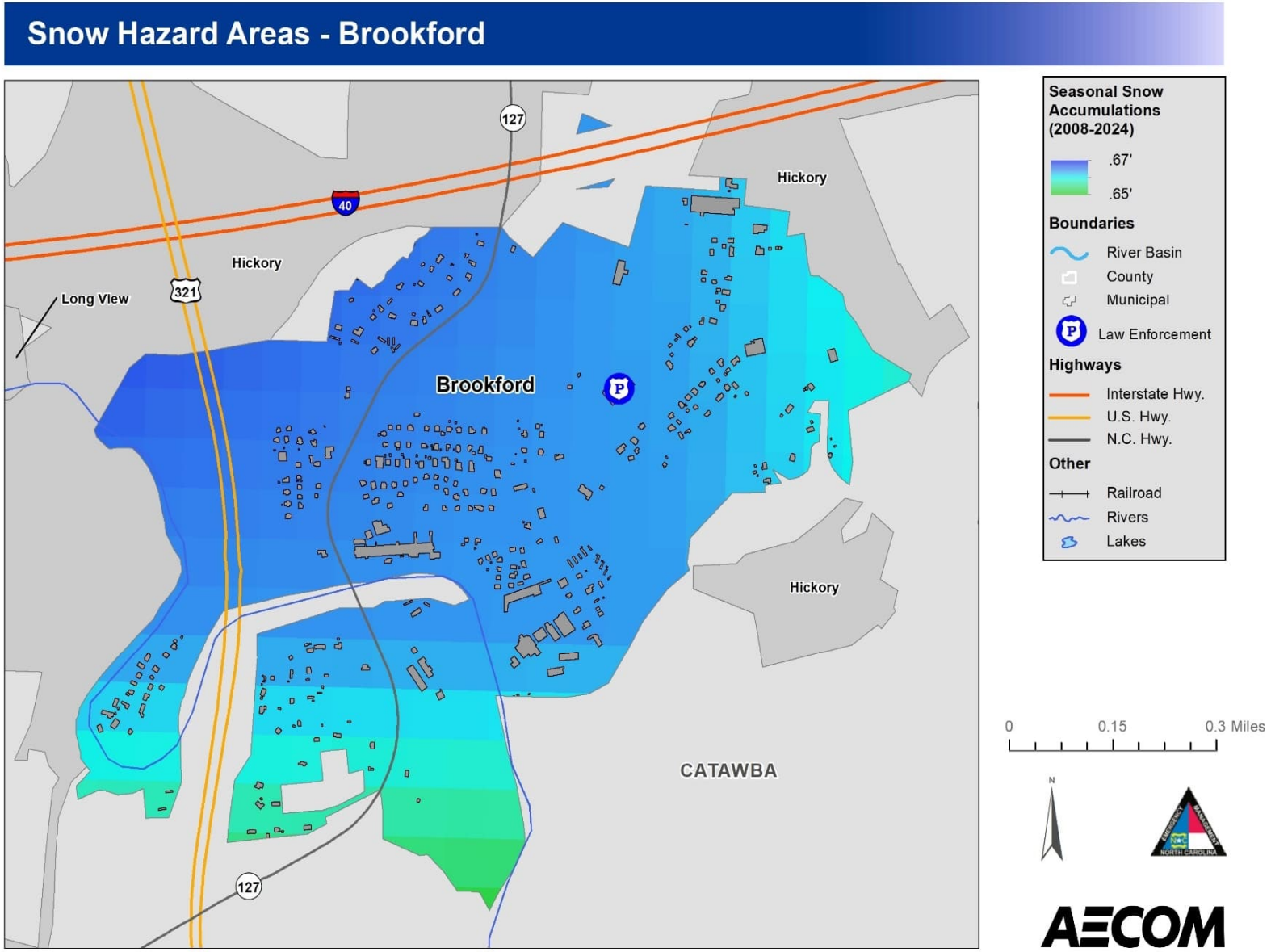


Figure 4- 66: Snow Hazard Areas for Brookford

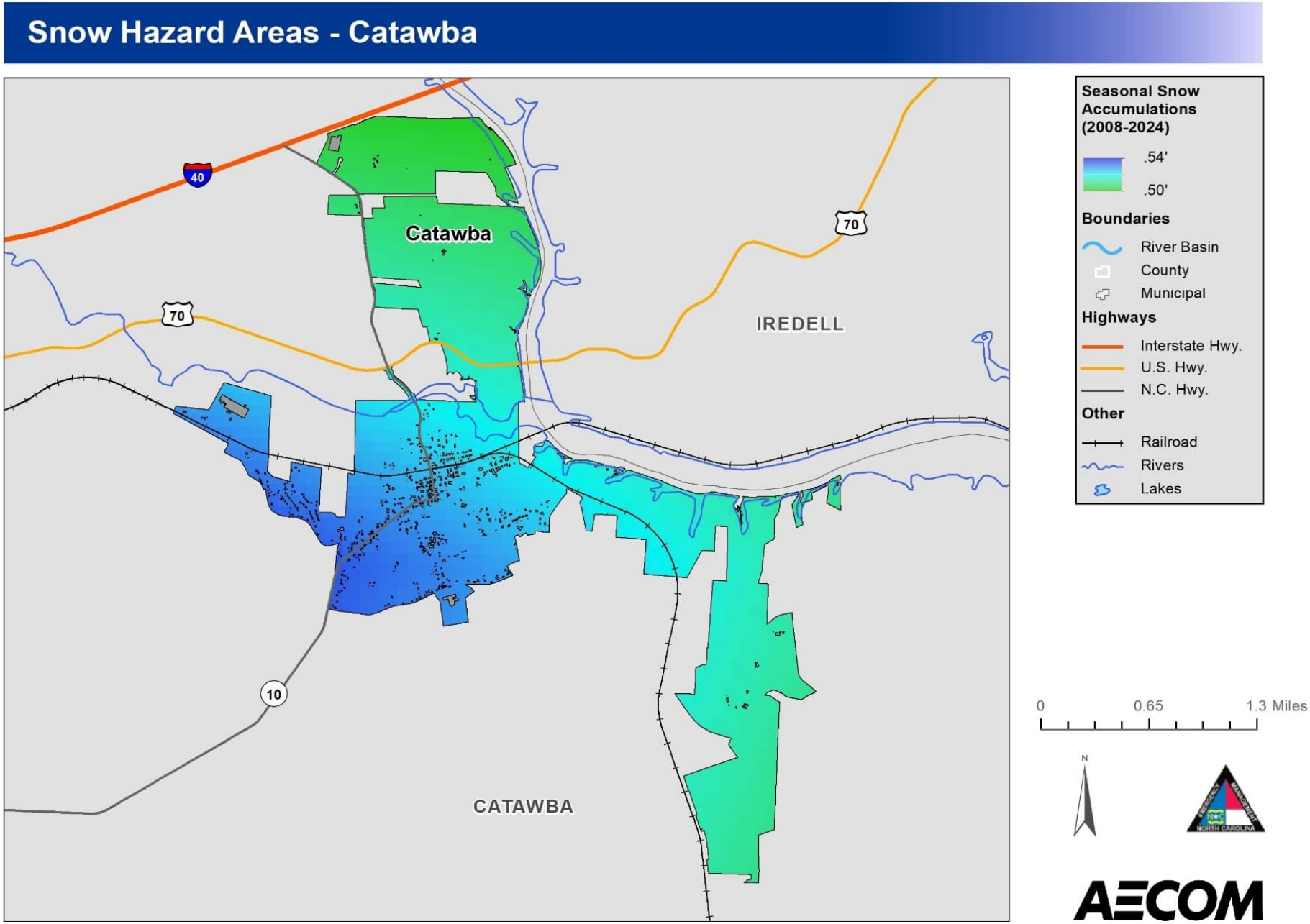


Figure 4- 67: Snow Hazard Areas for Catawba

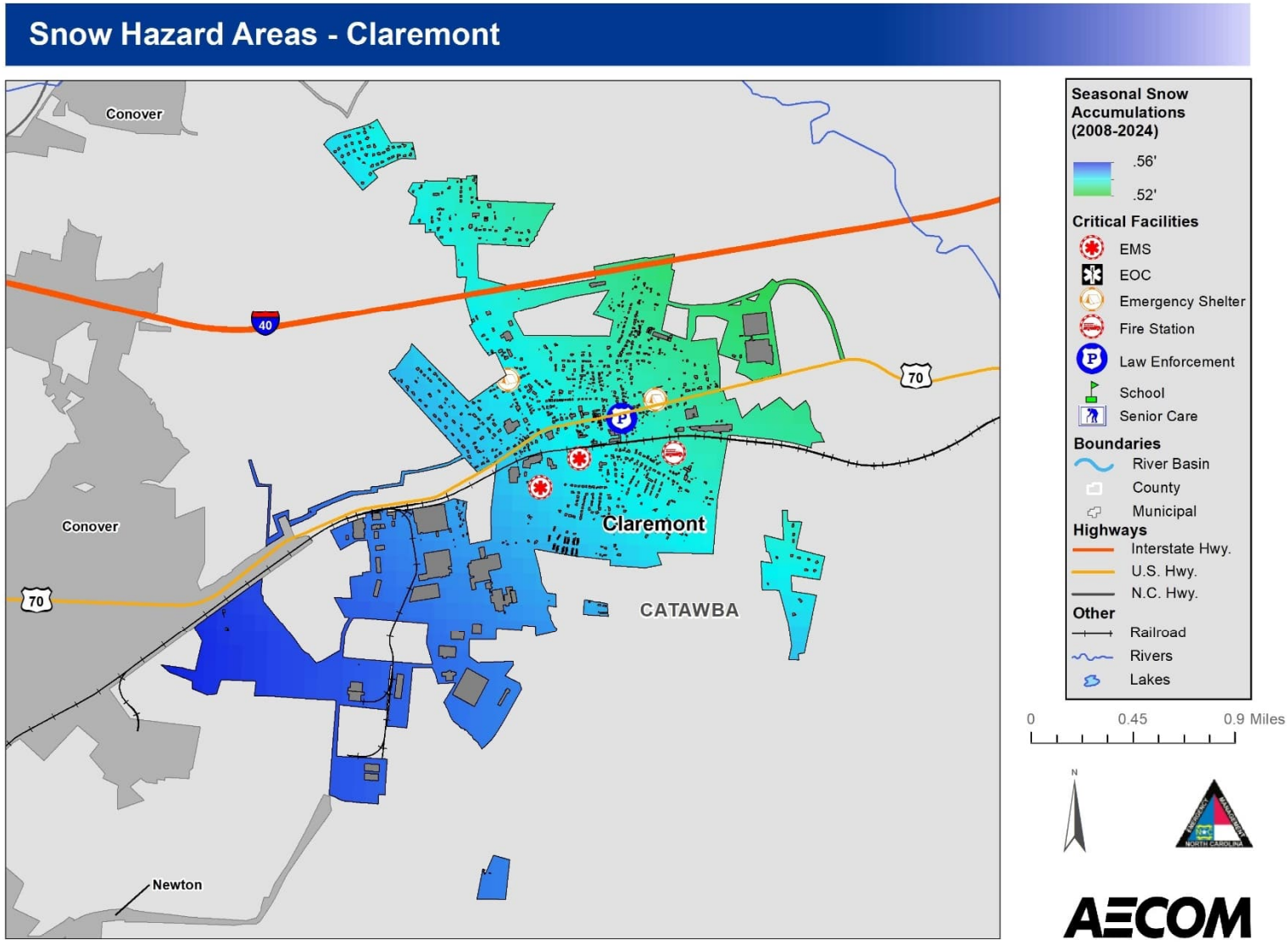


Figure 4- 68: Snow Hazard Areas for Claremont

Snow Hazard Areas - Conover

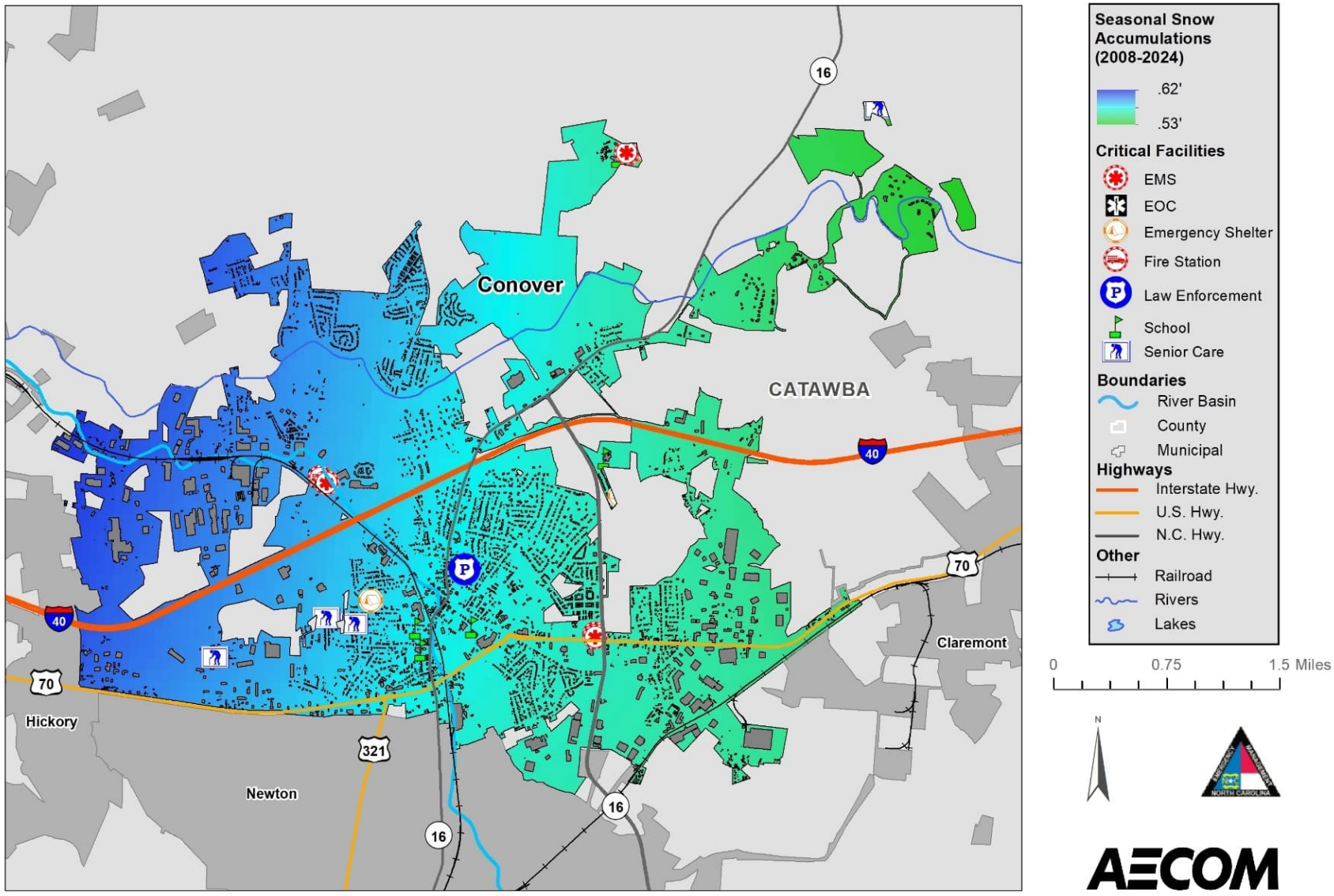


Figure 4- 69: Snow Hazard Areas for Conover

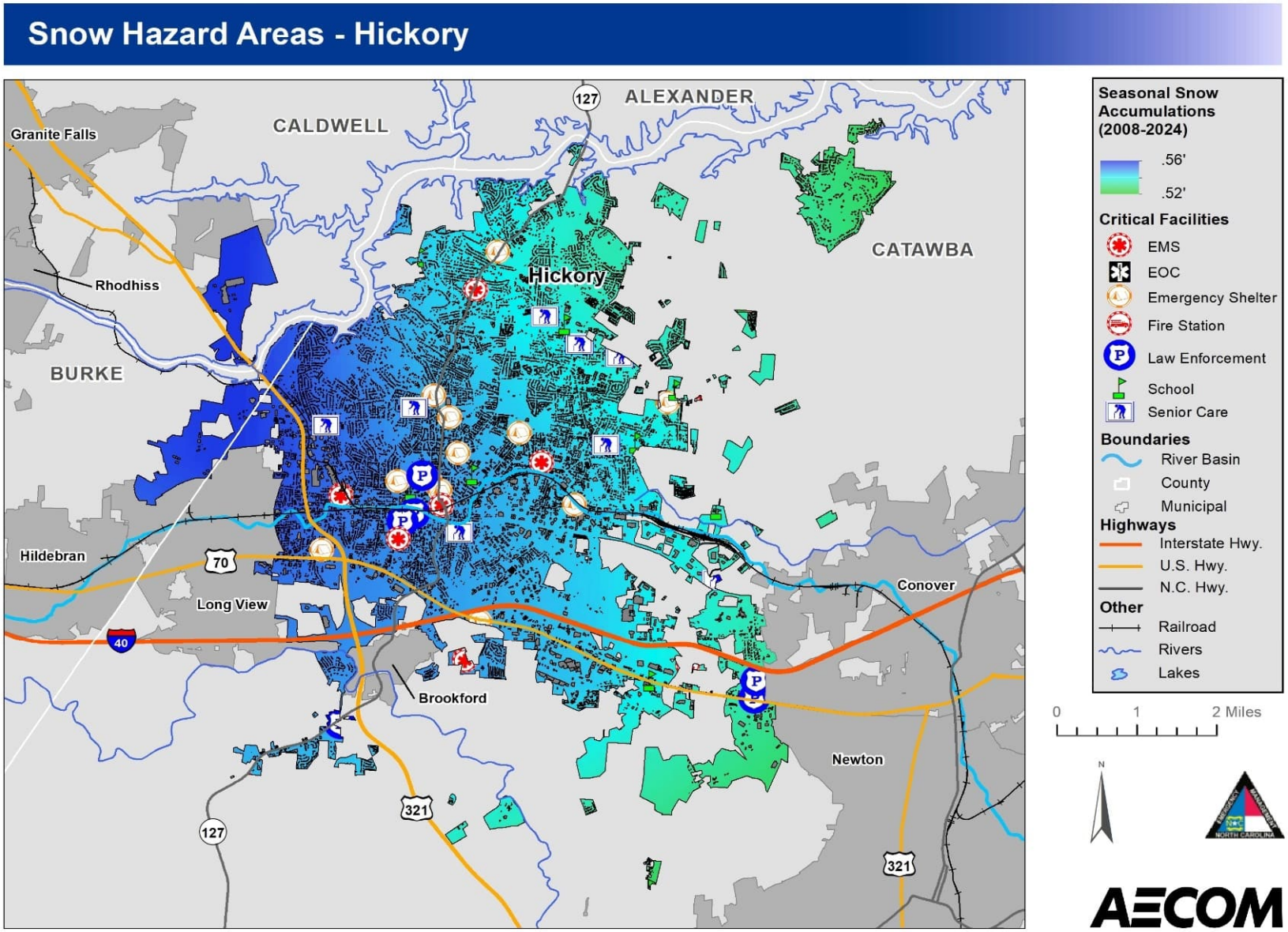


Figure 4- 70: Snow Hazard Areas for Hickory

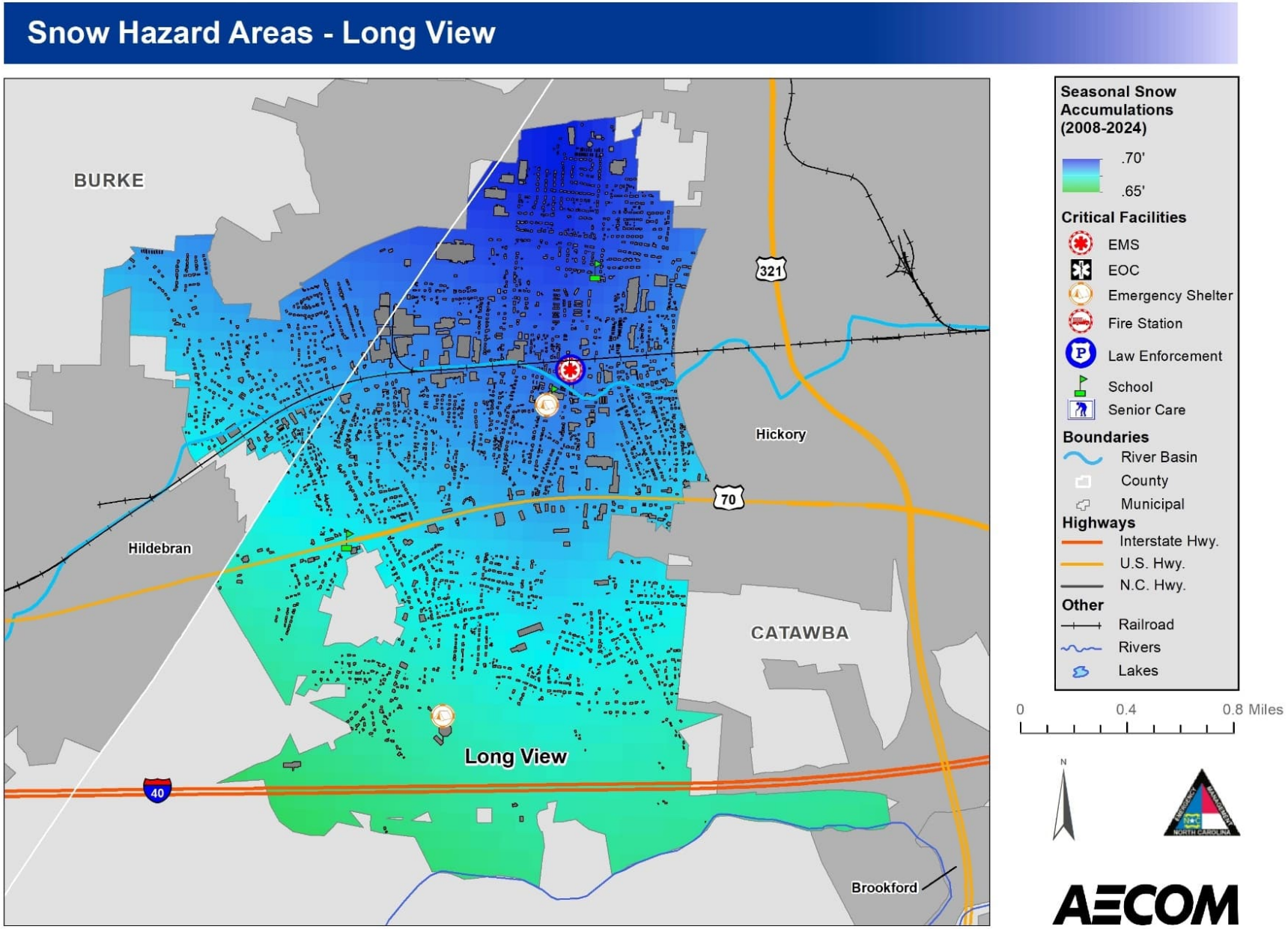


Figure 4- 71: Snow Hazard Areas for Long View

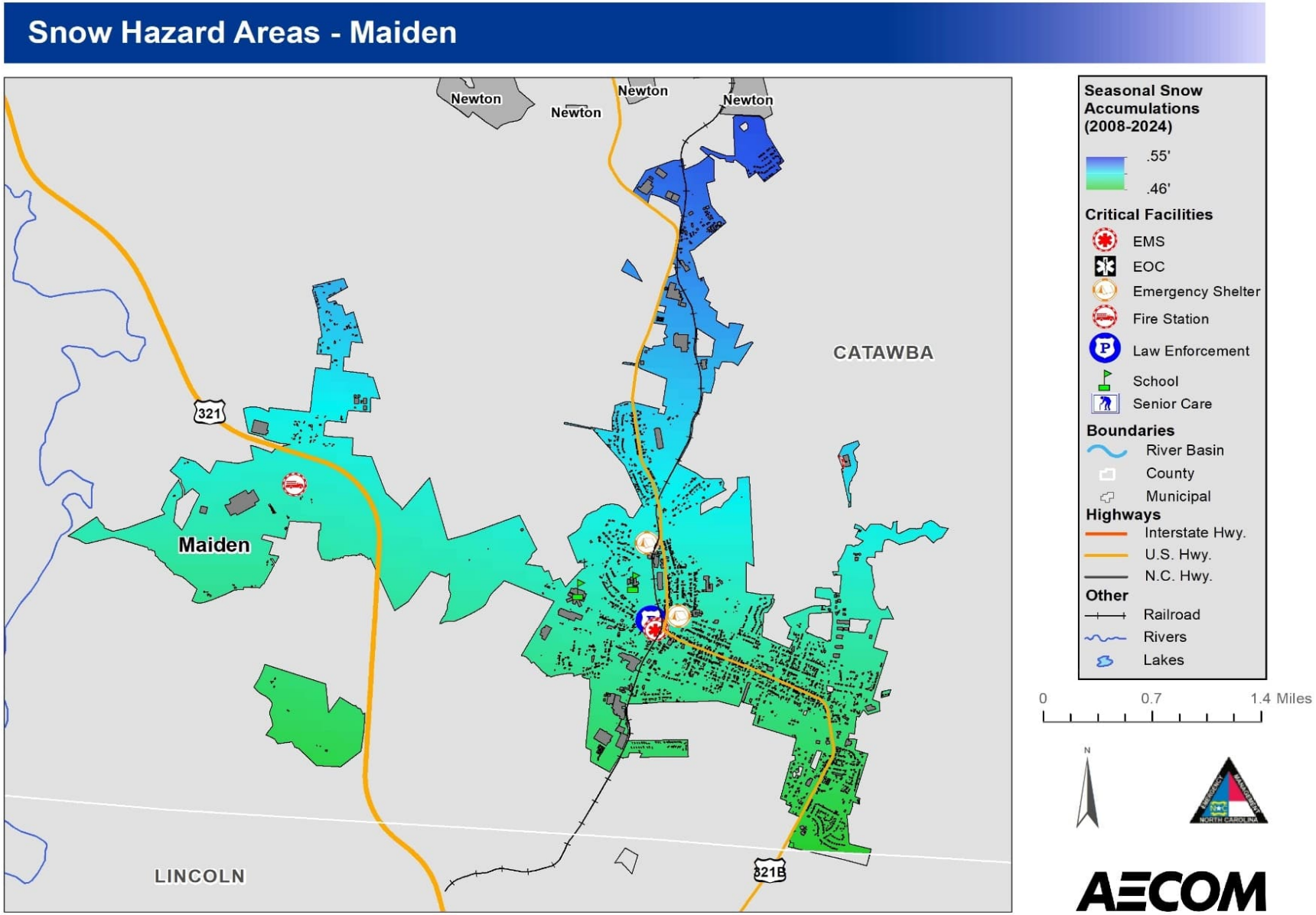


Figure 4- 72: Snow Hazard Areas for Maiden

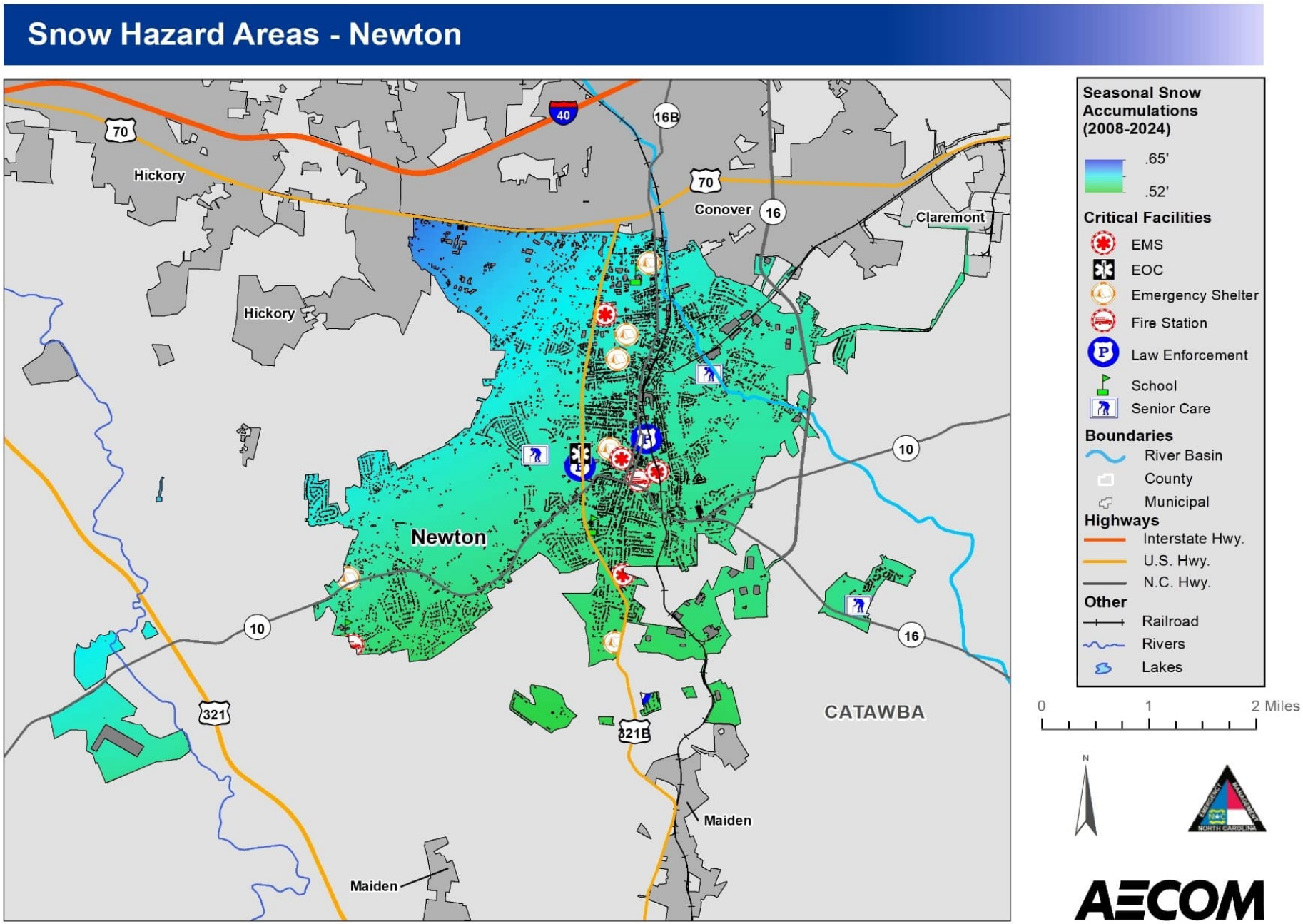


Figure 4- 73: Snow Hazard Areas for Newton

Snow Hazard Areas - Alexander County

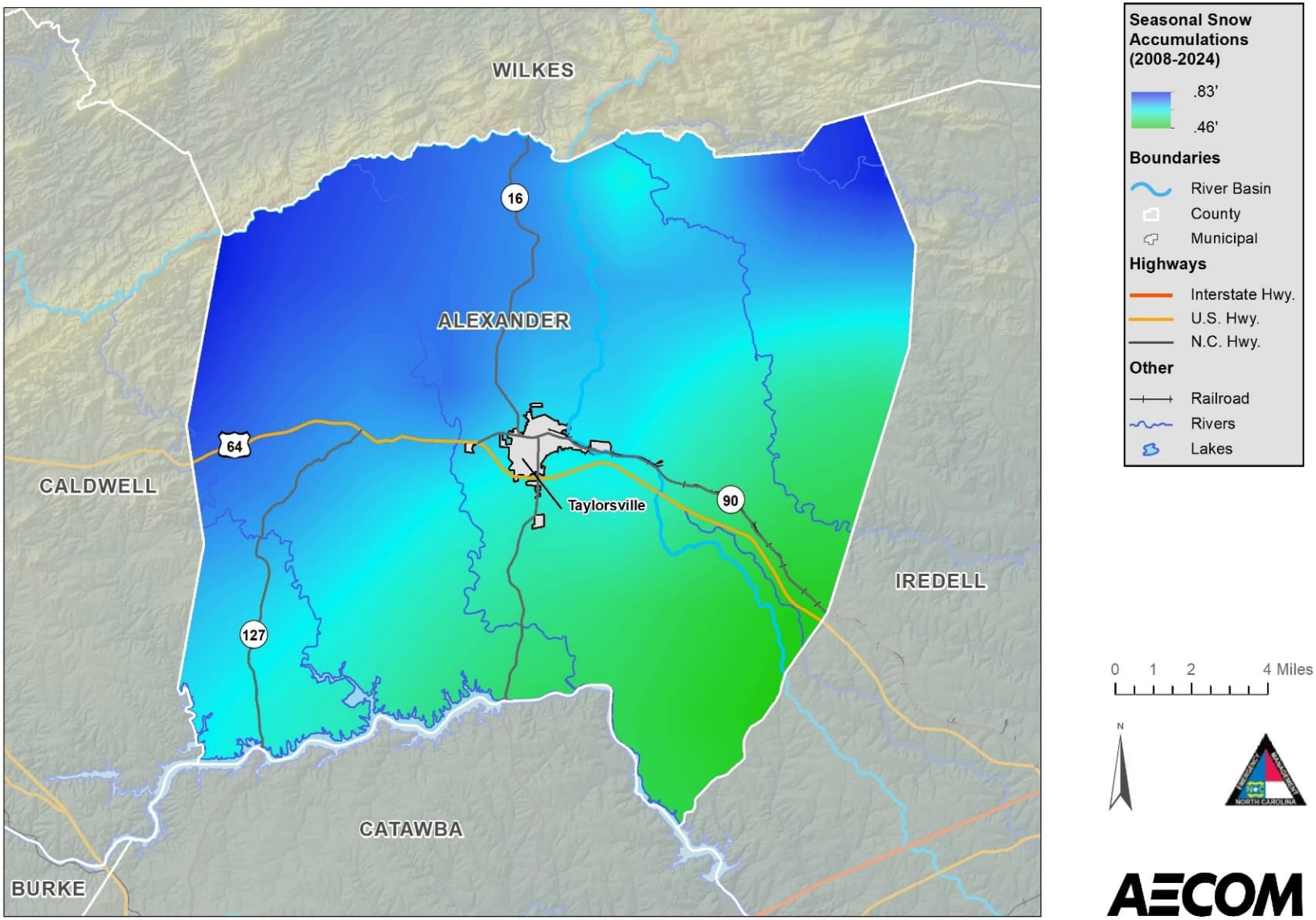


Figure 4- 74: Snow Hazard Areas for Alexander County

4.5.7.3. Extent (Magnitude and Severity)

Definition:

The extent of winter storms can be measured by the amount of snowfall received (in inches).

Extent Event:

The highest recorded event for the planning area occurred in Catawba County in 2004. The area received a total of 12-22 inches of snow across the county with the rate of snowfall at 3-4 incher per hour. This event created an estimated $2,000 in property damage. Alexander (Zone), Burke (Zone), Caldwell (Zone) and Catawba (Zone) include all jurisdictions.

4.5.7.4. Historical Occurrences

The Appendix A contains a table with all recorded events of heavy snow, winter weather, and winter storms from 2018-2023, but the notable accounts of heavy snow in the Unifour counties are summarized below from the NCDC Storm Events database event narratives, unless sources are otherwise specified.

Alexander, Caldwell, Burke, and Catawba (12/8/2018):

NCDC Episode Narrative: *Snow developed across northwest North Carolina around midnight the morning of the 9th and began accumulating quickly. Moderate to heavy snow continued through the morning of the 9th before tapering off during the early afternoon. Storm total accumulations were generally in the 10-to-15-inch range, with slightly lower amounts south of I-40, and locally higher amounts across the mountains, particularly the high peaks along the Blue Ridge, where more than two feet fell. Travel was paralyzed across this area for a couple of days.*

A high-pressure system brought cold air over the state and brought temperatures at or below freezing for 2/3 of the state and in the mountains accumulations of over ten inches of snow were reported, while northern parts of the state received more than a foot of snow and well above the average annual snowfall due to the event[17].

Burke and Caldwell (1/8/2021):

Snow developed across western North Carolina around midnight and continued through the morning of the 8th as an area of low pressure moved across the coastal plain of Georgia and the Carolinas. Heavy snow accumulations were reached across much of the northern mountains during the late morning before the snow tapered off to scattered snow showers and flurries throughout the afternoon and evening. Total accumulations ranged from 3 to 6 inches across this area, with locally higher totals of as much as 8 inches reported above 4500 feet.

Alexander, Caldwell, Burke, Catawba (1/16/2022)

Moisture overspread the North Carolina foothills and far western Piedmont early on the 16th as strengthening low pressure moved across the Deep South. Strong northeast winds supplied ample cold air for the precipitation to begin as light snow across much of the foothills. Snow continued into the overnight, becoming moderate to occasionally heavy, with snowfall rates of up to an inch per hour reported. Heavy snowfall criteria of 2 to 4 inches were reached in many areas by sunrise, with accumulating snow continuing through the morning hours before tapering off to occasional snow showers during the afternoon and evening. Total snow accumulations ranged from 5 to 10 inches across much of the area, with locally higher amounts along the eastern Blue Ridge escarpment. Travel was difficult to nearly impossible throughout the 16th and much of the 17th.

4.5.7.5. Probability of Future Occurrences

County		Alexander	Catawba	Burke	Caldwell
EAL	Value	$24,000	$95,000	$57,000	$55,000
	Rating	Relatively Low	Relatively Moderate	Relatively Moderate	Relatively Moderate
Risk Index	Score	33.8	68.7	56.5	54.8
	Rating	Relatively Low	Relatively Moderate	Relatively Low	Relatively Low
Frequency (Events per Year)		2.4	2.2	2.7	2.8
Historic Loss Ratio		Relatively Low	Relatively Low	Very Low	Very Low

Table 4- 39: NRI EAL, Risk Index Values, expected frequency, and Historic Loss Ratio for Winter Weather

The probability of future Snow is shown in the table below, by jurisdiction.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Medium**
Burke County (Unincorporated Area)	**Medium**

Jurisdiction	Probability of Future Occurrence
Caldwell County (Unincorporated Area)	Medium
Catawba County (Unincorporated Area)	Medium
City of Claremont	Medium
City of Conover	Medium
City of Hickory	Medium
City of Lenoir	Medium
City of Morganton	Medium
City of Newton	Medium
Town of Brookford	Medium
Town of Cajah's Mountain	Medium
Town of Catawba	Medium
Town of Connelly Springs	Medium
Town of Drexel	Medium
Town of Gamewell	Medium
Town of Glen Alpine	Medium
Town of Granite Falls	Medium
Town of Hildebran	Medium
Town of Hudson	Medium
Town of Long View	Medium
Town of Maiden	Medium
Town of Rhodhiss	Medium
Town of Rutherford College	Medium

Jurisdiction	Probability of Future Occurrence
Town of Sawmills	**Medium**
Town of Taylorsville	**Medium**
Town of Valdese	**Medium**
Village of Cedar Rock	**Medium**

4.5.7.6. Snow Hazard Vulnerability

All the inventoried assets in the Unifour Region are exposed to potential winter weather. Any specific vulnerabilities of individual assets would depend greatly on individual design, building characteristics (such as a flat roof), and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future updates. A qualitative factor in terms of vulnerability is a general lack of awareness on the part of county residents in preparing for and responding to winter storm conditions, such as snow in a manner that will minimize the danger to themselves and others. This lack of awareness is especially apparent when driving/roadway conditions catch motorists off-guard. Potential losses associated with winter storms, such as snow include the cost of the removal of snow from roadways, debris clean-up, and some indirect losses from power outages, etc. All future structures and infrastructure in the region will be vulnerable to winter storms.

4.5.7.7. Climate Change

The uncertainty associated with potentially changing climate conditions creates unpredictability for future severe winter storms and their accompanying snowfall. While rising global temperatures are likely to cause shorter and warmer winters in many areas, there is also the possibility that the likelihood of dangerously low temperatures may increase due to continuing trends of temperature extremes. Warmer winters, however, mean that precipitation that would normally fall as snow may begin to fall as rain or freezing rain instead.

According to the North Carolina Climate Science Report, it is very likely that total snowfall in the state will decrease, and it is also likely that the number of heavy snowstorms will decrease. Analysis of snowfall at North Carolina weather observing stations with long records found decreasing trends over the period of 1930–2007 at most stations, especially those outside of the mountainous region in the west of the state.

However, some global climate models predict an increase in the number of winter storms under higher emissions scenarios, but even if there were increases in the frequency or intensity of winter storms, the effects of warmer winters would nevertheless lead to decreases in average annual snowfall.

The NRI categorizes winter weather as a distinct category of risk, and Table 4- 40 below summarizes the exposure value of buildings, population, and agriculture, along with the population equivalent value, potentially vulnerable to winter weather hazards.

County	Agriculture Exposure	Population Exposure	Population Equivalence	Building Exposure	Total Exposure Value *(including population equivalent value)*
Alexander	$202,258,636	36,437	$422,669,200,000	$6,490,937,927	$429,362,396,563
Burke	$93,434,888	87,524	$1,015,278,400,000	$13,642,218,341	$1,029,014,053,229
Caldwell	$55,098,567	80,475	$933,512,735,709	$15,073,052,806	$948,640,887,082
Catawba	$88,641,140	160,509	$1,861,904,400,000	$37,175,998,799	$1,899,169,039,939
Total	**$439,433,231**	**364,945**	**$4,233,364,735,709**	**$72,382,207,873**	**$4,306,186,376,813**

Table 4- 40: Winter Weather NRI exposure values and vulnerability

4.5.8. Dam Failure

Worldwide interest in dam and levee safety has risen significantly in recent years. Communities across the county, including those in Unifour, have an elevated interest in dam safety, operation, and maintenance due to aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees.

There are approximately 92,000 dams in the United States as of 2024, according to FEMA's National Inventory of Dams, most of which are privately owned. Other owners include state and local authorities, public utilities, and federal agencies. Dams provide numerous benefits, such as storage for drinking water, safe navigation channels, and agricultural irrigation. Dams also provide hydroelectric power, create lakes for fishing and recreation, and save lives by preventing or reducing the impacts of flood hazard events.

Though dams have many benefits, they can also pose a risk to communities if not correctly designed, operated, and maintained. When development exists downstream of a dam, the energy of the water stored behind even a small dam can cause loss of life and significant property damage in the event of a dam failure. If a levee breaks, scores of properties are quickly submerged, and residents may become trapped by rapidly rising floodwater. The failure of dams and levees can potentially place large numbers of people and property in harm's way.

HHPD2-a. Location within the Planning Area

The figures below show counts and locations of high and intermediate-hazard dams in each participating jurisdiction.

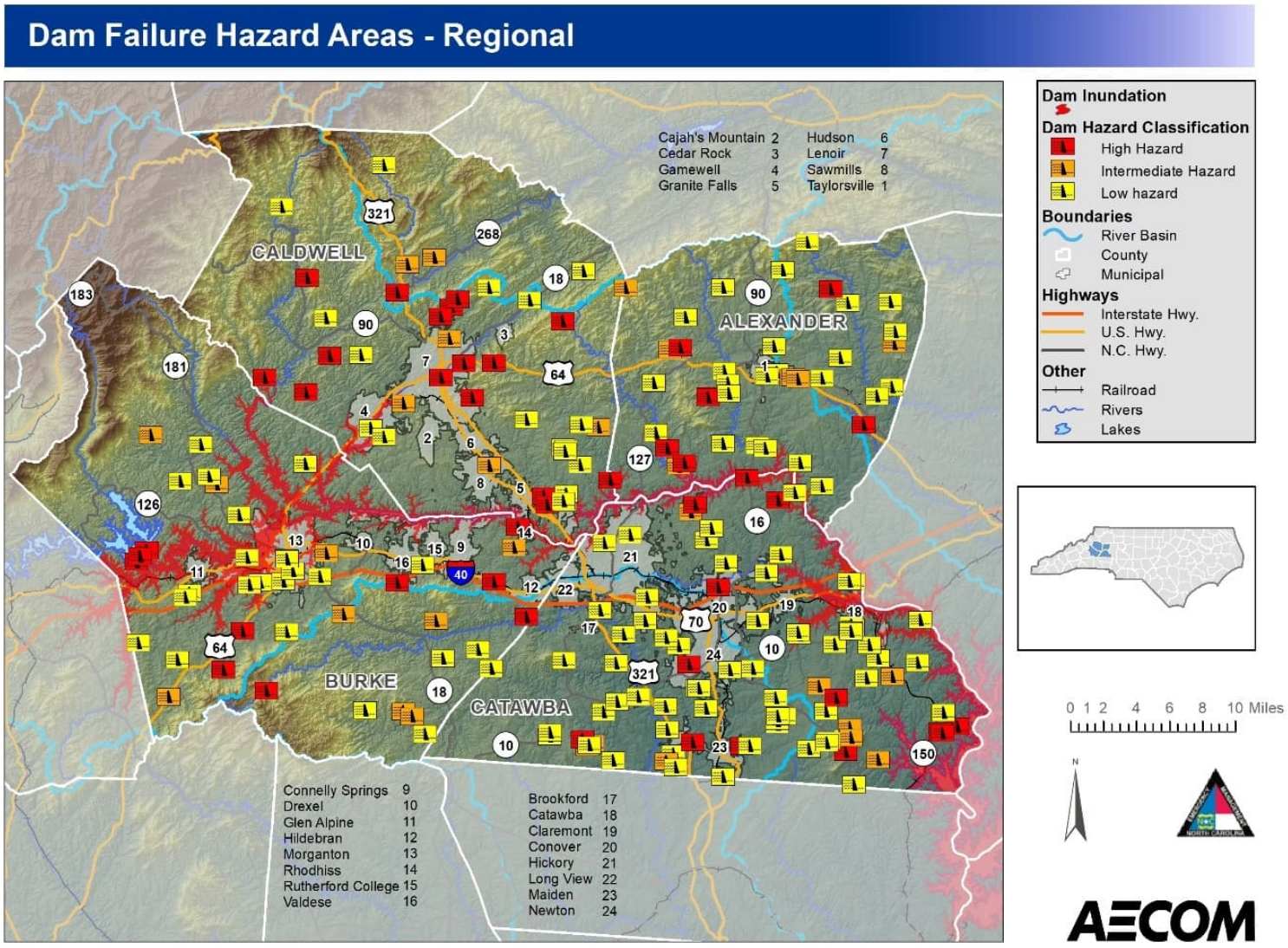


Figure 4- 75: Dam Failure Hazard Areas

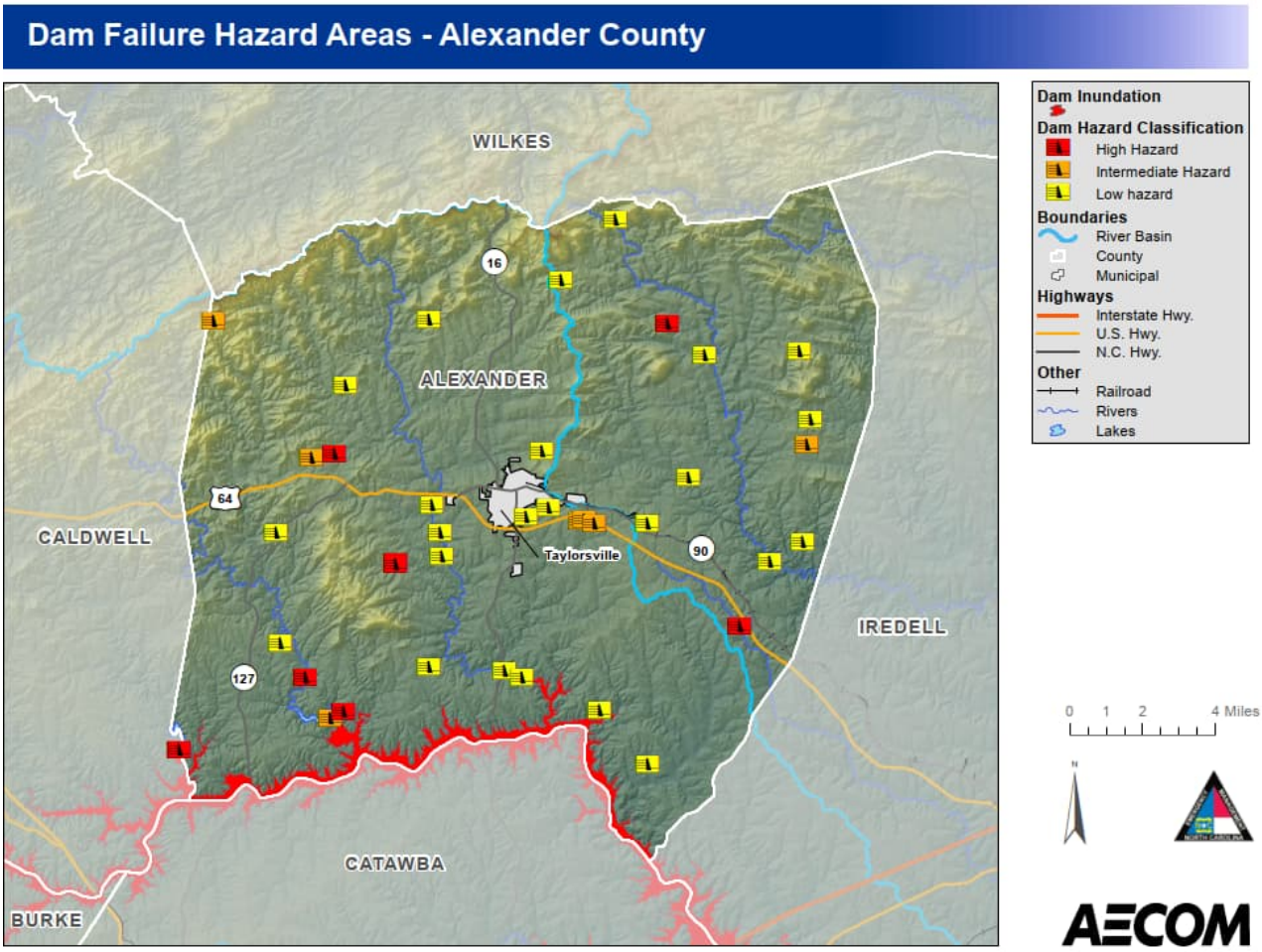


Figure 4- 77: Dam Failure Hazard Areas for Alexander County

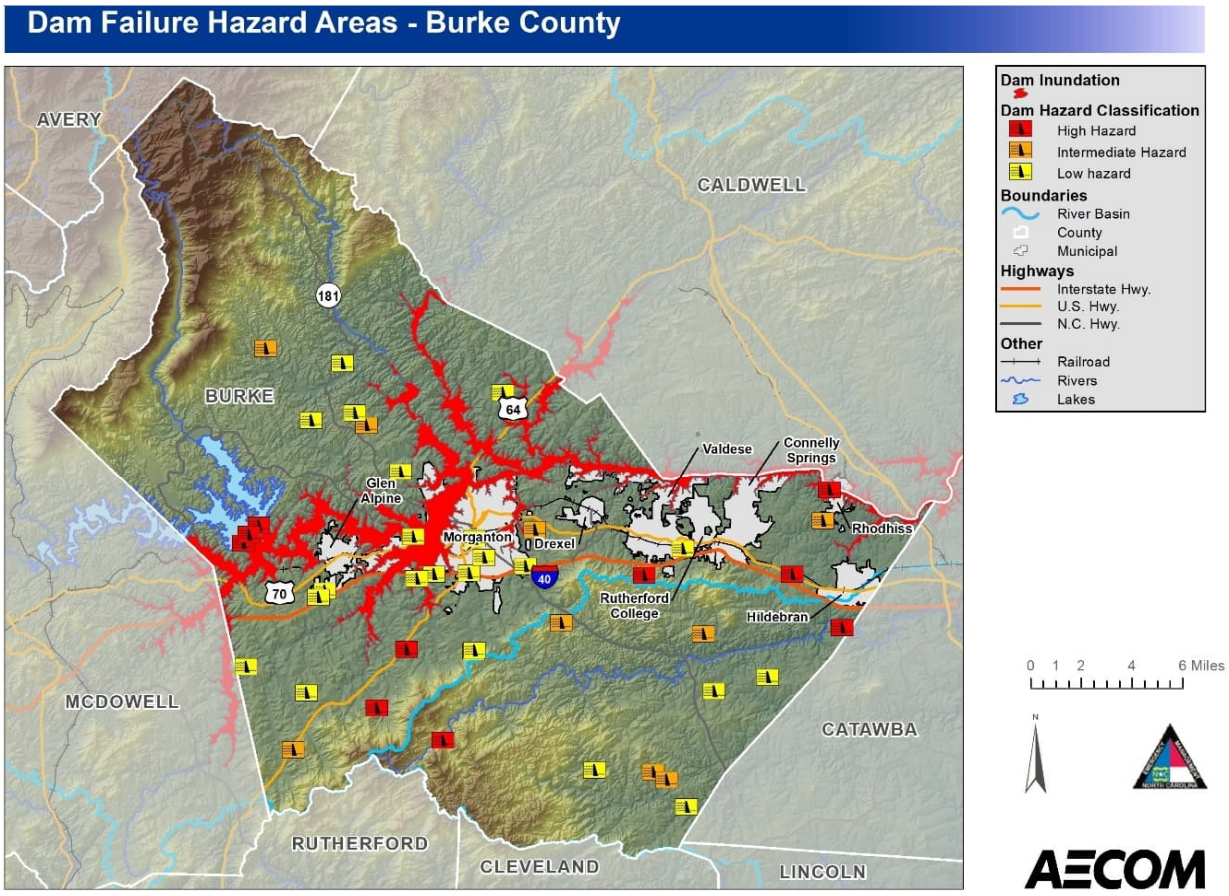


Figure 4- 76: Dam Failure Hazard Areas for Burke County

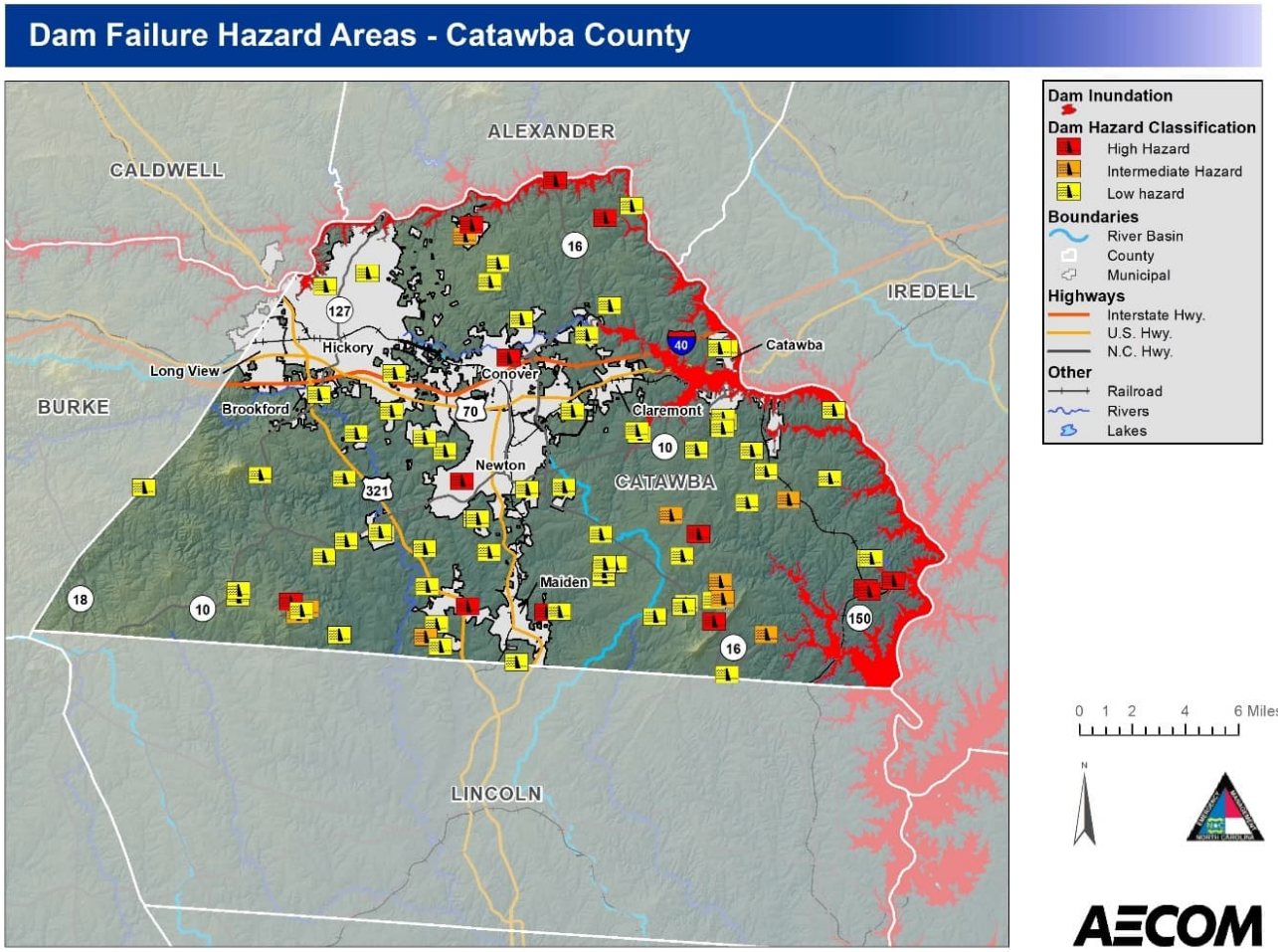


Figure 4- 78: Dam Failure Hazard Areas for Catawba County

Jurisdiction	High	Intermediate
Alexander		
Alexander County (Unincorporated Area)	8	0
Subtotal Alexander	**8**	**0**
Burke		
Burke County (Unincorporated Area)	4	5
City of Morganton	0	1

Jurisdiction	High	Intermediate
Subtotal Burke	**4**	**6**
Caldwell		
Caldwell County (Unincorporated Area)	4	2
City of Lenoir	2	0
Town of Granite Falls	1	2
Town of Sawmills	0	1
Subtotal Caldwell	**7**	**5**
Catawba		
Catawba County (Unincorporated Area)	5	5
City of Conover	1	0
City of Hickory	1	0
City of Newton	1	0
Subtotal Catawba	**8**	**5**
TOTAL PLAN	**27**	**16**

Table 4- 41: Counts of High Hazard and Intermediate Hazard Dams by Jurisdiction

Source: North Carolina Dams Program, North Carolina Department of Environment and Natural Resources (NCDENR).

HHPD2-a Extent (Magnitude and Severity)

Two factors influence the potential severity of a dam failure: the amount of water impounded, and the density, type, and value of development and infrastructure located downstream. The potential extent of dam failure may be classified according to its “hazard potential,” meaning the probable damage that would occur if the structure failed in terms of loss of human life and economic loss or environmental damage. The State of North Carolina classifies dam structures under its regulations according to hazard potential as described in Table 4- 42**.** Figure 4-79provides locations of State-regulated dams. It is important to note that these classifications are not based on the adequacy or structural integrity of the existing dam structures.

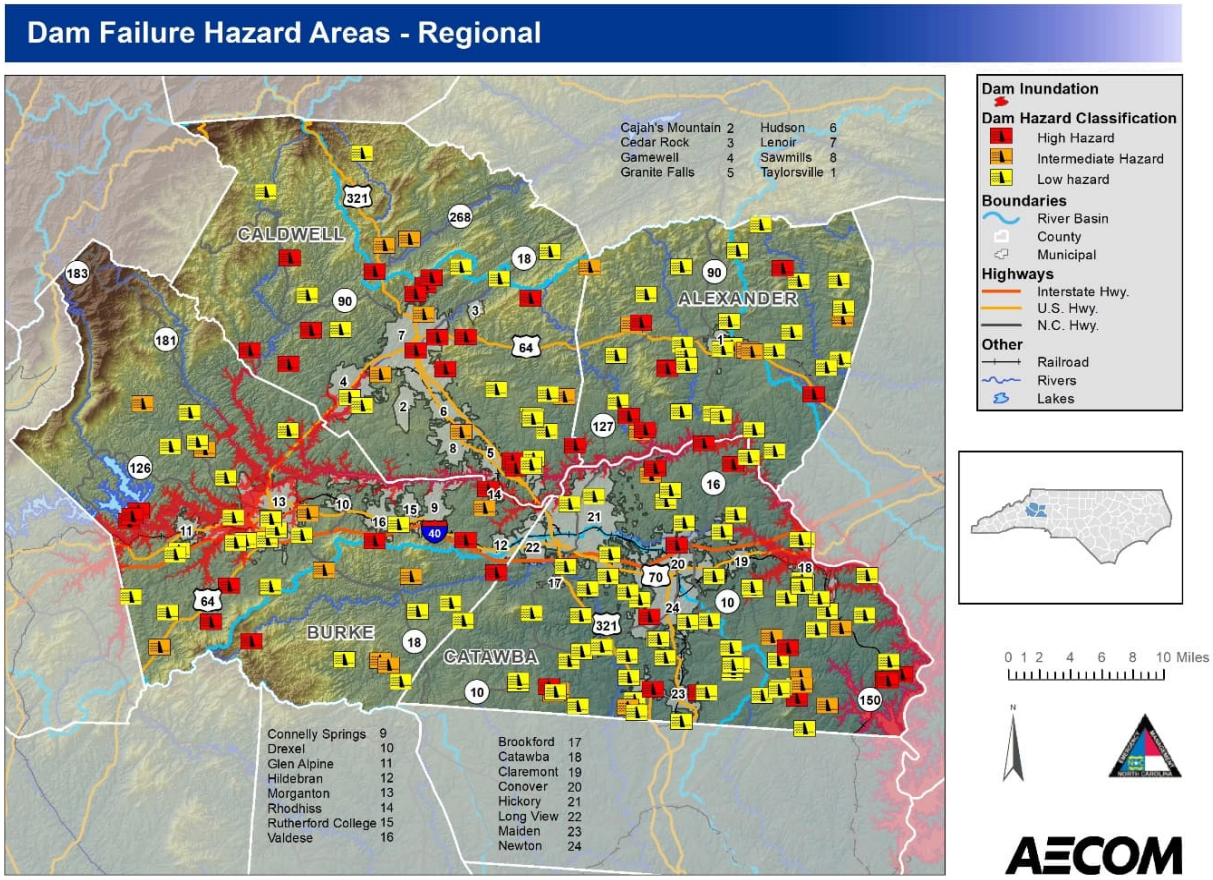


Figure 4- 79: Locations of State-Regulated Dams

Hazard Classification	Description	Quantitative Guidelines
Low	Dams located where failure may damage uninhabited, low-value, non-residential buildings, agricultural land, or low-volume roads.	1) Less than 25 vehicles per day 2) Less than $30,000
Intermediate	Dams located where failure may damage highways or secondary railroads, cause interruption of use or service of public utilities, cause minor damage to isolated homes, or cause minor damage to commercial and industrial buildings.	1) 25 to less than 250 vehicles per day 2) $30,000 to less than $200,000

Hazard Classification	Description	Quantitative Guidelines
High	Dams located 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.	1) Probable loss of 1 or more human lives 2) More than $200,000

Table 4- 42: Classification of Hazard Potential for North Carolina Dams

Source: North Carolina Dams Program, North Carolina Department of Environment and Natural Resources (NCDENR).

4.5.8.1. Historical Occurrences

No historical occurrences were identified in the planning area.

4.5.8.2. Probability of Future Occurrences

The table below shows the probability of future dam failure by jurisdiction based on the analyses performed in IRISK.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Low**
Burke County (Unincorporated Area)	**Low**
Caldwell County (Unincorporated Area)	**Low**
Catawba County (Unincorporated Area)	**Low**

Jurisdiction	IRISK Probability of Future Occurrence
City of Claremont	Low
City of Conover	Low
City of Hickory	Low
City of Lenoir	Low
City of Morganton	Low
City of Newton	Low
Town of Brookford	Low
Town of Cajah's Mountain	Low
Town of Catawba	Low
Town of Connelly Springs	Low
Town of Drexel	Low
Town of Gamewell	Low
Town of Glen Alpine	Low
Town of Granite Falls	Low
Town of Hildebran	Low
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Low
Town of Rhodhiss	Low
Town of Rutherford College	Low
Town of Sawmills	Low
Town of Taylorsville	Low
Town of Valdese	Low
Village of Cedar Rock	Low

4.5.8.3. HHPD2-b. Dam Failure Hazard Vulnerability

There is a fundamental limitation in the data available for dam/levee failure hazard events regarding the planning area's vulnerability assessment. Excellent data is available for GIS analysis, including point locations and mapped inundation areas. However, this robust data is primarily available for the dams owned by Duke Energy Corporation. These include the Bridgewater Dam, Lookout Shoals Dam, Oxford Dam, and Rhodhiss Dam PMF Inundation Areas. These large facilities would undoubtedly profoundly impact the planning area should a failure occur; however, such failures are extremely unlikely, and the HMPC feels strongly that these are not the structures that concern the Unifour Region. The dam structures that are of concern are smaller, privately owned, and unregulated dams for which no GIS data or inventories are currently available. These facilities could cause the most damage and disruption should a more common failure occur.

Given the importance of smaller, privately owned, and/or unregulated dams and their gap in available data for the Unifour Region, it has been determined that presenting detailed risk assessment results for the Duke Energy facilities, even though data is available, would be misleading and unproductive for mitigation planning. It has also been determined that any rudimentary calculations based on the point locations for the dams mapped by NCDENR would also be potentially misleading if any buffer or proximity analysis was performed to estimate surrounding impacts should a failure occur. Given these caveats, subsequent sections speak to the potential significant impacts of a dam failure event.

Therefore, any mitigation actions developed for this hazard should address data limitations, education and awareness programs, and/or any jurisdiction-specific concerns that may be addressable through an appropriate mitigation project.

4.5.8.4. HHPD2-a. Climate Change

Climate and weather pattern changes are expected to lead to more severe storm events, likely increasing the risk of dam overtopping, structural damage, or other failures. In addition, hydraulic structures designed to current standards may not be sufficient to handle future climate change-driven conditions of more intense rainfall and runoff. Since the likelihood of dam failure depends on many factors in addition to climate considerations, detailed projections of future changes in the frequency of dam failures cannot be made with any degree of confidence.

4.5.8.5. HHPD2-a. Potential Significant Impacts of Dam Incidents

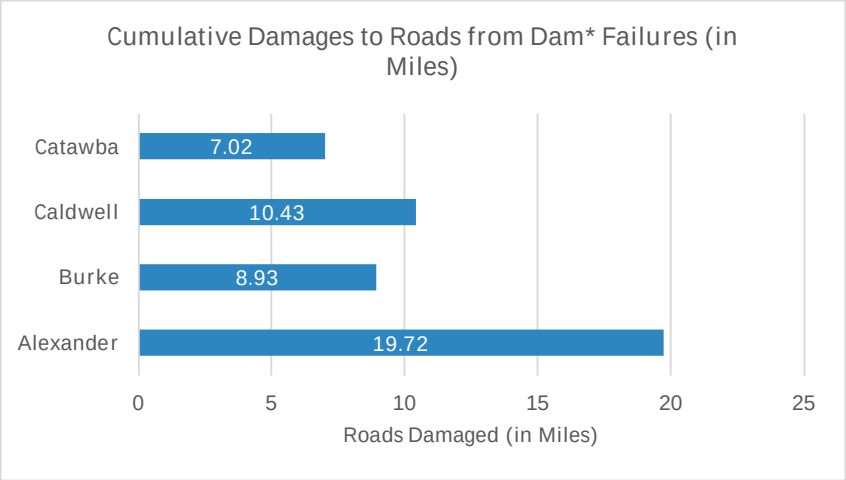
This section highlights the critical vulnerabilities of Alexander, Burke, Caldwell, and Catawba counties to dam failures, focusing on infrastructure damage, population exposure, and economic impacts. Key analyses reveal the extent of cumulative road damages, populations at risk during morning and evening hours, and the financial losses associated with residential, commercial, industrial, and public buildings. This data underscores the importance of targeted mitigation strategies to protect vulnerable populations, enhance infrastructure resilience, and

reduce economic disruption. This section presents data from the North Carolina Department of Public Safety's State Emergency Response Application (SERA), providing valuable insights for effective hazard mitigation planning.

Counties	Dams* With Available Impact Data	Dams* Without Available Impact Data
Alexander	6	2
Burke	4	6
Caldwell	6	9
Catawba	10	3

**In this context, "Dams" refer to all High and Intermediate Hazard Dams reported in the previous sections.*

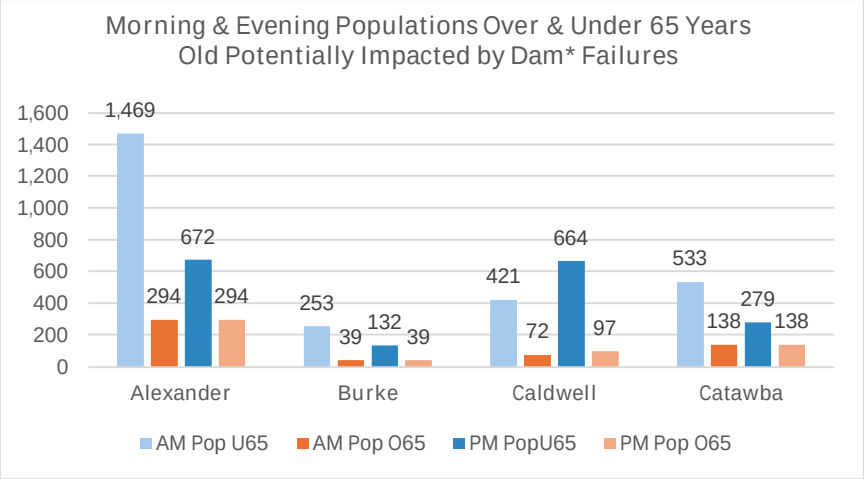
Dam failures can have significant impacts on infrastructure. Roads vulnerable to the impacts of dam failures can cause widespread infrastructure disruption that challenges emergency response efforts and impedes evacuation routes, directly affecting community safety and recovery efforts. Alexander County has the largest length of roadways vulnerable to the impacts of dam failure at 19.72 miles, followed by Caldwell (10.43 miles), Burke (8.93 miles), and Catawba (7.02 miles). Including these analyses supports planning efforts to prioritize infrastructure resilience, improve access during emergencies, and minimize disruptions to daily life.



**In this context, "Dams" refer to all High and Intermediate Hazard Dams reported in the previous*

Highlighting populations exposed to the impacts of dam failures, categorized by age groups over and under 65 during morning (AM) and evening (PM) periods, is significant because it identifies the specific demographic vulnerabilities that must be addressed in the hazard mitigation planning process. This information allows for targeted strategies to protect those most at risk, such as older adults who may have mobility limitations or special medical needs, ensuring that emergency response plans are inclusive and effective. By understanding at-risk

populations' daily patterns and demographics, communities can enhance evacuation routes, communication plans, and resource allocation to reduce overall impacts, protect people and infrastructure, and increase resilience to future dam-related hazards.



**In this context, "Dams" refer to all High and Intermediate Hazard Dams reported in the previous sections.*

Alexander County has the highest morning exposure for those under 65 (1,469) and over 65 (294), highlighting a significant daytime risk, particularly for working-age adults and older residents. In contrast, Caldwell County sees a notable shift in evening exposure with increased vulnerability, especially for the under-65 population, rising from 421 in the morning to 664 in the evening, indicating a potential need for evening-focused evacuation and response measures. The consistent presence of older adults in both AM and PM periods across counties, such as 294 in Alexander and 138 in Catawba, underscores the need for tailored strategies that address the unique challenges elderly residents face during any time of day, enhancing overall community resilience to dam failures.

The analysis of building risk versus damage from dam failures in Alexander, Burke, Caldwell, and Catawba counties reveals significant variations in potential impacts, highlighting the need for tailored mitigation strategies. Alexander County faces the highest residential risk, with 1,003 homes at risk and damages exceeding $58 million, emphasizing the critical importance of protecting residential areas to prevent substantial financial losses and displacement of residents. Caldwell County, although with fewer residential buildings at risk, experiences considerable commercial building damage totaling over $12.3 million, which could disrupt local economies and businesses, demonstrating the necessity for focused economic resilience measures.

Building Risk vs. Building Damage from Dam Failures	Alexander	Burke	Caldwell	Catawba
Residential Buildings at Risk	1,003	134	245	424
Residential Building Damage	$58,154,043.84	$2,136,651.28	$7,162,217.12	$8,262,928.55
Commercial Buildings at Risk	15	5	65	6
Commercial Building Damage	$4,757,358.38	$133,703.90	$12,360,319.10	$443,742.45
Industrial Buildings at Risk	4	9	5	4
Industrial Building Damage	$70,392.61	$102,680.50	$1,766,374.76	$254,206.01
Public Buildings at Risk	0	5	4	5
Public Building Damage	$0.00	$1,311,580.22	$539,695.71	$48,893.58
Total Buildings at Risk	**1,022**	**153**	**319**	**439**
Total Building Damage	**$62,981,794.82**	**$3,684,615.90**	**$21,828,606.69**	**$9,009,770.60**

**In this context, "Dams" refer to all High and Intermediate Hazard Dams reported in the previous sections.*

With lower overall risk, Burke County still shows vulnerability, especially in public infrastructure, with public building damages estimated at over $1.3 million, indicating a need to enhance protective measures for essential services. Catawba County presents a diverse risk profile, with nearly $9 million in total building damages, highlighting the importance of comprehensive risk assessments across all building types to inform strategic investments in dam safety improvements, emergency response planning, and infrastructure protection. These findings underscore the broader goal of reducing hazard impacts and building resilience in communities vulnerable to dam failures.

4.5.8.6. HHPD2-a. Cascading Impacts

In

the context of high- and intermediate-hazard dams, cascading impacts refer to a chain reaction of different disasters. For example, a drought causes loss of vegetation that may cause additional

stormwater runoff and erosion, leading to dam overtopping and/or silting. Due to a lack of available data and software modeling capabilities, the probability of the other 14 hazards identified in this plan having a cascading impact that results in a dam failure was not analyzed quantitatively. Cascading impacts are briefly discussed in the list below for each hazard this plan covers. The list clearly identifies whether the planning team and relevant literature judge a hazard unlikely to have a significant cascading impact on dams.

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

Levee Failure: levee failure could increase downstream water flow, adding pressure on nearby dams and heightening the risk of a high-hazard dam failure.

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

Tornado: tornadoes could damage a dam's infrastructure or surrounding vegetation but are less likely to cause a cascading impact leading to dam failure directly.

Earthquake: earthquakes can weaken a dam’s structural integrity or trigger landslides into the reservoir, increasing the risk of dam failure.

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

Snow: rapid snowmelt can lead to increased runoff, contributing to overtopping and potential dam failure.

Hail: hail alone is unlikely to cause cascading impacts that result in dam failure, as it does not significantly affect water levels or structural integrity.

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

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

Ice: ice buildup can block spillways or cause structural damage, increasing the likelihood of overtopping or dam failure.

Thunderstorm Winds: thunderstorm winds alone are unlikely to cause cascading impacts that lead to dam failure, though associated heavy rain could increase the risk.

Erosion: ongoing erosion can weaken a dam's structural integrity over time, eventually leading to a potential failure if not addressed.

Sinkholes: a sinkhole near a dam can undermine its foundation, leading to sudden structural failure and a cascading disaster.

4.5.9. Hail

Hailstorms are another potential 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, having developed sufficient weight, they fall as precipitation—as balls or irregularly shaped masses of ice greater than 0.75 in. (1.91 cm) 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.

4.5.9.1. Hail Hazard Analysis

Hail is a product of thunderstorms or intense showers. Hail is generally white and translucent, consisting of liquid or snow particles encased with layers of ice. Hail is formed within the high portion of a well-organized thunderstorm. When hailstones become too heavy to be caught in an updraft and carried back into the clouds of a thunderstorm (hailstones can be caught in numerous updrafts, adding a coating of ice to the original frozen droplets each time), they then fall as hail, and a hailstorm occurs.

4.5.9.2. Location within the Planning Area

Thunderstorms are widespread atmospheric disturbances that are not isolated to a specific geographic location. Therefore, it is assumed that the entire planning area is exposed to these hazards. However, it is possible to map historic hail reporting by diameter as an indication of where in the plan area these hazards have previously been observed and to what degree.

Hail Hazard Areas - Regional

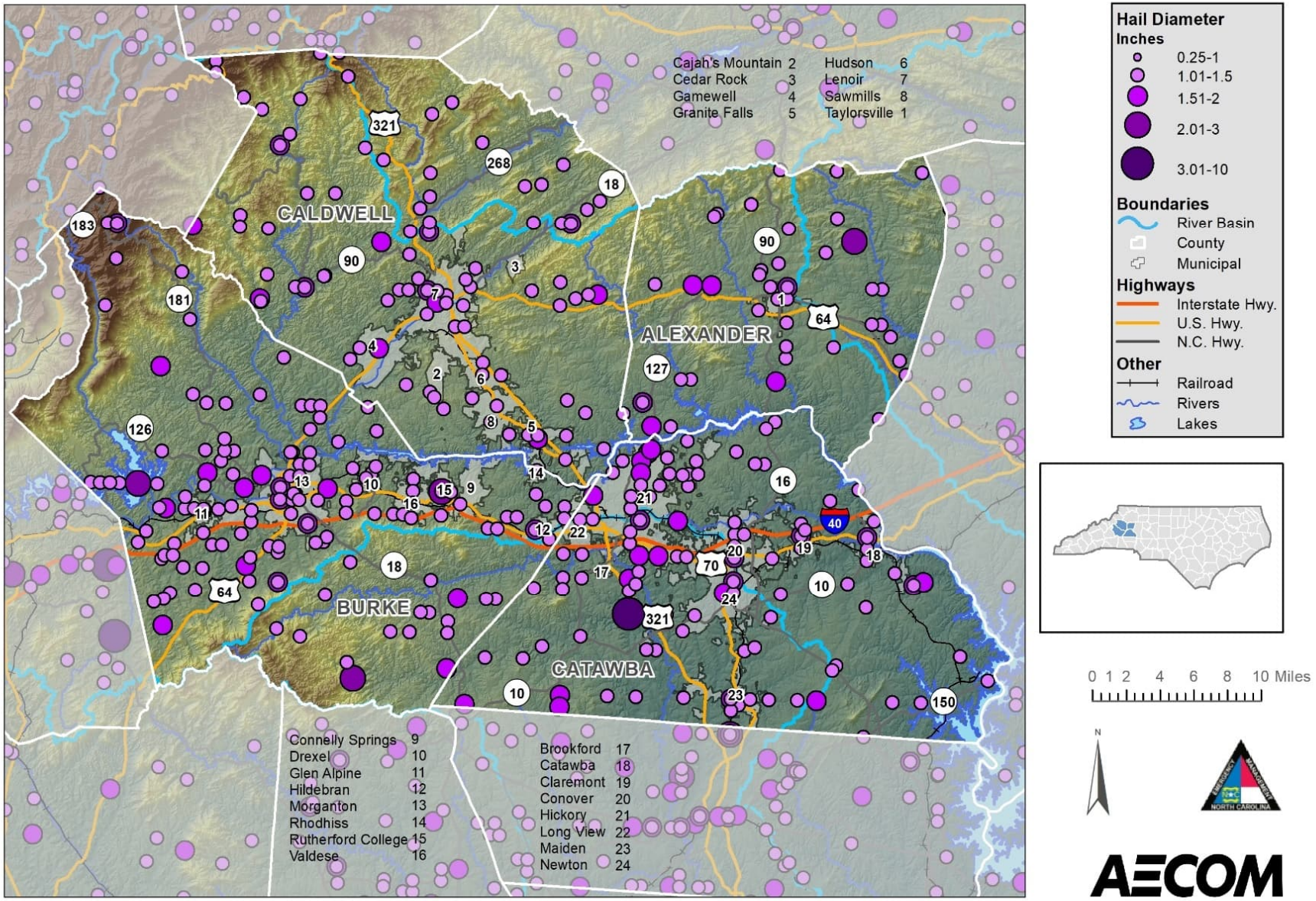


Figure 4- 80: Hail Hazard Areas

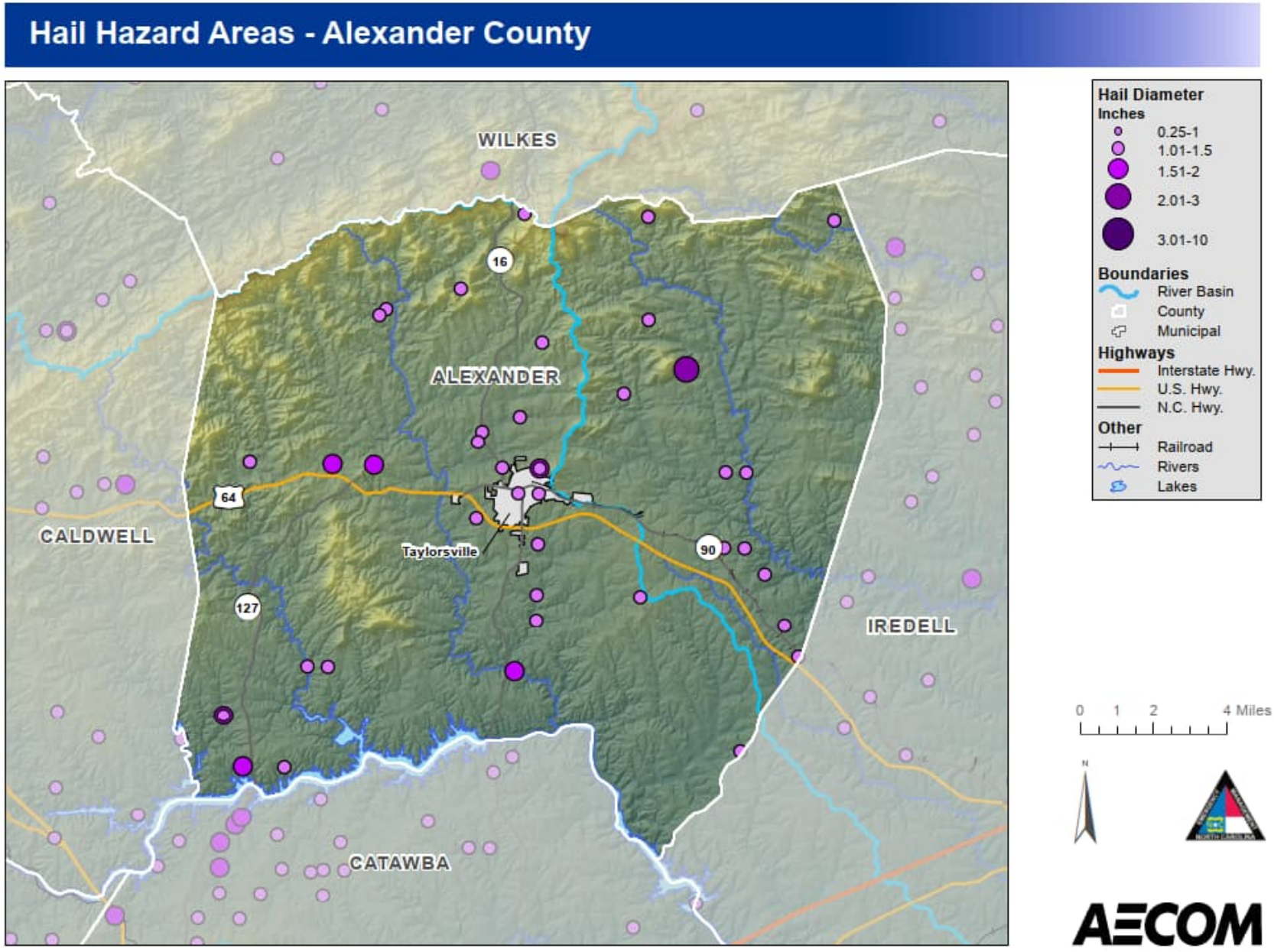


Figure 4- 81: Hail Hazard Areas for Alexander County

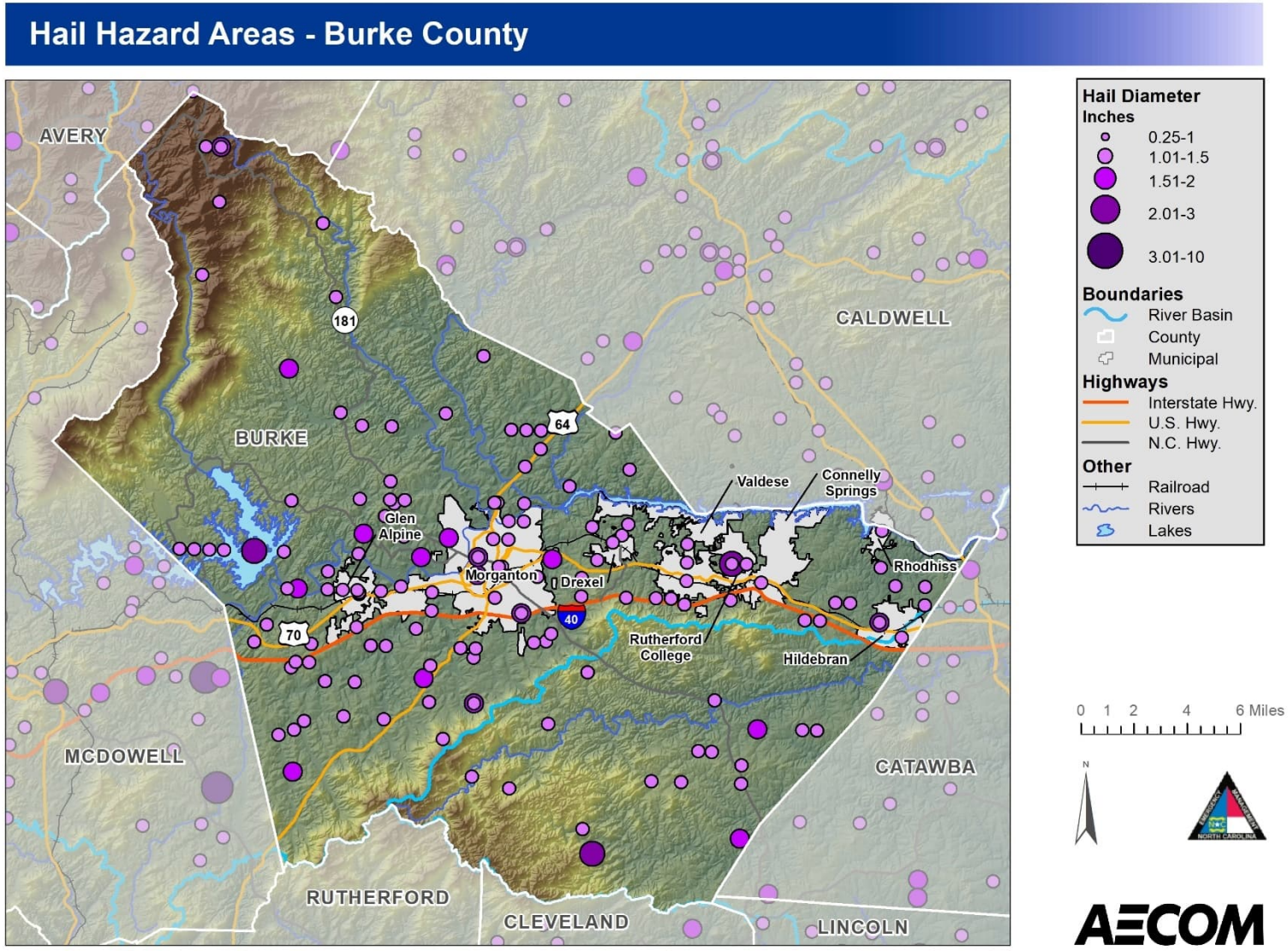


Figure 4- 82:Hail Hazard Areas for Burke County

Hail Hazard Areas - Caldwell County

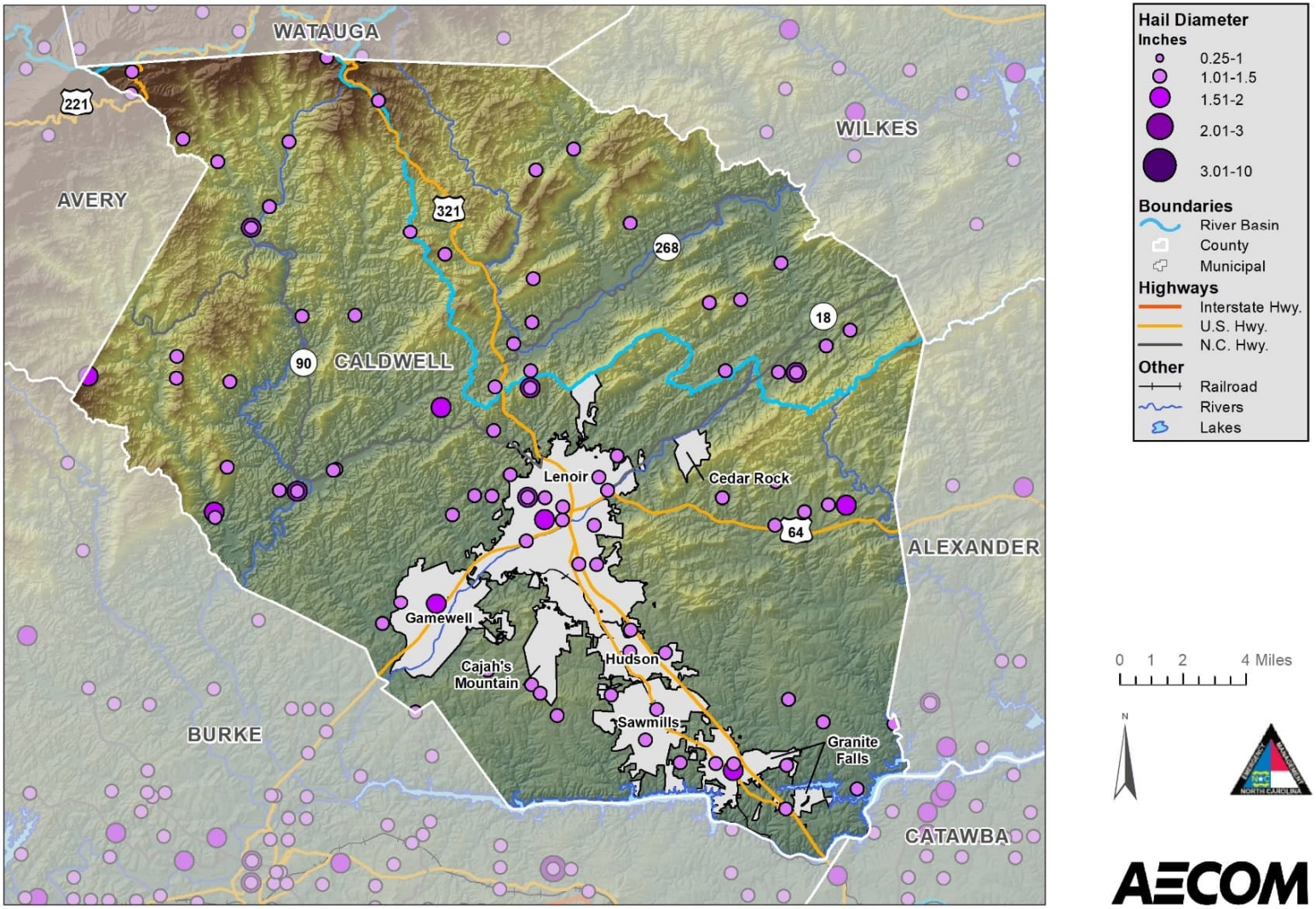
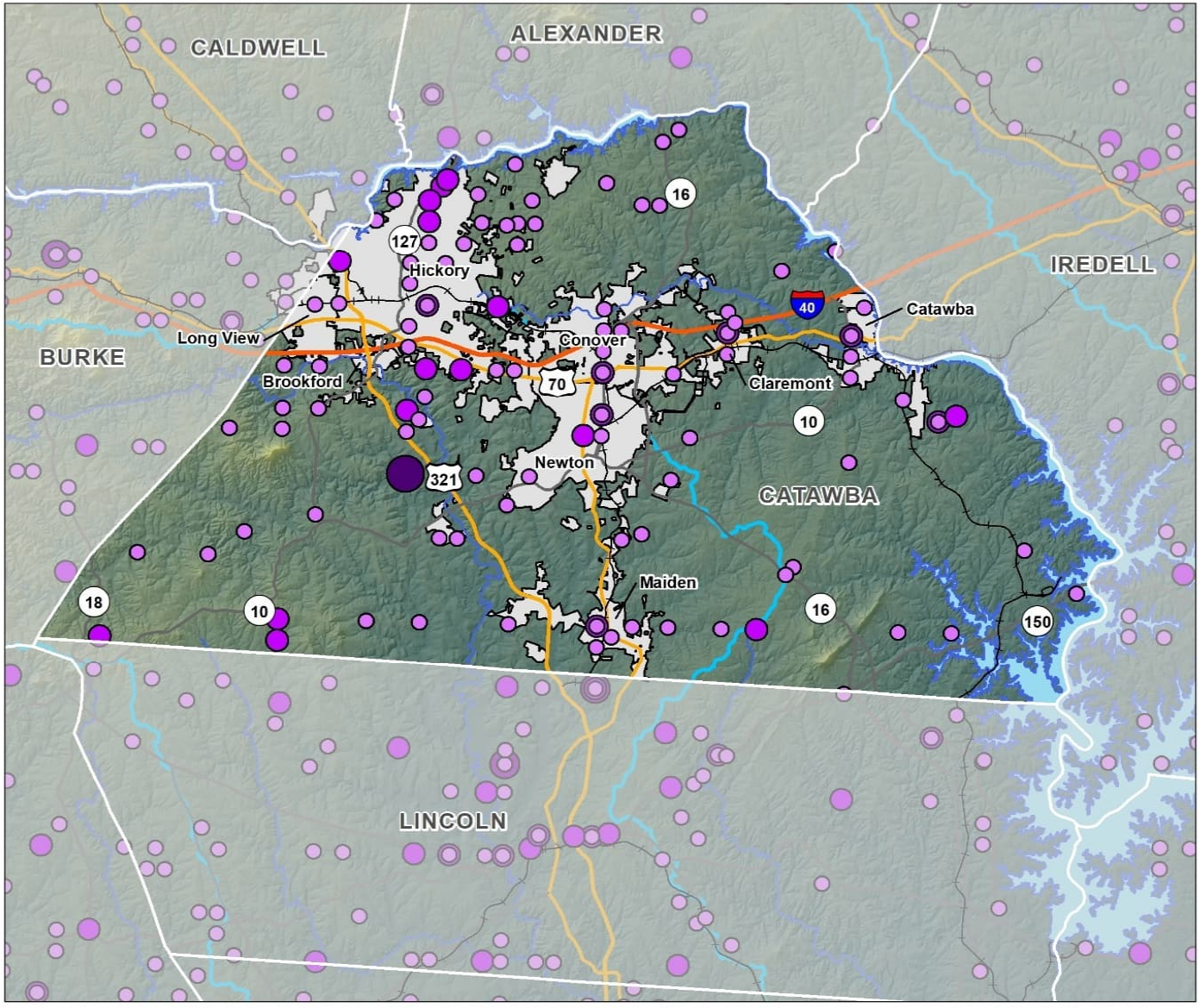


Figure 4- 83: Hail Hazard Areas for Caldwell County

Hail Hazard Areas - Catawba County



Hail Diameter
Inches
- 0.25-1
- 1.01-1.5
- 1.51-2
- 2.01-3
- 3.01-10

Boundaries
- River Basin
- County
- Municipal

Highways
- Interstate Hwy.
- U.S. Hwy.
- N.C. Hwy.

Other
- Railroad
- Rivers
- Lakes

0 1 2 4 6 Miles

N

AECOM

Figure 4- 84: Hail Hazard Areas for Catawba County

4.5.9.3. Extent (Magnitude and Severity)

Definition:

The TORRO Hailstorm Intensity Scale (H0 to H10) in relation to typical damage and hail size codes. Size codes are presented in Table 4- 43**.**

TORRO Hailstorm Intensity Scale				
	Intensity Category	**Typical Hail Diameter (mm)***	**Probable Kinetic Energy, J-m2**	**Typical Damage Impacts**
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	5-15	>20	Slight general damage to plants, crops
H2	Significant	10-20	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60		Bodywork of grounded aircraft dented; brick walls pitted
H7	Destructive	50-75		Severe roof damage, risk of serious injuries
H8	Destructive	60-90		(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-**100**		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

Table 4- 43: TORRO Hailstorm Intensity Scale

* Approximate range (typical maximum size in bold), since other factors (e.g. number and density of hailstones, hail fall speed and surface wind speeds) affect severity.

Hail size and diameter in relation to TORRO Hailstorm Intensity Scale.		
Size code	**Maximum Diameter mm**	**Description**
0	5-9	Pea
1	10-15	Mothball
2	16-20	Marble, grape
3	21-30	Walnut
4	31-40	Pigeon's egg > squash ball
5	41-50	Golf ball > Pullet's egg
6	51-60	Hen's egg
7	61-75	Tennis ball > cricket ball
8	76-90	Large orange > Soft ball
9	91-100	Grapefruit
10	>100	Melon

Table 4- 44: Hail Size and Diameter

The Size Code is the maximum reported size code accepted as consistent with other reports and evidence.

4.5.9.4. Extent Event:

Hail is known to be damaging hazard occurrences in the Unifour Region that can result in multiple injuries and high loses in property damages. The largest recorded size of a hailstone in the planning area (according to NCDC) is 4.5 inches reported in Morganton in Burke County (in 2000) and in Newton in Catawba County (in 1998). Since 2000, there have been 432 reports of hail in the Unifour Region, and the report of the largest hail was in Morganton in 2008 at 2.75 in. There have been 109 reports in Catawba, 100 in Caldwell, 45 in Alexander, and 178 in Burke County total since 2000 (NCDC). Since 2018, there have been 40 days with hail reported, with no property damage reported, and the largest instance of hail was 2 in reported on July 21, 2018 (NCDC).

4.5.9.5. Historical Occurrences

According to NCDC, 494 recorded instances of hail conditions have affected the planning area causing an estimated $10,053,000 in property damages, $0 in crop damages, 0 death(s), and 0 reported injuries between 1950 and 2023.

The following historical occurrences have been identified based on the NCDC Storm Events database in from 2018-2023. It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded, or unreported events may have occurred within the planning area during this timeframe. Although the NCDC Storm Events Database reports no property damage due to hail, there may be unreported property damage or other damages associated with reported hail events. Below, 10 hail events with the largest reported hail magnitude and extent are summarized below from the NCDC Storm Events Database:

Catawba, Alexander, Burke, Caldwell (7/21/2018)

Scattered thunderstorms developed during the afternoon across the North Carolina mountains and foothills and moved east. A few of the storms produced brief severe weather in the form of large hail and damaging winds.

County	Location	Magnitude (in)	Event Narrative
Catawba	Hickory	2	Public reported (via Social Media) two-inch diameter hail on the north side of Hickory.
Alexander	Bethlehem	1.75	Media and spotter reported half dollar to golf ball size hail in the Bethlehem area.
Burke	Morganton	1	Spotter and the media reported quarter size hail in the Morganton area.
Caldwell	Mt. Herman	1	Ham radio operator reported quarter size hail near Lenoir.

Caldwell County (5/26/2022)

A broad band of moderate to heavy rain showers with embedded strong to severe thunderstorms moved over western North Carolina throughout the afternoon into the evening. Several strong to severe thunderstorms produced locally damaging wind gusts, brief large hail, and even a couple of tornadoes, including a strong tornado in Iredell County. Media reported quarter to golf ball size hail in the Granite Falls and Northlakes areas.

Location	Granite Falls
Magnitude (in)	1.75

Alexander County (7/4/2019)

Scattered thunderstorms and storm clusters developed across the North Carolina Piedmont during the afternoon. A couple of the storms produced damaging wind gusts. Ham radio operator reported ping pong ball size hail on Walker Foundry Loop at Highway 16.

Location	Taylorsville Airport
Magnitude (in)	1.5

Burke County (4/13/2019)

Scattered clusters of heavy rain showers and thunderstorms developed in the vicinity of a stationary front across western North Carolina throughout the 13th. Repeated movement of showers and storms resulted in flash flooding developing across Cabarrus County beginning in the morning. Meanwhile, an isolated supercell thunderstorm produced large hail and isolated damaging wind gusts across Burke County during the afternoon. Media and the public reported quarter to half dollar size hail from the Oak Hill community to just north of Morganton.

Location	Oak Hill
Magnitude (in)	1.25

Burke, Catawba, and Alexander County (5/10/2018)

Isolated to scattered thunderstorms developed across the Blue Ridge during the afternoon and moved into the Piedmont during the evening. Some of the storms produced severe weather in the form of large hail and locally damaging winds. Strong to severe supercell thunderstorms developed repeatedly and trained across portions of the foothills, particularly in Polk County, such that some locations received multiple periods of up to golf ball size hail.

County	Location	Magnitude (in)	Event Narrative
Burke	Enola	1	Media reported nickel to quarter size hail off Salem Rd.
	Burke Chapel		Public reported hail of at least quarter size.
Catawba	Propst Xrds		Spotter reported up to quarter size hail north of Cooksville.
Alexander	Taylorsville		Media reported mostly nickel size hail with a few quarter size stones.

Burke County (6/3/2018)

Scattered thunderstorms developed across the southern Appalachians throughout the afternoon and moved southeast. Several storms produced brief severe weather in the form of large hail and damaging winds across the North Carolina mountains and foothills.

Location	Magnitude (in)	Event Narrative
Brindletown	1	Media reported quarter size hail on Bennett Rd and Scott Rd and on Jenkins Rd.
Burke Chapel	0.75	Spotter reported 3/4-inch hail.

Burke and Catawba County (8/8/2018)

Scattered thunderstorms developed across the North Carolina Blue Ridge during the afternoon, with storms developing gradually along outflows into the Piedmont throughout the afternoon and into the evening. A few of the storms produced brief damaging winds.

County	Location	Magnitude (in)	Event Narrative
Burke	Hildebran	1	Public reported quarter size hail On 3rd St Southeast.
Catawba	Duan	0.75	Spotter reported penny size hail on Saint James Church Rd.
	Propst Xrds	0.75	Spotter reported penny size hail on Mountain Grove Rd.

Caldwell County (7/20/2019)

Scattered to numerous thunderstorms developed across northern North Carolina during the afternoon. A few of the storms produced brief damaging wind gusts and some hail.

Location	Magnitude (in)	Event Narrative
Hudson	1	Amateur radio operator reported quarter size hail in the Hudson area.
Sawmills	0.88	Ham radio operator reported nickel size hail in Sawmills.

Caldwell County (9/30/2019)

Isolated thunderstorms developed near the North Carolina Blue Ridge during the afternoon and evening. A couple of the storms produced brief large hail.

Location	Magnitude (in)	Event Narrative
Hartland	1	Public reported dime to quarter size hail on Macedonia Rd.
Rhodhiss	1	Amateur radio reported quarter size hail on River Bend Dr near Highway 321.

Burke and Caldwell County (4/25/2020)

Isolated thunderstorms developed in the vicinity of a warm front across the mountains of southwest North Carolina and the northern foothills during the evening. In addition, a couple of supercell thunderstorms moved into the southern Piedmont from upstate South Carolina. Several of these storms produced large hail and brief damaging winds.

County	Location	Magnitude (in)	Event Narrative
Burke	Oak Hill	1	Broadcast media reported nickel to quarter size hail in the Oak Hill community.
Caldwell	Baton	1	Spotter reported quarter size hail on Mountain View Cir and Union Grove Rd and nearby at Oakmont Dr and Connelly Springs Rd.

A table in Appendix A provides a summary of this historical information by participating jurisdiction from 2018-2023 from the NCDC Storm Events Database. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

4.5.9.6. Probability of Future Occurrences

County		Alexander	Catawba	Burke	Caldwell
EAL	**Value**	$205,000	$992,000	$224,000	$198,000
	Rating	Relatively Low	Relatively Moderate	Relatively Low	Relatively Low
Risk Index	**Score**	68.2	91.1	70.9	67.7
	Rating	Relatively Low	Relatively Moderate	Relatively Low	Relatively Low
Frequency (Events per Year)		5.3	5.7	5.5	5.1
Historic Loss Ratio		Relatively Low	Relatively Low	Very Low	Very Low

Table 4- 45: NRI Hail Risk Index, EAL, Frequency, and Historic Losses

The probability of future Hail is shown in the table below, by jurisdiction.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Low**
Burke County (Unincorporated Area)	**Low**
Caldwell County (Unincorporated Area)	**Low**
Catawba County (Unincorporated Area)	**Low**
City of Claremont	**Low**
City of Conover	**Low**
City of Hickory	**Low**
City of Lenoir	**Low**
City of Morganton	**Low**
City of Newton	**Low**
Town of Brookford	**Low**
Town of Cajah's Mountain	**Low**
Town of Catawba	**Low**
Town of Connelly Springs	**Low**
Town of Drexel	**Low**
Town of Gamewell	**Low**
Town of Glen Alpine	**Low**

Jurisdiction	Probability of Future Occurrence
Town of Granite Falls	**Low**
Town of Hildebran	**Low**
Town of Hudson	**Low**
Town of Long View	**Low**
Town of Maiden	**Low**
Town of Rhodhiss	**Low**
Town of Rutherford College	**Low**
Town of Sawmills	**Low**
Town of Taylorsville	**Low**
Town of Valdese	**Low**
Village of Cedar Rock	**Low**

4.5.9.7. Hail Hazard Vulnerability

All the inventoried assets in the Unifour Region are exposed to hail. Any specific vulnerability of individual assets depends greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future updates.

4.5.9.8. Climate Change

Climate change can potentially produce more large hail by fueling stronger thunderstorm updrafts. Stronger updrafts suspend hail high within storms for longer, enabling them to grow and produce larger hailstones. Records show an increase in the number of large hailstones across the whole United States in recent years, and while there is also evidence of an increase in the number of hail days per year, the inherent uncertainty in reported hail size reduces the confidence in any projections. In fact, while the trend across much of the United States suggests more hail events with larger hail stones, in at least one study[18] a *decrease* in hail frequency and damage potential is predicted over eastern and southeastern regions in spring and summer, due to a significant increase in melting that mitigates gains in hail size from increased buoyancy.

County	Agriculture Exposure	Population Exposure	Population Equivalence	Building Exposure	Total exposure Value ***(including population equivalent value)***
Alexander	$202,258,636	36,437.00	$422,669,200,000	$6,490,937,927	$429,362,396,563
Burke	$93,436,823	87,532.00	$1,015,371,200,000	$13,643,350,490	$1,029,107,987,313
Caldwell	$55,120,539	80,586.00	$934,797,600,000	$15,099,673,534	$949,952,394,073
Catawba	$88,641,140	160,509.00	$1,861,904,400,000	$37,175,998,799	$1,899,169,039,939
Total	**$439,457,138**	**365,064.00**	**$4,234,742,400,000**	**$72,409,960,750**	**$4,307,591,817,888**

Table 4- 46: NRI Exposure Values for Hail and representative value of vulnerable agriculture, population, and building values

4.5.10. Drought

Drought is a natural climatic condition caused by an extended period of limited rainfall beyond that which occurs naturally in a broad geographic area. High temperatures, high winds and low humidity can worsen drought conditions, and can make areas more susceptible to wildfire. Human demands and actions can also hasten drought-related impacts.

Droughts are frequently classified as one of four types: meteorological, agricultural, hydrological, or socio-economic. Meteorological droughts are typically defined by the level of "dryness" when compared to an average or normal amount of precipitation over a given period. Agricultural droughts relate common characteristics of drought to their specific agricultural-related impacts. Emphasis tends to be placed on factors such as soil water deficits, water needs based on differing stages of crop development, and water reservoir levels. Hydrological drought is directly related to the effect of precipitation shortfalls on surface and groundwater supplies. Human factors, particularly changes in land use, can alter the hydrologic characteristics of a basin. Socio-economic drought is the result of water shortages that limit the ability to supply water-dependent products in the marketplace.

4.5.10.1. Drought Hazard Analysis

Drought conditions typically do not cause property damages or threaten lives, but rather drought effects are most directly felt by agricultural sectors. At times, drought may also cause community-wide impacts because of acute water shortages (regulatory use restrictions, drinking water supply, and saltwater intrusion). The magnitude of impacts correlates directly with local groundwater supplies, reservoir storage, and development densities. Drought conditions can also contribute to or exacerbate extreme heat concerns, particularly about elderly populations.

4.5.10.2. Location within the Planning Area

The National Weather Service looks at drought and extreme heat as episodes that impact a widespread forecast "zone," and therefore it is not common to pinpoint a specific location within

a planning area that is more susceptible to these hazards than others. From this viewpoint, each county is considered uniformly at risk to drought and extreme heat. However, the most significant financial losses are likely to occur in areas that are primarily agricultural.

Figure 4- 85shows the US Drought Monitor summary map for the United States Through February 2024.

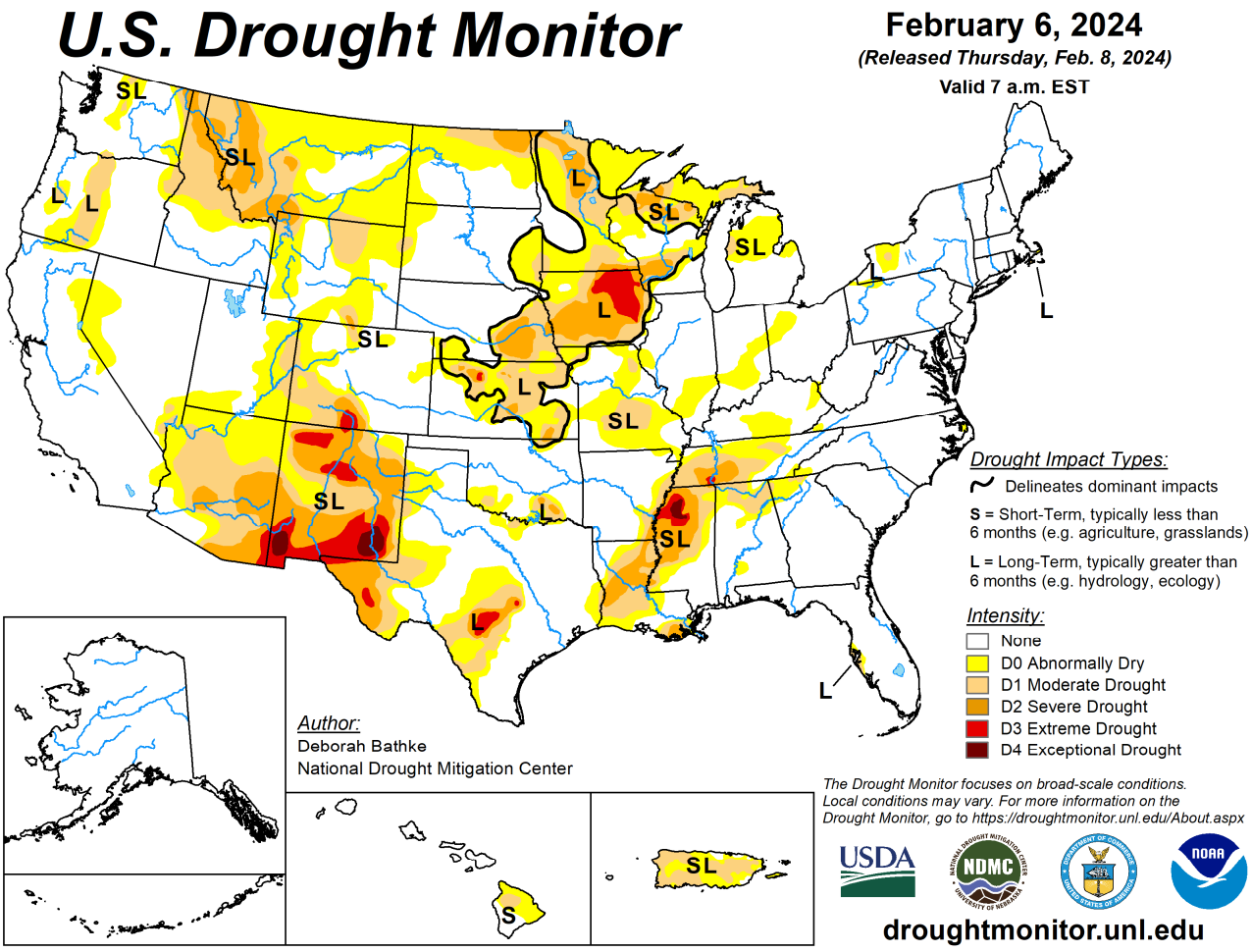


Figure 4- 85: U.S. Drought Monitor from February 6, 2024

Source: NOAA

Figure 4- 86 shows the most recent Palmer Drought Severity Index summary map for the Unifour Region from 1895-2013. PDSI drought classifications are based on observed drought conditions and range from -0.5 (incipient dry spell) to -4.0 (extreme drought). As can be seen, the Eastern United States has historically not seen as many significant long-term droughts as the Central and Western regions of the country.

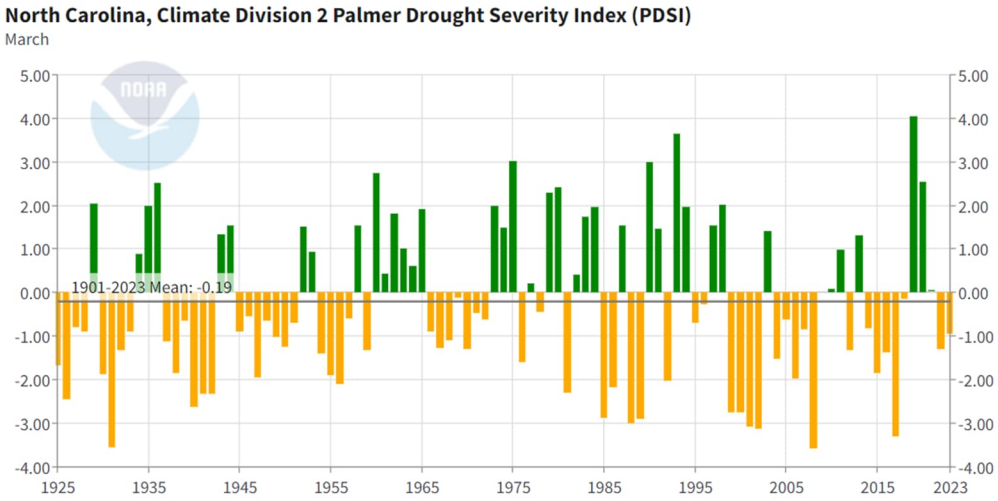


Figure 4- 86: Palmer Drought Severity Index for the Northern Mountains Climate Division

Source: NOAA NCEI Climate at a Glance Divisional Time Series (https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/divisional/time-series/3102/pdsi/1/3/1925-2023?base_prd=true&begbaseyear=1901&endbaseyear=2023)

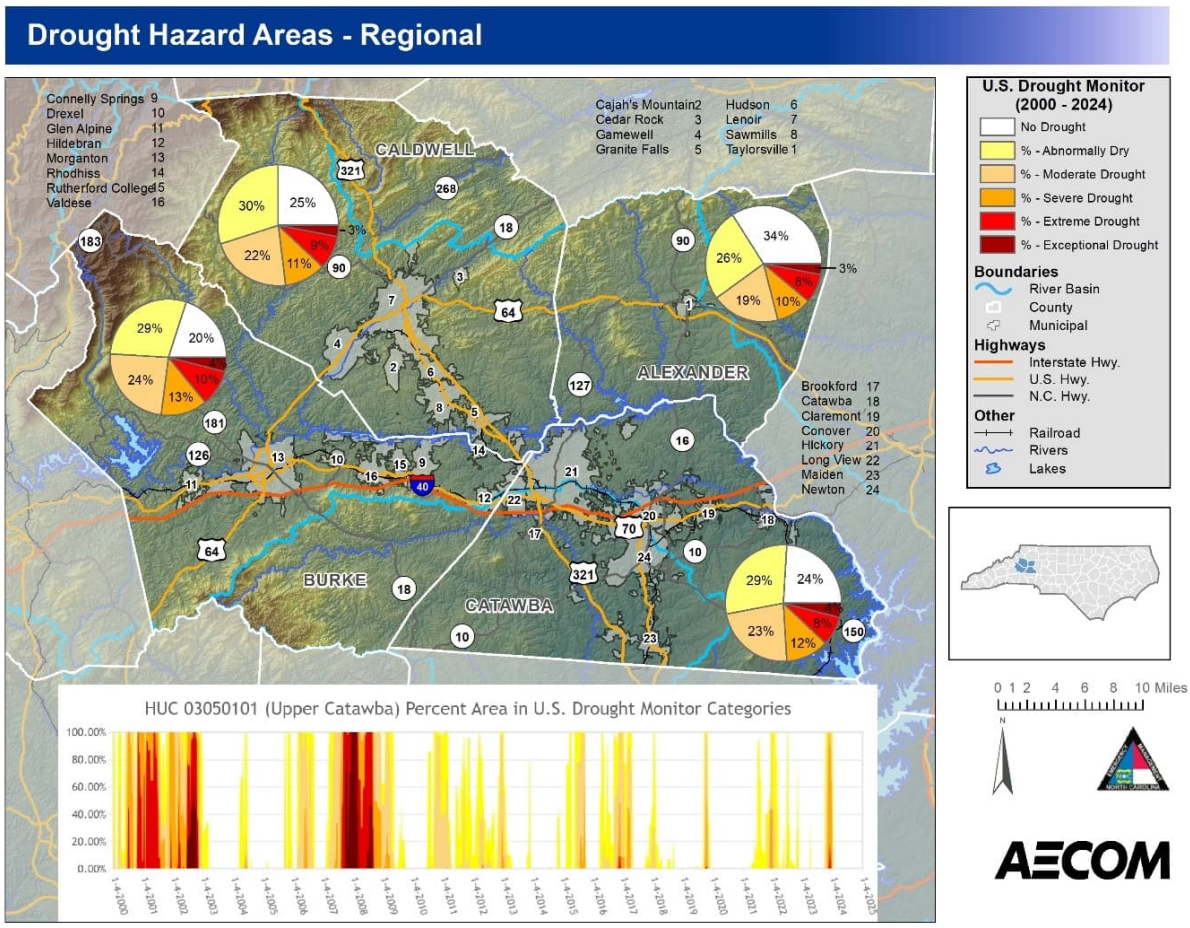


Figure 4- 88: Drought Hazard Areas

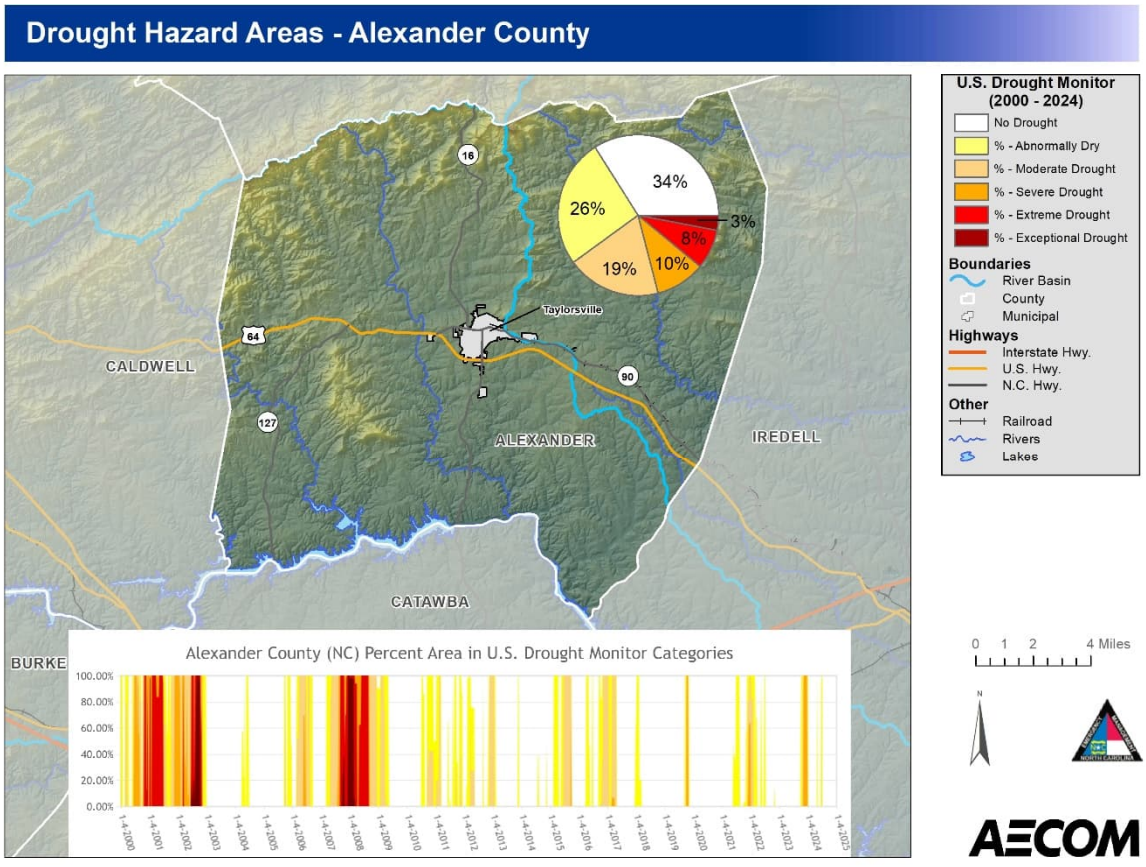


Figure 4- 87: Drought Hazard Areas for Alexander County

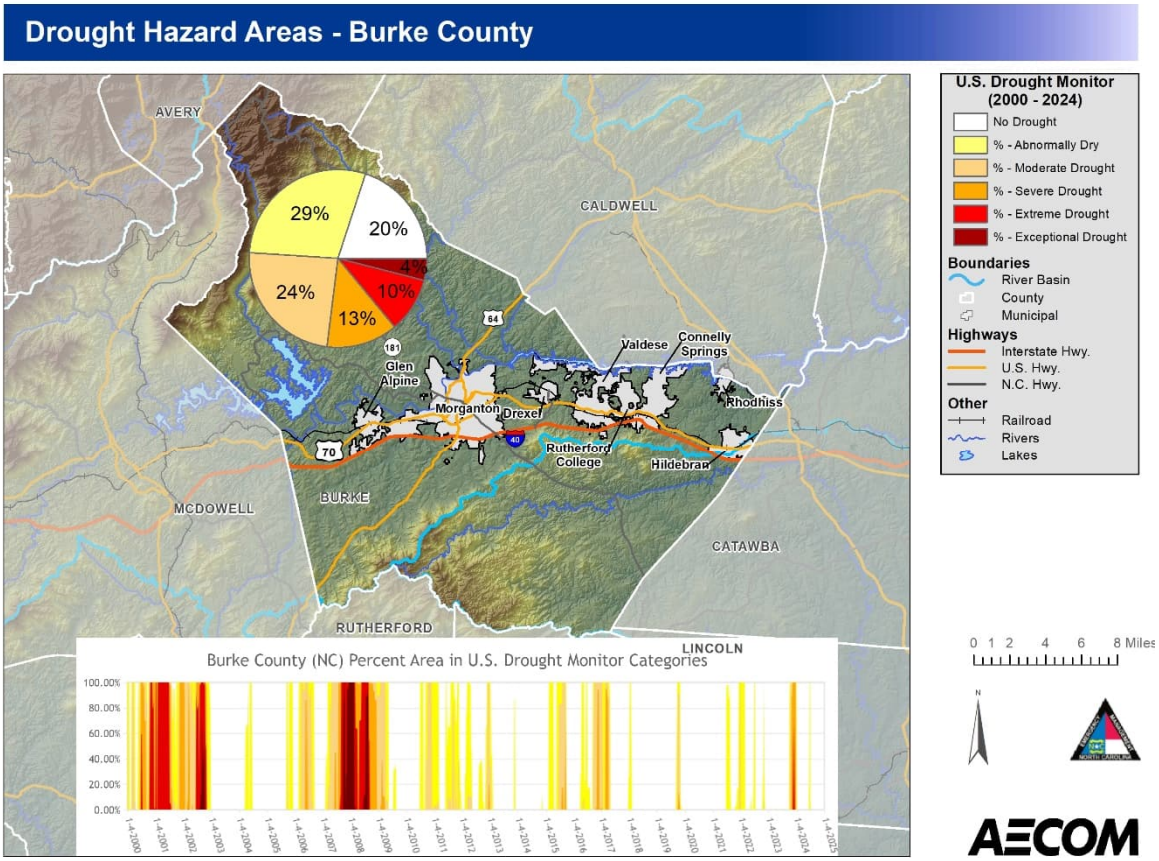


Figure 4- 90: Drought Hazard Areas for Burke County

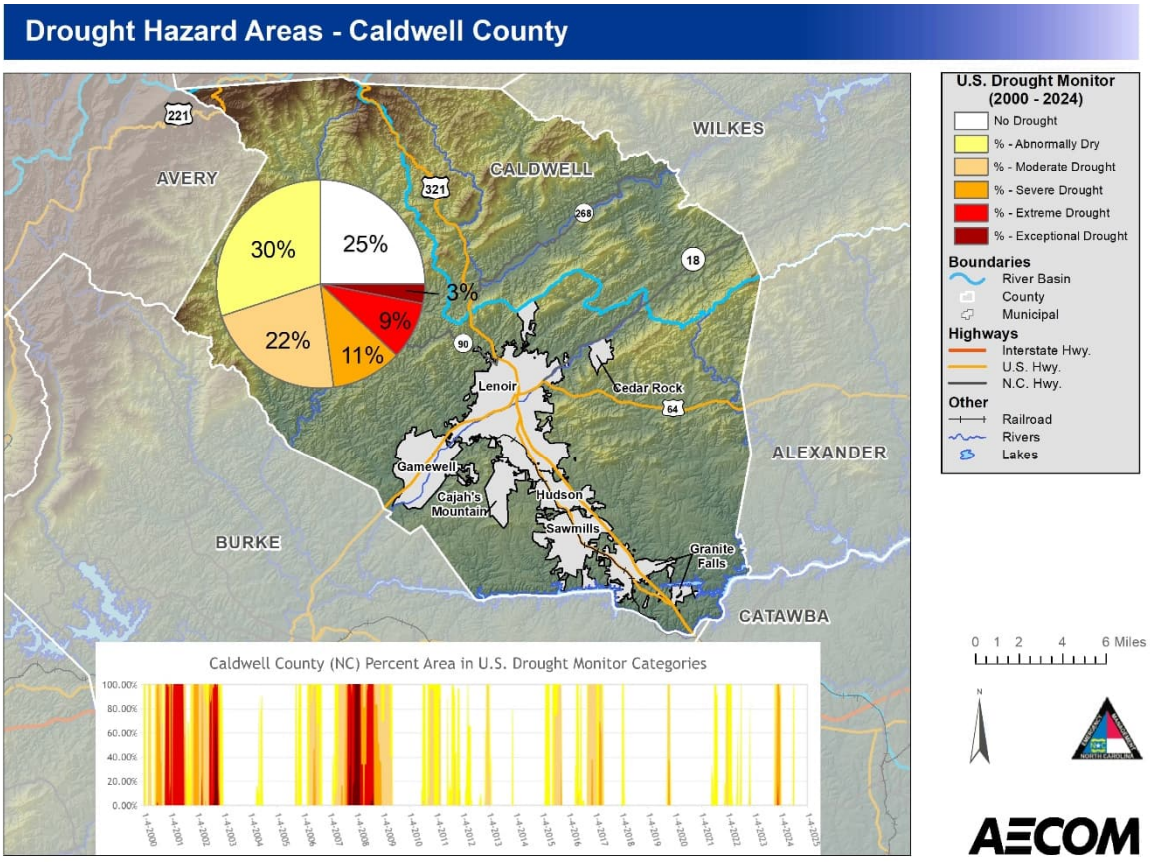


Figure 4- 89: Drought Hazard Areas for Caldwell County

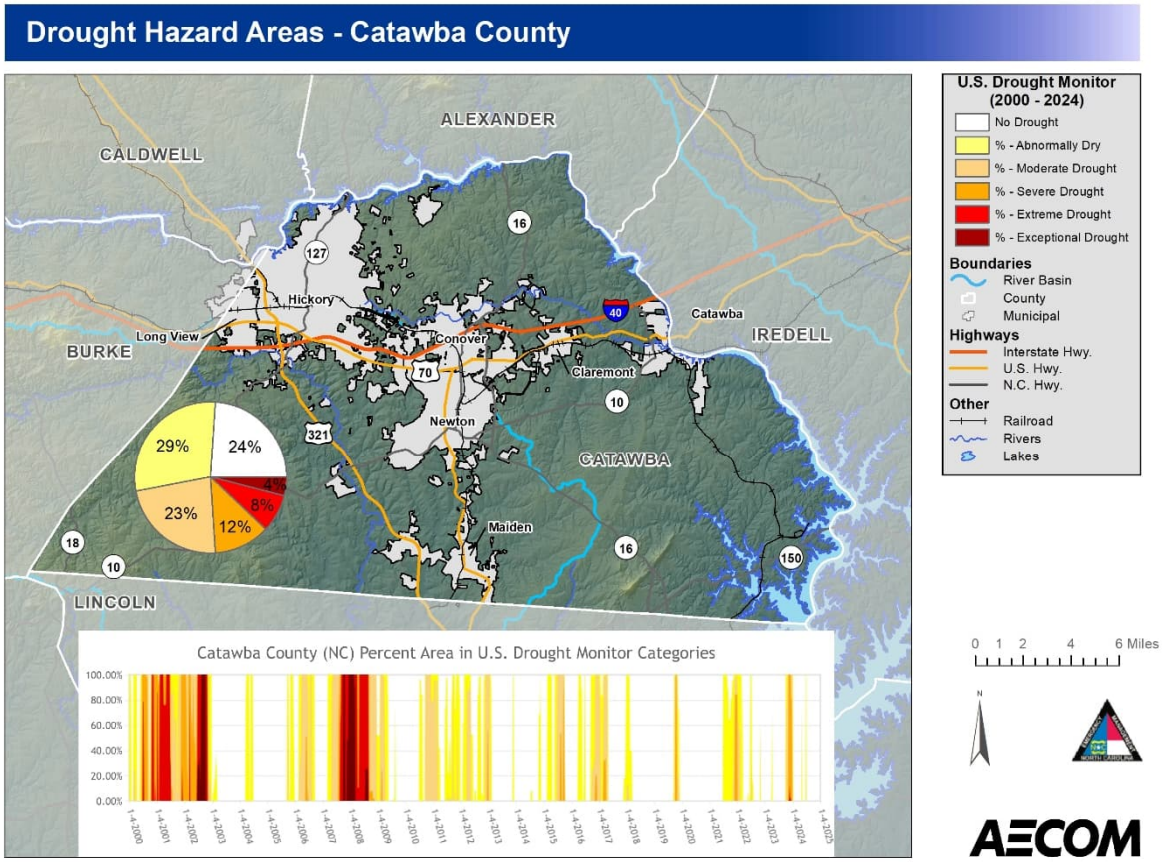


Figure 4- 91: Drought Hazard Areas for Catawba County

4.5.10.3. Extent (Magnitude and Severity)

Definition:

Drought extent is defined by the North Carolina Drought Monitor Classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the North Carolina Drought Monitor Classifications, the most severe drought condition is Exceptional.

Extent Event:

As of 2024, the highest recorded event for the planning area was all counties (Alexander, Burke, Caldwell, Catawba) from December 2007-March 2008. According to the North Carolina Drought Monitor, all four counties and twenty-four jurisdictions (Taylorsville, Connelly Springs, Drexel, Glen Alpine, Hildebran, Rhodhiss, Morganton, Rutherford College, Valdese, Cajah's Mountain, Cedar Rock, Gamewell, Granite Falls, Hudson, Lenoir, Sawmills, Brookford, Catawba, Claremont, Conover, Hickory, Longview, Maiden, Newton) were in a D4 (Exceptional Drought) for this time period. Another example of severe drought occurred in January 2012 following months of lowered precipitation and continued until the end of February 2012[19]. Drought

conditions have also been observed from mid-2016 to mid-2017, where D1-D4 droughts were experienced in NC[20]. More information about historic drought conditions in North Carolina and the percentage of land impacted can be found in Figure 4- 92

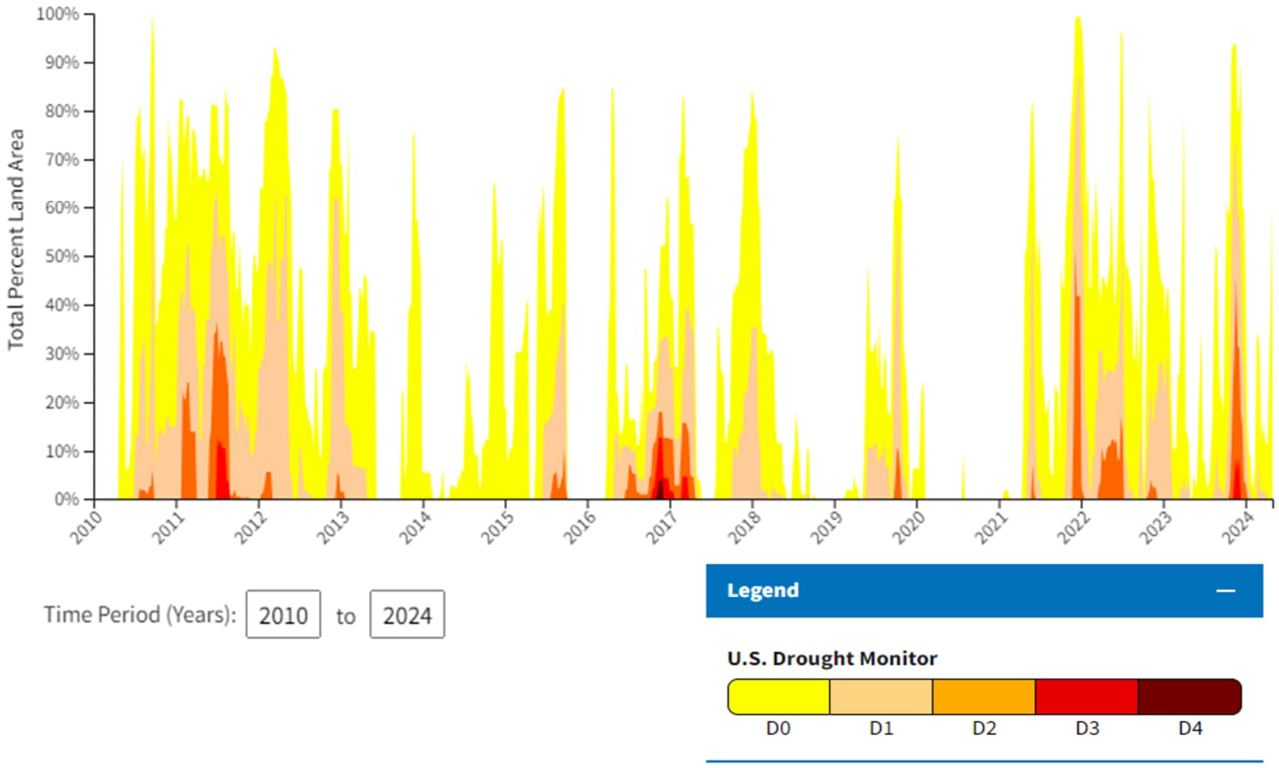


Figure 4- 92: Drought monitor from 2010 to 2024 in North Carolina. Source: NOAA National Drought Information System (https://www.drought.gov/states/north-carolina#historical-conditions)

4.5.10.4. Historical Occurrences

The following historical occurrences of drought ranging from 1998 to 2023 have been identified based on the NCDC Storm Events database Table 4- 47. It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded, or unreported events may have occurred within the planning area during this timeframe.

Location	Events	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Alexander								
Alexander County (Unincorporated Area)	**35**	Standard	0	0	$0	$0	$0	$0
Burke								
Burke County (Unincorporated Area)	**16**	Standard	0	0	$0	$0	$0	$0
Caldwell								
Caldwell County (Unincorporated Area)	**15**	Standard	0	0	$0	$0	$0	$0
Catawba								
Catawba County (Unincorporated Area)	**35**	Standard	0	0	$0	$0	$0	$0
TOTAL PLAN	**101 Events**		**0**	**0**	**$0**	**$0**	**$0**	**$0**

Table 4- 47: Occurrences of Drought (1998 to 2023)

Source: National Climatic Data Center (NCDC) Storm Events Database and or potential user entered data.

According to NCDC 101 recorded instances of Drought conditions have affected the planning area since 1998 causing an estimated $0 in losses to property, $0 in losses to agricultural crops, 0 death(s), and 0 injury(ies).

Table 4- 47 provides a summary of this historical information by participating jurisdiction. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

4.5.10.5. Probability of Future Occurrences

County		Alexander	Catawba	Burke	Caldwell
EAL	Value	$140,000	$379,000	$342,000	$183,000
	Rating	Relatively Low	Relatively Moderate	Relatively Moderate	Relatively Low
Risk Index	Score	73.8	86.1	86	76.6
	Rating	Relatively Low	Relatively Moderate	Relatively Moderate	Relatively Low
Frequency (Events per Year)		31	32.1	33.2	30.7
Historic Loss Ratio		Relatively Moderate	Relatively Moderate	Relatively Moderate	Relatively Moderate

Table 4- 48: NRI Drought EAL, Risk Index, Frequency, and Historic Loss Ratio values. Risk index for drought is only based on agricultural/crop impacts.

The probability of future Drought is highly unpredictable and depend on the conditions of the specific areas that may be affected. The current risk, according to the 2023 NC Hazard Mitigation Plan, is between 1% and 0.33% annual probability. Although, the NCMHP (2023) also states that the changes in weather patterns and climate suggest that the drought conditions may be experienced more frequently in specific areas that are more prone to drought conditions.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Medium**
Burke County (Unincorporated Area)	**Medium**
Caldwell County (Unincorporated Area)	**Medium**

Jurisdiction	Probability of Future Occurrence
Catawba County (Unincorporated Area)	Medium
City of Claremont	Medium
City of Conover	Medium
City of Hickory	Medium
City of Lenoir	Medium
City of Morganton	Medium
City of Newton	Medium
Town of Brookford	Medium
Town of Cajah's Mountain	Medium
Town of Catawba	Medium
Town of Connelly Springs	Medium
Town of Drexel	Medium
Town of Gamewell	Medium
Town of Glen Alpine	Medium
Town of Granite Falls	Medium
Town of Hildebran	Medium
Town of Hudson	Medium
Town of Long View	Medium
Town of Maiden	Medium
Town of Rhodhiss	Medium
Town of Rutherford College	Medium
Town of Sawmills	Medium
Town of Taylorsville	Medium

Jurisdiction	Probability of Future Occurrence
Town of Valdese	**Medium**
Village of Cedar Rock	**Medium**

4.5.10.6. Drought Hazard Vulnerability

It is estimated that annualized losses to the drought hazard will decrease over time due to the continued trend of decreasing agricultural production within the Region, much of which has to do with decreases in the number of farms and land available for farming. While future agricultural losses may decrease other sectors of the Region that are dependent on water supply will likely continue to experience future economic impacts during periods of severe to extreme drought conditions.

4.5.10.7. Climate Change

Future changes in weather patterns and climate may have effects on the vulnerability to the drought hazard for all counties in North Carolina. These changes could impact the probability of drought occurrences, as well as the extent or location of droughts. Lasting drought conditions may be experienced in some areas more frequently.

The North Carolina Climate Science Report predicts future droughts to be warmer than historical events with a high level of confidence. The warmer conditions will lead to more rapid drying through increases in potential evapotranspiration. Therefore, it is likely that future droughts in the Unifour Region in their multiple forms will be more frequent and severe in terms of soil moisture deficits and the impacts on rainfed agriculture and natural vegetation.

County	**Agriculture Exposure**	**Population Exposure**	Population Equivalence	**Building** Exposure	Total exposure Value ***(including population equivalent value)***
Alexander	$9,296,672	N/A			$9,296,672
Burke	$21,668,012				$21,668,012
Caldwell	$12,091,164				$12,091,164
Catawba	$24,258,990				$24,258,990
Total	$67,314,838				$67,314,838

Table 4- 49: NRI Agricultural Exposure to Drought

4.5.11. Hurricane Winds

Hurricanes and tropical storms, along with nor'easters and typhoons, are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornadoes. Coastal areas are particularly vulnerable to storm surge, wind-driven waves, and tidal flooding which can prove more destructive than cyclone wind.

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

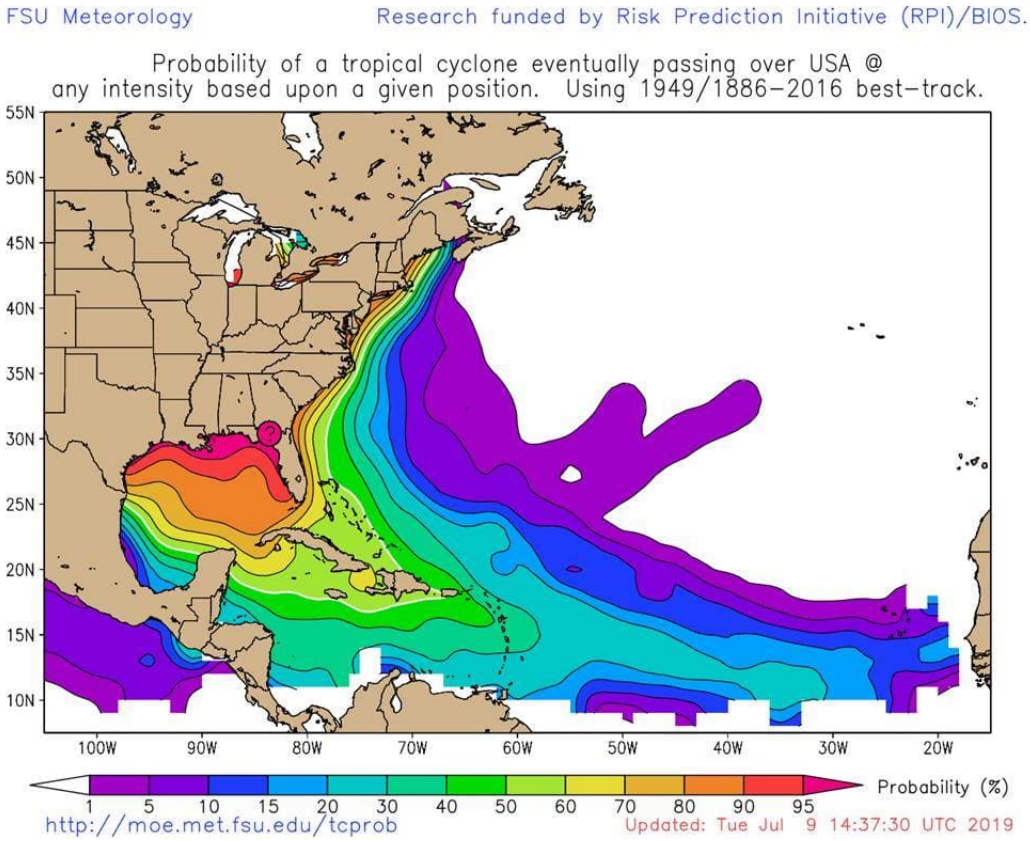


Figure 4- 93: Empirical Probability of a Named Hurricane or Tropical Storm

Figure 4- 94 shows, for any location, the chance of a hurricane or tropical storm affecting the area sometime during the Atlantic hurricane season. The figure was created by the National Oceanic and Atmospheric Administration's (NOAA) Hurricane Research Division, using data from 1949/1886-2016. The figure shows the number of times a storm or hurricane was located within approximately 100 miles (165 kilometers) of a given spot in the Atlantic basin.

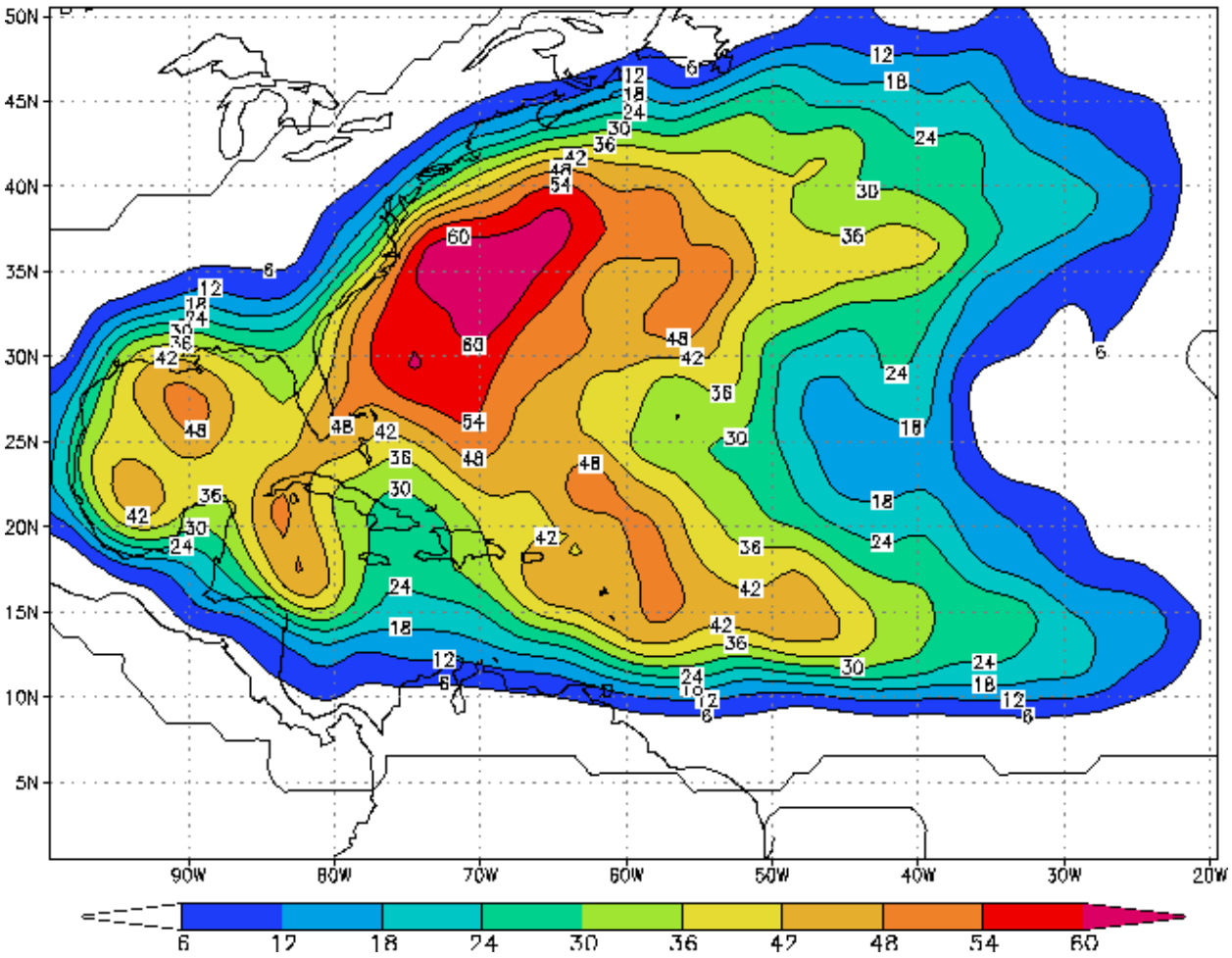


Figure 4- 94: Empirical Probability of a Named Hurricane or Tropical Storm

Source: National Oceanic and Atmospheric Administration, Hurricane Research Division

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 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 which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense. The Saffir-Simpson Scale is shown in Table 4- 50.

CATEGORY	MAXIMUM SUSTAINED WIND SPEED(MPH)	MINIMUM SURFACE PRESSURE(MILLIBARS)	STORM SURGE (FEET)
1	74–95	Greater than 980	3–5
2	96–110	979–965	6–8
3	111–130	964–945	9–12
4	131–155	944–920	13–18
5	155 +	Less than 920	19+

Table 4- 50: Saffir-Simpson Scale

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential, 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 cyclones making landfall, they account for over 70 percent of the damage in the United States. Table 4- 51 describes the damage that could be expected for each hurricane category.

Storm 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.	

Storm Category	Damage Level	Description of Damages	Photo Example
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.	

Table 4- 51: Hurricane Damage Classifications

Sources: National Hurricane Center and the Federal Emergency Management Agency

While not directly relevant to the planning area, storm surge is another common element of hurricane activity. A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from four to five feet in a Category 1 hurricane up to 20 feet in a Category 5 storm. The storm surge arrives ahead of the storm's actual landfall and the more intense the hurricane is, the sooner the surge arrives. Water rise can be very rapid, posing a serious threat to those who have not yet evacuated flood-prone areas. A storm surge is a wave that has outrun its generating source and become a long period swell. The surge is always highest in the right-front quadrant of the direction in which the hurricane is moving. As the storm approaches shore, the greatest storm surge will be to the north of the hurricane eye. Such a surge of high water topped

by waves driven by hurricane force winds can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate coast.



Hurricane Floyd brought a devastating 15 feet of storm surge that damaged or destroyed hundreds of houses along the ocean front of Long Beach on Oak Island, North Carolina in September 1999. A prime example of successful hazard mitigation, the elevated home (right) survived while the older, ground-level block foundation of the home on the left was undermined and crushed. (Photo by Dave Gatley/FEMA News Photo)

Storm surge heights and associated waves are dependent upon the shape of the continental shelf (narrow or wide) and the depth of the ocean bottom (bathymetry). A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves.

Damage during hurricanes may also result from spawned tornadoes and inland flooding associated with heavy rainfall that usually accompanies these storms. Hurricane Floyd, for example, was at one time a Category 4 hurricane racing towards the North Carolina coast. As far inland as Raleigh, the state capital located more than 100 miles from the coast, communities were preparing for winds exceeding 100 miles per hour. While Floyd made landfall as a Category 2 hurricane it caused the worst inland flooding disaster in North Carolina's history. Rainfall amounts exceeded 20 inches in certain locales and 67 counties sustained damages.

Like hurricanes, nor'easters are ocean storms capable of causing substantial damage to coastal areas in the Eastern United States due to their strong winds and heavy surf. Nor'easters are named for the winds that blow in from the northeast and drive the storm up the East Coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful.

Nor’easters are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe beach erosion and coastal flooding. There are two main components to a nor'easter: (1) a Gulf Stream low-pressure system (counter-clockwise winds) generated off the southeastern U.S. coast, gathering warm air and moisture from the Atlantic, and pulled up the East Coast by strong northeasterly winds at the leading edge of the storm; and (2) an Arctic high-pressure system (clockwise winds) which meets the low-pressure system with cold, arctic air blowing down from Canada. When the two systems collide, the moisture and cold air produce a mix of precipitation and have the potential for creating dangerously high winds and heavy seas. As the low-pressure system deepens, the intensity of the winds and waves increase and can cause serious damage to coastal areas as the storm moves northeast.

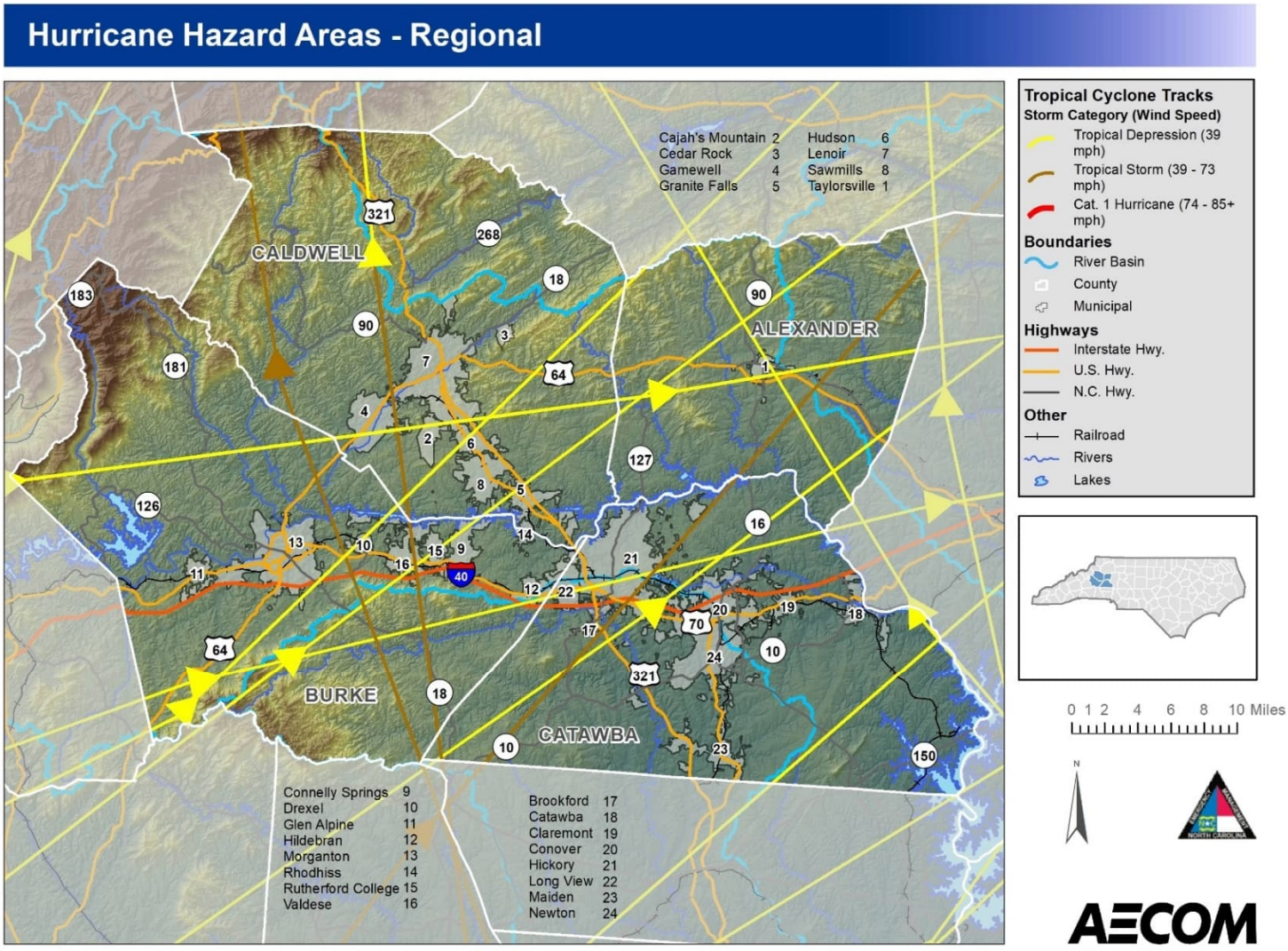


Figure 4- 95: Hurricane Winds Hazard Areas

4.5.11.1. Location within the Planning Area

The figures below show the probability of future named storms and paths of historic storms in the planning area

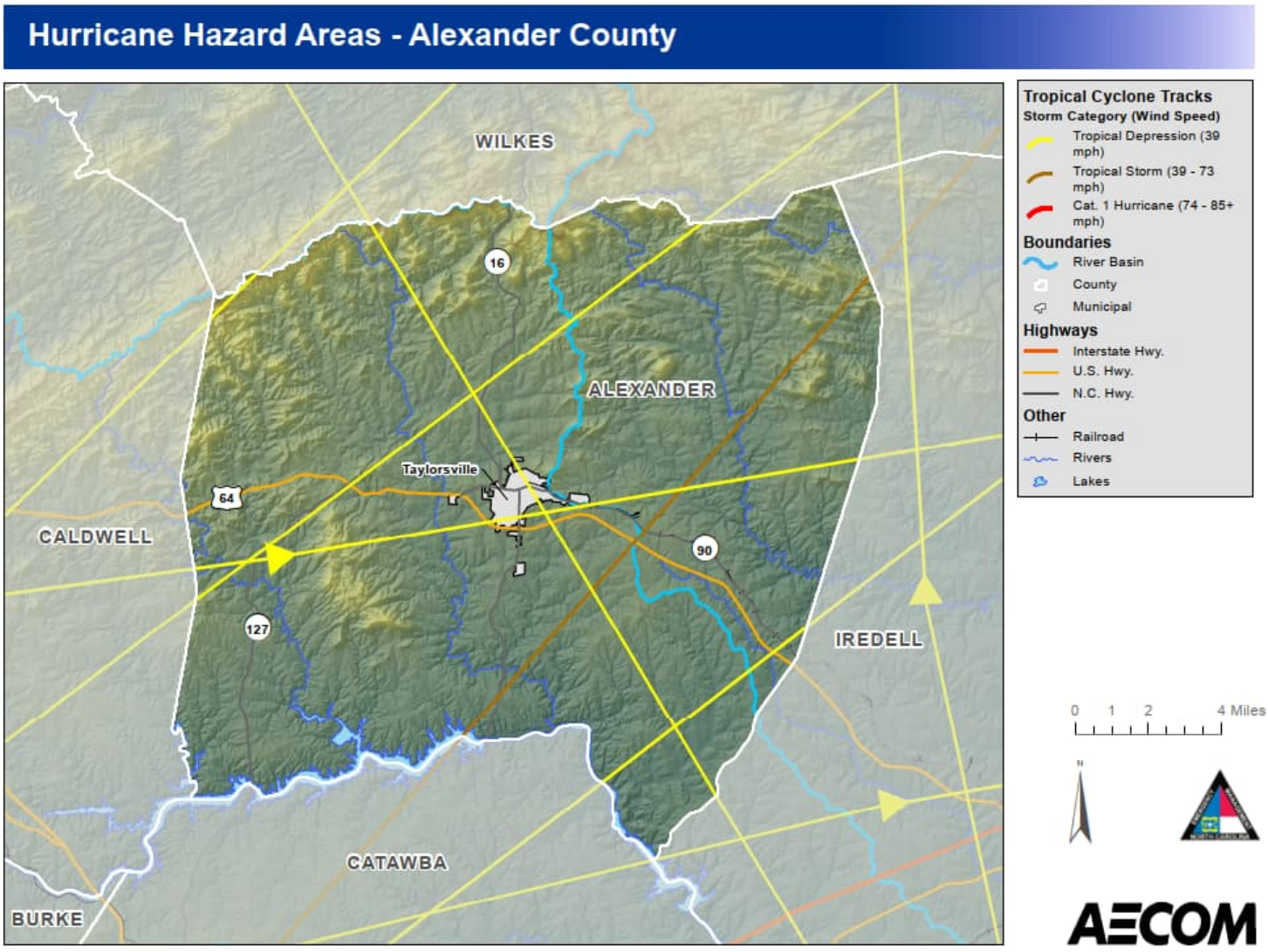


Figure 4- 96: · Hurricane Winds Hazard Areas for Alexander County

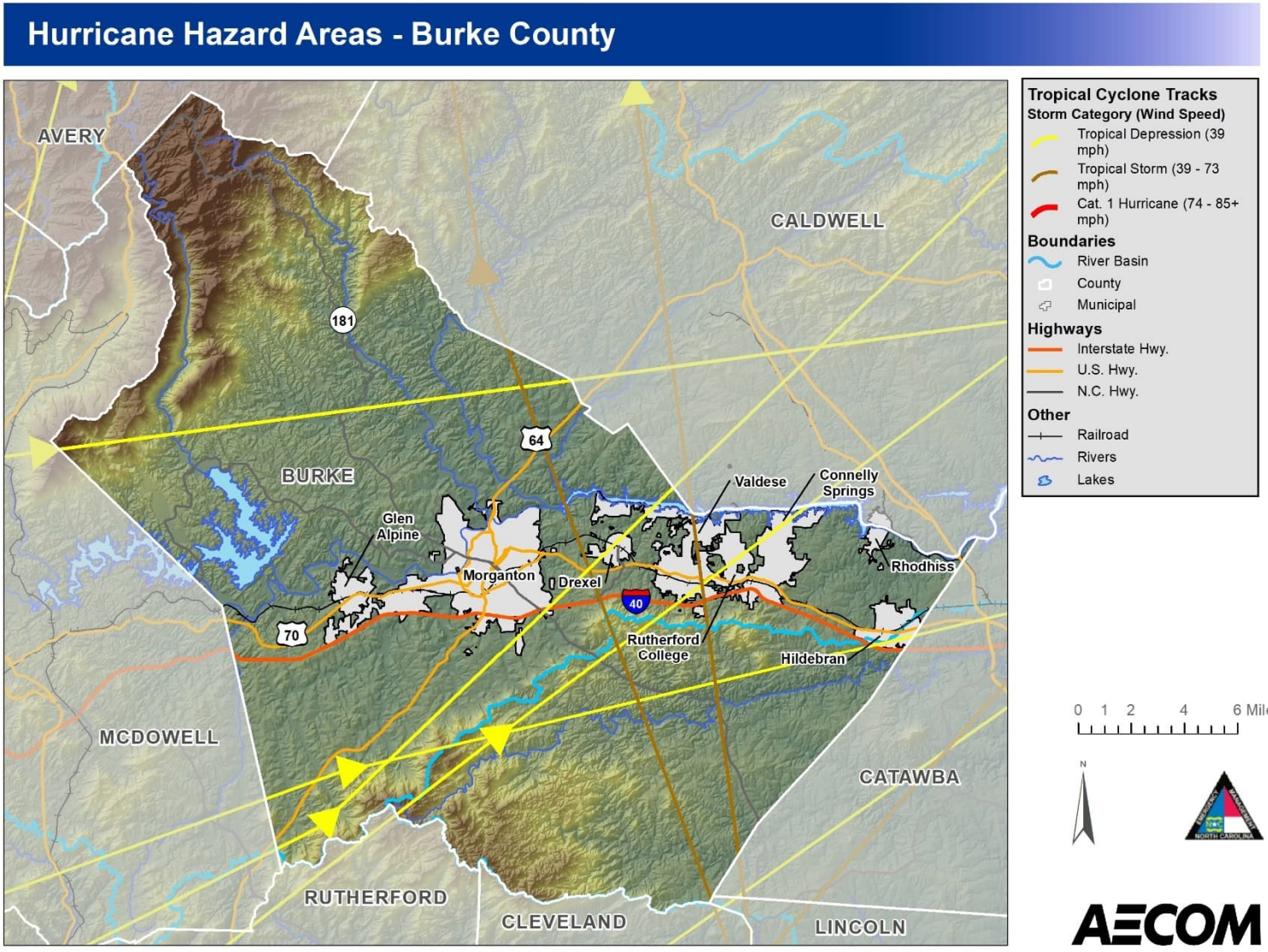


Figure 4- 97: Hurricane Winds Hazard Areas for Burke County

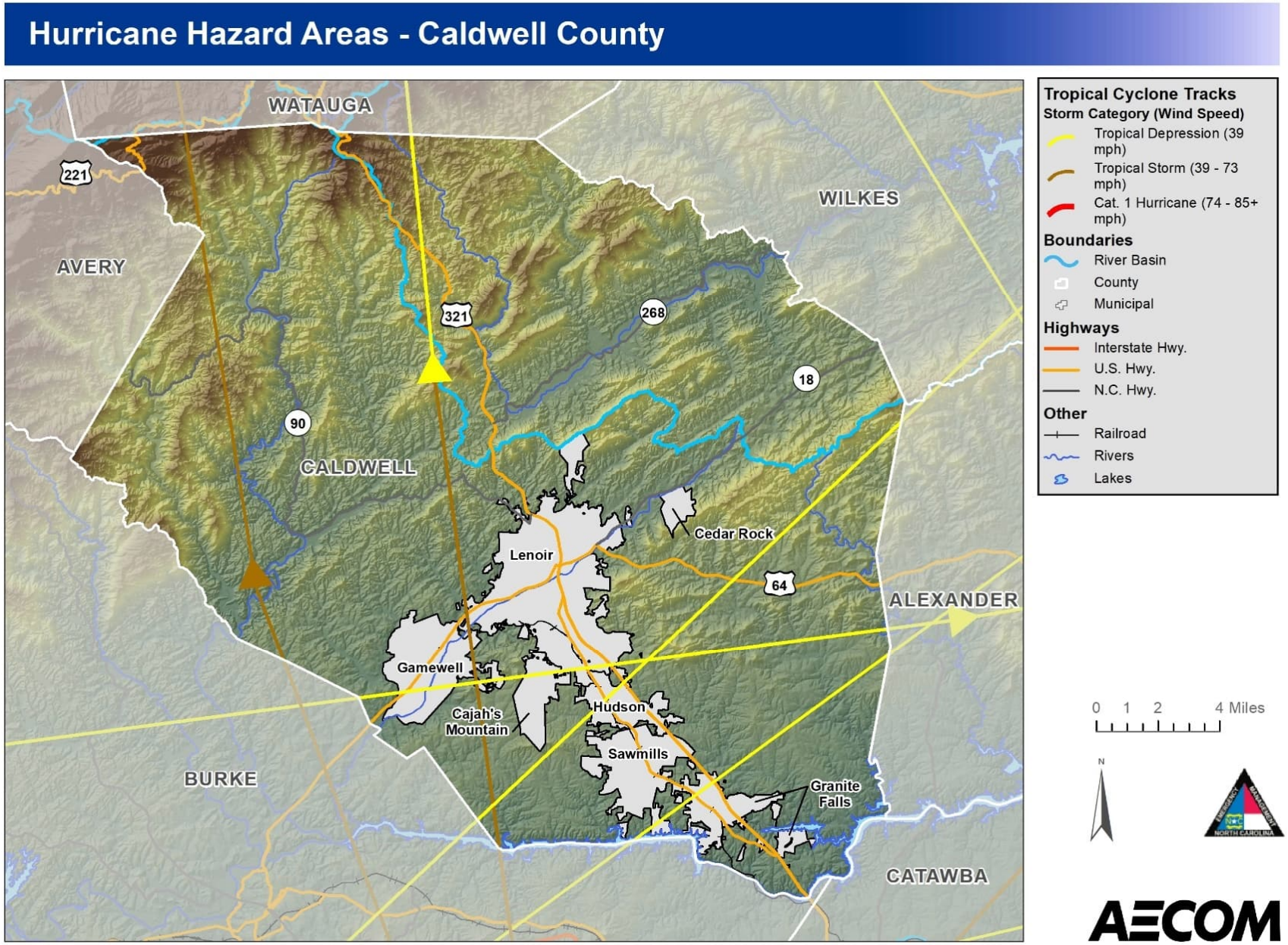


Figure 4- 98: Hurricane Winds Hazard Areas for Caldwell County

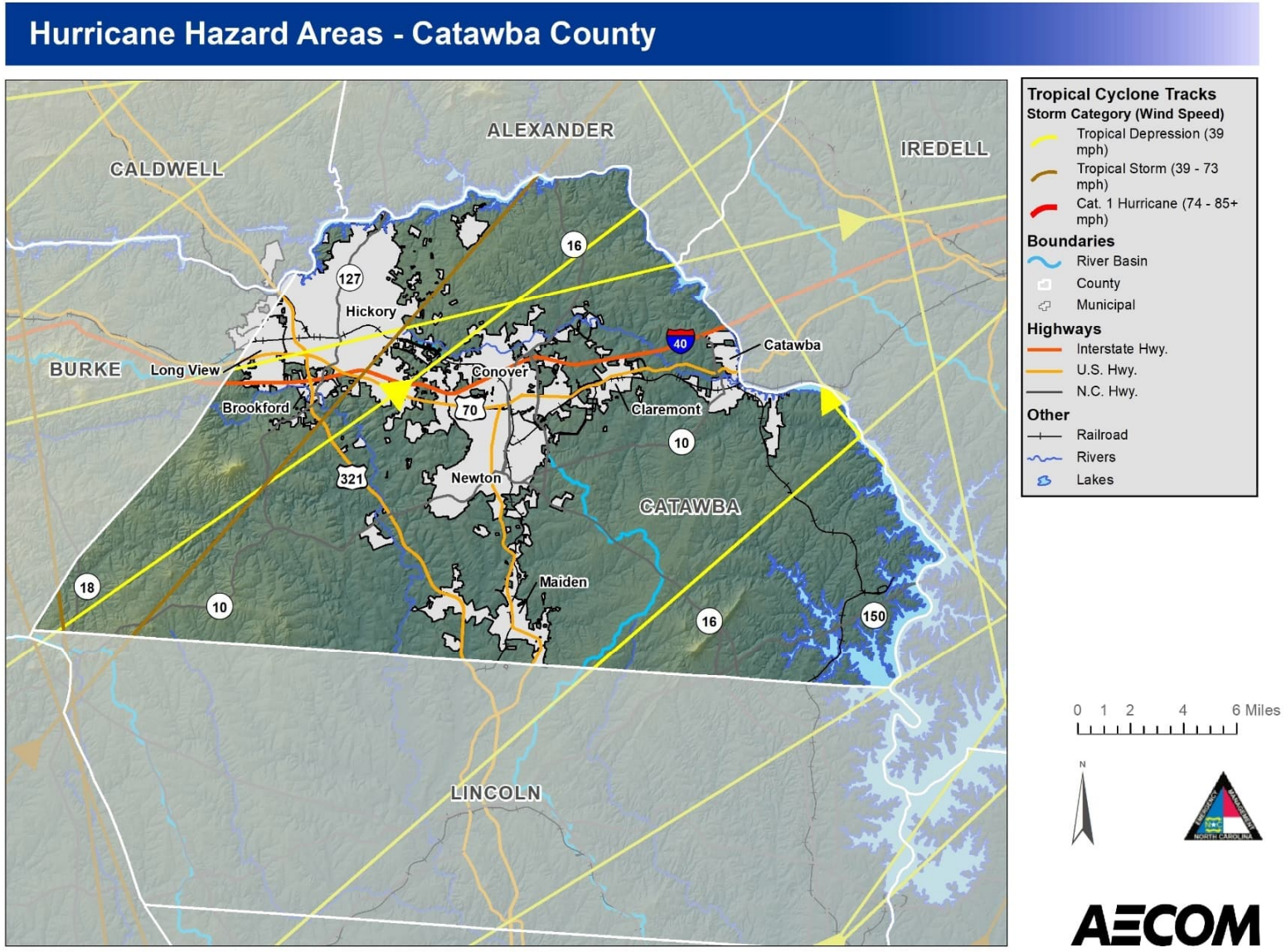


Figure 4- 99: Hurricane Winds Hazard Areas for Catawba County

4.5.11.2. Extent (Magnitude and Severity)

Definition:

Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5.

Extent Event:

Hurricanes and tropical storms of any magnitude and severity are theoretically possible within the planning area, however major hurricanes (Category 3 and greater) are less likely to retain that classification as far inland as the Unifour Region. Since the 1850s, the greatest magnitude hurricane to impact the planning area has been a Category 1 hurricane in 1989 (Hurricane Hugo) (see Historical Occurrences section below). A Category 1 hurricane typically results in minimal damages, including damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage, etc. that is not applicable to the planning area.

4.5.11.3. Historical Occurrences

Table 4- 52 lists the 50 hurricanes, tropical depression, and tropical storm paths that have crossed within a 100-mile radius of the mean center of the planning area between 1859 to 2023[21]. Between 1950 and 2023 there was a reported total property damage of $6,000 in Burke, Caldwell, Catawba, and Alexander counties. The most powerful hurricane recorded remains as an unnamed hurricane that occurred in 1893 which reached a maximum recorded wind speed of 85 mph.

Name	Date	Magnitude	Maximum Recorded Wind Speed (mph)
Unnamed	09/17/1859	Tropical Storm	45
Unnamed	09/11/1882	Tropical Storm	45
Unnamed	06/22/1886	Tropical Storm	45
Unnamed	09/24/1889	Tropical Storm	50
Unnamed	08/28/1893	Category 1 Hurricane	85
Unnamed	07/19/1901	Tropical Depression	35
Unnamed	10/11/1902	Extra-tropical Storm	35
Unnamed	10/11/1905	Extra-tropical Storm	25
Unnamed	09/23/1907	Extra-tropical Storm	35
Unnamed	08/30/1911	Extra-tropical Storm	30

Name	Date	Magnitude	Maximum Recorded Wind Speed (mph)
Unnamed	09/04/1913	Tropical Storm	45
Unnamed	08/03/1915	Tropical Depression	35
Unnamed	09/23/1920	Tropical Storm	65
Unnamed	10/03/1927	Tropical Storm	45
Unnamed	08/11/1928	Extra-tropical Storm	30
Unnamed	08/18/1939	Tropical Depression	30
Unnamed	08/14/1940	Extra-tropical Storm	35
Unnamed	08/28/1949	Tropical Storm	45
Able	08/31/1952	Tropical Storm	50
Gracie	09/30/1959	Tropical Storm	70
Cleo	08/30/1964	Tropical Depression	30
Abby	06/08/1968	Tropical Depression	30
Babe	09/08/1977	Tropical Depression	30
David	09/05/1979	Tropical Storm	65
Bob	07/25/1985	Tropical Storm	65
Danny	08/18/1985	Tropical Depression	30
Chris	08/29/1988	Tropical Depression	30
Hugo	09/22/1989	Category 1 Hurricane	85
Beryl	08/17/1994	Tropical Depression	15
Bill	07/02/2003	Tropical Depression	25
Ivan	09/09/2004	Tropical Depression	25
Jeanne	09/13/2004	Tropical Depression	25
Cindy	07/03/2005	Extra-tropical Storm	20
Florence	09/10/2018	Tropical Depression	25
Michael	10/11/2018	Tropical Storm	52
Florence	9/13/2018	Tropical Depression	29
Bertha	5/27/2020	Tropical Depression	29
Claudette	6/21/2021	Tropical Depression	35
Ian	10/1/2022	Extratropical Storm	23

Table 4- 52: Historical Occurrences of Hurricane Storm Paths Crossing within 75 Miles of the Planning Area
Source: NOAA National Hurricane Center and North Carolina State University Climate Office Hurricane Database

4.5.11.4. Probability of Future Occurrences

County		Alexander	Catawba	Burke	Caldwell
EAL	Value	$430,000	$1,900,000	$537,000	$555,000
	Rating	Very Low	Relatively Low	Very Low	Relatively High
Risk Index	Score	61	75.1	63.8	63.9
	Rating	Very Low	Relatively Low	Relatively Low	Relatively Low
Frequency (Events per Year)		0	0.1	0	1.1
Historic Loss Ratio		Relatively Low	Relatively Low	Relatively Low	Relatively Moderate

Table 4- 53: NRI Risk Index, EAL, Frequency, and Historic Loss Ratio for Hurricanes

Based on the analyses performed in IRISK, the probability of future Hurricane Winds is shown in the table below, by jurisdiction.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Medium**
Burke County (Unincorporated Area)	**Medium**
Caldwell County (Unincorporated Area)	**Medium**
Catawba County (Unincorporated Area)	**Medium**
City of Claremont	**Medium**
City of Conover	**Medium**

Jurisdiction	IRISK Probability of Future Occurrence
City of Hickory	Medium
City of Lenoir	Medium
City of Morganton	Medium
City of Newton	Medium
Town of Brookford	Medium
Town of Cajah's Mountain	Medium
Town of Catawba	Medium
Town of Connelly Springs	Medium
Town of Drexel	Medium
Town of Gamewell	Medium
Town of Glen Alpine	Medium
Town of Granite Falls	Medium
Town of Hildebran	Medium
Town of Hudson	Medium
Town of Long View	Medium
Town of Maiden	Medium
Town of Rhodhiss	Medium
Town of Rutherford College	Medium
Town of Sawmills	Medium
Town of Taylorsville	Medium
Town of Valdese	Medium
Village of Cedar Rock	Medium

4.5.11.5. Climate Change

Changing climate and weather conditions are likely to impact the number and intensity of future hurricane events in North Carolina. The amount of influence that human-induced climate warming has had on hurricanes to date is believed to be relatively small, and this, in conjunction with observational limitations and large natural variations, makes it difficult to establish whether there are as yet any clear trends in hurricanes that can be attributed to human-induced warming.

Studies conducted by the National Oceanic and Atmospheric Administration (NOAA) have predicted that while there may be less frequent, low-category storm events (Tropical Storms, Category 1 Hurricanes), there will be more high-category storm events (Category 4 and 5 Hurricanes) in the future. In other words, there may be fewer hurricanes overall in any given year, but when hurricanes do form, it is more likely that they will become larger storms that can cause massive damage.

That said, while a consistent finding of numerous previous studies of hurricanes and climate change was that the strongest storms will become stronger as the climate continues to warm, there is now less consistency regarding how hurricane frequency will change. Some earlier projections of decreases in hurricane activity now appear less confident in light of more recent high-resolution modeling studies.

On a global scale, it is predicted with high confidence that the intensity of the strongest hurricanes is likely to increase with a warming climate. For specific regions such as North Carolina, the confidence in this outcome is lower, but there is no known reason to suggest that North Carolina will not experience stronger hurricanes in future.

4.5.11.6. Hurricane Winds Hazard Vulnerability

Continued enforcement of building codes, flood damage prevention ordinances and other local regulatory tools and policies designed to mitigate the effects of high hazard winds is expected to minimize future losses as construction and planning continue to seek higher standards. Based on historical events the most significant local impacts for the Unifour Region regarding future events will likely be damage to trees (and the requisite management of vegetative debris) and widespread power outages to the area.

The following tables provide counts and values by jurisdiction relevant to Hurricane Winds hazard vulnerability in the Unifour Regional HMP Area.

4.5.12. Ice

Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Sleet—raindrops that freeze into ice pellets before reaching the ground—usually bounce when hitting a surface and do not stick to objects; however, sleet can accumulate like snow and cause a hazard to motorists. Freezing rain is rain that falls onto a surface with a temperature below freezing, forming a glaze of ice. Even small accumulations of ice can cause a significant hazard, especially on power lines and trees. An ice storm occurs when freezing rain falls and freezes immediately upon impact. Communications and power can be disrupted for days, and even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

A freeze is weather marked by low temperatures, especially when below the freezing point (zero degrees Celsius or thirty-two degrees Fahrenheit). Agricultural production is seriously affected when temperatures remain below the freezing point.

4.5.12.1. Ice Hazard Analysis

In general, winter weather events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation, all of which may create locally hazardous conditions regardless of the magnitude of the overall event. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.

4.5.12.2. Location within the Planning Area

Winter weather, including blizzards, frosts/freezes, heavy snow, ice storms and sleet, are widespread atmospheric conditions that are not isolated to a specific geographic location. Therefore, it is assumed that the entire planning area is exposed to this hazard. In the figures below, the measurements ranging from 0.0-1.5 are in inches.

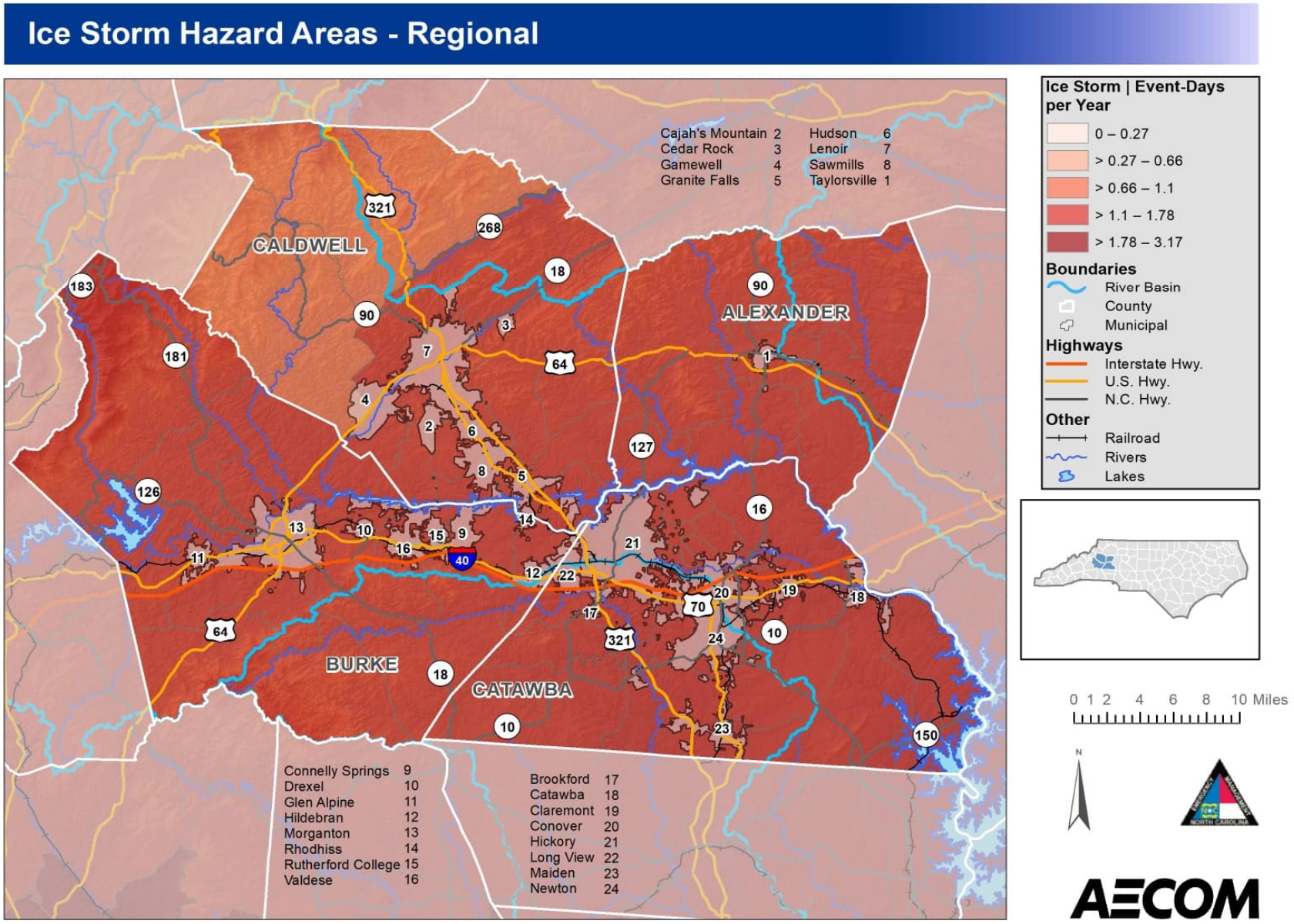


Figure 4- 100: Ice Hazard Areas with Average Annual Accumulation in inches

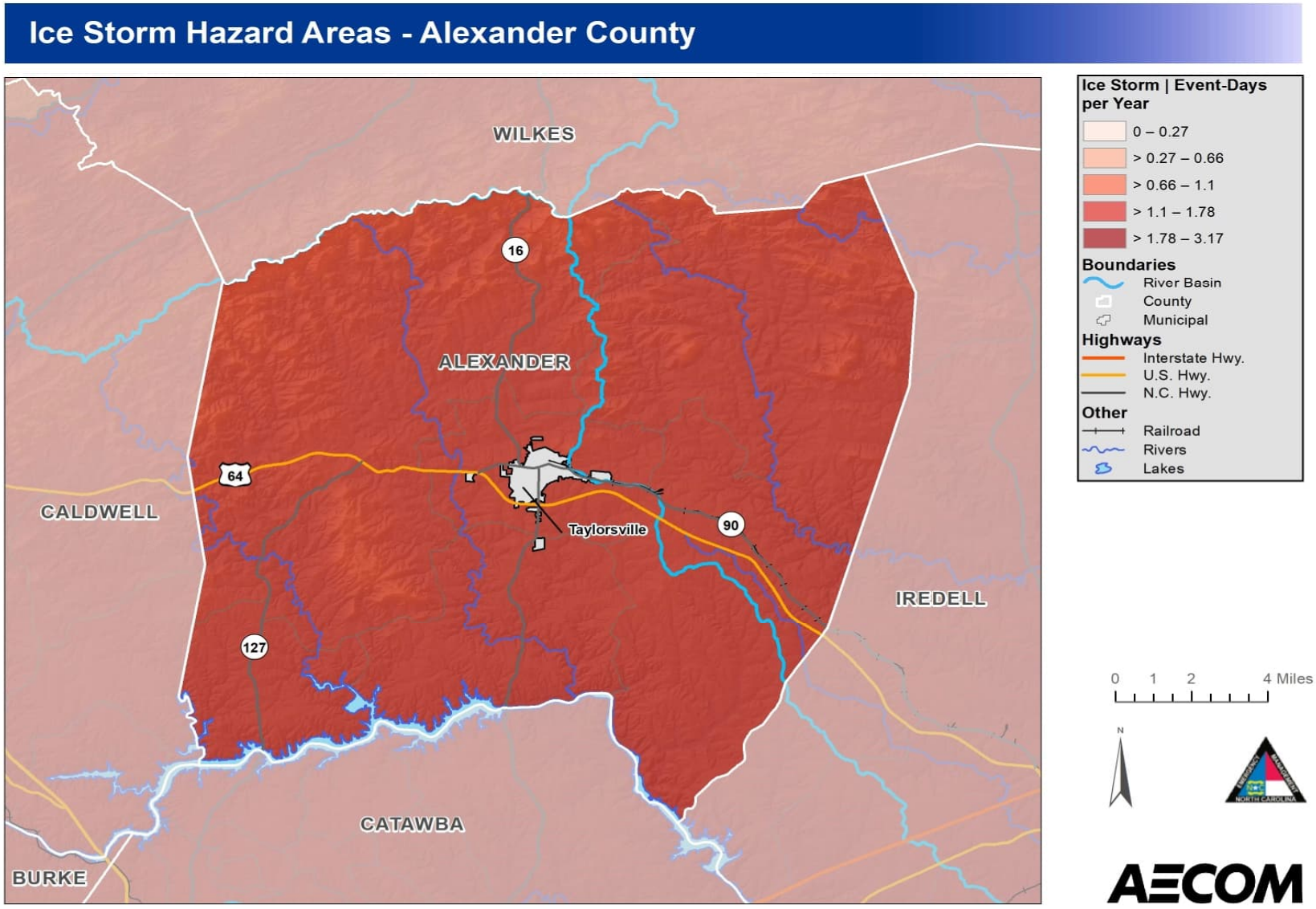


Figure 4- 101: Ice Hazard Areas with Average Annual Accumulation in inches for Alexander County

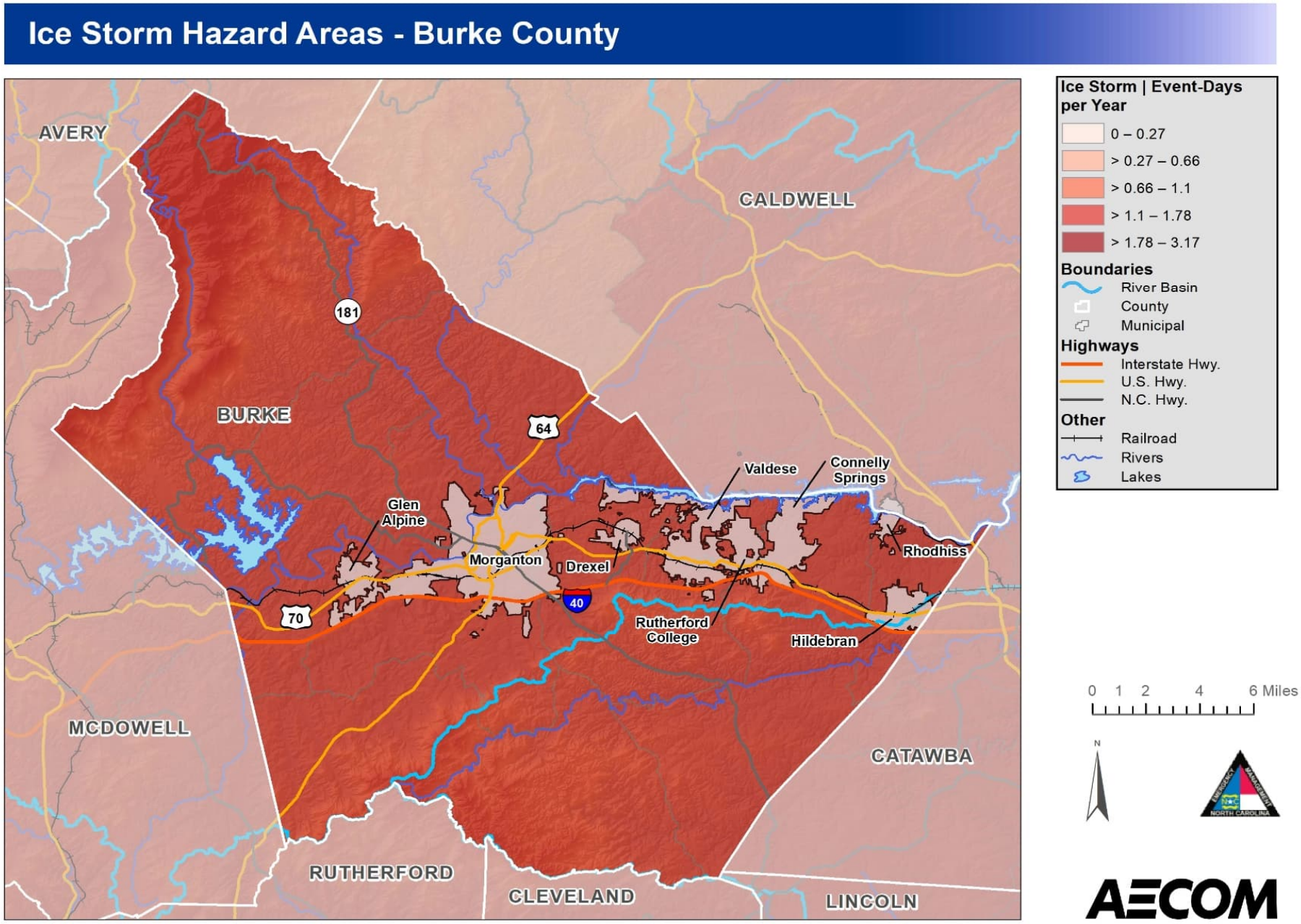


Figure 4- 102: Ice Hazard Areas with Average Annual Accumulation in inches for Burke County

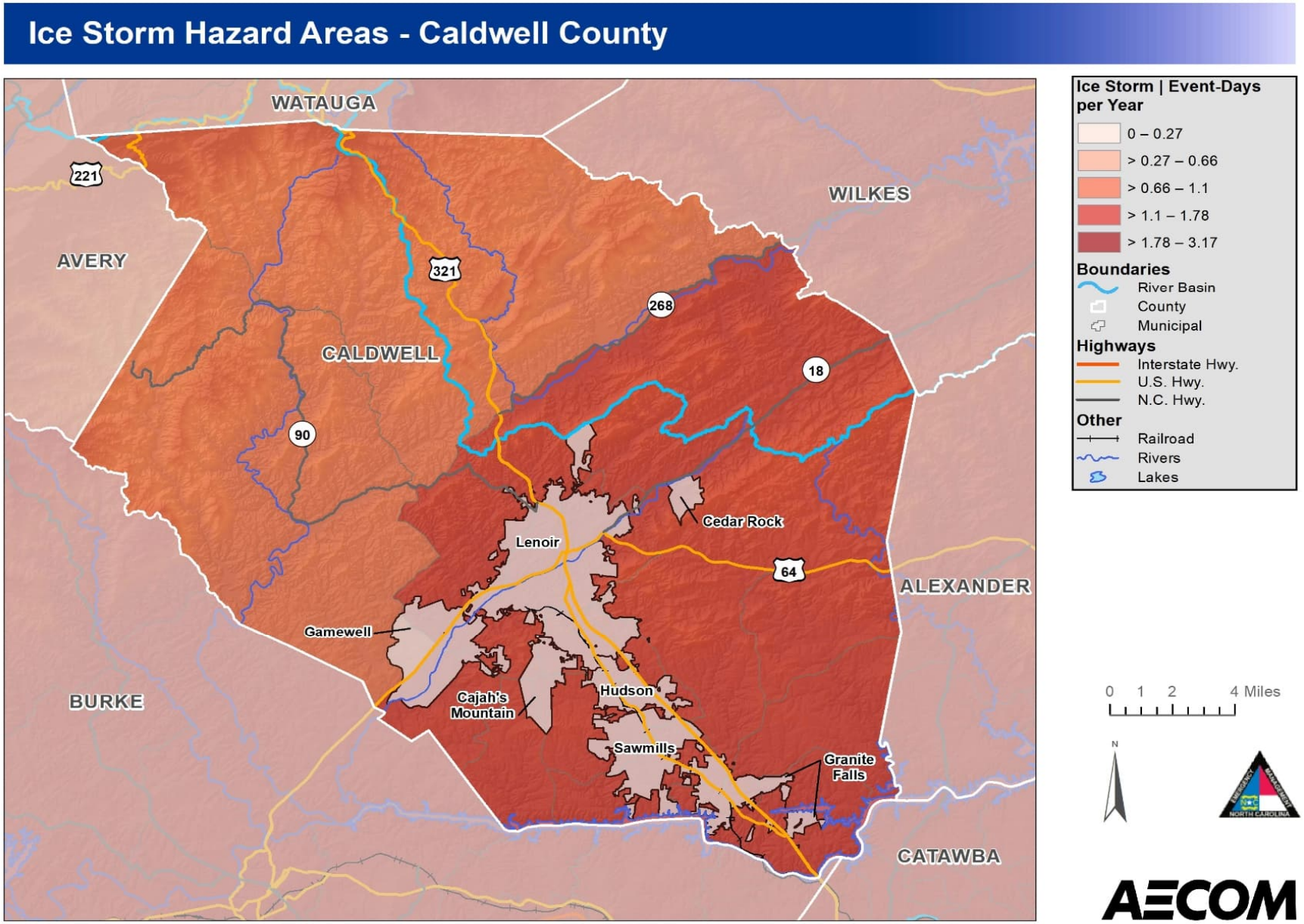


Figure 4- 103: Ice Hazard Areas with Average Annual Accumulation in inches for Caldwell County

Ice Storm Hazard Areas - Catawba County

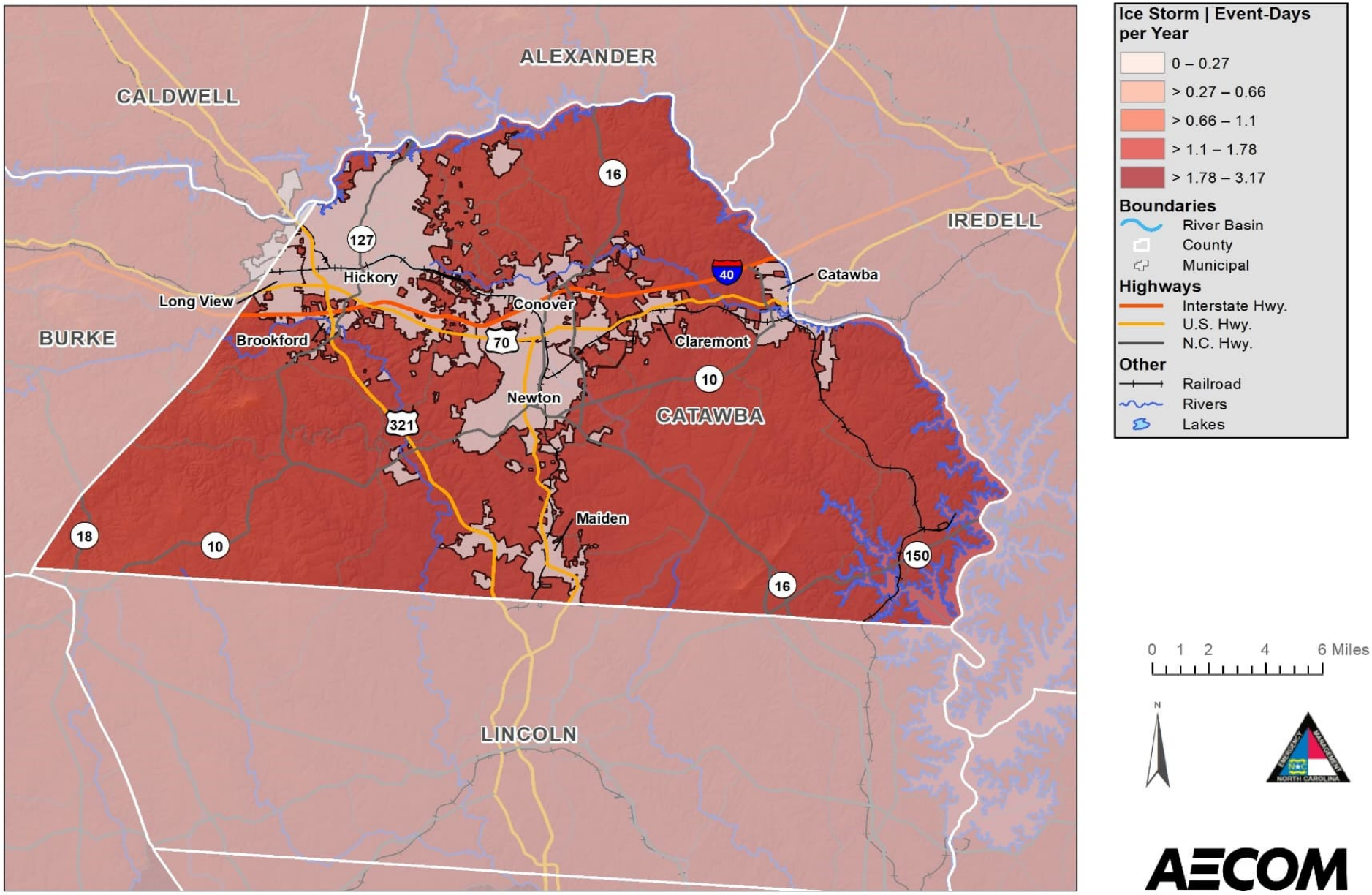


Figure 4- 104: Ice Hazard Areas with Average Annual Accumulation in inches for Catawba County

4.5.12.3. Extent (Magnitude and Severity)

Definition:

Severity of ice storms can be measured by the accumulation amount of ice received in inches.

Extent Event:

The highest recorded event for the planning area was in all four counties (Alexander, Burke, Caldwell, Catawba) and the 24 cities (Taylorsville, Connelly Springs, Drexel, Glen Alpine, Hildebran, Rhodhiss, Morganton, Rutherford College, Valdese, Cajah's Mountain, Cedar Rock, Gamewell, Granite Falls, Hudson, Lenoir, Sawmills, Brookford, Catawba, Claremont, Conover, Hickory, Longview, Maiden, Newton) in December 2002. The planning area received 3-4 inches of snow then transitioned into sleet and freezing rain accumulating approximately 1/4-1/2 inches of ice.

4.5.12.4. Historical Occurrences

The following historical occurrences ranging from 1996 to the present have been identified based on the NCDC Storm Events database. NCDC presents winter weather hazards under multiple subcategories. The table below shows occurrences of winter weather events, frost/freezes, ice storms and sleet. Because winter weather affects a large geographic area, this information is processed by NCDC in forecast “zones,” and therefore a municipal-level breakdown is not provided. Similarly, it is important to note that many of the events shown for one county are the same events that are counted for one of the other four counties in the planning area. For these reasons, totals are not provided in the table for the Unifour area as some double counting would be inherent in the numbers. Also, only those historical occurrences listed in the NCDC database are shown here and other smaller, unrecorded, or unreported events may have occurred within the planning area during this timeframe.

The following are summaries from the NCDC Storm Events Database episode narratives and are the only reported events of Ice Storms between 2018 and 2023:

Burke and Caldwell County (11/14/2018)

Precipitation developed in association with weak low pressure moving across the Southeast during the overnight of the 14th and early morning of the 15th. Precipitation began as rain and/or snow across the mountains but transitioned to liquid as temperatures warmed aloft. However, a wedge of cool air remained in place across the Blue Ridge, resulting in freezing rain, mainly within a few miles either side of the Continental Divide. While most areas saw around a tenth of an inch or less of ice accretion, damaging ice accumulations were reported across the high elevations of Caldwell and Burke Counties, as well as eastern portions of Avery County.

Burke and Caldwell County (11/24/2018)

For the second time in 10 days, a freezing rain event developed across portions of the mountains and foothills of North Carolina. Precipitation developed during the overnight, as a wave of low pressure moved along the Gulf Coast. Precipitation began as rain and snow but transitioned to freezing rain across all but the highest elevations (where more of a wintry mix was reported), as a wedge of cold air locked in near the Blue Ridge. As freezing rain continued through daybreak, damaging accumulations of ice, generally between one quarter and one half inch were reported across the area. Quite a few trees and power lines, along with numerous power outages were reported across the area.

Alexander, Burke, Caldwell, and Catawba County (1/12/2019)

Moist air flowing over a wedge of cold air banked against the eastern slopes of the Appalachians resulted in precipitation development across the Blue Ridge and surrounding areas beginning during the evening of the 12th. The atmosphere quickly cooled to or below freezing near the escarpment and out across the lower elevations of the foothills and far northwest Piedmont. This resulted in much of the precipitation falling as freezing rain in these areas. The freezing rain continued through the overnight across the Blue Ridge and surrounding areas before tapering off around daybreak on the 13th. Total ice accretion of one quarter to one half inch was reported, with the heaviest amounts being across the foothills and immediately along the Blue Ridge escarpment. Scattered downed trees and power outages were reported throughout the area.

Burke and Caldwell County (2/17/2021)

Moisture and precipitation overspread the western North Carolina late in the evening of the 17th and continued into the morning of the 18th in association with an area of low pressure moving along the Gulf Coast. Enough cold air was trapped along the eastern Blue Ridge escarpment to allow much of this precipitation to fall as freezing rain. By the time the precipitation tapered off during the morning of the 18th, total ice accretion was generally around one quarter inch, although spotty amounts closer to one half inch were reported. Due to warm road temperatures, accretion was primarily limited to elevated surfaces and limited travel difficulties.

Probability of Future Occurrences

County		Alexander	Catawba	Burke	Caldwell
EAL	**Value**	90.9	97.7	96.3	95.7
	Rating	Relatively High	Very High	Very High	Relatively High
Risk Index	**Score**	92	98.2	97.2	96.4
	Rating	Relatively High	Very High	Very High	Very High
Frequency (Events per Year)		1.4	1.7	1.5	1.1

County	Alexander	Catawba	Burke	Caldwell
Historic Loss Ratio	Relatively Moderate	Relatively Low	Relatively Moderate	Relatively Moderate

Table 4- 54: NRI Ice Storm Risk Index, EAL, Frequency, and Historic Loss Ratio

The probability of future Ice is shown in the table below, by jurisdiction.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Medium**
Burke County (Unincorporated Area)	**Medium**
Caldwell County (Unincorporated Area)	**Medium**
Catawba County (Unincorporated Area)	**Medium**
City of Claremont	**Medium**
City of Conover	**Medium**
City of Hickory	**Medium**
City of Lenoir	**Medium**
City of Morganton	**Medium**
City of Newton	**Medium**
Town of Brookford	**Medium**
Town of Cajah's Mountain	**Medium**
Town of Catawba	**Medium**

Jurisdiction	Probability of Future Occurrence
Town of Connelly Springs	**Medium**
Town of Drexel	**Medium**
Town of Gamewell	**Medium**
Town of Glen Alpine	**Medium**
Town of Granite Falls	**Medium**
Town of Hildebran	**Medium**
Town of Hudson	**Medium**
Town of Long View	**Medium**
Town of Maiden	**Medium**
Town of Rhodhiss	**Medium**
Town of Rutherford College	**Medium**
Town of Sawmills	**Medium**
Town of Taylorsville	**Medium**
Town of Valdese	**Medium**
Village of Cedar Rock	**Medium**

4.5.12.5. Ice Hazard Vulnerability

A qualitative factor in terms of vulnerability is a general lack of awareness on the part of county residents in preparing for and responding to winter storm conditions, such as ice in a manner that will minimize the danger to themselves and others. This lack of awareness is especially apparent when driving/roadway conditions catch motorists off-guard. Potential losses associated with winter storms, such as ice include the cost of the removal of ice from roadways, debris clean-up, and some indirect losses from power outages, etc. All future structures and infrastructure in the region will be vulnerable to winter storms.

4.5.12.6. Climate Change

The uncertainty associated with potentially changing climate conditions creates unpredictability for future severe winter storms including those that result in significant ice formation and accumulation. While it is generally assumed that rising global temperatures will result in shorter and warmer winters in many areas, warmer winters may mean that precipitation that would normally fall as snow may begin to fall as freezing rain instead.

The North Carolina Climate Science Report similarly states that there is considerable uncertainty about future changes in the number and severity of extratropical cyclones which cause winter storms, and consequently there is low confidence concerning future changes in the number of ice storms and incidents of freezing rain likely to occur.

4.5.13. Thunderstorm Wind

4.5.13.1. Thunderstorm Winds Hazard Analysis

Thunderstorms are caused when air masses of varying temperatures meet. Rapidly rising warm moist air serves as the “engine” for thunderstorms. These storms can occur singularly, in lines, or in clusters. 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% of these storms are classified as “severe.” Although thunderstorms generally affect a small area when they occur, they are very dangerous because of their ability to generate tornadoes, hailstorms, strong winds, flash flooding, and damaging lightning. While thunderstorms can occur in all regions of the United States, they are most common in the central and southern states because atmospheric conditions in those regions are most ideal for generating these powerful storms.

4.5.13.2. Location within the Planning Area

Straight-line winds, which in extreme cases have the potential to cause wind gusts that exceed 100 miles per hour, are responsible for most thunderstorm wind damage. One type of straight-line wind, the downburst, can cause damage equivalent to a strong tornado and can be extremely dangerous to aviation. Figure 4- 105 shows how the frequency and strength of extreme windstorms vary across the United States. The map was produced by the Federal Emergency Management Agency (FEMA) and is based on 40 years of tornado history and over 100 years of hurricane history. Zone IV, the darkest area on the map, has experienced both the greatest number of tornadoes and the strongest tornadoes. As shown by the map key, wind speeds in Zone IV can be as high as 250 MPH.

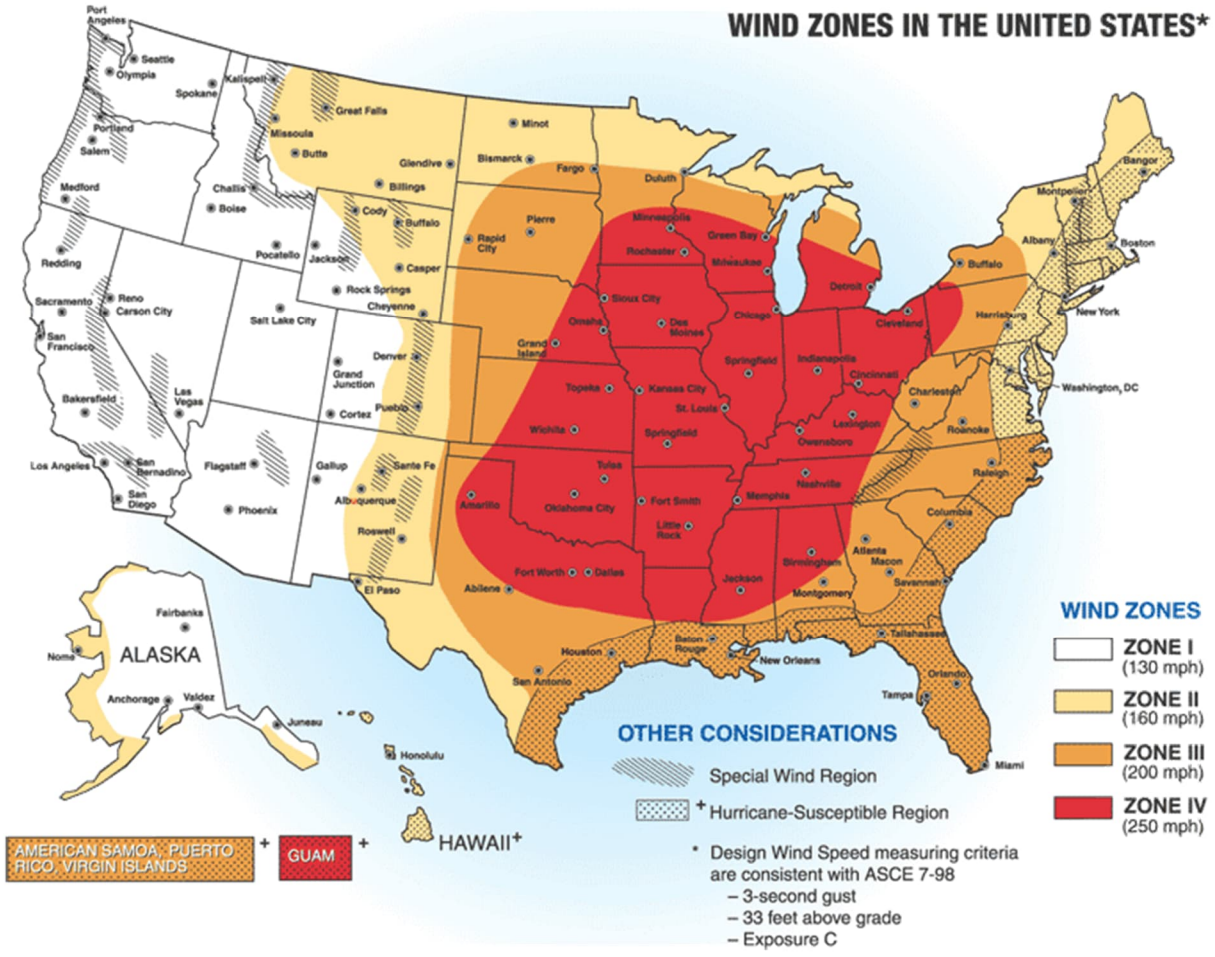


Figure 4- 105: Wind Zones in the United States

Source: Federal Emergency Management Agency

The National Weather Service collected data for thunder days, number and duration of thunder events, and lightning strike density for the 30-year period from 1948 to 1977. A series of maps was generated showing the annual average thunder event duration, the annual average number of thunder events, and the mean annual density of lightning strikes. Figure 4- 107 illustrates the annual average number of severe thunderstorm warnings from 2004-2023.

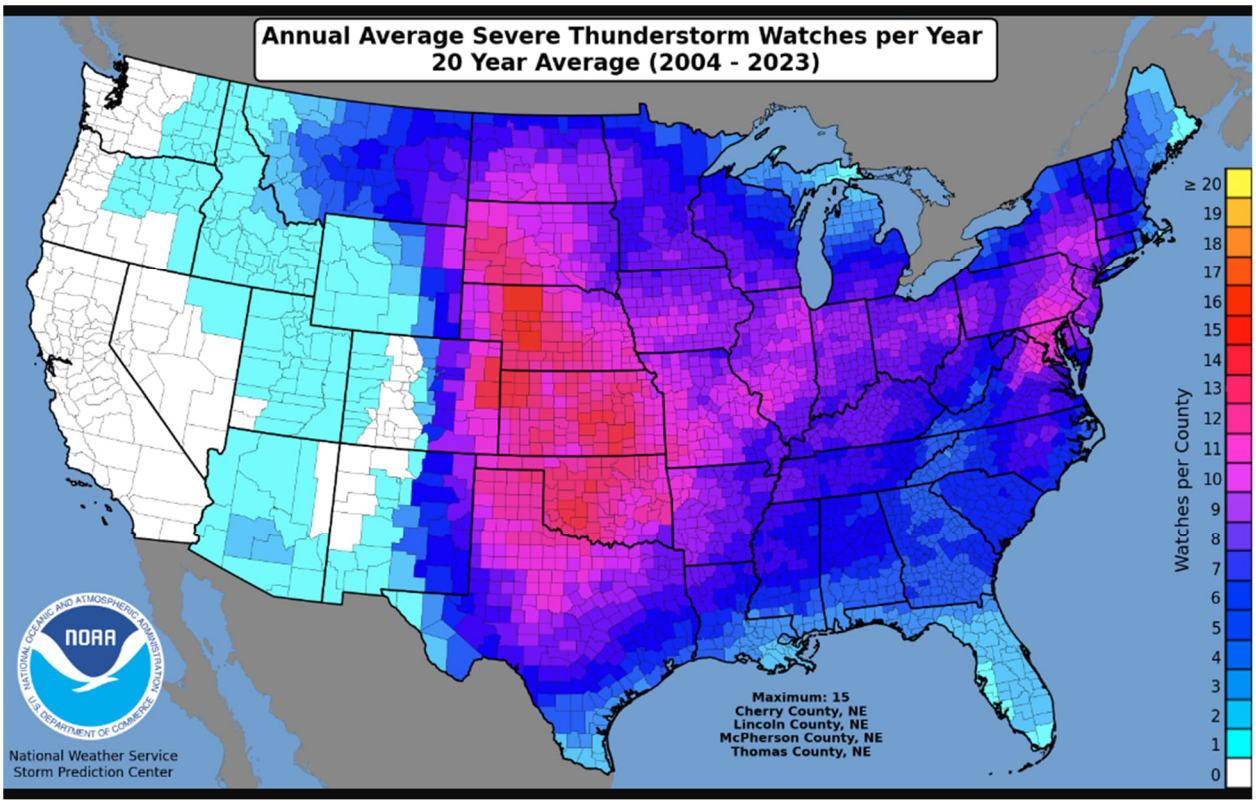


Figure 4- 107: Annual Average Number of Severe Thunderstorm Warnings (2004-2023)

Source: NOAA Severe Weather Maps, Graphics, and Data (https://www.spc.noaa.gov/wcm/)

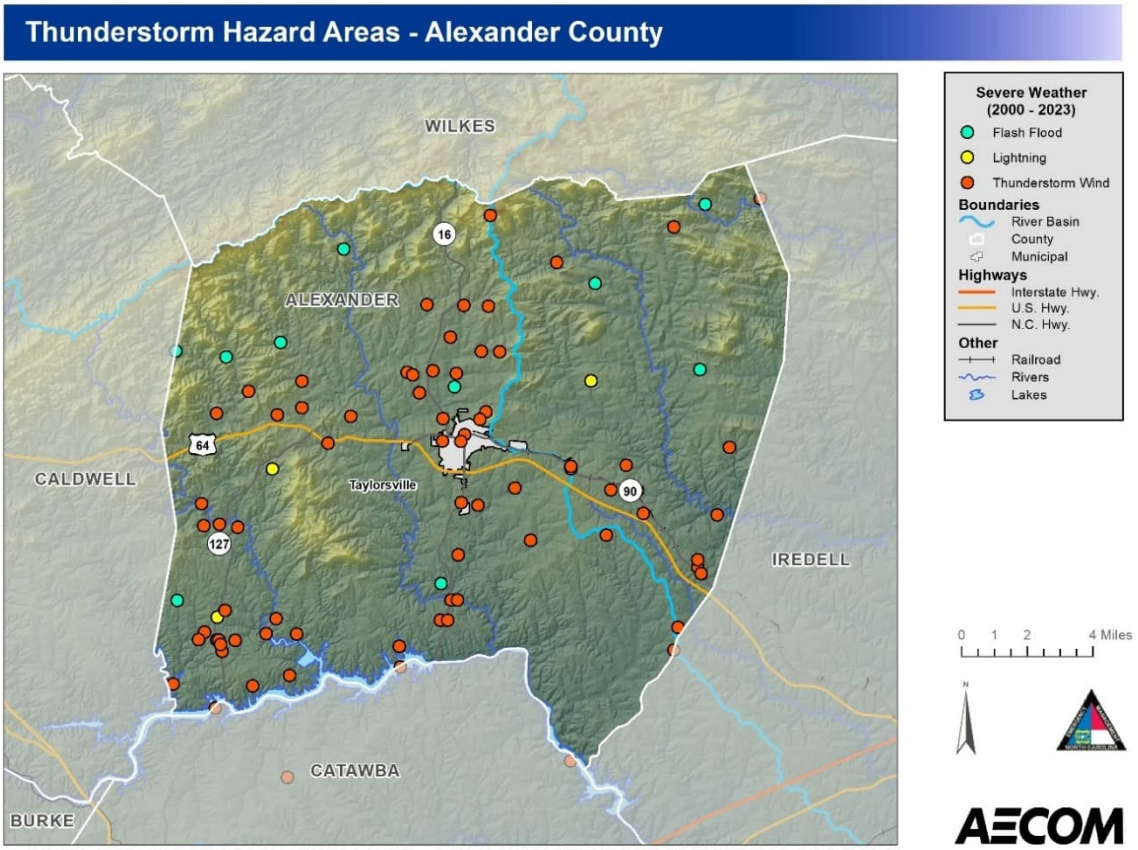


Figure 4- 106: Thunderstorm Hazard Areas for Alexander County

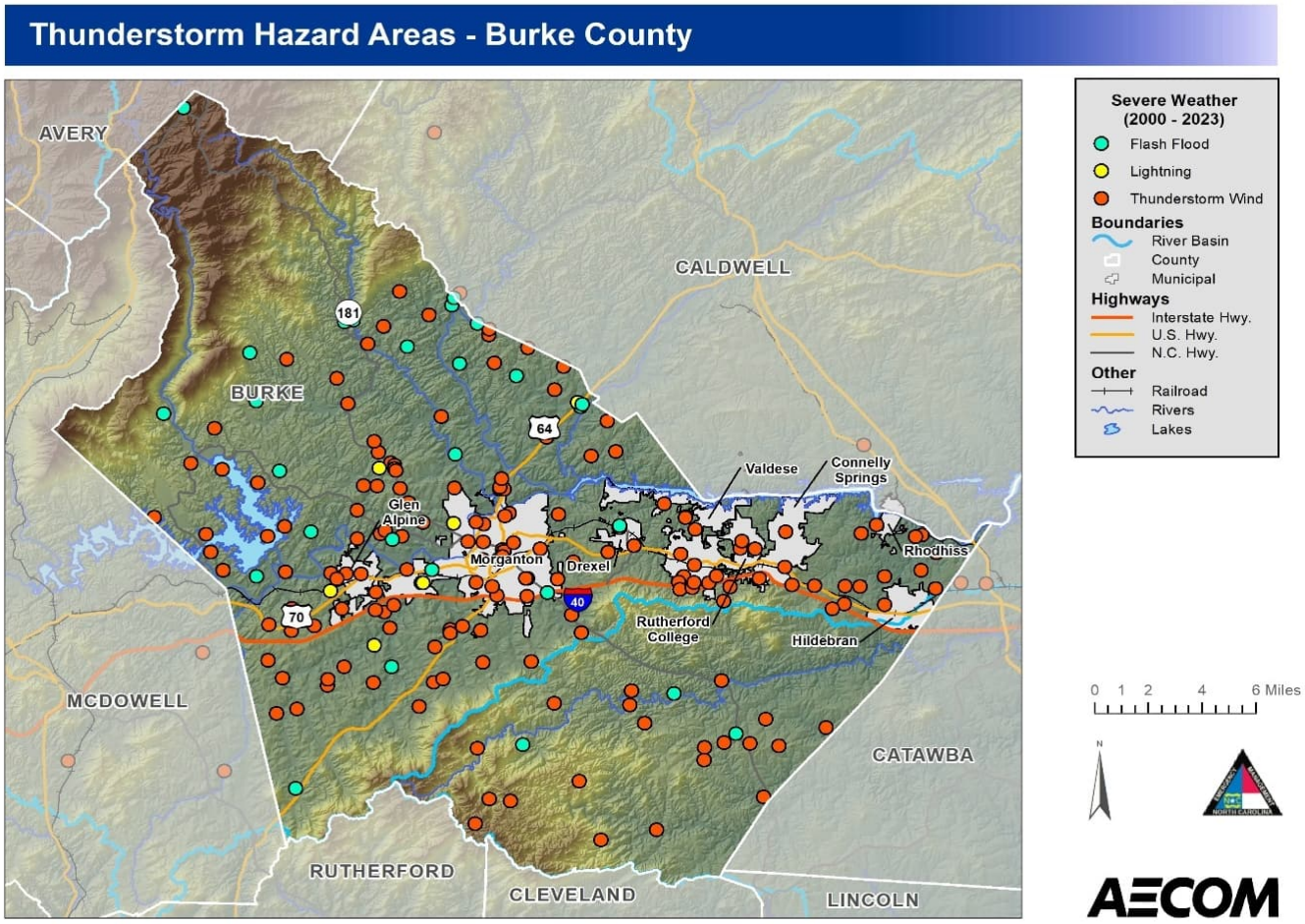


Figure 4- 109: Thunderstorm Hazard Areas for Burke County

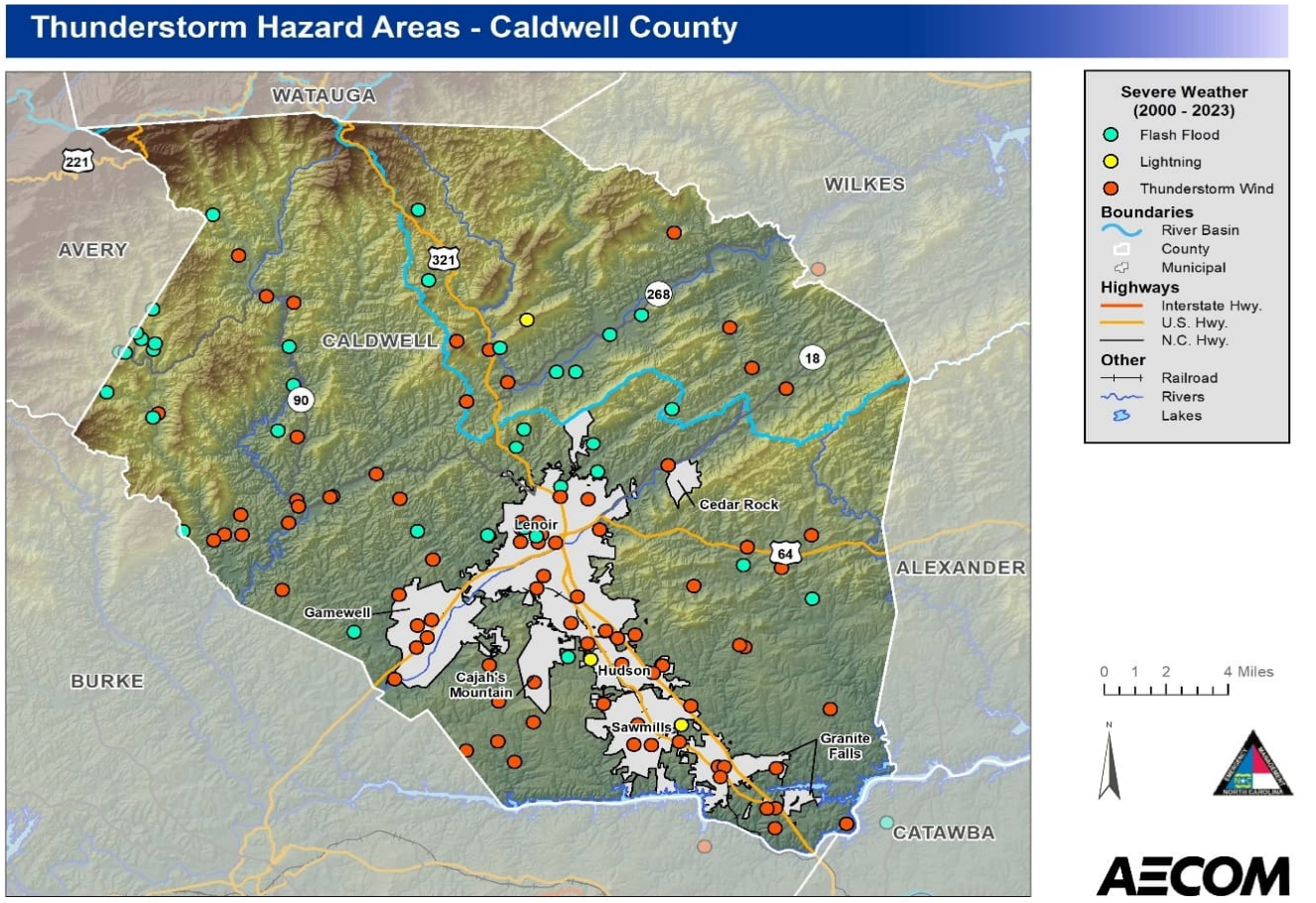


Figure 4- 108: Thunderstorm Hazard Areas for Caldwell County

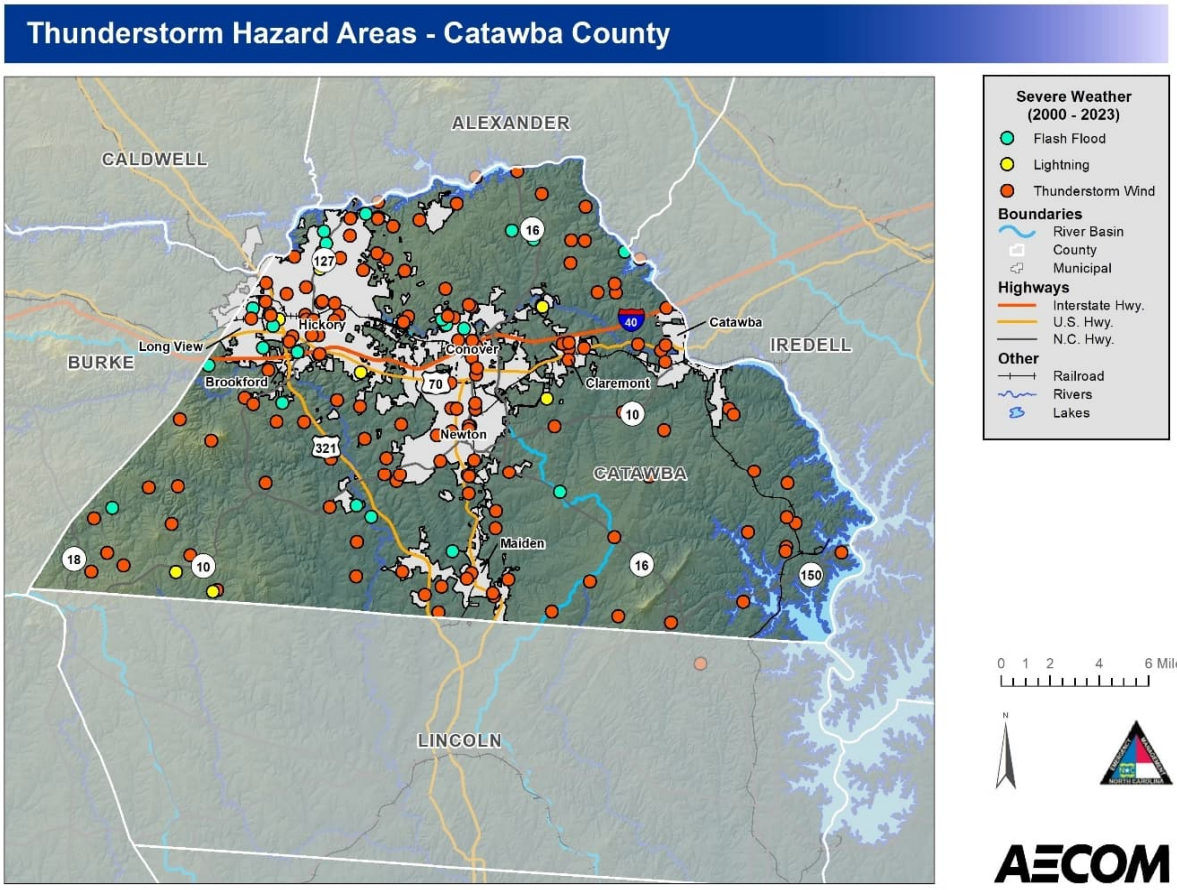


Figure 4- 110: Thunderstorm Hazard Areas for Catawba County

4.5.13.3. Extent (Magnitude and Severity)

Definition:

Thunderstorm extent is defined by the number of thunder events and wind speeds reported.

Extent Event:

Thunderstorms are known to be damaging hazard occurrences in the Unifour Region that can result in multiple injuries. There is currently no specific overall scale to rank the potential severity of severe events of this type, but it is assumed that the magnitude and severity of future occurrences will be like that of historical occurrences. The highest recorded thunderstorm winds in the planning area (according to NCDC) were 75 knots reported in Rutherford College in Burke County in 1997.

There are some national studies that suggest that the risk of severe thunderstorms that produce torrential rain, damaging winds, large hail, and tornadoes may increase due to changes in the climate.

4.5.13.4. Historical Occurrences

The following historical occurrences have been identified based on the NCDC Storm Events database as the most damaging events between 2018 and 2023, and all the episode and event narratives identified by the NCDC Storm Events database can be seen in Appendix A. It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded, or unreported events may have occurred within the planning area during this time frame. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

According to NCDC 641 recorded instances of Thunderstorm Winds conditions have affected the planning area causing an estimated $3,193,000 in losses to property between 1955 and 2023, and one death and one 2 injuries reported between 2018 and 2023. The total reported property damage due to thunderstorm winds between A summary of all the accounts of thunderstorm winds between 2018 and 2023 from the NCDC database can be found in Appendix A along with the event narratives.

The following are summaries from the NCDC Storm Events Database of 10 of the most damaging reported thunderstorm wind events between 2018 and 2023 in terms of property damage and spatial extent:

Caldwell County (7/6/2018)

Scattered thunderstorms developed across the North Carolina mountains and foothills during the afternoon and moved into the western Piedmont by early evening. A few of the storms produced strong to damaging winds that caused tree damage, with one tree falling on a vehicle north of Lenoir, killing one of the occupants. EM reported a large tree was blown down on a vehicle in Green Mountain Park killing a 78-year-old occupant and causing minor injuries to two others. A few other trees were blown down in Lenoir and areas just east of the city.

Deaths	1
Injuries	2
Property Damage	$5,000

Alexander, Burke, Catawba, and Caldwell County (8/7/2023)

Numerous thunderstorms and storm clusters moved across western North Carolina throughout the afternoon. Many of these storms produced severe weather, mainly in the form of damaging wind gusts, some of which were long-lived. A couple of weak tornadoes also developed in the Piedmont, including a long-track EF1.

County	Location	Property Damage	Episode Narrative
Alexander	Bethlehem	$50,000	Fire dept reported multiple trees and some power lines blown down, some blocking roads across southern Alexander County. Structural damage occurred to a couple of buildings, including a structure at Alexander County fairgrounds.
Burke	Hildebran	$10,000	Public reported (via social media) a tree blown down on a home.
	Glen Alpine	$2,000	County comms and spotter reported numerous trees and some power lines blown down from Glen Alpine across Morganton and vicinity. One tree fell on an outbuilding near Glen Alpine.
Caldwell	Hudson	0	Emergency manager reported a billboard blown over along Highway 321 near Hudson. Ham radio operator reported a tree blown down on power lines in Sawmills.
Catawba	Brookford	$200,000	NWS storm survey found a swath of intense straight line wind damage across central Catawba County, from Mountain View and Hickory to Conover and Newton. Large numbers of trees were snapped and/or uprooted with numerous large tree branches downed. Several power poles were snapped, and a few structures were damaged, including a building at the Hickory American Legion Fairgrounds and a greenhouse that was destroyed.
	Maiden	0	Public reported (via social media) numerous trees and power lines blown down across Maiden and vicinity.
	Claremont	0	Public reported (via social media) trees blown down on I-40 in the Claremont area, and additional trees down on nearby Rock Barn Rd.
Total		**$262,000**	

Alexander, Burke, Catawba, and Caldwell County (6/25/2018)

For the third day in a row, multiple thunderstorm clusters, some producing damaging winds moved from East Tennessee into western North Carolina during the afternoon into the evening. While severe weather was confined to the mountains on the 23rd and 24th, storms on the 25th also produced severe weather in the foothills and northwest Piedmont.

County	Location	Property Damage	Event Narrative
Alexander	All Healing Springs	0	Media reported multiple trees blown down on Mountain Ridge Church Road.
Burke	Table Rock	0	Spotter reported numerous trees and power lines blown down in western Burke County. Media reported numerous trees down in the Morganton area, especially along the Catawba River. At least one road was closed in Morganton due to falling trees. Additional sporadic tree damage was also reported outside of this corridor, including at Highway 18 and Antioch Rd near the Caldwell County line.
Caldwell	Gamewell	$200,000	Multiple sources reported numerous trees blown down in the Gamewell area. Trees fell on and destroyed one house and severely damaged two others. Roads blocked by downed trees included Miller Hill Rd, Dulatown Rd, and Connelly Springs Rd in Granite Falls.
Catawba	Longview	0	Media reported trees blown down along Highway 321.
	Claremont	0	Broadcast media reported several trees blown down along River Bend Rd. Public also reported (via social media) reported numerous small trees blown down in the Catfish community.

Alexander and Burke County (7/6/2022)

Scattered thunderstorms and storm clusters developed over western North Carolina during the afternoon and evening. Several of the storms produced strong-to-damaging wind gusts.

County	Location	Property Damage	Event Narrative
Alexander	Bethlehem	0	Media reported trees blown down in Bethlehem and along Lake Hickory near Highway 16.
Burke	Burke Chapel	$50,000	Public reported multiple trees blown down with one on a trailer, part of the roof removed from a house, and a destroyed barn on Buzz Lowman St. Media reported numerous trees blown down nearby on Old Laurel Rd and significant damage to the roof of a manufacturing building on Claude Britton Rd. Ham radio operator reported multiple large trees down on Highway 18.

Burke, Caldwell, and Catawba County (4/13/2020)

A strong storm system impacted the Southeast, resulting in an area of widespread heavy rain and embedded strong to severe thunderstorms that moved across western North Carolina during the late night and early morning hours. Localized flash flooding, some of which was quite significant developed across the mountains. Isolated severe weather also occurred, mainly in the form of damaging wind gusts. Strong southerly gradient winds also caused some damage across mainly the high elevations of western North Carolina.

County	Location	Property Damage	Event Narrative
Burke	Drexel	0	Media reported several trees blown down along John Berry Rd.
Caldwell	Gamewell	$50,000	County comms reported trees blown down on Highway 18 in Gamewell. Spotter reported a large tree down on Connelly Springs Rd.
Catawba	Hickory	0	Public reported a tree and power line fell on a vehicle and structure in the Hickory area. Spotter reported multiple trees down along I-40 east of Hickory.

Alexander, Burke, Catawba, and Caldwell County (8/21/2019)

County	Location	Date	Property Damage	Event Narrative
Alexander	Bethlehem	8/13/2019	5000	Amateur radio operator reported two trees blown down and blocking traffic near the intersection of Highway 127 and Telephone Exchange Rd. Spotter reported minor damage to a structure on Highway 127. Power lines were also blown down in the area.
Burke	Morganton	8/13/2019	0	Spotter reported trees blown down on Valley View St.
Catawba	Oyama	8/13/2019	0	County comms reported a tree blown down and blocking Snow Creek Rd NE and multiple trees and power lines down along Laurel Springs Dr, Lee Cline Rd, and County Home Rd.
	Bandy	8/13/2019	0	Public reported a tree and multiple large limbs blown down.

Widely scattered thunderstorms developed along the Blue Ridge during the afternoon and moved southeast. Several storms produced brief severe weather across the Piedmont, mainly in the form of damaging wind gusts.

Burke County (4/14/2019)

Numerous showers along with strong to severe thunderstorms developed across western North Carolina throughout the 14th in advance of a strong frontal system. Some of these storms produced areas of wind damage throughout the afternoon and evening.

Location	Date	Property Damage	Event Narrative
Morganton	4/14/2019	$50,000	NWS storm survey reported numerous trees blown down throughout Morganton and vicinity, with several trees down on homes, including along West Fleming Dr, King St, and Antioch Rd.
Pleasant Grove Brke	4/14/2019	0	County comms reported multiple trees and power lines blown down on River Meadows Ln at the intersection Of River Rd.
Enola	4/14/2019	0	County comms reported multiple trees blown down near the intersection of Watershed Rd and Enola Rd.

- **Morganton, Burke County (7/27/2021)**

Scattered thunderstorms and storm clusters developed across western North Carolina during the afternoon and early evening. A couple of the storms produced brief damaging wind gusts over the foothills. Spotter reported a tree blown down across on 3 cars and another tree on a house in the city of Morganton.

Reported Property Damage
$30,000

- **Alexander and Catawba County (8/2/2020)**

Scattered to numerous thunderstorms developed along a cold front across western North Carolina during the afternoon. A couple of the storms produced brief damaging winds across the northern foothills.

County	Location	Property Damages	Event Narrative
Alexander	Taylorsville Airport	$20,000	Fire dept reported part of a chicken house destroyed and numerous trees and a few power lines blown down at the

County	Location	Property Damages	Event Narrative
			intersection of Sulfur Springs Rd and Hiddenite Church Rd.
Catawba	Oyama	0	Fire dept reported trees blown down at County Home Rd and Lee Cline Rd on Herman Sipe Rd and on 1st Ave Place NE.

- **Duan, Catawba County (6/16/2022)**

Scattered thunderstorms developed over western North Carolina during the afternoon and moved southeast. Some of the storms organized into small clusters. Several of the clusters and individual cells produced large hail and damaging wind gusts. Public reported a large tree was blown down on a house along Highway 16 south of Newton.

Property Damage
$10,000

County	Total Event Reports	Property Damage	Total Deaths	Total Injuries
Alexander	15	$120,000	0	0
Burke	59	$157,000	0	0
Caldwell	18	$221,000	1	2
Catawba	36	$292,000	0	0

Table 4- 55: Summary of thunderstorm wind damages, deaths, injuries, and total injuries between 2018 and 2023 from the NCDC Storm Events Database

4.5.13.5. Probability of Future Occurrences

Based on the analyses performed in IRISK, the probability of future Thunderstorm Winds is shown in the table below, by jurisdiction.

4.5.13.6. Climate Change

As reported by the North Carolina State Hazard Mitigation Plan, the National Aeronautics and Space Administration (NASA), predicts that thunderstorm events in the future are likely to become more frequent in the southeastern USA as a result of weather extremes. Thunderstorm potential is measured by an index that NASA created called the Convective Available Potential Energy (CAPE) index. This measures how warm and moist the air is, which is a major contributing factor in thunderstorm formation. NASA projects that by the period of 2072-2099 the CAPE in the Unifour Region will increase by 300-400J/kg, which places it in the area likely to experience the second greatest increase in CAPE in the United States. This indicates that there will potentially be even more frequent thunderstorms in the Unifour Region going forward.

The North Carolina Climate Science Report also suggests that the occurrence of severe thunderstorms will likely increase due to climate change throughout the State. Global climate models consistently project an increase in the frequency of severe thunderstorm events across the United States over the mid-to late 21stcentury. Based on the increased frequency of very high CAPE, increases in storm intensity are also projected for the Unifour Region over this same period.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	IRISK Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Medium**
Burke County (Unincorporated Area)	**Medium**
Caldwell County (Unincorporated Area)	**Medium**
Catawba County (Unincorporated Area)	**Medium**

Jurisdiction	IRISK Probability of Future Occurrence
City of Claremont	Medium
City of Conover	Medium
City of Hickory	Medium
City of Lenoir	Medium
City of Morganton	Medium
City of Newton	Medium
Town of Brookford	Medium
Town of Cajah's Mountain	Medium
Town of Catawba	Medium
Town of Connelly Springs	Medium
Town of Drexel	Medium
Town of Gamewell	Medium
Town of Glen Alpine	Medium
Town of Granite Falls	Medium
Town of Hildebran	Medium
Town of Hudson	Medium
Town of Long View	Medium
Town of Maiden	Medium
Town of Rhodhiss	Medium
Town of Rutherford College	Medium
Town of Sawmills	Medium
Town of Taylorsville	Medium

Jurisdiction	IRISK Probability of Future Occurrence
Town of Valdese	**Medium**
Village of Cedar Rock	**Medium**

4.5.13.7. Thunderstorm Winds Hazard Vulnerability

However, continued enforcement of building codes, flood damage prevention ordinances and other local regulatory tools and policies designed to mitigate the effects of high hazard winds is expected to minimize future losses as construction and planning continue to seek higher standards. Based on historical events the most significant local impacts for the Unifour Region regarding future events will likely be damage to trees (and the requisite management of vegetative debris) and widespread power outages to the area.

The following tables provide counts and values by jurisdiction relevant to Thunderstorm Winds hazard vulnerability in the Unifour Regional HMP Area.

Table 0-1: Population Impacted by the 25 Year Thunderstorm Winds

Jurisdiction	Total Population	Population At Risk		All Elderly Population	Elderly Population At Risk		All Children Population	Children At Risk	
		Number	Percent		Number	Percent		Number	Percent
Alexander									
Alexander County (Unincorporated Area)	33,016	33,016	100%	4,995	4,995	100%	1,961	1,961	100%
Town of Taylorsville	4,180	4,180	100%	632	632	100%	248	248	100%
Subtotal Alexander	**37,196**	**37,196**	**100%**	**5627**	**5627**	**100%**	**2209**	**2209**	**100%**
Burke									
Burke County (Unincorporated Area)	49,470	49,457	100%	7,997	7,995	100%	2,762	2,761	100%
City of Hickory	456	48,988	10743%	74	6,892	9313.5%	25	3,052	12208%
City of Morganton	22,546	22,546	100%	3,645	3,645	100%	1,259	1,259	100%
Town of Connelly Springs	1,659	1,659	100%	268	268	100%	93	93	100%
Town of Drexel	5,506	5,506	100%	890	890	100%	307	307	100%

Jurisdiction	Total Population	Population At Risk		All Elderly Population	Elderly Population At Risk		All Children Population	Children At Risk	
		Number	Percent		Number	Percent		Number	Percent
Town of Glen Alpine	1,964	1,964	100%	318	318	100%	110	110	100%
Town of Hildebran	1,945	1,945	100%	314	314	100%	109	109	100%
Town of Long View	698	4,879	699%	113	700	619.5%	39	300	769.2%
Town of Rhodhiss	640	1,025	160.2%	103	162	157.3%	36	58	161.1%
Town of Rutherford College	1,502	1,502	100%	243	243	100%	84	84	100%
Town of Valdese	4,387	4,387	100%	709	709	100%	245	245	100%
Subtotal Burke	**90,773**	**143,858**	**158.5%**	**14674**	**22136**	**150.9%**	**5069**	**8378**	**165.3%**
Caldwell									
Caldwell County (Unincorporated Area)	34,680	34,673	100%	5,352	5,351	100%	1,940	1,940	100%
City of Hickory	51	48,988	96054.9%	8	6,892	86150%	3	3,052	101733.3%
City of Lenoir	20,837	20,837	100%	3,216	3,216	100%	1,166	1,166	100%
Town of Blowing Rock	51	1,376	2698%	8	172	2150%	3	54	1800%

Jurisdiction	Total Population	Population At Risk		All Elderly Population	Elderly Population At Risk		All Children Population	Children At Risk	
		Number	Percent		Number	Percent		Number	Percent
Town of Cajah's Mountain	2,789	2,789	100%	430	430	100%	156	156	100%
Town of Gamewell	4,043	4,043	100%	624	624	100%	226	226	100%
Town of Granite Falls	7,104	7,104	100%	1,096	1,096	100%	397	397	100%
Town of Hudson	6,431	6,431	100%	992	992	100%	360	360	100%
Town of Rhodhiss	385	1,025	266.2%	59	162	274.6%	22	58	263.6%
Town of Sawmills	6,380	6,380	100%	985	985	100%	357	357	100%
Village of Cedar Rock	294	294	100%	45	45	100%	16	16	100%
Subtotal Caldwell	**83,045**	**133,940**	**161.3%**	**12815**	**19965**	**155.8%**	**4646**	**7782**	**167.5%**
Catawba									
Catawba County (Unincorporated Area)	70,017	70,011	100%	9,835	9,834	100%	4,368	4,368	100%
City of Claremont	1,957	1,957	100%	275	275	100%	122	122	100%
City of Conover	9,669	9,669	100%	1,358	1,358	100%	603	603	100%

Jurisdiction	Total Population	Population At Risk		All Elderly Population	Elderly Population At Risk		All Children Population	Children At Risk	
		Number	Percent		Number	Percent		Number	Percent
City of Hickory	48,481	48,988	101%	6,810	6,892	101.2%	3,024	3,052	100.9%
City of Newton	14,214	14,214	100%	1,997	1,997	100%	887	887	100%
Town of Brookford	371	371	100%	52	52	100%	23	23	100%
Town of Catawba	1,152	1,152	100%	162	162	100%	72	72	100%
Town of Long View	4,181	4,879	116.7%	587	700	119.3%	261	300	114.9%
Town of Maiden	4,964	4,972	100.2%	697	698	100.1%	310	310	100%
Subtotal Catawba	**155,006**	**156,213**	**100.8%**	**21773**	**21968**	**100.9%**	**9670**	**9737**	**100.7%**
TOTAL PLAN	**366,020**	**471,207**	**128.7%**	**54889**	**69696**	**127%**	**21594**	**28106**	**130.2%**

Source: GIS Analysis

4.5.14. Erosion

4.5.14.1. Erosion Hazard Analysis

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.

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 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.

4.5.14.2. Location within the Planning Area

No data is currently available with which to map identified areas of erosion concern.

4.5.14.3. Extent (Magnitude and Severity)

Definition:

The extent of erosion can be defined by the measurable rate of erosion that occurs over time for a specific land area.

Extent Event:

No data is currently available with which to determine magnitudes or severity of erosion hazard areas within the Unifour Region.

4.5.14.4. Historical Occurrences

No historical occurrences were identified in the planning area.

4.5.14.5. Probability of Future Occurrences

The probability of future Erosion is shown in the table below, by jurisdiction.

4.5.14.6. Climate Change

Since erosion in this context is associated primarily with extreme runoff and flood events, and to a lesser extent extreme wind events, it is likely that the increasing frequency or intensity of these events as a result of climate change will cause greater erosion problems in the future. However, there is very little readily available information that could be used to evaluate in more detail any potential increase in the risk of erosion specifically in the Unifour Region.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	Probability of Future Occurrence
Alexander County (Unincorporated Area)	**Low**
Burke County (Unincorporated Area)	**Low**

Jurisdiction	Probability of Future Occurrence
Caldwell County (Unincorporated Area)	Low
Catawba County (Unincorporated Area)	Low
City of Claremont	Low
City of Conover	Low
City of Hickory	Low
City of Lenoir	Low
City of Morganton	Low
City of Newton	Low
Town of Brookford	Low
Town of Cajah's Mountain	Low
Town of Catawba	Low
Town of Connelly Springs	Low
Town of Drexel	Low
Town of Gamewell	Low
Town of Glen Alpine	Low
Town of Granite Falls	Low
Town of Hildebran	Low
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Low
Town of Rhodhiss	Low
Town of Rutherford College	Low
Town of Sawmills	Low

Jurisdiction	Probability of Future Occurrence
Town of Taylorsville	**Low**
Town of Valdese	**Low**
Village of Cedar Rock	**Low**

4.5.14.7. Erosion Hazard Vulnerability

Based upon a lack of historical events, relevant GIS data, and any immediate threat to life or property, a detailed vulnerability assessment has not been conducted for this hazard.

4.5.15. Sinkholes

4.5.15.1. Sinkholes Hazard Analysis

There are three general types of sinkholes known to occur in North Carolina: geologic, debris-related, and infrastructure failure-related. Typical geologic sinkholes are directly related to the dissolving of limestone or other carbonate rocks by rainwater which has become slightly acidic from contact with either tannic acid from leaf litter or acids emitted from the burning of fossil fuels. This is the process of how caverns are formed. The surface water melts the carbonate as the water percolates downward. When a cavern is created, the thickness of the remaining carbonate continues to diminish until the weight of the cover rock exceeds the strength of the cover rock. The hole which is created can be circular or elongated. The second type of sinkhole is one that is debris-related and is caused by the decomposition of building materials such as buried wood. Many times, a circular sinkhole develops along a newly paved or widened road, where a tree was cut down, but the root ball was never removed. When the root ball rots, the pavement collapses. The final type of sinkhole is one associated with the failure of buried infrastructure, such as pipes, culverts, or the settling of soil used to cover buried power lines, cables, water lines, or sewer lines. In most cases, sinkholes associated with settling are from recently buried pipes or utility lines, where the cover material was not completely compacted and settled naturally over time. Significant infrastructure failure-related sinkholes are also caused by water (stormwater, potable water, or sewer) which carries soil and sediment from a crack, hole, or other point of failure in a pipe. The failure of a stormwater pipe can be dramatic because, during storm events when there are high water flows, there can be very rapid erosion of the soil and fill material used to cover buried pipes. In addition to the sinkhole causes explained above, there is a fourth potential cause of ground collapse in North Carolina and that is a mine collapse. While not specifically considered a sinkhole occurrence, the effects are similar.

4.5.15.2. Location within the Planning Area

The geologic formations under Alexander, Burke, Caldwell, and Catawba counties are composed of igneous and metamorphic granitic rocks, which are not the types of rocks which can be dissolved by acidic water. Therefore, geologic sinkholes are not a significant concern for the planning area.

Debris and infrastructure-related sinkholes are largely dependent upon undocumented human activity, construction practices, and natural course of events and therefore no portions of the planning area can be specifically mapped as known sinkhole hazard areas.

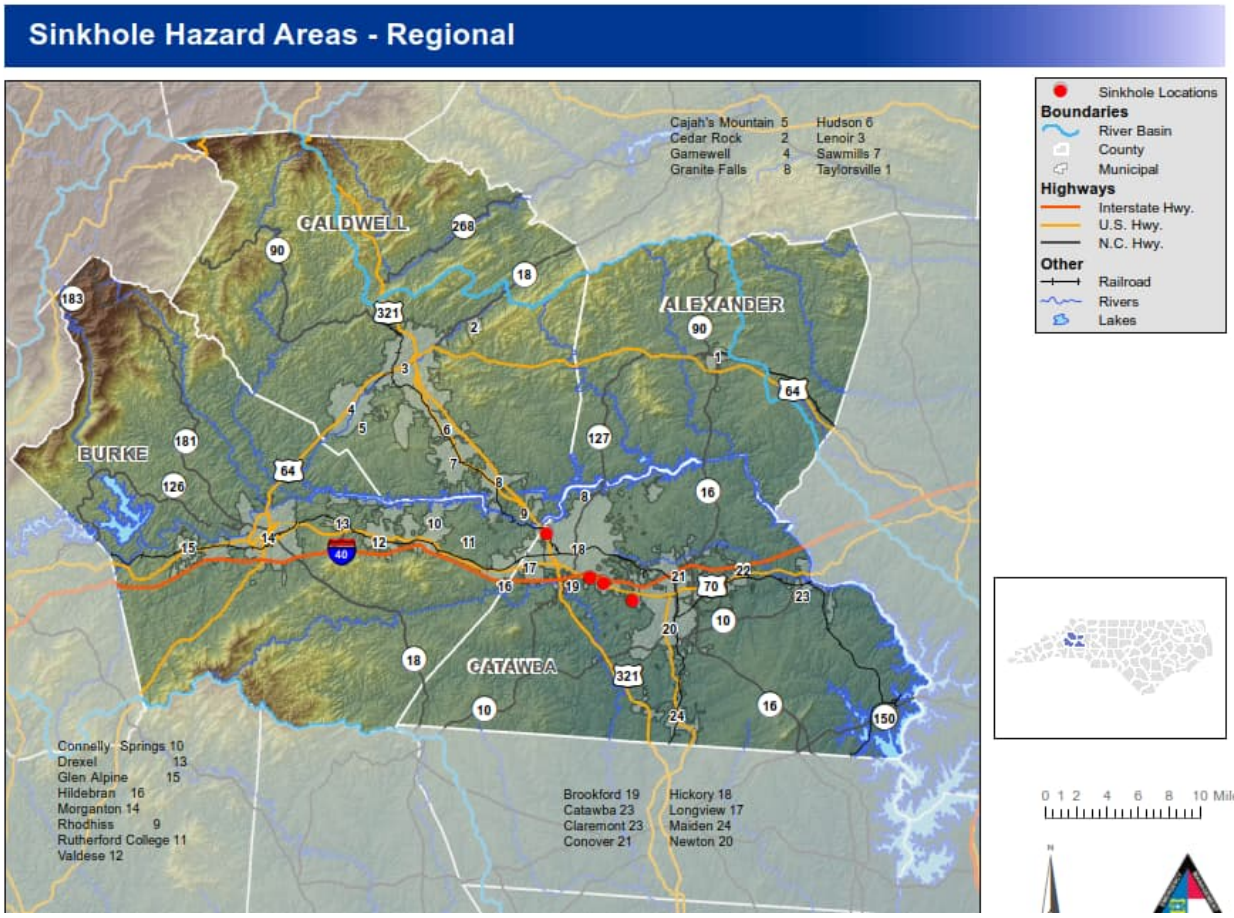


Figure 4- 111: Sinkhole Hazard Areas

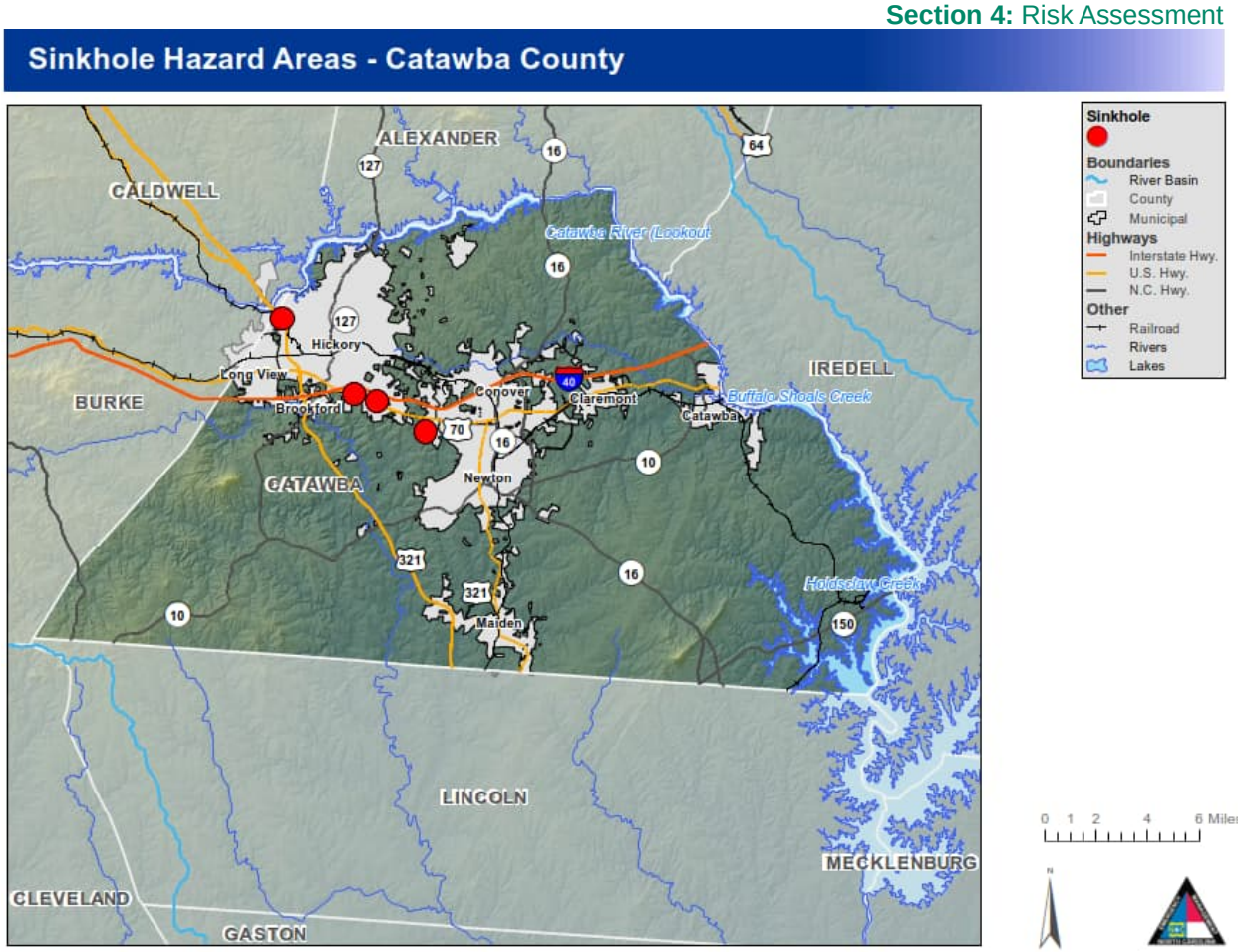


Figure 4- 112: Sinkhole Hazard Areas in Catawba County

Extent (Magnitude and Severity)

Definition:

The lengths of these natural conduits are often *measured* in feet for width and depth.

Extent Event:

Sinkholes are typically small, highly localized events that can have a varied magnitude and severity based on a wide range of site-specific variables. Since all historical data was provided by the HMPC no further information is available on the severity or depth of the previously occurred sinkholes.

4.5.15.3. Historical Occurrences

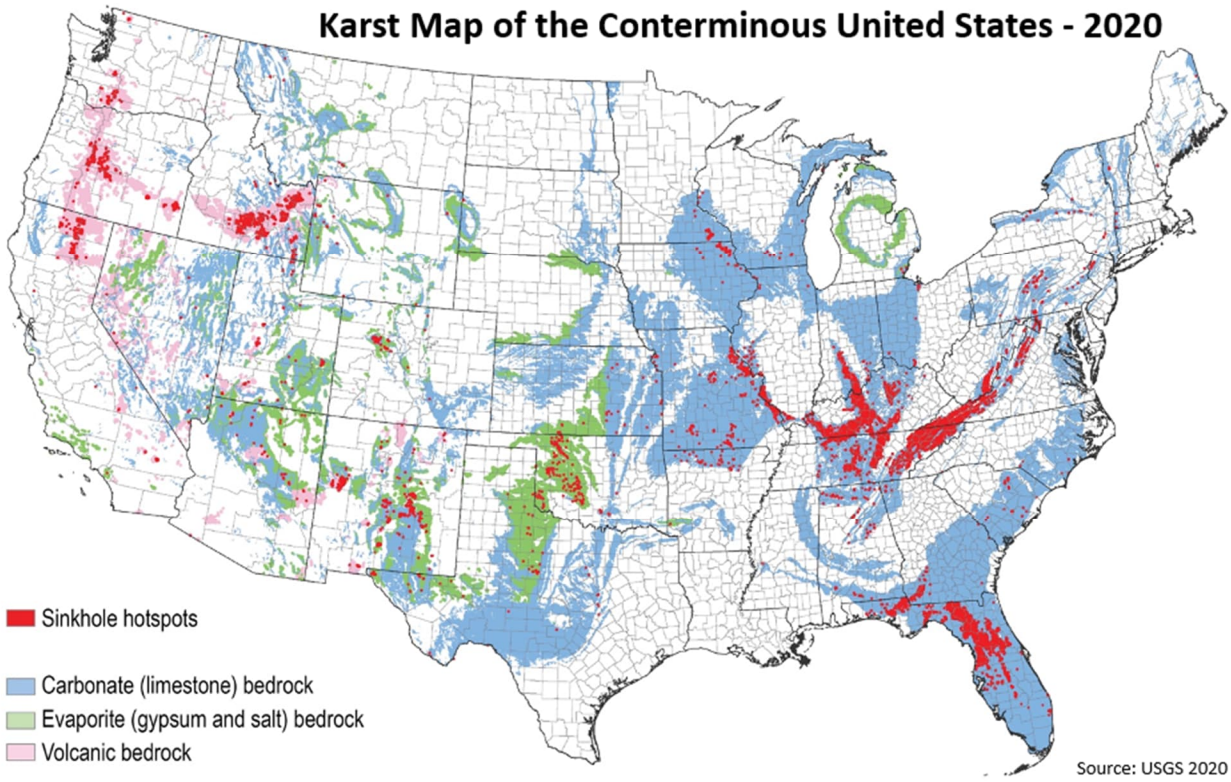


Figure 4- 113: Karst Map of the United States

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Catawba								
City of Hickory	08/17/02		0	0	$0	$0	$0	$0
City of Hickory	07/01/05		0	0	$0	$0	$0	$0
City of Hickory	05/19/11		0	0	$0	$0	$0	$0
City of Hickory	07/30/13		0	0	$0	$0	$0	$0
Subtotal Catawba	**4 Events**		**0**	**0**	**$0**	**$0**	**$0**	**$0**
TOTAL PLAN	**4 Events**		**0**	**0**	**$0**	**$0**	**$0**	**$0**

Table 4- 56: Historical Occurrences of Sinkholes (2002 to 2019)

Source: Catawba County Emergency Management.

Table 4- 57 and Table 4- 56 provide a summary of this historical information by participating jurisdiction. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

Jurisdiction	Number of Occurrences	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Catawba							
City of Hickory	4	0	0	$0	$0	$0	$0
Subtotal Catawba	**4**	**0**	**0**	**$0**	**$0**	**$0**	**$0**
TOTAL PLAN	**4**	**0**	**0**	**$0**	**$0**	**$0**	**$0**

Table 4- 57: Summary of Historical Sinkholes Occurrences by Participating Jurisdiction

Source: Catawba County Emergency Management

4.5.15.4. Probability of Future Occurrences

The probability of future Sinkholes is shown in the table below, by jurisdiction.

4.5.15.5. Climate Change

Similar to landslides, sinkholes can be caused by heavy rains and flooding. An increase in the number and intensity of severe storms, and resulting heavy rains and flooding, may also result in sinkholes developing more frequently. Occurrence of sinkholes associated with the failure of drainage systems and other infrastructure will also be a likely consequence of the increased rainfall intensity associated with climate change. However, there is very little readily available information that could be used to evaluate in more detail any potential increase in the risk of sinkhole occurrence specifically in the Unifour Region.

Definitions for Descriptors Used for Probability of Future Hazard Occurrences

- Low: Less than 1% annual probability
- Medium: Between 1% and 10% annual probability
- High: Greater than 10% annual probability

Jurisdiction	Probability of Future Occurrence
Alexander County (Unincorporated Area)	Low
Burke County (Unincorporated Area)	Low
Caldwell County (Unincorporated Area)	Low
Catawba County (Unincorporated Area)	Low
City of Claremont	Low
City of Conover	Low
City of Hickory	Low
City of Lenoir	Low
City of Morganton	Low
City of Newton	Low
Town of Brookford	Low
Town of Cajah's Mountain	Low
Town of Catawba	Low
Town of Connelly Springs	Low
Town of Drexel	Low
Town of Gamewell	Low
Town of Glen Alpine	Low
Town of Granite Falls	Low
Town of Hildebran	Low
Town of Hudson	Low
Town of Long View	Low
Town of Maiden	Low

Jurisdiction	Probability of Future Occurrence
Town of Rhodhiss	**Low**
Town of Rutherford College	**Low**
Town of Sawmills	**Low**
Town of Taylorsville	**Low**
Town of Valdese	**Low**
Village of Cedar Rock	**Low**

4.5.15.6. Sinkhole Hazard Vulnerability

Due to what is assumed to be a relatively low probability of a sinkhole occurrence producing significant damages in the participating jurisdictions, as well as insufficient data and methodology to produce a region-wide assessment, a detailed vulnerability analysis was not conducted for this hazard.

4.6. Hazard Extent Summary

The table below is a summary of the extent and impacts of the various hazards shown in this plan.

Hazard		Description
River Flooding	Definition	Flood Extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. Flood depth and velocity are recorded via the USGS stream gages throughout the region.
River Flooding	Extent Event	The highest recorded peak river stage on record is 28.6 feet at John's River in Burke County, recorded September 7-9, 2004, during Hurricane Frances. It is worth noting that this is based on available records from existing river gages and may not represent the worst flooding in the Region's history. Similarly, a database of high-water marks is not available for all areas of the Region for comparison, validation, or further reliable research on the magnitude of historical occurrences.
Wildfire	Definition	The average size of wildfires in the Unifour Region is typically small.
Wildfire	Extent Event	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county
Tornado	Definition	Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA as well as the Fujita/Enhanced Fujita Scale.

Hazard		Description
Tornado	Extent Event	Tornadoes of any magnitude and severity are possible within the planning area. Since 1951, the highest magnitude tornado to impact the Unifour Region has been an F4 on the Fujita Scale for Tornado Damage which has occurred on two separate occasions in two different counties in the planning area.
Earthquake	Definition	Earthquake extent can be measured by the Richter Scale and the Modified Mercalli Intensity (MMI) scale.
Earthquake	Extent Event	The most severe earthquake felt in the Unifour Region since the mid-1800s was a six (VI) on the Modified Mercalli Intensity Scale. This event occurred in 1886, the effects of which were reported specifically in the City of Hickory which was 337 miles from the epicenter of the earthquake. The effects of this magnitude earthquake typically include trees swaying, suspended objects swinging, and objects falling off of shelves. Earthquakes of greater magnitude may be possible within the region; however, this is known to be the greatest severity currently on record.
Landslide	Definition	Landslide data is provided from United States Geological Survey (USGS).
Landslide	Extent Event	The magnitude and severity of landslides can vary greatly depending on terrain and other highly localized factors. In addition, there is no overall severity rating scale for landslides that can be applied to the Unifour Region.
Snow	Definition	The extent of winter storms can be measured by the amount of snowfall received (in inches).
Snow	Extent Event	There is currently no overall scale to rank the potential severity of severe winter weather events of this type, but it is assumed that the magnitude and severity of future occurrences will be like that of historical occurrences.
Ice	Definition	There is currently no overall scale to rank the potential severity of ice storms.
Ice	Extent Event	There is currently no overall scale to rank the potential severity of severe winter weather events of this type, but it is assumed that the magnitude and severity of future occurrences will be like that of historical occurrences.
Hail	Definition	There is currently no specific overall scale to rank the potential severity of severe events of this type
Hail	Extent Event	Hail is known to be damaging hazard occurrences in the Unifour Region that can result in multiple injuries. There is currently no specific overall scale to rank the potential severity of severe events of this type, but it is assumed that the magnitude and severity of future occurrences will be like that of historical occurrences.

Hazard		Description
Drought	Definition	Drought extent is defined by the North Carolina Drought Monitor Classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the North Carolina Drought Monitor Classifications, the most severe drought condition is Exceptional.
Drought	Extent Event	As supported by the historical occurrences presented in the following subsection, the magnitude and severity of the drought/extreme heat hazard in the planning area is relatively mild. No deaths, injuries, property damages, or crop damages have been reported according to NCDC since 1998, so it is difficult to assign any specific severity rating to this hazard.
Hurricane Winds	Definition	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5.
Hurricane Winds	Extent Event	Hurricanes and tropical storms of any magnitude and severity are theoretically possible within the planning area, however major hurricanes (Category 3 and greater) are less likely to retain that classification as far inland as the Unifour Region. Since the 1850s, the greatest magnitude hurricane to impact the planning area has been a Category 1 hurricane in 1989 (Hurricane Hugo) (see Historical Occurrences section below). A Category 1 hurricane typically results in minimal damages, including damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage, etc. that is not applicable to the planning area.
Thunderstorm Winds	Definition	Thunderstorm extent is defined by the number of thunder events and wind speeds reported.
Thunderstorm Winds	Extent Event	Thunderstorms are known to be damaging hazard occurrences in the Unifour Region that can result in multiple injuries. There is currently no specific overall scale to rank the potential severity of severe events of this type, but it is assumed that the magnitude and severity of future occurrences will be like that of historical occurrences.
Erosion	Definition	The extent of erosion can be defined by the measurable rate of erosion that occurs.
Erosion	Extent Event	No data is currently available with which to determine magnitudes or severity of erosion hazard areas within the Unifour Region.
Sinkholes	Definition	The lengths of these natural conduits are often measured in feet.
Sinkholes	Extent Event	Sinkholes are typically small, highly localized events that can have a varied magnitude and severity based on a wide range of site-specific variables.

Table 4- 58: Summary of Hazard Extents

4.7. Conclusions on Hazard Risk

No changes in development impacted the Region and all its jurisdiction's overall vulnerability for all hazards addressed. Based on consensus of the Hazard Mitigation Planning Committee, in addition to the results presented in this Risk Assessment, the hazards addressed in this plan have been ranked according to the following prioritized list:

High Risk Hazards

- Flood
- Tornado
- Thunderstorm
- Wildfire

Moderate Risk Hazards

- Snow
- Ice
- Sinkhole
- Dam Failure
- Hail
- Hurricane

Low Risk Hazards

- Drought
- Erosion
- Landslide
- Levee Failure

In addition to the results presented throughout this Risk Assessment, The Expected Annualized Losses (EAL) determined by FEMAs NRI is presented in Table 4- 59 and summarized above further help substantiate the priority ranking stated here in these conclusions on hazard risk. The EAL Values are calculated by FEMA to represent the expected average economic loss in dollars from natural hazards each year with three consequence types: Buildings, People, and Agriculture. The EAL is calculated by the equation: Exposure X Annualized Frequency X Historic Loss Ratio, (Terms are defined in Error! Reference source not found.).

- **The Exposure Value** represents the natural consequence factor which represents the value of the three consequence types (People, buildings, and agriculture) that have the potential to be exposed to the natural hazard occurrence and was determined by exposure data which has the best accuracy and national data for each natural hazard.
- **The Annualized Frequency** is a natural hazard incidence factor which represents the probability of a natural hazard event occurring per year based on historical data. The

Annualized Frequency is defined by the number of recorded events per year over the period of record or the modeled probability of a hazards occurrence each year.

- **The Historic Loss Ratio (HLR)** represents the estimated percentage of building value, population, or agriculture which are expected to be lost due to natural hazards. The Historic Loss Ratio is calculated by loss by consequence type documented for each hazard type from source data divided by the total value, by consequence type (People, Buildings, and Agriculture), estimated to be exposed to a natural hazard occurrence.

Please see the NRI Technical Documentation for more information about datasets, calculations and methodology[22].

In addition to the results presented throughout this Risk Assessment, the EAL in Table 4- 59 with information about EAL calculations summarized above further help substantiate the priority ranking stated here in these conclusions on hazard risk. Certain hazards (such as Hail, Ice, Snow, Thunderstorm Winds and Wildfire) occur very frequently, and are only summarized by total counts and total damages in each jurisdiction. Below are the summaries of Expected Annual Loss and Exposure Values in Table 4- 60, EAL by consequence type in Table 4- 59 and Expected Annual Frequency and Historic Loss Ratio in Table 4- 61.

Hazard	Expected Annual Loss Alexander EAL	Exposure	Burke EAL	Exposure	Catawba EAL	Exposure	Caldwell EAL	Exposure
Cold Wave	$0	$0	$11,000	$14B	$0	$0	$23,000	$50B
Drought	$140,000	$9.3M	$342,000	$22M	$379,000	$24M	$183,000	$12M
Earthquake	$145,000	$429B	$338,000	$1T	$1.1M	$1.9T	$407,000	$951B
Hail	$205,000	$429B	$224,000	$1T	$992,000	$1.9T	$198,000	$950B
Heat Wave	$0	$0	$0	$0	$0	$0	$0	$0
Hurricane	$430,000	$429B	$537,000	$1T	$1.9M	$1.9T	$555,000	$950B
Ice Storm	$612,000	$429B	$1.4M	$1T	$2M	$1.9T	$1.3M	$950B
Landslide	$22,000	$146B	$182,000	$539B	$150,000	$691B	$560,000	$508B
Lightning	$213,000	$429B	$726,000	$1T	$219,000	$1.9T	$461,000	$950B
Riverine Flooding	$37,000	$2.3B	$934,000	$8.7B	$541,000	$13B	$312,000	$19B
Strong Wind	$464,000	$429B	$411,000	$1T	$1.1M	$1.9T	$1M	$950B
Tornado	$872,000	$429B	$2.2M	$1T	$5.2M	$1.9T	$1.6M	$950B
Wildfire	$27,000	$26B	$64,000	$34B	$62,000	$167B	$76,000	$39B
Winter Weather	$24,000	$429B	$57,000	$1T	$95,000	$1.9T	$55,000	$949B

Table 4- 59: NRI Expected Annual Loss and Exposure Values by Hazard Type for the Unifour Counties

EAL Consequences or Components		Alexander	Burke	Catawba	Caldwell
Composite EAL		$3,189,537.78	$7,459,011.53	$13,763,907.36	$6,747,375.78
Total Building	**EAL**	$1,727,076.44	$4,308,976.54	$9,086,511.01	$4,106,089.49
	EAL Rate	$1 per $3.76K of building value	$1 per $3.17K of building value	$1 per $4.09K of building value	$1 per $3.68K of building value
Population	**EAL**	0.09 Fatalities	0.21 Fatalities	0.36 Fatalities	0.19 Fatalities
	EAL Rate	1 per 421.81K people	1 per 420.38K people	1 per 450.72K people	1 per 416.27K people
	Equivalence EAL	$1,002,030.40	$2,415,382.34	$4,130,966.33	$2,245,633.35
Agriculture	**EAL**	$460,430.95	$734,652.65	$546,430.03	$395,652.94
	EAL Rate	$1 per $439.28 of Agriculture value	$1 per $127.19 of agriculture value	$1 per $162.22 of agriculture value	$1 per $139.32 of agriculture value

Table 4- 60: NRI EAL by Consequence or Components for the Unifour Counties

Hazard	Expected Annual Loss							
	Alexander		Burke		Catawba		Caldwell	
	Frequency (Events Per Year)	Historic Loss Ratio	Frequency (Events Per Year)	Historic Loss Ratio	Frequency (Events Per Year)	Historic Loss Ratio	Frequency (Events Per Year)	Historic Loss Ratio
Cold Wave	0	No Rating	0	No Rating	0	No Rating	0.1	Relatively Low
Drought	31	Relatively Moderate	33.2	Relatively Moderate	32.1	Relatively Moderate	30.7	Relatively Moderate
Earthquake	0.046% Chance Per Year	Relatively Low	0.058% Chance per Year	Relatively Low	0.049% Chance per year	Relatively Moderate	0.054% Chance Per Year	Relatively Low
Hail	5.3	Relatively Low	5.5	Very Low	5.7	Relatively Low	5.1	Very Low
Heat Wave	0	No Rating	0	No Rating	0	No Rating	0	No Rating
Hurricane	0	Relatively Low	0	Relatively Low	0.1	Relatively Low	0	Relatively Low

Hazard	Expected Annual Loss							
	Alexander		Burke		Catawba		Caldwell	
	Frequency (Events Per Year)	Historic Loss Ratio	Frequency (Events Per Year)	Historic Loss Ratio	Frequency (Events Per Year)	Historic Loss Ratio	Frequency (Events Per Year)	Historic Loss Ratio
Ice Storm	1.4	Relatively Moderate	1.5	Relatively Moderate	1.7	Relatively Low	1.1	Relatively Moderate
Landslide	0	Very Low	0	Very Low	0	Very Low	0.2	Very Low
Lightning	62.7	Relatively Moderate	54	Relatively Moderate	65.8	Very Low	57.1	Relatively Moderate
Riverine Flooding	0.4	Very Low	2	Relatively Low	1	Very Low	2.3	Very Low
Strong Wind	2.7	Relatively Low	2.6	Very Low	2.6	Relatively Low	2.8	Relatively Low
Tornado	0.14	Relatively Moderate	0.2	Relatively Moderate	0.2	Relatively Moderate	0.2	Relatively Low
Wildfire	0.016% Chance per Year	Relatively Low	0.034% Chance Per year	Relatively Low	0.007% Chance Per Year	Relatively Low	0.029% Chance per Year	Relatively Low
Winter Weather	2.4 Events Per Year	Relatively Low	2.7	Very Low	2.2	Relatively Low	2.8	Very Low

Table 4- 61: NRI Expected Annual Frequency and Historic Loss Ratio Rating

Formatting Checklist
Grammar and Spelling Initial
Figure and Table Cross References
Header and Footer Pages
Citation style consistent
Figure and table numbers updated
Checked – 9/13/2024

[1] Zuzak, C., Sheehan, A., Goodenough, E., McDougall, A., Stanton, C., McGuire, P., Mowrer, M., Roberts, B., & Rozelle, J. (2023). National Risk Index: Technical Documentation. In Federal Emergency Management Agency, FEMA.gov. Retrieved May 28, 2024, from https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_technical-documentation.pdf
[2] North Carolina Historic Preservation Office & North Carolina Department of Natural and Cultural Resources. (2019). HPOWEB 2.0 (2.0) [Dataset]. NC Historic Preservation Office. https://nc.maps.arcgis.com/home/item.html?id=d2d04d8d7e03403f889419526e682529
[3] NOAA's National Weather Service. (n.d.). 80-Year List of Severe Weather Fatalities. https://www.weather.gov/hazstat/ https://www.weather.gov/media/hazstat/80years_2023.pdf
[4] NOAA's National Weather Service. (n.d.-b). Flood related hazards. https://www.weather.gov/safety/flood-hazards
[5] National Oceanic and Atmospheric Administration [NOAA]. (n.d.). Storm Events Database (By National Center for Environmental Information [NCEI]). National Center for Environmental Information. https://www.ncdc.noaa.gov/stormevents/
[6] National Oceanic and Atmospheric Administration [NOAA]. (n.d.). Storm Events Database (By National Center for Environmental Information [NCEI]). National Center for Environmental Information. https://www.ncdc.noaa.gov/stormevents/
[7] National Oceanic and Atmospheric Administration [NOAA]. (n.d.). Storm Events Database (By National Center for Environmental Information [NCEI]). National Center for Environmental Information. https://www.ncdc.noaa.gov/stormevents/
[8] Federal Emergency Management Administration [FEMA]. (n.d.). National Risk Index Data Resources [Dataset]. In Department of Homeland Security [DHS], FEMA National Risk Index. https://hazards.fema.gov/nri/data-resources#spatialTribal
[9] Wildland Fire Interagency Geospatial Services. (2024). Wildland fire incident locations [Dataset]. In National Interagency Fire Center, NIFC Open Data Site. National Interagency Fire Center. https://data-nifc.opendata.arcgis.com/datasets/b4402f7887ca4ea9a6189443f220ef28_0/explore?location=0.000000%2C0.000000%2C1.93&showTable=true
[10] Wildland Fire Interagency Geospatial Services. (2024). Wildland fire incident locations [Dataset]. In National Interagency Fire Center, NIFC Open Data Site. National Interagency Fire Center. https://data-nifc.opendata.arcgis.com/datasets/b4402f7887ca4ea9a6189443f220ef28_0/explore?location=0.000000%2C0.000000%2C1.93&showTable=true
[11] Wildland Fire Interagency Geospatial Services. (2024). Wildland fire incident locations [Dataset]. In National Interagency Fire Center, NIFC Open Data Site. National Interagency Fire Center. https://data-nifc.opendata.arcgis.com/datasets/b4402f7887ca4ea9a6189443f220ef28_0/explore?location=0.000000%2C0.000000%2C1.93&showTable=true
[12] North Carolina Emergency Management & North Carolina Department of Public Safety. (2022). State of North Carolina 2023 Hazard Mitigation Plan. In ncdps.gov. NC Department of Public Safety. https://www.ncdps.gov/20230125-2023-nc-shmp-final-publicpdf/open
[13]National Oceanic and Atmospheric Administration [NOAA]. (n.d.). Storm Events Database (By National Center for Environmental Information [NCEI]). National Center for Environmental Information. https://www.ncdc.noaa.gov/stormevents/
[14] U.S. Geological Survey. (n.d.). Earthquake Catalog [Dataset]. In USGS Earthquake Hazards Program. USGS. https://earthquake.usgs.gov/earthquakes/search/
[15] U.S. Geological Survey. (n.d.-b). Magnitude Types. USGS Earthquake Hazards Program. Retrieved June 27, 2024, from https://www.usgs.gov/programs/earthquake-hazards/magnitude-types
[16] Bozdog, N. (2023). North Carolina landslide points [Dataset]. In NC Department of Environmental Quality, NC One Map. https://www.nconemap.gov/datasets/01965a193482438cb70332e5e524e38b_0/about

[17]Davis, C. (2021, August 10). Rapid reaction: A season's worth of snow in one day - North Carolina State Climate Office. North Carolina State Climate Office - A Public Service Center. https://climate.ncsu.edu/blog/2018/12/rapid-reaction-a-seasons-worth-of-snow-in-one-day/
[18] The Changing Hail Threat Over North America in Response to Anthropogenic Climate Change: J. C. Brimelow, W. R. Burrows and J. M. Hanesiak, Published online at www.nature.com, 26 June 2017
[19] https://www.ncdps.gov/20230125-2023-nc-shmp-final-publicpdf/open
[20] https://www.drought.gov/states/north-carolina#historical-conditions
[21] https://www.weather.gov/mhx/TropicalClimatology
[22] Zuzak, C., Sheehan, A., Goodenough, E., McDougall, A., Stanton, C., McGuire, P., Mowrer, M., Roberts, B., & Rozelle, J. (2023). National Risk Index: Technical Documentation. In Federal Emergency Management Agency, FEMA.gov. Retrieved May 28, 2024, from https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_technical-documentation.pdf

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Section 5: Capability Assessment

This section discusses the capability of the Plan Area to implement hazard mitigation activities. It consists of the following four subsections:

5.1 Overview
5.2 Conducting the Capability Assessment
5.3 Capability Assessment Findings
5.4 Conclusions on Local Capability

5.1. Overview

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. As in any planning process, it is important to try to establish which goals, objectives, and 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, number 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, and 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. *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 Plan Area serves as a critical planning step and an integral part of the foundation for designing an effective *Mitigation Strategy.* Coupled with the *Risk Assessment, the Capability Assessment* helps identify and target meaningful mitigation actions for incorporation into the *Mitigation Strategy* portion of the Plan. It helps establish the goals and objectives for the Region to pursue under this Plan and ensures that those goals are realistically achievable under given local conditions.

5.2. Conducting the Capability Assessment

To facilitate the inventory and analysis of local government capabilities within the Plan counties, a detailed *Local Capability Assessment Survey* was distributed to members of the Hazard Mitigation Planning Committee (HMPC) at the second planning committee meeting. The survey questionnaire requested 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 Region's fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes, as well as any existing education and outreach programs that can be used to promote mitigation. Survey respondents were also asked to comment on the current political climate regarding hazard mitigation, an important consideration for local planning or decision-making.

At a minimum, the survey results provide an extensive and consolidated inventory of existing local plans, ordinances, programs, and resources in place or under development, in addition to their overall effect on hazard loss reduction. In completing the survey, local officials were also required to conduct a self-assessment of their jurisdiction's specific capabilities. The survey instrument thereby not only helps accurately assess the degree of local capability, but it also serves as a good source of introspection for counties and local jurisdictions that want to improve their capabilities as identified gaps, weaknesses, or conflicts can be recast as opportunities for specific actions to be proposed as part of the mitigation strategy.

Each jurisdiction was asked to rate their planning and regulatory, general planning, floodplain management, administrative and technical, fiscal, education and outreach, mitigation, political, and overall capabilities. The jurisdictions were also given the opportunity to provide details about their

capabilities in terms of management plans which relate to their capabilities. These include hazard mitigation plans, comprehensive or general plans, disaster recovery plan, emergency operations plan, continuity of operations plans, capital improvement plans, historic preservation plan, zoning ordinances, subdivision ordinances, building codes, community rating system, floodplain management plans, open space management plans, and stormwater management plans. The capabilities assessments were used along with the completed mitigation actions to inventory the hazard mitigation capabilities of each jurisdiction to highlight their existing and ongoing capabilities along with areas of improvement.

The jurisdictions were also asked to rate their capabilities in terms of "High," "Moderate," or "Limited" for hazard mitigation in terms of overall hazard mitigation, planning and regulatory, general planning, floodplain management, administrative and technical, fiscal, education and outreach, mitigation, and political. Along with rating their capabilities for these categories, they were also given the opportunity to provide comments about their capability ratings. This allows the jurisdictions to think about the entire hazard mitigation planning process to get a sense of their overall hazard mitigation capabilities and are designed to provide nothing more than a general assessment of local government capability. In combination with the narrative responses provided by local officials, the results of this *Capability Assessment* provide critical information for developing an effective and meaningful mitigation strategy.

5.3. Capability Assessment Findings

The findings of the *Capability Assessment* are summarized in this Plan to provide insight into the relevant capacity of the Plan Area to implement hazard mitigation activities. All information is based on local government officials' input through the Local Capability Assessment Survey.

5.3.1. 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, in addition to the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed, and structures are built, as well as protecting environmental, historic, and cultural resources in the community. 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 or programs in place or under development for the Plan Area, along with their potential effect on loss reduction. This information will help identify opportunities to address existing gaps, weaknesses, or conflicts with other initiatives and integrate the implementation of this Plan with existing planning mechanisms where appropriate.

Table 5- 1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the Plan Area. A checkmark indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently

> ***Element A4-a.*** *Does the plan document what existing plans, studies, reports, and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?*

being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Hazard Mitigation Plan.

Listed below are existing plans, studies, reports, and technical information reviewed for plan development and update. Relevant information such as hazard analysis, NFIP data, building codes, ordinances and communication procedures were incorporated into the mitigation plan via coordination with

Jurisdiction	Hazard Mitigation Plan	Comprehensive Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvement Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Flood Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Alexander County	✓	✓				✓	✓		✓		✓			✓	✓	✓		✓	✓	✓	✓		✓	✓		✓	
Town of Taylorsville	✓	✓				✓	✓				✓	✓		✓	✓	✓		✓	✓	✓	✓		✓	✓		✓	
Burke County	✓	✓	✓			✓						✓				✓	✓	✓	✓	✓			✓	✓	✓	✓	
City of Morganton	✓	✓	✓	✓	✓	✓	✓					✓				✓	✓	✓	✓	✓			✓	✓		✓	
Town of Connelly Springs	✓	✓	✓		✓											✓		✓	✓							✓	
Town of Drexel	✓	✓	✓	✓		✓						✓			✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	
Town of Glen Alpine	✓	✓	✓		✓	✓		✓	✓									✓	✓	✓			✓	✓	✓	✓	
Town of Hildebran	✓	✓													✓	✓	✓	✓	✓	✓			✓	✓		✓	
Town of Rutherford College	✓	✓			✓										✓	✓	✓	✓	✓	✓			✓	✓		✓	
Town of Taylorsville	✓	✓				✓	✓				✓	✓		✓	✓	✓		✓	✓	✓	✓		✓	✓		✓	

Jurisdiction	Hazard Mitigation Plan	Comprehensive Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvement Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Flood Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Town of Valdese	✓	✓	✓		✓	✓		✓	✓			✓			✓	✓	✓		✓	✓	✓		✓	✓		✓	
Catawba County	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	
City of Claremont	✓	✓				✓				✓		✓			✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	
City of Conover	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓			✓	✓	✓	✓	
City of Hickory	✓	✓	✓		✓	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
City of Newton	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓		✓	✓
Town of Brookford	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Town of Catawba	✓	✓										✓	✓		✓	✓		✓	✓	✓						✓	
Town of Long View	✓	✓	✓		✓	✓	✓		✓	✓		✓	✓			✓	✓	✓	✓	✓			✓	✓		✓	

Jurisdiction	Hazard Mitigation Plan	Comprehensive Use Plan	Floodplain Management Plan	Open Space Management Plan	Stormwater Management Plan	Emergency Operations Plan	SARA Title III Plan	Radiological Emergency Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvement Plan	Economic Development Plan	Historic Preservation Plan	Transportation Plan	Flood Damage Prevention Ordinance	Flood Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Site Plan Review Requirements	Unified Development Ordinance	Post Disaster Redevelopment Ordinance	Building Code	Fire Code	Community Wildfire Protection Plan	National Flood Insurance Program	Community Rating System
Caldwell County	✓	✓													✓	✓		✓	✓	✓			✓			✓	
City of Lenoir	✓	✓			✓	✓	✓		✓			✓				✓		✓	✓	✓		✓	✓	✓		✓	✓
Town of Cajah's Mountain	✓	✓			✓	✓						✓			✓	✓		✓	✓				✓	✓		✓	
Town of Gamewell	✓	✓	✓	✓	✓	✓						✓			✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	
Town of Granite Falls	✓	✓			✓	✓			✓			✓			✓	✓		✓	✓	✓			✓	✓		✓	
Town of Hudson	✓	✓													✓	✓		✓	✓	✓			✓	✓		✓	
Town of Rhodhiss	✓	✓	✓	✓		✓						✓			✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	
Town of Sawmills	✓	✓			✓										✓	✓		✓	✓	✓			✓	✓		✓	
Village of Cedar Rock	✓	✓	✓									✓			✓	✓	✓	✓		✓			✓	✓		✓	

Table 5- 1: Review and Incorporation of Existing Plans, Studies, Reports, Ordinances, Technical Information and Programs

A more detailed discussion on the Region's planning and regulatory capability follows, along with the incorporation of additional information based on the narrative comments provided by local officials in response to the survey questionnaire.

5.3.2. Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases are preparedness, response, and recovery. Each phase is interconnected with hazard mitigation, as Figure 5-1 suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before a disaster event, such as elevation of flood-prone structures or through the continuous enforcement of policies that prevent and regulate development that is vulnerable to hazards because of its location, design, or other characteristics. Mitigation opportunities can also be identified during immediate preparedness or response activities (such as installing storm shutters in advance of a hurricane), and in many instances during the long-term recovery and redevelopment process following a disaster event.



Figure 5-1: 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 **Local Capability Assessment Survey** asked several questions across a range of emergency management plans to assess the Area's willingness to plan and their level of technical planning proficiency.

5.3.1.1. Updated Capabilities

Alexander County

- **Community Alert System:** Code Red notification platform has been implemented and the County continues to work with the local Information Team to increase the capabilities of the unified messaging system. This is maintained quarterly.
- **E-911 Center:** The County has constructed a E-911 Center that addresses new businesses and residences to add to the 911 address database. This is updated monthly or as needed to add new addresses as new construction projects obtain permits. This system addresses all the communities in Alexander County.

- **HyperReach:** The County has established HyperReach as their early warning system that uses social media, apps, and websites to share information with communities about early warnings of dam failure and potential hazards. The HyperReach system is a reverse 911 system that notifies residents about potentially hazardous conditions and is maintained quarterly. Applies to all communities in Alexander County.
- **Protocol for Monitoring Tail Race Areas:** Data about tail race monitoring areas below the Catawba River has been established by Duke Energy for real time information and alerts.
- **Transfer Switch Connections for New and Existing Public Facilities:** The County has added generators to newly constructed public facilities including the County Offices, Health Department, and Board of Elections.
- **Portable Generator:** The County has obtained a deployable trailer mounted generator for emergency response.
- **City of Morganton: Major Sewer and Wastewater Upgrades** have been completed, including wastewater plant renovations and line upgrades for the City's wastewater sewer systems. The City has also installed new water plant generators above the flood hazard areas to serve as a power source backup during catastrophic events to maintain the systems drinking water.
- **Town of Taylorsville Increased Emergency Response Forces:** the Town has increased the emergency response force by assisting with pay increases to assist with staffing issues, train more law enforcement, and maintain credentials.

Catawba County

- **Quick Connect Installation at Critical Public Facilities:** The County has coordinated with the American Red Cross to install pre-wired connections to use in portable generators at critical public facilities including two elementary schools (Startown Elementary and Bandys High School) with Department of Homeland Security Grants.
- **Requirement for Pre-wired Connections in New School Facilities:** The County has met with the Catawba County School representatives and established a policy to have pre-wired connections installed during any new construction to be more cost effective.
- **Protocol for Monitoring Tail Race Areas:** Data about tail race monitoring areas below the Catawba River has been established by Duke Energy for real time information and alerts.
- **Identification of Emergency Access Areas on Public Properties:** The County has established evacuation procedures for parks which include alternative routes. They have also established natural breaks to reduce the spread of wildfires to the adjoining properties.
- **Protocol for Notification of Log Jamming in Priority Watershed:** Established to notify the appropriate agencies and community partners to assist in clearing the log jam. The NCDOT is also notified of log jams, possible or existing, that can jeopardize bridge abutments.
- **City of Claremont is Installing Generator Hook-ups for Critical Facilities:** The City of Claremont Fire Department, Police Department, Public Works Department, McLin Sewer Treatment Plant, Rescue Squad, and four out of five lift stations now have emergency generators. Public works is scheduled to be building a new permanent generator in the near future.
- **City of Conover has installed Generators at all Critical Facilities:** All critical facilities now have permanent full backup capability with generators including the City Hall, Police Stations, Fire Stations, and Public Works buildings. **Brush and Wildland Fire Training** has incorporated the training into the annual training schedule in the City Fire Department.
- **City of Lenoir has** Installed Backup Generator at City Hall

- **City of Newton** added an **additional tree trimming crew** to keep trees and limbs clear of electric lines to prevent damage.
- **Town of Maiden** has constructed a **Remote Fire Station** at the intersection of Elbow Road and Startown Road, and another fire station is currently under construction.
- **City of Hickory** has added **Additional Commanders in the Fire Department:** the City of Hickory had realigned the structure of its fire department to allow for better management of multiple incidents and provide safety for public safety personnel. The City has purchased 11 four-wheel drive vehicles with **Off-Road Capability Vehicles** to utilize when residents become stranded or cut-off from services due to hazardous weather events. The City of Hickory Police department have acquired an elevated platform **Police Skytower** that can support police personnel and or surveillance equipment. It has provided firsthand management of severe weather events and can also be used to observe areas impacted by severe weather. A **Second Ladder Company within the Hickory Fire Department** has provided the City and has the ability to reduce the existing 43 square mile coverage to two 21.5 square miles of coverage. The Hickory Police Department has installed the **Radio Frequency Interoperability Hardware** to prevent communication breakdown due to compatibility issues between radio and telephone systems. The City continues to update the system as needed and provide training to other local governments and emergency service groups as needed.
- **Town of Brookford** has prepared a **Local Evacuation Route** to ensure the safety of its residents in anticipation of hazard events, particularly wildfires and floodings. The Town of Brookford has developed a **Mutual Aid Agreement** with the City of Hickory and works with Catawba County.
- **Town of Long View** has obtained gear through a grant to train 2-3 times a year for **Brush and Forest Firefighting Training**. The Town of Long View has developed a **Hazard Awareness Month** to promote hazard awareness throughout the town in the month of March.
- **Town of Catawba** routinely relies on **Scheduled Tree Clearing** through a private company and Duke Energy to prune and trim trees in order to prevent damage from hazard events.

Burke County

- **HyperReach:** The County has established HyperReach as their early warning system that uses social media, apps, and websites to share information with communities about early warnings of dam failure and potential hazards. The HyperReach system is a reverse 911 system that notifies residents about potentially hazardous conditions and is maintained quarterly. Applies to all communities in Alexander County.
- **Community Health and Disaster Mitigation Explorer (CHADME):** the WPCOG has created a community health and disaster mitigation tool that has an inventory of all Burke County infrastructure, critical facilities, and areas of concern.
- **E-911 Expansion:** Burke County has updated and expanded their E-911 program to include municipalities to cover the entire County with one system. The E-911 center updated the system with new addresses on a continuous basis when new residences and businesses are built or permitted. Building permits require a 911 address to be given for any new construction projects.
- **Town of Rutherford College** has obtained a **portable generator** that is used for the pump station when the power is out.
- **Town of Valdese** has installed a **Quick Connect Emergency Generator** in 2018 in the Valdese Water Department Pump Station. The Town of Valdese continually **monitors and inspects storm drainage systems** to clear debris and present debris from blocking the drain.

5.3.1.2. Hazard Mitigation Plan

A hazard mitigation plan represents a community's blueprint for how it intends to reduce the impact of natural, and in some cases 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.

- **28 of the 28 participating jurisdictions** in this regional planning effort have previously been covered by their county's multi-jurisdictional hazard mitigation plan.

5.3.1.3. Disaster Recovery Plan

A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster event. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans to capitalize 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.

- **7 of the 28 participating jurisdictions** have a disaster recovery plan either in place or under development. (5 jurisdictions have one in place; 4 have one under development; 0 covered under a county plan)

5.3.1.4. Emergency Operations Plan

An emergency operations plan outlines responsibility and how resources are deployed during and following an emergency or disaster.

- **20 of the 28 participating jurisdictions** have an emergency operation plan either in place or are covered under a county plan.
- **Alexander County** has undergone a complete re-write of their EOP and expect it to be completed by the end of 2024 with opportunities to review and revise annually in the future. This EOP establishes a program for evaluating and improving critical services and critical facilities to reduce risks of damage due to natural hazards.
- **Catawba County** has established procedures in their EOP to address dams, monitoring, and high-water events for public notification and awareness.

5.3.1.5. 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.

- **10 of the 28 participating jurisdictions** have a continuity of operations plan in place.

5.3.3. 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. **The Local Capability Assessment Survey** also asked questions regarding

general planning capabilities and the degree to which hazard mitigation is integrated into other ongoing planning efforts in the Plan Area.

5.3.2.1. Updated Capabilities by Jurisdiction

Alexander County

- **Land Use Development plan:** The County updated their Land Use Development plan in May 2024.
- **Town of Taylorsville** developed a **Unified Development Ordinance** has been adopted that combines the County and Town of Taylorsville zoning districts. A **Land Use Development Code** covering the area was also adopted in May 2024

Catawba County

- **Carolina Thread Master Plan:** Catawba County created and adopted the plan in coordination with the Carolina Thread Trail Organization which lays out a system of 126 miles of interconnected trails within the county, and 56 miles of the trail systems are located along river corridors which help preserve sensitive floodplain areas through the acquisition of easements.
- **Corridor Plans:** The County updated its corridor and small area plans to incorporate hazard mitigation elements into new development in areas where utilities, emergency services, and public facilities exist.
- **City of Claremont** has developed an **Infrastructure Database** that the WPCOG maintains with infrastructure and utilities database in a GIS system that is updated when changes are made.

Caldwell County

- **City of Lenoir** has developed a **Minimum Housing Database** to catalog vacant, substandard, and abandoned houses to prioritize the enforcement actions based on a formula that is weighted for factors such as public safety. Within 5 years, over 150 houses have been removed from the list as they are being abated. The City continues to identify houses for abatement and foreclosure every year.

Burke County

- **Town of Glen Alpine** reviews zoning ordinances on an annual basis and the Planning Board meets monthly to review ordinances, subdivision plans, future projects, and public concerns.
- **Town of Rutherford College** has revised its zoning regulations to require a 50-foot buffer for new development along the Catawba River and has revised the subdivision regulations to require all perennial and intermittent streams to be shown on subdivision plats.

5.3.2.2. Comprehensive/General Plan

A comprehensive land use plan, or general 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.

- **28 of the 28 participating jurisdictions** have a comprehensive land use plan either in place or under development.
- **Alexander County** updated their Comprehensive Plan in May 2024, and it will be reviewed annually.
- **City of Morganton** has developed the Imagine Morganton 2040 comprehensive plan which will be adopted by the City Council in 2024 and includes a Land Development Plan.
- **Burke County, along with The Town of Long View,** have updated their Comprehensive Land Use Plan which was adopted in 2022 and will be continually monitored until the next scheduled review in 2030. This includes preparing a development plan to relocate public infrastructure out of hazard areas and has been awarded a BRIC grant to update a pumping station within the County to reduce flooding.

5.3.2.3. 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.

- **19 of the 28 participating jurisdictions** have a capital improvements plan in place or under development.
- **City of Morganton** has updated their CIP with a development plan to relocate public infrastructure out of hazard areas.
- **Burke County** has developed a Capital Improvement Plan for public facilities that steer capital projects out of hazard areas.

5.3.2.4. 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 damage. 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.

- **5 of the 28 participating jurisdictions** have an historic preservation plan in place or under development.

5.3.2.5. 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 each 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.

- **27 of the 28 participating jurisdictions** have a zoning ordinance in place or under development.
- **The City of Lenoir** continues to enforce the City's Minimum Housing Ordinance and rehabilitate and move unsafe structures in addition to creating and maintaining a database of abandoned and at-risk structures to help with enforcement.
- **The Town of Taylorsville** has developed a unified development ordinance that combines the Alexander County and the Town of Taylorsville zoning districts.
- **Town of Glen Alpine** planning board and staff meet monthly to review ordinances, subdivision plans, and future projects.

5.3.2.6. 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.

- **27 of the 28 participating jurisdictions** have a subdivision ordinance in place or under development.
- **The Town of Rutherford College** requires subdivision regulations to require that all perennial and intermittent streams be show on subdivision plats.

5.3.2.7. 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.

- **26 of the 28 participating jurisdictions** have building codes in place.
- **Burke County** has updated its building codes to prevent new structures from being built in the tail race area below the Catawba River dams.

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). 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 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. Table provides NFIP policy and claim information for each participating jurisdiction in the Plan Area.

5.3.4. Floodplain Management

Flooding represents the greatest natural hazard facing our 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 *Capability Assessment* as a key indicator for measuring local capability.

For a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year flood event, and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties.

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their community.

Table 5-2 provides NFIP policy and claim information for each participating jurisdiction in the Plan Area.

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies In Force	Insurance In Force	Written Premium In Force	Closed Losses	Total Payments
Alexander County							
Alexander County (Unincorporated Area)	06/09/78	07/07/09	22	$5,737,000	$36,031		$44,910
Town of Taylorsville	12/18/07	07/07/09	3	$1,750,000	$8,345		$10,572
Subtotal Alexander	-	-	**25**	**$7,487,000**	**$44,376**		**$55,480**
Burke County							
Burke County (Unincorporated Area)	01/15/74	07/07/09	55	$14,438,000	$64,021		$80,728
City of Morganton	03/22/74	07/07/09	41	$12,219,000	$72,545		$92,579
Town of Connelly Springs	01/15/74	07/07/09	2	$700,000	$1,090		$1,319
Town of Drexel	08/08/75	07/07/09	4	$1,208,000	$4,428		$5,517
Town of Glen Alpine	01/15/74	07/07/09	2	$546,000	$1,447		$1,966
Town of Hildebran	09/05/07	07/07/09					
Town of Rutherford College	01/15/74	07/07/09	1	$350,000	$571		$690
Town of Valdese	07/25/75	07/07/09	5	$1,856,000	$9,108		11,955
Subtotal Burke	-	-	**107**	**$1,317,000**	**$153,210**		**$1,945,823**
Caldwell County							
Caldwell County (Unincorporated Area)	04/28/78	07/07/09	60	$14,895	$77,704		$96,287
City of Lenoir	12/03/76	07/07/09	82	$22,818,000	$157,465		$195,715
Town of Cajah's Mountain	08/16/88	07/07/09	1	350,000	434		$529
Town of Gamewell	08/16/88	07/07/09	1	$149,000	$720		$1,091

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies In Force	Insurance In Force	Written Premium In Force	Closed Losses	Total Payments
Town of Granite Falls	08/16/88	07/07/09	4	$766,000	$2,700		$3,251
Town of Hudson	08/16/88	07/07/09	5	$2,936,000	$5,173		$6,636
Town of Rhodhiss	06/21/74	07/07/09	5	$1,290,100	$3,223		$12,587
Town of Sawmills	04/28/78	07/07/09	1	$350,000	$856		$1,027
Village of Cedar Rock	04/28/78	07/07/09	0	0	0		0
Subtotal Caldwell	-	-	**159**	**$28,673,995**	**$232,613**		**$317,123**
Catawba County							
Catawba County (Unincorporated Area)	06/10/77	07/07/09	84	$22,714,000	$74,614		$92,811
City of Claremont	09/05/07	07/07/09	11	$3,056,000	$6,929		$9,257
City of Conover	06/21/74	07/07/09	19	$5,539,000	$25,181		$30,702
City of Hickory	09/13/74	07/07/09	94	$26,046,000	$78,611		$98,041
City of Newton	06/28/74	07/07/09	13	$4,407,000	$18,437		$23,096
Town of Brookford	09/06/74	07/07/09	0	0	0		0
Town of Catawba	06/28/74	07/07/09	3	$949,000	$2,455		$2,947
Town of Long View	06/28/74	07/07/09	5	$1,387,000	$4,946		$6,369
Town of Maiden	09/20/74	07/07/09	9	$4,478,000	$15,436		$19,263
Subtotal Catawba	-	-	**238**	**$68,576,000**	**$226,609**		**$1,376,882**
TOTAL PLAN	**-**	**-**	**529**	**$106,053,995**	**$656,808**		**$3,695,308**

Table 5-2: NFIP Policy and Claim Information

All jurisdictions listed above participate in the National Flood Insurance Program and will continue to comply with all required provisions and work to adequately comply in the future, utilizing several strategies. Floodplain management is managed through zoning ordinances, building code restrictions, and the county building inspection program. 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. Each county and its municipalities while participating in the National Flood Insurance Program comply with regulations as demonstrated in regular Community Assessment Visits (see attached Appendix X).

5.3.3.1. Updated Capabilities

Alexander County

- **Flood Prevention Ordinance:** Alexander County is expected to have a Land Development Code which has a section on flood prevention ordinances by September 2024 and to be updated annually. This also includes zoning and subdivision regulations in floodplain, steep slope, and wildfire hazard areas.
- **Updated Regulatory Floodplain Maps:** The County adopts and utilizes the current NC Floodplain Mapping Program Data, and it is reviewed annually.
- **Coordinated Floodplain Permitting System:** The County is setting up a centralized online permitting system which will be used by all inspection agencies with floodplain permitting and is estimated to start in 2025.
- **Town of Taylorsville:** has installed a **New Culvert For Muddy Creek** to improve drainage. The Town has worked to widen streets and improve the stormwater drainage for **Right-of-way and Ditch Maintenance** with funding to prevent damage to streets and property from stormwater.

Catawba County

- **Stormwater Requirements in the County Master Plan:** The County includes stormwater management requirements in the County Master Plan and maintenance plans are required and reviewed by staff.
- **Stormwater Committee:** A multi-jurisdictional Stormwater Committee to prioritize stormwater issues and projects within the area has been established with fire department, law enforcement, emergency managers, and the NCDOT staff, meeting quarterly to discuss issues of concern. Public service announcements are also periodically run to encourage the clearing of private road drains and driveway culvert drains.
- **City of Claremont** has adopted a **Floodplain Regulation** in their Comprehensive Use Plan which has floodplain regulation and current floodplain data. The new floodplain maps will be updated when FEMA adopts the updated FIRMs. The City of Claremont verified the height of manhole flood zones by GPS to ensure proper equipment is present and manholes along creeks have risers to improve **Water, Sewer, and Storm Facilities Data Collection**.
- **Town of Maiden** received a NC Department of Environmental Quality grant to improve the Maiden Reservoir Dam for **Dam Failure Study** and has multi-phase plan to address the issues with the dam. The Town has installed **Risers for Sewer Manholes** to improve infiltration and inflow during heavy rains. The Town continues to conduct **Public**

Awareness for Storm Drain Clearing training to encourage residents to keep storm drains clear of debris during storms.

- **Town of Brookford** adopted a **Flood Prevention Ordinance** based on models provided by the State of North Carolina. The Town has worked closely with Catawba County to dispose of debris and development of a **Debris Management Plan.** The Town continues to work with the Public Works Department to do weekly **Routine Storm Drain Inspection** as a preventative action.
- **City of Newton** has maintained continued **NFIP Compliance** with digital floodplain elevation certificates for all construction in the floodplain, including ongoing development.
- **Town of Catawba** routinely **Cleans and Repairs Stormwater Drains** as an ongoing preventative action.

Caldwell County

- **Flood Insurance Rate Maps:** The County has maintained comprehensive Geographic Information Systems (GIS) with current Flood Insurance Rate Map panels to ensure that information is readily available to the County citizens along with historical FIRM panels.
- **Town of Gamewell keeps Flood Insurance Rate Maps** on file at the Town Hall and on the County website.
- **City of Lenoir** continued to enforce the **Flood Damage Prevention Ordinance** and regulate construction within special flood hazard areas by requiring that all floodplain developments obtain floodplain development permits from the Lenoir Planning Department. In 2018 the City hired Freese and Nichols Inc. to begin an inventory of all **Underground stormwater infrastructure and Piped Stream Mapping** and to develop a Capital Improvements Plan based on the stormwater infrastructure needs of the City. This included a database to record any reported issues, develop an inventory of stormwater hotspots, and known structural issues or failures within pipes prioritized by a weighting system to allow the Council to prioritize funding needs. In 2023, the City hired WPCOG who have mapped half of the City's stormwater system as of June 2024. City of Lenoir staff continue to monitor storm drains before, during, and after storms to ensure **Obstruction Removal of Storm Drains** are completed in a timely manner. The staff also continue to collect reports from the public and utilize this information to identify problem areas where obstructions occur more frequently to prevent future occurrences.

- **Town of Hudson:**
  - **Flood Damage Prevention Ordinance:** the Town of Hudson has developed a Flood Damage Prevention Ordinance which was adopted in 2022 and they continue to enforce floodplain requirements.
  - **Flood Insurance Rate Maps:** The Town of Hudson continues to maintain FIRMs in the Hudson Town Hall and on the Caldwell County Tax Mapping website.
  - **Stormwater Regulation Enforcement:** The City of Lenoir continues to administer stormwater regulations for the Town of Hudson.

Burke County

- **Updated Flood Damage Prevention Ordinance:** The County along with the Town of Long View and the City of Morganton have continued to review and update their Flood Damage Prevention Ordinances based on changing hazard information, and they will be reviewed again based on map updated in 2025 if necessary.

- **Update of Regulatory Floodplain Maps:** the County adopts and utilizes the current NC Floodplain Mapping Program data which coincides with state update maps. The County continues to monitor the maps for updates.
- **Centralized Permitting:** The County, along with the Town of Long View, have set up a centralized permitting process including a filing and permitting process that ensures that compliance is maintained with floodplain regulations.
- **City of Morganton** continues to work with FEMA to adopt and **Update Regulatory Flood Maps** as they are released. There have been public meetings with the State and County representatives for concerned citizens. The City is currently waiting on the State to change the future Preliminary Maps to the Effective Maps. The City Public Works Department **Established a Drainage System Inspection Program** performs an annual critical systems maintenance, inspection, repair, and replacement of failed systems. The City continues to maintain the drainage system with an ADWI Grant to help document their assets and plan for future stormwater projects. **Acquisition and Inventory of High-Risk Properties in Flood Prone Areas is ongoing,** as The City continues to identify high risk properties and maintain a list of the properties, and as funding becomes available the City acquires the high-risk properties to eliminate the catastrophic loss of life and damage to property. Most of the properties are incorporated into greenways and parks within flood-prone areas.
- **Town of Hildebran** works with property owners and developers to ensure **Management of Future Development in Flood-Prone Areas** outside of the designated floodplain.
- **Town of Rutherford College** has developed a **Stormwater Management Plan** which meets all of the Federal Phase II stormwater regulations. The Town has also completed their stormwater map and conducted stormwater outreach.
- **Town of Valdese** has addressed drainage system management with the Town **Stormwater and Watershed Ordinance** which is under continuous observation and evaluation.

5.3.3.2. 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, adding extra local measures to provide protection from flooding. All 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. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in Table 5- 3. As class ratings improve (the lower the number, the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

CRS Class	Premium Reduction
1	45%
2	40%
3	35%

CRS Class	Premium Reduction
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0%

Table 5- 3: CRS Premium Discounts by Class

Community participation in the CRS is voluntary. Any community 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 intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it.

5.3.3.3. 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.

- **15 of the 28 participating** jurisdictions have a floodplain management plan in place.

5.3.3.4. 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.

- **8 of the 28 participating jurisdictions** have an open space management plan in place or under development.

5.3.3.5. 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.

- **16 of the 28 participating jurisdictions** have a stormwater management plan in place.
- **Burke County,** along with **The Town of Valdese**, have developed a countywide stormwater management plan covering the Catawba river basin which was completed in 2015. The Town of Valdese has also assigned a director of the Storm Water Management Program to assist with the plan.

5.3.4. 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 Local Capability Assessment Survey was used to capture information on administrative and technical capability through the identification of available staff and personnel resources. *The Local Capability Assessment Survey* was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Error! Reference source not found. provides a summary of the *Local Capability Assessment Survey* results for the Plan Area regarding relevant staff and personnel resources. A checkmark indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

Jurisdiction	Planners with knowledge of land development and land **management practices**	Engineers or professionals **trained in construction practices related to**	Planners or engineers with an understanding of natural and/or human-caused	Building Official	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	Personnel skilled in **Geographic Information** Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services
Burke County	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓
City of Morganton	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
Caldwell County	✓		✓	✓	✓	✓			✓	✓	✓		
City of Lenoir	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
Town of Rhodhiss			✓	✓	✓	✓			✓	✓	✓		
Catawba County	✓	✓	✓	✓	✓	✓			✓	✓			
Town of Brookford					✓	✓						✓	
Town of Catawba	✓			✓		✓				✓	✓	✓	
City of Conover	✓	✓	✓		✓	✓			✓	✓	✓	✓	✓
City of Hickory	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Town of Long View	✓	✓	✓			✓				✓	✓	✓	✓
Town of Maiden	✓		✓			✓						✓	✓
City of Newton	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓
Town of Drexel			✓	✓	✓	✓			✓	✓	✓		

Jurisdiction	Planners with knowledge of land development and land **management practices**	Engineers or professionals **trained in construction practices related to**	Planners or engineers with an understanding of natural and/or human-caused	Building Official	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	Personnel skilled in **Geographic Information** Systems (GIS) and/or HAZUS	Resource development staff or grant writers	Maintenance programs to reduce risk	Warning systems/services
Town of Valdese	✓				✓	✓						✓	✓
Alexander County	✓		✓	✓	✓	✓			✓				✓
Town of Granite Falls	✓		✓			✓			✓			✓	✓
Town of Hudson	✓	✓	✓	✓	✓	✓				✓	✓		✓
Town of Gamewell			✓	✓	✓	✓			✓	✓	✓		
Town of Taylorsville	✓		✓	✓	✓	✓			✓				✓
Town of Hildebran	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓
City of Claremont	✓	✓	✓			✓				✓		✓	✓
Town of Glen Alpine				✓	✓	✓			✓	✓			
Town of Connelly Springs	✓			✓		✓							
Town of Rutherford College				✓	✓	✓			✓	✓			
Town of Sawmills	✓	✓	✓	✓	✓	✓				✓	✓		✓
Town of Cajah's Mountain	✓	✓	✓	✓	✓	✓					✓		
Village of Cedar Rock	✓	✓	✓	✓	✓	✓			✓	✓	✓		✓

Table 5- 4: Relevant Staff/Personnel Resources

5.3.5. Fiscal Capability

The ability of a local government to act 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 houses, which can require a substantial commitment from local, state, and federal funding sources.

The Local Capability Assessment Survey was used to capture information on the Region's fiscal capability through the identification of locally available financial resources.

Table 5- 5 provides a summary of the results for the Plan Area regarding 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).

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Burke County	✓	✓			✓						
City of Morganton	✓	✓		✓	✓						
Caldwell County		✓	✓	✓	✓						
City of Lenoir	✓	✓	✓		✓						
Town of Rhodhiss	✓				✓						
Catawba County	✓	✓	✓		✓			✓			
Town of Brookford		✓									
Town of Catawba	✓	✓			✓			✓	✓		
City of Conover	✓	✓			✓		✓				
City of Hickory	✓	✓			✓			✓			
Town of Long View	✓	✓	✓		✓	✓	✓	✓	✓	✓	
Town of Maiden	✓	✓		✓	✓			✓			
City of Newton	✓	✓		✓	✓						
Town of Drexel	✓	✓		✓	✓						

Jurisdiction	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation Bonds	Revenue Bonds	Special Tax Bonds	Other
Town of Valdese	✓	✓			✓						
Alexander County		✓			✓			✓	✓	✓	
Town of Granite Falls	✓	✓		✓	✓	✓	✓				
Town of Hudson	✓	✓									
Town of Gamewell	✓				✓						
Town of Taylorsville	✓	✓			✓			✓	✓	✓	
Town of Hildebran											
City of Claremont	✓	✓			✓		✓				
Town of Glen Alpine		✓									
Town of Connelly Springs		✓			✓						
Town of Rutherford College	✓				✓			✓			
Town of Sawmills	✓	✓									
Town of Cajah's Mountain					✓						
Village of Cedar Rock	✓		✓				✓				

Table 5- 5: Relevant Fiscal Resources

5.3.6. Education and Outreach Capability

This type of local capability refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information. Examples include natural disaster or safety related school programs; participation in community programs such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns such as a Tornado Awareness Month.

Table 5- 6 provides a summary of the results for the Plan Area with regard to relevant education and outreach resources. A checkmark indicates that the given resource is locally available for hazard mitigation purposes.

5.3.6.1. Added Capabilities

Alexander County

- **Public Floodplain Management Information:** The County reviews a library of retrofitting techniques and continues to build a library of techniques which is reviewed monthly.
- **Community Alert System Education:** The City works with the Catawba County Emergency Services Department to conduct public outreach about the Community Alert System and the HyperReach Alert and Warning System along with the Town of Taylorsville.

Burke County

- **Retrofitting Technique Library:** Burke County maintains documentation related to retrofitting techniques and continues to add new documents as needed.
- **Community Alert System Outreach:** The County completed an outreach campaign to educate the public about the Community Alert System, how to obtain pre and post disaster resources, mitigation strategies, and mitigation actions for homeowners.
- **City of Morganton offers access to online Flood Elevation Certificates, FIRMs, and other** flood mapping protection services **for their Hazard Awareness Program** through NCEM**.** City staff consults with property owners and developers as to how to access this information and obtain guidance on a routine basis.
- **Town of Glen Alpine** offers **Education and Safety Training in Schools** through continuous programs, and will offer education in fire prevention, safety training, and mitigating natural hazards training to the schools and citizens. These will be focusing on talks to civic groups, children, Town citizens, and elderly adults. The Fire Department visits schools and civic clubs annually to present programs on fire prevention and safety, natural hazard awareness.
- **Town of Hildebran** has participated and will continue to participate in **Hazard Mitigation Outreach** both locally and regionally.
- **Town of Rutherford College** plans to conduct **Pre-Disaster Preparation Outreach** to educate the public at disaster fairs for the region.
- **Town of Valdese** continues to educate the public on safety and disaster preparedness in **Pre-Disaster Preparation Outreach**. The Valdese Fire Marshal was assigned to address continued education for the public on disaster preparedness and safety.

Catawba County

- **Community Alert System Outreach:** The County completed an outreach campaign to educate the public about the Community Alert System, how to obtain pre and post disaster resources, mitigation strategies, and mitigation actions for homeowners. This also includes the City of Conover, the Town of Brookford, and the Town of Maiden.
- **Local Emergency Planning Committee Network:** The LEPC meets semi-annually to discuss emergency preparedness and an environmental specialist has been added to the group to provide additional expertise for the group. The committee has been established to do the work and is up and running.
- **Firewise Community Programs:** County Forest Service Agency provided information about the Firewise program during various events throughout the past several years. They have also shared information with various fire departments when speaking about fire prevention. The County's Community Wildfire Protection Plan addresses areas of concern which are monitored by the Forest Service.

- **Manufactured Home Evacuation Outreach:** Outreach has been conducted to manufactured homeowners about emergency preparedness, such as participating in the County's Community Alert System. Information has been directly delivered to these owners and programs have also been conducted to inform owners of manufactured homes**.**
- **Flood-Prone Area Education and Outreach:** Staff has conducted door-to-door meetings with property owners in the Carpenters Cove area of Lake Lookout and shared information with the owners included: emergency preparedness, the County's Community Alert System, and flood insurance information. Countywide community and school programs have been conducted about the County's Community Alert System and flood prevention/insurance issues. An owner in Carpenters Cove applied for a flood mitigation grant and has completed mitigation actions for his structures.
- **Storm and Drought Resistant Landscape Manual:** Information about species of plants that grow well in the county has been obtained from various nurseries in the county. A list of the plants has been complied and illustrations have been developed and incorporated into a user-friendly manual.
- **Standard Hook Up Emergency Generator Education and Outreach:** Staff have worked with the nursing homes in the County and conducted testing of generators at schools and hospitals.
- **Tree-Trimming Outreach:** The County continues to educate residents about tree-trimming techniques to reduce power outages due to downed tree limbs.
- **City of Claremont** has a full-time **Public Information Officer** who provides information about hazard events and storm drainage clearing on social media and other forms of communication. The Public Information Officer who assists with social media outreach will continue educating residents about Drainage Clearing and Voluntary Water Use Restrictions during water conservation times. This will also include the development of hazard impacts in the City of Claremont and resources available for mitigation.
- **City of Conover** continues to highlight mitigation practices for homeowners through **Public Service Announcements through social media and the City Website** such as tree trimming, during wildfire and winter storm seasons and promotes education via social media, website, and brochures before, during, and after storm events. The City works with the Catawba County Emergency Services Department to conduct public outreach about the **Community Alert System** and all new utility customers are enrolled automatically in public outreach newsletters.
- **Town of Maiden** works with Catawba County Emergency Services Department to conduct public outreach about the **Community Alert System** and information about the system is also linked on the website.
- **Town of Long View** has established a **Hazard Awareness Month** in the month of March to spread awareness about natural hazards in the town.
- **Town of Brookford** has worked in coordination with Catawba County, the American Red Cross, and other organizations to continually update residents **Community Disaster Preparedness.** The Town of Brookford continually updates its residents about evacuation plans and the use of the community buildings as safe houses in extreme situations. Additionally, the Town continues to update and educate community members through Facebook and quarterly announcements.

Caldwell County

- **Hazard and Development Regulations:** The County had maintained information about hazards and development regulations in the local library, providing FEMA resources and links

in the county's websites, and ensuring that all municipalities provide a link regarding flooding information.

Jurisdiction	Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness,	Natural disaster or safety related school programs	StormReady certification	Firewise Communities certification	Public-private partnership initiatives addressing disaster-related issues	Other
Burke County		✓	✓	✓	✓		✓
City of Morganton		✓					
Caldwell County	✓	✓					
City of Lenoir	✓	✓	✓	✓			
Town of Rhodhiss	✓	✓	✓	✓			
Catawba County	✓	✓	✓	✓			
Town of Brookford		✓				✓	
Town of Catawba							
City of Conover							
City of Hickory	✓	✓	✓	✓			
Town of Long View	✓	✓		✓			
Town of Maiden	✓	✓	✓				
City of Newton		✓					
Town of Drexel	✓	✓	✓			✓	
Town of Valdese		✓		✓			
Alexander County	✓	✓	✓	✓		✓	
Town of Granite Falls	✓	✓	✓	✓			
Town of Hudson							
Town of Gamewell	✓	✓	✓	✓			
Town of Taylorsville							
Town of Hildebran	✓	✓	✓	✓		✓	
City of Claremont		✓					✓
Town of Glen Alpine		✓		✓			

Jurisdiction	Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs	Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness,	Natural disaster or safety related school programs	StormReady certification	Firewise Communities certification	Public-private partnership initiatives addressing disaster-related issues	Other
Town of Connelly Springs							
Town of Rutherford College	✓						
Town of Sawmills							
Town of Cajah's Mountain		✓					
Village of Cedar Rock		✓			✓		

Table 5- 6: Education and Outreach Resources

5.3.7. Mitigation Capability

This type of local capability refers to the mitigation strategies and actions developed by the communities in this plan. Table 5- 7 provides a summary of the results for the planning area regarding relevant mitigation resources. A checkmark indicates that the given resource is locally available for hazard mitigation purposes.

5.3.7.1. Added Capabilities:

Catawba County

- **County Unified Development Ordinance (UDO**) was amended to encourage the planting of drought tolerant plant materials as part of the landscaping requirements for new development. A Landscaping Manual is in the final stages of development which will include specific drought tolerant species for planting in the county. Also, the UDO encourages the use of sustainable maintenance systems for landscaping, such as rain barrels or cisterns. Catawba County adopted a policy whereby it will rebate 50% of fees related to plan review or express plan review for commercial buildings seeking LEED, Energy Star, and/or NC Healthy Built Homes certification. Catawba County is a signatory to the Duke Energy Relicensing Agreements which established a Low Inflow Protocol (LIP) in managing the river system during times of drought.
- **Carbon Footprint Analysis For The County's Facilities**; An Evaluation was conducted of current policies to identify ways to reduce greenhouse gases. Implement priority strategies identified in the study, which may include the production of biodiesel fuel at the County's EcoComplex, renewable energy sources such as windmills, reduction of particulate matter and ozone through recommendations of the Early Action Compact, and the development of an energy plan which may include purchasing policies that address energy reduction strategies and contractor policies for equipment emissions.
- **Green Purchasing Policy:** The Green Purchasing Policy was established to promote green friendly operations throughout the County government. All County owned buildings have been retrofitted for lighting. 100% of county lighting has been converted to T-8 lighting or better.

Projects in progress to convert landfill gas to renewable natural gas. Plans continue to install solar panels on existing landfill property.

- **Farm and Food Sustainability Plan**: the plan was developed by a committee of over 20 partners which identified 66 action items to be implemented over the next 5+ years to help promote and sustain agriculture in the county. Action items included identifying conservation lands to be protected by local land trusts and advocating for bottomlands to be incorporated into the State's Ecosystem Enhancement Program.

- **Preservation of Large, Intact Forest Through the Unified Development Ordinance:** Catawba County acquired 580 acres of land on Lake Norman (referred to as the Mountain Creek tract) in late 2010and this tract of land consists of an old growth forest with planted pines which will be preserved in perpetuity. The County Staff continue efforts to reduce invasive species including efforts related to pine tree removal and replacement at Riverbend and Mountain Creek Parks. Hudson Chapel property has been acquired by the County to preserve natural habitat.
- **Catawba County Parks Master Plan:** The Parks Master Plan was updated in 2017 to identify locations and funding sources for greenways to preserve sensitive land along river systems. Funding sources include Clean Water Management Trust Fund, Carolina Thread Trail, and others.
- **Local Land Trust Cooperation to Preserve Sensitive Land Along River Systems:** The county continues to work with two area land trusts to secure conservation easements on farmland to preserve sensitive land along river systems.
- **City of Conover** works with property owners and the NC Department of Transportation for **Tree Trimming of City Property** to address situations where dead or damaged trees are observed near the street rights of way. The City Utility Department continues to remove problematic trees and incorporate tree trimming into street maintenance activities. Utilities Department also clears problematic trees near critical infrastructure as part of routine maintenance.
- **City of Morganton** evaluates its **Tracking System for Mitigation Activities** and improves upon the information it provides to the public regarding mitigation activities. Weekly department head assessment meetings and interdepartmental review of the information provided generates routine updates through the City's website, CoMPAS Cable Programing, public awareness notices, press releases, and other educational brochures.

Jurisdiction	Do you apply for mitigation grant funding?	Do you perform reconstruction projects?	Do you perform building elevations?	Do you perform acquisitions?
Burke County			✓	
City of Morganton			✓	
Caldwell County				
City of Lenoir	✓		✓	
Town of Rhodhiss				
Catawba County	✓	✓	✓	✓
Town of Brookford				
Town of Catawba				
City of Conover				

Jurisdiction	Do you apply for mitigation grant funding?	Do you perform reconstruction projects?	Do you perform building elevations?	Do you perform acquisitions?
City of Hickory	✓	✓	✓	✓
Town of Long View	✓	✓		✓
Town of Maiden				
City of Newton		✓		
Town of Drexel	✓	✓		
Town of Valdese				
Alexander County			✓	
Town of Granite Falls				
Town of Hudson				
Town of Gamewell				
Town of Taylorsville	✓		✓	
Town of Hildebran				
City of Claremont				
Town of Glen Alpine				
Town of Connelly Springs				
Town of Rutherford College				
Town of Sawmills				
Town of Cajah's Mountain				
Village of Cedar Rock		✓		

Table 5- 7: Mitigation Resources

5.3.8. 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 *Local Capability Assessment Survey* was used to capture information on the political capability of the Plan Area. Survey respondents were asked to identify some 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 (e.g., building codes, floodplain management, etc.). The comments provided by the participating jurisdictions are listed below:

The agency responsible for monitoring this Plan is the Caldwell County Emergency Management Department. Periodic revisions and updates of the Unifour Regional Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, considering 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 each jurisdiction's individual Mitigation Action Plan.

The HMPC will continue to meet regularly, as determined by the Caldwell County Emergency Management Department. These regular meetings will take place in the fall of each year so that sufficient time is available to prepare public outreach messages and assess the status of any mitigation actions relevant to the upcoming severe seasonal spring weather and the start of hurricane season. Meetings will also be convened as necessary following any disaster events warranting a reexamination of the mitigation actions being implemented or proposed by the participating jurisdictions.

County and local staff of each participating jurisdiction will also continue to attend training workshops sponsored by the North Carolina Division of Emergency Management or others as appropriate to keep up to date with any changing guidance or planning requirements and to communicate that information to other representatives of participating jurisdictions.

As part of this monitoring, evaluation, and enhancement process, each participating jurisdiction will be expected to provide an annual status update to Caldwell County for their respective Mitigation Action Plans to evaluate the Plan's implementation effectiveness. This will ensure that the Plan is continuously maintained and updated to reflect changing conditions and needs within the Region. If determined appropriate or as requested, an annual report on the Plan will be developed and presented to local governing bodies of participating jurisdictions to report progress on the actions identified in the Plan and to provide information on the latest legislative requirements and/or changes to those requirements.

5.3.9. Local Self-Assessment

In addition to the inventory and analysis of specific local capabilities, the *Local Capability Assessment Survey* asked counties and local jurisdictions within the Plan Area to conduct a self-assessment of their perceived capability to implement hazard mitigation activities. As part of this process, local officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. In response to the survey questionnaire, county officials classified each of the capabilities as either "limited," "moderate," or "high."

Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Mitigation Capability	Political Capability	Overall Capability
Burke County	Limited	Moderate	Limited	Limited	Limited	Limited	**Limited**
City of Morganton	Moderate	Moderate	Moderate	Limited	Limited	Moderate	**Moderate**
Caldwell County	Limited	High	Limited	Moderate	Limited	Limited	

Jurisdiction	Plans, Ordinances, Codes and Programs	Administrative and Technical Capability	Fiscal Capability	Education and Outreach Capability	Mitigation Capability	Political Capability	Overall Capability
City of Lenoir	High	Limited	High	Limited	Limited	Moderate	**Limited**
Town of Rhodhiss	Limited	Limited	Moderate	Limited	Limited	Limited	**Limited**
Catawba County	Moderate	High	High	High	Moderate	High	**Moderate**
Town of Brookford	Moderate	Limited	Limited	Limited	Moderate	Limited	
Town of Catawba	High	Moderate	Limited	Limited	Moderate	High	
City of Conover	High	Limited	Limited	Limited	Limited	Limited	
City of Hickory	High	High	High	High	Moderate	High	**High**
Town of Long View	High	High	High	High	High	High	**High**
Town of Maiden	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	**Moderate**
City of Newton	Unrated	Unrated	Unrated	Unrated	Unrated	Unrated	**Unrated**
Town of Drexel	Limited	Limited	Moderate	Limited	Limited	Limited	**Limited**
Town of Valdese	Moderate	Limited	Limited	Limited	Unrated	Unrated	**Limited**
Alexander County	**Moderate**	**Limited**	**Limited**	**Moderate**	**Limited**	**Limited**	**Moderate**
Town of Granite Falls	Moderate	Moderate	Moderate	Limited	Moderate	Limited	**Moderate**
Town of Hudson	Moderate	Moderate	Limited	Moderate	Moderate	Moderate	
Town of Gamewell	Limited	Limited	Moderate	Limited	Limited	Limited	**Limited**
Town of Taylorsville	Moderate	Limited	Limited	Moderate	Limited	Limited	**Limited/ Moderate**
Town of Hildebran	Moderate	Moderate	Limited	Limited	Limited	Moderate	**Moderate**
City of Claremont	Moderate	Limited	Moderate	Moderate	Limited	Unrated	**Moderate**
Town of Glen Alpine	Limited	Moderate	Limited	Limited	Limited	Limited	**Limited**
Town of Connelly Springs	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	
Town of Rutherford College	Moderate	Moderate	Moderate	Limited	Limited	Limited	**Moderate**
Town of Sawmills	Moderate	Moderate	Limited	Moderate	Moderate	Moderate	
Town of Cajah's Mountain	Moderate	Moderate	Limited	Limited	Limited	Moderate	
Village of Cedar Rock	Limited	Limited	Limited	High	Moderate	Moderate	**Moderate**

Table 5- 8: Self-Assessment of Capability

5.4. Conclusions on Local Capability

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 7; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their mitigation actions.

Section 6: Mitigation Strategy

The Mitigation Strategy section provides the blueprint for the participating jurisdictions in the Plan Area to follow to become less vulnerable to the negative effects of the natural hazards identified and addressed in this Plan. It is based on the consensus of the Hazard Mitigation Planning Committee (HMPC) and the Risk Assessment and Capability Assessment findings and conclusions. It consists of the following five subsections:

6.1 Overview
6.2 Mitigation Goals
6.3 Identification and Analysis of Mitigation Techniques
6.4 Selection of Mitigation Techniques for the Plan Area
6.5 Plan Update Requirement

6.1. Overview

The intent of the Mitigation Strategy is to provide the Plan Area with overall goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of mitigation techniques deemed available to meet those goals and reduce the impact of identified hazards. The HMPC identified and analyzed 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. It is designed to be comprehensive, strategic, and functional in nature:

- In being comprehensive, the development of the Mitigation Strategy included a thorough review of all-natural hazards and identifies extensive mitigation measures intended to not only reduce the future impacts of high-risk hazards, but also to help the Plan Area achieve compatible economic, environmental, and social goals.
- In being strategic, the development of the Mitigation 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 included the identification of mitigation goals. Mitigation goals represent broad statements achieved through implementing 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), as well as 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 the 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 Plan Area (found in Section 7: Mitigation Action Plans). Each County and participating jurisdiction has its own Mitigation Action Plans (MAP) that reflect the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional action plan and is considered the most essential outcome of the mitigation planning process. A significant amount of time and effort was applied to this step in the process.

The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for the plan counties and incorporated 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 the 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 area Hazard Mitigation Plan.

In preparing each Mitigation Action Plans for the Plan Area, 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 planning area. Prioritization of the proposed mitigation actions was based on the factors outlined in subsection 6.1.1.

6.1.1. Mitigation Action Prioritization

The priority for each mitigation action was determined by the participating jurisdiction by identifying each action as high, moderate, or low priority. To make this decision, local government officials reviewed and considered the findings of the Risk Assessment and Capability Assessment. Other considerations included each individual mitigation action's effect 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). Benefits include losses avoided and population protected from injury and loss of life.

- 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. Actions were classified as high, moderate, or low priority by the participating jurisdiction officials. Only a general cost/benefit review was considered 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 projects prior to the application for or obligation of funding, as appropriate.

6.2. Mitigation Goals

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 Plan area counties and participating municipalities have developed 4 goal statements for local hazard mitigation planning in the Plan Area. These goals are presented in Table 6- 1**.**

Each goal, purposefully broad in nature, establishes the parameters used to review and update existing mitigation actions and aids in formulating new ones. The consistent implementation of mitigation actions over time will ensure that these mitigation goals are achieved.

GOAL #1	Encourage conservation of natural environments including forests, surface waters, wetlands, floodplains, and stream corridors
GOAL #2	Evaluate and revise existing and/or create new plans, policies, procedures, regulations and ordinances that will help reduce the damaging effects of natural hazards through effective mitigation
GOAL #3	Increase capabilities to support and implement effective mitigation measures
GOAL #4	Increase public awareness of hazard mitigation and hazard risk

Table 6- 1: Regional Mitigation Goals

6.3. Identification and Analysis of Mitigation Techniques

In formulating the Mitigation Strategy for the Plan Area, a wide range of activities were considered to help achieve the established mitigation goals, in addition to addressing any specific hazard concerns. These activities were discussed during the HMPC meetings. In general, all activities considered by the planning committee can be classified under one of the following four broad categories of mitigation techniques: local plans and regulations, structure and infrastructure projects, natural systems protection, and education and awareness programs. These are described in detail below.

6.3.1. Local Plans and Regulations

Mitigation actions that fall under this category include government authorities, policies, or codes that influence the way land, and buildings are developed and built. Examples of these types of actions include:

- Comprehensive plans
- Land use ordinances
- Subdivision regulations
- Development review
- NFIP Community Rating System
- Capital improvement programs
- Open space preservation
- Stormwater management regulations and master plans

6.3.2. Structure and Infrastructure Projects

Mitigation actions that fall under this category involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance (HMA) program. Examples of these types of actions include:

- Acquisitions and elevations of structures in flood-prone areas
- Utility undergrounding
- Structural retrofits
- Floodwalls and retaining walls
- Detention and retention structures
- Culverts
- Safe rooms

6.3.3. Natural Systems Protection

Mitigation actions that fall under this category minimize damage and losses and preserve or restore the functions of natural systems. Examples of these types of actions include:

- Sediment and erosion control
- Stream corridor restoration
- Forest management
- Conservation easements
- Wetland restoration and preservation

6.3.4. Education and Awareness Programs

Mitigation actions that fall under this category inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as Storm Ready or Fire wise communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions. Examples of these types of actions include:

- Radio or television spots
- Websites with maps and information

- Real estate disclosure
- Presentations to school groups or neighborhood organizations
- Mailings to residents in hazard-prone areas
- StormReady
- Firewise

6.3.5. Other Types of Actions

Participating jurisdictions may wish to include other types of actions in their Mitigation Action Plans that do not fit into one of the categories listed above. In some cases, these may not be viewed as pure examples of mitigation, but they may be related in ways that make sense to the local government adopting the actions. Examples of these types of actions include:

- Warning systems
- Communications enhancements
- Emergency response training and exercises
- Evacuation management
- Sandbagging for flood protection
- Installing temporary shutters for immediate wind protection
- Other forms of emergency services

6.4. Selection of Mitigation Techniques for the Plan Area

To determine the most appropriate mitigation techniques for the jurisdictions in the Plan Area, the HMPC thoroughly reviewed and considered the findings of the Risk Assessment and Capability 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).

6.5. Plan Update Requirement

In keeping with FEMA requirements for plan updates, the mitigation actions identified in the previous plan were evaluated to determine their current implementation status. Updates on the implementation status of each existing mitigation action are provided as part of the Mitigation Action Plans found in Section 7.

Section 7: Mitigation Actions

7.1. Overview

The *Mitigation Action Plans* section includes Mitigation *Action Plans* (MAP) for each participating jurisdiction. As stated in Section 6, each County and participating jurisdiction has its own MAP that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional action plan and is considered the most essential outcome of the mitigation planning process.

The participating jurisdictions are listed below in the order that the MAPs are included in this section.

Alexander County

- Town of Taylorsville

Burke County

- City of Morganton
- Town of Connelly Springs
- Town of Drexel
- Town of Glen Alpine
- Town of Hildebran
- Town of Rutherford College
- Town of Valdese

Caldwell County

- City of Lenoir
- Town of Cajah's Mountain
- Town of Gamewell
- Town of Granite Falls
- Town of Hudson
- Town of Rhodhiss
- Town of Sawmills
- Village of Cedar Rock

Catawba County

- City of Claremont
- City of Conover
- City of Hickory
- City of Newton
- Town of Brookford
- Town of Catawba

- Town of Long View
- Town of Maiden

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.
- **Cost Estimate**—High (greater than $50,000) Medium (between $20,000 & $50,000) Low (less than $20,000), Minimal (Generally only staff time is required)
- **Implementation Schedule**—Date by which the action the action should be completed. More information is provided when possible.
- **Implementation Status (2024)—**Indication of completion, progress, deferment, or no change since the previous plan. If the action **is new, that will be noted here:**

Mitigation Action Status	Definition
To Be Continued:	Continuing action or program**;** requires annual or periodic maintenance to continue the action
Complete:	No further action required for mitigation action to be implemented or used
In Progress:	Action is currently being implemented
Deferred:	Action will be reevaluated at a later date
Deleted:	The Jurisdiction will no longer utilize the action as a viable mitigation action that can be implemented.
New	The mitigation action has just been added to the 2024 HMP Update
Priority	
High	
Medium	
Low	

Table 7- 1: Mitigation Action Status Definitions

7.2. Summary of Mitigation Actions by Jurisdiction

Jurisdiction	All Hazards	River Flooding	Levee Failure	Wildfire	Tornado	Earthquake	Landslide	Snow	Dam Failure	Hail	Drought	Hurricane Winds	Ice	Thunderstorm Winds	Erosion	Sinkholes
Alexander County	10	12		2			1									
Town of Taylorsville	2	3		1	1			2		2	1	3	2	2		
Burke County	12	11		1												
Town of Connelly Springs	2	5														
Town of Drexel	2	3														
Town of Glen Alpine	3	1														
Town of Hildebran	5	2														
City of Morganton	4	7		1												
Town of Rutherford College	3	5						1					1		1	1
Town of Valdese	6	6														
Burke County	12	11		1												
Town of Connelly Springs	2	5														
Catawba County	7	14	2	4	2	2	2	6	2		3	8	6	7	3	2
Town of Brookford	6	6						2		2		3	2	4		
Town of Catawba (WPCOG)	6	10		2	3			3				3	3	3		

Jurisdiction	All Hazards	River Flooding	Levee Failure	Wildfire	Tornado	Earthquake	Landslide	Snow	Dam Failure	Hail	Drought	Hurricane Winds	Ice	Thunderstorm Winds	Erosion	Sinkholes
City of Claremont	4	7		1							2					
City of Conover	3	2		4	3			4		3		3	4	3		
City of Hickory	6	10		1	1			2				1	2	1		
Town of Long View	7	10		2			1	2					2	2		
Town of Maiden	2	8	3	2	2	1	1	2	3	1	1	2	2	2	1	1
City of Newton	4	9	1	3	2	1	1	2	1	2	1	2	2	2	1	1
Caldwell County	4	13	10	2	1		1	3	11		1		3	3		
Town of Cajah's Mountain	3	7	6	2	1			1	6	1	1		1	1		
Village of Cedar Rock	2	5	3	1					3		1					
Town of Gamewell	2	5	3	1					3		1					
Town of Granite Falls	5	8	6	2	6			5	6		5	7	5	7		
Town of Hudson	2	6	3	1			1		3		1				1	1
City of Lenoir	2	6		4										12		2
Town of Rhodhiss	3	5	5	2	1			1	5	1			1	1		
Town of Sawmills	3	8	3	1			1		3		1			1	1	1

Table 7- 2: Mitigation Action Counts by Jurisdiction *(entries marked with Winter weather = Snow and Ice, Thunderstorm = Thunderstorm Wind, and Dam or Levee Failure = Dam Failure and Levee Failure.)*

7.3. Alexander County

Alexander County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Conduct outreach to the public regarding Alexander County's Community Alert System to educate them on how to obtain information both pre- and post-disaster event.	Public Information and Awareness	All Hazards	Alexander County 911 Director and EM Coordinator	Minimal (Staff time only)	Alexander County General Fund	1-2 years	High	To Be Continued	Completed and continual work with County PIO with messaging on county webpage and social media. Creation of Local Information Team with county and school system PIO to increase unified messaging. This is maintained quarterly.
2	Improve information sharing with Duke Energy regarding its operational procedures for the movement of water through its hydro-electric systems on the Catawba River.	Public Information and Awareness	Flood	Alexander County Emergency Management	Minimal (Staff time only)	Alexander County General Fund	5 years	High	To Be Continued	Maintained monthly and continue to meet once a year for training and tabletop exercises. The County has a great working relationship with staff and communicate monthly. Increased communication with Duke Liaison during storm events.
3	Establish a protocol for monitoring the tail race areas below the Catawba River dams during high water events to ensure security of the area and limiting public access.	Dam Monitoring and Inspection	Flood	Alexander County Emergency Management	Minimal (Staff time only)	Alexander County General Fund	5 years	High	Complete	Data sharing webpage established by Duke Energy for real time information and alerts to impacted areas.
4	Install generator transfer switch connections during the construction of new public facilities (schools, fire stations, County buildings, etc.).	Structural Retrofitting	All Hazards	Alexander County Public Works Director and Emergency Management Coordinator	To Be Determined	Alexander County General Fund; Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC)	5 years	High	To Be Continued	Recently installed Generator on County EOC. Transfer switches install on Board of Elections. Generator for Cold storage installed on Health Department. County has a deployable trailer mounted generator and have added distribution box for generator to capital improvement planning. Reviewed annually during CIP.

Alexander County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
5	Upgrade centralized coordinated permitting process, including effective filing/permitting system to ensure compliance with floodplain regulations.	Local Plans and Regulations	Flood	Alexander County Planning Director and Alexander County Chief Code Enforcement Officer	Local staff time	Local staff time	2025	Moderate	To Be Continued	Upgrading to an online permitting software utilized by all inspection agencies which will include flood plain permitting. Pending updates in CY 2025.
6	Upgrade and maintain Early Warning System.	Emergency Warning Systems	All Hazards	Alexander County 911 Director and EM Coordinator	Local staff time	Local; state; federal; private (Duke Energy) grants	5 Years	High	To Be Continued	HyperReach is used as early warning system for Alexander County. Alexander County can send IPAWS messaging through HyperReach. Use of social media, Website, and Apps to share information with citizens. Use of local radio station is still ongoing. Formation of Local Information Team to assist with unified messaging throughout the county. Maintained quarterly.
7	Establish a program for evaluating and improving critical services (roads, bridges, water, sewer, electricity, etc.) and critical facilities (fire, rescue, medical, etc.) to reduce risk to natural hazards.	Utility Improvements	All Hazards	Alexander County Planning Director and Alexander County Emergency Management Coordinator	Local staff time	Local; state; federal grants	Annually	Moderate	To Be Continued	Critical Infrastructure is listed in Comprehensive Plan 2045. They are also listed in the Emergency Operations Plan and maintained in the 911 Center. Planning on making an addition for EMS, warehouse space, and new courthouse pending funding availability. Reviewed Annually
8	Prepare countywide stormwater management plan covering the Catawba River basin.	Stormwater Management and Drainage Maintenance	Flood	Alexander County Planning Director	Local staff time	Local; state grants	2020	Moderate	To Be Continued	Pending the hiring of an engineer to fully adopt and implement changes in the Land Development Code. Reviewed annually
9	Prepare development plan for relocating public infrastructure out of hazardous areas.	Local Plans and Regulations	All Hazards	Alexander County Emergency Management, Alexander County Public Works Director	Local staff time	Local staff time	1-5 years	Low	In Progress	Comprehensive Plan was updated in April 2024 and Land Use Development was updated in May 2024 addressing mitigation actions moving forward. Currently no plans to relocate infrastructure out of this area. Reviewed annually.

Alexander County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
10	Improve Emergency Operations Plan, which outlines warning and evacuation procedures for critical facilities, instructions for getting persons out of flood-prone or isolated areas, and protocols for controlling vehicles on evacuation routes.	Emergency Response Improvement	All Hazards	Alexander County Emergency Management	Local staff time	Local, State, Federal	5 Years	High	To Be Continued	Emergency Operations Plan is going through complete rewrite. Expected completion will be end of CY 2024. Evacuations will be covered in the new rewrite. Pending CY 2024.
11	Review/update Flood Damage Prevention Ordinance.	Local Plans and Regulations	Flood	Alexander County Planning Director	Local staff time	Local staff time	5 Years	Moderate	To Be Continued	Expected to have Land Development Code which addresses this area which should be updated by September 2024. Maintained annually.
12	Adopt zoning and subdivision regulations in floodplain, steep slope, and wildfire areas.	Local Plans and Regulations	Flood; Wildfire; Landslide	Alexander County Planning Director	Local staff time	Local staff time	Annually	High	Complete	Land Use Development Code covering this area was adopted in May 2024.
13	Revise/update regulatory floodplain maps.	Public Information and Awareness	Flood	Alexander County Planning Director	Local staff time	Local, State, Federal	1-5 years	Moderate	To Be Continued	The County adopts and utilizes current North Carolina Floodplain Mapping Program data. Updates coincide with state map updates. Reviewed annually.
14	Acquire federal funds to purchase destroyed or substantially damaged properties and relocate households.	Acquisitions and Improvements of Flood-Prone Properties	All Hazards	Alexander County Planning Director, Alexander County EM Coordinator, and Alexander County Administration.	Local staff time	State; Federal Grants	Case-by-case	High	To Be Continued	No properties were purchased, and no households were relocated. Staffing levels and funding do not allow a designated individual for these projects.
15	Complete Community Rating System (CRS) application. Ensure participation in the National Flood Insurance Program (NFIP).	Public Information and Awareness	Flood	Alexander County Planning Director and Alexander County Emergency Management Coordinator	Local staff time	Local staff time	Within 5 years	Moderate	To Be Continued	Requires continuous monitoring. All development applications reviewed for floodplain compliance prior to issuance. Floodplain areas identified on applicable zoning permits. Alexander County does not intend to apply for CRS.

Alexander County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
16	Update 1993 Comprehensive Land Use Plan.	Local Plans and Regulations	All Hazards	Alexander County Planning Director	Local staff time	Local staff time	Annually	High	Complete	2045 Comprehensive Plan was updated and approved in April 2024.
17	Step up centralized, coordinated permitting process including effective filing/permitting system to ensure compliance with floodplain regulations.	Local Plans and Regulations	Flood	Alexander County Planning Director and Alexander County Chief Code Enforcement Officer	Local staff time	Local staff time	Within 5 years	High	To Be Continued	Upgrading to an online permitting software utilized by all inspection agencies which will include flood plain permitting. Pending CY 2025.
18	Develop a comprehensive Capital Improvement Plan for public facilities that steers capital projects out of hazardous areas.	Local Plans and Regulations	Flood	Alexander County Administration	Local staff time	Local staff time	5 years	High	To Be Continued	In Progress: CIP was discussed with previous County Manager and started with some departments. This has been put on hold until new County Manager is hired. Continued Annually.
19	Maintain library on retrofitting techniques. Publicize through bulletins/newsletters.	Public Information and Awareness	All Hazards	Alexander County Planning Director and Alexander County Emergency Management Coordinator	Local staff time	Local staff time	1-5 Years	Moderate	To Be Continued	Constantly learning new techniques and best industrial standards. Building library throughout time. Reviewed monthly.
20	Continuation and expansion of E-911 Addressing Program to include all municipalities with goal to cover entire county with one system.	Emergency Warning Systems	All Hazards	Alexander County IT Director, GIS, and 911 Director	Local staff time	Local staff time	1-5 Years	High	To Be Continued	Requires continuous monitoring. Our addressing office along with the E-911 Center updates the addresses on a continuous basis when new residences and businesses are built. Before building permits are issued, a 911 address must be given for the new construction project. Maintained Monthly
21	Drainage system management—prepare countywide storm water management plan covering the Catawba River basin.	Stormwater Management and Drainage Maintenance	Flood	Alexander County Planning Director	N/A due to this action being	Local; state	To be updated in 2015	High	To Be Continued	Pending the hiring of an engineer to fully adopt and implement changes in the Land Development Code.

Alexander County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
22	Acquisition of properties susceptible to flood damage and wildland fires.	Acquisitions and Improvements of Flood-Prone Properties	Flood; Wildfire	Alexander County Planning Director and Alexander County Emergency Management Coordinator	Local staff time	Local; state; federal grants	5 Years	Moderate	To Be Continued	To be continued: Under annual review. No property acquisitions were conducted within the past 5 years. No federal grant funds were applied for or received.

Table 7- 3: Alexander County Mitigation Actions Updates

7.3.1. Town of Taylorsville

Town of Taylorsville Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Maintain street rights of way and ditches to prevent damage to streets and property in the event of a natural hazard occurrence.	Local Plans and Regulations	Flood; Thunderstorm; Lightning; Hail; Hurricane and Tropical Storm; Winter Weather	Town of Taylorsville Public Works	$100,000	Power bill revenue	2025	High	In Progress	Work has been done to widen streets and improve stormwater draining when funding permits. This is reviewed annually and when funding permits.
2	Improve drainage on Muddy Creek.	Structure and Infrastructure Projects	Floods; Thunderstorms; Hurricanes and Tropical Storms	Town of Taylorsville; North Carolina Department of Transportation (NCDOT); Alexander County	>$200,000	State / Federal Grants	2025	Moderate	Complete	A new culvert has been installed to improve drainage on Muddy Creek

Town of Taylorsville Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
3	Assist Alexander County with all mitigation actions that have a countywide impact and that benefit the Town of Taylorsville.	Local Plans and Regulations	All Hazards	Town of Taylorsville Administration	As Funded by Alexander County	Local, State, Federal Grants	5 years	Low	Complete	Land Use Development Code covering this area was adopted in May 2024.
4	In coordination with Alexander County, conduct outreach to the public regarding Alexander County's Community Alert System to educate them on how to obtain information both pre- and post- disaster event.	Public Information and Awareness	All Hazards	Town of Taylorsville Administration	Minimal (Local Staff Time)	Alexander County General Fund	1-2 Years	High	To Be Continued	**Maintained Quarterly:** The Town of Taylorsville is Working with Alexander County Emergency Management to share the HyperReach Alert and Warning System.
5	To establish, where feasible, additional emergency response forces, by at least 10%, that are trained, equipped, and prepared to respond to a variety of emergency and disaster situations. This concept is concurred by Alexander County and the Town of Taylorsville.	Emergency Services	Flood; Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Wildfire; Drought; Winter Weather	Town of Taylorsville Administration	Minimal (Local Staff Time)	Alexander County General Fund and Increased Property Taxes with Development	3-5 Years	Low	To Be Continued	**Maintained Annually:** Pay increases for TPD and Taylorsville FD were issued to assist with staffing issues. Funding continues for Alexander Rescue Squad. TPD continues to train and maintain credentials for law enforcement.

7.4. Burke County

Burke County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Review/update Flood Damage Prevention Ordinance.	Local Plans and Regulations	Flood	Burke County Planning & Development Department; Burke County Building Inspections Department; Burke County Emergency Services Department	Local Staff Time	Local Staff Time	5 Years	Moderate	To Be Continued	**Reviewed Annually:** Completed with continued monitoring on an annual basis based on hazard information changes.
2	Revise/Update regulatory floodplain maps of any known flood areas.	Local Plans and Regulations	Flood	Burke County Planning & Development Department; Burke County Land Records/GIS Department	Local Staff Time	Local, State, Federal Grants	5 Years	Moderate	To Be Continued	**Continued Monitoring:** Completed with continued monitoring and the County is waiting on new maps that may be released in 2025 for further review.
3	Adopt zoning and subdivision regulations in floodplain, steep slope, and wildfire hazard areas.	Local Plans and Regulations	All Hazards	Burke County Planning & Development Department; Burke County Emergency Services Department; Burke County Building Inspections Department	Local Staff Time	Local Staff Time	Annually	High	To Be Continued	**Reviewed Annually**: Completed and reviewed annually after the floodplain ordinance was adopted. All development projects are reviewed for floodplain compliance prior to development.
4	Update Comprehensive Use Plan	Local Plans and Regulations	All Hazards	Burke County Planning & Development Department	Local Staff Time	Local Staff Time	5 Years	High	To Be Continued	**Reviewed Annually:** The Comprehensive Land Use Plan was reviewed, revised, and adopted in 2022. The Plan will be reviewed each year and will be updated every 5 years.
5	Step up centralized coordinated permitting process, including effective filing/permitting system to ensure compliance with floodplain regulations.	Local Plans and Regulations	Flood	Burke County Emergency Services Department; Burke County Planning & Development Department; Burke County Building Inspections Department; Burke County Environmental Health Department	Local Staff Time	Local Staff Time	5 Years	Moderate	To Be Continued	**Reviewed Annually:** Permitting system is now computerized with process flow and undergoes annual reviews. The permitting process has been reviewed annually for the last 5 years.

Burke County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	Upgrade and maintain Early Warning System.	Local Plans and Regulations	All Hazards	Burke County Emergency Services Department	Local Staff Time	Local, State, Federal, and Private (Duke Energy) Grants	5 Years	High	To Be Continued	**Continued Monitoring:** Burke County utilizes Hyper-Reach, Reverse E-911, IPaws, and Smart 911 notifications to notify residents of potentially hazardous conditions and uses the local radio station for National Weather Service severe weather.
7	Establish a program for evaluating and improving critical services (roads, bridges, water, sewer, electricity, etc.) and critical facilities (fire, rescue, medical, etc.) to reduce risk to natural hazards.	Local Plans and Regulations	All Hazards	Burke County Emergency Services Department; Burke County Planning & Development Department; North Carolina Department of Transportation (NCDOT)	Local Staff Time	Local, State, and Federal Grants	Annually	Moderate	To Be Continued	**Reviewed Annually:** Burke County continues to coordinate with agencies to review and improve critical services and critical facilities to reduce the risk to natural hazards.
8	Prepare countywide stormwater management plan covering the Catawba River basin.	Local Plans and Regulations	Flood	Burke County Planning & Development Department	Local Staff Time	Local, State Grants	2020	Moderate	In Progress	Burke County does not have a storm water manager and work with DEQ as needed to manage stormwater in Burke County.
9	Prepare development plan for relocating public infrastructure out of hazardous areas.	Local Plans and Regulations	All Hazards	Burke County Planning & Development Department; Burke County Building Inspections Department	Local Staff Time	Local Staff Time	1-5 Years	Low	To Be Continued	A BRIC grant awarded in 2024 to update a pumping station within Burke County to reduce flooding.
10	Improve Hazardous Warning and Response Plan, which outlines warning and evacuation procedures for critical facilities, instructions for getting persons out of flood-prone or isolated areas, and protocols for controlling vehicles on evacuation routes.	Local Plans and Regulations	All Hazards	Burke County Planning & Development Department; Burke County Emergency Services Department	Local Staff Time	Local, State, and Federal Grants	5 Years	High	To Be Continued	**Reviewed Annually**: Burke County continues to review and enhancing outreach to citizens and essential personnel about the Hazardous Warning and Response Plan that was updated in 2025.

Burke County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
11	Review/update Flood Damage Prevention Ordinance.	Local Plans and Regulations	Flood	Burke County Planning & Development Department; Burke County Building Inspections Department	Local Staff Time	Local Staff Time	5 Years	Moderate	To Be Continued	**Reviewed Annually:** New maps will be reviewed in 2025 and the Flood Damage Prevention Ordinance will be reviewed as needed.
12	Adopt zoning and subdivision regulations in floodplain, steep slope, and wildfire areas.	Local Plans and Regulations	All Hazards	Burke County Planning & Development Department	Local Staff Time	Local Staff Time	Annually	High	To Be Continued	**Reviewed Annually:** Burke County reviews zoning and subdivision regulations annually.
13	Revise/update regulatory floodplain maps.	Local Plans and Regulations	Flood	Burke County Planning & Development Department; Burke County Land Records/GIS Department	Local Staff Time	Local, State, and Federal Grants	1-5 Years	Moderate	To Be Continued	**Reviewed As Needed:** Burke County continues to review new maps and will update regulatory maps in 2025 if needed.
14	Acquire federal funds to purchase destroyed or substantially damaged properties and relocate households.	Structure and Infrastructure Projects	All Hazards	Burke County Emergency Services Department; Burke County Planning & Development Department	Local Staff Time	State and Federal Grants	Case-by-Case	High	Deferred	No damage has occurred since 2019 that would qualify for federal funding.
15	Complete Community Rating System (CRS) application. Ensure participation in the National Flood Insurance Program (NFIP).	Local Plans and Regulations	Flood	Burke County Emergency Services Department	Local Staff Time	Local Staff Time	5 Years	Moderate	To Be Continued	Continuous monitoring and reviewing all applications.
16	Update 1993 Comprehensive Land Use Plan.	Local Plans and Regulations	All Hazards	Burke County Planning & Development Department	Local Staff Time	Local Staff Time	Annually	High	To Be Continued	**Reviewed As Needed**: The Comprehensive Land Use Plan has been reviewed, revised, and adopted in 2022 with next scheduled review in 2030.
17	Develop a comprehensive Capital Improvement Plan for public facilities that steers capital projects out of hazardous areas.	Local Plans and Regulations	Flood	Burke County Management; all departments	Local Staff Time	Local Staff Time	5 Years	High	To Be Continued	Nothing has been built in a hazardous area since last plan update.

Burke County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
18	Maintain library on retrofitting techniques. Publicize through bulletins/newsletters.	Public Information and Awareness	All Hazards	Burke County Building Inspections Department; Burke County Emergency Services Department; Burke County Planning & Development Department	Local Staff Time	Local, State Grants	1-5 Years	Moderate	To Be Continued	**Continuously Monitored:** all documents are now digitized.
19	Continuation and expansion of E-911 Addressing Program to include all municipalities with goal to cover entire county with one system.	Local Plans and Regulations	All Hazards	Burke County Emergency Services Department; 911 Addressing; Burke County Land Records/GIS Department	Local Staff Time	Local Staff Time	1-5 Years	High	To Be Continued	**Continuously Monitored:** Burke County continues to continuously monitor, maintain, and update E911 addresses. E911 addresses are obtained during site review/building permit issuance.
20	Drainage system management—prepare countywide storm water management plan covering the Catawba River basin.	Local Plans and Regulations	Flood	Burke County Planning & Development Department; West Piedmont Council of Governments (WPCOG)	N/A	Local, State Grants	Complete	High	Complete	Completed in 2015.
21	Acquisition of properties susceptible to flood damage and wildland fires.	Structure and Infrastructure Projects	Flood; Wildfire	Burke County Planning & Development Department; Burke County Building Inspections Department; Burke County Emergency Services Department	Local Staff Time	Local, State, and Federal Grants	5 Years	Moderate	To Be Continued	No damage has occurred since 2019 that would qualify for federal funding.

7.4.1. Town of Connelly Springs

Town of Connely Springs Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Require structures to be built in the floodplain to be constructed two feet above base flood elevation or be floodproofed.	Local Plans and Regulations	Flood	Town of Connelly Springs Planning Board; Burke County Building Inspections Department	Local staff time	Local staff time	5 years	Low	To Be Continued	To be continued: The Town contracts with Burke County for services provided by the Certified Floodplain Manager (CFM) to review all development within the floodplain. No known development has occurred in the floodplain over the past five years.
2	Track rebuilding activities after severe storms and consider policies to minimize repetitive losses.	Local Plans and Regulations	All Hazards	Town of Connelly Springs Board of Alderman (Planning Board)	Local staff time	Local staff time	5 years	Moderate	In Progress	**In progress:** No severe storms have impacted the town in the past five years that would trigger this activity. Measurable progress is slow due to staff availability and funding.
3	Require floodproofing for structures not elevated two feet above base flood elevation.	Local Plans and Regulations	Flood	Town of Connelly Springs Planning Board; Burke County Building Inspections Department	To be determined	Local, Federal, and State grant funded	5 years	Low	In Progress	**In progress:** All development within the floodplain is reviewed by the Burke County Floodplain Manager in accordance with a Resolution of Intent adopted September 8, 2003.
4	Require/maintain FEMA elevation certificates for all new permits for buildings or improvements in the floodplain.	Local Plans and Regulations	Flood	Town of Connelly Springs Board of Alderman (Planning Board); Burke County Building Inspections Department	Local staff time	Local, Federal, and State grant funded	5 years	Low	In Progress	**In progress**: No known new development has occurred in the floodplain.
5	Receive and begin using regulatory floodplain maps.	Local Plans and Regulations	Flood	Town of Connelly Springs Board of Alderman (Planning Board)	Local staff time	Local, Federal, and State grant funded	5 years	High	To Be Continued	**In progress:** The Town adopts and utilizes current North Carolina Floodplain Mapping Program data. Updates coincide with state map updates.

Town of Connely Springs Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	Review zoning and subdivision regulations to better control future development in these susceptible areas.	Local Plans and Regulations	Flood	Town of Connelly Springs Board of Alderman (Planning Board)	Local staff time	Local staff time	5 years	Moderate	To Be Continued	**In progress:** The Town has contracted with Burke County to provide zoning and code enforcement services which has identified gaps in zoning enforcement which are currently being addressed.
7	Work in cooperation with Burke County, surrounding local governments, and state and federal agencies to maintain appropriate mitigation strategies.	Local Plans and Regulations	All Hazards	Town of Connelly Springs Board of Alderman (Planning Board)	To be determined	Local, Federal, and State grant funded	5 years	High	To Be Continued	**In progress:** The Town of Connelly Springs participates in interagency meetings organized by Burke County and encourages participation in projects developed at the county level to the residents of Connelly Springs such as the E-911 Addressing System and sign-up for the emergency notification system (Hyper Reach). Projects are shared with residents through town council meetings, traditional media, and community flyers. The Town currently contracts zoning and code enforcement activities with Burke County and planning duties with the Western Piedmont Council of Governments (WPCOG). Measurable progress is slow due to staff availability and funding.

7.4.2. Town of Drexel (WPCOG)

Town of Drexel Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Revise zoning and subdivision regulations in floodplain areas to better control future development in these hazard susceptible areas.	Local Plans and Regulations	Flood	Town of Drexel Zoning Board; Town Council	Local staff time	Town of Drexel General Fund	5 years	Moderate	To be continued	To be continued. New Subdivision Ordinance was adopted in 2014. Measurable progress is slow due to staff availability and funding.

Town of Drexel Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
2	Revise subdivision regulations to require all perennial and intermittent streams be shown on plats.	Local Plans and Regulations	Flood	Town of Drexel Zoning Board; Town Council	Local staff time	Town of Drexel General Fund	2019-2025	Moderate	To be continued	to be continued: Currently required for major subdivisions.
3	In cooperation with Burke County, assist in establishing a program for evaluating and improving critical services (roads, bridges, water, sewer, electricity, etc.) and critical facilities (fire, rescue, medical, etc.) to reduce risk to natural hazards.	Utility Improvement and Maintenance	All Hazards	Town of Drexel Town Council	Local staff time	Local; state; federal grants	Annually	Moderate	In Progress	In progress. All Critical Facilities are located at Town hall but could use improvements. More than Burke County. The whole region is taking initiative (WPCOG).
4	In cooperation with Burke County, assist (as needed) in preparing a countywide stormwater management plan.	Local Plans and Regulations	Flood	Town of Drexel Town Council	Local staff time	Local; state; federal grants	2025	Moderate	In Progress	
5	Install generator transfer switch connections during the construction of new public facilities (schools, fire stations, public buildings, etc.).	Structural Retrofitting	All Hazards	Town of Drexel Planning and Zoning Department	To be determined	Local; State, Federal Hazard Mitigation Grant Program (HMGP)	2025	High	Deferred	Deferred. Town has not built any new public facilities.

7.4.3. Glen Alpine

Town of Glen Alpine Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Maintain continued compliance with the National Flood Insurance Program (NFIP) and NPDES Phase 2 stormwater control compliance.	Stormwater Management and Drainage Maintenance	Flood	Town of Glen Alpine Zoning Department/Code Enforcement Officer	$1,000	General budget	5 years	High	In Progress	In Progress
2	The Town, through continuous programs, will offer education in fire prevention, safety training and mitigating natural hazards to the schools and citizens focusing on talks to civic groups, children, Town citizens, and elderly adults.	Public Information and Awareness	All Hazards	Town of Glen Alpine Fire Department	$500	General budget	5 years	Moderate	In Progress	In Progress
3	The Planning Board reviews on an annual basis local zoning ordinances and land use plans for subdivisions, construction of new homes, and commercial development.	Local Plans and Regulations	All Hazards	Town of Glen Alpine Planning Board; Zoning Officer	$2,000	General Fund	5 years	Moderate	To Be Continued	To Be Continued
4	The Glen Alpine Fire Department, Burke County Emergency Management, and North Carolina Emergency Management will continue to evaluate and conduct a detailed needs assessment of emergency services, response, and critical needs.	Emergency Response Improvement	All Hazards	Glen Alpine Fire Department	$1,000	General budget; grants	5 Years	High	To Be Continued	To be Continued

7.4.4. Hildebran (WPCOG)

Town of Hildebran Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Install quick-connect emergency generator hook-ups for remaining critical facilities.	Structural Retrofitting	All Hazards	Town of Hildebran Town Council	$75,000	Local funds; grants	0-5 Years	Moderate	In Progress	**In progress:** Look at Municipal Complex and Town Hall. no measurable activity occurred due to funding, limited staff time.
2	Participate in public outreach on hazard mitigation both locally and regionally.	Public Information and Awareness	All Hazards	Town of Hildebran Planning Department	<$5000	Local funds; grants	5 Years	Moderate	To be continued	**To be continued:** The Town has participated in local outreach and will continue in the future.
3	Inventory all critical facilities' capabilities and needs.	Emergency Response Improvement	All Hazards	Town of Hildebran Planning Department	<$5000	Local funds	0-2 years	Moderate	In Progress	The WPCOG has created the Community Health and Disaster Mitigation Explorer (CHADME) tool which has inventory of Burke County infrastructure, critical facilities, and areas of concern.
4	Maintain updated database of all infrastructure.	Public Information and Awareness	All Hazards	Town of Hildebran Planning Department; Town of Hildebran Engineering Department	<$5000	Local funds; grants	0-2 years	Moderate	Complete	The WPCOG has created a tool that highlights all of these assets in one place. It is called the Community Health and Disaster Mitigation Explorer (CHADME).
5	Manage future development in flood-prone areas.	Local Plans and Regulations	Flood	Town of Hildebran Planning Department	Local staff time	Local staff time	5 Years	Low	In Progress	**In progress:** The Town will continue to work with property owners and developers to look at the BMP for development in flood-prone areas outside of the designated floodplain. At this time no development has occurred in flood-prone or floodplain areas.

Town of Hildebran Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	In cooperation with Burke County, assist in establishing a program for evaluating and improving critical services (roads, bridges, water, sewer, electricity, etc.) and critical facilities (fire, rescue, medical, etc.) to reduce risk to natural hazards.	Utility Improvement and Maintenance	All Hazards	Town of Hildebran Planning Department; Town of Hildebran Engineering Department	Staff time	Local; state; federal grants	5 Year Review	Moderate	In Progress	The WPCOG has created the Community Health and Disaster Mitigation Explorer (CHADME) tool which has inventory of Burke County infrastructure, critical facilities, and areas of concern.
7	In cooperation with Burke County, assist (as needed) in preparing a countywide stormwater management plan.	Local Plans and Regulations	Flood	Town of Hildebran Planning Department; Town of Hildebran Engineering Department	To be determined	Local; State grants and staff time	2025	Moderate	Deleted	**Deleted:** No longer in progress.
8	Phase II Stormwater Implementation.	Local Plans and Regulations	Flood; Severe Storms	Town of Hildebran Planning Department; Town of Hildebran Engineering Department	Unspecified	Local funds; grants	not immediate	Low	Deleted	**Deleted:** The Town received an exemption based on population.

7.4.5. City of Morganton

City of Morganton Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Review/update Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events (CRS 430).	Local Plans and Regulations	Flood; Wildfire	City of Morganton Planning Commission; City Council	Local staff time	Local staff time	1-5 years	High	In Progress	The City is reviewing its current ordinance and the proposed State Model Ordinance and producing a final document for adoption by City Council.
2	Revise/update regulatory floodplain maps (CRS 410).	Public Information and Awareness	Flood	Federal Emergency Management Agency (FEMA); North Carolina Department of Environment and Natural Resources (NCDENR); North Carolina Division of Emergency Management (NCDEM)	Local staff time	Local and State grants; FEMA	1-5 years	High	To Be Continued	One public meeting with the State and County representatives was held in Morganton for the concerned citizens. State representatives indicated it may be 2 years before state adopts current preliminary maps.
3	Update Land Development Plan.	Local Plans and Regulations	Flood	City of Morganton Planning Commission; City Council	$175,000	Local staff time	2025	High	To Be Continued	Imagine Morganton 2040 Comprehensive Plan proposed to be adopted by City Council in 2024
4	Merge E-911 dispatch programs to include all municipalities within the county to cover the entire county with one system.	Emergency Warning Systems	All Hazards	E-911/MIS	$7 million	Local; State grants	2014	High	Complete	**Completed:** City and local jurisdictions combined 911 dispatch through the construction of a new call center and consolidation of services. Completion and implementation were in the Fall 2014.
5	Establish/Maintain coordinated Drainage System Inspection Program.	Stormwater Management and Drainage Maintenance	Flood	City of Morganton Public Works Department	Local staff time	Local staff time	5 years	High	To Be Continued	The City Public Work Department continues to maintain the drainage system. A DWI Grant was awarded to help document our assets and plan for future stormwater projects.

City of Morganton Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	Utilize an early warning system to ensure adequate evacuation time in case of a major hazard event.	Emergency Warning Systems	All Hazards	City of Morganton Public Safety Department; Burke County Emergency Services	Local staff time	Local; State grants and staff time	2019-2025	High	To Be Continued	**Ongoing:** Duke Energy maintains the early warning system for dam failures and potential hazards dealing with Lake James. Hyper-Reach is used for a reverse 911 system to notify residences of potentially hazardous conditions. A local radio station is used for National Weather Service severe weather.
7	Establish a list of priority properties for acquisition in the event of another natural disaster.	Acquisitions and Improvements of Flood-Prone Properties	Flood	City of Morganton Development & Design Department, Public Information Office	Local staff time	Local Federal and State Grants	2019-2025	High	To be continued	**To be continued:** The City continues to identify and acquire high-risk properties as funding is made available to eliminate catastrophic loss of life and damage to property. Most of these properties are incorporated into parks and greenways within flood-prone areas Measurable progress is slow due to staff availability and funding.
8	Evaluate flood or access problems for critical facilities; develop recommendations for protecting critical parts (e.g., police and fire command centers); and identify alternate command posts, if necessary.	Local Plans and Regulations	Flood	City of Morganton Public Safety Department	Local staff time	Local staff time	1-5 years	High	Complete	The City's budget for 2024 includes funding for asset management plans for water and wastewater that will identify areas of concern for these critical facilities. The City continually designs and constructs upgrades to the City Water and wastewater systems. Generator Project completed and other projects to improve/upgrade the Water and Sewer Systems continue.
9	Develop and implement a hazard awareness program to include elevation Certificates, Flood Insurance Rate Map (FIRM) Data, Bulletin on property protection measures and flood insurance, and other activities under CRS 310/320/330/340/440.	Public Information and Awareness	Flood	City of Morganton Development & Design Department	Local staff time	Local staff time	2019-2025	High	To Be Continued	**In progress:** The City offers access to online Flood Elevation Certificates, FIRMs, and other flood mapping protection services through NCEM. City staff consults with property owners and developers as to how to access this information and obtain guidance on a routine basis. City staff will prepare the noted bulletin for information.

City of Morganton Mitigation Actions									
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
10	Develop a tracking system to evaluate progress and revise mitigation activities, as necessary.	Public Information and Awareness	All Hazards	City of Morganton Public Information Office	Local staff time	Local staff time	2019-2025	High	To Be Continued	**To be continued**: Each year the City evaluates and improves upon the information it provides to the public regarding mitigation activities. Weekly department head assessment meetings and interdepartmental review of the information provided generates routine updates through the City's website, CoMPAS Cable Programing, public awareness notices, press releases, and other educational brochures.
11	Capital Improvements Program—development plan for relocating public infrastructure out of hazards areas.	Local Plans and Regulations	All Hazards	Burke County Planning & Development Department; Burke County Building Inspections Department	Local staff time	Local staff time	5 years	Low	To Be Continued	**In progress:** Requires continuous monitoring. The only infrastructure Burke County has in hazardous areas is a Sewer Pump Station that is in a floodplain area. It is not possible to relocate the pump station due to the terrain and the cost to relocate. Any new projects are reviewed for hazardous areas before construction begins.

7.4.6. Town of Rutherford College (WPCOG)

Town of Rutherford College Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Require and maintain FEMA elevation certificates for new buildings or improvements to buildings on lots including portions of the 100-year floodplain (CRS 31).	Local Plans and Regulations	Flood	Town of Rutherford College Planning Department	To be determined	Local	immediate	Low	Complete	Completed
2	Revise/update regulatory floodplain maps (CRS 410).	Public Information and Awareness	Flood	Federal Emergency Management Agency (FEMA)	Unspecified	State Funding	As Needed	Low	Complete	Completed
3	Prepare and implement a town-wide stormwater management plan to meet federal Phase II stormwater regulations. Complete stormwater map and conduct stormwater outreach.	Stormwater Management and Drainage Maintenance	Flood; Erosion; Sinkhole	Town of Rutherford College Town Council	$5,000	Local	1-5 Years	High	Complete	Completed in 2021
4	Require 50-foot buffers for new development activities along the Catawba River.	Local Plans and Regulations	Flood	North Carolina Department of Water Quality	To be determined	State Funding	Immediate	Low	Complete	Completed
5	Maintain portable backup generator for emergency power needs.	Structural Retrofitting	All Hazards	Town of Rutherford College Town Council	Local Staff Time	Local Staff Time	Immediate (1 Year)	High	To Be Continued	Currently, Rutherford College has a large portable generator, but it is primarily used for the pump stations when the power goes out.
6	Obtain short-wave radio to provide direct communication with Burke County use existing walkie-talkies with number assigned to Burke County EMS.	Emergency Response Improvement	All Hazards	Town of Rutherford College Public Works Department	$1,000	Local Grant	2024	Moderate	To Be Continued	To be continued: Measurable progress is slow due to staff availability and funding.

Town of Rutherford College Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
7	Revise subdivision regulations to require all perennial and intermittent streams be shown on subdivision plats.	Local Plans and Regulations	Flood	Town of Rutherford College Administration Department	Unspecified	Local	2009-2010	Moderate	Complete	Completed
8	Trim trees along town power lines as needed.	Utility Maintenance	Winter Weather	Duke Energy	Local Staff Time	Local Funding	Immediate (1 Year)	High	To Be Continued	This is an ongoing update that the town maintains.
9	Conduct outreach to educate the public on pre-disaster preparation targeting schools, churches, civic groups, etc.	Public Information and Awareness	All Hazards	Town of Rutherford College Fire Department	To be determined	Hazard Mitigation Assistance (HMA) grants; Homeland Security grants; emergency management grants; local funding	1-3 years	High	To Be Continued	Hoping to conduct a Disaster Fair for the region (WPCOG)

7.4.7. Town of Valdese

Town of Valdese Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Promote the advancement of early warning to the public by providing All Hazard Weather Alert radios at little or no cost to the general public and ensuring the placement of the radios in all schools, daycares, churches, etc.	Education And Awareness	All Hazards	Town of Valdese Fire Department; Burke County Emergency Management	To Be Determined	Hazard Mitigation Assistance (HMA) grants; Homeland Security grants; emergency management grants; local funding	1-5 years	High	To Be Continued	**Deferred:** no progress has been made since 2019
2	Conduct outreach to educate the public on pre-disaster preparation targeting schools, churches, civic groups, etc.	Education And Awareness	All Hazards	Town of Valdese Fire Department, Burke Count Safe Kids	To Be Determined	Hazard Mitigation Assistance (HMA) grants; Homeland Security grants; emergency management grants; local funding	1-3 years	High	To Be Continued	**Ongoing:** Continuously educating the public on safety and disaster preparedness
3	Install quick-connect emergency generator transfer switch at Town of Valdese Water Department Pump Station.	Structural Or Infrastructure Project	All Hazards	Town of Valdese Water Department	$90,000	Hazard Mitigation Assistance (HMA) grants; Homeland Security grants; emergency management grants; local funding	1-5 years	High	Complete	
4	Maintain routine inspection and clearing of storm drainage system.	Structural Or Infrastructure Project	Flood	Town of Valdese Public Works Department	Minimal (Staff Time Only)	Town of Valdese General Fund	2025	High	To Be Continued	**Ongoing**: This is an ongoing and continuous process
5	Maintain compliance with the National Flood Insurance Program (NFIP) by: Providing related training periodically for Town Planning Director and Town Emergency Management Coordinator and Encouraging or requiring certain staff positions to obtain Certified Floodplain Manager (CFM) certification.	Local Plans and Regulations	Flood	Town of Valdese Planning Department	To Be Determined	Town of Valdese General Fund	1-3 years	Moderate	To Be Continued	**To Be Continued:** The Planner has received training, but the Town of Valdese still needs to train other staff.

Town of Valdese Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	In cooperation with Burke County, assist in establishing a program for evaluating and improving critical services (roads, bridges, water, sewer, electricity, etc.) and critical facilities (fire, rescue, medical, etc.) to reduce risk to natural hazards.	Local Plans and Regulations	All Hazards	Town of Valdese Public Works Department	To Be Determined	Local; state; federal grants	2025	Moderate	Deferred	**Deferred:** due to lack of funding
7	In cooperation with Burke County, assist (as needed) in preparing a countywide stormwater management plan.	Local Plans and Regulations	Flood	Town of Valdese Public Works Department / Wastewater Department	To Be Determined	Local; state grants	Revise in 2015	Moderate	Complete	**Complete:** Town of Valdese has Storm Water Management Program in place, with an assigned Director.
8	Develop an open space plan, target properties for acquisition, and fund an acquisition program.	Local Plans and Regulations	Flood	Town of Valdese Planning Department	Unfunded (Local Staff Time)	To Be Determined	1-5 years	Moderate	Deferred	**Deferred:** Open space plan is addressed in the Land Use Plan, but no funding for acquisition of properties is available
9	Implement drainage system management project.	Structural Or Infrastructure Project	Flood	Town of Valdese Public Works Department	Minimal (Staff Time Only)	Town of Valdese General Fund	5 Years	High	To Be Continued	**Ongoing:** Addressed in storm water ordinances and under continuous observation and evaluation
10	Implement an early warning system.	Education And Awareness	All Hazards	Burke County Emergency Management; Town of Valdese Fire Department	To Be Determined	Hazard Mitigation Assistance (HMA) grants; Homeland Security grants; emergency management grants; local funding	5 Years	High	To Be Continued	**Ongoing:** Town now has a public emergency alert system and use County's reverse 911 and Rave when needed
11	Establishment of reserve fund for relocating damaged infrastructure.	Structural Or Infrastructure Project	Flood	Town of Valdese Administration	To Be Determined	To Be Determined	1-5 years	Moderate	Deferred	**Deferred:** due to lack of funding

Town of Valdese Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
12	Improve Hazard Warning and Response Plan.	Local Plans and Regulations	All Hazards	Burke County Emergency Management; Town of Valdese Fire Department	To Be Determined	Local; state; federal grants	1-5 years	High	To Be Continued	**Ongoing**: Town now has a public emergency alert system and use County's reverse 911 and Rave when needed

7.5. Catawba County

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Install generator transfer switch connections during the construction of new public facilities (schools, fire stations, County buildings, etc.).	Structural Retrofitting	All Hazards	Catawba County Finance; Purchasing; and Emergency Services Departments	To be determined	General Fund; Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program.	1-5 years	High	To Be Continued	County continues to seek funding to address need for transfer switches.
2	Continue to evaluate County policies to reduce greenhouse gases. These policies may include additional lighting retrofitting, "green" purchasing goals, upgrading of equipment in buildings, acquisition/dedication of parkland, and timber management at existing parks.	Sustainability Improvement	Floods; Hurricanes and Tropical Storms; Severe Thunderstorms; Tornadoes; Wildfire; Drought; Winter Storms; and Dam or Levee Failure.	County Manager's Office	Staff time	General Fund	Immediate (1-2 years)	High	Complete	**Complete** - no additional update
3	Prepare a one-page information sheet that incorporates the floodplain development permitting process for all departments. In addition, when permits are being reviewed where access to the site requires new driveway/road construction across a floodplain, require stream crossing plans with drainage calculations, culvert size, and installation details.	Public Information and Awareness	Flood	Catawba County Building Inspections; Planning, Parks & Development; and Environmental Health Departments	Staff time	General Fund	1-2 years	High	In Progress	**In Progress:** Addressed through County's Stormwater Plan. A County engineer reviews plans for new subdivisions and works with local landowners in flood plain areas

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
4	Update the County's Parks Master Plan to identify locations and funding sources for greenways in order to preserve sensitive land along river systems.	Sustainability Improvement	Flood	Catawba County Planning, Parks & Development Department	Staff time	General Fund	1-2 years	High	Complete	**Complete -** no additional update
5	Conduct outreach to the public regarding the County's Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies such as proper tree-trimming techniques.	Public Information and Awareness	All Hazards	Catawba County Emergency Services Department	Staff time	General Fund	1-2 years	High	Complete	**Complete** - no additional update
6	Incorporate hazard mitigation elements into the development of new small area and corridor plans.	Local Plans and Regulations	All Hazards	Catawba County Planning, Parks & Development Department	Staff time	General Fund	1-2 years	High	To be continued	**Ongoing:** Corridor plans continue to encourage growth in areas where utilities, public facilities, and emergency services resources exist (i.e. smart growth principles).
7	Improve information sharing with Duke Energy regarding its operational procedures for the movement of water through its hydro-electric systems on the Catawba River. This can be achieved by meeting formally at least once a year, when significant weather events are anticipated, and when upgrades or improvements to the system are scheduled.	Public Information and Awareness	Flood	Catawba County Emergency Services Department	Staff time	General Fund	5 years	High	Complete	**Complete** - no additional update
8	Establish a protocol for monitoring the tail race areas below the Catawba River dams during high water events to ensure security of the area and limiting public access.	Dam Monitoring and Inspection	Flood	Catawba County Emergency Services and Sheriff's Departments	Staff time	General Fund	5 years	High	Complete	**Complete** - no additional update

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
9	Work with local land trusts to secure conservation easements on farmland to preserve sensitive land along river systems.	Sustainability Improvement	Flood	Catawba County Planning, Parks & Development, Cooperative Extension, and Soil & Water Conservation Departments	To be determined	Farmland Preservation Trust Fund; other private funding sources	3-5 years	Moderate	In Progress	**In progress:** This is a continuous effort with two area land trusts.
10	Identify locations of log jamming in priority watersheds which could jeopardize bridge abutments and water supply using new GIS aerial photography available in late 2014. Relay this information to appropriate agencies and develop action plans for abatement.	Stream Corridor Restoration	Flood	Catawba County Emergency Services and Planning, Parks & Development Departments	Staff time	General Fund and Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program grants	Immediate (1-2 years)	Moderate	Complete	**Complete** - no additional update
11	Evaluate the need for stronger building code requirements for structures constructed in the tail race areas below the Catawba River dams in order to prevent property damage downstream.	Local Plans and Regulations	Flood	Catawba County Building Codes & Services Department	Staff time	General Fund	3-5 Years	Moderate	Complete	**Complete** - no additional update
12	Propose the requirement for a stormwater master plan for new major subdivisions that addresses the treatment of stormwater for new roads and lots within the development.	Local Plans and Regulations	Flood	Catawba County Utilities & Engineering Department	Staff time	General Fund	3-5 Years	Moderate	Complete	County Master Plan addresses stormwater requirements. Plans are reviewed by County Staff to ensure that they meet requirements. Maintenance Plans are required and reviewed by staff.

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
13	Preserve large, intact forest land through the acquisition and/or dedication of park land through the County's Unified Development Ordinance requirements. As part of the Parks Department forestry management program, non-native pine plantation stands in the park property will be selectively harvested to allow for the successional return of native forest vegetation. This action is aimed at reducing greenhouse gases through carbon sequestration and thereby also helping to reduce the potential of increased frequency and severity of natural hazards (particularly drought and wildfire, but many others identified in this Plan as well).	Sustainability Improvement	All Hazards	Catawba County Planning, Parks & Development Department	Staff time to be determined	General Fund	5 years	High	To be continued	County Staff continue efforts to reduce invasive species including efforts related to pine tree removal and replacement at Riverbend and Mountain Creek Parks. Hudson Chapel property has been acquired by the County to preserve natural habitat.
14	Conduct a carbon footprint analysis for the County's facilities and evaluate current policies to identify ways to reduce greenhouse gases. Implement priority strategies identified in the study, which may include the production of biodiesel fuel at the County's EcoComplex, renewable energy sources such as windmills, reduction of particulate matter and ozone through recommendations of the Early Action Compact, and the development of an energy plan which may include purchasing policies that address energy reduction strategies and contractor policies for equipment emissions.	Sustainability Improvement	All Hazards	Multi-departmental through Green Initiatives Team, especially the Catawba County Public Health and Utilities & Engineering Departments	Staff time with implementation to be determined	General Fund and Energy Department grants	1-2 years	High	Complete	100% of county lighting has been converted to T-8 lighting or better. Projects in progress to convert landfill gas to renewable natural gas. Plans continue to install solar panels on existing landfill property.
15	Develop a farmland preservation plan which will identify tools and techniques to preserve sensitive farmland, and particularly those areas prone to flooding.	Local Plans and Regulations	Flood	Catawba County Planning, Parks & Development Department; Cooperative Extension through the Agricultural Advisory Board	To be determined	Agricultural Development & Farmland Preservation (ADFP) trust fund grant; Catawba County General Fund	1-2 years	High	Complete	Complete - no additional update

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
16	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the specific actions. This includes evaluating the Community Rating System (CRS) and identifying strategies that can be implemented to reduce flood potential and in turn allow for a reduction in flood insurance rates for citizens of the County. These strategies may include maintaining digital FEMA elevation certificates, training for plan reviewers and building inspectors, sponsoring a training workshop for surveyors, and pursuing Certified Floodplain Manager (CFM) certification for a staff person. Supplies of FEMA and NFIP materials will also be made available to the public in various locations throughout the county such as libraries and on the Catawba County website.	Public Information and Awareness	Flood	Catawba County Planning, Parks & Development and Emergency Services Departments	To be determined	General Fund and Grants	1-2 years	High	Complete	**Complete -** no additional update
17	Develop a countywide greenway master plan to provide an interconnected trail network which preserves sensitive land along river systems. These trails can become part of the Carolina Thread Trail, Duke Energy Relicensing facilities, and the Lake Norman Bicycle Route.	Local Plans and Regulations	Flood	Catawba County Planning, Parks & Development Department	To be determined	Carolina Thread Trail; Parks and Recreation Trust Fund (PARTF); Clean Water Management Trust Fund (CWMTF); other grant sources	1-2 years	High	Complete	**Complete -** no additional update
18	Provide education to citizens about tree-trimming techniques to reduce the potential for power outages due to downed tree limbs.	Public Information and Awareness	Hurricane and Tropical Storm; Severe Thunderstorm; Tornado; Winter Weather	Cooperative Extension through local power companies	Staff time	General Fund	1-3 years	High	To be continued	Cooperative Extension continues education efforts regarding tree-trimming techniques to County residents. Duke Energy has conducted a Bradford Pear tree replacement program in Catawba County.

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
19	Coordinate with the American Red Cross to install pre-wired connections ("Quick Connects") to use portable generators at targeted critical public facilities and those designed to serve as shelters for disaster survivors. Evaluate other locations with existing wiring which can accommodate generators, for example, schools, churches, recreation centers.	Emergency Response Improvement	All Hazards	Catawba County Emergency Services Department; American Red Cross	To be determined	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program.	5 years	High	Complete	**Complete** - no additional update
20	Provide outreach education to property owners along flood-prone areas, such as Carpenters Cove, about floodplain regulations and evacuation plans. This includes direct mailings to owners of repetitive loss properties (as identified by FEMA) about available mitigation grant programs. Also provide education opportunities for school-age children, such as the American Red Cross "Masters of Disaster" education program.	Public Information and Awareness	Flood	Catawba County Emergency Services Department; American Red Cross; Catawba County Planning, Parks & Development Department	Staff time	General Fund	1-3 years	High	Complete	**Complete -** no additional update
21	Promote a standard hook up for emergency generators such that any portable generator can be simply connected to it for supply of power to vital circuits in homes and/or public buildings. Priority locations are hospitals, nursing homes, schools, and government buildings.	Emergency Response Improvement	Flood; Hurricane and Tropical Storm; Thunderstorm; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam or Levee Failure; Earthquake; Sinkhole; Landslide	Catawba County Emergency Services Department; American Red Cross	To be determined	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program.	1-2 years	High-Moderate	Complete	**Complete -** no additional update

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
22	Identify areas for emergency access to and from public properties, such as Bakers Mountain Park, Riverbend Park, and the Wildlife Club (off Lynn Mountain Road). These areas will be maintained for access by emergency personnel in the event of wildfires or other events. This includes working with key property owners adjoining the subject properties, developing cooperative agreements, and clearing/maintaining new or existing fire roads. Emphasis will be placed on securing access ways at each of these properties. Gating, ditching, signage, and fencing is necessary in high risk areas that are prone to vandalism that may result in forest fires. The first phase will be mapping of appropriate locations and training with EMS in the County's parks.	Emergency Response Improvement	Wildfire	Catawba County Emergency Services Department; Forest Service; Park Personnel	To be determined	Grants or community-service projects with organized groups	1-2 years	Moderate	Complete	**Complete -** no additional update
23	Evaluate the Firewise communities program and its application to develop communities and homes which are designed, built, and maintained to withstand wildfires.	Public Information and Awareness	Wildfire	Catawba County Emergency Services; Fire Department; and Planning, Parks & Development Departments	To be determined	To Be Determined	2-3 years	Moderate	Complete	**Complete -** no additional update
24	Ensure that manufactured home parks have perimeter vegetative buffers to protect manufactured homes from high wind events.	Local Plans and Regulations	Hurricane and Tropical Storm; Thunderstorm; Tornado	Catawba County Planning, Parks & Development Department	Requirement of ordinance	Private	1-3 years	Moderate	Deleted	

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
25	Continue the work of the established multi-jurisdictional Stormwater Committee to prioritize stormwater issues/projects within the area. This committee will meet regularly to develop action plans and establish priorities for addressing stormwater issues which would minimize the impacts of flooding throughout the County. Examples of efforts would include coordination of stormwater review of subdivisions, public education on clearing stormwater drains and culverts, a stormwater plan to address flooding episodes at Carpenters Cove, and sharing of information with the North Carolina Department of Transportation (NCDOT) regarding debris accumulation at bridge abutments, culverts, etc.	Stormwater Management and Drainage Maintenance	Flood	Multi-jurisdictional with staff of Catawba County Engineering and Planning Departments	Staff time	General fund	1-2 years	Moderate	Complete	**Complete -** no additional update
26	Coordinate with Social Services to provide back-up power at family care, nursing, and adult care homes within the county.	Structural Retrofitting	Flood; Hurricane and Tropical Storm; Thunderstorm; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam or Levee Failure; Earthquake; Sinkhole; Landslide	Catawba County Emergency Services; Social Services	To be determined	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program.	2-3 years	Moderate	Complete	**Complete -** no additional update
27	Evaluate ordinances and policies to develop ways to address mitigation for drought events. This may include implementation of a Low Inflow Protocol along the Catawba River and encouraging drought resistant vegetation and LEED standards for new development.	Sustainability Improvement	Drought	Catawba County Planning, Parks & Development Department	Staff time	General Fund	1-3 years	Moderate	Complete	**Complete -** no additional update

Catawba County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
28	Continue and expand the network of public-private partners, such as the Local Emergency Planning Committee (LEPC), to include other organizations like the Contingency Planning Association of the Carolinas (CPAC) to engage the business community in hazard mitigation activities.	Public Information and Awareness	Flood; Hurricane and Tropical Storm; Thunderstorm; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam or Levee Failure; Earthquake; Sinkhole; Landslide	Catawba County Emergency Services Department	Staff time	General Fund	5 years	Moderate	Complete	**Complete** - no additional update
29	Develop a landscape manual which encourages the use of native trees and vegetation which are storm and drought resistant. This manual will be available to the development community as a tool to meet the landscaping requirements of the Unified Development Ordinance. The general public will also be encouraged to use this manual when landscaping individual home sites.	Public Information and Awareness	Hurricane and Tropical Storm; Thunderstorm; Tornado; Wildfire; Drought; Winter Weather	Catawba County Planning, Parks & Development Department; Cooperative Extension	Staff time	General Fund	1-3 years	Low	Complete	**Complete -** no additional update
30	Provide outreach education to manufactured home park owners and residents on the need for developing an evacuation plan during imminent hazard threats.	Public Information and Awareness	Flood; Hurricane and Tropical Storm; Thunderstorm; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam or Levee Failure; Earthquake; Sinkhole; Landslide	Catawba County Emergency Services Department	Staff time	General Fund	3-5 years	Low	Complete	**Complete -** no additional update
31	In coordination with the Carolina Thread Trail organization, begin acquiring land and construct an interconnected trail network along Lyle Creek.	Sustainability Improvement	Flood	Catawba County Planning, Parks & Development Department	To be determined	Carolina Thread Trail; Parks and Recreation Trust Fund (PARTF); North Carolina State Trails Program; volunteers	1-2 years	High	In Progress	Work continues to reach goals of connected trail networks.

7.5.1. Town of Brookford

Town of Brookford Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Develop a debris management plan.	Local Plans and Regulations	Flood; Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Wildfire; Winter Weather	Town of Brookford Administration Department	Local staff time	Local staff time	1-2 years	Moderate	Complete	Natural debris will be disposed of locally in Town, and manufactured debris will be disposed of working closely with Catawba County
2	Develop a post-disaster reconstruction plan to facilitate decision-making following a hazard event.	Emergency Response Improvement	All Hazards	Town of Brookford Administration Department; Town of Brookford Police Department; Town of Brookford Public Works Department	Local staff time	Local staff time	2-4 years	Moderate	Deferred	Deferred to the next plan update. Measurable progress is slow due to staff availability and funding.
3	Implement moderate to major repairs to stormwater drains.	Stormwater Management and Drainage Maintenance	Thunderstorms; Hurricane and Tropical Storms	Town of Brookford Public Works Department	Local staff time	Local staff time	1-2 years	High	To Be Continued	**Ongoing:** The Town has completed 2 large stormwater maintenance jobs along 22nd Ave SE.
4	Identify and strengthen facilities to function as public shelters.	Emergency Response Improvement	All Hazards	Town of Brookford Administration Department	To be determined	Grants; local staff time	2-4 years	Low	To Be Continued	**Ongoing:** The Town's Town hall is currently under renovation.
5	In coordination with the Catawba County Emergency Services Department, conduct outreach to the public regarding the County's Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies.	Public Information and Awareness	All Hazards	Town of Brookford; Catawba County Emergency Services Department	Staff time	General Fund	1-2 years	High	To Be Continued	**Ongoing:** The Town does Public Outreach through Facebook and Quarterly annoucements with billing materials.

Town of Brookford Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	Maintain continued compliance with the National Flood Insurance Program (NFIP).	Public Information and Awareness	Flood	Town of Brookford Administration Department	Local staff time	Local staff time	2-4 years	High	To be continued	**To be continued:** The Town adopted a Flood Damage Prevention Ordinance based on the model provided by the State of North Carolina. There are no inspectors within the Town, other than those that inspect through the County.
7	Develop mutual aid agreement with other jurisdictions to augment local inspection personnel after major disasters.	Emergency Response Improvement	All Hazards	Town of Brookford Administration Department	Local staff time	Local staff time	2-4 years	Moderate	To be continued	**Periodic Review:** Mutual Aid Agreement is completed, but there needs to be a review and update.
8	Prepare a Local Evacuation Plan to ensure the safety of Town residents in advance of anticipated hazard events, particularly wildfires and flooding.	Emergency Response Improvement	Wildfire; Flood	Town of Brookford Police Department	Local staff time	Local staff time	2-4 years	Moderate	Complete	**Complete:** The Town of Brookford Police Department does an annual update to the plan.
9	Enhance local citizens' disaster preparedness through continuous outreach and education efforts in coordination with Catawba County, the American Red Cross, and other support organizations.	Public Information and Awareness	All Hazards	Town of Brookford Administration Department; Town of Brookford Police Department	Local staff time	Local staff time	2-4 years	High	Complete	**Complete:** The Town of Brookford continues to update and educate the community through Facebook and quarterly announcements.

Town of Brookford Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
10	Continue routine inspections of the Town's storm drain system.	Stormwater Management and Drainage Maintenance	Flood	Town of Brookford Public Works Department	Local staff time	Local staff time	Continuous implementation (1-5 years)	Moderate	To be continued	**Ongoing:** The Public Works Dept continues to do weekly Storm Drain Inspections
11	Continue routinely pruning and clearing limbs on the Town's rights of way.	Maintenance for Damage Prevention	Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Winter Weather	Town of Brookford Public Works Department	Local staff time	Local staff time	Continuous implementation	Moderate	In Progress	The Public Works Dept has fallen behind on the right of way maintenance due to be understaffed. The Town is looking into some equipment to help with this situation.

7.5.2. Town of Catawba (WPCOG)

Town of Catawba Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation [illegible]	Priority	2024 Status	2024 Status Description
1	Evaluate Town policies to reduce greenhouse gases. These policies may include additional lighting retrofitting, “green” purchasing goals, and upgrading of equipment in buildings.	Sustainability Improvement	All Hazards	Town of Catawba Planning, Administration, and Public Works Departments	Staff time/low	Local staff time	5 Years	High	Deferred	**Deferred –** From a planning capacity there is nothing in place. Work with parties responsible (Administration, Police, and Fire) to achieve action.

Town of Catawba Mitigation Actions									
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation	Priority	2024 Status	2024 Status Description
2	If the Town Public Works Department can do this, keep infrastructure database updated when repairs are made and new facilities are installed.	Local Plans and Regulations	Flood; Severe Storms	Town of Catawba Public Works Department	Local staff time	Local staff time	1-5 years	Low	Deferred	**Deferred.** Public Works has no records, yet. Measurable progress is slow due to staff availability and funding.
3	Participate in local and regional public outreach programs regarding hazard potential in our area.	Public Information and Awareness	All Hazards	Town of Catawba Planning, Administration, Police, Fire, and Public Works Departments	Staff time/low	Local staff time	1-5 years	Moderate	Deferred	**Deferred**. The Town has participated in local outreach and will continue in the future.
4	Review Town of Catawba plans and ordinances for alignment and inclusivity regarding potential hazard mitigation measures.	Local Plans and Regulations	Flood; Severe Storms	Town of Catawba Planning and Administration Departments	Local staff time	Local staff time	1-5 years	High	In Progress	**In Progress**. Some ordinances have been adopted/changed but changes are still needed Measurable progress is slow due to lack of funding and staff availability.
5	Review flood data and designate flood-prone area for greenways in plans, if possible.	Local Plans and Regulations	Flood	Town of Catawba Planning Department	Local staff time	Local staff time	1-5 years	Moderate	In Progress	**In Progress.** Town has been working to build a green way along Lyle Creek and the Catawba River.

Town of Catawba Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation	Priority	2024 Status	2024 Status Description
6	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Evaluate and consider the adoption of "higher standards" that are proven to reduce flood damage (including additional freeboard, setbacks, limitations on lower-level enclosure size, and the prohibition on use of fill), Develop a checklist for review of building/development permit plans and for inspection of development in floodplains (a model is available), Establish a goal to have each plan reviewer attend a related training periodically (for example, the North Carolina Association of Floodplain Managers Annual Conference or Fall Floodplain Institute), Encourage or require certain local staff positions to obtain and maintain Certified Floodplain Manager (CFM) certification, and Maintain supplies of FEMA/NFIP materials to help property owners evaluate measures to reduce potential hazard damage. Make available in public buildings, local library, website, etc. and inform people who they can call to learn more information.	Public Information and Awareness	Flood	Town of Catawba Planning Department	Local staff time	Local staff time	5 Years	High	To be continued	**To be continued:** The Town adopted a Flood Damage Prevention Ordinance based off the model provided by the State that provides "higher standards" particularly regarding freeboard. The Town Planner will continue to attend a training regarding floodplain management if possible. There are no inspectors within the Town, other than those that inspect through the County. The Town has FEMA/NFIP information in Town Hall for pick up. The Town's website will add a link that directs people to FEMA and State program sites.
7	Develop a debris management plan.	Local Plans and Regulations	Flood; Hurricane and Tropical Storm; Severe Thunderstorm; Tornado; Wildfire; Winter Storm	Town of Catawba Administration Department	To be determined	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program; Economic Development Administration – Disaster Mitigation Planning and Technical Assistance.	5 Years	High	In Progress	**In progress.** Public works still has an informal plan currently in place. They turn debris into mulch and pile it on a lot where they provide it to the public for free. No formal plan has been drafted.

Town of Catawba Mitigation Actions									
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation	Priority	2024 Status	2024 Status Description
8	Provide hazard susceptibility checklist for homeowners to conduct their own inspections.	Public Information and Awareness	All Hazards	Town of Catawba Administration Department	To be determined	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Citizen Corps. Many FEMA and American Red Cross publications are available at no cost.	5 Years	Low	To be continued	**To be continued**: The Town has and will continue to provide materials to citizens via the sources listed above.
9	Establish pre-disaster debris management contracts.	Emergency Response Improvement	Flood; Hurricane and Tropical Storm; Severe Thunderstorm; Tornado; Wildfire; Winter Storm	Town of Catawba Administration, Police, Fire, and Public Works Department	Local staff time	Local staff time	Jul-25	High	In Progress	**In progress**: The Town's Public Works Department removes debris, and, in the case of a disaster, can take it to a landfill. The Town currently provides free mulch, made from the debris.
10	Develop a post-disaster reconstruction plan to facilitate decision making following a hazard event.	Emergency Response Improvement	All Hazards	Town of Catawba Administration, Police, and Fire Departments	To be determined	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program; Economic Development Administration – Disaster Mitigation Planning and Technical Assistance.	Jul-25	High	Deferred	**Deferred.** None in existence to the best of planning staff knowledge. Parties responsible (Administration, Police, and Fire) do not seem to have time to complete this given their current work load.

Town of Catawba Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation [illegible]	Priority	2024 Status	2024 Status Description
11	Draft a new stormwater drain map.	Stormwater Management and Drainage Maintenance	Flood	Town of Catawba Administration and Public Works Departments	To be determined	To Be Determined	Jul-25	High	In Progress	**In progress:** Measurable progress is slow due to lack of funding and staff availability.
12	Routinely clean and repair stormwater drains.	Stormwater Management and Drainage Maintenance	Flood	Town of Catawba Public Works Department	Staff time	To Be Determined	N/A	High	Complete	**Completed**. This activity has been completed as a mitigation action and now the Town Public Works Department does this as an ongoing preventative action.
13	Routinely prune trees and clear tree limbs hanging in right of way.	Maintenance for Damage Prevention	Hurricane and Tropical Storm; Severe Thunderstorm; Tornado; Winter Storm	Relies upon private company (Asplundh) through Duke Energy	Staff time	To Be Determined	N/A	High	Complete	**Completed.** This action has not been implemented directly by the Town due to lack of tree pruning equipment/apparatus. Instead, the Town relies upon a private company (Asplundh) through Duke Energy for pruning. With this in place, this action does not need to be carried over as an ongoing mitigation action to the list of 2019 actions.
14	Identify and strengthen facilities to function as public shelters.	Emergency Response Improvement	All Hazards	Town of Catawba Administration Department	To be determined	Department of Homeland Security – Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program.	N/A	Low	Complete	**Completed.** The Town of Catawba Fire Department is a public shelter, and the Town of Catawba Rescue Building serves as a backup. (It has a generator on site.)

7.5.3. City of Claremont

City of Claremont Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Update Claremont Land Development Plan and Recreation Master Plan with current flood data and keep flood-prone areas designated for greenways.	Local Plans and Regulations	Flood	City of Claremont Planning and Zoning Department	Local staff time	Local staff time	1-5 Years	Moderate	Complete	The new Comprehensive Land Use Plan was adopted in 2023, with a section on Floodplain regulation. Maps will need to be updated when FEMA adopts updated FIRMs
2	Keep infrastructure database updated when repairs are made and new facilities are installed.	Local Plans and Regulations	All Hazards	City of Claremont Planning and Zoning Department	Local staff time	Local staff time	1-5 Years	High	In Progress	WPCOG maintains a GIS system with utilities mapped. Updates are sent to WPCOG when changes are made
3	Take part in regional public outreach programs about hazard potential in our areas.	Public Information and Awareness	All Hazards	City of Claremont Planning and Zoning Department; City of Claremont Administration Department	Local staff time	Local staff time	1-5 Years	Moderate	In Progress	In Progress. City has a full-time employee that functions as a Public Information Officer. Social Media posts are made when there are hazard events, as well as when the county makes hazard posts. Staff will search for ways to further improve on this goal.
4	Install quick-connect emergency generator hook-ups for remaining critical facilities: four (4) pump stations and City Hall.	Structural Retrofitting	All Hazards	City of Claremont Public Works Department; City of Claremont Administration Department; City of Claremont Police Department; City of Claremont Fire Department	Local staff time	Local; Department of Homeland Security (Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program).	1-5 Years	High	In Progress	Installing permanent generator at (3) pump stations; last pump station will be decommissioned within the next 5 years with Lyle Creek Extension

City of Claremont Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
5	Create a public outreach program for City citizens about specific hazards that impact Claremont and the resources available for mitigation using social media, the City website, City newsletter, etc.	Public Information and Awareness	All Hazards	City of Claremont Planning and Zoning Department; City of Claremont Administration Department	Local staff time	Local staff time	1-5 Years	Moderate	To Be Continued	**Ongoing:** City has a full-time employee that functions as a Public Information Officer, who operates the city website, social media and writes a newsletter. Planning Staff will work to develop social media outreach, when the need arises.
6	Using social media, the City website, and other public outreach, encourage residents to keep storm drains and ditches clear of debris during storms (to assist, not rely solely on Public Works).	Public Information and Awareness	Flood	City of Claremont Public Works Department	Local staff time	Local staff time	1-5 Years	Moderate	To Be Continued	**In Progress.** City has a full-time employee that functions as a Public Information Officer. Planning Staff will work to develop social media outreach.
7	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Maintain digital FEMA elevation certificates for all construction in the floodplain, Establish a goal to have each plan reviewer attend a related training periodically, Encourage or require certain local staff positions to obtain and maintain Certified Floodplain Manager (CFM) certification, and Send information about the flood hazard and promote the availability of flood insurance through regularly scheduled mailings (such as the dissemination of handouts with annual property tax notices, utility bills, etc.).	Public Information and Awareness	Flood	City of Claremont Planning and Zoning Department	Local staff time	Local staff time	1-5 Years	High	To Be Continued	**In Progress**. Maintained compliance with NFIP. There have been no new developments in need of Elevation Certificates. An audit by NCDPS was successfully completed in June 2024. Staff plans to attend floodplain management training.

City of Claremont Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
8	Install quick-connect emergency generator hook-ups for remaining critical facilities.	Structural Retrofitting	All Hazards	City of Claremont Public Works Department; City of Claremont Administration Department; City of Claremont Police Department; City of Claremont Fire Department	Local staff time	Local; Department of Homeland Security (Emergency Management Performance Grants (EMPG), Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program).	1-5 Years	High	In Progress	Public Works is scheduled to have a new building with permanent generator within the next 5 years. The only remaining facility will be City Hall, which does not require a generator.
9	Encourage residents to continue with voluntary water restrictions and water conservation actions.	Sustainability Improvement	Drought	City of Claremont Planning and Zoning Department; City of Claremont Public Works Department	Local staff time	Local staff time	1-5 Years	Moderate	In Progress	In Progress. City has a full-time employee that functions as a Public Information Officer. Planning Staff will work to develop social media outreach, when the need arises.
10	Verify height of manholes in flood zones with GPS and ensure proper equipment is present.	Utility Maintenance	Flood	City of Claremont Public Works Department	Local staff time	Local staff time	Short range	Moderate	Complete	Manholes along creeks have risers

City of Claremont Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
11	Explore the feasibility of a Capital Improvement Plan to extend water lines to areas near the City with well problems.	Utility Improvement	Drought	City of Claremont Planning and Zoning Department	Local staff time	Local staff time	1-5 Years	Moderate	Deleted	**Deleted:** It is not a current goal of the City to extend water lines beyond properties within our authority.
12	Explore the feasibility of municipal purchase or private donations of floodplain areas for use as greenways.	Acquisitions and Improvements of Flood-Prone Properties	Flood	City of Claremont Planning and Zoning Department	Local staff time	Local/private donation	Moderate range (2-	Moderate	Deleted	**Deleted:** It is not currently feasible for the City to maintain a greenway.
13	Routinely inspect and maintain fire hydrants.	Utility Maintenance	Wildfire	City of Claremont Fire Department; City of Claremont Public Works Department	Local staff time	Local staff time	1-5 Years	Moderate	To Be Continued	**Maintained Bi-Annually:** Flushing is done bi-annually. Fire Department does annual inspection and flow testing. Work orders are submitted for any needed repairs.
14	Encourage residents to keep storm drains clear of debris during storms (to assist, not rely solely on Public Works).	Public Information and Awareness	Flood	City of Claremont Public Works Department	Local staff time	Local staff time	1-5 Years	Moderate	To Be Continued	**Ongoing**: City has a full-time employee that functions as a Public Information Officer. Planning Staff will work to develop social media outreach.

7.5.4. City of Conover

City of Conover Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Maintain continued community compliance with the National Flood Insurance Program (NFIP). Provide education to property owners, elected officials, and appointed officials about flood prevention.	Public Information and Awareness	Flood	City of Conover Planning and Economic Development Department	Local staff time	Local staff time	5 years	Moderate	To Be Continued	**Ongoing:** The City of Conover Staff continues to enforce local floodplain regulations on a case-by-case basis. City was audited for compliance by NCEM in 2024.
2	Provide education via website, social media, brochures, etc. regarding what to do before, during, and after storm events.	Public Information and Awareness	Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Winter Weather	City of Conover Fire Department	Local staff time	Local staff time	5 years	Moderate	To Be Continued	**Ongoing:** The City of Conover promotes public awareness during the proper months (Sept | Preparedness) and uses awareness material from NCEM, ReadyNc, etc.
3	Educate public about maintenance of property and trimming of trees located near streets and power lines.	Public Information and Awareness	Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Winter Weather	City of Conover Public Works Department; Duke Energy Corporation	Local staff time	Local staff time	5 years	Moderate	To Be Continued	**Ongoing:** The City plans to schedule public awareness
4	Ensure firefighters are properly trained in brush fire fighting techniques.	Emergency Response Improvement	Wildfire	City of Conover Fire Department	$1,400	Local staff time	5 years	Moderate	To Be Continued	**Completed Annually:** Brush Firefighting training is currently scheduled for company training the fall of 2024 and the Company Training schedule has incorporated brush firefighting training on an annual basis.

City of Conover Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
5	In coordination with the Catawba County Emergency Services Department, conduct outreach to the public regarding the County's Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies.	Public Information and Awareness	All Hazards	City of Conover; Catawba County Emergency Services Department	Staff time	General Fund	1-2 years	High	To Be Continued	**Ongoing:** Promoted by newsletter and all new utility customers are enrolled automatically
6	Install generator transfer switch connections during the construction of new public facilities (schools, fire stations, City buildings, etc.).	Structural Retrofitting	All Hazards	City of Conover Planning and Economic Development Department	To be determined	Local, State; Federal Hazard Mitigation Grant Program (HMGP)	5 years	High	Complete	**Complete:** All critical city facilities have full backup capability including police, fire, city hall, public works. Generator status of possible shelter locations such as schools or churches unknown.
7	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Hold informative work sessions for newly elected officials and new appointees to planning commissions and appeals/variance boards, to provide an overview of floodplain management, the importance of participating in the NFIP, and the implications of failing to enforce the requirements of the program or failing to properly handle variance requests, and Maintain supplies of FEMA/NFIP materials to help property owners evaluate measures to reduce potential hazard damage. Make available in public buildings, local library, website, etc. and inform people who they can call to learn more information.	Public Information and Awareness	Flood	City of Conover Planning and Economic Development Department	Minimal (staff time only)	Staff time only	Within 1-2 years	Moderate	To Be Continued	**To Be Continued:** Measurable progress is slow due to staff availability and funding.

City of Conover Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
8	Work with the local media to highlight mitigation practices for homeowners during wildfire and winter storm seasons through the development of Public Service Announcements (PSAs).	Public Information and Awareness	Wildfire; Winter Weather	City of Conover Fire Department	To be determined	To be determined	Within 1-2 years	Moderate	To be continued	**Ongoing:** The City uses its website and social media to communicate with citizens about storm events.
9	Aggressively encourage tree trimming of large older trees near structures, power lines, and rights of way.	Utility Maintenance	Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Winter Weather	City of Conover Public Works Department; Duke Energy Corporation	To be determined	To Be Determined	Within 1-2 years	Moderate	To be continued	**Ongoing:** The City of Conover continues to work with NCDOT to remove problematic trees and incorporate tree trimming into street maintenance activities. The Utilities Department also clears problematic trees near critical infrastructure as part of routine maintenance.
10	Ensure firefighters are properly trained in brush/wildland fire fighting techniques.	Emergency Response Improvement	Wildfire	City of Conover Fire Department	$1,200	Local staff time	1-2 years	Moderate	To be continued	**Completed Annually:** Brush Firefighting training is currently scheduled for company training the fall of 2024 and the Company Training schedule has incorporated brush firefighting training on an annual basis.

City of Conover Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
11	Routinely inspect and maintain fire hydrants.	Utility Maintenance	Wildfire	City of Conover Fire Department	Minimal staff time	Local staff time	1-5 years	Moderate	To be continued	**Occurs Annually**: At this point in the current calendar year all hydrant have been flow tested and maintenance has been performed on the bonnet and outlet covers. During the second half of the calendar year hydrants will be painted.
12	Consider establishing a local reserve fund for public mitigation measures.	Mitigation Funding	All Hazards	City of Conover Finance Department; City of Conover Public Works Department; City of Conover Planning and Economic Development Department	To be determined	To Be Determined	Within 1-2 years	Moderate	In Progress	**In progress:** The City funds staff positions which implement guidelines of the adopted hazard mitigation plan. Measurable progress is slow due to lack of funding and staff availability.

7.5.5. City of Hickory

City of Hickory Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Continue the enforcement of the City of Hickory 2007 Flood Damage Prevention Ordinance. This ordinance regulates construction and development activities within Special Flood Hazard Areas (SFHAs).	Local Plans and Regulations	Flood	City of Hickory Planning and Development Services Department	Budgeted activity	City of Hickory General Fund	1-5 years	High	In Progress	**Ongoing:** This is an ongoing and continuous process

City of Hickory Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
2	Monitor and enforce the provisions of the City of Hickory's NPDES Phase 2 Stormwater Control Ordinance and continue to provide community outreach on the importance of stormwater management.	Stormwater Management and Drainage Maintenance	Flood	City of Hickory Public Services Department, Engineering Division	Budgeted activity (staff time)	City of Hickory General Fund	1-5 years	High	In Progress	**Ongoing:** This is an ongoing and continuous process
3	Coordinate with willing, voluntary owners of repetitive loss properties to apply for hazard mitigation funding to implement projects that reduce or eliminate the long-term risk of future flood damages. This may be accomplished through property buyouts, elevation, or retrofit projects that remove or alter insured, at-risk repetitive loss structures.	Acquisitions and Improvements of Flood-Prone Properties	Flood	City of Hickory Planning and Development Services Department	To be determined on a case-by-case	Federal and State Hazard Mitigation Assistance Grants	1-5 years	Moderate	Deferred	No willingness to participate
4	Remove obstructions from public drainage ways or where threats to public infrastructure have been identified. The removal of obstructions will lessen the risk of flooding and damage to roadway and bridges.	Stormwater Management and Drainage Maintenance	Flood	City of Hickory Public Services Department	In progress and	City of Hickory General Fund	1-5 years	High	In Progress	Ongoing: This is an ongoing and continuous process that is monitored as necessary
5	Purchase eleven (11) four-wheel drive vehicles with off-road capabilities. These vehicles will be utilized to reach citizens who become stranded or cut-off from services due to flooding, winter weather, or similar events.	Emergency Response Improvement	Flood; Winter Weather	City of Hickory Police and Fire Departments	Budgeted activity (staff	City of Hickory General Fund	2014 - 2019	High	Complete	Purchases have been completed and vehicles are in use.

City of Hickory Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	Realignment of Fire Department command structure to add an additional Incident Commander per shift. This position will allow for better management of simultaneous multiple incidents and provide scene safety for public safety personnel.	Emergency Response Improvement	All Hazards	City of Hickory Fire Department	Budgeted activity (staff	City of Hickory General Fund	2014 - 2019	High	Complete	The position was created and activities either completed or on-going.
7	Continue to provide educational outreach to civic groups, neighborhood groups, school children, and similar persons on the importance of fire safety and prevention.	Public Information and Awareness	Wildfire	City of Hickory Fire Department, Fire Prevention Division	Budgeted activity (staff time)	City of Hickory General Fund	1-5 years	Moderate	To be Continued	**Completed Annually:** Fire education is provided throughout the calendar year to school children, civic groups and neighborhood groups.
8	In coordination with the Catawba County Emergency Services Department, conduct outreach to the public regarding the County's Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies.	Public Information and Awareness	All Hazards	City of Hickory; Catawba County Emergency Services Department	Staff time	General Fund	1-2 years	High	To be Continued	**Ongoing**

City of Hickory Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
9	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Evaluate permit application forms to determine possible modifications focused on flood hazard prevention, Develop a checklist for review of building/development permit plans and for inspection of development in floodplains, Sponsor a periodic NFIP workshop for local surveyors and builders, Encourage or require certain local staff positions to obtain and maintain Certified Floodplain Manager (CFM) certification, and Develop handouts for permit applications on specific issues such as installation of manufactured homes in flood hazard areas according to HUD installation standards, or guidance on improving/repairing existing buildings to better withstand potential hazards.	Public Information and Awareness	Flood	City of Hickory Planning and Development Services Department	Minimal (staff time only)	City of Hickory General Fund	1-5 years	High	In Progress	**In Progress:** City staff has received additional training in flood prevention.
10	Contact owners of repetitive loss property #0102594 to inform them of the technical assistance and hazard mitigation grant funding assistance made available to owners of repetitively flooded properties through the North Carolina Division of Emergency Management (NCEM) and Federal Emergency Management Agency (FEMA). This includes information on the pre-disaster grant funding program provided by FEMA through its Hazard Mitigation Assistance (HMA) programs, and particularly the Repetitive Flood Claims (RFC) program that can provide up to 100% in federal funds for eligible hazard mitigation activities.	Public Information and Awareness	Flood	City of Hickory Planning and Development Services Department	Minimal (staff time only)	City of Hickory General Fund	1-5 years	High	Deleted	

City of Hickory Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
11	Continue to enforce the requirements of the City of Hickory's 2007 Flood Damage Prevention Ordinance. This ordinance regulates construction standards for development activities within Special Flood Hazard Areas (SFHAs).	Local Plans and Regulations	Flood	City of Hickory Planning and Engineering Departments	In progress and budgeted activity (staff time)	City of Hickory General Fund	5 years	High	To be Continued	**Ongoing:** This is a continual Activity
12	Monitor and enforce the provisions of the City of Hickory's NPDES Phase 2 Stormwater Control Ordinance and continue to provide community outreach to the general public as to the ordinance's requirements and the importance of adequate stormwater control.	Stormwater Management and Drainage Maintenance	Flood	City of Hickory Engineering Departments	In progress and budgeted activity (staff time)	City of Hickory General Fund	5 years	High	To be Continued	**Ongoing:** These educational opportunities are provided annually at several public events.
13	Remove obstructions from drainage ways were located on public property or where a threat to a public improvement such as a road or drainage structure is identified.	Stormwater Management and Drainage Maintenance	Flood	City of Hickory Public Services Department	On-going and budgeted activity (staff time)	City of Hickory General Fund	1-5 years	High	To be Continued	**Ongoing:** Hickory Public Utilities was recently awarded a BRIC grant to perform shoreline stabilization activities at i.e. Northeast WWTP. Stabilization will protect public infrastructure from damage.
14	Designate emergency thoroughfares and update to necessary standards. Work with North Carolina Department of Transportation (NCDOT) representatives to identify emergency thoroughfares and identify necessary improvements to enhance safety and improve functionality during emergency events.	Emergency Response Improvement	All Hazards	City of Hickory Fire Department and NCDOT	To be determined	City of Hickory General Fund	5 years	High	To be Continued	**Periodic Review:** Review occurs to ensure new populations are accounted for in operations

City of Hickory Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
15	Continue to routinely prune trees and clear tree limbs hanging over rights of way to enhance safety and improve function during an emergency. In addition, continue policy requiring underground utility lines in new development and redevelopment projects.	Maintenance for Damage Prevention	Hurricanes and Tropical Storms; Severe Thunderstorms; Tornadoes; Winter Storms	Hickory Planning and Public Services Departments	In progress and budgeted activity	City of Hickory General Fund and Private Developers	5 years	High	To be Continued	**Ongoing:** All development projects are required to install underground utilities, where practical and legal to do so.
16	Implement City of Hickory Police Department Radio Frequency Interoperability hardware, to prevent communication breakdowns due to compatibility issues between radio frequencies and telephone systems.	Emergency Warning Systems	All Hazards	City of Hickory Police Department	$20,000	City of Hickory General Fund	In place 2015	High	Complete	
17	Implementation of Skytower by Hickory Police Department. Skytower is an elevated platform capable of supporting police personnel and/or surveillance equipment.	Emergency Response Improvement	All Hazards	City of Hickory Police Department	$119,000	JAG Grant	In place 2015	Moderate	Complete	
18	Implement second ladder company within the City of Hickory Fire Department. A second ladder company will provide the City with the ability to reduce the existing 43 square mile coverage area for the single ladder company into two 21.5 square mile coverage areas for the two companies.	Emergency Response Improvement	All Hazards	City of Hickory Fire Department	$475,000	Five- year federal grant followed by funding by City of Hickory General Fund	In place 2010, 2015	High	Complete	

City of Hickory Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
19	Takeover of duties of existing Hickory Rescue Light Rescue. The City of Hickory Fire Department will assume the responsibilities and response areas of the existing Hickory Rescue Light Rescue operated by Catawba County.	Emergency Response Improvement	All Hazards	City of Hickory Fire Department	To be determined	City of Hickory General Fund	In place as of 2010 and 2015	Moderate	Complete	
20	Involve emergency preparedness staff in the development of all planning activities with hazard mitigation impacts.	Local Plans and Regulations	All Hazards	Catawba County Emergency Services Department; Planning Department; Economic Development; City of Hickory	Minimal (Staff Time only)	Catawba County General Fund	5 years	High	To Be Continued	**Ongoing:** Other organizations are involved when necessary or advisable.

7.5.6. Town of Long View

Town of Long View Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Update Comprehensive Land Use Plan.	Local Plans and Regulations	All Hazards	Long View Planning Department	Local Staff Time	Local Staff Time	2022	High	To Be Continued	**Completed:** Review, revised and adopted in 2022 with next schedule review in 2030

Town of Long View Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
2	Increase dimensions of drainage culverts in troublesome areas.	Stormwater Management and Drainage Maintenance	Flood	Town of Long View Public Works Department	To be determin	To Be Determined	1-2 years	High	Deferred	
3	Step up centralized, coordinated permitting process including effective filing/permitting system to ensure compliance with floodplain regulations.	Local Plans and Regulations	Flood	Long View Planning Department	Local Staff Time	Local Staff Time	5 Years	High	To Be Continued	**Continuous Monitoring:** Computerized permitting and inspection program has been completed and is continually monitored
4	Draft a new stormwater drain map.	Stormwater Management and Drainage Maintenance	Flood	Town of Long View Planning Department; Town of Long View Public Works Department	To be determin	Local staff time	1-3 years	Moderate	Deferred	
5	Review/update Flood Damage Prevention Ordinance.	Local Plans and Regulations	Flood	Long View Planning Department	Local Staff	Local Staff Time	2025	Moderate	To Be Continued	**Continuous Monitoring:** Monitoring occurs based on hazard information changes.
6	Encourage residents to keep storm drains clear of debris before and after storms (to assist, not rely solely on Public Works).	Public Information and Awareness	Flood	Town of Long View Planning Department; Town of Long View Public Works Department	Minimal staff time	Local staff time	1-5 years	Moderate	Deferred	
7	Ensure participation in the National Flood Insurance Program (NFIP)	Local Plans and Regulations	Flood	Long View Planning Department	Local Staff	Local Staff Time	5 Years	Moderate	To Be Continued	**Continuous Monitoring:** Continuously maintaining all applications reviewed.
8	Coordinate with local power companies to develop publicly acceptable tree trimming policies. Include public education for property owners on the benefits of proper tree trimming around power lines and clearing of debris around homes.	Public Information and Awareness	Winter Weather; Thunderstorm	Town of Long View Planning Department	Minimal staff time	Local staff time	2-3 years	Moderate	Deferred	

Town of Long View Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
9	Develop Vulnerability Assessment Plan.	Local Plans and Regulations	All Hazards	Town of Long View Planning Department; Town of Long View Public Works Department; Town of Long View Fire Department	To be determined	Local staff time	3-4 years	Moderate	Deferred	
10	Require tree preservation and/or plantings for residential and non-residential development to reduce the impacts of stormwater runoff.	Local Plans and Regulations	Flood; Landslide	Town of Long View Planning Department	Staff time only	Local staff time	1-2 years	High	Deferred	
11	Establish a “Hazard Awareness Month” to promote hazard awareness throughout the Town.	Public Information and Awareness	All Hazards	Town of Long View Administration Department	Cost of brochur	To Be Determined	1 year	Moderate	Complete	
12	In coordination with the Catawba County Emergency Services Department, conduct outreach to the public regarding the County’s Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies.	Public Information and Awareness	All Hazards	Town of Long View; Catawba County Emergency Services Department	Staff time	General Fund	1-2 years	High	Deferred	

Town of Long View Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
13	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Evaluate permit application forms to determine possible modifications focused on flood hazard prevention, Encourage or require certain local staff positions to obtain and maintain Certified Floodplain Manager (CFM) certification, Hold informative work sessions for newly elected officials and new appointees to planning commissions and appeals/variance boards to provide an overview of floodplain management, the importance of participating in the NFIP, and the implications of failing to properly handle variance requests, Conduct a review of other regulatory programs and planning tools, such as the comprehensive plan and zoning ordinance, and report on opportunities to improve consistency with the objectives of floodplain management, and Maintain supplies of FEMA/NFIP materials to help property owners evaluate measures to reduce potential hazard damage. Make available in public buildings, the local library, website, etc. and inform people who they can call to learn more information.	Public Information and Awareness	Flood	Town of Long View Planning Department	Local staff time	Local staff time	1-5 years	High	Deferred	
14	Routinely inspect and clear debris from drainage system.	Stormwater Management and Drainage Maintenance	Flood	Town of Long View Public Works Department	Local staff time	Local staff time	1-5 years	Moderate	Deferred	

Town of Long View Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
15	Routinely prune trees and clear tree limbs hanging in the right of way.	Maintenance for Damage Prevention	Thunderstorm; Winter Weather	Town of Long View Public Works Department	Local staff	Local staff time	1-5 years	High	Deferred	
16	Require the burial of electrical, telephone, and cable lines for new development.	Local Plans and Regulations	Thunderstorm; Winter Weather	Town of Long View Planning Department	Minimal cost to the developer; no cost to the Town.	Private sector	1-5 years	High	Deferred	
17	Routinely inspect and maintain fire hydrants.	Utility Maintenance	Fire	Town of Long View Fire Department	Local staff time	Local staff time	Immediate/in progress	Moderate	Complete	
18	Provide hazard susceptibility checklist for homeowners to conduct their own inspections.	Public Information and Awareness	All Hazards	Town of Long View Administration Department; Town of Long View Planning Department	To be determined	FEMA; American Red Cross	1-5 years	Moderate	Deferred	
19	Acquire federal funds to purchase destroyed or substantially damaged properties and relocate households.	Structure and Infrastructure Projects	All Hazards	Planning and Finance Departments	Local Staff Time	State and Federal Grants	Case-By-Case Basis	High	Deferred	
20	Explore the feasibility of municipal purchase or private donations of floodplain areas for use as greenways.	Acquisitions and Improvements of Flood-Prone Properties	Flood	Town of Long View Planning Department	Local staff time	Local staff time	Moderate range (2-3 years)	Moderate	Deferred	

Town of Long View Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
21	Ensure firefighters are properly trained and equipped for brush/forest firefighting techniques.	Emergency Response Improvement	Wildfire	Town of Long View Fire Department	Local staff time	Yearly Budgeted Activity	Immediate/in progress	Moderate	Complete	

7.5.7. Town of Maiden

Town of Maiden Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
1	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Evaluate permit application forms to determine possible modifications focused on flood hazard prevention, Develop a checklist for review of building/development permit plans and for inspection of development in floodplains (a model is available), Establish a goal to have each plan reviewer attend a related training periodically (for example, the North Carolina Association of Floodplain Managers Annual Conference or Fall Floodplain Institute), Maintain a map of areas that flood frequently (e.g., areas where repetitive loss properties are located) and prioritize those areas for inspection immediately after the next flood. If outside FEMA Special Flood Hazard Areas, consider requiring existing NFIP regulatory standards (compliance with existing ordinance) through overlay zoning, etc., and Conduct a review of other regulatory programs and planning tools, such as the comprehensive plan and zoning ordinance, and report on opportunities to improve consistency with the objectives of floodplain management.	Public Information and Awareness	Flood	Town of Maiden Planning Department	Staff time only	Local staff time	1-5 years	High	In Progress	In Progress
2	Continue to address the long-term maintenance and removal of the Maiden Water Supply dam structure with relevant state agencies.	Dam Monitoring and Inspection	Flood; Dam or Levee Failure	Town of Maiden Public Works Department	To be determined	Local; state; federal grants	1-5 years	High	Complete	Update completed
3	Continue with the installation of more effective risers to sewer manholes to reduce infiltration and inflow during heavy rains.	Stormwater Management and Drainage Maintenance	Flood	Town of Maiden Public Works Department	Local staff time	Local staff time	1-2 years	High	Complete	Update completed

Town of Maiden Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
4	Routinely prune trees and clear tree limbs hanging near electrical lines.	Maintenance for Damage Prevention	Hurricane and Tropical Storm; Thunderstorm; Hail; Lightning; Tornado; Winter Weather	Town of Maiden Public Works Department, Electrical Division	$25,000 annually	Local grants	1-5 years	High	In progress	Limbs are trimmed through town in phases and as funds are available.
5	Routinely inspect and clean debris from drainage system.	Stormwater Management and Drainage Maintenance	Flood	Town of Maiden Public Works Department	Local staff time	Local staff time	1-5 years	Moderate	In progress	In Progress
6	Explore the feasibility of municipal purchase and/or private donation of floodplain areas for use as greenways.	Acquisitions and Improvements of Flood-Prone Properties	Flood	Town of Maiden Planning Department	Local staff time	Local staff time	1-5 years	Moderate	In Progress	In Progress
7	Investigate backup power opportunities for critical facilities	Structural Retrofitting	All Hazards	Town of Maiden	To be determined	Local, State and Federal Grants	1-5 years	Moderate	In Progress	In Progress
8	Continue to ensure firefighters are properly trained and equipped for brush/wildland firefighting techniques.	Emergency Response Improvement	Wildfire	Town of Maiden Fire Department	$1,000 per firefighter in staff time	Local staff time	1-2 years	Moderate	In Progress	In Progress
9	Continue to encourage residents to keep storm drains clear of debris during storms (to assist, not rely solely on Public Works).	Public Information and Awareness	Flood	Town of Maiden Public Works Department	Local staff time	Local staff time	1-5 years	Moderate	To be continued	To be continued
10	In coordination with the Catawba County Emergency Services Department, conduct outreach to the public regarding the County's Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies.	Public Information and Awareness	All Hazards	Town of Maiden; Catawba County Emergency Services Department	Staff time	General Fund	1-2 years	High	To be continued	Same

Town of Maiden Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
11	Develop a dam failure study for the Maiden Reservoir Dam and continue to address the long-term maintenance or removal of the dam structure with relevant state agencies.	Local Plans and Regulations	Flood; Dam or Levee Failure	Town of Maiden Public Works Department	To be determined	Local; state; federal grants	1-5 years	High	Complete	Update completed
12	Construct a remote fire station to house at least two trucks and additional firefighting and life/safety equipment necessary for first responders during periods of emergency or disasters.	Emergency Response Improvement	Flood; Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam or Levee Failure; Earthquake; Sinkhole; Landslide	Town of Maiden Fire Department; Town of Maiden Administration Department	Local staff time	Grants; taxes	2-5 years	Moderate	In Progress	Additional fire station under construction

7.5.8. City of Newton

City of Newton Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
1	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Maintain FEMA digital elevation certificates for all construction in the floodplain and Establish a goal to have each plan reviewer and building inspector attend a related training periodically (for example, the North Carolina Association of Floodplain Managers Annual Conference or Fall Floodplain Institute).	Public Information and Awareness	Flood	City of Newton Planning and Zoning Department	Staff time and travel	General Fund	1-5 years	High	Deferred	Deferred to the next plan update. Measurable progress is slow due to staff availability and funding.
2	Increase dimensions of drainage culverts in troublesome areas.	Stormwater Management and Drainage Maintenance	Flood	City of Newton Public Works Department	To be determined	To Be Determined	1-5 years	Moderate	Deferred	Deferred to the next plan update. Measurable progress is slow due to staff availability and funding.
3	Maintain a seasonal hazard awareness campaign.	Public Information and Awareness	All Hazards	City of Newton Public Information Officer	To be determined	To Be Determined	1-5 years	Low	Deferred	Deferred to the next plan update. Measurable progress is slow due to staff availability and funding.

City of Newton Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
4	In coordination with the Catawba County Emergency Services Department, conduct outreach to the public regarding the County's Community Alert System to educate them about how to obtain information both pre- and post-event and about mitigation strategies.	Public Information and Awareness	All Hazards	Town of Newton; Catawba County Emergency Services Department	Staff time	General Fund	1-2 years	High	Deferred	Deferred to the next plan update. Measurable progress is slow due to staff availability and funding.
5	Maintain continued compliance with the National Flood Insurance Program (NFIP) through implementation of the following specific actions: Maintain FEMA digital elevation certificates for all construction in the floodplain, Evaluate permit application forms to determine possible modifications focused on flood hazard prevention, Develop a checklist for review of building/development permit plans and for inspection of development in floodplains, and Establish a goal to have each plan reviewer and building inspector attend a related training periodically (for example, the North Carolina Association of Floodplain Managers Annual Conference or Fall Floodplain Institute).	Public Information and Awareness	Flood	City of Newton Planning and Zoning Department	To be determined (staff and travel)	To Be Determined	1-2 years	High	Complete	Completed. The Planning Department has continued to maintain digital elevation certificates for all construction in the floodplain, included ongoing development. A flood hazard focus during the City's annual zoning permit revisions included flood management in the development checklist and budgeted for floodplain training for proceeding five years. This resulted in the City's Floodplain Program receiving a clean audit by the State in 2013.

City of Newton Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
6	Routinely inspect and clear debris from drainage system.	Stormwater Management and Drainage Maintenance	Flood	City of Newton Planning and Zoning Department	To be determined	To Be Determined	1-5 years	High	In Progress	In progress: The City of Newton Public Works staff cleans and inspects the drainage system as needed, including problem areas before and after heavy rain events.
7	Routinely prune trees and clear tree limbs hanging in right of way.	Maintenance for Damage Prevention	Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Winter Weather	City of Newton Public Works Department	To be determined	To Be Determined	1-5 years	High	To be continued	In Progress: The City of Newton has hired an additional tree trimming crew (2 total) to keep trees and limbs clear of electric lines.
8	Maintain a comprehensive infrastructure mapping system to document locations and attributes of infrastructure systems.	Public Information and Awareness	All Hazards	City of Newton Public Works Department	To be determined	To Be Determined	1-5 years	High	To be continued	In Progress: The City of Newton has collected all known infrastructure (water, sewer, electric) and has a process in place to continuously update the data set.
9	Evaluate existing utility network and create a list of infrastructure protection projects based on highest potential hazard impacts.	Utility Maintenance	All Hazards	City of Newton Public Works Department	To be determined	To Be Determined	1-5 years	High	In Progress	In progress: The City has a Capital Improvement Plan that plans capital cost for a five-year period. Hazard mitigation is a category for ranking projects.
10	Increase dimensions of drainage culverts in troublesome areas.	Stormwater Management and Drainage Maintenance	Flood	City of Newton Public Works Department	To be determined	To Be Determined	1-5 years	Moderate	In Progress	In progress: The City has undertaken several culvert projects over the last several years, which involved replacing undersized culverts with larger sized pipes.

City of Newton Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
11	Train fire personnel in wildfire, brush, and forest fire firefighting techniques and practices.	Emergency Response Improvement	Wildfire	City of Newton Fire Department	To be determined	To Be Determined	1-5 years	Moderate	In Progress	In progress: The Fire Department trains each of its personnel in wildfire, brush, and forest fire techniques on an annual basis.
12	Work with local media to establish a public wildfire awareness program.	Public Information and Awareness	Wildfire	City of Newton Fire Department	To be determined	To Be Determined	1-5 years	Moderate	In Progress	In progress: Over the past 5 years, the Fire Department has worked with the City's PIO and local media to educate the public about wildfire hazards. The City's efforts to educate the public on wildfires includes adopting a proclamation for a Fire Safety Week each year. The City has also included relevant articles in its quarterly newsletter which goes out to all utility customers, as well as including information on the City's website, Facebook page, and Twitter. In addition, the Fire Department has a Fire Educator that speaks to groups of all ages about fire safety topics, which includes wildfire awareness. Specific groups visited by the Fire Educator include schools, childcare centers, and civic groups.

City of Newton Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
13	Maintain a seasonal hazard awareness campaign.	Public Information and Awareness	Flood; Hurricane and Tropical Storm; Thunderstorm; Lightning; Hail; Tornado; Wildfire; Drought; Winter Weather; Erosion; Dam or Levee Failure; Earthquake; Sinkhole; Landslide	City of Newton Public Information Officer	To be determined	To Be Determined	1-5 years	Low	In Progress	In progress: The City's PIO through the local media, newsletters, and social media worked to educate the public on seasonal hazards. The City has included articles about hazard awareness in its quarterly newsletter which is sent out to all utility customers, as well as including information on the City's website, Facebook page, and Twitter. Also, the PIO has prepared and obtained brochures to distribute as needed to educate the public on hazard awareness, focusing on flood; hurricane and tropical storm; thunderstorm, lightning, and hail; tornado; wildfire; drought; winter weather; and erosion.

7.6. Caldwell County

Caldwell County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Require a finished floor elevation certificate for all development within the Special Flood Hazard Area (SFHA) within both incorporated and unincorporated portions of the county. All elevation certificates should be submitted on an official FEMA elevation certificate. No certificate of occupancy shall be issued for any development within a defined SFHA without the submittal of the required elevation certificate.	Local Plans and Regulations	Flood; Dam or Levee Failure	Caldwell County Planning Department; Planning Staff of all municipalities in Caldwell County	$50,000	Existing staff and administrative resources	5 Years	High	In Progress	In progress: No measurable progress due to staffing and funding
2	Maintain a map information service involving the following: Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including provision of information on whether a given property is located within a flood hazard area, Provide information regarding the flood insurance purchase requirement, Maintain historical and current FIRMs, Advertise once annually in the local newspaper, and Provide information to inquirers about local floodplain management requirements.	Public Information and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department; administrative staff of all participating jurisdictions within Caldwell County	$85,000	Tax-based funding	5 Years	Moderate	In Progress	In progress: No measurable progress due to staffing and funding
3	Caldwell County will annually mail a notice to all property owners whose land is located within a Special Flood Hazard Area (SFHA). The notice should clearly state that the recipient's property is susceptible to flooding and provide information pertinent to emergency evacuation and post-disaster recovery.	Public Information and Awareness	Flood	Caldwell County Planning Department	$8,500	Maintain present activities under the funding available	5 Years	Moderate	In Progress	In progress: No measurable progress due to staffing and funding
4	The Caldwell County Planning Department will work with local real estate agencies to ensure that agents are informing clients when property for sale is located within a Special Flood Hazard Area (SFHA). Caldwell County will provide these agencies with brochures documenting the concerns relating to development located within flood-prone areas and ways that homeowners may make their homes more disaster resistant to strong winds, lightning, and heavy rains.	Public Information and Awareness	Flood; Winter Weather; Wildfire; Thunderstorm; Windstorm	Caldwell County Planning Department; Caldwell County Emergency Management Department	Local staff time	Existing Department Budget and Staff Resources	5 Years	High	In progress	In progress: No measurable progress due to staffing and funding

Caldwell County Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
5	The Caldwell County Planning Department and Caldwell County Building Inspections will make information regarding hazards and development regulations within floodplains available through the following: Ensuring that the local library maintains information relating to flooding and flood protection, Providing a link on their website to FEMA resources addressing flooding and flood protection, and Each of the county's municipalities, if a website is in place, will provide a link on their website to FEMA resources addressing flooding and flood protection, sheltering, evacuation procedures, disaster preparedness, and post-disaster recovery.	Public Information and Awareness	Flood; Winter Weather; Thunderstorm; Dam or Levee Failure; Tornado	Caldwell County Building Inspections and Planning Department; administrative staff of all participating jurisdictions within the county	$1,200 per year	Maintain present activities under the funding available	5 Years	High	Complete	Completed
6	The Caldwell County Building Inspections will provide comprehensive services regarding planning and development activities within the defined Special Flood Hazard Area (SFHA) and issues relating to the construction of disaster resistant structures. These services will include: Providing site specific flood and flood-related information on an as-needed basis, Maintaining a list of contractors with experience in floodproofing and retrofit techniques, Providing information on wind proofing construction methods for new and renovated structures, Maintaining materials providing an overview of how to select a qualified contractor, Making site visits upon request to review occurrences of flooding, drainage problems, and sewer problems. If applicable, the inspector should provide one-on-one advice to the property owner, Providing advice and assistance regarding CRS activity 530, Advertising the availability of this service once annually within the local newspaper, and Maintaining a log of all individuals assisted through this County service including all site visits.	Public Information and Awareness	Flood	Caldwell County Building Inspections; Caldwell County Planning Department	Maintain present activities under the funding available	Existing Department Budget and Staff Resources	5 Years	High	In progress	In progress: No measurable progress due to staffing and funding
7	Caldwell County and its municipalities will continue to maintain all property acquired within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. All parties will continue to pro-actively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.	Local Plans and Regulations	Flood; Dam or Levee Failure; Wildfire	Caldwell County Building Inspections; Caldwell County Planning Department	$250,000+	Grant fund resources; Lenoir EMS Base Budget	1-5 years	High	In progress	In progress: No measurable progress due to staffing and funding

Caldwell County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
8	The Caldwell County Planning Department will maintain a comprehensive Geographic Information System (GIS) with current Flood Insurance Rate Map (FIRM) panels in an effort to make this information readily available to County citizens. In addition to this digital data, bound copies of all historical and current FIRM panels will be maintained within the Caldwell County Planning Department office.	Public Information and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department; Caldwell County Information Technology Department	unspecified	Existing department and Staff Resources	1-5 years	High	Complete	Complete
9	The Caldwell County Mitigation Advisory Committee, in conjunction with all municipal jurisdictions participating in the plan update, will work on the five-year implementation of this Hazard Mitigation Plan Update. At the end of the five-year period, the County will again update the plan.	Public Information and Awareness	All Hazards	Caldwell County Emergency Management Department	To be determined	General Fund	1-5 years	High	In progress	Continuous
10	Caldwell County, as well as all participating jurisdictions, will continue to support the North Carolina Office of Dam Safety's efforts to monitor and inspect all dams throughout the county, as well as the State of North Carolina. The County relies on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable.	Dam Monitoring and Inspection	Flood; Dam or Levee Failure	Caldwell County Emergency Management Department; administrative staff of all participating jurisdictions	$2,500 per year	Caldwell County Emergency Management Budget for registry	1-5 years	High	In progress	In progress: No measurable progress due to staffing and funding
11	Caldwell County will maintain participation in the Community Rating System (CRS) program. Additionally, Caldwell County will work with all participating jurisdictions, upon request, to secure inclusion in the CRS program. Currently, only unincorporated Caldwell County is a participant in the program.	Public Information and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department; elected boards of all participating jurisdictions	Local staff time	Existing Department Budget and Staff Resources	5 years	Moderate	In progress	In progress: No measurable progress due to staffing and funding
12	The Caldwell County Emergency Management Department will continue to work closely with the American Red Cross on the management and, when necessary, operation of emergency shelter facilities within the county. The County will operate only in a support role in dealing with individual shelter issues.	Emergency Response Improvement	All Hazards	American Red Cross; Caldwell County Emergency Management Department	$200,000	Grant funding and possible donations	2-5 years	High	In progress	In progress: No measurable progress due to staffing and funding

Caldwell County Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
13	Caldwell County will work with the American Red Cross and will attempt to obtain funding for locating switches and generators at all emergency shelter locations.	Emergency Response Improvement	All Hazards	Caldwell County Emergency Management Department; American Red Cross	Local Staff Time	Existing Department Budget and Staff Resources or grant funding	2-5 years	High	In progress	
14	The Caldwell County Emergency Management Department will continue to coordinate with the Caldwell County Public Works Department, as well as all participating jurisdictions, regarding the monitoring of water resources statewide. When necessary, the County will institute measures to conserve water resources according to the County's Drought Management Plan.	Sustainability Improvement	Drought	Caldwell County Water Department; administrative staff of all participating jurisdictions	Local Staff Time	Existing Department Budget and Staff Resources	1-5 years	Low	In progress	In progress: No measurable progress due to staffing and funding
15	Caldwell County will assist all communities within the county, including property owners in unincorporated areas, in applying for FEMA-sponsored mitigation grant assistance for the acquisition and/or elevation of substantially damaged structures following a natural disaster.	Acquisitions and Improvements of Flood-Prone Properties	Flood	Caldwell County Emergency Management Department; elected boards of all participating jurisdictions	To be determined	Existing Department Budget and Staff Resources	1-5 years	Low	In Progress	In progress: No need for implementation in last 5 years
16	The Caldwell County Emergency Management Department will continue to work on the establishment of a comprehensive special need's registry. This effort will involve the cooperation of all participating jurisdictions.	Emergency Response Improvement	All Hazards	Caldwell County Emergency Management Department; administrative staff of all participating jurisdictions	Local Staff Time	Existing Department Budget and Staff Resources	1-5 years	Low	Deleted	
17	The City of Lenoir will continue to serve an administrative role in the implementation and enforcement of the County's comprehensive stormwater management program. The stormwater regulations outlined within this program shall apply to Gamewell, Cajah's Mountain, Lenoir, Hudson, Sawmills, and Granite Falls.	Stormwater Management and Drainage Maintenance	Flood	City of Lenoir Planning and Building Inspections Department; administrative staff of Caldwell County; administrative staff of all municipalities within the county	Staff Time	Existing Department Budget and Staff Resources	1-5 years	High	In progress	In progress: No measurable progress due to staffing and funding

Caldwell County Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
18	Caldwell County will consider the development and adoption of a slope control ordinance based on the findings outlined within this plan.	Local Plans and Regulations	Landslide	Caldwell County Planning Department; Caldwell County Board of Commissioners	Local Staff Time	Existing Department Budget and Staff Resources	2-5 years	Low	In progress	
19	To incorporate discussions relating to the provision of electric service during or following natural hazard events, Caldwell County will consider inviting a staff member from each of the electric service providers operating in the county to attend and participate in all Local Emergency Planning Commission (LEPC) meetings.	Emergency Response Improvement	Flood; Dam or Levee Failure; Winter Weather; Thunderstorm; Windstorm	Caldwell County Emergency Management Department; Electric Service Providers	Local Staff Time	Existing Department Budget and Staff Resources	2-5 years	Moderate	In Progress	Utility providers remain involved in LEPC

7.6.1. Town of Cajah's Mountain

Town of Cajah's Mountain Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Maintain a map information service involving the following: Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including provision of information on whether a given property is located within a flood hazard area, Provide information on the flood insurance purchase requirement, Maintain historical and current FIRMs, Advertise once annually in the local newspaper, and Provide information to inquirers about local floodplain management requirements.	Public Information and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department	To be determined	Town of Cajah's Mountain General Fund	1-5 years	High	In Progress	In progress: Caldwell County Online GIS maps include updated flood hazard area overlays and Town staff are available to answer questions and make determinations. Current and previous FIRMs available for review at Town Hall.

Town of Cajah's Mountain Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
2	The Caldwell County Planning and Development Department and the Caldwell County Building Inspections Department will make information regarding hazards and development regulations within floodplains available through the following: Ensuring that the local library maintains information relating to flooding and flood protection, Providing a link on their website to FEMA resources addressing flooding and flood protection, and All participating jurisdictions, if a website is in place, will provide a link on their website to FEMA resources addressing flooding and flood protection, sheltering, evacuation procedures, disaster preparedness, and post-disaster recovery.	Public Information and Awareness	Flood; Winter Weather; Wildfire; Thunderstorms; Lightning; Hail; Dam or Levee Failure; Tornado	Caldwell County Planning and Development Department; Caldwell County Building Inspections Department	To be determined	General Fund	2-5 Years	High	In Progress	In progress: The Town of Cajah's Mountain has utilized its website to publicize FEMA resources for disaster preparedness.
3	Caldwell County and all participating jurisdictions will continue to maintain all property acquired within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. All parties will continue to pro-actively establish open space within the floodplain and floodway as grant funds become available to carry out this initiative.	Local Plans and Regulations	Flood; Dam or Levee Failure; Wildfire	Caldwell County Commissioners	To be determined	General Fund	1-5 years	High	In Progress	In progress: The Town will participate in the county program to establish perpetual open space in Special Flood Hazard Areas as budget allows.
4	The Caldwell County Mitigation Advisory Committee, in conjunction with all municipal jurisdictions participating in the plan update, will work on the five-year implementation of this Hazard Mitigation Plan Update. At the end of the five-year period, the County will again update the plan.	Public Information and Awareness	All Hazards	Caldwell County Emergency Management Department	To be determined	General Fund	1-5 years	High	In Progress	In progress: The Town of Cajah's Mountain has participated in the regionalization of the Caldwell County hazard mitigation plan and is now a participating jurisdiction in the Unifour Regional Hazard Mitigation Plan which has taken the place of the previously planned county-level 5-year plan update.

Town of Cajah's Mountain Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
5	Caldwell County, as well as all participating jurisdictions, will continue to support the North Carolina Office of Dam Safety efforts to monitor and inspect all dams throughout the County, as well as the State of North Carolina. The County relies on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable.	Dam Monitoring and Inspection	Flood; Dam or Levee Failure	Caldwell County Emergency Management Department	To be determined	General Fund	1-5 years	High	In Progress	In progress: The Town will work in conjunction with County Emergency Management staff to remain informed about the safety status of local dams to be able to pass this information along to citizens.
6	Caldwell County Emergency Services will continue to coordinate with the Caldwell County Public Works Department, as well as all participating jurisdictions, regarding the monitoring of water resources statewide. When necessary, the County will institute measures to conserve water resources according to the County's Drought Management Plan.	Emergency Response Improvement	Drought	Caldwell County Water Department	To be determined	General Fund	1-5 years	High	In Progress	In progress: The Town will notify citizens if the County's Drought Management Plan must be implemented through its website, social media, and Town Hall informational sign.
7	Caldwell County will assist all communities within the County, including property owners in unincorporated areas, in applying for FEMA-sponsored mitigation grant assistance for the acquisition and/or elevation of substantially damaged structures following a natural disaster.	Acquisitions and Improvements of Flood-Prone Properties	All Hazards	Caldwell County Emergency Management Department	To be determined	General Fund; possible grant funding	1-5 years	Moderate	In Progress	In progress: Measurable progress is slow due to staff availability and funding.
8	The City of Lenoir will continue to serve an administrative role in the implementation and enforcement of the County's comprehensive stormwater management program. The stormwater regulations outlined within this program shall apply to Gamewell, Cajah's Mountain, Lenoir, Hudson, Sawmills, and Granite Falls.	Stormwater Management and Drainage Maintenance	Flood; Dam or Levee Failure	City of Lenoir Planning Department	To be determined	General Fund	1-5 years	High	In Progress	In progress: The Town contracts with the City of Lenoir on a yearly basis for implementation and enforcement of the Stormwater regulations.

7.6.2. Village of Cedar Rock (WPCOG)

Village of Cedar Rock Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Caldwell County will assist all communities within the County, including property owners in unincorporated areas, in applying for FEMA-sponsored mitigation grant assistance for the acquisition and/or elevation of substantially damaged structures following a natural disaster.	Acquisitions and Improvements of Flood-Prone Properties	Flood	Caldwell County Building Inspections Department	$1,200	Unspecified	5 years	Moderate	Complete	No new development since last plan update.
2	Investigate maintaining a contract with a qualified post-disaster recovery service provider for essential services and equipment including generators and will include documentation required for reimbursement from FEMA/NCEM.	Emergency Response Improvement	All Hazards	Village of Cedar Rock Village Council	Local staff time	Grants and tax-based funding	1-5 years	Moderate	Deferred	Deferred due to contracting with WPCOG for a staff person to manage disaster recovery and response.
3	Monitor water resources and when necessary, institute measures to conserve water through Drought Management Plan.	Sustainability Improvement	Drought	Caldwell County Water Department	$1,500,000	Grants and tax-based funding	1-5 years	High	To be continued	To be continued: Monitoring occurs annually. Lack of need for implementation due to lack of drought conditions.
4	Support the North Carolina Office of Dam Safety; make sure dams are regularly inspected.	Dam Monitoring and Inspection	Flood; Dam or Levee Failure	North Carolina Department of the Environment and Natural Resources (NCDENR), Dam Program	To be determined	Grants and tax-based funding	5 years	High	In Progress	Measurable progress is slow due to staff availability and relevance to the Village. 5% complete.
5	Continue to maintain all property acquired within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to pro-actively establish open space within the floodplain.	Local Plans and Regulations	Flood; Dam or Levee Failure; Wildfire	Caldwell County Planning Department	$250,000+	Grant funds; Lenoir EMS Base Budget	2015	High	Deleted	

Village of Cedar Rock Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	Caldwell County Planning and Building Inspections Departments will make information regarding hazards and development regulations within the floodplain available through the following: library, link on website to FEMA addressing flood protection, disaster preparedness, and post-disaster recovery.	Public Information and Awareness	All Hazards	Caldwell County Building Inspections Department; Village of Cedar Rock	$1,200	General Budget	5 Years	High	To be continued	Village staff work with Caldwell County to ensure information disseminated annually.
7	Maintain a map information service about Flood Insurance Rate Maps (FIRMs), advertise annually in the paper, and provide information to inquirers about local floodplain management requirements.	Public Information and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department	$85,000	Tax-based funding	5 Years	High	Complete	Complete
8	Require flood elevation certificates for development within the Special Flood Hazard Area (SFHA).	Local Plans and Regulations	Flood	Caldwell County Building Inspections Department	$50,000	General budget	5 Years	High	Complete	No new development since last plan update.

7.6.3. Town of Gamewell (WPCOG)

Town of Gamewell Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Caldwell County will assist all communities (Town of Gamewell) within the county, including property owners in unincorporated areas, in applying for FEMA-sponsored mitigation grant assistance for the acquisition	Structural or Infrastructure Project	Flood	Caldwell County Building Inspections Department	Local staff time	Local, state and federal grant sources	5 Years	Moderate	In Progress	In progress: Caldwell County has been and continues to aid when communities (Town of Gamewell) are applying for funding to help

Town of Gamewell Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
	and/or elevation of substantially damaged structures following a natural disaster.									landowners bring at-risk structures into compliance.
2	Maintain a contract with a qualified post-disaster recovery service provider for essential services and equipment including generators and will include documentation required for reimbursement from FEMA/NCEM.	Local Plans and Regulations	All Hazards	Town of Gamewell Town Council; Town of Gamewell Administration	Local staff time	Local, state and federal grant sources	1-5 years	Moderate	In Progress	In progress: Measurable progress is slow due to staff availability and funding.
3	Monitor water resources and when necessary institute measures to conserve water through Drought Management Plan.	Local Plans and Regulations	Drought	Caldwell County Water Department	$1.5 million	Grants and tax-based funding	5 Years	High	Deleted	Deleted. It is not feasible for the Town to institute drought management policies since it does not own or operate a water distribution facility.
4	Support the North Carolina Office of Dam Safety; make sure dams are regularly inspected.	Structural or Infrastructure Project	Flood; Dam or Levee Failure	North Carolina Department of Environment and Natural Resources (NCDENR), Dams Program	Local staff time	Grants and tax-based funding	5 Years	High	In Progress	In progress: Caldwell County has started a registry to track the location and depth of all ponds and dams within the county.
5	Continue to maintain all property acquired within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to pro-actively establish open space within the floodplain.	Natural Systems Protection	Flood; Dam or Levee Failure; Wildfire	Caldwell County Planning Department	$250,000+	Grant funds; Lenoir EMS Base Budget	2015	High	Deleted	Deleted. It is not feasible for the Town to fully accomplish this action.
6	Caldwell County Planning and Building Inspections Departments will make information regarding hazards and development regulations within the floodplain available through the following: library, link on website to FEMA information addressing	Education and Awareness	All Hazards	Caldwell County Building Inspections Department; Town of Gamewell	$1,200	General Budget	Immediate (1-2 years)	High	In Progress	In progress: The Town of Gamewell is working in coordination with Caldwell County to fulfill this action. Measurable progress is slow due to lack of funding and staff availability.

Town of Gamewell Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
	flood protection, disaster preparedness, and post-disaster recovery.									
7	Maintain a map information service about Flood Insurance Rate Maps (FIRMs), advertise annually in the newspaper, and provide information to inquirers about local floodplain management requirements.	Education and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department	$85,000	Tax-based funding	Intermediate	High	Complete	Completed. Maps are kept on file at Town Hall and are also available on the County website.
8	Require flood elevation certificates for development within the Special Flood Hazard Area (SFHA).	Local Plans and Regulations	Flood	Caldwell County Building Inspections Department	$50,000	General Budget	Immediate (1-2 years)	High	In Progress	In progress: This will be a part of the new Flood Damage Prevention Ordinance to be adopted in late 2019 or early 2020.

7.6.4. Town of Granite Falls

Town of Granite Falls Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Establish and maintain Temporary Disaster Debris Staging Area by selecting suitable site and submitting to the North Carolina Department of Environment and Natural Resources (NCDENR) for approval for use during a natural disaster.	Structural or Infrastructure Project	Tornado; Winter Weather; Severe Thunderstorm ; Hurricane and Tropical Storm	Caldwell County Emergency Management Department; Town of Granite Falls Manager	Staff time to be determined	Existing Department Budget and Staff Resources	1-5 Years	Moderate	In Progress	In progress: The Town has not yet utilized the Granite Falls Recreation Center as a Temporary Disaster Debris Staging site and therefore has not asked the Solid Waste Section of NCDEQ to activate the site. Conditional approval granted October 9, 2013 remains in effect.

Town of Granite Falls Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
										This action item is carried forward to the 2019-2024 Plan.
2	Implement educational outreach to citizens on recognizing potential conflicts between trees and overhead power lines, tree trimming techniques to reduce potential for power outages due to downed trees or falling tree limbs, and the benefits of hiring an arborist and safety tips for cleanup after a storm.	Education and Awareness	Tornado; Winter Weather; Severe Thunderstorm; Hurricane and Tropical Storm	Town of Granite Falls Electric Department with assistance from ElectriCities	Staff time	Existing Department Budget, public power agency, and Staff Resources	1-2 years	High	Deferred	Deferred: The Town has recently updated its website. There are currently no specific resources available on the website pertaining to this action item. This mitigation action will be deferred to the 2019-2024 Hazard Mitigation Plan.
3	Evaluate infrastructure upgrades to fresh water intake on Lake Rhodhiss to ensure water supply during severe drought conditions.	Structural or Infrastructure Project	Drought	Town of Granite Falls Water Department	To be determined	General fund, grant funding	3-4 Years	Moderate	In Progress	In progress: Measurable progress is slow due to lack of funding and staff availability. This remains a priority and has been carried forward as an action item for the 2019-2024 Plan.
4	Incorporate hazard mitigation elements into the next update of the Town's Land Use Plan and any small area or corridor plans.	Local Plans and Regulations	All Hazards	Town of Granite Falls Planning Department	Staff time, consultant fees to be determined	General fund, grant funding	1-2 years	Moderate	In Progress	In progress: The Town is planning to update to the Land Use Plan in the next 1-2 years. The Town has had preliminary discussions with the Western Piedmont Council of Governments regarding their assistance with the update.
5	Caldwell County and all participating jurisdictions will continue to maintain all property acquired within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. All parties will continue to pro-actively establish open space within the floodplain and floodway as grant funds	Local Plans and Regulations; Natural Systems Protection	Flood; Dam or Levee Failure; Wildfire	Town of Granite Falls Town Council	Local staff time	Grants and tax-based funding	1-5 Years	High	To be continued	To be continued: The Town remains committed to maintaining any property that is acquired within a Special Flood Hazard Area as open space in perpetuity.

Town of Granite Falls Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
	become available to carry out this initiative.									
6	Caldwell County, as well as all participating jurisdictions, will continue to support the North Carolina Office of Dam Safety's efforts to monitor and inspect all dams throughout the county, as well as the State of North Carolina. The County relies on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable.	Structural or Infrastructure Project	Flood; Dam or Levee Failure	Caldwell County Emergency Management Department; Town of Granite Falls Town Council	To be determined		1-5 Years	High	Deferred	Deferred: This mitigation action is carried forward to the 2019-2024 Hazard Mitigation Plan.
7	Caldwell County Emergency Management will continue to coordinate with the County Public Works Department, as well as all participating jurisdictions, regarding the monitoring of water resources statewide. When necessary, the County will institute measures to conserve water resources according to the County's Drought Management Plan.	Natural Systems Protection	Drought	Caldwell County Water Department; Town of Granite Falls Town Council	To be determined	Existing Department Budget and Staff Resources	1-5 Years	High	To be continued	To be continued: The Town has policies in place for implementation should the need arise. The Town continues to maintain participation with the Drought Management Advisory Group and cooperation with Caldwell County Emergency Management. This action is carried forward as an action item for the 2019-2024 Plan.
8	Caldwell County will assist all communities within the county, including property owners in unincorporated areas, in applying for FEMA-sponsored mitigation grant assistance for the acquisition and/or elevation of substantially damaged structures following a natural disaster.	Structural or Infrastructure Project	Flood	Caldwell County Emergency Management	Staff time to be determined	Existing Department Budget and Staff Resources/ Grants	1-5 Years	Moderate	In Progress	In progress: This remains a priority and has been carried forward as an action item for the 2019-2024 Plan.
9	Caldwell County Emergency Services will continue to work on the establishment of a comprehensive	Local Plans and Regulations	All Hazards	Caldwell County Emergency	Staff time to be	Existing Department Budget and	1-5 Years	Moderate	In Progress	In progress: The Town would be able to work with Caldwell County Emergency Management to

Town of Granite Falls Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
	special needs registry. This effort will involve the cooperation of all participating jurisdictions.			Management Department; Granite Falls		Staff Resources				develop a comprehensive special needs registry. This remains a priority and is hereby carried forward as a 2019-2024 Action Item.
10	The City of Lenoir will continue to serve an administrative role in the implementation and enforcement of the County's comprehensive stormwater management program. The stormwater regulations outlined within this program shall apply to Granite Falls, Gamewell, Cajah's Mountain, Lenoir, Hudson, and Sawmills.	Local Plans and Regulations	Flood; Dam or Levee Failure	City of Lenoir Planning Department	Staff time to be determined	Existing Department Budget and Staff Resources	1-5 Years	High	In Progress	In progress: Following an audit of the local Stormwater program in late 2018, the NCDEQ is requiring each municipality to develop its own Stormwater Management Plan and maintain its own Stormwater MS4 Permit. The Town is currently working with NCDEQ and the City of Lenoir to develop a strategy going forward. This action item is carried forward to the 2019-2024 Plan.
11	Caldwell County, as well as all participating jurisdictions, will maintain a contract with a qualified post-disaster recovery service provider. This contract will include the provision of essential services and equipment, including generators, and will include documentation required for reimbursement from FEMA/NCEM.	Structural or Infrastructure Project	All Hazards	Caldwell County Emergency Management Department; Granite Falls	Local staff time	Grants and tax-based funding	1-5 Years	Moderate	In Progress	In progress: This remains a priority and has been carried forward as an action item for the 2019-2024 Plan.
12	The Town of Granite Falls will aim to draft a comprehensive Parks and Recreation Plan over the next five years. This plan will incorporate recommendations regarding the purchase and development of flood-prone land for recreational purposes.	Local Plans and Regulations	Flood; Dam or Levee Failure; Wildfire	Town of Granite Falls Town Council	Staff time and consultant fees to be determined	Existing Department Budget and Staff Resources; grant funding	2-5 years	Moderate	In Progress	In progress: The Town developed a Parks & Recreation Master Plan in 2016; however, it does not include a specific recommendation regarding the acquisition of flood-prone properties. The Parks & Recreation Master Plan will be updated in the future; therefore,

Town of Granite Falls Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
										this action item is carried forward to the 2019-2024 Plan.
13	Maintain a map information service involving the following: Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including provision of information on whether a given property is located within a flood hazard area, Provide information regarding the flood insurance purchase requirement, Maintain historical and current FIRMs, Advertise once annually in the local newspaper, and Provide information to inquirers about local floodplain management requirements.	Natural Systems Protection, Education & Outreach	Flood; Dam or Levee Failure	Caldwell County Planning Department	Staff time to be determined	Existing Department Budget and Staff Resources	1-5 years	High	In Progress	In progress: The Town continues to make all the relevant information available and to provide information to those who inquire about floodplain management requirements. The Town can continue to find more effective ways to get floodplain information to the general public, particularly those whose property lies in Special Flood Hazard Areas. The Town will evaluate the effectiveness of a direct mailing to affected property owners in order to advise regarding the limitations that may exist on their property.
14	Install backup generator or transfer switch (to facilitate safe connection of portable generator) when any new Town facilities are constructed or existing buildings are substantially renovated.	Structural or Infrastructure Project	Tornado; Winter Weather; Severe Thunderstorm ; Hurricane and Tropical Storm	Town of Granite Falls Electric Department with assistance from ElectriCities	Variable (grants and local staff time)	Existing department, public power agency, and grant funding	1-5 years	Moderate	New Action	New Action
15	Amend Zoning Ordinance to require that any new manufactured home parks must include a buffer (vegetative, masonry, berm, etc.) that can serve as a wind break.	Local Plans and Regulations	Tornado; Severe Thunderstorm; Hurricane and Tropical Storm	Town of Granite Falls Planning Department	Staff Time – Legally Required	Existing Department Budget	2-5 years	Moderate	New Action	New Action
16	Develop a map of all stormwater outfalls within the Town's jurisdiction. Comprehensive map can serve as a tool for maintaining and periodically inspecting for any blockages or damage,	Structural or Infrastructure Project	Tornado; Winter Weather; Severe Thunderstorm;	Town of Granite Falls	To be Determined	General Fund, Grant Funding	2-5 years	Moderate	New Action	New Action

Town of Granite Falls Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
	particularly in advance of a heavy rain event.		Hurricane and Tropical Storm							
17	Develop an informational brochure that explains the importance of keeping storm drains and catch basins clear of debris and encourages residents to be proactive about keeping them clean and reporting issues. This information could be disseminated through the Town's website, social media and newsletter.	Education and Awareness	Flood; Severe Thunderstorm ; Hurricane and Tropical Storm	Town of Granite Falls	Staff Time – Printing Costs	General Fund, Grant Funding	1-2 years	Moderate	New Action	New Action
18	Establish a new electric sub-station that would provide a secondary feed for the Town's electric distribution system.	Structural or Infrastructure Project	Tornado; Severe Thunderstorm; Winter Weather; Hurricane and Tropical Storm	Town of Granite Falls Electric Department	$2 million+	Grant Funding	5-10 Years	Moderate	New Action	New Action
19	Maintain a map information service involving the following: Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including provision of information on whether a given property is located within a flood hazard area, Provide information regarding the flood insurance purchase requirement, Maintain historical and current FIRMs, Advertise once annually in the local newspaper, and Provide information to inquirers about local floodplain management requirements.	Natural Systems Protection	Flood; Dam or Levee Failure	Caldwell County Planning Department	Staff time to be determined	Existing Department Budget and Staff Resources	1-5 years	High	In Progress	In progress: Caldwell County Online GIS maps include updated flood hazard area overlays and Town staff are available to answer questions and make determinations. Current and previous FIRMs are available for review at Town offices. The Town of Granite Falls Flood Damage Prevention Ordinance is available on the Town website.

Town of Granite Falls Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
20	The Caldwell County Mitigation Advisory Committee (MAC), in conjunction with all municipal jurisdictions participating in this plan update, will work on the five-year implementation of this Hazard Mitigation Plan Update. At the end of the five-year period, the County will again update the plan.	Local Plans and Regulations	All Hazards	Caldwell County Emergency Management Department	To be determined	General Fund	1-5 years	High	To be continued	To be continued: The Town of Granite Falls has participated in the regionalization of the Caldwell County hazard mitigation plan and is now a participating jurisdiction in the Unifour Regional Hazard Mitigation Plan which has taken the place of the previously planned county-level 5-year plan update.
21	Caldwell County Emergency Services will continue to work on the establishment of a comprehensive special needs registry. This effort will involve the cooperation of all participating jurisdictions.	Local Plans and Regulations	All Hazards	Caldwell County Emergency Services	Staff time to be determined	Existing Department Budget and Staff Resources	1-5 years	Moderate	In Progress	In progress: Measurable progress is slow due to staff availability and funding.

7.6.5. Town of Hudson (WPCOG)

Town of Hudson Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	City of Lenoir to administer stormwater regulations.	Local Plans and Regulations	Flood; Sinkhole; Erosion; Landslide	City of Lenoir Planning and Building Inspections Department; Caldwell County; all participating jurisdictions in Caldwell County	$50,000	Existing Department Budget and Staff Resources	Immediate	High	Complete	Completed. The City of Lenoir continues to administer stormwater regulations for the Town of Hudson. Prepare for new audits from NCDEQ and EPA. Implement new stormwater illicit discharge identification methods.

Town of Hudson Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
2	Caldwell County will assist all communities within the county, including property owners in unincorporated areas, in applying for FEMA-sponsored mitigation grant assistance for the acquisition and/or elevation of substantially damaged structures following a natural disaster.	Structural or Infrastructure Project	Flood	Caldwell County Building Inspections Department	Local staff time	Grants and tax-based funding	1-5 years	Moderate	In Progress	In progress: Caldwell County has been and continues to help when communities are applying for funding to help landowners bring at-risk structures into compliance.
3	Investigate maintaining a contract with a qualified post-disaster recovery service provider for essential services and equipment including generators and will include documentation required for reimbursement from FEMA/NCEM.	Local Plans and Regulations	All Hazards	Town of Hudson Administration Department; Town of Hudson Police Department	Local staff time	Grants and tax-based funding	1-5 years	Moderate	Deferred	Deferred to the next plan update: Measurable progress is slow due to staff availability and funding.
4	Monitor water resources and when necessary, institute measures to conserve water through Drought Management Plan.	Local Plans and Regulations	Drought	Caldwell County Water Department; Hudson	$1.5 million	Grants and tax-based funding	1-5 years	High	In Progress	In progress: Measurable progress is slow due to staff availability and funding.
5	Support the North Carolina Office of Dam Safety; make sure dams are regularly inspected.	Structural or Infrastructure Project	Flood; Dam or Levee Failure	North Carolina Department of Environment and Natural Resources (NCDENR) Dams Program; Hudson	Local staff time	Grants and tax-based funding	5 Years	High	In Progress	In progress: Caldwell County has started a registry to track the location and depth of all ponds and dams within the county.
6	Continue to maintain all property acquired with the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Continue to pro-actively establish open space within the floodplain.	Natural Systems Protection	Flood; Dam or Levee Failure; Wildfire	Caldwell County Planning Department; Hudson	$250,000+	Grant funds; Lenoir EMS Base Budget	2021	High	In Progress	In progress: Action continues. Flood Damage Prevention Ordinance was adopted in 2015.

Town of Hudson Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
7	Caldwell County Planning and Building Inspections Departments will make information regarding hazards and development regulations within the floodplain available through the following: library, link on website to FEMA information addressing flood protection, disaster preparedness, and post-disaster recovery.	Education and Awareness	All Hazards	Planning Dept. Caldwell County Building Inspections Department; Hudson	$1,200; local staff time	General Budget	Immediate (1-2 years)	High	In Progress	In progress: The Town of Hudson is working in coordination with the Caldwell County Town Planner to fulfill this action
8	Maintain a map information service about Flood Insurance Rate Maps (FIRMs), advertise annually in the newspaper, and provide information to inquirers about local floodplain management requirements.	Education and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department	$85,000	Tax-based funding	2021	Low	Complete	Completed. Maps are kept on file at Hudson Town Hall and are available on the Caldwell County Tax Mapping website.
9	Require flood elevation certificates for development within the Special Flood Hazard Area (SFHA).	Local Plans and Regulations	Flood	Planning Dept/Caldwell County Building Inspections Department	$50,000	General Budget	Immediate (1-	High	Complete	Flood Damage Prevention Ordinance adopted in 2022

7.6.6. City of Lenoir

City of Lenoir Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
1	Continue enforcement of Lenoir's Flood Damage Prevention Ordinance. This ordinance regulates construction and development activities within Special Flood Hazard Areas (SFHAs).	Local Plans and Regulations	Flood	City of Lenoir Planning Department	Existing Staff Resources	General Fund; User Fees for Floodplain Development Permits	5 years	High	To be continued	All floodplain development is required to obtain floodplain development permits from the Lenoir Planning Department.
2	The City of Lenoir will maintain compliance with all of the Minimum Measures outlined in the City's Stormwater Management Plan, consistent with the requirements of the NC DEQ and the US EPA. These minimum measures include public input, public outreach and education, post construction stormwater controls, illicit discharge monitoring and enforcement, construction site run-off controls, and good housekeeping at City facilities.	Local Plans and Regulations; Education and Awareness Programs	Flood; Severe Storms	Western Piedmont Council of Governments	$51,000/year	General Fund; exploring a Stormwater Utility Fee	5 years	High	Deleted	No change since 2019, WPCOG manages the stormwater program
3	Remove obstructions from public drainage ways or where threats to public infrastructure have been identified. The removal of obstructions will lessen the risk of flooding and damage to roadways and bridges.	Structural or Infrastructure Project	Flood; Severe Storm; Wind	City of Lenoir Public Works Department	Existing staff resources	General Fund, exploring the adoption of a Stormwater Utility Fee	5 years	High	To be continued	Visual inspection by Streets staff before, during and after storm events as well as reports from the public. Staff have identified "problem areas" which are inspected at a higher frequency.
4	Continue to provide educational outreach to civic groups, neighborhood groups, school children, and similar persons as to the importance of fire safety and prevention.	Education and Awareness	Fire	City of Lenoir Fire Department	Existing staff resources	General Fund	5 years	Moderate	In Progress	In progress: Measurable progress is slow due to staff availability and funding.

City of Lenoir Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
5	Explore options for pruning trees, clearing tree limbs hanging over rights of way, and removal of dead trees on public and private property to enhance safety and improve function during an emergency. In addition, develop an informational handout with resources to encourage the private clearing of unhealthy or dead trees/limbs on private property.	Natural Systems Protection; Education and Awareness Programs	Severe Storm; Wind; Fire	City of Lenoir Public Works Department; Nuisance Abatement (Police and Planning Departments)	$15,000	Existing Staff Resources; General Fund; grants (City pruning currently unfunded)	5 years	Moderate	To be continued	Public Works prunes limbs on trees that hang over rights of way as needed, and is quick to remove fallen trees over roadways. An informational handout has not been created but can be prioritized by staff.
6	Identify and map the location of piped/underground streams throughout the City, and monitor these locations for signs of structural failure. Make property owners aware of piped streams on their properties.	Local Plans and Regulations; Education and Awareness Programs	Severe Storm; Flood; Sinkhole	City of Lenoir Planning and Public Works Department	Existing staff resources	General Fund, stormwater utility fund, grants	FY18-19; FY19-20	High	To be continued	In 2023, the City hired the WPCOG to map the entirety of the City's stormwater system. Over half of the system has been mapped as of June 2024. No progress has been made regarding making property owners aware of piped streams on their property.
7	Explore the feasibility of establishing a Stormwater Utility Fee as a dedicated funding source for stormwater infrastructure projects to replace aging infrastructure, address erosion, and mitigate flood-prone areas.	Local Plans and Regulations	Severe Storm; Flood; Sinkhole	City of Lenoir Planning Department; City of Lenoir Finance Department; City of Lenoir Public Works Department	General Fund	Existing Staff Resources	1-2 Years	High	To be continued	Freese and Nichols Inc has been contracted by the city to create a stormwater infrastructure criticality assessment tool. Along with the mapped stormwater system, this will help the City create a stormwater CIP.
8	Continue to enforce the City's Minimum Housing Ordinance to rehabilitate or remove unsafe structures. In addition, create a database of abandoned and at-risk structures in the city to aide enforcement.	Local Plans and Regulations	Severe Storm; Wind; Fire	City of Lenoir Planning Department	Existing staff resources	General Fund	5 Years	High	To be continued	The City continues to identify houses for abatement and/or foreclosure every year.

City of Lenoir Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
9	Continue to explore the feasibility of erecting a back-up power generator to serve City Hall in the event of power failure. This ensures communication lines remain open during natural and manmade disasters that result in power failure, as all City communications are routed through City Hall.	Structural or Infrastructure Project	All Hazards	City of Lenoir Public Works Department; City of Lenoir Finance Department; City of Lenoir IT Department	$40,000	General Fund; grants	1-2 Years	High	Complete	City Hall's back up generator was installed in 2019
10	Conduct outreach to educate the public on pre-disaster preparation targeting schools, churches, civic groups, etc.	Education and Awareness	All Hazards	City of Lenoir Fire Department	To be determined	Hazard Mitigation Assistance (HMA) grants; Homeland Security grants; emergency management grants; local funding	1-3 years	High	New action	

7.6.7. Town of Rhodhiss (WPCOG)

Town of Rhodhiss Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	Require a finished floor elevation certificate for all development within the Special Flood Hazard Area (SFHA) within both incorporated and unincorporated portions of the County. All elevation certificates should be submitted on an official FEMA elevation certificate. No certificate of occupancy shall be issued for any development within a defined SFHA without the submittal of the required elevation certificate.	Local Plans and Regulations	Flood; Dam or Levee Failure	Burke County Building Inspections Department; Caldwell County Building Inspections Department	Minimal (staff time only)	Existing staff and administrative resources	5 Years	High	Deferred	Deferred: Measurable progress is slow due to staff availability and funding.
2	Maintain a map information service involving the following: Provide information relating to Flood Insurance Rate Maps (FIRMs) to all inquirers, including provision of information on whether a given property is located within a flood hazard area, Provide information regarding the flood insurance purchase requirement, Maintain historical and current FIRMs, Advertise once annually in the local newspaper, and Provide information to inquirers about local floodplain management requirements.	Public Information and Awareness	Flood; Dam or Levee Failure	Burke County; Caldwell County; Town of Rhodhiss	Minimal (staff time only)	Existing Department Budget and Staff Resources	5 Years	High	Deferred	Deferred: Measurable progress is slow due to staff availability and funding. The Town is actively involved in assisting the North Carolina Floodplain Mapping Program in achieving their goals.
3	Caldwell County and its municipal jurisdictions will continue to maintain all property acquired within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. All parties will continue to pro-actively establish open space within the floodplain and floodway	Local Plans and Regulations	Flood; Dam or Levee Failure; Wildfire	Surrounding counties; Town of Rhodhiss	To be determined on a case-by-case basis	State and federal grant resources	5 Years	High	In Progress	In progress: Continuing discussions with a property owner to create a greenway along the Catawba River. The Town has purchased property on the Burke County side of Town to develop a park on the Catawba River. The Town

Town of Rhodhiss Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
	as grant funds become available to carry out this initiative.									received a PARTF grant which will help in making this happen.
4	The Caldwell County Building Inspections Department will provide comprehensive services regarding planning and development activities within the defined Special Flood Hazard Area (SFHA) and issues relating to the construction of disaster resistant structures. These services will include: Providing site-specific flood and flood-related information on an as-needed basis, Maintaining a list of contractors with experience in floodproofing and retrofit techniques, Providing information on wind proofing construction methods for new and renovated structures, Maintaining materials providing an overview of how to select a qualified contractors, Making site visits upon request to review occurrences of flooding, drainage problems, and sewer problems. If applicable, the inspector should provide one-on-one advice to the property owner, Providing advice and assistance regarding CRS activity 530, Advertising the availability of this service once annually within the local newspaper, and Maintaining a log of all individuals assisted through this County service including all site visits.	Public Information and Awareness	Flood; Winter Weather; Wildfire; Thunderstorms; Lightning; Hail; Dam or Levee Failure; Tornado	Primary Responsible Party: Caldwell County Building Inspections Department. Secondary Responsible Party: Caldwell County Planning and Development Department	Minimal (staff time only)	Existing Department Budget and Staff Resources	5 Years	High	Deleted	Deleted: The Town of Rhodhiss relies on Caldwell County to implement the actions described above. Therefore, this action is not reflected in the Town's 2019 Mitigation Actions above.

Town of Rhodhiss Mitigation Actions										
Mitigation Action #	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
5	The Caldwell County Mitigation Advisory Committee (MAC), in conjunction with all municipal jurisdictions participating in the plan update, will work on the five-year implementation of this Hazard Mitigation Plan Update. At the end of the five-year period, the County will again update the plan.	Public Information and Awareness	All Hazards	Primary Responsible Party: Caldwell County Emergency Services. Secondary Responsible Party: Caldwell County Mitigation Advisory Committee and Town of Rhodhiss	To be determined based on future scope of work for 5-year plan update	Funding for annual maintenance and implementation of the hazard mitigation plan will be provided through the Caldwell County annual budget ordinance.	5 year interval	High	To be continued	To be continued: The Town of Rhodhiss has participated in the regionalization of the Caldwell County hazard mitigation plan and is now a participating jurisdiction in the Unifour Regional Hazard Mitigation Plan, which has taken the place of the previously planned county-level 5-year plan update.
6	Caldwell County, as well as all participating jurisdictions, including Duke Energy, will continue to support the North Carolina Office of Dam Safety efforts to monitor and inspect all dams throughout the County, as well as the State of North Carolina. The County relies on this agency to ensure that all dam facilities, both public and private, are properly maintained and stable.	Dam Monitoring and Inspection	Flood; Dam or Levee Failure	Primary Responsible Party: Caldwell County Emergency Services. Secondary Responsible Party: Town of Rhodhiss.	Minimal (staff time only)	Existing Department Budget and Staff Resources	5 Years	High	In Progress	In progress: Measurable progress is slow due to staff availability and funding.
7	In order to provide comprehensive and effective emergency response services to all Town residents, the Town of Rhodhiss will take steps to update and/or acquire the following equipment over the course of the next five years: One new fire truck, emergency communication equipment, rescue tools (per the recommendation of Caldwell County Emergency Services), one set of jaws of life (Hurst Tools), and it should be noted that the Town of Rhodhiss needs to rehabilitate the Town's existing fire department or build a new	Emergency Response Improvement	All Hazards	Primary Responsible Party: Town of Rhodhiss Town Council. Secondary Responsible Party: Caldwell County Emergency Services.	$1,000,000 +	State and Federal Grants	5 Years	High	Deferred	Deferred: The Town of Rhodhiss fire department has acquired the emergency communication equipment (hand-held radios). The fire department cannot perform rescues because of a lack of availability of funding to purchase needed equipment and certification in rescue would be needed. We have made some improvements in the fire department such as: partial wiring of the upstairs and main

Town of Rhodhiss Mitigation Actions										
Mitigation Action #	**Description**	**Type of Mitigation Action**	**Hazards Addressed**	**Lead Agency & Department Responsible**	**Estimated Cost**	**Possible Funding**	**Implementation Schedule**	**Priority**	**2024 Status**	**2024 Status Description**
	facility. This effort will involve replacement of all equipment.									breaker box; re-flooring the downstairs area and painting it; dividing the upstairs areas into individual rooms/wiring what can be done at present. We continue to apply for federal grants to help with the purchase of a new fire truck and the state grants have helped with purchasing turn-out gear. We are replacing turn-out gear as we can afford to do so. The following will be done as monies may be acquired: a sprinkler system, insulation, finish wiring, and a phone or alarm for rescue assistance at fire department (push button alarm). The Town of Rhodhiss requires additional grant management assistance to fully complete this Mitigation Action.
8	Involve emergency preparedness staff in the development of all planning activities with hazard mitigation impacts.	Local Plans and Regulations	All Hazards	Caldwell County Emergency Services Department; Planning Department; Economic Development	Minimal (Staff Time only)	Caldwell County General Fund	5 Years	High	To be continued	To be continued: The Town of Rhodhiss will continue to involve all staff in all planning activities in the community

7.6.8. Town of Sawmills (WPCOG)

Town of Sawmills Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
1	WPCOG to administer stormwater regulations. Action apply for individual new NPDES permit , new ordinance adoption.	Local Plans and Regulations	Flood; Sinkhole; Erosion; Landslide; Stormwater	WPCOG	$50,000	Existing Department Budget and Staff Resources	Immediate (1-2 years)	High	In Progress	In progress: Will be amending in 2019 due to EPA/DEQ audit of City of Lenoir adoption of new ordinance, resolutions permit requirements, public outreach requirements.
2	Caldwell County will assist all communities within the county, including property owners in unincorporated areas, in applying for FEMA-sponsored mitigation grant assistance for the acquisition and/or elevation of substantially damaged structures following a natural disaster.	Structural or Infrastructure Project	Flood	Caldwell County Building Inspections Department	Local staff time	State and Federal Grant programs	2025	Moderate	Deferred	Deferred: Measurable progress is slow due to staff availability and funding.
3	Maintain a contract with a qualified post-disaster recovery service provider for essential services and equipment including generators and will include documentation required for reimbursement from FEMA/NCEM.	Local Plans and Regulations	All Hazards	Town of Sawmills Public Works and Sanitation Department	Local staff time	General Fund	1-5 Years	Moderate	To be continued	To be continued: Measurable progress is slow due to staff availability and funding.
4	Monitor water resources and when necessary institute measures to conserve water through Drought Management Plan.	Local Plans and Regulations	Drought	Caldwell County Water Department	$1,500,000	Grants and tax-based funding	1-5 years	High	In Progress	In progress: Measurable progress is slow due to staff availability and funding.
5	Support the North Carolina Office of Dam Safety; make sure dams are regularly inspected.	Structural or Infrastructure Project	Flood; Dam or Levee Failure	North Carolina Department of Environment and Natural Resources (NCDENR) Dams Program	Local staff time	Grants and tax-based funding	5 years	High	In Progress	In progress. Measurable progress is slow due to staff availability and funding.

Town of Sawmills Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
6	Continue to maintain all property acquired within the Special Flood Hazard Area (SFHA) as undisturbed open space in perpetuity. Pro-actively establish open space within the floodplain.	Natural Systems Protection	Flood; Dam or Levee Failure; Wildfire	Caldwell County Planning Department	$250,000+	Grant funds; Lenoir EMS Base Budget	2020	High	Deleted	Deleted: The Town of Sawmills is no longer willing to buy property in the floodplain because of costs.
7	Caldwell County Planning and Building Inspections Departments will make information regarding hazards and development regulations within floodplain available through the following: library, link on website to FEMA addressing flood protection, disaster preparedness, and post-disaster recovery.	Education and Awareness	Flood	Caldwell County Building Inspections Department	$1,200	General Budget	Immediate (1-2 years)	High	Complete	Completed
8	Maintain a map information service about Flood Insurance Rate Maps (FIRMs), advertise in the paper, and provide information to inquirers about local floodplain management requirements.	Education and Awareness	Flood; Dam or Levee Failure	Caldwell County Planning Department	$85,000	Tax-based funding	Immediate (1-2 years)	High	Deferred	Deferred: Measurable progress is slow due to staff availability and funding.
9	Require flood elevation certificates for development within the Special Flood Hazard Area (SFHA).	Local Plans and Regulations	Flood	Town of Sawmills Planning Department	$50,000	General Budget	1-5 years	High	In Progress	In progress for development. Measurable progress is slow due to staff availability and funding.
10	Maintain portable backup generator for emergency power needs.	Structural or Infrastructure Project	All Hazards	Town of Sawmills Town Council	<$3,000	Caldwell County Emergency Management; State and Federal grants)	5 years	High	Deferred	Deferred: Measurable progress is slow due to staff availability and funding.

Town of Sawmills Mitigation Actions										
Mitigation Action	Description	Type of Mitigation Action	Hazards Addressed	Lead Agency & Department Responsible	Estimated Cost	Possible Funding	Implementation Schedule	Priority	2024 Status	2024 Status Description
11	Caldwell County Planning and Building Inspections Departments will make information regarding all hazards and regulations within floodplain available through the following: library, link on website to FEMA addressing flood protection, disaster preparedness, and post-disaster recovery.	Education and Awareness	All Hazards	Caldwell County Building Inspections Department	$1,200	General Budget	Immediate (1-2 years)	High	Deferred	

Section 8: Plan Maintenance Procedures

The *Plan Maintenance Procedures* section discusses how the *Mitigation Strategy* and *Mitigation Action Plans* will be implemented by participating jurisdictions and how the overall Regional Hazard Mitigation Plan will be evaluated and enhanced over time. This section also discusses how the public will continue to be involved in the hazard mitigation planning process. It consists of the following three subsections:

8.1 Implementation
8.2 Monitoring, Evaluation, and Enhancement
8.3 Continued Public Involvement

Plan Maintenance Step	When	How	Who
Monitoring	Twice per year.	Get status updates on mitigation actions, compile progress reports and identify mid-course corrections.	Emergency Management Director
Evaluating	Once a year or after a disaster event.	Use a standard form to review how the plan has been carried out so far and record lessons learned.	Emergency Management Director, Lead Jurisdiction Planning Department Manager
Updating	Every 5 years, or after a disaster event.	Review the plan and update it as necessary. This may mean hiring a contractor to perform a more in-depth update process.	Emergency Management Director, Lead Jurisdiction Planning Department Manager

Figure 8- 1: Plan maintenance procedures recommended by the FEMA local mitigation handbook 1

8.1. Implementation

Each jurisdiction participating in this Plan is responsible for implementing specific mitigation actions as prescribed in their locally adopted *Mitigation Action Plan* (Section 7). In each Mitigation Action Plan, every proposed action is assigned to a specific local department or agency to assign responsibility and accountability and increase the likelihood of subsequent implementation. This approach enables individual jurisdictions to update their own unique mitigation action list as needed without altering the broader focus of the regional Plan. The separate adoption of locally specific actions also ensures that each jurisdiction is not held responsible for the monitoring and implementation of actions belonging to other jurisdictions involved in the planning process.

In addition to the assignment of a local lead department or agency, an implementation period or a specific implementation date or window has been assigned to each mitigation action to help assess whether actions are being implemented in a timely fashion. The jurisdictions present

within the Plan Area 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.*

It will be the responsibility of each participating jurisdiction to determine additional implementation procedures beyond those listed within their *Mitigation Action Plan* This includes integrating the requirements of the Regional Hazard Mitigation Plan into other local planning documents, processes, or mechanisms such as comprehensive or capital improvement plans, when appropriate. The members of the Hazard Mitigation Planning Committee (HMPC) will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the Regional Hazard Mitigation Plan and will not contribute to increased hazard vulnerability in the Plan Area. Opportunities to integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the HMPC and through the five-year 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 HMPC to be the most effective and appropriate method to implement local hazard mitigation actions currently.

The Plan Area Hazard Mitigation Plan will be highlighted whenever possible in Annual Reports prepared by each county and included in departmental, or agency reports as deemed appropriate. In addition, each municipal jurisdiction will seek to implement this plan's goals and strategies by incorporating the recommendations into annual action plans adopted by their respective City or Town Councils. This plan will be incorporated by reference into other planning mechanisms whenever appropriate.

8.2. Monitoring, Evaluation, and Enhancement

The agencies responsible for monitoring this Plan are the Alexander, Burke, Caldwell and Catawba County Emergency Management Departments. Priorities have not changed since the plan was previously approved. Periodic revisions and updates of the Unifour Regional Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, considering 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 each jurisdiction’s individual Mitigation Action Plan.

The HMPC will continue to meet regularly, as determined by the Alexander, Burke, Caldwell and Catawba County Emergency Management Departments. These regular meetings will take place in the fall of each year so that sufficient time is available to prepare public outreach messages and assess the status of any mitigation actions relevant to the upcoming severe seasonal spring weather and the start of hurricane season. Meetings will also be convened as necessary following any disaster events warranting a reexamination of the mitigation actions being implemented or proposed by the participating jurisdictions.

County and local staff of each participating jurisdiction will also continue to attend training workshops sponsored by the North Carolina Division of Emergency Management or others as appropriate to keep up to date with any changing guidance or planning requirements and to communicate that information to other representatives of participating jurisdictions.

As part of this monitoring, evaluation, and enhancement process, each participating jurisdiction will be expected to provide an annual status update to Caldwell County for their respective Mitigation Action Plans to evaluate the Plan's implementation effectiveness. This will ensure that the Plan is continuously maintained and updated to reflect changing conditions and needs within the Region. If determined appropriate or as requested, an annual report on the Plan will be developed and presented to local governing bodies of participating jurisdictions to report progress on the actions identified in the Plan and to provide information on the latest legislative requirements and/or changes to those requirements.

Five (5) Year Plan Review

The Plan will be reviewed by the HMPC every five years to determine whether there have been any significant changes in the Plan Area that may, in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, the 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 will be reviewed by the HMPC every five years to determine whether there have been any significant changes in the Plan Area that may, in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, the 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 community officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. The lead agency will be responsible for reconvening the HMPC and conducting the five-year review.

During the five-year plan review process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Has the nature or magnitude of risks changed?
- Are the current resources appropriate for implementing the Plan?
- Are there implementation problems, such as technical, political, legal, or coordination issues with other agencies?

- Have the outcomes occurred as expected?
- Did the jurisdictions, agencies, and other partners participate in the plan implementation process as proposed?

Following the five-year review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures outlined herein. Upon completion of the review and update/amendment process, the Plan Area Hazard Mitigation Plan will be submitted to the State Hazard Mitigation Officer at the North Carolina Division of Emergency Management for final review and approval in coordination with the Federal Emergency Management Agency.

Disaster Declaration

Following a disaster declaration, the Plan will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. The Lead Agencies will be responsible for reconvening the HMPC and ensuring appropriate stakeholders are invited to participate in the plan revision and update process after declared disaster events.

Reporting Procedures

The results of the five-year review will be summarized by the HMPC in the relevant sections of the updated plan. This includes: a comprehensive description of the plan update process including an evaluation of planning process (Section 2); any updates to the planning area profile (Section 3); any notable revisions or updates to the risk assessment (Section 4) or capability assessment (Section 5); updated mitigation goals and consideration of mitigation action alternatives where necessary (Section 6); status updates on previously adopted mitigation action plans, including the identification of reasons for delays or obstacles to their implementation, as well as the identification of newly proposed mitigation actions (Section 7); and revisions or updates to plan maintenance procedures (Section 8).

Any necessary revisions or changes to the countywide Plan elements must follow the monitoring, evaluation, and enhancement procedures outlined herein. For changes and updates to the individual *Mitigation Action Plan* appropriate local designees will assign responsibility for the completion of the task.

To assist with the continued engagement of the jurisdiction with HMP implementation and mitigation action progress, the Plan Incorporation Worksheet provides an incorporation and monitoring tool to keep track of plan progress, implementation, review periods, progress updates, and public review periods to document changes to the capabilities of each jurisdiction in regards to planning. This Plan Incorporation and Monitoring Tool is located in Appendix E.

8.3 Continued Public Involvement

Public participation is an integral component of the mitigation planning process and will continue to be essential as this Plan evolves and is updated over time.

The most appropriate and meaningful opportunities for the public to be involved in the maintenance and implementation of the Unifour Regional Hazard Mitigation Plan is during the five-year plan review process as described earlier in this section. As demonstrated in Section 2: *Planning Process,* the Unifour Region and its participating jurisdictions have been extremely ambitious in gaining widespread public involvement during the five-year plan review process through multiple methods. While the five-year plan review process represents the greatest opportunity for such involvement, other efforts to involve the public in the maintenance, evaluation, and revision process will continue to be made as necessary. These efforts may include:

- Advertising meetings of the Hazard Mitigation Planning Committee in the local newspaper, public bulletin boards and/or City and County office buildings;
- Designating willing citizens and private sector representatives as official members of the Hazard Mitigation Planning Committee;
- Utilizing local media to update the public of any maintenance and/or periodic review activities taking place;
- Utilizing City and County Web sites to advertise any maintenance and/or periodic review activities taking place; and
- Maintaining copies of the Plan in public libraries or other appropriate venues;
- Posting the Annual Progress Reports on the Plan to City, County and Town Web sites;
- Heavy publicity of the plan and potential ways for the public to be involved after each major event, tailored to the event that has just happened;
- Planned activities during Severe Weather Preparedness Week (or similar events), such as sending brief press releases that tie recent hazard occurrences with information from the hazard mitigation plan;
- Keeping websites, social media outlets, etc. updated;
- Drafting articles for the local community newspapers/newsletters;
- Holding annual public meetings;
- Utilizing social media accounts (e.g. Instagram, Facebook, or X, *formerly known as Twitter*

[1] Federal Emergency Management Agency [FEMA]. (2023). Local Mitigation Planning Handbook. In FEMA.gov (pp. i–ii). https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-handbook_052023.pdf

Appendix A: Severe Weather Occurrences (2018-2024)

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County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
Alexander	Vashti	11/12/2020	Tropical Cyclone Eta moved from the eastern Gulf of Mexico, across the northern Florida peninsula, to off the South Carolina coast throughout the 11th and 12th. Tropical moisture streaming into the Carolinas throughout this time resulted in development of heavy rainfall, with widespread rainfall amounts of 4 to 6 inches, with locally higher amounts across the foothills and Piedmont of North Carolina. This resulted in areas of flash flooding and main stem river flooding, some of which was	Emergency manager reported major flash flooding developed throughout Alexander County after up to 9 inches of rain fell in 24 hours, with around half of that falling in a 3-hour period prior to daybreak on the 12th. The most significant flooding occurred along the South Yadkin River in the Hiddenite area. Multiple recreational vehicles and campers were swept down the river from a campground off Princess Ln. Five people, ages ranging from 1 to 76, drowned and 31 more people required rescue from rapidly rising flood water. Otherwise, most of the creeks and streams in the central and northeast part of the county overflowed onto at least one road, with more than 50 roads closed at some	**Property Damage**	$450,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
			significant, resulting in multiple fatalities and significant damage.	point during the event. Although heavy rainfall tapered off across		
				Alexander County throughout the morning, runoff from the earlier excessive rain continued to cause elevated stream levels and localized high water conditions to persist into the afternoon. A portion of a bridge over the South Yadkin collapsed on Cheatham Ford Rd during this time. Part of another bridge was washed out on Hopewell Church Rd (over Mill Creek). A 64-year-old man was killed when he drove his vehicle over the collapsed bridge. At least two other bridges were also compromised.	**Deaths**	6
	All Healing Springs	7/15/2023	Widespread showers and thunderstorms developed in the vicinity of a trough over the North Carolina foothills throughout the 15th. While rainfall was primarily in the 2 to 3 inch range, isolated areas of 4 to 6 inches fell in just a few hours across the northern foothills. This resulted in localized, but significant flash flooding across western Alexander County, where one fatality occurred.	Fire dept reported flash flooding developed along Duck Creek after 4 to 6 inches of rain fell in just a few hours along the Caldwell/Alexander County line. Two individuals were swept down the creek when they fled their vehicle after driving into flood water at Duck Creek Dr and Dover Church Rd. A 49-year old woman drowned while the other person was rescued. At least one road was washed out in the area.	**Deaths**	1
					Injuries	1
					Property Damage	$10,000
	Bethlehem	6/9/2019	A moist upslope flow developing north of a stationary front resulted in widespread showers and thunderstorms developing across western North Carolina during the evening of the 8th into the overnight and early morning hours of the ninth. Four to seven inches of rain, with	Fire department reported most roads in the Bethlehem area were flooded and closed after another round in a series of heavy rainfall episodes caused flash flooding to develop across the area during the morning of the 9th. Multiple water rescues had to be performed. Twenty four hour rainfall totals	**Property Damage**	$11,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
			locally higher amounts of 10 inches or more falling over the northern foothills resulted in flash flooding in multiple areas. The widespread nature of the excessive rainfall within the Catawba River watershed caused the river to rise to levels not seen in almost 80 years in the western Piedmont, with flooding persisting in some areas through the 10th. Meanwhile, a brief, weak tornado developed across Rutherford County.	were in the 4 to 7 inch range, with much of that falling in relatively short bursts.		
	Taylorsville	2/6/2020	Unusually high levels of moisture for early February combined with a slow-moving frontal system to produce an extended period of moderate to heavy rainfall across western North Carolina from the morning of the 5th until the early morning hours of the 7th. Intense rain rates associated with bands of heavy rain showers and embedded thunderstorms developing along the front during the morning and afternoon of the 7th resulted in rather widespread flash flooding. Isolated tornadoes also developed during this time across the Piedmont. Total rainfall of 3 to 6 inches resulted in flooding persisting along some main stem rivers and larger streams well into the 7th.	Newspaper reported flash flooding developed across central Alexander County after 4 to 5.5 inches of rain fell across the county in around 24 hours, with much of that falling during the morning and early afternoon of the 6th. Multiple tributaries of the Lower Little River overflowed their banks and flooded adjacent roads. These included Muddy Fork, which inundated Old Wilkesboro Rd just north of Taylorsville, Stirewalt Creek which flooded Heavenly Acres Rd, and Glade Creek which flooded Millersville Rd and Paul Pane Store Rd.	**Property Damage**	$2,000
	Taylorsville Airport	1/9/2024	A major/complex frontal system brought widespread rain with embedded thunderstorms to western North Carolina, mainly during the afternoon of the 9th. Widespread rainfall amounts of 3 to 5 inches (with locally higher amounts) in around 12 hours resulted in numerous reports of flooding. Isolated severe thunderstorms	Fire dept reported flash flooding developed along Muddy Fork after 3 to 5 inches of rain fell across Alexander County in around 12 hours. Old Wilkesboro Rd was closed and rendered impassable due to inundation from the creek.	**Property Damage**	$1,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
			also resulted in a number of damaging wind gusts reports over the Piedmont, along with an EF1 tornado that impacted portions of Catawba and Iredell Counties.			
Burke	Calvin	6/8/2019	A moist upslope flow developing north of a stationary front resulted in widespread showers and thunderstorms developing across western North Carolina during the evening of the 8th into the overnight and early morning hours of the ninth. Four to seven inches of rain, with locally higher amounts of 10 inches or more falling over the northern foothills resulted in flash flooding in multiple areas. The widespread nature of the excessive rainfall within the Catawba River watershed caused the river to rise to levels not seen in almost 80 years in the western Piedmont, with flooding persisting in some areas through the 10th. Meanwhile, a brief, weak tornado developed across Rutherford County.	Multiple sources reported flash flooding developed across portions of northern Burke County when as much as 6 inches of rain fell across the area in just a few hours. Flooding began on the Highway 64 corridor when a portion of the highway had to be closed in the Chesterfield community due to flood water. Antioch Rd was also flooded by Lower Creek in this same area. Water from Canoe Creek was also reportedly flowing over Highway 226. Smith Branch overflowed its banks in the Connelly Springs area, flooding some houses on Woodlawn Dr. A nursing home was evacuated in the Rutherford College area after a small unnamed tributary overflowed its banks. A tributary of Henry Fork flooded a portion of Woodland Hill Rd in Hildebrand, which undermined the structural integrity of the road and prompted voluntary evacuations.	Property Damage	$50,000
	Brindletown	2/6/2020	Unusually high levels of moisture for early February combined with a slow-moving frontal system to produce an extended period of moderate to heavy rainfall across western North Carolina from the morning of the 5th until the early morning hours of the 7th. Intense rain rates associated with bands of heavy rain showers and embedded thunderstorms developing along the front during the morning and afternoon of the 7th resulted in rather widespread flash flooding. Isolated tornadoes also	County comms and media reported localized flash flooding developed across the southeastern half of Burke County after 4.5 to 5.5 inches of rain fell in about 24 hours with much of that falling during the morning of the 6th. Multiple roads were closed several roads and private bridges damaged/washed out due to a combination of small stream flooding as well as poor drainage in urban areas. These included Nuckolls Dr Morningstar Church Rd Byrd Rd East Meadow Trail Van Horn Rd Powell Rd Antioch Rd and Powell Dr Ext.		$25,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
	Joy	2/6/2020	developed during this time across the Piedmont. Total rainfall of 3 to 6 inches resulted in flooding persisting along some main stem rivers and larger streams well into the 7th.	Although heavy rainfall tapered off across Burke County during the afternoon county comms reported high water conditions persisted through the evening and early part of the overnight with multiple roads remaining flooded and closed throughout the county. In addition a stream gauge on the Johns River north of Morganton exceeded its established flood stage after 3 to 6 inches of rain fell in and near the headwaters over about 24 hours. Multiple roads were flooded including Old Johns River Rd Spainhour Rd Johns River Rd and Corpening Bridge Rd.		$25,000
	Chesterfield	11/12/2020	Tropical Cyclone Eta moved from the eastern Gulf of Mexico, across the northern Florida peninsula, to off the South Carolina coast throughout the 11th and 12th. Tropical moisture streaming into the Carolinas throughout this time resulted in development of heavy rainfall, with widespread rainfall amounts of 4 to 6 inches, with locally higher amounts across the foothills and Piedmont of North Carolina. This resulted in areas of flash flooding and main stem river flooding, some of which was significant, resulting in multiple fatalities and significant damage.	A stream gauge on Hunting Creek near Morganton indicated significant flash flooding developed along the stream after 4.5 to 6 inches of rain fell in the area, with a significant portion of that falling in the 2-3 hours prior to daybreak. Coal Chute Rd was inundated and several businesses between the river and East Fleming Dr were also flooded. Backwater effects along Fiddlers Run also resulted in flooding of Bethel Park. Additionally, spotter reported severe drainage flooding along Highway 64 at Chesterfield. Other non-specific road flooding reports were received from elsewhere in Morganton as well as in the Valdese area.		$10,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
	Enola	10/7/2021	A slow moving area of upper level low pressure over the Mid-Mississippi Valley pumped semi-tropical weather into the western Carolinas for a couple of days, resulting in occasional rounds of moderate to heavy in the day leading up to the 7th. Scattered slow-moving thunderstorm clusters developed over the foothills during the morning of the 7th, producing torrential rainfall rates of 2 to 3 inches per hour and total rainfall amounts of 3 to 7 inches, much of which fell in just 2 to 3 hours. This excessive rainfall resulted in flash flooding of a number of creeks and other small streams.	A stream gauge on the Broad River at Bat Cave indicated flash flooding developed, with over a one-foot rise in less than an hour, after 3 to 6 inches of rain fell across the basin in just a few hours. Multiple campgrounds and a few homes were inundated from Bat Cave and vicinity downstream to the Rutherford County line.		$10,000
Caldwell	Globe	4/13/2020	A strong storm system impacted the Southeast, resulting in an area of widespread heavy rain and embedded strong to severe thunderstorms that moved across western North Carolina during the late night and early morning hours. Localized flash flooding, some of which was quite significant developed across the mountains. Isolated severe weather also occurred, mainly in the form of damaging wind gusts. Strong southerly gradient winds also caused some damage across mainly the high elevations of western North Carolina.	Emergency manager reported flash flooding developed along multiple creek across northwest Caldwell County after 4 to 6 inches of rain fell, mostly in less than 8 hours. Anthony Creek overflowed its banks in the Globe community, washing out a low water crossing. Wilson Creek washed out several low water crossing on Brown Mountain Beach Rd. Johns River inundated Old Johns River Rd in several locations. Buffalo Creek and several of its tributaries also inundated low water crossing in the far northern part of the county. A stream gauge on the Yadkin River near Patterson exceeded its established flood stage, indicating flooding of low lying roads and minor flooding of some structures in the Happy Valley community.	Property Damage	$100,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
	Edgemont	5/18/2018	EM and county comms reported significant flash flooding developed along Johns River and especially Wilson Creek after as much as 7 inches of rain fell in just a few hours across extreme western Caldwell County. Water from Wilson Creek entered several homes on Laurel St in Edgemont, and two families at this location were rescued via helicopter after their homes were cut off by flood water. A stream gauge on Wilson Creek at Edgemont reached its highest level since the gauge became operational in 2008. Portions of Wilson Creek Beach Rd, Brown Mountain Beach Rd, and Old Johns River Rd were reportedly washed away, while numerous other roads were flooded and closed, including Adako Rd and Collettsville Rd along the Johns River. A parking lot at Collettsville School was flooded with about two feet of water from the Johns River. Multiple landslides were also reported to be blocking roads in the area, including an estimated 100 foot wide slide that blocked Edgemont Rd.			$50,000
	Richland	11/12/2020	Tropical Cyclone Eta moved from the eastern Gulf of Mexico, across the northern Florida peninsula, to off the South Carolina coast throughout the 11th and 12th. Tropical moisture streaming into the Carolinas throughout this time resulted in development of heavy rainfall, with widespread rainfall amounts of 4 to 6 inches, with locally higher amounts across the foothills and Piedmont of North Carolina. This resulted in areas of flash flooding and main stem river flooding, some of which was significant, resulting in multiple fatalities and significant damage.	A stream gauge on the Yadkin River near Patterson exceeded its established flood stage after 4 to 7 inches fell across the basin, with much of that falling in only 3 hours or so between midnight and daybreak on the 12th. Multiple roads and some homes were inundated in the Happy Valley community, especially between Highway 268 and the river. Additionally, a few mudslides developed in the Yadkin basin, including a large one that covered/closed Kirby Mountain Rd north of Patterson.		$50,000
	Edgemont	6/9/2019	A moist upslope flow developing north of a stationary front resulted in widespread showers and thunderstorms developing across western North Carolina during the evening of the 8th into the overnight and early morning hours of the ninth. Four to seven inches of rain, with locally higher amounts of 10 inches or more falling over the northern foothills resulted in flash flooding in multiple areas.	During an ongoing flood event, new flash flooding developed across Caldwell County, particularly in the Wilson Creek and Johns Creek basins, after heavy rain showers and thunderstorms moved back into the area and dropped 1 to 2 inches of rain on top of saturated soils and swollen streams in just a couple of hours. The main impacts were along Wilson Creek, where the stream reportedly rose 3 to 4 feet in the span of 20 minutes between Edgemont and the confluence with the Johns River. An occupant of a home along Edgemont Rd had to be rescued when water from Wilson Creek inundated the home, rising to window-level. A gauge on the Johns River		$30,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
			The widespread nature of the excessive rainfall within the Catawba River watershed caused the river to rise to levels not seen in almost 80 years in the western Piedmont, with flooding persisting in some areas through the 10th. Meanwhile, a brief, weak tornado developed across Rutherford County.	just over the line in Burke County rose quickly from minor to moderate stage, indicating worsening flooding of several roads along the stream and its tributaries. Flooding also persisted along the Yadkin River in the northern part of the county.		
	Lenoir	6/8/2019		Multiple sources reported flash flooding developed over southern and eastern portions of Caldwell County after 4 to 7 inches of rain fell in just a few hours. The bulk of the flooding issues were from the south side of Lenoir to Hudson and Cajah's Mountain. Multiple roads were reported to be covered with water in south Lenoir, with motorists unable to leave their driveways. Severe urban flooding of the town hall parking lot in Cajah's Mountain apparently resulted in a sink hole opening up, which a vehicle then fell into. A tributary of Little Gunpowder Creek overflowed its banks and flooded Legion Rd near the Friendly Park Rd intersection. Meanwhile, Duck Creek overflowed its banks in the northeast part of the county and washed out part of Duck Creek Rd. Finally, a stream gauge on Little Creek in Lenoir exceeded its established flood stage.		$10,000
Catawba	Catawba	11/12/2020	Tropical Cyclone Eta moved from the eastern Gulf of Mexico, across the northern Florida peninsula, to off the South Carolina coast throughout the 11th and 12th. Tropical moisture streaming into the Carolinas throughout this time resulted in development of heavy	A stream gauge on the Catawba River at Lookout Shoals Dam indicated major flash flooding developed just upstream of the dam after 5 to 8 inches of rain fell throughout the Catawba basin, with the bulk of that falling in only a 3-hour period between midnight and sunrise on the 12th. Numerous homes were inundated and damaged, with numerous residents	Property Damage	$500,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
			rainfall, with widespread rainfall amounts of 4 to 6 inches, with locally higher amounts across the foothills and Piedmont of North Carolina. This resulted in areas of flash flooding and main stem river flooding, some of which was significant, resulting in multiple fatalities and significant damage.	evacuated along the western shores of Lookout Shoals Lake. This was the second major flood event along this portion of the Catawba in less than two years (June 2019), and the second highest crest on record at Lookout Shoals (August 1940).		
	Catawba	6/9/2019	A moist upslope flow developing north of a stationary front resulted in widespread showers and thunderstorms developing across western North Carolina during the evening of the 8th into the overnight and early morning hours of the ninth. Four to seven inches of rain, with locally higher amounts of 10 inches or more falling over the northern foothills resulted in flash flooding in multiple areas. The widespread nature of the excessive rainfall within the Catawba River watershed caused the river to rise to levels not seen in almost 80 years in the western Piedmont, with flooding persisting in some areas through the 10th. Meanwhile, a brief, weak tornado developed across Rutherford County.	A dam pool stage gauge reported and emergency manager confirmed flooding of the Catawba River upstream of the Lookout Sholes dam occurred after widespread rainfall amounts of 4 to 7 inches fell within the basin upstream of the dam, with much of that falling over the course of several hours. Several homes in the Carpenters Cove community and along Longfield St were inundated with flood water. The pool elevation behind the dam peaked at just over 108 ft on the morning of the 9th, which was its highest level since August 1940.		$250,000
	Long View	6/8/2019		Multiple sources reported flash flooding developed in Hickory and vicinity after 4 to 6 inches of rain fell in just a few hours. This was in addition to the 3 inches of rain that fell across roughly the same area on the night of the 7th. Flooding was first reported in southeast Hickory where apartment buildings on 12th Ave SE were flooded by Miller Branch resulting in the rescue of several residents. Flooding was otherwise confined primarily to the Mountain View area where multiple streams overflowed their banks and flooded roads. These included a tributary of Henry Fork which flooded Mountain Grove Rd Henry Fork flooding Old Shelby Rd another tributary of		$50,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
				Henry Fork that flooded Wallace Dairy Rd at Mt Zion Church Rd and Pott Creek which sent water into Fred T Foard High School and the adjacent road.		
	Catawba	2/6/2020	Unusually high levels of moisture for early February combined with a slow-moving frontal system to produce an extended period of moderate to heavy rainfall across western North Carolina from the morning of the 5th until the early morning hours of the 7th. Intense rain rates associated with bands of heavy rain showers and embedded thunderstorms developing along the front during the morning and afternoon of the 7th resulted in rather widespread flash flooding. Isolated tornadoes also developed during this time across the Piedmont. Total rainfall of 3 to 6 inches resulted in flooding persisting along some main stem rivers and larger streams well into the 7th.	A stream gauge at Lookout Shoals Dam on the Catawba River exceeded its established flood stage, reaching moderate flood levels after widespread rainfall of 4.5 to 5.5 inches fell throughout the basin in about 24 hours. Crawl space flooding of a home occurred on Longfield St, while other homes in the Carpenters Cove community experienced some inundation of foundations.		$50,000
	Hickory	8/15/2020	Numerous showers and thunderstorms and storm clusters developed over the northern foothills of North Carolina from the evening into the early morning hours. Repeating and slow moving showers and storms resulted in localized heavy to excessive rainfall and flash flooding.	Multiple sources reported flash flooding developed along multiple streams and creeks across northern Catawba County especially Falling Creek Snow Creek and Lyle Creek after 2.5 to 4.5 inches of rain fell across the area in just a few hours. Multiple swift water rescues were reported especially along Falling Creek and Snow Creek. Water from Lyle Creek inundated an apartment complex on County Home Rd in Conover. Roads impacted and closed due to flood waters included Bunkerhill School Rd near Deal Rd		$50,000

County	Location	Event Date	Event Narrative	Episode Narrative	Notable Damages	
				Highway 16 Snow Creek Rd Kool Park Rd NE 12th Ave and Springs Rd NE.		

Table A- 1: Summary of 5 most notable flooding and flash flooding events from the NCDC Storm Events Database between 2018 and 2023.

Location	Date	Event Type	Episode Narrative
Alexander (Zone)	3/12/2018	Winter Weather	Precipitation developed across the northern foothills and northwest Piedmont during the early morning in association with a frontal zone and associated low pressure. While most of the precip fell as rain, cooler air filtering in from the north, along with cooling brought about higher precipitation rates forced a brief change over to snow around sunrise. The snow accumulated quickly in spots, and some areas north of I-40 reported as much as 4 inches. The quick accumulation caused slick spots to develop on roads, with quite a few traffic accidents reported along the I-40 corridor. However, a warm ground and quickly warming temps ended resulted in fast melting after the snow.
Caldwell Mountains (Zone)			
Burke Mountains (Zone)			
Greater Caldwell (Zone)			
Catawba (Zone)	3/14/2018	Winter Weather	An area of moderate to heavy snow showers moved off the Blue Ridge and across the foothills and portions of the far western Piedmont around sunrise. Although the snow was brief, generally only lasting around an hour in most locations, up to an inch of snow quickly accumulated. Despite warm road temperatures, the rapid accumulation resulted in some travel difficulties across the foothills.
Burke Mountains (Zone)			
Greater Burke (Zone)			
Greater Caldwell (Zone)			
Caldwell Mountains (Zone)			
Burke Mountains (Zone)	3/24/2018	Winter Weather	As a warm front lifted slowly north across the Tennessee Valley and the Carolinas, an area of light to moderate snow developed across the northern mountains around daybreak on the 24th. Warmer air gradually overspread the area from the southwest, allowing many areas to change to rain. The exception was along the Blue Ridge, mainly along and east of the continental divide, where a narrow corridor of near-freezing surface temperatures locked in for much of the day. By late afternoon, temperatures warming above the surface forced a transition to sleet and freezing rain in these areas. Ice accumulation of up to one half inch was reported on top of up to an
Caldwell Mountains (Zone)			

Location	Date	Event Type	Episode Narrative
			inch of sleet and snow. Pockets of significant tree damage were reported in locations that received the higher ice accumulations.
Alexander (Zone) **Greater Caldwell (Zone)**			Precipitation developed across the northern foothills and northwest Piedmont during the morning of the 24th, as a warm front lifted slowly north across the Tennessee Valley and the Carolinas. After falling as rain for much of the day, precipitation turned to snow and sleet during the evening as cooler air funneled into the area from the northeast. Many areas along and north of I-40 received a quick half inch to 2 inches of snow and sleet before the precipitation tapered off during the early morning hours.
Alexander (Zone) **Catawba (Zone)**	11/24/2018	Winter Weather	Precipitation developed across the mountains, foothills, and far western Piedmont of North Carolina during the overnight, as a wave of low pressure moved along the Gulf Coast. Precipitation began as rain is most areas, but transitioned to freezing rain as a wedge of cold air locked in across the area. By the time the precipitation tapered off around sunrise, ice accretion of one tenth to one quarter inch was reported in many areas, with the highest amounts reported near the Blue Ridge. Scattered downed trees and power lines/power outages were reported.
Alexander (Zone) **Greater Caldwell (Zone)** **Greater Burke (Zone)** **Burke Mountains (Zone)** **Caldwell Mountains (Zone)** **Catawba (Zone)**	12/8/2018	Heavy Snow	Snow developed across northwest North Carolina around midnight the morning of the 9th, and began accumulating quickly. Moderate to heavy snow continued through the morning of the 9th before tapering off during the early afternoon. Storm total accumulations were generally in the 10 to 15 inch range, with slightly lower amounts south of I-40, and locally higher amounts across the mountains, particularly the high peaks along the Blue Ridge, where more than two feet fell. Travel was paralyzed across this area for a couple of days.
Alexander (Zone) **Greater Burke (Zone)** **Greater Caldwell (Zone)** **Burke Mountains (Zone)**	1/23/2019	Winter Weather	Patchy light freezing rain developed across western North Carolina during the early morning hours of the 23rd and continued off and on through mid-morning. Ice accretion was generally confined to areas north of I-85, and was quite light in most areas, around a tenth of an inch or less. Some slick spots developed on roads, resulting in a few traffic accidents. Patchy light freezing rain developed across western North Carolina during the early morning hours of the 23rd and continued off and on through mid-morning. Ice accretion was generally confined to areas north of I-85, and was quite light in most

Location	Date	Event Type	Episode Narrative
Caldwell Mountains (Zone)			areas, around a tenth of an inch or less. Some slick spots developed on roads, resulting in a few traffic accidents.
Catawba (Zone)			
Alexander (Zone)	2/19/2019	Winter Weather	A moist southerly flow develop above a cool wedge of high pressure resulted in development of precipitation across western North Carolina during the afternoon and evening of the 19th. Just enough cold air was in place to allow the precipitation to initially fall as a mixture of sleet and snow along the eastern Blue Ridge escarpment as well as the far northern foothills and Piedmont. As warm air developed aloft, precipitation gradually transitioned to sleet and freezing rain in most of these locations during the overnight and early morning hours of the 21st. Most areas transitioned to rain during the morning of the 21st, although some pockets of freezing rain persisted in sheltered areas along the Blue Ridge. Total sleet and snow accumulations generally ranged from one half inch to less than 2 inches, although some high elevation areas along the Blue Ridge saw 2 to 4 inches of snow. Some locations along the Blue Ridge saw between .1 and .2 inch ice accretion before the precip tapered off or changed to rain.
Burke Mountains (Zone)			
Caldwell Mountains (Zone)			
Greater Caldwell (Zone)			
Alexander (Zone)	12/13/2019	Winter Weather	Moisture associated with a developing low pressure system along the Southeast Coast overspreading a cool and dry air mass over western North Carolina resulted in development of freezing rain, mainly along the Blue Ridge escarpment, and along and near the I-40 corridor in the foothills and Piedmont. Light ice accretion of around .10 inch or less was primarily confined to elevated surfaces, although a few slick spots developed over the mountains. Precipitation changed to rain throughout the morning as temperatures warmed above freezing.
Greater Burke (Zone)			
Greater Caldwell (Zone)			
Catawba (Zone)			
Caldwell Mountains (Zone)			
Burke Mountains (Zone)			
Burke Mountains (Zone)	1/31/2020	Winter Weather	Precipitation spread northeast across western North Carolina beginning around daybreak. Temperatures were just cold enough for precipitation to begin as snow across the Blue Ridge. Snow continued through the morning across much of this area before ending or changing to rain in some locations. Total accumulations were generally in the 1 to 3 inch range.
Caldwell Mountains (Zone)			

Location	Date	Event Type	Episode Narrative
Caldwell Mountains (Zone) **Burke Mountains (Zone)**	2/21/2020	Winter Weather	Moisture overspreading a southward-moving cold front resulted in development of precipitation across the North Carolina mountains throughout the daylight hours of the 21st. Temperatures were cold enough in most locations for this precipitation to fall as snow, although rain mixed in at times below about 2500 feet. By the time the snow tapered off during the evening, snowfall totals ranged from trace amounts up to an inch in the lower interior valleys, to 1 to 4 inches above 2500 feet and in the valleys near the Blue Ridge.
Burke Mountains (Zone) **Caldwell Mountains (Zone)**	2/28/2020	Winter Weather	A strong upper level disturbance crossing the southern Appalachians resulted in redevelopment of snow showers across the North Carolina mountains throughout the 28th and early on the 29th. The relatively long duration of the event along with the enhanced lift from the disturbance allowed for higher accumulations than normally seen during northwest flow events, while accumulating snowfall was also reported well south and east of the usual Tennessee border areas, including across portions of the middle and upper French Broad Valley. Total amounts were generally in the 2-4 inch range, although amounts as high as 8 inches were reported on some of the high peaks and ridge tops.
Burke Mountains (Zone) **Alexander (Zone)** **Caldwell Mountains (Zone)** **Greater Burke (Zone)** **Greater Caldwell (Zone)** **Catawba (Zone)**	12/16/2020	Winter Weather	Light freezing rain developed over portions of western North Carolina, primarily areas along the eastern Blue Ridge escarpment, the northern foothills, and northwest Piedmont as areas of low pressure moved along the Gulf and southeast Atlantic coast. The precipitation changed to rain in most locations during the late morning as temperatures warmed above freezing. Total ice accretion was generally around a tenth of an inch or less, although isolated spots along the eastern Blue Ridge saw around a quarter of an inch. Light freezing rain developed over portions of western North Carolina, primarily areas along the eastern Blue Ridge escarpment, the northern foothills, and northwest Piedmont as areas of low pressure moved along the Gulf and southeast Atlantic coast. The precipitation changed to rain in most locations during the late morning as temperatures warmed above freezing. Total ice accretion was generally around a tenth of an inch or less, although isolated spots along the eastern Blue Ridge saw around a quarter of an inch.
Burke Mountains (Zone) **Caldwell Mountains (Zone)**	12/24/2020	Winter Weather	Precipitation associated with an area of low pressure and attendant cold front moved across western North Carolina throughout Christmas Eve into Christmas morning. Snow levels dropped quickly across the mountains during the evening hours, resulting in rain changing to snow. By the time the snow tapered off around daybreak on Christmas, snowfall totals range from 1 to 4 inches across the area, with locally higher amounts in the higher elevations. This was the first notable Christmas snowfall for this area since 2010.

Location	Date	Event Type	Episode Narrative
Greater Caldwell (Zone) **Greater Burke (Zone)**	1/7/2021	Winter Weather	Snow developed across the mountains and foothills of North Carolina during the evening of the 7th as an area of low pressure moved across the coastal plain of Georgia and the Carolinas. The snow mixed with or changed to rain in many areas before tapering off during the daylight hours of the 9th. Total accumulations were generally in the 1 to 3 inch range, although some areas above 2500 feet or so saw as much as 4 inches.
Burke Mountains (Zone) **Caldwell Mountains (Zone)**	1/8/2021	Heavy Snow	Snow developed across western North Carolina around midnight and continued through the morning of the 8th as an area of low pressure moved across the coastal plain of Georgia and the Carolinas. Heavy snow accumulations were reached across much of the northern mountains during the late morning, before the snow tapered off to scattered snow showers and flurries throughout the afternoon and evening. Total accumulations ranged from 3 to 6 inches across this area, with locally higher totals of as much as 8 inches reported above 4500 feet.
Caldwell Mountains (Zone) **Greater Burke (Zone)** **Greater Caldwell (Zone)** **Catawba (Zone)** **Alexander (Zone)** **Burke Mountains (Zone)**	1/30/2021	Winter Storm/ Winter Weather	A wintry mix developed across portions of the mountains and portions of the foothills during the evening of the 30th as a frontal system moved across the Tennessee and Ohio Valleys. Precipitation began as snow in most locations and accumulated to a couple of inches or so throughout the evening. As temperatures warmed aloft, precip transitioned to sleet, especially along and south of I-40, where heavy sleet accumulations of 1 to 2 inches were reported in some areas. A transition to freezing rain occurred before the precip ended, resulting in a light glaze of ice on top of the sleet and snow. Total snow and sleet accumulations ranged from 1 to 3 inches along and south of I-40, where sleet undercut the totals, to 4 to 6 inches across Avery and Mitchell Counties. Ice accretion was mostly less than a tenth of an inch. A wintry mix developed across portions of the mountains and portions of the foothills during the evening of the 30th as a frontal system moved across the Tennessee and Ohio Valleys. Precipitation began as snow in most locations and accumulated lightly before warming temperatures aloft forced a transition to sleet and freezing rain. Total accumulations of sleet and snow generally ranged from one half inch to less than two inches, although some locations above 3000 feet or so saw up to 3 inches.
Burke Mountains (Zone) **Caldwell Mountains (Zone)** **Alexander (Zone)**	2/6/2021	Winter Weather	Snow developed across the North Carolina mountains during the afternoon and evening of the 6th and continued through the overnight as a cold front approached from the Tennessee and Ohio Valleys. By the time the snow tapered off during the morning of the 7th. Total accumulations ranged from 2 to 4 inches across the area, with some locally higher amounts reported above 3500 feet or so. Snow developed across the the Piedmont and foothills of western North Carolina during the evening of the 6th and continued into the overnight hours before tapering off or changing to rain during the early morning of the 7th. Total snow accumulations

Location	Date	Event Type	Episode Narrative
Greater Caldwell (Zone) **Greater Burke (Zone)** **Catawba (Zone)**			generally ranged from 1 to 3 inches across the area, with some locally higher amounts of around 4 inches reported. The snow briefly changed to sleet and freezing rain in some areas before the precipitation ended, but accumulations were minimal.
Alexander (Zone) **Catawba (Zone)** **Greater Burke (Zone)** **Greater Caldwell (Zone)**	2/17/2021	Winter Weather	Moisture and precipitation overspread the western Carolinas late in the evening of the 17th and continued into the morning of the 18th in association with an area of low pressure moving along the Gulf Coast. Enough cold air was in place to allow some of this precipitation to fall as freezing rain, until warming temperatures gradually forced a transition to rain from southwest to northeast. Total ice accretion was generally in the .10 to .20 range, with spotty higher amounts. Due to warm road temperatures, accretion was primarily limited to elevated surfaces and limited travel difficulties.
Alexander (Zone) **Burke Mountains (Zone)** **Caldwell Mountains (Zone)** **Catawba (Zone)** **Greater Burke (Zone)** **Greater Caldwell (Zone)**	1/16/2022	Heavy Snow	Moisture overspread the North Carolina foothills and far western Piedmont early on the 16th as strengthening low pressure moved across the Deep South. Strong northeast winds supplied ample cold air for the precipitation to begin as light snow across much of the foothills. Snow continued into the overnight, becoming moderate to occasionally heavy, with snowfall rates of up to an inch per hour reported. Heavy snowfall criteria of 2 to 4 inches was reached in many areas by sunrise, with accumulating snow continuing through the morning hours before tapering off to occasional snow showers during the afternoon and evening. Total snow accumulations ranged from 5 to 10 inches across much of the area, with locally higher amounts along the eastern Blue Ridge escarpment. Travel was difficult to nearly impossible throughout the 16th and much of the 17th.
Alexander (Zone) **Catawba (Zone)** **Greater Burke (Zone)** **Greater Caldwell (Zone)**	2/7/2022	Winter Weather	Moisture associated with low pressure developing off the South Carolina coast overspread the North Carolina Piedmont during the morning, resulting in a brief period of light precipitation. Enough cold air was in place to allow much of this to fall as freezing rain north of I-85. Light ice accretion of around a tenth of an inch or less was reported, mainly on elevated surfaces. Roads were warm enough such that travel issues were primarily relegated to a few slick spots on bridges and overpasses. Spotty dustings of snow were also reported north of I-40.
Burke Mountains (Zone)	1/6/2024	Winter Weather	The second arctic cold front in 4 days brought gusty northwest winds and another shot of very cold air to the southern Appalachians in the wake of an arctic cold front. Winds gusting from 30 to 45 mph combined with air temperatures in the single digits, with

Location	Date	Event Type	Episode Narrative
Caldwell Mountains (Zone)			some below zero readings observed above 4000 feet, to produce wind chill values between 10 and 25 below above 3500 feet. Meanwhile, wind chill values from 0 to 10 below were observed in the North Carolina mountains valleys and across the higher elevations of South Carolina and northeast Georgia.
Burke Mountains (Zone)	1/9/2024	Winter Weather	Precipitation overspread the southern Appalachians during the early morning of the 9th in advance of a strong storm system. Once the precipitation began, pockets of cold air developed and became trapped for a few hours in a small area along the eastern Blue Ridge escarpment of North Carolina. This resulted in freezing rain falling in these areas. Isolated ice accretion was reported, with a few locations receiving almost a quarter inch.
Burke Mountains (Zone) **Caldwell Mountains (Zone)**	1/18/2024	Winter Weather	Snow showers developed across the high elevations of North Carolina during the evening of the 18th. Snow showers continued off and on through the 19th before tapering off during the early morning hours of the 20th. While snow was initially limited to the higher elevations, snow levels fell in the wake of a cold front, with snow showers eventually impacting the valleys during the afternoon and evening of the 19th. By the time the snow tapered off, total accumulations of 2 to 6 inches were reported, mainly above 3500 feet. However, some lower valley locations received 1 to 4 inches, including in the Asheville area and in the lower French Broad Valley.
Burke Mountains (Zone)	3/1/2024	Winter Weather	Precipitation developed across portions of the North Carolina mountains during the pre-dawn hours. Pockets of cold air lingering across some high elevation locations, as well as valley locations near the Blue Ridge escarpment resulted in light freezing rain. Light icing occurred, with general ice accretion of around a tenth of an inch or less. However, some spotty locations saw amounts close to one quarter inch.

Table A- 2: Winter Weather, Heavy Snow, and Winter Storm Events from the NCDC Storm Events Database between 2018 - 2024.

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Morganton	05/21/2000	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	05/21/2000	Hail	0.88 in.	0	0	0.00K	0.00K
Morganton	05/24/2000	Hail	2.75 in.	0	0	0.00K	0.00K
Glen Alpine	05/24/2000	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Morganton	05/24/2000	Hail	4.50 in.	0	0	0.00K	0.00K
Morganton	05/24/2000	Hail	4.50 in.	0	0	0.00K	0.00K
Hickory	05/28/2000	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	06/28/2000	Hail	0.88 in.	0	0	0.00K	0.00K
Newton	07/28/2000	Hail	0.75 in.	0	0	0.00K	0.00K
Rutherford College	08/25/2000	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	08/25/2000	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	06/04/2001	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	06/04/2001	Hail	1.00 in.	0	0	0.00K	0.00K
Terrell	06/25/2001	Hail	0.75 in.	0	0	0.00K	0.00K
Brindletown	04/17/2002	Hail	1.75 in.	0	0	0.00K	0.00K
Bethlehem	05/10/2002	Hail	0.88 in.	0	0	0.00K	0.00K
Claremont	05/10/2002	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	06/06/2002	Hail	0.75 in.	0	0	0.00K	0.00K
Bethlehem	06/13/2002	Hail	1.75 in.	0	0	0.00K	0.00K
Kings Creek	07/04/2002	Hail	1.00 in.	0	0	0.00K	0.00K
Taylorsville	04/30/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	04/30/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	05/02/2003	Hail	1.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Millersville	05/03/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Hiddenite	05/03/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Ellendale	05/03/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Granite Falls	05/03/2003	Hail	0.88 in.	0	0	0.00K	0.00K
Newton	05/03/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Newton	05/03/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Hickory	05/03/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Lenoir	05/15/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Jonas Ridge	05/15/2003	Hail	1.00 in.	0	0	0.00K	0.00K
Taylorsville	05/15/2003	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	05/15/2003	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	05/15/2003	Hail	1.75 in.	0	0	0.00K	0.00K
Glen Alpine	05/15/2003	Hail	1.00 in.	0	0	0.00K	0.00K
Taylorsville	05/15/2003	Hail	1.00 in.	0	0	0.00K	0.00K
Hildebran	05/15/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Lenoir	06/30/2003	Hail	0.88 in.	0	0	0.00K	0.00K
Longview	07/09/2003	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	07/12/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	07/13/2003	Hail	1.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Morganton	07/13/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Lenoir	07/16/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	07/16/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Collettsville	07/18/2003	Hail	0.88 in.	0	0	0.00K	0.00K
Taylorsville	07/21/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	07/21/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Maiden	07/21/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Valdese	07/29/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	08/22/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Icard	08/22/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	08/22/2003	Hail	0.75 in.	0	0	0.00K	0.00K
Sherrills Ford	08/22/2003	Hail	0.88 in.	0	0	0.00K	0.00K
Drexel	05/09/2004	Hail	0.88 in.	0	0	0.00K	0.00K
Stony Pt	05/09/2004	Hail	1.25 in.	0	0	0.00K	0.00K
Hildebran	05/09/2004	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	05/09/2004	Hail	0.88 in.	0	0	0.00K	0.00K
Lenoir	05/22/2004	Hail	1.50 in.	0	0	0.00K	0.00K
Lenoir	05/22/2004	Hail	1.50 in.	0	0	50.00K	0.00K
Lenoir	05/22/2004	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Morganton	05/30/2004	Hail	0.75 in.	0	0	0.00K	0.00K
Lenoir	07/04/2004	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	07/04/2004	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	04/07/2005	Hail	0.75 in.	0	0	0.00K	0.00K
Lenoir	05/10/2005	Hail	0.88 in.	0	0	0.00K	0.00K
Hickory	05/10/2005	Hail	0.88 in.	0	0	0.00K	0.00K
Bethlehem	05/10/2005	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	05/10/2005	Hail	0.88 in.	0	0	0.00K	0.00K
Morganton	05/14/2005	Hail	0.88 in.	0	0	0.00K	0.00K
Chesterfield	06/06/2005	Hail	0.75 in.	0	0	0.00K	0.00K
Granite Falls	06/19/2005	Hail	0.75 in.	0	0	0.00K	0.00K
Longview	06/19/2005	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	08/05/2005	Hail	1.75 in.	0	0	0.00K	0.00K
Morganton	04/03/2006	Hail	1.00 in.	0	0	0.00K	0.00K
Granite Falls	04/03/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	04/03/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Hiddenite	04/03/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	04/08/2006	Hail	0.88 in.	0	0	0.00K	0.00K
Lenoir	04/08/2006	Hail	0.88 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Terrell	04/17/2006	Hail	0.88 in.	0	0	0.00K	0.00K
Morganton	04/25/2006	Hail	0.88 in.	0	0	0.00K	0.00K
Morganton	04/25/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Longview	04/25/2006	Hail	0.88 in.	0	0	0.00K	0.00K
Claremont	04/25/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Granite Falls	04/25/2006	Hail	1.75 in.	0	0	0.00K	0.00K
Conover	04/25/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	04/25/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	05/13/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	05/14/2006	Hail	1.75 in.	0	0	0.00K	0.00K
Gamewell	05/14/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Maiden	05/14/2006	Hail	0.88 in.	0	0	0.00K	0.00K
Maiden	05/14/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Maiden	05/14/2006	Hail	2.00 in.	0	0	1.00K	0.00K
Maiden	05/14/2006	Hail	1.00 in.	0	0	0.00K	0.00K
Hildebran	05/14/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	05/14/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Conover	05/14/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	05/14/2006	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Catawba	05/20/2006	Hail	2.00 in.	0	0	0.00K	0.00K
Morganton	06/02/2006	Hail	0.88 in.	0	0	0.00K	0.00K
Morganton	06/11/2006	Hail	1.00 in.	0	0	0.00K	0.00K
Granite Falls	06/22/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	06/22/2006	Hail	1.00 in.	0	0	0.00K	0.00K
Maiden	06/23/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Maiden	06/23/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	07/04/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Conover	07/04/2006	Hail	1.00 in.	0	0	0.00K	0.00K
Conover	07/15/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	07/20/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Lenoir	07/28/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	09/10/2006	Hail	1.75 in.	0	0	0.00K	0.00K
Patterson	10/05/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Lenoir	11/11/2006	Hail	0.75 in.	0	0	0.00K	0.00K
Newton	04/15/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	04/15/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Gamewell	04/15/2007	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	04/15/2007	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Morganton	06/08/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Catawba	06/08/2007	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	06/11/2007	Hail	1.25 in.	0	0	0.00K	0.00K
Bethlehem	06/11/2007	Hail	0.88 in.	0	0	0.00K	0.00K
Hickory	06/11/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Icard	06/12/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Granite Falls	06/12/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	06/14/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Jonas Ridge	06/24/2007	Hail	0.88 in.	0	0	0.00K	0.00K
Patterson	06/28/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	06/28/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Jonas Ridge	07/23/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	07/25/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	07/25/2007	Hail	0.88 in.	0	0	0.00K	0.00K
Longview	08/04/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Lenoir	08/23/2007	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	08/23/2007	Hail	0.88 in.	0	0	0.00K	0.00K
Glen Alpine	04/26/2008	Hail	0.88 in.	0	0	0.00K	0.00K
Maiden	04/26/2008	Hail	0.88 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Collettsville	05/08/2008	Hail	1.75 in.	0	0	0.00K	0.00K
Lenoir	05/08/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Patterson	05/11/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	05/11/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	05/11/2008	Hail	2.75 in.	0	0	0.00K	0.00K
Morganton	06/10/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	06/21/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	06/21/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Patterson	06/22/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	06/22/2008	Hail	0.88 in.	0	0	0.00K	0.00K
Conover	06/22/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Catawba	06/22/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	06/27/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	06/28/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Valdese	07/07/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	07/07/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	07/07/2008	Hail	1.75 in.	0	0	0.00K	0.00K
Grandin	07/07/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	08/02/2008	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Lenoir	08/14/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Bethlehem	08/14/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	08/14/2008	Hail	1.00 in.	0	0	0.00K	0.00K
Taylorsville	09/30/2008	Hail	0.75 in.	0	0	0.00K	0.00K
Longview	04/21/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Morganton	05/09/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Kings Creek	05/16/2009	Hail	0.75 in.	0	0	0.00K	0.00K
Vashti	05/29/2009	Hail	1.00 in.	0	0	0.00K	0.00K
Collettsville	06/02/2009	Hail	1.00 in.	0	0	0.00K	0.00K
Mortimer	06/02/2009	Hail	1.50 in.	0	0	0.00K	0.00K
Oak Hill	06/03/2009	Hail	0.75 in.	0	0	0.00K	0.00K
Drums Xrds	06/11/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Enola	07/12/2009	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	07/20/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Oak Hill	07/20/2009	Hail	1.75 in.	0	0	0.00K	0.00K
Oak Hill	07/20/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Calvin	07/20/2009	Hail	1.75 in.	0	0	0.00K	0.00K
Morganton	07/20/2009	Hail	0.88 in.	0	0	0.00K	0.00K
Burke Chapel	07/20/2009	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
All Healing Spgs	08/05/2009	Hail	0.75 in.	0	0	0.00K	0.00K
Brookford	08/05/2009	Hail	0.75 in.	0	0	0.00K	0.00K
Drexel	09/09/2009	Hail	1.00 in.	0	0	0.00K	0.00K
Valmead	05/14/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Glen Alpine	05/28/2010	Hail	0.75 in.	0	0	0.00K	0.00K
Enola	05/28/2010	Hail	1.75 in.	0	0	0.00K	0.00K
Morganton	06/15/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Claremont	06/15/2010	Hail	0.88 in.	0	0	0.00K	0.00K
Drexel	07/09/2010	Hail	0.75 in.	0	0	0.00K	0.00K
Rufus	07/18/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Patterson	08/05/2010	Hail	1.00 in.	0	0	0.00K	0.00K
Grace Chapel	11/16/2010	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	02/28/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Claremont	02/28/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	04/09/2011	Hail	1.75 in.	0	0	0.00K	0.00K
Morganton	04/09/2011	Hail	2.00 in.	0	0	0.00K	0.00K
Connellys Spgs	04/09/2011	Hail	0.88 in.	0	0	0.00K	0.00K
Gamewell	04/28/2011	Hail	1.75 in.	0	0	0.00K	0.00K
Lenoir	04/28/2011	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Glen Alpine	05/10/2011	Hail	1.50 in.	0	0	0.00K	0.00K
Taylorsville	05/10/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Chesterfield	05/13/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Chesterfield	05/13/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Patterson	05/24/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Baily Camp	05/26/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Mortimer	05/26/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Whitnel	05/26/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Valmead	05/26/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	06/08/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Calvin	06/08/2011	Hail	1.50 in.	0	0	0.00K	0.00K
Connellys Spgs	06/10/2011	Hail	0.88 in.	0	0	0.00K	0.00K
Brookford	06/11/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	06/11/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	06/11/2011	Hail	1.25 in.	0	0	0.00K	0.00K
Catawba	06/12/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Kings Creek	06/21/2011	Hail	1.25 in.	0	0	0.00K	0.00K
Startown	06/21/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	06/28/2011	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Oyama	06/28/2011	Hail	0.88 in.	0	0	0.00K	0.00K
Hickory	07/07/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Whitnel	08/11/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Baton	08/11/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Collettsville	08/13/2011	Hail	0.88 in.	0	0	0.00K	0.00K
Propst Xrds	08/14/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville	08/18/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Catawba	08/18/2011	Hail	0.88 in.	0	0	0.00K	0.00K
Hickory	08/19/2011	Hail	0.75 in.	0	0	0.00K	0.00K
Bridgewater	08/21/2011	Hail	1.00 in.	0	0	0.00K	0.00K
Oyama	02/24/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Claremont	02/24/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Oyama	02/24/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	03/20/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Patterson	04/17/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Drexel	04/17/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	04/26/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Valdese	04/26/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Richland	04/27/2012	Hail	1.50 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Glen Alpine	05/01/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	05/01/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	05/01/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	05/01/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	05/01/2012	Hail	0.88 in.	0	0	0.00K	0.00K
Morganton	05/01/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Yadkin Vly	05/02/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Globe	05/02/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Drexel	05/21/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Pleasant Grove Brke	05/22/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Globe	06/22/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	06/22/2012	Hail	1.25 in.	0	0	0.00K	0.00K
Globe	07/01/2012	Hail	1.75 in.	0	0	0.00K	0.00K
Warrior	07/01/2012	Hail	1.75 in.	0	0	0.00K	0.00K
Lenoir	07/01/2012	Hail	1.75 in.	0	0	0.00K	0.00K
Icard	07/01/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	07/01/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Brookford	07/01/2012	Hail	1.75 in.	0	0	0.00K	0.00K
Brookford	07/01/2012	Hail	2.00 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Morganton	07/01/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Draco	07/01/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	07/02/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Catawba	07/16/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Longisland	07/16/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	07/25/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Olivers Xrds	07/25/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Paynes Store	08/02/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Conover	08/02/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Calvin	08/08/2012	Hail	1.00 in.	0	0	0.00K	0.00K
Cedar Vly	09/28/2012	Hail	0.75 in.	0	0	0.00K	0.00K
Pleasant Grove Brke	05/07/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	05/11/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Drexel	05/11/2013	Hail	0.88 in.	0	0	0.00K	0.00K
Granite Falls	05/11/2013	Hail	0.88 in.	0	0	0.00K	0.00K
Brindletown	05/11/2013	Hail	0.88 in.	0	0	0.00K	0.00K
Joy	05/21/2013	Hail	1.50 in.	0	0	1.00K	0.00K
Lenoir	05/22/2013	Hail	0.88 in.	0	0	0.00K	0.00K
Valmead	05/22/2013	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Vashti	05/23/2013	Hail	0.88 in.	0	0	0.00K	0.00K
Taylorsville	05/23/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Hiddenite	05/23/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Drexel	06/13/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Conover	06/13/2013	Hail	1.25 in.	0	0	0.00K	0.00K
Bridgewater	06/26/2013	Hail	1.50 in.	0	0	0.00K	0.00K
Enola	06/26/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Oak Hill	07/05/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	07/12/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Collettsville	07/12/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	07/12/2013	Hail	1.25 in.	0	0	0.00K	0.00K
Glen Alpine	07/12/2013	Hail	1.25 in.	0	0	0.00K	0.00K
Enola	07/12/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Jonas Ridge	07/17/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Stony Pt	07/17/2013	Hail	0.88 in.	0	0	0.00K	0.00K
Claremont	07/17/2013	Hail	0.75 in.	0	0	0.00K	0.00K
Jonas Ridge	07/25/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Oyama	08/12/2013	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	04/03/2014	Hail	0.88 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Oak Hill	06/04/2014	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	06/11/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Jonas Ridge	06/16/2014	Hail	0.88 in.	0	0	0.00K	0.00K
Icard	06/16/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Ieard	06/18/2014	Hail	0.88 in.	0	0	0.00K	0.00K
Hildebran	06/18/2014	Hail	0.88 in.	0	0	0.00K	0.00K
Longview	06/18/2014	Hail	0.88 in.	0	0	0.00K	0.00K
Icard	06/18/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Chesterfield	06/19/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Saw Mills	06/19/2014	Hail	0.75 in.	0	0	0.00K	0.00K
Valdese	06/19/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Brookford	06/19/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Claremont	06/19/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Jonas Ridge	06/19/2014	Hail	1.25 in.	0	0	0.00K	0.00K
Morganton	06/20/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Connellys Spgs	07/23/2014	Hail	0.88 in.	0	0	0.00K	0.00K
Drexel	07/24/2014	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	09/06/2014	Hail	0.75 in.	0	0	0.00K	0.00K
Chesterfield	10/10/2014	Hail	1.00 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Morganton	10/11/2014	Hail	0.75 in.	0	0	0.00K	0.00K
Joy	04/09/2015	Hail	1.25 in.	0	0	0.00K	0.00K
Collettsville	04/09/2015	Hail	0.88 in.	0	0	0.00K	0.00K
Globe	06/01/2015	Hail	0.88 in.	0	0	0.00K	0.00K
Bethlehem	06/02/2015	Hail	0.75 in.	0	0	0.00K	0.00K
Catawba	06/02/2015	Hail	1.00 in.	0	0	0.00K	0.00K
Glen Alpine	06/18/2015	Hail	0.75 in.	0	0	0.00K	0.00K
Calvin	06/18/2015	Hail	0.75 in.	0	0	0.00K	0.00K
Valdese	06/19/2015	Hail	0.75 in.	0	0	0.00K	0.00K
Hudson	06/19/2015	Hail	0.88 in.	0	0	0.00K	0.00K
Glen Alpine	06/19/2015	Hail	0.75 in.	0	0	0.00K	0.00K
Oyama	06/30/2015	Hail	0.75 in.	0	0	0.00K	0.00K
Oak Hill	06/30/2015	Hail	0.88 in.	0	0	0.00K	0.00K
Catawba	07/21/2015	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	08/14/2015	Hail	1.00 in.	0	0	0.00K	0.00K
Bethlehem	09/04/2015	Hail	0.88 in.	0	0	0.00K	0.00K
Grace Chapel	09/04/2015	Hail	0.88 in.	0	0	0.00K	0.00K
Hickory	09/04/2015	Hail	1.00 in.	0	0	0.00K	0.00K
Gamewell	09/04/2015	Hail	1.00 in.	0	0	1.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Glen Alpine	05/02/2016	Hail	0.88 in.	0	0	0.00K	0.00K
Pleasant Grove Brke	05/03/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Burke Chapel	05/03/2016	Hail	1.00 in.	0	0	0.00K	0.00K
Propst Xrds	05/03/2016	Hail	1.00 in.	0	0	0.00K	0.00K
Propst Xrds	05/03/2016	Hail	0.88 in.	0	0	0.00K	0.00K
Cotton Factory	05/03/2016	Hail	0.88 in.	0	0	0.00K	0.00K
Drums Xrds	05/03/2016	Hail	1.00 in.	0	0	0.00K	0.00K
All Healing Spgs	06/02/2016	Hail	1.00 in.	0	0	0.00K	0.00K
Valdese	06/27/2016	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	06/29/2016	Hail	1.50 in.	0	0	0.00K	0.00K
Morganton	06/29/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	06/29/2016	Hail	1.75 in.	0	0	0.00K	0.00K
Enola	06/29/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Conover	06/29/2016	Hail	1.00 in.	0	0	0.00K	0.00K
Oak Hill	06/30/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Oak Hill	06/30/2016	Hail	0.88 in.	0	0	0.00K	0.00K
Duan	07/03/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Glen Alpine	07/05/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Claremont	07/11/2016	Hail	1.00 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Chesterfield	07/16/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	07/16/2016	Hail	0.88 in.	0	0	0.00K	0.00K
Conover	07/22/2016	Hail	1.25 in.	0	0	0.00K	0.00K
Morganton	09/27/2016	Hail	0.88 in.	0	0	0.00K	0.00K
Grandin	09/28/2016	Hail	1.00 in.	0	0	0.00K	0.00K
Bridgewater	09/29/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Collettsville	09/29/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Stony Pt	09/29/2016	Hail	0.75 in.	0	0	0.00K	0.00K
Stony Pt	09/29/2016	Hail	1.00 in.	0	0	0.00K	0.00K
Patterson	09/29/2016	Hail	0.88 in.	0	0	0.00K	0.00K
Enola	03/01/2017	Hail	0.75 in.	0	0	0.00K	0.00K
Valdese	03/01/2017	Hail	0.75 in.	0	0	0.00K	0.00K
Enola	03/01/2017	Hail	0.88 in.	0	0	0.00K	0.00K
Pleasant Grove Brke	03/01/2017	Hail	1.25 in.	0	0	0.00K	0.00K
Oyama	03/01/2017	Hail	1.50 in.	0	0	0.00K	0.00K
Kings Creek	03/27/2017	Hail	0.88 in.	0	0	0.00K	0.00K
Drexel	04/05/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Rutherford College	04/05/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	04/06/2017	Hail	1.25 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Baily Camp	05/19/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	05/19/2017	Hail	0.75 in.	0	0	0.00K	0.00K
Granite Falls	06/13/2017	Hail	0.75 in.	0	0	0.00K	0.00K
Hudson	06/13/2017	Hail	0.75 in.	0	0	0.00K	0.00K
Oyama	06/13/2017	Hail	1.00 in.	0	0	0.00K	0.00K
leard	07/13/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	07/17/2017	Hail	0.75 in.	0	0	0.00K	0.00K
Taylorsville Arpt	07/17/2017	Hail	0.88 in.	0	0	0.00K	0.00K
Liledoun	07/17/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	07/17/2017	Hail	0.88 in.	0	0	0.00K	0.00K
Hickory	07/17/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Icard	07/17/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Lenoir	07/18/2017	Hail	1.50 in.	0	0	0.00K	0.00K
Collettsville	07/22/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Chesterfield	07/23/2017	Hail	1.00 in.	0	0	0.00K	0.00K
Taylorsville Arpt	09/05/2017	Hail	0.75 in.	0	0	0.00K	0.00K
Hickory	05/07/2018	Hail	0.88 in.	0	0	0.00K	0.00K
Enola	05/10/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Burke Chapel	05/10/2018	Hail	1.00 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Propst Xrds	05/10/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Taylorsville	05/10/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Granite Falls	05/20/2018	Hail	0.88 in.	0	0	0.00K	0.00K
Brindletown	06/03/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Burke Chapel	06/03/2018	Hail	0.75 in.	0	0	0.00K	0.00K
Mt Herman	06/10/2018	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	06/11/2018	Hail	0.75 in.	0	0	0.00K	0.00K
Oak Hill	06/11/2018	Hail	0.75 in.	0	0	0.00K	0.00K
Chesterfield	07/05/2018	Hail	0.75 in.	0	0	0.00K	0.00K
Morganton	07/21/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory	07/21/2018	Hail	2.00 in.	0	0	0.00K	0.00K
Mt Herman	07/21/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Bethlehem	07/21/2018	Hail	1.75 in.	0	0	0.00K	0.00K
Duan	08/08/2018	Hail	0.75 in.	0	0	0.00K	0.00K
Propst Xrds	08/08/2018	Hail	0.75 in.	0	0	0.00K	0.00K
Hildebran	08/08/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Glen Alpine	09/01/2018	Hail	1.00 in.	0	0	0.00K	0.00K
Oak Hill	04/13/2019	Hail	1.25 in.	0	0	0.00K	0.00K
Hiddenite	05/31/2019	Hail	0.88 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Taylorsville Arpt	07/04/2019	Hail	1.50 in.	0	0	0.00K	0.00K
Oyama	07/11/2019	Hail	1.00 in.	0	0	0.00K	0.00K
Saw Mills	07/20/2019	Hail	0.88 in.	0	0	0.00K	0.00K
Hudson	07/20/2019	Hail	1.00 in.	0	0	0.00K	0.00K
Burke Chapel	07/31/2019	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton	08/13/2019	Hail	1.00 in.	0	0	0.00K	0.00K
Abingdon	08/21/2019	Hail	0.88 in.	0	0	0.00K	0.00K
Startown	08/23/2019	Hail	1.00 in.	0	0	0.00K	0.00K
Hartland	09/30/2019	Hail	1.00 in.	0	0	0.00K	0.00K
Rhodhiss	09/30/2019	Hail	1.00 in.	0	0	0.00K	0.00K
Oak Hill – Burke County	4/25/2020	Hail	1.00 in.	0	0	0.00K	0.00K
Baton – Caldwell County	4/25/2020	Hail	1.00 in.	0	0	0.00K	0.00K
Propst XRDS – Catawba County	4/26/2020	Hail	0.88in	0	0	0.00K	0.00K
Morganton – Burke County	7/10/2020	Hail	1.00 in.	0	0	0.00K	0.00K
Chesterfield – Burke County	7/21/2020	Hail	1.00 in	0	0	0.00k	0.00k
Valdese – Burke County	7/21/2020	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory – Burke County	7/21/2020	Hail	1.00 in.	0	0	0.00K	0.00K
Morganton – Burke County	3/27/2021	Hail	0.75 in.	0	0	0.00K	0.00K
Newton – Catawba County	6/14/2021	Hail	1.00 in.	0	0	0.00K	0.00K

Location	Date	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
Claremont – Catawba County	7/17/2021	Hail	0.75 in.	0	0	0.00K	0.00K
Baton – Caldwell County	8/14/2021	Hail	0.88 in.	0	0	0.00K	0.00K
Glen Alpine – Burke County	5/01/2022	Hail	1.00 in.	0	0	0.00K	0.00K
Granite Falls – Caldwell County	5/26/2022	Hail	1.75 in.	0	0	0.00K	0.00K
Chesterfield – Burke County	6/02/2022	Hail	0.75 in.	0	0	0.00K	0.00K
Oak Hill – Burke County	6/02/2022	Hail	1.00 in.	0	0	0.00K	0.00K
Chesterfield – Burke County	7/02/2022	Hail	0.75 in.	0	0	0.00K	0.00K
Burke Chapel – Burke County	7/06/2022	Hail	1.75 in.	0	0	0.00K	0.00K
Newton – Catawba County	8/10/1011	Hail	0.88 in.	0	0	0.00K	0.00K
Warrior – Caldwell County	3/03/2023	Hail	0.88 in.	0	0	0.00K	0.00K
Taylorsville – Alexander County	4/06/2023	Hail	1.00 in.	0	0	0.00K	0.00K
Smiths Store – Alexander County	4/06/2023	Hail	1.00 in.	0	0	0.00K	0.00K
Enola – Burke County	4/22/2023	Hail	0.75 in.	0	0	0.00K	0.00K
Brindletown – Burke County	6/26/2023	Hail	1.00 in.	0	0	0.00K	0.00K
Hickory – Catawba County	7./01/2023	Hail	1.00 in.	0	0	0.00K	0.00K
Rutherford College – Burke County	9/07/2023	Hail	0.75 in.	0	0	0.00K	0.00K
Totals:				0	0	53.00K	0.00K

Table A- 3: Hail events summary from the NCDC between 2000-2023

Location	Date	Episode Narrative
Caldwell Mountains (Zone)	11/14/2018	Precipitation developed in association with weak low pressure moving across the Southeast during the overnight of the 14th and early morning of the 15th. Precipitation began as rain and/or snow across the mountains, but transitioned to liquid as temperatures warmed aloft. However, a wedge of cool air remained in place across the Blue Ridge, resulting in freezing rain, mainly within a few miles either side of the Continental Divide. While most areas saw around a tenth of an inch or less of ice accretion, damaging ice accumulations were reported across the high elevations of Caldwell and Burke Counties, as well as eastern portions of Avery County.
Burke Mountains (Zone)		
Burke Mountains (Zone)	11/24/2018	For the second time in 10 days, a freezing rain event developed across portions of the mountains and foothills of North Carolina. Precipitation developed during the overnight, as a wave of low pressure moved along the Gulf Coast. Precipitation began as rain and snow, but transitioned to freezing rain across all but the highest elevations (where more of a wintry mix was reported), as a wedge of cold air locked in near the Blue Ridge. As freezing rain continued through daybreak, damaging accumulations of ice, generally between one quarter and ine half inch were reported across the area. Quite a few trees and power lines, along with numerous power outages were reported across the area.
Greater Caldwell (Zone)		
Greater Burke (Zone)		
Caldwell Mountains (Zone)		
Alexander (Zone)	1/12/2019	Moist air flowing over a wedge of cold air banked against the eastern slopes of the Appalachians resulted in precipitation development across the Blue Ridge and surrounding areas beginning during the evening of the 12th. The atmosphere quickly cooled to or below freezing near the escarpment and out across the lower elevations of the foothills and far northwest Piedmont. This resulted in much of the precipitation falling as freezing rain in these areas. The freezing rain continued through the overnight across the Blue Ridge and surrounding areas before tapering off around daybreak on the 13th. Total ice accretion of one quarter to one half inch was reported, with the heaviest amounts being across the foothills and immediately along the Blue Ridge escarpment. Scattered downed trees and power outages were reported throughout the area.
Burke Mountains (Zone)		
Caldwell Mountains (Zone)		
Catawba (Zone)		
Greater Burke (Zone)		
Greater Caldwell (Zone)		
Burke Mountains (Zone)	2/17/2021	Moisture and precipitation overspread the western North Carolina late in the evening of the 17th and continued into the morning of the 18th in association with an area of low pressure moving along the Gulf Coast. Enough cold air was trapped along the eastern Blue Ridge escarpment to allow much of this precipitation to fall as freezing rain. By the time the precipitation tapered off during the morning of the 18th, total ice accretion was generally around one quarter inch, although spotty amounts closer to one half inch were reported. Due to warm road temperatures, accretion was primarily limited to elevated surfaces and limited travel difficulties.
Caldwell Mountains (Zone)		

Table A- 4: Ice storms from the NCDC storm events database between 2018 and 2023

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Calvin	4/15/2018	0	0	0	Media reported trees and power lines blown down on Lions Hill St.	Scattered to numerous afternoon thunderstorms developing ahead of a cold front moved into the North Carolina Piedmont from South Carolina during the early afternoon. Several of the storms produced severe weather in the form of large to very large hail and locally damaging winds.
	Enola		0	0	0	County comms reported several trees blown down and blocking trails in South Mountains State Park.	
Caldwell	Hudson		0	0	0	County comms reported a few trees blown down in the Hudson area.	
Burke	Valdese	5/10/2018	0	0	0	Media reported multiple trees blown down.	Isolated to scattered thunderstorms developed across the Blue Ridge during the afternoon and moved into the Piedmont during the evening. Some of the storms produced severe weather in the form of large hail and locally damaging winds. Strong to severe supercell thunderstorms developed repeatedly and trained across portions of the foothills, particularly in Polk County, such that some locations received multiple periods of up to golf ball size hail.
Alexander	Stony Pt		0	0	0		
Caldwell	Gamewell	6/1/2018	0	0	0	Ham radio operator reported several trees blown down around the Highway 18 and Rocky Road area.	Scattered to numerous thunderstorms developed across western North Carolina throughout the afternoon and evening. Several of the storms produced brief severe weather in the form of damaging wind gusts.

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Enola	6/3/2018	0	0	0	Media reported trees blown down on Jenkins Rd.	Scattered thunderstorms developed across the southern Appalachians throughout the afternoon and moved southeast. Several storms produced brief severe weather in the form of large hail and damaging winds across the North Carolina mountains and foothills.
Burke	Oak Hill	6/11/2018	0	0	0	Media reported multiple trees and power lines blown down in the Oak Hill area.	Isolated thunderstorms developed during the afternoon across the North Carolina foothills. One of these storms produced occasional severe weather as it moved south across the far western Piedmont. Then, as a cold front moved southwest across the area throughout the evening, scattered to numerous showers and storms developed along it, producing additional brief severe weather.

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Table Rock	6/25/2018	0	0	0	Spotter reported numerous trees and power lines blown down in western Burke County. Media reported numerous trees down in the Morganton area, especially along the Catawba River. At least one road was closed in Morganton due to falling trees. Additional sporadic tree damage was also reported outside of this corridor, including at Highway 18 and Antioch Rd near the Caldwell County line.	For the third day in a row, multiple thunderstorm clusters, some producing damaging winds moved from East Tennessee into western North Carolina during the afternoon into the evening. While severe weather was confined to the mountains on the 23rd and 24th, storms on the 25th also produced severe weather in the foothills and northwest Piedmont.
Caldwell	Gamewell		0	0	$200,000	Multiple sources reported numerous trees blown down in the Gamewell area. Trees fell on and destroyed one house and severely damaged two others. Roads blocked by downed trees included Miller Hill Rd, Dulatown Rd, and Connelly Springs Rd in Granite Falls.	
Alexander	All Healing Spgs		0	0	0	Media reported multiple trees blown down on Mountain Ridge Church Road.	
Catawba	Longview		0	0	0	Media reported trees blown down along Highway 321.	
	Claremont		0	0	0	Broadcast media reported several trees blown down along River Bend Rd. Public also reported (via social media) reported numerous small trees blown down in the Catfish community.	
Caldwell	Yadkin Vly	7/6/2018	1	2	5000	EM reported a large tree was blown down on a vehicle in Green Mountain Park killing a 78-year-old occupant and causing minor injuries to two others. A few other trees were blown down in Lenoir and areas just east of the city.	Scattered thunderstorms developed across the North Carolina mountains and foothills during the afternoon and moved into the western Piedmont by early evening. A few of the

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							storms produced strong to damaging winds that caused tree damage, with one tree falling on a vehicle north of Lenoir, killing one of the occupants.
Burke	Valdese	7/21/2018	0	0	0	Media reported trees and power lines blown down in the area around Church St. NW and Dixie Ave NW.	Scattered thunderstorms developed during the afternoon across the North Carolina mountains and foothills and moved east. A few of the storms produced brief severe weather in the form of large hail and damaging winds.
Catawba	Claremont	7/22/2018	0	0	1000	Public reported large tree limbs blown down and minor roof damage on Highway 10.	Scattered to numerous thunderstorms developed along a cold front across the North Carolina Piedmont during the afternoon and evening.A few of the storms produced brief large hail and damaging winds. While most of the severe weather was marginal, a significant downburst did occur in the Concord area.
Catawba	Conover	8/6/2018	0	0	10000	EM reported multiple trees blown down on the north side of Conover, with a tree down on a mobile home on County Home Rd and several trees blocking I-40 near mile marker 132.	Scattered thunderstorms developed across the North Carolina foothills during the afternoon and moved southeast. One storm produced brief damaging winds in the Conover area.
Catawba	Duan	8/8/2018	0	0	0	Spotter reported trees blown down on Rome Jones Rd.	Scattered thunderstorms developed across the North Carolina Blue Ridge during the
	Startown		0	0	0	Spotter reported trees blown down on Hardwood Cir.	

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Brindletown		0	0	0	Spotter reported trees blown down along Jenkins Rd.	afternoon, with storms developing gradually along outflows into the Piedmont throughout the afternoon and into the evening. A few of the storms produced brief damaging winds.
Catawba	Hickory		0	0	10000	Public reported a tree blown down on a house on 13th Ave Northwest.	
Catawba	Startown	8/31/2018	0	0	0	County comms reported trees blown down along Robinson Rd.	Isolated thunderstorms developed during the afternoon and evening over the foothills and western Piedmont of North Carolina. A few of the storms produced brief damaging winds.
Burke	Glen Alpine	9/1/2018	0	0	0	Media reported multiple trees blown down on Powerhouse Rd.	Isolated thunderstorms developed over the North Carolina Piedmont and foothills during the evening. A couple of the storms produced brief severe weather.
Burke	Morganton	9/2/2018	0	0	0	County comms reported multiple trees blown down across the south side of Morganton. One tree fell on a house and took down a power line on Mt Home Church Ave.	Isolated thunderstorms developed across the foothills and western Piedmont during the afternoon and evening. A couple of the storms produced brief damaging winds.
Catawba	Newton		0	0	0	County comms reported a few trees blown down near the intersection of Shannonbrook Dr and Radio Station Rd.	
Catawba	Startown	9/27/2018	0	0	0	FD reported two trees blown down on Robinson Rd.	A cluster of thunderstorms producing pockets of damaging wind gusts moved into the North Carolina Piedmont from Upstate South Carolina during the evening. Several areas of wind damage were reported along the I-77 corridor.
	Olivers Xrds		0	0	0	Ham radio operator reported multiple trees blown down near Maiden.	

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Calvin	4/13/2019	0	0	0	County comms reported trees down on Highway 126.	Scattered clusters of heavy rain showers and thunderstorms developed in the vicinity of a stationary front across western North Carolina throughout the 13th. Repeated movement of showers and storms resulted in flash flooding developing across Cabarrus County beginning in the morning. Meanwhile, an isolated supercell thunderstorm produced large hail and isolated damaging wind gusts across Burke County during the afternoon.
	Drexel		0	0	0	County comms reported multiple trees blown down on Mountain View Dr.	
Burke	Morganton	4/14/2019	0	0	50000	NWS storm survey reported numerous trees blown down throughout Morganton and vicinity, with several trees down on homes, including along West Fleming Dr, King St, and Antioch Rd.	Numerous showers along with strong to severe thunderstorms developed across western North Carolina throughout the 14th in advance of a strong frontal system. Some of these storms produced areas of wind damage throughout the afternoon and evening.
Burke	Pleasant Grove Brke		0	0	0	County comms reported multiple trees and power lines blown down on River Meadows Ln at the intersection Of River Rd.	
Burke	Enola		0	0	0	County comms reported multiple trees blown down near the intersection of Watershed Rd and Enola Rd.	
Catawba	Cotton Factory	4/19/2019	0	0	10000	EM reported a large tree blown down on a garage at Main Street and North 9th Avenue. Possible tornado.	A large area of moderate to heavy rain showers, along with embedded clusters of strong to severe thunderstorms moved slowly across western North Carolina throughout the morning and into the afternoon of the 19th ahead of a slow-moving cold front. Some of the storms produced a couple of isolated, weak tornadoes and locally
Alexander	Taylorsville		0	0	0	Ham radio operator reported multiple trees blown down in Taylorsville, with some blocking roads.	

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							damaging winds. However, the larger impact was from flash flooding resulting from a swath of 4 to 7 inches of rain that fell across portions of the mountains.
Burke	Table Rock	6/22/2019	0	0	0	County comms reported multiple trees blown down on Highway 181.	A line of strong to severe thunderstorms developing in association with an area of low pressure across Tennessee moved into the North Carolina mountains around midnight on the morning of the 22nd, and produced areas of wind damage before weakening.
Alexander	Taylorsville Arpt	7/4/2019	0	0	0	Fire dept reported numerous trees and power lines blown down on Highway 16 near Taylorsville.	Scattered thunderstorms and storm clusters developed across the North Carolina Piedmont during the afternoon. A couple of the storms produced damaging wind gusts.
Caldwell	Collettsville	7/8/2019	0	0	1000	Fire dept reported trees blown down on Yellow Belle Pl, with a tree on power lines and another on an outbuilding.	Isolated thunderstorms developed near the North Carolina Blue Ridge during the late afternoon. One storm produced brief damaging winds in Caldwell County.
Catawba	Oyama	7/11/2019	0	0	0	Media reported multiple small trees uprooted.	Scattered to numerous thunderstorms developed across western North Carolina during the afternoon. A few of the storms produced damaging wind gusts and even some large hail.
	Startown		0	0	0	Media reported one large hardwood tree uprooted and several smaller trees split near the intersection of Highway 10 and Jarrett Farm Rd.	
Burke	Calvin	7/20/2019	0	0	10000	County comms reported the roof was blown off a building at a flea market on Jamestown Rd. Numerous	Scattered to numerous thunderstorms developed across

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
						trees were blown down in this area as well, with more sporadic wind damage extending north past the Catawba River to near Highway 126.	northern North Carolina during the afternoon. A few of the storms produced brief damaging wind gusts and some hail.
Caldwell	Joyceton	7/20/2019	0	0	10000	County comms reported the roof of a mobile home collapsed on Mount Herman Rd.	Scattered to numerous thunderstorms developed across northern North Carolina during the afternoon. A few of the storms produced brief damaging wind gusts and some hail.
Burke	Morganton	8/7/2019	0	0	0	Spotter reported trees fell along E Parker Rd and Bethel Rd, with one tree falling on a vehicle.	Isolated thunderstorms developed along the Blue Ridge during the late afternoon and moved east. One storm produced brief damaging winds in the Morganton area.
Burke	Morganton	8/13/2019	0	0	0	Spotter reported trees blown down on Valley View St.	Widely scattered thunderstorms developed along the Blue Ridge during the afternoon and moved southeast. Several storms produced brief severe weather across the Piedmont, mainly in the form of damaging wind gusts.
Alexander	Bethlehem		0	0	5000	Amateur radio operator reported two trees blown down and blocking traffic near the intersection of Highway 127 and Telephone Exchange Rd. Spotter reported minor damage to a structure on Highway 127. Power lines were also blown down in the area.	
Catawba	Oyama		0	0	0	County comms reported a tree blown down and blocking Snow Creek Rd NE and multiple trees and power lines down along Laurel Springs Dr, Lee Cline Rd, and County Home Rd.	
	Bandy		0	0	0	Public reported a tree and multiple large limbs blown down.	
Burke	Rutherford College	8/21/2019	0	0	0	County comms and media reported multiple trees and power lines blown down from the Rutherford College area through the Rhodiss and Icard area.	Scattered to numerous thunderstorms developed near the North Carolina Blue Ridge during the afternoon into early evening. Several storm clusters organized as the storms moved
Caldwell	Granite Falls		0	0	0	County comms reported trees and power lines blown down in the Granite Falls area. Ham radio operator reported power lines down in the Northlakes area.	

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Alexander	Millersville		0	0	50000	County comms reported multiple trees and power lines blown down in the Lake Hickory. One large tree fell on and split a house in half. Numerous trees and power lines were also blown down between Vashti and Hiddenite with one tree shut down due to trees blocking the road.	southeast across the foothills and western Piedmont. Several of these clusters produced small swaths of damaging wind gusts, some of which were fairly significant.
Catawba	Claremont		0	0	0	Fire dept reported trees blown down on River Bend Rd and Rest Home Rd.	
Caldwell	Valmead	8/22/2019	0	0	0	County comms reported a tree down across Powell Rd near Camelot Ct and another tree down along with downed power lines in the Green Mountain Park area.	Scattered to numerous thunderstorms developed near the Blue Ridge escarpment during the afternoon and moved southeast to affect the foothills and western Piedmont into the late afternoon. Several of the storms produced brief damaging winds.
	Mt Herman		0	0	0	Spotter reported trees blown down on Norwood St.	
Alexander	Taylorsville		0	0	0	County comms reported a few power lines blown down in the Taylorsville area.	
Burke	Icard		0	0	0	County comms reported trees blown down in far eastern Burke County.	
Burke	Oak Hill	9/13/2019	0	0	0	Media reported multiple trees blown down northwest of Morganton, with a few down across Highway 181.	Scattered to numerous thunderstorms and storm clusters developed over western North Carolina during the afternoon and evening in association with a back door cold front. A couple of the storms produced large hail, brief damaging winds, and/or heavy rainfall.
Burke	Morganton	10/31/2019	0	0	0	County comms reported multiple trees blown down in the Morganton area.	Multiple lines of heavy rain showers and thunderstorms moved across western North Carolina throughout Halloween Day along and ahead of a potent cold front. Several pockets of strong to damaging winds were

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							reported in association with some of the thunderstorms and heaviest showers.
Catawba	Brookford	1/11/2020	0	0	0	Ham radio operator reported multiple trees blown down across Catawba County.	Multiple lines of thunderstorms developed across the western Carolinas in advance of a cold front during the late afternoon and evening. Some of these lines produced swaths of wind damage across the southern mountains, foothills, and mainly the northern Piedmont.
Caldwell	Gamewell	4/13/2020	0	0	0	County comms reported trees blown down on Highway 18 in Gamewell. Spotter reported a large tree down on Connelly Springs Rd.	A strong storm system impacted the Southeast, resulting in an area of widespread heavy rain and embedded strong to severe thunderstorms that moved across western North Carolina during the late night and early morning hours. Localized flash flooding, some of which was quite significant developed across the mountains. Isolated severe weather also occurred, mainly in the form of damaging wind gusts. Strong southerly gradient winds also caused some damage across mainly the high elevations of western North Carolina.
Burke	Drexel		0	0	0	Media reported several trees blown down along John Berry Rd.	
Catawba	Hickory		0	0	50000	Public reported a tree and power line fell on a vehicle and structure in the Hickory area. Spotter reported multiple trees down along I-40 east of Hickory.	
Burke	Morganton	4/25/2020	0	0	0	Public reported (via Social Media) a few large trees blown down in Catawba Meadows Park.	Isolated thunderstorms developed in the vicinity of a warm front across the mountains of southwest North Carolina and the northern foothills during the

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							evening. In addition, a couple of supercell thunderstorms moved into the southern Piedmont from upstate South Carolina. Several of these storms produced large hail and brief damaging winds.
Burke	Morganton	7/10/2020	0	0	0	Media reported a tree blown down near the intersection of Valley View St and Highway 18. Law enforcement reported multiple trees and power lines down near Piedmont Rd and Belvidere Ln. Public reported (via Social Media) a couple of trees down in the Chesterfield community.	Scattered thunderstorms developed across western North Carolina during the afternoon and evening. A couple of the storms produced brief severe weather.
Burke	Bridgewater	7/18/2020	0	0	0	Media reported multiple trees blown down off Dysartsville Rd.	Scattered to numerous thunderstorms developed across western North Carolina throughout the afternoon and evening. Several of the storms produced brief damaging wind gusts.
Burke	(Hky)Hickory Muni Ar	7/18/2020	0	0	0	Media reported multiple trees blown down along Airport Rhodiss Rd.	Scattered to numerous thunderstorms developed across western North Carolina throughout the afternoon and evening. Several of the storms produced brief damaging wind gusts.
Catawba	Hickory		0	0	0	Public reported (via Social Media) large tree limbs blown down along Highway 127.	
Burke	Chesterfield	7/21/2020	0	0	0	Spotter reported multiple trees blown down along Highway 64 in the Chesterfield community.	Numerous thunderstorms and scattered storm clusters developed across western North Carolina during the afternoon and evening. Multiple severe thunderstorms developed, mainly producing brief damaging wind gusts.
Catawba	Bandy		0	0	0	Fire Dept reported trees blown down on Bandys Cross Rd.	

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Chesterfield	7/23/2020	0	0	0	County comms reported trees and power lines blown down long Smokey Creek Rd and at Foothills Regional Airport.	Scattered thunderstorms developed across western North Carolina during the afternoon. One storm produced brief damaging winds in Burke County.
Burke	Icard	7/31/2020	0	0	0	Media reported trees and power lines blown down on Cape Hickory Rd.	Scattered to numerous thunderstorms and storm clusters developed across western North Carolina during the evening. Several of the storms produced brief damaging wind gusts and/or heavy rainfall. A small area of flash flooding developed in downtown Asheville. of flash flooding developed in downtown Asheville.
Alexander	All Healing Spgs		0	0	0	Media reported trees blown down and blocking Antioch Church Rd.	
Catawba	Oyama		0	0	0	Public reported (via Social Media) a tree blown down on 46th Ave NE in Hickory. Ham radio operator reported multiple trees blown down along Rockbarn Rd NE in Conover.	
Catawba	Oyama	8/2/2020	0	0	0	Fire dept reported trees blown down at County Home Rd and Lee Cline Rd on Herman Sipe Rd and on 1st Ave Place NE.	Scattered to numerous thunderstorms developed along a cold front across western North Carolina during the afternoon. A couple of the storms produced brief damaging winds across the northern foothills.
Alexander	Hiddenite		0	0	20000	Fire dept reported part of a chicken house destroyed and numerous trees and a few power lines blown down at the intersection of Sulfur Springs Rd and Hiddenite Church Rd.	
Burke	Drexel	8/6/2020	0	0	0	County comms reported trees and power lines blown down in the Drexel area.	Numerous thunderstorms and scattered storm clusters developed along a stationary front across western North Carolina during the afternoon and evening. One storm produced brief damaging winds in Burke County. Locally heavy to excessive rainfall also

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							occurred, resulting in isolated flash flooding in Catawba County.
Burke	Morganton	3/27/2021	0	0	0	Public reported a few large tree limbs blown down in the Morganton area.	Scattered thunderstorms and storm clusters developed over western North Carolina throughout the afternoon. A few of the storms produced isolated large hail and damaging wind gusts.
Burke	Oak Hill	4/10/2021	0	0	0	Media reported numerous trees blown down on Highway 181 at Bowman Ave and trees and power lines down on Highway 64 north of Morganton.	A line of heavy rain showers and thunderstorms moved over the North Carolina foothills during the late afternoon and evening in advance of a cold front. A couple of areas of isolated damaging winds along with weak tornadoes were reported as the line swept across the area.
Caldwell	Piney		0	0	0	NWS storm survey reported a small area of downburst damage along Playmore Beach Rd. Numerous trees were snapped and/or uprooted from Braswell Place to just west of Celia Creek Rd.	
Alexander	Taylorsville Arpt	6/8/2021	0	0	0	Trees and utility lines were blown down along Highway 16.	Isolated thunderstorms developed across western North Carolina during the afternoon and evening. One of the storms produced brief damaging wind gusts in Alexander County.
Catawba	Claremont	7/17/2021	0	0	0	Multiple trees were blown down or heavily damaged in Riverbend Park. Additional large limbs were also blown down.	Widely scattered thunderstorms developed over western North Carolina throughout the afternoon. One of the storms produced brief damaging wind gusts in Catawba County.
Burke	Morganton	7/27/2021	0	0	30000	Spotter reported a tree blown down across on 3 cars and another tree on a house in the city of Morganton.	Scattered thunderstorms and storm clusters developed across western North Carolina during the afternoon and early evening.

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							A couple of the storms produced brief damaging wind gusts over the foothills.
Burke	Oak Hill	8/14/2021	0	0	0	Media reported multiple trees and power lines blown down along Frank Whisnant Rd.	Numerous thunderstorms developed over western North Carolina throughout the afternoon. A number of the storms produced brief damaging wind gusts and some hail.
Caldwell	Baton		0	0	0	County comms reported trees and power lines blown down on Clarks Chapel Rd and on Calico Rd.	
Burke	Morganton	8/26/2021	0	0	0	Fire dept reported several trees blown down in and around Morganton.	Scattered thunderstorms developed over the mountains and adjacent foothills throughout the afternoon. A couple of the storms produced brief damaging wind gusts in the foothills.
Burke	Pleasant Grove Brke	8/31/2021	0	0	0	County comms reported a few trees blown down in the Pleasant Grove area.	Moisture associated with the far outer circulation of the remnants of Hurricane Ida resulted in development of numerous rain showers and thunderstorms across the North Carolina foothills during the afternoon. One small line of heavy showers and thunderstorms produced pockets of damaging winds as it moved north-northeast across the area.
	Glen Alpine		0	0	0	County comms reported a tree blown down on Lytle Dr. Public reported multiple trees down near Bethel Park in Morganton.	
Burke	Morganton	3/23/2022	0	0	0	County comms reported trees and power lines blown down throughout the Morganton area, including at the intersection Of Propst Rd and Highway 64, and Sanford Rd at Tate St, and on Lenoir Rd and Kirksey Dr.	A cold front moving across the region resulted in development of a line of scattered thunderstorms over western Nouth Carolina during the late afternoon and evening. A couple of the storms produced locally damaging wind gusts in addition

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							to an EF1 tornado in Alexander County. Additionally, heavy rainfall resulted in some localized flooding in the southern mountains.
Caldwell	Baton	5/6/2022	0	0	0	Public reported 10 to 20 trees, a few of them large blown down along J M Craig Road. A few of the trees were quite large and uprooted. A tree limb punctured the wall of an old sawmill.	Scattered to numerous thunderstorms developed ahead of a frontal system throughout the afternoon and evening across western North Carolina. Several of the storms produced brief large hail and damaging winds, while an EF1 tornado developed in Swain County.
Caldwell	Baton		0	0	0	Public reported (via Social Media) several trees blown down on Baton School Road.	Scattered to numerous thunderstorms developed ahead of a frontal system throughout the afternoon and evening across western North Carolina. Several of the storms produced brief large hail and damaging winds, while an EF1 tornado developed in Swain County.
Burke	Icard	5/26/2022	0	0	0	Media reported multiple trees and power lines blown down.	A broad band of moderate to heavy rain showers with embedded strong to severe thunderstorms moved over western North Carolina throughout the afternoon into the evening. Several strong to severe thunderstorms produced locally damaging wind gusts, brief large hail, and even a couple of tornadoes, including a strong tornado in Iredell County.
Catawba	Startown		0	0	0	Media reported multiple trees blown down on power lines in the Startown community.	

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Morganton	6/2/2022	0	0	0	Media reported trees and power lines blown down on Piedmont Rd near Highway 18.	Scattered thunderstorms developed over the North Carolina mountains and foothills during early-to-mid afternoon and steadily developed into the Piedmont during mid-to-late afternoon. A few of the storms produced hail and brief damaging wind gusts.
	Joy		0	0	0	Media reported trees and power lines blown down at a couple of campgrounds along Steele Creek and Upper Creek.	
Caldwell	Saw Mills		0	0	5000	Media reported three pine trees blown down off Powder Creek Ct and a tree on a vehicle on Pooveys Chapel Church Rd.	
Burke	Oak Hill		0	0	0	County comms reported multiple trees blown down northwest of Morganton, including on Jay Clark Rd.	
Burke	Ramsey	6/8/2022	0	0	5000	Media reported a tree was blown down on a truck along Highway 18.	Isolated thunderstorms developed over western North Carolina during the afternoon. Some of the storms produced gusty winds.
Catawba	Brookford	6/14/2022	0	0	0	Spotter reported multiple trees blown down on Zion Church Rd.	A line of thunderstorms moved south across western North Carolina during the morning. A few of the storms became strong-to-severe, producing hail and damaging wind gusts.
Catawba	Duan	6/16/2022	0	0	10000	Public reported a large tree was blown down on a house along Highway 16 south of Newton.	Scattered thunderstorms developed over western North Carolina during the afternoon and moved southeast. Some of the storms organized into small clusters. Several of the clusters and individual cells produced large hail and damaging wind gusts.
Caldwell	Kings Creek	7/5/2022	0	0	0	Public reported multiple trees blown down in the Kings Creek community.	A line of thunderstorms moved southeast across western North Carolina during the evening. Several of the embedded storms
Burke	Pleasant Grove Brke		0	0	0	County comms reported trees blown down on Corn Hill Rd.	

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Morganton		0	0	0	Media reported trees blown down near the intersection of Enola Rd and Highway 18.	produced locally damaging wind gusts.
Catawba	Newton		0	0	0	County comms reported a few trees blown down across Catawba County.	
Catawba	Plateau		0	0	0	County comms reported a few trees blown down off Cooksville Rd.	
Alexander	Bethlehem	7/6/2022	0	0	0	Media reported trees blown down in Bethlehem and along Lake Hickory near Highway 16.	Scattered thunderstorms and storm clusters developed over western North Carolina during the afternoon into the early evening. Several of the storms produced locally damaging wind gusts.
Burke	Burke Chapel		0	0	50000	Public reported multiple trees blown down with one on a trailer, part of the roof removed from a house, and a destroyed barn on Buzz Lowman St. Media reported numerous trees blown down nearby on Old Laurel Rd and significant damage to the roof of a manufacturing building on Claude Britton Rd. Ham radio operator reported multiple large trees down on Highway 18.	
Burke	Glen Alpine	7/23/2022	0	0	0	County comms reported trees blown down on Linville St.	Scattered thunderstorms developed over western North Carolina, mainly during the evening. A few of the storms produced brief damaging wind gusts.
Alexander	Bethlehem	7/25/2022	0	0	0	Fire dept reported two pine trees blown down just north of Bethlehem.	Scattered thunderstorms and storm clusters developed over western North Carolina during the afternoon and evening. Several of the storms produced strong-to-damaging wind gusts.
Burke	Pleasant Grove Brke		0	0	0	Park service reported multiple large tree limbs blown down across South Mountains State Park.	
Catawba	Conover	8/12/2022	0	0	0	Multiple trees and power lines were blown down in the city of Conover and power lines were blown down in Newton.	Isolated thunderstorms developed over the North Carolina foothills and Piedmont during the late afternoon and evening. One of the storms produced locally damaging wind gusts across several counties.

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Burke	Brindletown	8/15/2022	0	0	0	Media reported two trees blown down near the intersection of Hayes Water Rd and Conley Rd.	Scattered thunderstorms developed over western North Carolina during the afternoon. Several of the storms produced brief damaging wind gusts.
Burke	Morganton	3/3/2023	0	0	0	County comms reported trees and power lines blown down along Wesley Rd.	Multiple lines and clusters of thunderstorms moved into western North Carolina during the late afternoon and evening ahead of a cold front. Multiple reports of wind damage were received, mainly across the mountains.
Burke	Chesterfield	7/28/2023	0	0	0	Public reported trees and power lines blown down on Antioch Rd.	Scattered thunderstorms developed over western North Carolina during the afternoon and evening. A few of these storms produced brief damaging wind gusts.
Burke	Icard		0	0	0	County comms reported multiple trees blown down throughout the Icard area.	
Caldwell	Collettsville	7/29/2023	0	0	0	Ham radio operator reported several trees blown down across Caldwell County.	A line of strong-to-severe thunderstorms moved into western North Carolina from east Tennessee during the late afternoon and evening. Isolated embedded cells produced locally damaging wind gusts.
Burke	Chesterfield		0	0	0	Ham radio operator and spotter reported multiple trees and power lines blown down on roads in the Drexel area, including on Antioch Rd, at N Drexel Rd and Butler Rd, and on Settlemyre Rd.	
Catawba	Longview		0	0	0	Ham radio operators reported multiple trees blown down across the Hickory area, with multiple large trees down and blocking roads in Conover.	
Burke	Pleasant Grove Brke		0	0	0	County comms reported trees blown down on Sugar Loaf Rd.	
Catawba	Startown	8/6/2023	0	0	1000	Emergency manager reported several trees blown down in a wooded area off of Zion Church Rd, with a small tree down on an outbuilding in the vicinity.	An area of showers and thunderstorms moved across the North Carolina Piedmont during the afternoon. Some of the embedded storms became

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
							briefly severe, producing damaging wind gusts.
Burke	Glen Alpine	8/7/2023	0	0	2000	County comms and spotter reported numerous trees and some power lines blown down from Glen Alpine across Morganton and vicinity. One tree fell on an outbuilding near Glen Alpine.	Numerous thunderstorms and storm clusters moved across western North Carolina throughout the afternoon. Many of these storms produced severe weather, mainly in the form of damaging wind gusts, some of which were fairly long-lived. A couple of weak tornadoes also developed in the Piedmont, including a long-track EF1.
Caldwell	Hudson		0	0	0	Emergency manager reported a billboard blown over along Highway 321 near Hudson. Ham radio operator reported a tree blown down on power lines in Sawmills.	
Alexander	Bethlehem		0	0	50000	Fire dept reported multiple trees and some power lines blown down, some blocking roads across southern Alexander County. Structural damage occurred to a couple of buildings, including a structure at Alexander County fairgrounds.	
Burke	Hildebran		0	0	10000	Public reported (via Social Media) a tree blown down on a home.	
Catawba	Brookford		0	0	200000	NWS storm survey found a swath of intense straight line wind damage across central Catawba County, from Mountain View and Hickory to Conover and Newton. Large numbers of trees were snapped and/or uprooted with numerous large tree branches downed. Several power poles were snapped and a few structures were damaged, including a building at the Hickory American Legion Fairgrounds and a greenhouse that was destroyed.	
Catawba	Maiden		0	0	0	Public reported (via Social Media) numerous trees and power lines blown down across Maiden and vicinity.	
Catawba	Claremont		0	0	0	Public reported (via Social Media) trees blown down on I-40 in the Claremont area, and additional trees down on nearby Rock Barn Rd.	
Alexander	Bethlehem	8/27/2023	0	0	0	County comms reported a few trees blown to the south of Ellendale.	Scattered thunderstorms and storm clusters developed across

County	Location	Date	Deaths	Injuries	Property Damage ($)	Event Narrative	Episode Narrative
Alexander	Millersville		0	0	0	County comms reported at least two trees blown down in the vicinity of Highway 16 across southern Alexander County.	western North Carolina throughout the afternoon into the evening. Some storms produced brief damaging wind gusts.
Burke	Connellys Spgs	9/7/2023	0	0	0	Public reported trees blown down at Rhodhiss Rd and Knob Ave.	Widely scattered thunderstorms along with a couple of storm clusters developed over western North Carolina, mainly during the evening. Several of the storms produced brief damaging wind gusts and/or large hail.
Catawba	Conover	9/13/2023	0	0	0	County comms reported a tree blown down on a vehicle on Conover Blvd West. Fire dept reported a tree down on and blocking Highway 10.	Scattered thunderstorms and storm clusters developed across western North Carolina during the late afternoon. A couple of storms produced brief damaging wind gusts in the northern Piedmont.
Total			**1**	**2**	**$750,000**		

Table A- 5: NCDC Thunderstorm Winds reported between 2018 and 2023

County	Jurisdiction	Date	Event Type	Deaths	Injuries	Property Damage
Burke Co.	Glen Alpine	4/15/2018	Flash Flood	0	0	1000
Caldwell Co.	Edgemont	5/18/2018	Flash Flood	0	0	50000
Burke Co.	Joy	5/18/2018	Flood	0	0	5000
Caldwell Co.	Edgemont	5/19/2018	Flood	0	0	5000
Caldwell Co.	Yadkin Vly	5/29/2018	Flash Flood	0	0	2000
Burke Co.	Table Rock	5/29/2018	Flash Flood	0	0	3000
Caldwell Co.	Edgemont	5/29/2018	Flash Flood	0	0	2000

County	Jurisdiction	Date	Event Type	Deaths	Injuries	Property Damage
Caldwell Co.	Collettsville	5/30/2018	Flood	0	0	500
Burke Co.	Joy	5/30/2018	Flood	0	0	1000
Caldwell Co.	Edgemont	5/31/2018	Flash Flood	0	0	5000
Burke Co.	Pleasant Grove Brke	9/16/2018	Flash Flood	0	0	1000
Caldwell Co.	Edgemont	9/16/2018	Flood	0	0	1000
Burke Co.	Joy	9/17/2018	Flood	0	0	1000
Burke Co.	Joy	9/23/2018	Flash Flood	0	0	2000
Caldwell Co.	Edgemont	10/11/2018	Flash Flood	0	0	1000
Burke Co.	Joy	10/11/2018	Flood	0	0	2000
Caldwell Co.	Edgemont	10/11/2018	Flood	0	0	500
Burke Co.	Joy	12/21/2018	Flood	0	0	1000
Burke Co.	Joy	12/28/2018	Flood	0	0	2000
Catawba Co.	Brookford	6/7/2019	Flash Flood	0	0	5000
Burke Co.	Calvin	6/8/2019	Flash Flood	0	0	50000
Caldwell Co.	Lenoir	6/8/2019	Flash Flood	0	0	10000
Catawba Co.	Longview	6/8/2019	Flash Flood	0	0	50000
Caldwell Co.	Edgemont	6/8/2019	Flood	0	0	1000
Burke Co.	Joy	6/8/2019	Flood	0	0	2000
Catawba Co.	Catawba	6/9/2019	Flood	0	0	250000
Catawba Co.	Oyama	6/9/2019	Flash Flood	0	0	10000
Alexander Co.	Bethlehem	6/9/2019	Flash Flood	0	0	10000
Catawba Co.	Oyama	6/9/2019	Flood	0	0	1000
Alexander Co.	Bethlehem	6/9/2019	Flood	0	0	1000
Caldwell Co.	Edgemont	6/9/2019	Flash Flood	0	0	30000
Burke Co.	Joy	6/9/2019	Flash Flood	0	0	2000
Burke Co.	Joy	1/12/2020	Flood	0	0	1000
Catawba Co.	Conover	2/6/2020	Flash Flood	0	0	10000

County	Jurisdiction	Date	Event Type	Deaths	Injuries	Property Damage
Burke Co.	Brindletown	2/6/2020	Flash Flood	0	0	25000
Caldwell Co.	Lenoir	2/6/2020	Flash Flood	0	0	2000
Alexander Co.	Taylorsville	2/6/2020	Flash Flood	0	0	2000
Burke Co.	Joy	2/6/2020	Flood	0	0	25000
Catawba Co.	Catawba	2/6/2020	Flood	0	0	50000
Caldwell Co.	Globe	4/13/2020	Flash Flood	0	0	100000
Burke Co.	Joy	4/13/2020	Flash Flood	0	0	1000
Burke Co.	Joy	4/13/2020	Flood	0	0	1000
Catawba Co.	Propst Xrds	6/19/2020	Flash Flood	0	0	500
Catawba Co.	Drums Xrds	8/6/2020	Flash Flood	0	0	500
Catawba Co.	Hickory	8/15/2020	Flash Flood	0	0	50000
Caldwell Co.	Yadkin Vly	10/29/2020	Flash Flood	0	0	3000
Burke Co.	Joy	10/29/2020	Flash Flood	0	0	5000
Caldwell Co.	Whitnel	10/29/2020	Flood	0	0	1000
Burke Co.	Joy	10/29/2020	Flood	0	0	1000
Caldwell Co.	Richland	11/12/2020	Flash Flood	0	0	50000
Alexander Co.	Vashti	11/12/2020	Flash Flood	5	0	350000
Catawba Co.	Catawba	11/12/2020	Flash Flood	0	0	500000
Burke Co.	Chesterfield	11/12/2020	Flash Flood	0	0	10000
Catawba Co.	Longview	11/12/2020	Flash Flood	0	0	1000
Alexander Co.	Vashti	11/12/2020	Flood	1	0	100000
Catawba Co.	Catawba	11/12/2020	Flood	0	0	10000
Caldwell Co.	Collettsville	8/17/2021	Flood	0	0	500
Burke Co.	Joy	8/17/2021	Flood	0	0	1000
Burke Co.	Enola	10/7/2021	Flash Flood	0	0	10000
Burke Co.	Joy	11/11/2022	Flood	0	0	1000
Caldwell Co.	Collettsville	11/11/2022	Flood	0	0	500
Caldwell Co.	Edgemont	11/11/2022	Flash Flood	0	0	500

County	Jurisdiction	Date	Event Type	Deaths	Injuries	Property Damage
Alexander Co.	All Healing Spgs	7/15/2023	Flash Flood	1	1	10000
Caldwell Co.	Yadkin Vly	7/15/2023	Flash Flood	0	0	2000
Burke Co.	Joy	12/26/2023	Flood	0	0	1000
Caldwell Co.	Valmead	1/9/2024	Flash Flood	0	0	5000
Alexander Co.	Taylorsville Arpt	1/9/2024	Flash Flood	0	0	1000
Burke Co.	Joy	1/9/2024	Flood	0	0	1000
Caldwell Co.	Collettsville	1/9/2024	Flood	0	0	1000
Catawba Co.	Propst Xrds	1/9/2024	Flash Flood	0	0	1000

Table A- 6: Flooding Events from 2018-2024 from the NCDC Storm Events Database

Incident Name	County	Discovery Date and Time	Cause	Acres	Landowner Category	Landowner Kind	Initial Lat	Initial Lon	Estimated Cost
Dam Cove Rd	Catawba	2024-04-18 19:33:00	Human	0.4	Private	Private			1200
Henry Fork	Burke	2024-04-15 17:36:00	Undetermined	211	State	Other			3000
OVERLOOK	Burke	2024-01-22 16:35:31	Human	0.1	USFS	Federal	36.03246	-81.7928	
Winchester Road	Caldwell	2023-11-07 18:25:00	Human	2	Private	Private			600
TRUCKSTOP	Burke	2023-11-03 20:02:51	Human	0.1	USFS	Federal	35.92275	-81.8203	
BABEL TOWER	Burke	2023-04-25 18:13:00	Natural	12	USFS	Federal	35.91848	-81.9184	
181	Burke	2023-03-06 15:24:00	Undetermined	0.1	USFS	Federal	35.92307	-81.8203	
OVERLOOK	Burke	2022-03-22 21:36:00	Undetermined	0.2	USFS	Federal	35.90136	-81.906	
RACKETT BRANCH	Caldwell	2022-03-05 22:28:00	Human	30	USFS	Federal	36.08051	-81.7615	

HAWKSBILL	Burke	2021-04-20 16:18:00	Human	4.5	USFS	Federal	35.91469	-81.8783	
UPPER CREEK FALLS	Burke	2021-03-22 22:01:00	Unknown	0.1	USFS	Federal	35.95921	-81.8614	
GRF Dobson Knob RX	Burke	2020-03-01 12:44:07	Unknown				35.81644	-81.9371	
BARKHOUSE	Burke	2019-11-10 20:37:00	Human	0.1	USFS	Federal	35.95392	-81.8497	
UPPER CREEK	Burke	2019-10-19 14:59:00	Human	0.1	USFS	Federal	35.93225	-81.8051	
TABLE ROCK	Burke	2019-06-02 22:43:00	Human	0.5			35.8898	-81.8839	
BRUSHY RIDGE	Burke	2019-04-28 20:22:00	Human	3	USFS	Federal	35.92333	-81.9182	
UPPER CREEK	Burke	2018-04-30 23:06:00	Human	1	USFS	Federal	35.91933	-81.8038	
CORN FIELD	Caldwell	2018-03-17 18:48:00	Human	42			36.01123	-81.6516	
WOLF PIT	Burke	2018-03-04 20:59:00	Human	0.25			35.81	-81.8707	
CABIN TRAIL	Burke	2017-10-25 17:35:00	Human	0.4	USFS	Federal			
WILSON CREEK	Caldwell	2017-07-07 19:04:00	Human		USFS	Federal			
STAIRCASE	Caldwell	2017-06-03 22:00:00	Natural	10					
MCNAB	Burke	2017-04-28 12:10:00	Human	25	USFS	Federal			
Bartley	Caldwell	2017-03-24 18:44:00		5					3500
WHITE CREEK	Burke	2017-03-16 19:45:00	Natural	5500					937840.56
Chestnut Knob	Burke	2016-11-06 13:00:00	Undetermined	6435					4600000
PADDY'S CREEK	Burke	2016-10-24 20:10:00	Human	12	USFS	Federal			

Upper creek	Burke	2016-06-07 21:30:00	Natural	169	USFS	Federal	250000
THUNDERHOLE	Caldwell	2015-09-04 20:30:00	Natural	0.5	USFS	Federal	
HWY 105	Burke	2015-05-04 18:31:00	Human	0.5	USFS	Federal	
BLUE GRAVEL	Burke	2015-04-11 18:30:00	Undetermined	521	USFS	Federal	264194
PERCY CREEK	Burke	2014-12-13 19:15:00	Human		USFS	Federal	
Silver Creek	Burke	2014-12-13 8:00:00	Undetermined	300			3362
Jon Johnson	Burke	2014-11-11 16:55:00	Human	0.1			
HIGHWAY 105	Burke	2014-10-25 19:30:00	Human		USFS	Federal	

Table A- 7: Documented wildfires from the National Interagency Fire Center Database for the Unifour Counties.

Appendix B: Critical Facilities, Historical Properties, and Emergency Services

Tables:

Table 1: Healthcare and vulnerable facilities According to the NC Department of Health and Human Services Division of Health Service Regulation.....1
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Table 1: Healthcare and vulnerable facilities According to the NC Department of Health and Human Services Division of Health Service Regulation

County	City or Town	Facility Type	Facility Name
Burke	Morganton	Hospital	UNC Health Blue Ridge
		Intermediate Care Facilities for Adults	Hartland Group Home
			Chesterfield Group Home
			SCI-Burke ICF/MR Group Home
		Nursing Facility	Autumn Care of Drexel
			Magnolia Lane Nursing and Rehabilitation Center
			Grace Ridge
			Grace Heights Health and Rehabilitation
		Cardiac Rehabilitation Facility	UNC Health Blue Ridge- Cardiac Rehabilitation
		Family Care Homes	Quaker Meadows Family Care
			Chesterfield Family Care Home
			Perkins Care Home
			The Patterson House Family Care Home
			Clara's Cottage # 2
			Clara's Cottage # 1
			McCurry Family Care Home
			Country Pines II
			Days of Comfort Family Care Home
		Adult Care Homes / Homes for the Aged	Burke Assisted Living
			Cambridge House
			The Berkeley
			McAlpine Adult Care

County	City or Town	Facility Type	Facility Name
			Morganton Long Term Care, Southview Facility
	Connely Springs	Nursing Facility	College Pines Health and Rehabilitation
			Carolina Rehab Center of Burke
		Family Care Homes	East View Family Care
	Glen Alpine	Family Care Homes	Glen Alpine Family Care
	Hildebran	Adult Care Homes / Homes for the Aged	Cambridge House
	Jonas Ridge	Adult Care Homes / Homes for the Aged	Jonas Ridge Adult Care
Caldwell	Lenoir	Hospital	Caldwell Memorial Hospital
		Intermediate Care Facilities for Adults	Creekside Group Home
		Nursing Facility	Gateway Rehabilitation and Healthcare
			Lenoir Health and Rehabilitation Center
			Shaire Nursing Center
		Family Care Homes	DalyCares
		Cardiac Rehabilitation Facility	UNC Heart and Vascular
		Adult Care Homes / Homes for the Aged	Brookdale Lenoir
			The Shaire Center
			Grandview Villa Assisted Living
	Granite Falls	Intermediate Care Facilities for Adults	VOCA-Laurel Group Home
		Nursing Facility	Hickory Falls Health and Rehabilitation
		Adult Care Homes / Homes for the Aged	Grace Village Assisted Living & Memory Care
			Brockford Inn
	Morganton	Intermediate Care Facilities for Adults	Playmore Group Home
			Lower Creek Group Home
Catawba	Hickory	Hospital	Catawba Valley Medical Center
			Frye Regional Medical Center
		Nursing Facility	The Greens at Viewmont
			Trinity Ridge
			Trinity Village
			The Greens at Hickory
		Cardiac Rehabilitation Facility	Catawba Valley Medical Center CRP
			Frye Regional Medical Center Cardiopulmonary Rehab. Prg
		Family Care Homes	Serenity Family Care Home

County	City or Town	Facility Type	Facility Name
		Adult Care Homes / Homes for the Aged	Hickory Village
			Springs of Catawba
			Brookdale Hickory Northeast
			Brookdale Falling Creek
	Claremont	Intermediate Care Facilities for Adults	Penny Lane #1
			Penny Lane II
	Maiden	Intermediate Care Facilities for Adults	Wendover Home
	Newton	Intermediate Care Facilities for Adults	23rd Street Home
			Shannonbrook Home
		Nursing Facility	Abernethy Laurels
		Adult Care Homes / Homes for the Aged	Piedmont Village at Newton
			TerraBella Newton
	Conover	Nursing Facility	Conover Nursing and Rehabilitation Center
		Family Care Homes	Mulberry Place
		Adult Care Homes / Homes for the Aged	Austin Adult Care
			Heritage Place II
			Heritage Care of Conover
Alexander	Taylorsville	Intermediate Care Facilities for Adults	Little River Group Home
			VOCA-Second Avenue Group Home
			Ellendale Group Home
		Nursing Facility	Valley Nursing and Rehabilitation Center
		Family Care Homes	Sarah's House
		Adult Care Homes / Homes for the Aged	Heritage Care Home of Taylorsville
			Faith Assisted Living Facility
			Taylorsville House

Table 2: Emergency Medical Services, Fire Stations, and Law Enforcement centers according to NC One Map[1]

Facility Type	Facility Name	Address	City	County
EMS	Hiddenite Fire Department Incorporated	45 FIRE DEPARTMENT COURT ROAD	Hiddenite	Alexander
Fire Station	Hiddenite Fire Department, Inc.	4975 E. NC 90 Hwy		
Fire Station	Hiddenite Fire Department, Inc.	4472 Cheatham Ford Road		
EMS	Stony Point Volunteer Fire Department	501 Ruritan Park	Stony Point	
Fire Station	Stony Point Volunteer Fire Department, Inc.			
Fire Station	Stony Point Volunteer Fire Department, Inc.	9621 Paul Payne Store Road		

[1] https://www.nconemap.gov/datasets/99618bd65ab04dd2b0a6b0cd896e7113_1/explore ; https://www.nconemap.gov/maps/41382a5c439e4ed384ba4ecf6ac170ad ; https://www.nconemap.gov/datasets/6f4fe0c55b0d4cbb92877e461d698c29_0/explore

Facility Type	Facility Name	Address	City	County
EMS	Sugarloaf Volunteer Fire Department Incorporated	3564 STATE HIGHWAY 16 NORTH	Taylorsville	
EMS	Bethlehem Community Volunteer Fire Department Incorporated	235 TEAGUE TOWN ROAD		
EMS	Ellendale Community Volunteer Fire Department Incorporated	70 ELLENDALE FIRE DEPARTMENT ROAD		
EMS	Central Alexander Fire Department Incorporated	EMERGENCY STREET		
EMS	Vashti Volunteer Fire Department Incorporated	21 VASHTI FIRE DEPARTMENT ROAD		
EMS	Wittenburg Volunteer Fire Department	45 WITTENBURG ROAD		
EMS	Alex Rescue Squad And Emergency Medical Services Incorporated	197 EMERGENCY STREET		
EMS	Alexander County Emergency Medical Services Station 1	2430 STATE HIGHWAY 90 EAST		
Fire Station	Bethlehem Community Fire & Rescue, Inc.	7373 NC Hwy 127		
Fire Station	Central Alexander Fire Department, Inc.	173 Emergency Street		
Fire Station	Ellendale Community Volunteer Fire Department, Inc.	30 Ellendale Road		
Fire Station	Sugar Loaf Volunteer Fire Department, Inc.	4272 N. NC 16 Hwy N		
Fire Station	Vashti Volunteer Fire Department, Inc.	21 Vashti Fire Department Road		
Fire Station	Wittenburg Volunteer Fire Department	77 Wittenburg Road		
Law Enforcement	Alexander County Sheriffs Office	29 WEST MAIN AVENUE		
Law Enforcement	City Of Taylorsville Police Department	67 MAIN AVENUE DRIVE		
EMS	Alexander County Emergency Medical Services - Bethlehem Base	9110 STATE HIGHWAY 127		
Fire Station	George Hildebran Fire And Rescue Department Inc.	7470 George Hildebran School Road	Connelly Springs	Burke
Fire Station	Icard Township Fire Rescue, Inc.	3475 Miller Bridge Road		
Fire Station	Lovelady Volunteer Fire & Rescue Department, Incorporated	1008 US 70 Hwy		
Fire Station	South Mountains Fire Rescue, Inc.	8204 Gus Peeler Road		
EMS	Burke County Emergency Services Station 2	750 MALCOLM BOULEVARD		
EMS	Rhodhiss Volunteer Fire Department	200 BURKE STREET		
Law Enforcement	Rhodhiss Police Department	200 BURKE STREET		
Law Enforcement	North Carolina Division Of Parks - South Mountains State Park	3001 SOUTH MOUNTAIN PARK AVENUE		
Fire Station	Drexel Fire Department	202 Church Street	Drexel	
Law Enforcement	Drexel Police Department	202 CHURCH STREET		
Fire Station	Glen Alpine Volunteer Fire Department	104 Catawba Street	Glen Alpine	
EMS	Hickory Fire Department Station 4 - Airport	3101 9TH AVENUE DRIVE NORTHWEST	Hickory	
Fire Station	Drowning Creek Volunteer Fire Department, Inc.	1630 Airport Rhodhiss Road		
EMS	Burke County Emergency Services Station 4	705 UNITED STATES HIGHWAY 70 WEST	Hildebran	
Fire Station	Icard Township Fire Rescue, Inc.	100 First Avenue North East		
Fire Station	Jonas Ridge Volunteer Fire & Rescue Department, Inc.	6680 Dogwood Knob Road	Jonas Ridge	Burke

Facility Type	Facility Name	Address	City	County
EMS	Burke County Emergency Services Station 1	108 FOOTHILLS DRIVE	Morganton	Burke
EMS	Burke County Emergency Services Station 3	50 CATAWBA STREET		
EMS	Burke County Rescue Squad	120 SAINT MARYS CHURCH ROAD		
Fire Station	Brendletown Fire Protection And Rescue Association, Inc.	5157 US Hwy 64		
Fire Station	Brendletown Fire Protection And Rescue Association, Inc.	3646 Bennet Road		
Fire Station	Chesterfield Fire And Rescue Protection Association, Inc.	2160 Hwy. 18 N. and U.S. 64		
Fire Station	Enola Volunteer Fire Rescue	2559 Enola Road		
Fire Station	Lake James Fire And Rescue, Inc.	3222 Hwy. 126		
Fire Station	Morganton Department Of Public Safety	231 Avery Avenue		
Fire Station	Morganton Department Of Public Safety	801 Carbon City Road		
Fire Station	Morganton Department Of Public Safety	840 Burkemont Avenue		
Fire Station	Oak Hill Fire And Rescue Protection Association, Inc.	2400 NC 181 Hwy		
Fire Station	Oak Hill Fire And Rescue Protection Association, Inc.	3000 Brown Mountian Beach Road		
Fire Station	Salem Community Fire And Rescue Protection Association, Inc	1315 Salem Rd		
Fire Station	Salem Community Fire And Rescue Protection Association, Inc	3461 NC 18 South	Morganton	
Fire Station	Triple Community Fire Department, Inc.	505 Mountain View Drive		
Fire Station	West End Volunteer Fire Department, Incorporated	3776 Jamestown Rd.		
Fire Station	West End Volunteer Fire Department, Incorporated	1908 Jamestown Road		
Law Enforcement	Town Of Glen Alpine Police Department	103 PITTS STREET		
Law Enforcement	Broughton State Mental Hospital Police Department	1000 SOUTH STERLING STREET		
Law Enforcement	Burke County Sheriffs Department	150 GOVERNMENT DRIVE		
Law Enforcement	North Carolina State Highway Patrol Troop F District I	260 ENOLA ROAD		
Law Enforcement	Morganton Department Of Public Safety	304 SOUTH COLLEGE STREET		
Fire Station	Longtown Volunteer Fire Department, Inc.	7765 South Mountain Institute Rd.	Nebo	
Fire Station	West End Volunteer Fire Department, Incorporated	5731 Benfield's Landing Road		
Law Enforcement	North Carolina Division Of Parks - Lake James State Park	2785 STATE HIGHWAY 126		
EMS	Burke County Emergency Services Station 5	6680 DOGWOOD KNOB ROAD	Newland	
Fire Station	Lovelady Volunteer Fire & Rescue Department, Incorporated	748 Malcolm Blvd.	Rutherford College	
EMS	Eastern Burke County Rescue Squad	713 CHURCH STREET NORTHWEST	Valdese	
Fire Station	Valdese Fire Department	121 Faet Street SW		
Law Enforcement	City Of Valdese Police Department	121 FAET STREET		
EMS	Collettsville Volunteer Fire And Rescue Department Incorporated	5430 ADAKO ROAD	Collettsville	

Facility Type	Facility Name	Address	City	County
Fire Station	Collettsville Volunteer Fire And Rescue Department, Inc.	5430 Adako Road		Caldwell
EMS	Granite Falls Fire Department	119 NORTH MAIN STREET	Granite Falls	
EMS	Grace Chapel Volunteer Fire Department	4470 GRACE CHAPEL ROAD		
EMS	Sawmills Volunteer Fire Department Incorporated	4068 UNITED STATES HIGHWAY 321A		
EMS	Lovelady Rescue Squad	5584 YORK ROAD		
Fire Station	Grace Chapel Volunteer Fire Department	4548 Grace Chapel Road		
Fire Station	Granite Falls Fire Department	119 North Main Street		
Fire Station	Sawmills Volunteer Fire & Rescue, Inc.	4068 US 321-A		
Law Enforcement	City Of Granite Falls Police Department	5 FALLS AVENUE		
Fire Station	Rhodhiss Fire Department	200 Burke Street	Hickory	
EMS	Hudson Fire And Rescue Squad Incorporated	122 MOUNT HERMAN ROAD	Hudson	
Fire Station	The Hudson Volunteer Fire Department, Inc.	122 Mount Herman Road		
Law Enforcement	Town Of Hudson Police Department	550 CENTRAL STREET		
Law Enforcement	North Carolina State Highway Patrol Troop F District Iii	309 PINE MOUNTAIN ROAD		
EMS	Little River Fire Department Incorporated	4800 OAKHILL SCHOOL ROAD	Lenoir	
EMS	Gamewell Volunteer Fire Department Incorporated	2806 MORGANTON BOULEVARD SOUTHWEST		
EMS	Patterson Volunteer Fire Department Incorporated	1414 YADKIN RIVER ROAD		
EMS	Yadkin Valley Volunteer Fire Department	2815 STATE HIGHWAY 268		
EMS	North Catawba Fire - Rescue Department Incorporated	2064 CONNELLY SPRINGS ROAD		
EMS	Lenoir Fire Department Station 2	1927 NORWOOD STREET SOUTHWEST		
EMS	Kings Creek Volunteer Fire Department Incorporated	3420 WILKESBORO BOULEVARD		
EMS	Valmead Volunteer Fire Department Incorporated	1757 NORTH MAIN STREET		
EMS	Lenoir Fire Department Station 1	602 HARPER AVENUE NORTHWEST		
EMS	Caldwell County Emergency Medical Services	616 WEST AVENUE NORTHWEST		
EMS	Lenoir Rescue Squad	420 FAIRVIEW DRIVE SOUTHWEST		
Fire Station	Collettsville Volunteer Fire And Rescue Department, Inc.	6370 Globe Creek Place		
Fire Station	King's Creek Volunteer Fire Department, Inc.	3420 Wilkesboro Blvd		
Fire Station	Lenoir Fire Department	602 Harper Ave. NW		
Fire Station	Lenoir Fire Department	1927 Norwood Street		
Fire Station	Lenoir Fire Department	1015 Wilkesboro Blvd. NE		
Fire Station	Little River Fire Department, Inc.	4800 Oak Hill School Road		
Fire Station	North Catawba Fire-Rescue Department, Inc.	2064 Connelly Springs Road		

Facility Type	Facility Name	Address	City	County
Fire Station	Patterson Fire-Rescue Department Inc.	1414 Yadkin River Rd.		
Fire Station	Patterson Fire-Rescue Department Inc.	4500 Blowing Rock Blvd		
Fire Station	The Gamewell Volunteer Fire Department, Inc.	2806 Morganton Blvd.		
Fire Station	Valmead Volunteer Fire-Rescue Department, Inc.	1757 North Main Street		
Fire Station	Yadkin Valley Volunteer Fire-Rescue Department, Inc.	2815 NC Hwy 268		
Law Enforcement	Caldwell County Sheriffs Department / Caldwell County Jail	2351 MORGANTON BOULEVARD SOUTHWEST		
Law Enforcement	North Carolina Department Of Environment And Natural Resources Division Of Forest Resources - District 2	1543 WILKESBORO BOULEVARD NORTHEAST		
Law Enforcement	City Of Lenoir Police Department	1035 WEST AVENUE NORTHWEST		
EMS	Catawba Volunteer Fire Department Station 8	108 NORTH MAIN STREET	Catawba	Catawba
EMS	Bandys Crossroads Volunteer Fire Department Station 9 Base 1	1611 BUFFALO SHOALS ROAD		
EMS	Catawba Rescue Squad Incorporated	300 ROSENWALD SCHOOL STREET		
Fire Station	Bandys Crossroads Volunteer Fire Department, Incorporated	1611 Buffalo Shoals Road		
Fire Station	Catawba Volunteer Fire Department, Inc.	108 N Main St		
Law Enforcement	Catawba Police Department	107 SOUTH MAIN STREET		
EMS	Oxford Fire Department Station 2 - Catfish Fire District	5710 STATE HIGHWAY 16 NORTH	Claremont	
EMS	Claremont Fire Department	2850 FIREHOUSE LANE		
EMS	Claremont Rescue Squad	2748 SOUTH OXFORD STREET		
Fire Station	Claremont Fire Department	2850 Fire House Lane		
Fire Station	Oxford Fire Department, Inc.	5688 Oxford School Rd		
Fire Station	Oxford Fire Department, Inc.	5710 NC Hwy 16 North		
Law Enforcement	Claremont Police Department	3301 EAST MAIN STREET		
EMS	Saint Stephens Fire Department Station 4 Base 2	4060 SPRINGS ROAD	Conover	
EMS	Conover Fire Department Station 1	1225 CONOVER BOULEVARD EAST		
EMS	Conover Fire Department Station 3	1776 VILLAGE SQUARE NORTHWEST		
EMS	Conover Fire Department Station 2	1110 FIRST STREET WEST		
Fire Station	Conover Fire Department	1225 Conover Blvd E		
Fire Station	Conover Fire Department	1011 1st Street W		
Fire Station	Conover Fire Department	1776 Village Square NW		
Fire Station	St. Stephens Fire Department, Inc.	4060 Springs Road		
Law Enforcement	North Carolina Alcohol Law Enforcement District 7 Station	3305-13 16TH AVENUE SOUTHEAST		
Law Enforcement	Conover Police Department	115 2ND AVENUE NORTHEAST		
Fire Station	Sherrills Ford - Terrell Fire & Rescue, Inc.	4582 Burris Rd	Denver	

Facility Type	Facility Name	Address	City	County
EMS	Saint Stephens Fire Department Station 4 Base 1	2810 SPRINGS ROAD NORTHEAST	Hickory	Catawba
EMS	Mountain View Volunteer Fire Department Station 12	3323 STATE HIGHWAY 127 SOUTH		
EMS	Hickory Fire Department Station 6 - Viewmont	3036 NORTH CENTER STREET		
EMS	Hickory Fire Department Station 5 - Fairbrook	1425 21ST STREET DRIVE SOUTHEAST		
EMS	Hickory Fire Department Station 2 - Highland	1305 9TH AVENUE NORTHEAST		
EMS	Hickory Fire Department Station 1 - Headquarters	19 2ND STREET DRIVE NORTHEAST		
EMS	Hickory Rescue Squad Incorporated	320 3RD STREET DRIVE SOUTHWEST		
EMS	Hickory Fire Department Station 7 - Southeast	465 CATAWBA VALLEY BOULEVARD SOUTHEAST	Hickory	
EMS	Hickory Fire Department Station 3 - West Hickory	135 11TH STREET NORTHWEST		
Fire Station	Hickory Fire Department	19 2nd Street NE		
Fire Station	Hickory Fire Department	1305 9th Ave NE		
Fire Station	Hickory Fire Department	135 11th Street NW		
Fire Station	Hickory Fire Department	3101 9th Avenue		
Fire Station	Hickory Fire Department	1425 21st Street Drive SE		
Fire Station	Hickory Fire Department	3036 North Center Street		
Fire Station	Hickory Fire Department	465 Catawba Valley Blvd		
Fire Station	Long View Fire Department	2404 1ST AVE SW		
Fire Station	Mountain View Volunteer Fire Department Of Catawba County, Inc.	3323 Hwy # 127 South		
Fire Station	Mountain View Volunteer Fire Department Of Catawba County, Inc.	1540 Henry River Road		
Fire Station	Mountain View Volunteer Fire Department Of Catawba County, Inc.	3571 NC Hwy 127 South		
Fire Station	St. Stephens Fire Department, Inc.	2810 Springs Road		
Law Enforcement	Federal Bureau Of Investigation - Hickory Resident Agency	231 GOVERNMENT AVENUE SOUTHWEST		
Law Enforcement	Brookford Police Department	1700 SOUTH CENTER STREET		
Law Enforcement	Longview Police Department	2404 1ST AVENUE SOUTHWEST		
Law Enforcement	City Of Hickory Police Department	347 2ND AVENUE SOUTHWEST		
Law Enforcement	North Carolina Bureau Of Investigation - Hickory Office	1060 ZION CHURCH ROAD		
Law Enforcement	United States Internal Revenue Service Criminal Investigation Division - Hickory	115 5TH AVENUE NORTHWEST		
EMS	Long View Fire Department Station 2	2404 1ST AVENUE SOUTHWEST	Long View	
EMS	Maiden Fire Department Station 10	110 WEST MAIN STREET	Maiden	
Fire Station	Bandys Crossroads Volunteer Fire Department, Incorporated	3679 Buffalo Shoals Road		
Fire Station	Bandys Crossroads Volunteer Fire Department, Incorporated	4849 NC 16 Hwy S		
Fire Station	Maiden Fire Department	110 W Main St		

Facility Type	Facility Name	Address	City	County
Fire Station	Maiden Fire Department	5911 Startown Rd.		
Law Enforcement	Maiden Police Department	201 WEST MAIN STREET		
EMS	Newton Fire Department Station 2 - Northside	560 WEST 21ST STREET	Newton	
EMS	Bandys Crossroads Volunteer Fire Department Station 9 Base 2	1598 BUFFALO SHOALS ROAD		
EMS	Newton-Conover Rescue Squad Incorporated	327 EAST A STREET		
EMS	Propst Crossroads Volunteer Fire Department	3169 PLATEAU ROAD		
EMS	Newton Fire Department Station 1 - Headquarters	116 WEST A STREET		
EMS	Maiden Rescue Squad Incorporated	3496 SAINT JAMES CHURCH ROAD	Newton	Caldwell
EMS	Catawba County Emergency Medical Services	1101 SOUTH BRADY AVENUE		
Fire Station	Newton Fire Department	119 S. Brady Ave.		
Fire Station	Newton Fire Department	560 W 21St Street		
Fire Station	Newton Fire Department	4197 Startown Road		
Fire Station	Propst Cross Roads Volunteer Fire Department No. 5	3169 Plateau Rd		
Law Enforcement	North Carolina State Highway Patrol Troop F - Headquarters	1033 SMYRE FARM ROAD		
Law Enforcement	North Carolina State Highway Patrol Troop F District V	3265 UNITED STATES HIGHWAY 70 SOUTHEAST		
Law Enforcement	Catawba County Sheriffs Office / Catawba County Jail	100 SOUTHWEST BOULEVARD		
Law Enforcement	Newton City Police Department	411 NORTH COLLEGE AVENUE		
EMS	Sherrills Ford Terrell Fire And Rescue Station 2	4385 MOUNT PLEASANT ROAD	Sherrills Ford	
EMS	Sherrills Ford Terrell Fire And Rescue - Headquarters	4011 SLANTING BRIDGE ROAD		
EMS	Sherrills Ford Terrell Fire And Rescue	8073 SHERRILLS FORD ROAD		
Fire Station	Sherrills Ford - Terrell Fire & Rescue, Inc.	4011 Slanting Bridge Rd		
Fire Station	Sherrills Ford - Terrell Fire & Rescue, Inc.	4385 Mt. Pleasant Rd		
Fire Station	Sherrills Ford - Terrell Fire & Rescue, Inc.	2080 Mollys Backbone Road		
EMS	Cooksville Volunteer Fire Department Station 14	6942 OLD SHELBY ROAD	Vale	
Fire Station	Cooksville Volunteer Fire Department No. 8	6942 Old Shelby Road		

Table 3: Historic Places, Buildings, Districts, and Structures from the NRI Register of Historic Places[2]

County	Property Name	Property Type
Alexander	Lucas Mansion	Building
	Taylorsville Milling Company Roller Mill	

[2] National Register Database and Research - National Register of Historic Places (U.S. National Park Service). (n.d.). https://www.nps.gov/subjects/nationalregister/database-research.htm#table

County	Property Name	Property Type
Burke	Avery Avenue Historic District	District
	Avery Avenue School	Building
	Avery, Alphonse Calhoun, House	Building
	Bellevue	Building
	Broughton Hospital Historic District	District
	Burke County Courthouse	Building
	Creekside	Building
	Dale's, USB Market	Building
	Dalmas, Jean-Pierre Auguste, House	Building
	Dunavant Cotton Manufacturing Company	Building
	Forney, Jacob, Jr., House	Building
	Franklin-Penland House	Building
	Gaither House	Building
	Garrou-Morganton Full-Fashioned Hosiery Mills	Building
	Gaston Chapel	Building
	Gilboa Methodist Church	Building
	Henry River Mill Village Historic District	District
	Hunting Creek Railroad Bridge	Structure
	Jonesboro Historic District	District
	Lackey, John Alexander, House	Building
	Magnolia Place	Building
	Magnolia Place (Boundary Decrease)	Building
	Morganton Downtown Historic District	District
	Mountain View	Building
	North Carolina School for the Deaf Historic District	District
	North Carolina School for the Deaf: Main Building	Building
	North Green Street-Bouchelle Street Historic District	District
	Quaker Meadows	Building
	Quaker Meadows Cemetery	Site
	Riddle, Dr. Joseph Bennett, House	Building
	Sloan-Throneburg Farm	Building
	South King Street Historic District	District
	Southern Railway Freight Station	Building
	Swan Ponds	Building
	Tate House	Building
	Tate, Franklin Pierce, House	Building
	Valdese Elementary School	Building
	Waldensian Presbyterian Church	Building
	Waldensian Swiss Embroidery Company–Valdese Weavers, Inc. Mill	Building
	West Union Street Historic District	District
	Western North Carolina Insane Asylum	Building

County	Property Name	Property Type
	White Street-Valdese Avenue Historic District	District
Caldwell	Bernhardt, J.M., Planing Mill and Box Factory-Steele Cotton Mill	Building
	Caldwell County Courthouse	Building
	Carolina and Northwestern Railway Freight Station	Building
	Clover Hill	Building
	Dula-Horton Cemetery	Site
	Fort Defiance	Building
	Fountain, The	Building
	Hagler, William, House	Building
	Hudson Cotton Manufacturing Company	Building
	Lenoir Cotton Mill-Blue Bell Inc. Plant	Building
	Lenoir Downtown Historic District	District
	Lenoir Downtown Historic District (Boundary Increase)	District
	Lenoir Grammar School	Building
	Lenoir High School	District
	Lenoir, Walter James, House	Building
	Mariah's Chapel	Building
	Mary's Grove	Building
	Patterson School Historic District	District
	Poe, Edgar Allan, House	Building
	Riverside	Building
Catawba	Anthony, Abraham, Farm	District
	Balls Creek Campground	District
	Bandy Farms Historic District	District
	Bolick Historic District	District
	Bost-Burris House	Building
	Bunker Hill Covered Bridge	Structure
	Catawba County Courthouse	Building
	Catawba Historic District	District
	Claremont High School Historic District	District
	Claremont High School Historic District (Boundary Increase)	District
	Elliott-Carnegie Library	Building
	First Presbyterian Church	Building
	Foil-Cline House	Building
	Frye, Dr. Glenn R., House	Building
	Geitner, Clement, House	Building
	George, Lee & Helen, House	Building
	Grace Reformed Church	Building
	Grace Union Church and Cemetery	District
	Harris Arcade	Building

County	Property Name	Property Type
	Hickory Municipal Building	Building
	Hickory Southwest Downtown Historic District	District
	Highland School	Building
	Hollar Hosiery Mills-Knit Sox Knitting Mills	Building
	Houck's Chapel	Building
	Huffman, George, Farm	District
	Keever-Cansler Farm	District
	Kenworth Historic District	District
	Kenworth Historic District (Boundary Increase)	District
	Lentz, John A., House	Building
	Long, McCorkle and Murray Houses	District
	Lyerly Full Fashioned Mill	Building
	Memorial Reformed Church	Building
	Miller-Cansler House	Building
	Moore, Alexander, Farm	District
	Moretz, John Alfred, House	Building
	Munday House	Building
	Murray's Mill Historic District	District
	Neill-Turner-Lester House	Building
	Newton Downtown Historic District	District
	North Main Avenue Historic District	District
	Oakwood Historic District	District
	Oakwood Historic District (Boundary Increase)	District
	Perkins House	Building
	Piedmont Wagon Company	Building
	Powell-Trollinger Lime Kilns	Structure
	Propst House	Building
	Propst, David F., House	Building
	Reinhardt, Franklin D., and Harren-Hood Farms	District
	Reinhardt, William Pinckney, House	Building
	Ridgeview Public Library, (Former)	Building
	Rock Barn Farm	Building
	Rudisill-Wilson House	Building
	Self-Trott-Bickett House	Building
	Sharpe-Gentry Farm	District
	Sherrill, Miles Alexander, House	Building
	Shuford House	Building
	Shuford-Hoover House	Building
	St. Paul's Church and Cemetery	Building
	St. Paul's Reformed Church	Building
	Terrell Historic District	District
	Warlick-Huffman Farm	District
	Weidner Rock House	Building
	Wesley's Chapel Arbor and Cemetery	District

County	Property Name	Property Type
	Whisnant Hosiery Mills	Building
	Wilfong-Wilson Farm	District
	Yoder's Mills	District
	Historic District	

Appendix C: Flooding Sources and Historical Flooding (2005-2018)

Table 1: Flooding Sources Studied by Detailed Methods: Revised or Newly Studied.....1

Table 1: Flooding Sources Studied by Detailed Methods: Revised or Newly Studied

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Abingdon Creek	Approximately 940 feet upstream of Huffman Road	Approximately 325 feet upstream of M.W. Setzer Road	Caldwell County
Amos Creek	The confluence with Mulberry Creek	Approximately 1.4 miles upstream of the confluence with Mulberry Creek	Caldwell County
Angley Creek	The confluence with Gunpowder Creek	Approximately 600 feet upstream of SE Starcross Road	Caldwell County, City of Lenoir, Town of Hudson
Angley Creek Tributary 1	The confluence with Angley Creek	Approximately 1.2 miles upstream of the confluence with Angley Creek	Caldwell County, City of Lenoir
Anthony Creek	Approximately 55 feet upstream of the confluence with Prong Creek and Racket Creek	Approximately 1.4 miles upstream of the confluence with Prong Creek and Rocket Creek	Caldwell County
Back Creek	The confluence with Irish Creek	Approximately 0.5 mile upstream of the confluence with Irish Creek	Burke County
Bailey Fork	Approximately 0.8 mile upstream of I-40	At US-64	Burke County, City of Morganton
Bakers Creek Tributary	The confluence with Bakers Creek	Approximately 1.4 miles upstream of Swinging Bridge Road	Catawba County
Bakers Creek Tributary 1	The confluence with Bakers Creek	Approximately 0.7 mile upstream of Stratford Drive (SR 3000)	Catawba County
Balls Creek	The confluence with Catawba River	Approximately 970 feet upstream of Little Mountain Road	Catawba County, Town of Catawba
Barger Branch	The confluence with Henry Fork	Approximately 200 feet upstream of 8th Avenue SE	City of Hickory, Town of Brookford

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Barger Branch Tributary 1	The confluence with Barger Branch	Approximately 800 feet upstream of 8th Avenue SE	City of Hickory
Barger Branch Tributary 2	The confluence with Barger Branch Tributary 1	Approximately 1,050 feet upstream of confluence with Barger Branch Tributary 1	City of Hickory
Barger Branch Tributary 3	The confluence with Barger Branch	Approximately 130 feet upstream of 8th Avenue SE	City of Hickory
Beaver Branch	The confluence with Lambert Creek	Approximately 500 feet upstream of SR 1307	Alexander County
Beaver Creek	The confluence with Yadkin River	Approximately 1.5 miles upstream of the Wilkes / Caldwell County boundary	Caldwell County
Beaverdam Creek	The confluence with Big Branch into South Yadkin River	Approximately 2.5 miles upstream of Vashti Road (SR 1403)	Alexander County
Big Branch	The confluence with Elk Shoals Creek	Approximately 550 feet upstream of SR 1619	Alexander County
Big Branch into South Yadkin River	The confluence with South Yadkin River	Approximately 0.5 mile upstream of Vashti Cemetery Road (SR 1430)	Alexander County
Bills Branch	Approximately 830 feet upstream of US 321	Approximately 0.5 mile upstream of US Highway 321	Catawba County, City of Newton, Town of Maiden
Billy Branch	The confluence with Gunpowder Creek	Approximately 0.6 mile upstream of North Highland Avenue	Town of Granite Falls
Blairs Fork Creek	Approximately 130 feet upstream of Collettsville Road / NC-90	Approximately 780 feet upstream of Parson's Park Drive	Caldwell County
Blairs Fork Creek	The confluence with Lower Creek	Approximately 130 feet upstream of Collettsville Road / NC-90	Caldwell County, City of Lenoir
Blue Creek	The confluence with Kings Creek 1 and Little Kings Creek	Approximately 2.9 miles upstream of Grandin Road (SR 1552)	Caldwell County
Boone Fork	The confluence with Mulberry Creek	Approximately 2.1 miles upstream of the confluence with Mulberry Creek	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Bristol Creek	The confluence with Lower Creek	Approximately 180 feet downstream of the Burke / Caldwell County boundary	Burke County, Caldwell County
Bristol Creek Tributary 1	The confluence with Bristol Creek	Approximately 0.4 mile upstream of the confluence with Bristol Creek	Burke County
Camp Creek	The confluence with Jacob Fork	Approximately 0.5 mile downstream of SR 1736	Burke County, Catawba County
Camp Creek	The confluence with Wilson Creek	The confluence of Raider Camp Creek and Harper Creek	Caldwell County
Canoe Creek	Approximately 150 feet upstream of NC 126	Approximately 0.4 mile upstream of SR 1254	Burke County, City of Morganton
Carroll Creek	The confluence with Parks Creek	Approximately 1,000 feet upstream of SR 1424	Burke County
Catawba River	Approximately 0.6 mile downstream of Hudson Chapel Road	Toe at Lookout Shoals Dam	Catawba County, Town of Catawba
Catawba River	Approximately 0.9 mile upstream of confluence of Elk Shoal Creek	Lake Hickory/ Oxford Dam	Alexander County, Catawba County
Catawba River	Approximately 1,100 feet upstream of Watermill Glen Alpine Road (SR 1147)	At Bridgewater Dam (Power Plant)	Burke County, Town of Glen Alpine
Catawba River	Approximately 1,100 feet upstream of Watermill Glen Alpine Road (SR1147)	Approximately 1,100 feet downstream of SR 1501	Burke County
Catawba River	At Malcolm Boulevard	The confluence of Johns River	Burke County, Caldwell County, City of Morganton, Town of Rutherford College, Town of Valdese
Catawba River	North Center Street/State Highway 127	At Lake Rhodhiss Dam	Alexander County, Burke County, Caldwell County, Catawba County, City of Hickory, Town of Granite Falls, Town of Rhodhiss
Catawba River	The confluence of Johns River	Approximately 1,100 feet upstream of Watermill Glen Alpine Road (SR 1147)	Burke County, City of Morganton, Town of Glen Alpine

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Catawba River Tributary 1	Approximately 370 feet downstream of 39th Avenue Drive NW	Approximately 1,080 feet upstream of 31st Avenue NW	Catawba County, City of Hickory
Catawba River Tributary 1	The confluence with Catawba River	Approximately 0.5 mile upstream of SR 1223	Burke County
Catawba River Tributary 2	The confluence with Catawba River	Approximately 2.8 miles upstream of the confluence with Catawba River	Burke County
Celia Creek	The confluence with Husband Creek	Approximately 1.0 mile upstream of Celia Creek Road	Caldwell County
Clarks Creek	Approximately 100 feet downstream of confluence of Clarks Creek Tributary 2	Approximately 310 feet upstream of the Catawba/Lincoln County boundary	Catawba County
Clarks Creek	Approximately 310 feet upstream of Catawba/Lincoln County line	Approximately 60 feet downstream of 15th Street SE	Catawba County, City of Hickory, City of Newton, Town of Maiden
Clear Creek	The confluence with Silver Creek	Approximately 500 feet upstream of US 64	Burke County
Cline Creek	Approximately 30 feet downstream of the confluence of Cline Creek Tributary 1	Approximately 150 feet downstream of Interstate 40	City of Conover
Cline Creek	The confluence with Clarks Creek	Approximately 30 feet downstream of confluence of Cline Creek Tributary 1	Catawba County, City of Conover, City of Newton
Cline Creek North	Approximately 0.4 mile upstream of Rifle Range Road	Approximately 2.0 miles upstream of the confluence of Cline Creek North Tributary 1	Catawba County
Cline Creek North Tributary 1	The confluence with Cline Creek North	Approximately 0.5 mile upstream of Rifle Range Road	Catawba County
Cline Creek Tributary 1	The confluence with Cline Creek	Approximately 450 feet upstream of Interstate 40	City of Conover
Cline Creek Tributary 2	The confluence with Cline Creek	Approximately 1,300 feet upstream of Interstate 40	City of Conover
Cold Water Creek	The confluence with Johns River	Approximately 1.7 miles upstream of the confluence with Johns River	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Conover Creek	The confluence with Lyle Creek	Approximately 1,420 feet upstream of 5th Street Place NE	Catawba County, City of Conover
Cow Branch	The confluence with Pott Creek	Approximately 0.8 mile upstream of Grace Church Road	Catawba County
Craig Creek	The confluence with Wilson Creek	Approximately 1.9 miles upstream of the confluence with Wilson Creek	Caldwell County
Cripple Creek	The confluence with Frye Creek and Horseford Creek	Approximately 1,000 feet upstream of 4th Street Drive NW	City of Hickory
Cripple Creek Tributary 1	The confluence with Cripple Creek	Approximately 1,910 feet upstream of confluence with Cripple Creek	City of Hickory
Cub Creek	The confluence with Henry Fork	Approximately 200 feet downstream of SR 1737	Burke County
Dellinger Creek	The confluence with Elk Shoal Creek	Approximately 725 feet upstream of Rest Home Road (SR 1702)	Catawba County
Dennis Creek	The confluence with Yadkin River	Approximately 0.8 mile upstream of Hines Branch Road	Caldwell County
Double Branch	The confluence with McGalliard Creek	Approximately 1,800 feet upstream of I-40	Burke County, Town of Valdese
Double Branch Tributary 1	The confluence with Double Branch	Approximately 900 feet upstream of SR 1722	Burke County
Douglas Creek	The confluence with Jacob Fork	Approximately 0.4 mile downstream of Old Rock Quarry Road	Burke County, Catawba County
Drowning Creek	Approximately 300 feet downstream of SR 1621	Approximately 1.8 miles upstream of I-40	Burke County
Drowning Creek Tributary 1	Approximately 800 feet upstream of Wilson Road	Approximately 1,700 feet upstream of Cline Park Drive	Town of Hildebran
Drowning Creek Tributary 2	Approximately 100 feet downstream of the confluence of Drowning Creek Tributary 2B	Approximately 200 feet downstream of the Railroad	Burke County
Drowning Creek Tributary 2B	The confluence with Drowning Creek Tributary 2	Approximately 150 feet downstream of the Railroad	Burke County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Duck Creek	The confluence with Middle Little River	The confluence of Holsclaw Creek and White Creek	Alexander County
Dye Branch	The confluence with McGalliard Creek	Approximately 150 feet downstream of Ribet Avenue SE	Burke County, Town of Valdese
Elk Branch	The confluence with Jones Creek	Approximately 1,310 feet upstream of Old Sampson Road (SR 1574)	Caldwell County
Elk Shoal Creek	The confluence with Catawba River	Approximately 1,980 feet upstream of Rest Home Road (SR 1702)	Catawba County
Elk Shoals Creek	The confluence with Catawba River	Approximately 350 feet upstream of SR 1631	Alexander County
Elk Shoals Creek Tributary 1	The confluence with Elk Shoals Creek	Approximately 0.5 mile upstream of the confluence with Elk Shoals Creek	Alexander County
Elk Shoals Creek Tributary 2	The confluence with Elk Shoals Creek	Approximately 0.5 mile upstream of confluence with Elk Shoals Creek	Alexander County
Estes Mill Creek	The confluence with Wilson Creek	Approximately 1.2 miles upstream of the confluence with Wilson Creek	Caldwell County
Falling Creek	Approximately 0.4 mile downstream of Cloninger Mill Road NE	Approximately 50 feet downstream of 12th Avenue NE	Catawba County, City of Hickory
Falling Creek Tributary 1	The confluence with Falling Creek	Approximately 275 feet upstream of 14th Avenue NE	City of Hickory
Falling Creek Tributary 2	The confluence with Falling Creek	Approximately 380 feet upstream of 12th Avenue NE	City of Hickory
Fiddle Creek	The confluence with Mulberry Creek	Approximately 1,620 feet upstream of the confluence with Mulberry Creek	Caldwell County
Franklin Branch	The confluence with Johns River	Approximately 1,500 feet upstream of the confluence with Franklin Branch Tributary 1	Caldwell County
Franklin Branch Tributary 1	The confluence with Franklin Branch	Approximately 1,540 feet upstream of the confluence with Franklin Branch	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Freemason Creek	The confluence with Catawba River	Approximately 300 feet upstream of Stamey Road	Caldwell County, Town of Sawmills
Freemason Creek Tributary 1	The confluence with Freemason Creek	Approximately 1.5 miles upstream of the confluence with Freemason Creek	Caldwell County, Town of Sawmills
Freemason Creek Tributary 1A	The confluence with Freemason Creek Tributary 1	Approximately 1,690 feet upstream of Hickory Nut Ridge Road	Town of Sawmills
Freemason Creek Tributary 2	The confluence with Freemason Creek	Approximately 0.8 mile upstream of Horseshoe Bend Road	Town of Sawmills
Freemason Creek Tributary 2A	The confluence with Freemason Creek Tributary 2	Approximately 620 feet upstream of Lafayette Avenue	Town of Sawmills
Frye Creek	The confluence with Cripple Creek and Horseford Creek	Approximately 425 feet upstream of 33rd Street NW	City of Hickory, Town of Long View
Geitner Branch	The confluence with Henry Fork	Approximately 1,900 feet upstream of 7th Avenue SW	City of Hickory
Geitner Branch Tributary 1	The confluence with Geitner Branch	Approximately 1,250 feet upstream of confluence with Geitner Branch	City of Hickory
Geitner Branch Tributary 2	The confluence with Geitner Branch	Approximately 1,670 feet upstream of 7th Avenue SW	City of Hickory
Ginger Creek	The confluence with Middle Little River	Approximately 0.7 mile upstream of Draco Road	Caldwell County
Ginger Creek Tributary 1	The confluence with Ginger Creek	Approximately 1.3 miles upstream of Scout Road	Caldwell County
Glade Creek	The confluence with Lower Little River	Approximately 1.1 miles upstream of SR 1604	Alexander County
Glade Creek Tributary 1	The confluence with Glade Creek	Approximately 0.8 mile upstream of SR 1607	Alexander County, Town of Taylorsville
Grassy Creek	The confluence with Lower Little River	Approximately 0.4 mile upstream of SR 1344	Alexander County
Grassy Creek Tributary 1	The confluence with Grassy Creek	Approximately 0.7 mile upstream of the confluence with Grassy Creek	Alexander County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Grassy Creek Tributary 2	The confluence with Grassy Creek	Approximately 0.7 mile upstream of NC 16	Alexander County
Greasy Creek	The confluence with Lower Little River	Approximately 0.4 mile upstream of SR 1344	Alexander County
Greasy Creek Tributary 1	The confluence with Grassy Creek	Approximately 0.7 mile upstream of the confluence with Grassy Creek	Alexander County, Town of Taylorsville
Green Rock Branch	The confluence with Buffalo Creek	Approximately 1.5 miles upstream of Buffalo Cove Road (SR 1504)	Caldwell County
Gunpowder Creek	Approximately 785 feet upstream of SE Starcross Road	Approximately 600 feet upstream of SE Applegate Court	City of Lenoir
Gunpowder Creek	The confluence with Catawba River	Approximately 0.5 mile upstream of Pine Mountain Road (SR 1809)	Caldwell County, City of Hickory, Town of Granite Falls, Town of Hudson
Gunpowder Creek Tributary 1	The confluence with Gunpowder Creek	Approximately 280 feet downstream of Temple Hill Church Road	Caldwell County
Gunpowder Creek Tributary 2	The confluence with Gunpowder Creek	Approximately 45 feet downstream of Christie Road (SR 1717)	Caldwell County
Gunpowder Creek Tributary 2A	The confluence with Gunpowder Creek Tributary 2	Approximately 1,550 feet upstream of Christie Road (SR 1717)	Caldwell County, Town of Hudson
Gunpowder Creek Tributary 3	The confluence with Gunpowder Creek	Approximately 2,340 feet upstream of the confluence with Gunpowder Creek	Town of Hudson
Gunpowder Creek Tributary 4	The confluence with Gunpowder Creek	Approximately 0.6 mile upstream of the confluence with Gunpowder Creek	Town of Hudson
Gunpowder Creek Tributary 5	The confluence with Gunpowder Creek	Approximately 1,115 feet upstream of SE Eastwood Park Circle	City of Lenoir
Gunpowder Creek Tributary 6	The confluence with Gunpowder Creek	Approximately 0.5 mile upstream of Renwick Street	City of Lenoir
Guys Branch	The confluence with Elk Shoals Creek	Approximately 0.5 mile upstream of the confluence with Elk Shoals Creek	Alexander County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Haas Creek	The confluence with Pott Creek	Approximately 0.8 mile upstream of Grace Church Road	Catawba County
Hall Creek	The confluence with Silver Creek	Approximately 0.4 mile upstream of US 64	Burke County
Harper Creek	The confluence with Camp Creek and Raider Camp Creek	The confluence of South Harper Creek	Caldwell County
Hayes Mill Creek	The confluence with Catawba River	Approximately 0.6 mile upstream of Helton Road	Caldwell County, Town of Granite Falls, Town of Sawmills
Hayes Mill Creek Tributary 1	The confluence with Hayes Mill Creek	Approximately 1,700 feet upstream of the confluence with Hayes Mill Creek	Town of Granite Falls, Town of Sawmills
Hayes Mill Creek Tributary 2	The confluence with Hayes Mill Creek	Approximately 1,900 feet upstream of the confluence with Hayes Mill Creek	Town of Sawmills
Henry Fork	Approximately 0.6 mile upstream of SR 1002	Approximately 0.9 mile upstream of SR 1918	Burke County
Henry Fork	The confluence with South Fork Catawba River and Jacob Fork	The Catawba/Burke County boundary	Catawba County, City of Hickory, City of Newton, Town of Brookford, Town of Long View
Henry Fork Tributary 1	The confluence with Henry Fork	Approximately 0.5 mile upstream of Catawba Valley Boulevard SE	City of Hickory
Henry Fork Tributary 2	The confluence of Henry Fork	Approximately 1,930 feet upstream of Brookford Boulevard	City of Hickory, Town of Brookford
Henry Fork Tributary 3	The confluence with Henry Fork	Approximately 2,000 feet upstream of Robinson Road	Catawba County
Hildebran Creek	The confluence with Clarks Creek	Approximately 150 feet upstream of A. C. Little Drive	City of Newton
Holdsclaw Creek	The confluence with Catawba River	Approximately 1,500 ft upstream of the confluence of Holdsclaw Creek Tributary 1	Catawba County
Holdsclaw Creek Tributary 1	The confluence with Holdsclaw Creek	Approximately 1,450 feet upstream of the confluence with Holdsclaw Creek	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Holly Branch	Approximately 220 feet downstream of the confluence of Holly Branch Tributary 1 and Shady Branch	The confluence of Shady Branch and Holly Branch Tributary 1	Town of Maiden
Holly Branch Tributary 1	The confluence with Holly Branch	Approximately 200 feet upstream of South Main Avenue	Town of Maiden
Holsclaw Creek	The confluence with Duck Creek	Approximately 0.8 mile upstream of SR 1302	Alexander County
Hop Creek	The confluence with Holly Branch	Approximately 200 feet upstream of South Main Avenue	Catawba County
Horseford Creek	Approximately 1,520 feet upstream of confluence with Catawba River	The confluence of Frye Creek and Cripple Creek	Catawba County, City of Hickory
Howard Creek	The confluence with Catawba River	Approximately 850 feet upstream of SR 1512	Burke County, Town of Drexel, Town of Valdese
Howard Creek Tributary 1	The confluence with Howard Creek	Approximately 350 feet upstream of Railroad	Town of Drexel
Howards Creek	The confluence with South Fork Catawba River	Approximately 500 feet upstream of the Catawba/Lincoln County boundary	Catawba County
Hoyle Creek	The confluence with Catawba River	Approximately 1,500 feet upstream of the confluence with Micol Creek	Burke County, Town of Rutherford College, Town of Valdese
Hoyle Creek Tributary 1	The confluence with Hoyle Creek	Approximately 0.9 mile upstream of the confluence with Hoyle Creek	Burke County, Town of Rutherford College, Town of Valdese
Hoyle Creek Tributary 2	The confluence with Hoyle Creek	Approximately 0.7 mile upstream of the confluence with Hoyle Creek	Town of Rutherford College, Town of Valdese
Hunting Creek	Approximately 250 feet upstream of the confluence of Hunting Creek Tributary 3	Approximately 1,100 feet upstream of SR 2002	Burke County, City of Morganton
Hunting Creek Tributary 2	The confluence with Hunting Creek	Approximately 0.7 mile upstream of Walker Road (SR 1942)	City of Morganton
Hunting Creek Tributary 3	The confluence with Hunting Creek	Approximately 0.4 mile upstream of the confluence with Hunting Creek	Burke County, City of Morganton

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Husband Creek	The confluence with Lower Creek	Approximately 1,925 feet upstream of Rocky Road (SR 1143)	Caldwell County, Town of Gamewell
Husband Creek Tributary 1	The confluence with Husband Creek	Approximately 140 feet downstream of Fleming Chapel Church Road (SR 1322)	Caldwell County
Husband Creek Tributary 2	The confluence with Husband Creek	Approximately 750 feet upstream of Crooked Creek Way	Caldwell County
Indian Creek	The Lincoln/Gaston County boundary	Approximately 550 ft upstream of the Catawba/Lincoln County boundary	Catawba County
Irish Creek	The confluence with Upper Creek and Warrior Fork	Approximately 800 feet upstream of the confluence with Reedys Fork Creek	Burke County
Irish Creek Tributary 1	The confluence with Irish Creek	At SR 1240	Burke County
Isaac Creek	The confluence with Upper Little River	Approximately 0.7 mile upstream of SR 1143	Alexander County
Island Creek	The confluence with Catawba River	Approximately 0.4 mile upstream of SR 1621	Alexander County
Island Creek	The confluence with Catawba River	Approximately 0.7 mile upstream of I-40	Burke County, Town of Connelly Springs, Town of Rutherford College
Jackson Camp Creek	The confluence with Yadkin River	Approximately 1.0 mile upstream of Richland Road (SR 1372)	Caldwell County
Jacob Fork	Approximately 220 feet upstream of Providence Church Road	Approximately 990 feet upstream of the Catawba/Burke County boundary	Burke County, Catawba County
Jacob Fork	Approximately 990 feet upstream of the Catawba/Burke County boundary	Approximately 450 feet upstream of SR 1904	Burke County
Jacob Fork Tributary 1	The confluence with Jacob Fork	Approximately 1.3 miles upstream of Cooksville Road	Catawba County
Jesse Fork	The confluence with Buffalo Creek	Approximately 0.8 mile upstream Stone Mountain Road (SR 1503)	Caldwell County
Jesse Fork Tributary 1	The confluence with Jesse Fork	Approximately 330 feet upstream of Wallace Coffey Place	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Johns River	Approximately 1.1 miles upstream of Triple T Lane	Approximately 3.8 miles upstream of the confluence of Thunderhole Creek	Caldwell County
Johns River	The confluence with Catawba River	Approximately 1,500 feet upstream of the Burke / Caldwell County boundary	Burke County, Caldwell County, City of Morganton
Jones Creek	The confluence with Buffalo Creek	Approximately 50 feet downstream of the Watauga / Caldwell County boundary	Caldwell County
Jumping Run	The confluence with Rock Creek	Approximately 500 feet upstream of NC 127	Alexander County
Kings Creek 1	The confluence with Yadkin River	The confluence of Little Kings Creek and Blue Creek	Caldwell County
Kings Creek 2	The confluence with Blue Creek	Approximately 1.9 miles upstream of the confluence of Kings Creek 2 Tributary 1	Caldwell County
Kings Creek 2 Tributary 1	The confluence with Kings Creek 2	Approximately 1.6 miles upstream of Blue Door School Road	Caldwell County
Lambert Creek	The confluence with Lower Little River	Approximately 0.8 mile upstream of SR 1307	Alexander County
Lambert Creek Tributary 1	The confluence with Lambert Creek	Approximately 800 feet upstream of SR 1307	Alexander County
Laurel Creek	The confluence with Henry Fork	Approximately 1.2 miles upstream of Shouppe Way	Burke County
Laurel Creek	The confluence with Wilson Creek	Approximately 1.1 miles upstream of the confluence with Wilson Creek	Caldwell County
Laytown Creek	The confluence with Yadkin River	Approximately 1.8 miles upstream of Laytown Road (SR 1507)	Caldwell County
Linville River	Approximately 2.6 miles upstream of NC 126	Approximately 800 feet downstream of the Land Harbors Dam	Burke County
Linville River	The confluence with Catawba River	Approximately 0.7 mile downstream of NC 126	Burke County
Lippard Creek	The confluence with Sawmill Branch and Leepers Creek	Approximately 1,940 feet upstream of the Catawba/Lincoln County boundary	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Little Creek	The confluence with Upper Little River	Approximately 1.4 miles upstream of Cove Mountain Lane	Caldwell County
Little Gunpowder Creek (near City of Lenoir)	Approximately 700 feet upstream of SW Walt Arney Road	Approximately 1,075 feet upstream of Connelly Springs Road	Town of Cajah's Mountain
Little Gunpowder Creek (near Town of Hudson)	Approximately 0.8 mile upstream of Little Gunpowder Creek Drive (SR 1133)	Approximately 1.4 miles upstream of Little Gunpowder Creek Drive (SR 1133)	Caldwell County, Town of Cajah's Mountain
Little Gunpowder Creek (near Town of Hudson)	The confluence with Gunpowder Creek	Approximately 0.8 mile upstream of Little Gunpowder Creek Drive (SR 1133)	Caldwell County, Town of Granite Falls, Town of Hudson, Town of Sawmills
Little Gunpowder Creek (near Town of Hudson) Tributary 1	The confluence with Little Gunpowder Creek (near Town of Hudson)	Approximately 50 feet upstream of Madison MHP Drive	Town of Hudson
Little Gunpowder Creek (near Town of Hudson) Tributary 2	The confluence with Little Gunpowder Creek (near Town of Hudson)	Approximately 0.4 mile upstream of Chickadee Trail Place	Town of Hudson
Little Kings Creek	The confluence with Kings Creek and Blue Creek	Approximately 1,620 feet upstream of Zacks Fork Road (SR 1511)	Caldwell County
Little Mulberry Creek 1	The confluence with Mulberry Creek	Approximately 0.5 mile upstream of Planters Way	Caldwell County
Little Mulberry Creek 2	The confluence with Mulberry Creek	Approximately 0.4 mile upstream of Shallow Creek Road (SR 1530)	Caldwell County
Little Silver Creek	Approximately 0.6 mile upstream of Causby Road (SR 1147)	Approximately 1.1 miles upstream of Ceramic Tile Drive	Burke County, City of Morganton, Town of Glen Alpine
Long Creek	The confluence with McLin Creek	Approximately 1,450 feet upstream of Railroad	City of Claremont, City of Conover
Long Shoal Creek	The confluence with Catawba River (Lake Hickory)	Approximately 0.4 mile upstream of Pinecrest Drive NE	Catawba County, City of Hickory
Long View Creek	The confluence with Henry Fork	Approximately 1,500 feet upstream of US-70 SW	City of Hickory, Town of Long View
Long View Creek Tributary 1	The confluence with Long View Creek	Approximately 100 feet upstream of US-70	City of Hickory
Long View Creek Tributary 2	The confluence with Long View Creek	Approximately 1,460 feet upstream of confluence with Long View Creek	Town of Long View

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Lost Cove Creek	The confluence with Wilson Creek	Approximately 2.1 miles upstream of the confluence with Gragg Prong Creek	Caldwell County
Lower Creek	Approximately 800 feet downstream of the confluence of Abingdon Creek	Approximately 1,830 feet upstream of the second crossing of Cedar Rock Circle (SR 1706)	Caldwell County, City of Lenoir, Town of Gamewell
Lower Creek	The confluence with Catawba River	Approximately 1,290 feet downstream of the confluence with Husband Creek	Burke County, Caldwell County
Lower Creek Tributary 1	The confluence with Lower Creek	Approximately 0.7 mile upstream of SE Haigler Road	City of Lenoir
Lower Little River	The confluence with Catawba River	Approximately 0.9 mile upstream of SR 1332	Alexander County
Lower Little River Tributary 1	The confluence with Lower Little River	Approximately 1.9 miles upstream of the confluence with Lower Little River	Alexander County
Lower Little River Tributary 2	The confluence with Lower Little River	Approximately 1,600 feet upstream of SR 1124	Alexander County
Lower Little River Tributary 2A	The confluence with Lower Little River Tributary 2	Approximately 1,600 feet upstream of confluence with Lower Little River Tributary 2	Alexander County
Lower Little River Tributary 3	The confluence with Lower Little River	Approximately 1.4 miles upstream of SR 1110	Alexander County
Lower Little River Tributary 4	The confluence with Lower Little River	Approximately 1,000 feet upstream of SR 1104	Alexander County, Town of Taylorsville
Lyle Creek	Approximately 0.6 miles downstream of confluence of Bakers Creek	Approximately 550 feet upstream of 18th Street NE	Catawba County, City of Conover, City of Hickory
Lyle Creek Tributary	The confluence with Lyle Creek	Approximately 1,950 feet upstream of Community Road	Catawba County
Lyle Creek Tributary 1	The confluence with Lyle Creek	Approximately 1.0 mile upstream of Crossing Creek Drive (SR 2454)	Catawba County
Maiden Creek	Approximately 1.3 miles upstream of Providence Mill Road	Approximately 80 feet downstream of North Olivers Cross Road	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
McGalliard Creek	Approximately 250 feet upstream of confluence of McGalliard Creek Tributary 2	The confluence of Double Branch	Burke County, Town of Valdese
McGalliard Creek	The confluence of Double Branch	Approximately 400 feet upstream of SR 1722	Burke County
McGalliard Creek	The confluence with Catawba River	Approximately 1.1 miles upstream of the confluence with Catawba River	Burke County, Town of Valdese
McGalliard Creek Tributary 1	The confluence with McGalliard Creek	Approximately 1,800 feet upstream of Louise Avenue NE	Burke County, Town of Valdese
McGalliard Creek Tributary 2	The confluence with McGalliard Creek	Approximately 600 feet downstream of I-40	Burke County, Town of Drexel
McGalliard Creek Tributary 2A	The confluence with McGalliard Creek Tributary 2	Approximately 800 feet upstream of Drexel Road	Town of Drexel
McGalliard Creek Tributary 2B	The confluence with McGalliard Creek Tributary 2	Approximately 200 feet downstream of SR 1721	Burke County, Town of Drexel
McLin Creek Tributary 1	The confluence with McLin Creek	Approximately 1,250 feet upstream of Frazier Drive	City of Claremont
McRory Creek	The confluence with Upper Little River	Approximately 0.6 mile upstream of McRary Creek Road (SR 1721)	Caldwell County
Micol Creek	The confluence with Hoyle Creek	Approximately 350 feet downstream of I-40	Burke County, Town of Valdese
Micol Creek Tributary 1	The confluence with Micol Creek	Approximately 0.5 mile upstream of Montonya View Drive	Burke County, Town of Rutherford College, Town of Valdese
Micol Creek Tributary 1A	The confluence with Micol Creek Tributary 1	Approximately 75 feet downstream of SR 1001	Burke County, Town of Rutherford College
Micol Creek Tributary 1A1	The confluence with Micol Creek Tributary 1A	Approximately 0.4 mile upstream of the confluence with Micol Creek Tributary 1A	Burke County
Middle Little River	The confluence with Catawba River/Lake Hickory	Approximately 280 feet upstream of the Alexander / Caldwell County boundary	Alexander County, Caldwell County
Middle Little River	The most downstream crossing of the Alexander / Caldwell County boundary	Approximately 0.4 mile upstream of Brush Mountain Road (SR 1733)	Alexander County, Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Middle Little River Tributary 2	The confluence with Middle Little River	Approximately 300 feet downstream of SR 1152	Alexander County
Middle Little River Tributary 3	The confluence with Middle Little River	Approximately 1,480 feet upstream of Taylorsville Road	Caldwell County
Middle Little River Tributary 4	The confluence with Middle Little River	Approximately 1,300 feet upstream of Duck Creek Road (SR 1730)	Caldwell County
Middle Little River Tributary 5	The confluence with Middle Little River	Approximately 0.5 mile upstream of the confluence with Middle Little River	Caldwell County
Mill Creek	The confluence with South Yadkin River	Approximately 0.4 mile upstream of the confluence with South Yadkin River	Alexander County
Mill Creek	The confluence with Upper Little River	Approximately 1.0 mile upstream of Petra Mill Road (SR 1740)	Caldwell County
Mill Creek (into Yadkin River)	The confluence with Yadkin River	Approximately 1.2 miles upstream of NC Highway 268	Caldwell County
Miller Branch	The confluence with Clarks Creek	Approximately 1.9 miles upstream of confluence with Clarks Creek	City of Hickory
Miller Creek	The confluence with South Yadkin River	Approximately 260 feet upstream of Sprinkle Dairy Road (SR 1475)	Alexander County
Morris Creek	The confluence with Upper Little River	Approximately 490 feet upstream of Sheriffs Road (SR 1730)	Caldwell County
Mountain Creek	The confluence with Catawba River (Lake Norman)	Approximately 1.6 miles upstream of the confluence of Mountain Creek Tributary 3	Catawba County
Mountain Creek	The confluence with Middle Little River	Approximately 200 feet upstream of SR 1150	Alexander County
Mountain Creek Tributary 2	The confluence with Mountain Creek	Approximately 1.6 miles upstream of the confluence with Mountain Creek	Catawba County
Mountain Creek Tributary 2A	The confluence with Mountain Creek Tributary 2	Approximately 1.4 miles upstream of the confluence with Mountain Creek Tributary 2	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Mountain Creek Tributary 3	The confluence with Mountain Creek	Approximately 1.0 mile upstream of the confluence with Mountain Creek	Catawba County
Mountain Creek Tributary 3A	The confluence with Mountain Creek Tributary 3	Approximately 0.5 mile upstream of the confluence with Mountain Creek Tributary 3	Catawba County
Mountain Run	The confluence with Upper Little River	Approximately 125 feet upstream of Fox Road (SR 1726)	Caldwell County
Muddy Creek	Approximately 0.4 mile downstream of Robinson Road (SR 1146)	The confluence of Muddy Creek Tributary 2 and Muddy Creek Tributary 3	Catawba County
Muddy Creek	The confluence of Old Catawba River	The confluence of North Muddy Creek and South Muddy Creek	Burke County
Muddy Creek Tributary 1	The confluence with Muddy Creek	Approximately 0.7 mile upstream of Robinwood Road (SR 1148)	Catawba County
Muddy Creek Tributary 2	The confluence with Muddy Creek	Approximately 0.6 mile upstream of Robinwood Road (SR 1148)	Catawba County
Muddy Creek Tributary 3	The confluence with Muddy Creek	Approximately 1.3 miles upstream of the confluence with Muddy Creek	Catawba County, City of Hickory
Muddy Fork Creek	The confluence with Lower Little River	Approximately 600 feet downstream of SR 1405	Alexander County, Town of Taylorsville
Muddy Fork Creek Tributary 1	The confluence with Muddy Fork Creek	Approximately 1.6 miles upstream of Old Wilkesboro Road	Alexander County, Town of Taylorsville
Mulberry Creek	Approximately 90 feet downstream of Collettsville Road	Approximately 0.7 mile upstream of the confluence of Amos Creek	Caldwell County
Mull Creek	The confluence with Lyle Creek	Approximately 500 feet upstream of 9th Avenue NE	Catawba County, City of Claremont, City of Conover
Mundy Creek	The confluence with Reed Creek	Approximately 500 feet upstream of Lineberger Road	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Mundy Creek Tributary 1	The confluence with Mundy Creek	Approximately 1,400 feet upstream of Grassy Creek Road	Catawba County
Naked Creek	Approximately 0.5 mile downstream of St. Peters Church Road (SR 1453)	Approximately 0.5 mile upstream of Timber Ridge Road	Catawba County
Nolden Creek	The confluence with Catawba River	Approximately 1,900 feet upstream of Nolden Creek Road	Burke County, Town of Connelly Springs
Old Catawba River	The confluence with Catawba River	The Burke / McDowell County boundary	Burke County
Old Field Branch	The confluence with Buffalo Creek	Approximately 1.7 miles upstream of the confluence with Buffalo Creek	Caldwell County
Ooten Creek	The confluence with Yadkin River	Approximately 0.6 mile upstream of the confluence with Yadkin River	Caldwell County
Paddy Creek	The confluence with Catawba River	Approximately 2.9 miles upstream of SR 1237	Burke County
Parks Creek	The confluence with Johns River	Approximately 100 feet downstream of SR 1405	Burke County
Pearcy Creek	The confluence with Parks Creek	Approximately 1.1 miles upstream of SR 1405	Burke County
Pearcy Creek Tributary 1	The confluence with Pearcy Creek	Approximately 20 feet downstream of SR 1405	Burke County
Pilot Branch	The confluence with Upper Little River	Approximately 440 feet upstream of Burns Road (SR 1749)	Caldwell County
Pinch Gut Creek	Approximately 120 feet upstream of Saint James Church Road	Approximately 0.9 mile upstream of Saint James Church Road	Catawba County
Pinch Gut Creek Tributary 1	The confluence with Pinch Gut Creek	Approximately 0.5 mile upstream of the confluence with Pinch Gut Creek	Catawba County
Poplar Creek	The confluence with Lambert Creek	Approximately 0.5 mile upstream of SR 1305	Alexander County
Pott Creek	The confluence with South Fork Catawba River	Approximately 1.9 miles upstream of Plateau Road	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Preston Creek	The confluence with Yadkin River	Approximately 650 feet upstream of Kirby Mountain Road (SR 1370)	Caldwell County
Prong Creek	The confluence with Johns River	Approximately 65 feet downstream of the confluence Racket Creek and Anthony Creek	Caldwell County
Propst Creek	Approximately 1.9 miles upstream of confluence with Lyle Creek	Approximately 75 feet downstream of Sipe Road (SR 1492)	Catawba County, City of Hickory
Racket Creek	Approximately 65 feet downstream of the confluence with Prong Creek and Anthony Creek	Approximately 145 feet upstream of the confluence with Ballew Creek	Caldwell County
Raider Camp Creek	The confluence with Camp Creek	Approximately 1,795 feet upstream of the confluence with Camp Creek	Caldwell County
Reed Creek	The confluence with Mountain Creek	Approximately 1.1 miles upstream of Mount Pleasant Road (SR 1849)	Catawba County
Reedys Fork Creek	The confluence with Irish Creek	Approximately 0.5 mile upstream of the confluence with Irish Creek	Burke County
Rhodes Mill Creek	The confluence with Pott Creek	Approximately 1,100 feet upstream of Leatherman Road	Catawba County
Rhodes Mill Creek Tributary 1	The confluence with Rhodes Mill Creek	Approximately 0.4 mile upstream of the confluence with Rhodes Mill Creek	Catawba County
Rock Creek	The confluence with Middle Little River	The confluence of Jumping Run	Alexander County
Rock Creek	The confluence with Upper Little River	Approximately 200 feet downstream of Fowler Road (SR 1747)	Caldwell County
Rock Creek Tributary 1	The confluence with Rock Creek	Approximately 1,000 feet upstream of confluence with Rock Creek	Alexander County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Rockhouse Creek	The confluence with Buffalo Creek	Approximately 30 feet downstream of the Watauga / Caldwell County boundary	Caldwell County
Rockhouse Creek	The confluence with Lost Cove Creek	Approximately 0.4 mile upstream of Avery/Caldwell County boundary	Caldwell County
Rocky Creek	The confluence with South Yadkin River	The Alexander/Iredell County boundary	Alexander County
Rocky Creek	The Iredell/Alexander County boundary	Approximately 1.0 mile upstream of the confluence of Rocky Creek Tributary 1	Alexander County
Roses Creek	The confluence with Irish Creek	Approximately 1.7 miles upstream of SR 1262	Burke County
Roses Creek Tributary 1	The confluence with Roses Creek	Approximately 0.6 mile upstream of the confluence with Roses Creek	Burke County
Rush Branch	The confluence with Mulberry Creek	Approximately 0.9 mile upstream of the confluence with Mulberry Creek	Caldwell County
Russell Creek	The confluence with Irish Creek	Approximately 1.6 miles upstream of SR 1240	Burke County
Secrets Creek	The confluence with Howard Creek	Approximately 0.8 mile upstream of South Main Street	Town of Drexel, Town of Valdese
Shady Branch	The confluence with Holly Branch	Approximately 500 feet upstream of South 11th Avenue	Town of Maiden
Shady Branch Tributary 1	The confluence with Shady Branch	Approximately 1,800 feet upstream of South 8th Avenue	Town of Maiden
Silver Creek	Approximately 1.6 miles upstream of I-40	Approximately 1,800 feet upstream of US 64	Burke County, City of Morganton
Silver Creek	The confluence with Gunpowder Creek	Approximately 0.6 mile upstream of Falls Avenue (SR 1107)	Caldwell County, Town of Granite Falls
Silver Creek Tributary 1	The confluence with Silver Creek	Approximately 100 feet downstream of the Railroad	City of Morganton

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Simpson Creek	The confluence with Roses Creek	Approximately 1.5 miles upstream of the confluence with Roses Creek	Burke County
Smokey Creek	The confluence with Catawba River	The Burke / Caldwell County boundary	Burke County
Smokey Creek Tributary 1	The confluence with Smokey Creek	Approximately 0.4 mile upstream of the confluence with Smokey Creek	Burke County
Smyre Creek	Approximately 120 feet downstream of the confluence of Smyre Creek Tributary 1	Approximately 50 feet downstream of NC-16	Catawba County, City of Newton
Smyre Creek Tributary 1	The confluence with Smyre Creek	Approximately 1,500 feet upstream of the confluence with Smyre Creek	Catawba County, City of Newton
Snow Creek	The confluence with Catawba River	Approximately 1,040 feet upstream of 15th Avenue NE	Catawba County, City of Hickory
Snow Creek	The confluence with South Yadkin River	Approximately 260 feet upstream of Mountain View Road (SR 1614E)	Alexander County
Snow Hill Branch	The confluence with Town Creek	Approximately 1,100 feet upstream of East 11th Street	City of Newton
South Fork Catawba River	Approximately 2.6 miles upstream of the confluence of Howards Creek	Approximately 125 feet downstream of NC-10	Catawba County, City of Newton
South Fork Catawba River Tributary 6	The confluence with South Fork Catawba River	Approximately 530 feet upstream of Herter Road (SR 2022)	Catawba County
South Fork Catawba River Tributary 7	The confluence with South Fork Catawba River	Approximately 0.9 mile upstream of the confluence with South Fork Catawba River	Catawba County
South Fork Catawba River Tributary 8	The confluence with South Fork Catawba River	Approximately 0.7 mile upstream of Wilfong Road (SR 2020)	Catawba County
South Fork Catawba River Tributary 9	The confluence with South Fork Catawba River	Approximately 1.1 miles upstream of US Highway 321	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
South Fork Catawba River Tributary 9A	The confluence with South Fork Catawba River Tributary 9	Approximately 1,500 feet upstream of the confluence with South Fork Catawba River Tributary 9	Catawba County
South Muddy Creek	The confluence with Muddy Creek	Approximately 0.7 mile upstream of SR 1780	Burke County
South Muddy Creek Tributary 1	The confluence with South Muddy Creek	Approximately 920 feet upstream of McDowell/Burke County boundary	Burke County
South Yadkin River	The confluence with Yadkin River	Approximately 510 feet downstream of Vashti Road (SR 1403)	Alexander County
Spainhour Creek	The confluence with Blairs Fork Creek	Approximately 1,800 feet upstream of Blowing Rock Boulevard	City of Lenoir
Spring Creek	The confluence with Lower Little River	Approximately 1.7 miles upstream of SR 1121	Alexander County
Stirewalt Creek	The confluence with Lower Little River	Just upstream of the Railroad	Alexander County, Town of Taylorsville
Stratford Creek	The confluence with Catawba River	Approximately 130 feet downstream of Lee Pearson Road (SR 1136)	Caldwell County
Stratford Creek Tributary 1	The confluence with Stratford Creek	Approximately 1,815 feet upstream of Baton School Road (SR 1139)	Caldwell County
Terrapin Creek	The confluence with Catawba River (Lake Norman)	Approximately 1.2 miles upstream of the confluence of Terrapin Creek Tributary 1	Catawba County
Terrapin Creek Tributary 1	The confluence with Terrapin Creek	Approximately 1 mile upstream of the confluence with Terrapin Creek	Catawba County
Third Creek	Approximately 1,130 feet downstream of Interstate 40	Approximately 0.5 mile upstream of Lentz Road	Alexander County
Thorps Creek	The confluence with Wilson Creek	Approximately 1,375 feet upstream of Edgemont Road	Caldwell County
Thunderhole Creek	The confluence with Johns River	Approximately 0.4 mile upstream of the confluence of New Years Creek	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Tims Creek	The confluence with Henry Fork	Approximately 1.3 miles upstream of SR 1788	Burke County
Town Branch	The confluence with Catawba River	Approximately 0.5 mile upstream of 2nd Street S.W.	Town of Catawba
Town Creek	Approximately 1,400 feet upstream of St. James Church Road	Approximately 0.8 miles upstream of State Route 10	City of Newton
Tributary to Lyle Creek Tributary	The confluence with Lyle Creek Tributary	Approximately 0.7 mile upstream of the confluence with Lyle Creek Tributary	Catawba County
Upper Creek	The confluence with Irish Creek and Warrior Fork	Approximately 0.5 mile upstream of SR 1405	Burke County
Upper Little River	The confluence with Catawba River	Approximately 0.7 mile upstream of Teaberry Lane	Alexander County, Caldwell County
Upper Little River Tributary 1	The confluence with Upper Little River	Approximately 2,380 feet upstream of Charlie Little Road (SR 1741)	Caldwell County
Wallace Creek	The confluence with South Yadkin River	Approximately 1,200 feet upstream of the confluence of Greasy Creek	Alexander County
Walnut Bottom Creek	The confluence with Johns River	Approximately 0.6 mile upstream of the confluence with Johns River	Caldwell County
Warrior Creek	The confluence with Yadkin River	Approximately 210 feet upstream of Warrior Road (SR 1346)	Caldwell County
Warrior Fork	Approximately 0.5 mile upstream of the confluence of Wilson Creek	The confluence of Irish Creek and Upper Creek	Burke County, City of Morganton
White Creek	The confluence with Duck Creek	Approximately 1.9 miles upstream of SR 1304	Alexander County
Wilson Creek	Approximately 1.1 miles upstream of Adako Road (SR 1337)	Approximately 500 feet upstream of the confluence of Cary Flat Branch	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Yadkin River	Approximately 90 feet upstream of Whisnant Road (SR 1517)	Approximately 2.2 miles upstream of the confluence of Ooten Creek	Caldwell County
Yadkin River	The confluence of Elk Creek	Approximately 0.5 mile upstream of the confluence of Mill Creek (into Yadkin River)	Caldwell County
Yadkin River Tributary 25	The confluence with Yadkin River	Approximately 1.3 miles upstream of NC Highway 268	Caldwell County
Zacks Fork Creek	The confluence with Lower Creek	Approximately 900 feet downstream of NE Georgetown Road	City of Lenoir
Zacks Fork Creek Tributary 1	The confluence with Zacks Fork Creek	Approximately 1.2 miles upstream of the confluence with Zacks Fork Creek	Caldwell County, City of Lenoir

Table 2: Flooding Sources Studied by Detailed Methods: Limited Detailed

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Abingdon Creek	The confluence with Lower Creek	Approximately 940 feet upstream of Huffman Road	Caldwell County, City of Lenoir, Town of Gamewell
Allen Creek	The confluence with Maiden Creek	Approximately 50 feet downstream of Jim Beard Road (SR 1867)	Catawba County, Town of Maiden
Bailey Fork	The confluence with Silver Creek	Approximately 0.8 mile upstream of I-40	City of Morganton
Bakers Creek	The confluence with Lyle Creek	Approximately 900 feet downstream of Lee Cline Road (SR 1486)	Catawba County
Betts Branch	The confluence with Clarks Creek	Approximately 2.0 miles upstream of Sigmon Dairy Road	Catawba County
Bills Branch	The confluence with Clarks Creek	Approximately 830 feet upstream of US Highway 321	Catawba County, City of Newton
Canoe Creek	The confluence with Catawba River	Approximately 150 feet upstream of NC 126	Burke County, City of Morganton

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Catawba River	At Lake Rhodhiss Dam	At Malcolm Boulevard	Burke County, Caldwell County, City of Lenoir, Town of Connelly Springs, Town of Granite Falls, Town of Rhodhiss, Town of Rutherford College, Town of Sawmills
Catawba River (Lake Hickory)	Lake Hickory / Oxford Dam	NC 127	Alexander County, Catawba County, City of Hickory
Catawba River (Lake Norman)	Cowans Ford Dam	Approximately 0.6 mile downstream of Hudson Chapel Road (SR 1004)	Catawba County
Catawba River (Lookout Shoals Lake)	Toe at Lookout Shoals Dam	Approximately 0.4 mile upstream of the confluence of Elk Shoal Creek	Alexander County, Catawba County
Cline Creek North	The confluence with Lyle Creek	Approximately 0.4 mile upstream of Rifle Range Road (SR 1488)	Catawba County, City of Conover
Drowning Creek	The confluence with Catawba River	Approximately 300 feet downstream of SR 1621	Burke County
Drowning Creek Tributary 1	The confluence with Drowning Creek	Approximately 800 feet upstream of Wilson Road	Burke County, Town of Hildebran
Drowning Creek Tributary 2	The confluence with Drowning Creek	Approximately 100 feet downstream of the confluence of Drowning Creek Tributary 2B	Burke County, Town of Hildebran
Drowning Creek Tributary 2A	The confluence with Drowning Creek Tributary 2	Approximately 1,600 feet upstream of the confluence with Drowning Creek Tributary 2	Burke County
East Prong Creek	The confluence with Hunting Creek	Approximately 500 feet downstream of Mount Home Church Road	City of Morganton
East Tributary to McLin Creek	The confluence with McLin Creek	Approximately 0.5 mile upstream of confluence with McLin Creek	City of Conover
Fiddlers Run	The confluence with East Prong Creek	Approximately 100 feet downstream of Old Colony Road	City of Morganton

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Fitz Creek	The confluence with Cripple Creek	Approximately 175 feet upstream of 2nd Avenue NW	City of Hickory
Greasy Creek	The confluence with Lower Creek	Approximately 0.4 mile upstream of SW Morganton Boulevard	City of Lenoir
Gunpowder Creek	Approximately 0.5 mile upstream of Pine Mountain Road (SR 1809)	Approximately 785 feet upstream of SE Starcross Road	City of Lenoir, Town of Hudson
Hagan Fork Creek	The confluence with McLin Creek	Upstream side of Mount Olive Church Road	Catawba County
Henry Fork	Burke / Catawba County boundary	Approximately 0.6 mile upstream of SR 1002	Burke County, Catawba County
Herman Branch Creek	The confluence with Lyle Creek	Approximately 25 feet downstream of 26th Street NE	Catawba County, City of Hickory
Hickory Creek	The confluence with Lyle Creek	Approximately 1,350 ft upstream of 20th Street NE	City of Hickory
Holly Branch	The confluence with Maiden Creek	Approximately 220 feet downstream of the confluence of Holly Branch Tributary 1 and Shady Branch	Town of Maiden
Howard Creek	Approximately 850 feet upstream of SR 1512	Approximately 300 feet upstream of US-70	Burke County, Town of Drexel, Town of Valdese
Hunting Creek	The confluence with Catawba River	Approximately 250 feet upstream of the confluence of Hunting Creek Tributary 3	Burke County, City of Morganton
Hunting Creek Tributary 1	The confluence with Hunting Creek	Approximately 0.7 mile upstream of the confluence with Hunting Creek	Burke County, City of Morganton
Jacob Fork	The confluence with Henry Fork and South Fork Catawba River	Approximately 220 feet upstream of Providence Church Road	Catawba County, City of Newton
Johns River	Approximately 1,500 feet upstream of the Burke / Caldwell County boundary	Approximately 1.1 miles upstream of Triple T Lane	Caldwell County
Lake Norman	Cowans Ford Dam	Approximately 0.6 mile downstream of Hudson Chapel Road (SR 1004)	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Linville River	Approximately 0.7 mile downstream of NC 126	Approximately 2.6 miles upstream of NC 126	Burke County
Little Gunpowder Creek (near City of Lenoir)	The confluence with Gunpowder Creek	Approximately 700 feet upstream of SW Walt Arney Road	City of Lenoir, Town of Cajah's Mountain, Town of Hudson
Little Silver Creek	The confluence with Silver Creek	Approximately 0.6 mile upstream of Causby Road (SR 1147)	City of Morganton, Town of Glen Alpine
Lower Creek	Approximately 1,830 feet upstream of the second crossing of Cedar Rock Circle (SR 1706)	Approximately 1,900 feet upstream of K and B Farm Lane	Caldwell County, Village of Cedar Rock
Lower Creek	The Burke / Caldwell County boundary	Approximately 800 feet downstream of the confluence of Abingdon Creek	Burke County, Caldwell County, Town of Gamewell
Lyle Creek	The confluence with Catawba River	Approximately 0.6 mile downstream of the confluence of Bakers Creek	Catawba County, City of Claremont, City of Conover, Town of Catawba
Maiden Creek	The confluence with Clarks Creek	Approximately 1.3 miles upstream of Providence Mill Road	Catawba County, Town of Maiden
McGalliard Creek	Approximately 1.1 miles upstream of the confluence with Catawba River	Approximately 250 feet upstream of the confluence of McGalliard Creek Tributary 2	Burke County, Town of Valdese
McLin Creek	The confluence with Lyle Creek	Approximately 0.8 mile upstream of East 20th Street	Catawba County, City of Claremont, City of Conover, City of Newton, Town of Catawba
Mulberry Creek	The confluence with Johns River	Approximately 90 feet downstream of Collettsville Road	Caldwell County
Pinch Gut Creek	The confluence with Maiden Creek	Approximately 120 feet upstream of Saint James Church Road	Catawba County, Town of Maiden
Propst Creek	The confluence with Lyle Creek	Approximately 1.9 miles upstream of the confluence with Lyle Creek	Catawba County, City of Conover

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Sandy Run	The confluence with Hunting Creek	Approximately 2.4 miles upstream of the confluence with Hunting Creek	Burke County, City of Morganton
Silver Creek	The confluence with Catawba River	Approximately 1.6 miles upstream of I-40	Burke County, City of Morganton
Smokey Creek	The Burke / Caldwell County boundary	Approximately 1,500 feet upstream of Smokey Creek Road (SR 1134)	Burke County, Caldwell County
Smyre Creek	The confluence with Clarks Creek	Approximately 120 feet downstream of the confluence of Smyre Creek Tributary 1	Catawba County, City of Newton
South Fork Catawba River	Approximately 125 feet downstream of NC 10	The confluence of Jacob Fork and Henry Fork	Catawba County, City of Newton
Town Creek	The confluence with Smyre Creek	Approximately 1,400 feet upstream of St. James Church Road	City of Newton
Warrior Fork	The confluence with Catawba River	Approximately 0.5 mile upstream of the confluence of Wilson Creek	Burke County, City of Morganton
West Tributary McLin Creek	The confluence with McLin Creek	Approximately 850 feet upstream of Ann Avenue	City of Newton
Wilson Creek	The confluence with Johns River	Approximately 1.1 miles upstream of Adako Road (SR 1337)	Caldwell County
Wilson Creek	The confluence with Warrior Fork	Approximately 0.8 mile upstream of St. Mary's Church Road (SR 1414)	Burke County, City of Morganton
Yadkin River	Approximately 0.5 mile upstream of the confluence of Mill Creek	Approximately 90 feet upstream of Whisnant Road (SR 1517)	Caldwell County
Zacks Fork Branch	The confluence with Zacks Fork Creek	Approximately 100 feet upstream of NE Sherlee Street	City of Lenoir
Zacks Fork Creek	Approximately 900 feet downstream of NE Georgetown Road	Approximately 1.1 miles upstream of Westover Heights Road	Caldwell County, City of Lenoir

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Abingdon Creek	Approximately 940 feet upstream of Huffman Road	Approximately 325 feet upstream of M.W. Setzer Road	Caldwell County
Amos Creek	The confluence with Mulberry Creek	Approximately 1.4 miles upstream of the confluence with Mulberry Creek	Caldwell County
Angley Creek Tributary 1	The confluence with Angley Creek	Approximately 1.2 miles upstream of the confluence with Angley Creek	Caldwell County, City of Lenoir
Anthony Creek	Approximately 55 feet upstream of the confluence with Prong Creek and Racket Creek	Approximately 1.4 miles upstream of the confluence with Prong Creek and Rocket Creek	Caldwell County
Back Creek	The confluence with Irish Creek	Approximately 0.5 mile upstream of the confluence with Irish Creek	Burke County
Bailey Fork	Approximately 0.8 mile upstream of I-40	At US-64	Burke County, City of Morganton
Bakers Creek Tributary	The confluence with Bakers Creek	Approximately 1.4 miles upstream of Swinging Bridge Road	Catawba County
Bakers Creek Tributary 1	The confluence with Bakers Creek	Approximately 0.7 mile upstream of Stratford Drive (SR 3000)	Catawba County
Balls Creek	The confluence with Catawba River	Approximately 970 feet upstream of Little Mountain Road	Catawba County, Town of Catawba
Beaver Branch	The confluence with Lambert Creek	Approximately 500 feet upstream of SR 1307	Alexander County
Beaver Creek	The confluence with Yadkin River	Approximately 1.5 miles upstream of the Wilkes / Caldwell County boundary	Caldwell County
Beaverdam Creek	The confluence with Big Branch into South Yadkin River	Approximately 2.5 miles upstream of Vashti Road (SR 1403)	Alexander County
Big Branch	The confluence with Elk Shoals Creek	Approximately 550 feet upstream of SR 1619	Alexander County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Big Branch into South Yadkin River	The confluence with South Yadkin River	Approximately 0.5 mile upstream of Vashti Cemetery Road (SR 1430)	Alexander County
Bills Branch	Approximately 830 feet upstream of US 321	Approximately 0.5 mile upstream of US Highway 321	Catawba County, City of Newton, Town of Maiden
Billy Branch	The confluence with Gunpowder Creek	Approximately 0.6 mile upstream of North Highland Avenue	Town of Granite Falls
Blairs Fork Creek	Approximately 130 feet upstream of Collettsville Road / NC-90	Approximately 780 feet upstream of Parson's Park Drive	Caldwell County
Blue Creek	The confluence with Kings Creek 1 and Little Kings Creek	Approximately 2.9 miles upstream of Grandin Road (SR 1552)	Caldwell County
Boone Fork	The confluence with Mulberry Creek	Approximately 2.1 miles upstream of the confluence with Mulberry Creek	Caldwell County
Bristol Creek	The confluence with Lower Creek	Approximately 180 feet downstream of the Burke / Caldwell County boundary	Burke County, Caldwell County
Bristol Creek Tributary 1	The confluence with Bristol Creek	Approximately 0.4 mile upstream of the confluence with Bristol Creek	Burke County
Camp Creek	The confluence with Jacob Fork	Approximately 0.5 mile downstream of SR 1736	Burke County, Catawba County
Camp Creek	The confluence with Wilson Creek	The confluence of Raider Camp Creek and Harper Creek	Caldwell County
Canoe Creek	Approximately 150 feet upstream of NC 126	Approximately 0.4 mile upstream of SR 1254	Burke County, City of Morganton
Carroll Creek	The confluence with Parks Creek	Approximately 1,000 feet upstream of SR 1424	Burke County
Catawba River	Approximately 0.6 mile downstream of Hudson Chapel Road	Toe at Lookout Shoals Dam	Catawba County, Town of Catawba
Catawba River	Approximately 0.9 mile upstream of confluence of Elk Shoal Creek	Lake Hickory/ Oxford Dam	Alexander County, Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Catawba River	Approximately 1,100 feet upstream of Watermill Glen Alpine Road (SR 1147)	At Bridgewater Dam (Power Plant)	Burke County, Town of Glen Alpine
Catawba River	Approximately 1,100 feet upstream of Watermill Glen Alpine Road (SR1147)	Approximately 1,100 feet downstream of SR 1501	Burke County
Catawba River	At Malcolm Boulevard	The confluence of Johns River	Burke County, Caldwell County, City of Morganton, Town of Rutherford College, Town of Valdese
Catawba River	North Center Street/State Highway 127	At Lake Rhodhiss Dam	Alexander County, Burke County, Caldwell County, Catawba County, City of Hickory, Town of Granite Falls, Town of Rhodhiss
Catawba River Tributary 1	The confluence with Catawba River	Approximately 0.5 mile upstream of SR 1223	Burke County
Catawba River Tributary 2	The confluence with Catawba River	Approximately 2.8 miles upstream of the confluence with Catawba River	Burke County
Celia Creek	The confluence with Husband Creek	Approximately 1.0 mile upstream of Celia Creek Road	Caldwell County
Clarks Creek	Approximately 100 feet downstream of confluence of Clarks Creek Tributary 2	Approximately 310 feet upstream of the Catawba/Lincoln County boundary	Catawba County
Clear Creek	The confluence with Silver Creek	Approximately 500 feet upstream of US 64	Burke County
Cline Creek	Approximately 30 feet downstream of the confluence of Cline Creek Tributary 1	Approximately 150 feet downstream of Interstate 40	City of Conover
Cline Creek North	Approximately 0.4 mile upstream of Rifle Range Road	Approximately 2.0 miles upstream of the confluence of Cline Creek North Tributary 1	Catawba County
Cline Creek North Tributary 1	The confluence with Cline Creek North	Approximately 0.5 mile upstream of Rifle Range Road	Catawba County
Cline Creek Tributary 1	The confluence with Cline Creek	Approximately 450 feet upstream of Interstate 40	City of Conover

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Cline Creek Tributary 2	The confluence with Cline Creek	Approximately 1,300 feet upstream of Interstate 40	City of Conover
Cold Water Creek	The confluence with Johns River	Approximately 1.7 miles upstream of the confluence with Johns River	Caldwell County
Cow Branch	The confluence with Pott Creek	Approximately 0.8 mile upstream of Grace Church Road	Catawba County
Craig Creek	The confluence with Wilson Creek	Approximately 1.9 miles upstream of the confluence with Wilson Creek	Caldwell County
Cub Creek	The confluence with Henry Fork	Approximately 200 feet downstream of SR 1737	Burke County
Dennis Creek	The confluence with Yadkin River	Approximately 0.8 mile upstream of Hines Branch Road	Caldwell County
Double Branch Tributary 1	The confluence with Double Branch	Approximately 900 feet upstream of SR 1722	Burke County
Douglas Creek	The confluence with Jacob Fork	Approximately 0.4 mile downstream of Old Rock Quarry Road	Burke County, Catawba County
Drowning Creek	Approximately 300 feet downstream of SR 1621	Approximately 1.8 miles upstream of I-40	Burke County
Drowning Creek Tributary 1	Approximately 800 feet upstream of Wilson Road	Approximately 1,700 feet upstream of Cline Park Drive	Town of Hildebran
Drowning Creek Tributary 2	Approximately 100 feet downstream of the confluence of Drowning Creek Tributary 2B	Approximately 200 feet downstream of the Railroad	Burke County
Drowning Creek Tributary 2B	The confluence with Drowning Creek Tributary 2	Approximately 150 feet downstream of the Railroad	Burke County
Elk Branch	The confluence with Jones Creek	Approximately 1,310 feet upstream of Old Sampson Road (SR 1574)	Caldwell County
Elk Shoals Creek	The confluence with Catawba River	Approximately 350 feet upstream of SR 1631	Alexander County
Elk Shoals Creek Tributary 1	The confluence with Elk Shoals Creek	Approximately 0.5 mile upstream of the confluence with Elk Shoals Creek	Alexander County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Elk Shoals Creek Tributary 2	The confluence with Elk Shoals Creek	Approximately 0.5 mile upstream of confluence with Elk Shoals Creek	Alexander County
Estes Mill Creek	The confluence with Wilson Creek	Approximately 1.2 miles upstream of the confluence with Wilson Creek	Caldwell County
Fiddle Creek	The confluence with Mulberry Creek	Approximately 1,620 feet upstream of the confluence with Mulberry Creek	Caldwell County
Franklin Branch	The confluence with Johns River	Approximately 1,500 feet upstream of the confluence with Franklin Branch Tributary 1	Caldwell County
Franklin Branch Tributary 1	The confluence with Franklin Branch	Approximately 1,540 feet upstream of the confluence with Franklin Branch	Caldwell County
Freemason Creek	The confluence with Catawba River	Approximately 300 feet upstream of Stamey Road	Caldwell County, Town of Sawmills
Freemason Creek Tributary 1	The confluence with Freemason Creek	Approximately 1.5 miles upstream of the confluence with Freemason Creek	Caldwell County, Town of Sawmills
Freemason Creek Tributary 1A	The confluence with Freemason Creek Tributary 1	Approximately 1,690 feet upstream of Hickory Nut Ridge Road	Town of Sawmills
Freemason Creek Tributary 2	The confluence with Freemason Creek	Approximately 0.8 mile upstream of Horseshoe Bend Road	Town of Sawmills
Freemason Creek Tributary 2A	The confluence with Freemason Creek Tributary 2	Approximately 620 feet upstream of Lafayette Avenue	Town of Sawmills
Ginger Creek	The confluence with Middle Little River	Approximately 0.7 mile upstream of Draco Road	Caldwell County
Ginger Creek Tributary 1	The confluence with Ginger Creek	Approximately 1.3 miles upstream of Scout Road	Caldwell County
Glade Creek	The confluence with Lower Little River	Approximately 1.1 miles upstream of SR 1604	Alexander County
Glade Creek Tributary 1	The confluence with Glade Creek	Approximately 0.8 mile upstream of SR 1607	Alexander County, Town of Taylorsville

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Grassy Creek	The confluence with Lower Little River	Approximately 0.4 mile upstream of SR 1344	Alexander County
Grassy Creek Tributary 1	The confluence with Grassy Creek	Approximately 0.7 mile upstream of the confluence with Grassy Creek	Alexander County
Grassy Creek Tributary 2	The confluence with Grassy Creek	Approximately 0.7 mile upstream of NC 16	Alexander County
Greasy Creek	The confluence with Lower Little River	Approximately 0.4 mile upstream of SR 1344	Alexander County
Greasy Creek Tributary 1	The confluence with Grassy Creek	Approximately 0.7 mile upstream of the confluence with Grassy Creek	Alexander County, Town of Taylorsville
Green Rock Branch	The confluence with Buffalo Creek	Approximately 1.5 miles upstream of Buffalo Cove Road (SR 1504)	Caldwell County
Gunpowder Creek	Approximately 785 feet upstream of SE Starcross Road	Approximately 600 feet upstream of SE Applegate Court	City of Lenoir
Gunpowder Creek Tributary 1	The confluence with Gunpowder Creek	Approximately 280 feet downstream of Temple Hill Church Road	Caldwell County
Gunpowder Creek Tributary 2	The confluence with Gunpowder Creek	Approximately 45 feet downstream of Christie Road (SR 1717)	Caldwell County
Gunpowder Creek Tributary 2A	The confluence with Gunpowder Creek Tributary 2	Approximately 1,550 feet upstream of Christie Road (SR 1717)	Caldwell County, Town of Hudson
Gunpowder Creek Tributary 3	The confluence with Gunpowder Creek	Approximately 2,340 feet upstream of the confluence with Gunpowder Creek	Town of Hudson
Gunpowder Creek Tributary 4	The confluence with Gunpowder Creek	Approximately 0.6 mile upstream of the confluence with Gunpowder Creek	Town of Hudson
Gunpowder Creek Tributary 5	The confluence with Gunpowder Creek	Approximately 1,115 feet upstream of SE Eastwood Park Circle	City of Lenoir
Gunpowder Creek Tributary 6	The confluence with Gunpowder Creek	Approximately 0.5 mile upstream of Renwick Street	City of Lenoir

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Guys Branch	The confluence with Elk Shoals Creek	Approximately 0.5 mile upstream of the confluence with Elk Shoals Creek	Alexander County
Haas Creek	The confluence with Pott Creek	Approximately 0.8 mile upstream of Grace Church Road	Catawba County
Hall Creek	The confluence with Silver Creek	Approximately 0.4 mile upstream of US 64	Burke County
Harper Creek	The confluence with Camp Creek and Raider Camp Creek	The confluence of South Harper Creek	Caldwell County
Hayes Mill Creek Tributary 1	The confluence with Hayes Mill Creek	Approximately 1,700 feet upstream of the confluence with Hayes Mill Creek	Town of Granite Falls, Town of Sawmills
Hayes Mill Creek Tributary 2	The confluence with Hayes Mill Creek	Approximately 1,900 feet upstream of the confluence with Hayes Mill Creek	Town of Sawmills
Henry Fork	Approximately 0.6 mile upstream of SR 1002	Approximately 0.9 mile upstream of SR 1918	Burke County
Henry Fork Tributary 3	The confluence with Henry Fork	Approximately 2,000 feet upstream of Robinson Road	Catawba County
Holdsclaw Creek	The confluence with Catawba River	Approximately 1,500 ft upstream of the confluence of Holdsclaw Creek Tributary 1	Catawba County
Holdsclaw Creek Tributary 1	The confluence with Holdsclaw Creek	Approximately 1,450 feet upstream of the confluence with Holdsclaw Creek	Catawba County
Holly Branch	Approximately 220 feet downstream of the confluence of Holly Branch Tributary 1 and Shady Branch	The confluence of Shady Branch and Holly Branch Tributary 1	Town of Maiden
Holly Branch Tributary 1	The confluence with Holly Branch	Approximately 200 feet upstream of South Main Avenue	Town of Maiden
Hop Creek	The confluence with Holly Branch	Approximately 200 feet upstream of South Main Avenue	Catawba County
Howard Creek	The confluence with Catawba River	Approximately 850 feet upstream of SR 1512	Burke County, Town of Drexel, Town of Valdese

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Howard Creek Tributary 1	The confluence with Howard Creek	Approximately 350 feet upstream of Railroad	Town of Drexel
Howards Creek	The confluence with South Fork Catawba River	Approximately 500 feet upstream of the Catawba/Lincoln County boundary	Catawba County
Hoyle Creek	The confluence with Catawba River	Approximately 1,500 feet upstream of the confluence with Micol Creek	Burke County, Town of Rutherford College, Town of Valdese
Hoyle Creek Tributary 1	The confluence with Hoyle Creek	Approximately 0.9 mile upstream of the confluence with Hoyle Creek	Burke County, Town of Rutherford College, Town of Valdese
Hoyle Creek Tributary 2	The confluence with Hoyle Creek	Approximately 0.7 mile upstream of the confluence with Hoyle Creek	Town of Rutherford College, Town of Valdese
Hunting Creek	Approximately 250 feet upstream of the confluence of Hunting Creek Tributary 3	Approximately 1,100 feet upstream of SR 2002	Burke County, City of Morganton
Hunting Creek Tributary 3	The confluence with Hunting Creek	Approximately 0.4 mile upstream of the confluence with Hunting Creek	Burke County, City of Morganton
Husband Creek	The confluence with Lower Creek	Approximately 1,925 feet upstream of Rocky Road (SR 1143)	Caldwell County, Town of Gamewell
Husband Creek Tributary 1	The confluence with Husband Creek	Approximately 140 feet downstream of Fleming Chapel Church Road (SR 1322)	Caldwell County
Husband Creek Tributary 2	The confluence with Husband Creek	Approximately 750 feet upstream of Crooked Creek Way	Caldwell County
Indian Creek	The Lincoln/Gaston County boundary	Approximately 550 ft upstream of the Catawba/Lincoln County boundary	Catawba County
Irish Creek	The confluence with Upper Creek and Warrior Fork	Approximately 800 feet upstream of the confluence with Reedys Fork Creek	Burke County
Irish Creek Tributary 1	The confluence with Irish Creek	At SR 1240	Burke County
Isaac Creek	The confluence with Upper Little River	Approximately 0.7 mile upstream of SR 1143	Alexander County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Island Creek	The confluence with Catawba River	Approximately 0.4 mile upstream of SR 1621	Alexander County
Island Creek	The confluence with Catawba River	Approximately 0.7 mile upstream of I-40	Burke County, Town of Connelly Springs, Town of Rutherford College
Jackson Camp Creek	The confluence with Yadkin River	Approximately 1.0 mile upstream of Richland Road (SR 1372)	Caldwell County
Jacob Fork	Approximately 220 feet upstream of Providence Church Road	Approximately 990 feet upstream of the Catawba/Burke County boundary	Burke County, Catawba County
Jacob Fork	Approximately 990 feet upstream of the Catawba/Burke County boundary	Approximately 450 feet upstream of SR 1904	Burke County
Jacob Fork Tributary 1	The confluence with Jacob Fork	Approximately 1.3 miles upstream of Cooksville Road	Catawba County
Jesse Fork	The confluence with Buffalo Creek	Approximately 0.8 mile upstream Stone Mountain Road (SR 1503)	Caldwell County
Jesse Fork Tributary 1	The confluence with Jesse Fork	Approximately 330 feet upstream of Wallace Coffey Place	Caldwell County
Johns River	Approximately 1.1 miles upstream of Triple T Lane	Approximately 3.8 miles upstream of the confluence of Thunderhole Creek	Caldwell County
Johns River	The confluence with Catawba River	Approximately 1,500 feet upstream of the Burke / Caldwell County boundary	Burke County, Caldwell County, City of Morganton
Jones Creek	The confluence with Buffalo Creek	Approximately 50 feet downstream of the Watauga / Caldwell County boundary	Caldwell County
Jumping Run	The confluence with Rock Creek	Approximately 500 feet upstream of NC 127	Alexander County
Kings Creek 1	The confluence with Yadkin River	The confluence of Little Kings Creek and Blue Creek	Caldwell County
Kings Creek 2	The confluence with Blue Creek	Approximately 1.9 miles upstream of the confluence of Kings Creek 2 Tributary 1	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Kings Creek 2 Tributary 1	The confluence with Kings Creek 2	Approximately 1.6 miles upstream of Blue Door School Road	Caldwell County
Lambert Creek	The confluence with Lower Little River	Approximately 0.8 mile upstream of SR 1307	Alexander County
Lambert Creek Tributary 1	The confluence with Lambert Creek	Approximately 800 feet upstream of SR 1307	Alexander County
Laurel Creek	The confluence with Henry Fork	Approximately 1.2 miles upstream of Shouppe Way	Burke County
Laurel Creek	The confluence with Wilson Creek	Approximately 1.1 miles upstream of the confluence with Wilson Creek	Caldwell County
Laytown Creek	The confluence with Yadkin River	Approximately 1.8 miles upstream of Laytown Road (SR 1507)	Caldwell County
Linville River	Approximately 2.6 miles upstream of NC 126	Approximately 800 feet downstream of the Land Harbors Dam	Burke County
Linville River	The confluence with Catawba River	Approximately 0.7 mile downstream of NC 126	Burke County
Lippard Creek	The confluence with Sawmill Branch and Leepers Creek	Approximately 1,940 feet upstream of the Catawba/Lincoln County boundary	Catawba County
Little Creek	The confluence with Upper Little River	Approximately 1.4 miles upstream of Cove Mountain Lane	Caldwell County
Little Gunpowder Creek (near City of Lenoir)	Approximately 700 feet upstream of SW Walt Arney Road	Approximately 1,075 feet upstream of Connelly Springs Road	Town of Cajah's Mountain
Little Gunpowder Creek (near Town of Hudson)	Approximately 0.8 mile upstream of Little Gunpowder Creek Drive (SR 1133)	Approximately 1.4 miles upstream of Little Gunpowder Creek Drive (SR 1133)	Caldwell County, Town of Cajah's Mountain
Little Gunpowder Creek (near Town of Hudson) Tributary 1	The confluence with Little Gunpowder Creek (near Town of Hudson)	Approximately 50 feet upstream of Madison MHP Drive	Town of Hudson
Little Gunpowder Creek (near Town of Hudson) Tributary 2	The confluence with Little Gunpowder Creek (near Town of Hudson)	Approximately 0.4 mile upstream of Chickadee Trail Place	Town of Hudson
Little Kings Creek	The confluence with Kings Creek and Blue Creek	Approximately 1,620 feet upstream of Zacks Fork Road (SR 1511)	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Little Mulberry Creek 2	The confluence with Mulberry Creek	Approximately 0.4 mile upstream of Shallow Creek Road (SR 1530)	Caldwell County
Lost Cove Creek	The confluence with Wilson Creek	Approximately 2.1 miles upstream of the confluence with Gragg Prong Creek	Caldwell County
Lower Creek	The confluence with Catawba River	Approximately 1,290 feet downstream of the confluence with Husband Creek	Burke County, Caldwell County
Lower Creek Tributary 1	The confluence with Lower Creek	Approximately 0.7 mile upstream of SE Haigler Road	City of Lenoir
Lower Little River	The confluence with Catawba River	Approximately 0.9 mile upstream of SR 1332	Alexander County
Lower Little River Tributary 1	The confluence with Lower Little River	Approximately 1.9 miles upstream of the confluence with Lower Little River	Alexander County
Lower Little River Tributary 2	The confluence with Lower Little River	Approximately 1,600 feet upstream of SR 1124	Alexander County
Lower Little River Tributary 2A	The confluence with Lower Little River Tributary 2	Approximately 1,600 feet upstream of confluence with Lower Little River Tributary 2	Alexander County
Lower Little River Tributary 3	The confluence with Lower Little River	Approximately 1.4 miles upstream of SR 1110	Alexander County
Lower Little River Tributary 4	The confluence with Lower Little River	Approximately 1,000 feet upstream of SR 1104	Alexander County, Town of Taylorsville
Lyle Creek Tributary	The confluence with Lyle Creek	Approximately 1,950 feet upstream of Community Road	Catawba County
Lyle Creek Tributary 1	The confluence with Lyle Creek	Approximately 1.0 mile upstream of Crossing Creek Drive (SR 2454)	Catawba County
Maiden Creek	Approximately 1.3 miles upstream of Providence Mill Road	Approximately 80 feet downstream of North Olivers Cross Road	Catawba County
McGalliard Creek	The confluence of Double Branch	Approximately 400 feet upstream of SR 1722	Burke County
McGalliard Creek	The confluence with Catawba River	Approximately 1.1 miles upstream of the confluence with Catawba River	Burke County, Town of Valdese

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
McGalliard Creek Tributary 1	The confluence with McGalliard Creek	Approximately 1,800 feet upstream of Louise Avenue NE	Burke County, Town of Valdese
McGalliard Creek Tributary 2	The confluence with McGalliard Creek	Approximately 600 feet downstream of I-40	Burke County, Town of Drexel
McGalliard Creek Tributary 2A	The confluence with McGalliard Creek Tributary 2	Approximately 800 feet upstream of Drexel Road	Town of Drexel
McGalliard Creek Tributary 2B	The confluence with McGalliard Creek Tributary 2	Approximately 200 feet downstream of SR 1721	Burke County, Town of Drexel
McLin Creek Tributary 1	The confluence with McLin Creek	Approximately 1,250 feet upstream of Frazier Drive	City of Claremont
McRory Creek	The confluence with Upper Little River	Approximately 0.6 mile upstream of McRary Creek Road (SR 1721)	Caldwell County
Micol Creek Tributary 1	The confluence with Micol Creek	Approximately 0.5 mile upstream of Montonya View Drive	Burke County, Town of Rutherford College, Town of Valdese
Micol Creek Tributary 1A	The confluence with Micol Creek Tributary 1	Approximately 75 feet downstream of SR 1001	Burke County, Town of Rutherford College
Micol Creek Tributary 1A1	The confluence with Micol Creek Tributary 1A	Approximately 0.4 mile upstream of the confluence with Micol Creek Tributary 1A	Burke County
Middle Little River	The most downstream crossing of the Alexander / Caldwell County boundary	Approximately 0.4 mile upstream of Brush Mountain Road (SR 1733)	Alexander County, Caldwell County
Middle Little River Tributary 2	The confluence with Middle Little River	Approximately 300 feet downstream of SR 1152	Alexander County
Middle Little River Tributary 3	The confluence with Middle Little River	Approximately 1,480 feet upstream of Taylorsville Road	Caldwell County
Middle Little River Tributary 4	The confluence with Middle Little River	Approximately 1,300 feet upstream of Duck Creek Road (SR 1730)	Caldwell County
Middle Little River Tributary 5	The confluence with Middle Little River	Approximately 0.5 mile upstream of the confluence with Middle Little River	Caldwell County
Mill Creek	The confluence with South Yadkin River	Approximately 0.4 mile upstream of the confluence with South Yadkin River	Alexander County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Mill Creek	The confluence with Upper Little River	Approximately 1.0 mile upstream of Petra Mill Road (SR 1740)	Caldwell County
Mill Creek (into Yadkin River)	The confluence with Yadkin River	Approximately 1.2 miles upstream of NC Highway 268	Caldwell County
Miller Creek	The confluence with South Yadkin River	Approximately 260 feet upstream of Sprinkle Dairy Road (SR 1475)	Alexander County
Morris Creek	The confluence with Upper Little River	Approximately 490 feet upstream of Sheriffs Road (SR 1730)	Caldwell County
Mountain Creek	The confluence with Catawba River (Lake Norman)	Approximately 1.6 miles upstream of the confluence of Mountain Creek Tributary 3	Catawba County
Mountain Creek	The confluence with Middle Little River	Approximately 200 feet upstream of SR 1150	Alexander County
Mountain Creek Tributary 2	The confluence with Mountain Creek	Approximately 1.6 miles upstream of the confluence with Mountain Creek	Catawba County
Mountain Creek Tributary 2A	The confluence with Mountain Creek Tributary 2	Approximately 1.4 miles upstream of the confluence with Mountain Creek Tributary 2	Catawba County
Mountain Creek Tributary 3	The confluence with Mountain Creek	Approximately 1.0 mile upstream of the confluence with Mountain Creek	Catawba County
Mountain Creek Tributary 3A	The confluence with Mountain Creek Tributary 3	Approximately 0.5 mile upstream of the confluence with Mountain Creek Tributary 3	Catawba County
Mountain Run	The confluence with Upper Little River	Approximately 125 feet upstream of Fox Road (SR 1726)	Caldwell County
Muddy Creek	Approximately 0.4 mile downstream of Robinson Road (SR 1146)	The confluence of Muddy Creek Tributary 2 and Muddy Creek Tributary 3	Catawba County
Muddy Creek	The confluence of Old Catawba River	The confluence of North Muddy Creek and South Muddy Creek	Burke County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Muddy Creek Tributary 1	The confluence with Muddy Creek	Approximately 0.7 mile upstream of Robinwood Road (SR 1148)	Catawba County
Muddy Creek Tributary 2	The confluence with Muddy Creek	Approximately 0.6 mile upstream of Robinwood Road (SR 1148)	Catawba County
Muddy Creek Tributary 3	The confluence with Muddy Creek	Approximately 1.3 miles upstream of the confluence with Muddy Creek	Catawba County, City of Hickory
Muddy Fork Creek	The confluence with Lower Little River	Approximately 600 feet downstream of SR 1405	Alexander County, Town of Taylorsville
Muddy Fork Creek Tributary 1	The confluence with Muddy Fork Creek	Approximately 1.6 miles upstream of Old Wilkesboro Road	Alexander County, Town of Taylorsville
Mulberry Creek	Approximately 90 feet downstream of Collettsville Road	Approximately 0.7 mile upstream of the confluence of Amos Creek	Caldwell County
Mundy Creek	The confluence with Reed Creek	Approximately 500 feet upstream of Lineberger Road	Catawba County
Mundy Creek Tributary 1	The confluence with Mundy Creek	Approximately 1,400 feet upstream of Grassy Creek Road	Catawba County
Nolden Creek	The confluence with Catawba River	Approximately 1,900 feet upstream of Nolden Creek Road	Burke County, Town of Connelly Springs
Old Catawba River	The confluence with Catawba River	The Burke / McDowell County boundary	Burke County
Old Field Branch	The confluence with Buffalo Creek	Approximately 1.7 miles upstream of the confluence with Buffalo Creek	Caldwell County
Ooten Creek	The confluence with Yadkin River	Approximately 0.6 mile upstream of the confluence with Yadkin River	Caldwell County
Paddy Creek	The confluence with Catawba River	Approximately 2.9 miles upstream of SR 1237	Burke County
Parks Creek	The confluence with Johns River	Approximately 100 feet downstream of SR 1405	Burke County
Pearcy Creek	The confluence with Parks Creek	Approximately 1.1 miles upstream of SR 1405	Burke County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Pearcy Creek Tributary 1	The confluence with Pearcy Creek	Approximately 20 feet downstream of SR 1405	Burke County
Pilot Branch	The confluence with Upper Little River	Approximately 440 feet upstream of Burns Road (SR 1749)	Caldwell County
Pinch Gut Creek	Approximately 120 feet upstream of Saint James Church Road	Approximately 0.9 mile upstream of Saint James Church Road	Catawba County
Pinch Gut Creek Tributary 1	The confluence with Pinch Gut Creek	Approximately 0.5 mile upstream of the confluence with Pinch Gut Creek	Catawba County
Poplar Creek	The confluence with Lambert Creek	Approximately 0.5 mile upstream of SR 1305	Alexander County
Pott Creek	The confluence with South Fork Catawba River	Approximately 1.9 miles upstream of Plateau Road	Catawba County
Preston Creek	The confluence with Yadkin River	Approximately 650 feet upstream of Kirby Mountain Road (SR 1370)	Caldwell County
Prong Creek	The confluence with Johns River	Approximately 65 feet downstream of the confluence Racket Creek and Anthony Creek	Caldwell County
Racket Creek	Approximately 65 feet downstream of the confluence with Prong Creek and Anthony Creek	Approximately 145 feet upstream of the confluence with Ballew Creek	Caldwell County
Raider Camp Creek	The confluence with Camp Creek	Approximately 1,795 feet upstream of the confluence with Camp Creek	Caldwell County
Reed Creek	The confluence with Mountain Creek	Approximately 1.1 miles upstream of Mount Pleasant Road (SR 1849)	Catawba County
Reedys Fork Creek	The confluence with Irish Creek	Approximately 0.5 mile upstream of the confluence with Irish Creek	Burke County
Rhodes Mill Creek	The confluence with Pott Creek	Approximately 1,100 feet upstream of Leatherman Road	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Rhodes Mill Creek Tributary 1	The confluence with Rhodes Mill Creek	Approximately 0.4 mile upstream of the confluence with Rhodes Mill Creek	Catawba County
Rock Creek	The confluence with Middle Little River	The confluence of Jumping Run	Alexander County
Rock Creek	The confluence with Upper Little River	Approximately 200 feet downstream of Fowler Road (SR 1747)	Caldwell County
Rock Creek Tributary 1	The confluence with Rock Creek	Approximately 1,000 feet upstream of confluence with Rock Creek	Alexander County
Rockhouse Creek	The confluence with Buffalo Creek	Approximately 30 feet downstream of the Watauga / Caldwell County boundary	Caldwell County
Rockhouse Creek	The confluence with Lost Cove Creek	Approximately 0.4 mile upstream of Avery/Caldwell County boundary	Caldwell County
Rocky Creek	The Iredell/Alexander County boundary	Approximately 1.0 mile upstream of the confluence of Rocky Creek Tributary 1	Alexander County
Roses Creek	The confluence with Irish Creek	Approximately 1.7 miles upstream of SR 1262	Burke County
Roses Creek Tributary 1	The confluence with Roses Creek	Approximately 0.6 mile upstream of the confluence with Roses Creek	Burke County
Rush Branch	The confluence with Mulberry Creek	Approximately 0.9 mile upstream of the confluence with Mulberry Creek	Caldwell County
Russell Creek	The confluence with Irish Creek	Approximately 1.6 miles upstream of SR 1240	Burke County
Secrets Creek	The confluence with Howard Creek	Approximately 0.8 mile upstream of South Main Street	Town of Drexel, Town of Valdese
Shady Branch	The confluence with Holly Branch	Approximately 500 feet upstream of South 11th Avenue	Town of Maiden
Shady Branch Tributary 1	The confluence with Shady Branch	Approximately 1,800 feet upstream of South 8th Avenue	Town of Maiden

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Silver Creek	Approximately 1.6 miles upstream of I-40	Approximately 1,800 feet upstream of US 64	Burke County, City of Morganton
Silver Creek	The confluence with Gunpowder Creek	Approximately 0.6 mile upstream of Falls Avenue (SR 1107)	Caldwell County, Town of Granite Falls
Silver Creek Tributary 1	The confluence with Silver Creek	Approximately 100 feet downstream of the Railroad	City of Morganton
Simpson Creek	The confluence with Roses Creek	Approximately 1.5 miles upstream of the confluence with Roses Creek	Burke County
Smokey Creek	The confluence with Catawba River	The Burke / Caldwell County boundary	Burke County
Smokey Creek Tributary 1	The confluence with Smokey Creek	Approximately 0.4 mile upstream of the confluence with Smokey Creek	Burke County
Smyre Creek	Approximately 120 feet downstream of the confluence of Smyre Creek Tributary 1	Approximately 50 feet downstream of NC-16	Catawba County, City of Newton
Smyre Creek Tributary 1	The confluence with Smyre Creek	Approximately 1,500 feet upstream of the confluence with Smyre Creek	Catawba County, City of Newton
Snow Creek	The confluence with South Yadkin River	Approximately 260 feet upstream of Mountain View Road (SR 1614E)	Alexander County
South Fork Catawba River	Approximately 2.6 miles upstream of the confluence of Howards Creek	Approximately 125 feet downstream of NC-10	Catawba County, City of Newton
South Fork Catawba River Tributary 6	The confluence with South Fork Catawba River	Approximately 530 feet upstream of Herter Road (SR 2022)	Catawba County
South Fork Catawba River Tributary 7	The confluence with South Fork Catawba River	Approximately 0.9 mile upstream of the confluence with South Fork Catawba River	Catawba County
South Fork Catawba River Tributary 8	The confluence with South Fork Catawba River	Approximately 0.7 mile upstream of Wilfong Road (SR 2020)	Catawba County
South Fork Catawba River Tributary 9	The confluence with South Fork Catawba River	Approximately 1.1 miles upstream of US Highway 321	Catawba County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
South Fork Catawba River Tributary 9A	The confluence with South Fork Catawba River Tributary 9	Approximately 1,500 feet upstream of the confluence with South Fork Catawba River Tributary 9	Catawba County
South Muddy Creek	The confluence with Muddy Creek	Approximately 0.7 mile upstream of SR 1780	Burke County
South Muddy Creek Tributary 1	The confluence with South Muddy Creek	Approximately 920 feet upstream of McDowell/Burke County boundary	Burke County
South Yadkin River	The confluence with Yadkin River	Approximately 510 feet downstream of Vashti Road (SR 1403)	Alexander County
Spring Creek	The confluence with Lower Little River	Approximately 1.7 miles upstream of SR 1121	Alexander County
Stirewalt Creek	The confluence with Lower Little River	Just upstream of the Railroad	Alexander County, Town of Taylorsville
Stratford Creek	The confluence with Catawba River	Approximately 130 feet downstream of Lee Pearson Road (SR 1136)	Caldwell County
Stratford Creek Tributary 1	The confluence with Stratford Creek	Approximately 1,815 feet upstream of Baton School Road (SR 1139)	Caldwell County
Terrapin Creek	The confluence with Catawba River (Lake Norman)	Approximately 1.2 miles upstream of the confluence of Terrapin Creek Tributary 1	Catawba County
Terrapin Creek Tributary 1	The confluence with Terrapin Creek	Approximately 1 mile upstream of the confluence with Terrapin Creek	Catawba County
Third Creek	Approximately 1,130 feet downstream of Interstate 40	Approximately 0.5 mile upstream of Lentz Road	Alexander County
Thorps Creek	The confluence with Wilson Creek	Approximately 1,375 feet upstream of Edgemont Road	Caldwell County
Thunderhole Creek	The confluence with Johns River	Approximately 0.4 mile upstream of the confluence of New Years Creek	Caldwell County
Tims Creek	The confluence with Henry Fork	Approximately 1.3 miles upstream of SR 1788	Burke County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Town Creek	Approximately 1,400 feet upstream of St. James Church Road	Approximately 0.8 miles upstream of State Route 10	City of Newton
Tributary to Lyle Creek Tributary	The confluence with Lyle Creek Tributary	Approximately 0.7 mile upstream of the confluence with Lyle Creek Tributary	Catawba County
Upper Creek	The confluence with Irish Creek and Warrior Fork	Approximately 0.5 mile upstream of SR 1405	Burke County
Upper Little River	The confluence with Catawba River	Approximately 0.7 mile upstream of Teaberry Lane	Alexander County, Caldwell County
Upper Little River Tributary 1	The confluence with Upper Little River	Approximately 2,380 feet upstream of Charlie Little Road (SR 1741)	Caldwell County
Wallace Creek	The confluence with South Yadkin River	Approximately 1,200 feet upstream of the confluence of Greasy Creek	Alexander County
Walnut Bottom Creek	The confluence with Johns River	Approximately 0.6 mile upstream of the confluence with Johns River	Caldwell County
Warrior Creek	The confluence with Yadkin River	Approximately 210 feet upstream of Warrior Road (SR 1346)	Caldwell County
Warrior Fork	Approximately 0.5 mile upstream of the confluence of Wilson Creek	The confluence of Irish Creek and Upper Creek	Burke County, City of Morganton
White Creek	The confluence with Duck Creek	Approximately 1.9 miles upstream of SR 1304	Alexander County
Wilson Creek	Approximately 1.1 miles upstream of Adako Road (SR 1337)	Approximately 500 feet upstream of the confluence of Cary Flat Branch	Caldwell County
Yadkin River	Approximately 90 feet upstream of Whisnant Road (SR 1517)	Approximately 2.2 miles upstream of the confluence of Ooten Creek	Caldwell County
Yadkin River	The confluence of Elk Creek	Approximately 0.5 mile upstream of the confluence of Mill Creek (into Yadkin River)	Caldwell County

	Riverine Sources		
Sources	**From**	**To**	**Affected Communities**
Yadkin River Tributary 25	The confluence with Yadkin River	Approximately 1.3 miles upstream of NC Highway 268	Caldwell County
Zacks Fork Creek Tributary 1	The confluence with Zacks Fork Creek	Approximately 1.2 miles upstream of the confluence with Zacks Fork Creek	Caldwell County, City of Lenoir

Table 3: Historical Flooding Occurrences from NCDC between 2005-2018.

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Alexander								
Alexander County (Unincorporated Area)	10/08/05	Flood	0	0	0	$0	0	$0
Alexander County (Unincorporated Area)	05/26/09	Flash Flood	0	0	$0	$0	$0	$0
Alexander County (Unincorporated Area)	06/03/09	Flash Flood	0	0	$0	$0	$0	$0
Alexander County (Unincorporated Area)	01/24/10	Flash Flood	0	0	$0	$0	$0	$0
Alexander County (Unincorporated Area)	01/24/10	Flash Flood	0	0	$0	$0	$0	$0
Alexander County (Unincorporated Area)	05/14/12	Flash Flood	0	0	$0	$0	$0	$0
Alexander County (Unincorporated Area)	07/11/13	Flash Flood	0	0	$0	$0	$0	$0
Subtotal Alexander	**7 Events**		**0**	**0**	**$0**	**$0**	**$0**	**$0**

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Burke								
Burke County (Unincorporated Area)	08/26/08	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	05/26/09	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	01/24/10	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	01/25/10	Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	08/15/10	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	03/06/11	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	04/16/11	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	04/16/11	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	04/16/11	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	04/16/11	Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	11/29/11	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	09/18/12	Flash Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	05/05/13	Flood	0	0	$30,000	$24,254	$0	$0
Burke County (Unincorporated Area)	07/04/13	Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	07/04/13	Flash Flood	0	0	$0	$0	$0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Burke County (Unincorporated Area)	07/04/13	Flood	0	0	$0	$0	$0	$0
Burke County (Unincorporated Area)	07/12/13	Flash Flood	0	0	$60,000	$48,827	$0	$0
Burke County (Unincorporated Area)	04/19/15	Flood	0	0	$1,000	$865	$0	$0
Burke County (Unincorporated Area)	12/02/15	Flood	0	0	$500	$442	$0	$0
Burke County (Unincorporated Area)	12/24/15	Flash Flood	0	0	$1,000	$885	$0	$0
Burke County (Unincorporated Area)	02/03/16	Flash Flood	0	0	$5,000	$4,443	$0	$0
Burke County (Unincorporated Area)	10/23/17	Flood	0	0	$1,000	$943	$0	$0
Burke County (Unincorporated Area)	04/15/18	Flash Flood	0	0	$1,000	$959	$0	$0
Burke County (Unincorporated Area)	05/18/18	Flood	0	0	$5,000	$4,808	$0	$0
Burke County (Unincorporated Area)	05/29/18	Flash Flood	0	0	$3,000	$2,888	$0	$0
Burke County (Unincorporated Area)	05/30/18	Flood	0	0	$1,000	$963	$0	$0
Burke County (Unincorporated Area)	09/16/18	Flash Flood	0	0	$1,000	$973	$0	$0
Burke County (Unincorporated Area)	09/17/18	Flood	0	0	$1,000	$973	$0	$0
Burke County (Unincorporated Area)	09/23/18	Flash Flood	0	0	$2,000	$1,946	$0	$0
Burke County (Unincorporated Area)	10/11/18	Flood	0	0	$2,000	$1,950	$0	$0
Burke County (Unincorporated Area)	12/21/18	Flood	0	0	$1,000	$981	$0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Burke County (Unincorporated Area)	12/28/18	Flood	0	0	$2,000	$1,964	$0	$0
City of Morganton	05/19/05	Flash Flood	0	0	0	$0	0	$0
City of Morganton	07/19/05	Flash Flood	0	0	0	$0	0	$0
City of Morganton	07/27/05	Flash Flood	0	0	0	$0	0	$0
City of Morganton	08/17/05	Flash Flood	0	0	0	$0	0	$0
City of Morganton	09/12/14	Flash Flood	0	0	$100,000	$84,720	$0	$0
City of Morganton	09/12/14	Flood	0	0	$10,000	$8,472	$0	$0
Town of Drexel	06/09/13	Flash Flood	0	0	$0	$0	$0	$0
Subtotal Burke	**39 Events**		**0**	**0**	**$227,500**	**$192,255**	**$0**	**$0**
Caldwell								
Caldwell County (Unincorporated Area)	07/03/05	Flash Flood	0	0	$20,000	$12,347	0	$0
Caldwell County (Unincorporated Area)	08/18/05	Flash Flood	0	0	0	$0	0	$0
Caldwell County (Unincorporated Area)	08/26/08	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	05/16/09	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	03/06/11	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	04/16/11	Flash Flood	0	1	$50,000	$37,671	$0	$0
Caldwell County (Unincorporated Area)	05/14/12	Flash Flood	0	0	$0	$0	$0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Caldwell County (Unincorporated Area)	05/14/12	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	05/14/12	Flash Flood	0	0	$300,000	$234,584	$0	$0
Caldwell County (Unincorporated Area)	05/14/12	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	07/11/12	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	08/09/12	Flash Flood	0	0	$5,000	$3,941	$0	$0
Caldwell County (Unincorporated Area)	01/30/13	Flash Flood	0	0	$50,000	$40,064	$0	$0
Caldwell County (Unincorporated Area)	05/05/13	Flood	0	0	$30,000	$24,254	$0	$0
Caldwell County (Unincorporated Area)	06/09/13	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	07/04/13	Flash Flood	0	0	$300,000	$243,966	$0	$0
Caldwell County (Unincorporated Area)	07/07/13	Flash Flood	0	0	$0	$0	$0	$0
Caldwell County (Unincorporated Area)	07/12/13	Flash Flood	0	0	$50,000	$40,689	$0	$0
Caldwell County (Unincorporated Area)	09/01/13	Flash Flood	0	0	$0	$0	$0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Caldwell County (Unincorporated Area)	04/19/15	Flood	0	0	$1,000	$865	$0	$0
Caldwell County (Unincorporated Area)	02/03/16	Flash Flood	0	0	$5,000	$4,443	$0	$0
Caldwell County (Unincorporated Area)	05/24/17	Flash Flood	0	0	$500	$465	$0	$0
Caldwell County (Unincorporated Area)	10/23/17	Flood	0	0	$1,000	$943	$0	$0
Caldwell County (Unincorporated Area)	05/18/18	Flash Flood	0	0	$50,000	$48,077	$0	$0
Caldwell County (Unincorporated Area)	05/19/18	Flood	0	0	$5,000	$4,808	$0	$0
Caldwell County (Unincorporated Area)	05/29/18	Flash Flood	0	0	$2,000	$1,925	$0	$0
Caldwell County (Unincorporated Area)	05/29/18	Flash Flood	0	0	$2,000	$1,925	$0	$0
Caldwell County (Unincorporated Area)	05/30/18	Flood	0	0	$500	$481	$0	$0
Caldwell County (Unincorporated Area)	05/31/18	Flash Flood	0	0	$5,000	$4,814	$0	$0
Caldwell County (Unincorporated Area)	09/16/18	Flood	0	0	$1,000	$973	$0	$0
Caldwell County (Unincorporated Area)	10/11/18	Flash Flood	0	0	$1,000	$975	$0	$0

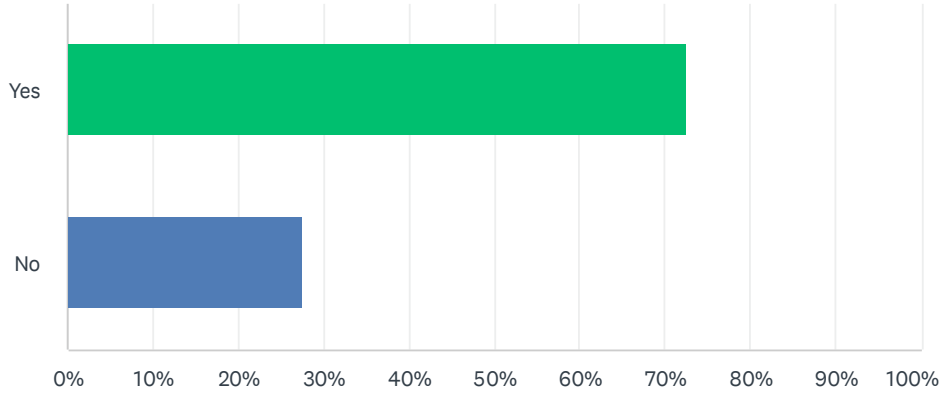
Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
Caldwell County (Unincorporated Area)	10/11/18	Flood	0	0	$500	$487	$0	$0
City of Lenoir	06/07/05	Flash Flood	0	0	$15,000	$9,238	0	$0
City of Lenoir	06/08/05	Flash Flood	0	0	0	$0	0	$0
City of Lenoir	06/10/09	Flash Flood	0	0	$20,000	$14,139	$0	$0
City of Lenoir	06/09/13	Flash Flood	0	0	$0	$0	$0	$0
Town of Hudson	07/27/17	Flash Flood	0	0	$500	$468	$0	$0
Village of Cedar Rock	07/02/13	Flood	0	0	$0	$0	$0	$0
Subtotal Caldwell	**38 Events**		**0**	**1**	**$915,000**	**$732,543**	**$0**	**$0**
Catawba								
Catawba County (Unincorporated Area)	01/24/10	Flash Flood	0	0	$0	$0	$0	$0
Catawba County (Unincorporated Area)	05/14/12	Flash Flood	0	0	$20,000	$15,639	$0	$0
Catawba County (Unincorporated Area)	05/06/13	Flood	0	0	$2,000,000	$1,616,958	$0	$0
Catawba County (Unincorporated Area)	06/05/13	Flash Flood	0	0	$0	$0	$0	$0
Catawba County (Unincorporated Area)	07/27/13	Flash Flood	0	0	$1,000,000	$814,901	$0	$0
Catawba County (Unincorporated Area)	06/02/16	Flash Flood	0	0	$500	$449	$0	$0
City of Conover	07/27/13	Flash Flood	0	0	$900,000	$733,411	$0	$0
City of Hickory	05/19/05	Flash Flood	0	0	$5,000	$3,073	0	$0

Location	Date	Type	Deaths	Injuries	Reported Property Damage	Reported Property Damage (PV)	Reported Crop Damage	Reported Crop Damage (PV)
City of Hickory	07/07/05	Flash Flood	0	0	0	$0	0	$0
City of Hickory	07/09/13	Flash Flood	0	0	$0	$0	$0	$0
City of Hickory	07/27/13	Flash Flood	0	0	$1,500,000	$1,222,352	$0	$0
City of Hickory	07/27/13	Flash Flood	0	0	$200,000	$162,980	$0	$0
City of Hickory	07/27/13	Flash Flood	0	0	$1,500	$1,222	$0	$0
City of Hickory	07/27/13	Flood	0	0	$100,000	$81,490	$0	$0
City of Hickory	02/03/16	Flash Flood	0	0	$2,000	$1,777	$0	$0
City of Newton	08/27/08	Flash Flood	0	0	$0	$0	$0	$0
Town of Long View	07/21/12	Flash Flood	0	0	$1,000	$787	$0	$0
Town of Maiden	08/17/08	Flash Flood	0	0	$50,000	$34,365	$0	$0
Subtotal Catawba	**18 Events**		**0**	**0**	**$5,780,000**	**$4,689,405**	**$0**	**$0**
TOTAL PLAN	**102 Events**		**0**	**1**	**$6,922,500**	**$5,614,203**	**$0**	**$0**

Appendix D: Public Survey Results

Q1 Have you ever experienced or been impacted by a disaster?

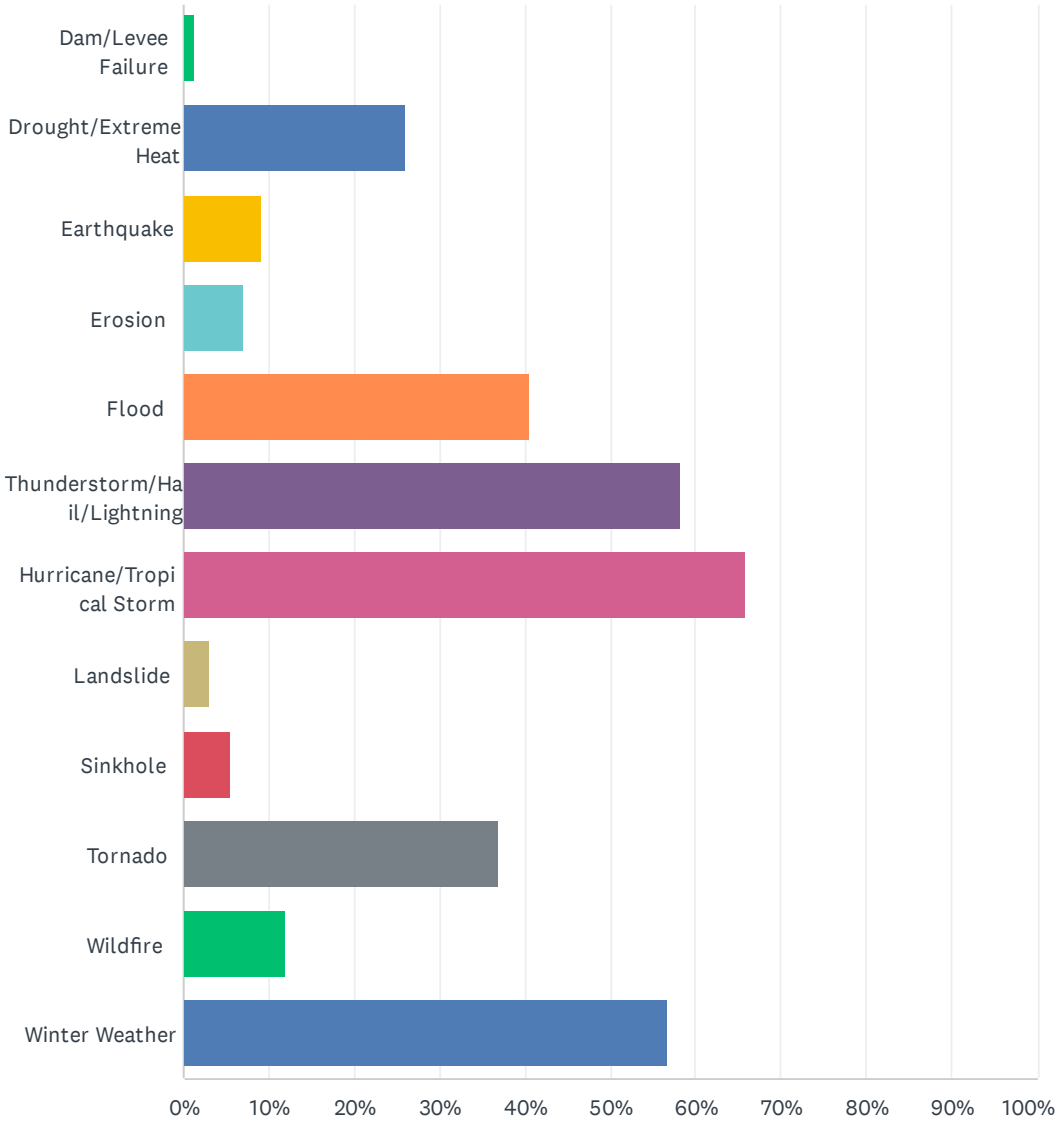
Answered: 577 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	72.44%	418
No	27.56%	159
TOTAL		577

Q2 If yes, Which of these natural hazards have you experienced or been impacted by? (Check all that apply.)

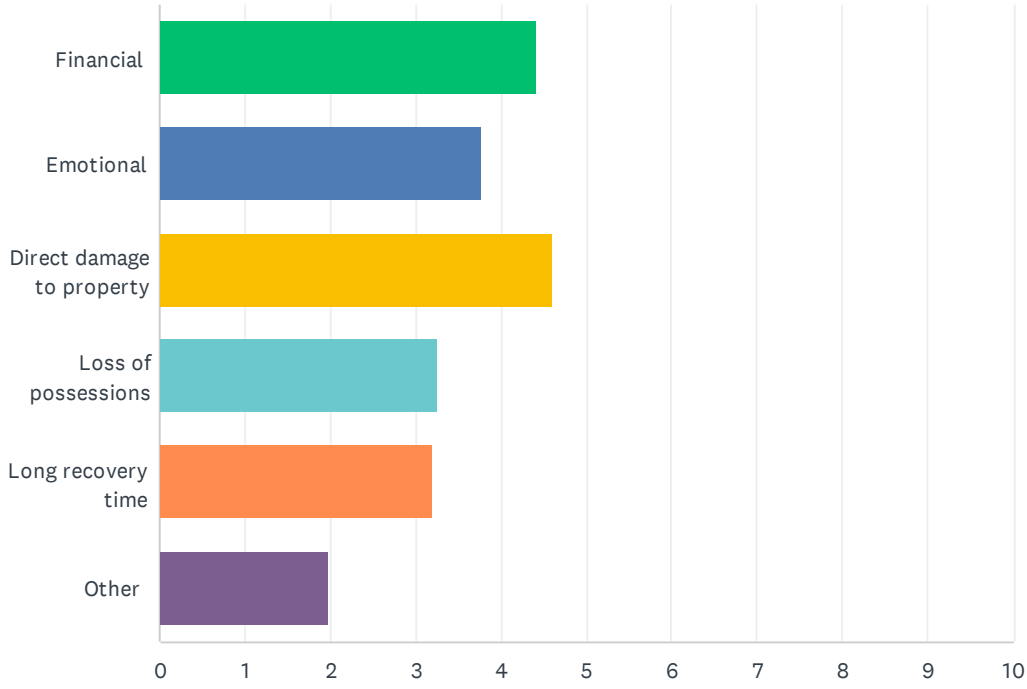
Answered: 439 Skipped: 140



ANSWER CHOICES	RESPONSES	
Dam/Levee Failure	1.37%	6
Drought/Extreme Heat	25.97%	114
Earthquake	9.11%	40
Erosion	7.06%	31
Flood	40.55%	178
Thunderstorm/Hail/Lightning	58.31%	256
Hurricane/Tropical Storm	65.83%	289
Landslide	2.96%	13
Sinkhole	5.47%	24
Tornado	36.90%	162
Wildfire	11.85%	52
Winter Weather	56.72%	249
Total Respondents: 439		

Q3 What was the most difficult part for you in recovering from past disasters that you have experienced? (1 being most difficult and 6 being least difficult.)

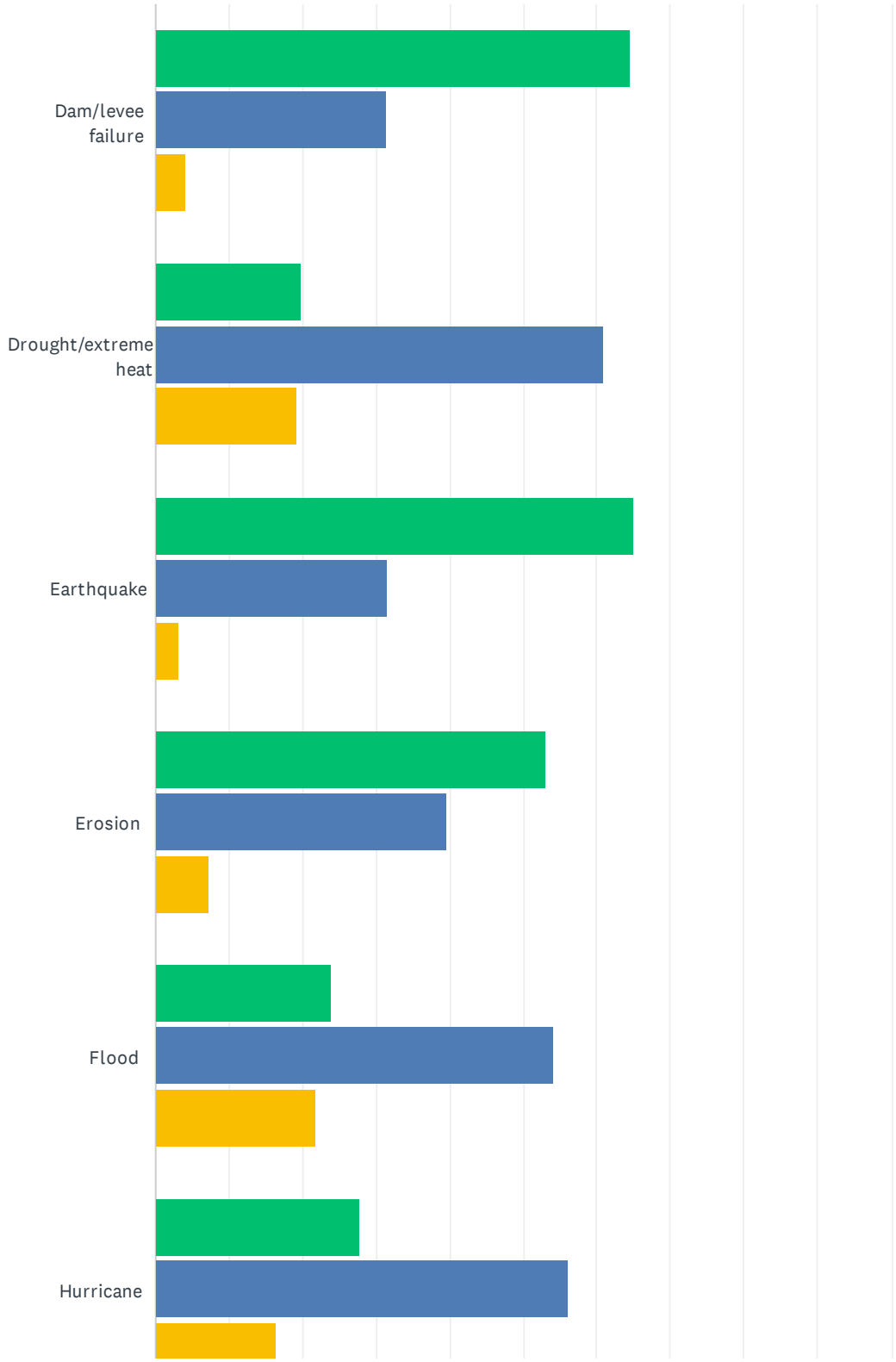
Answered: 467 Skipped: 112

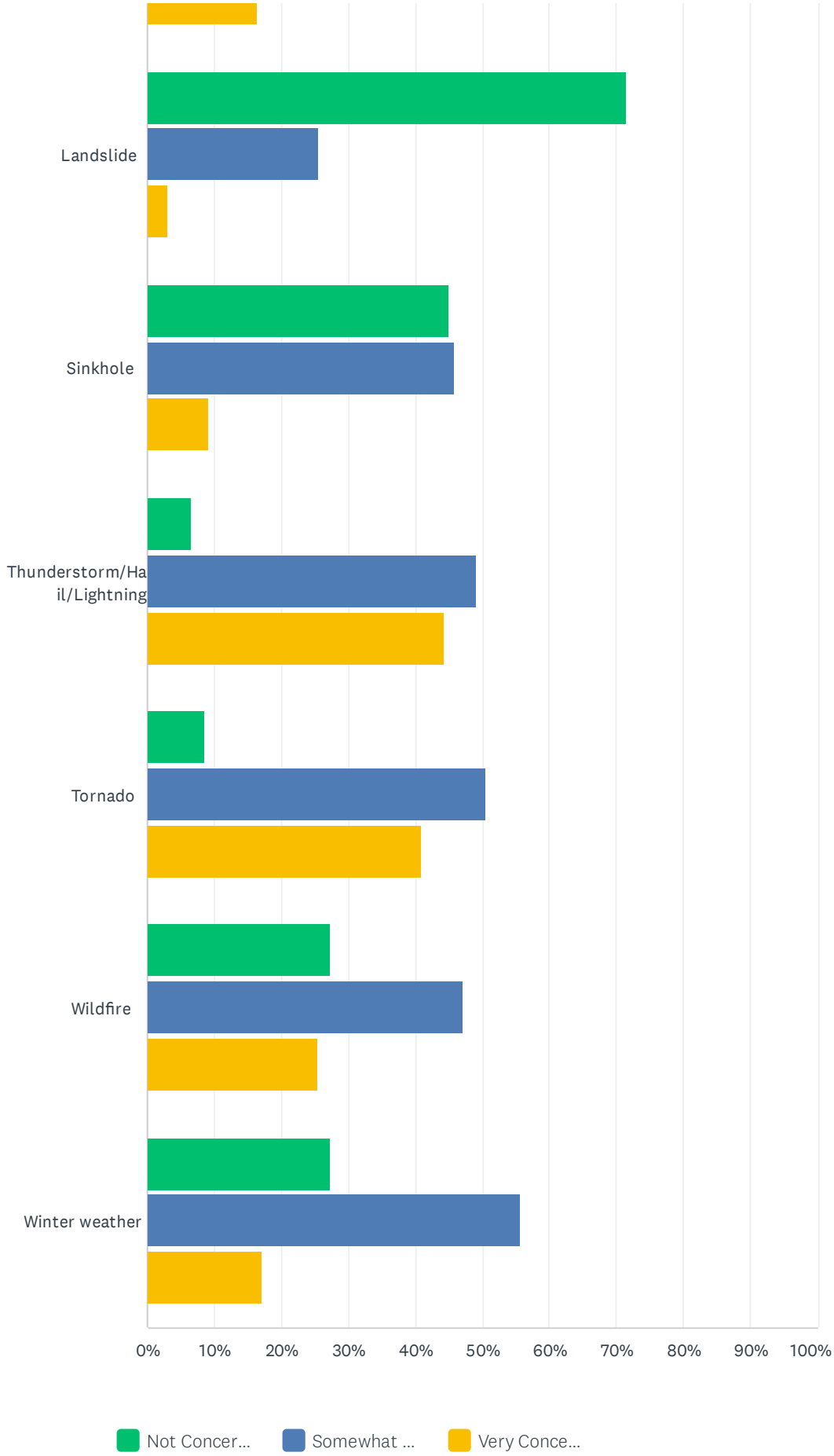


	1	2	3	4	5	6	TOTAL	SCORE
Financial	27.75% 96	27.75% 96	19.08% 66	13.29% 46	7.23% 25	4.91% 17	346	4.41
Emotional	16.42% 56	17.89% 61	22.87% 78	19.06% 65	17.01% 58	6.74% 23	341	3.77
Direct damage to property	35.90% 140	24.36% 95	17.95% 70	11.79% 46	5.64% 22	4.36% 17	390	4.60
Loss of possessions	5.69% 19	14.67% 49	20.06% 67	29.64% 99	20.06% 67	9.88% 33	334	3.27
Long recovery time	10.05% 38	11.38% 43	17.72% 67	19.58% 74	31.22% 118	10.05% 38	378	3.19
Other	10.83% 26	2.08% 5	5.42% 13	5.42% 13	9.17% 22	67.08% 161	240	1.99

Q4 How concerned are you about the possibility of your community being impacted by each of these natural hazards? (Check the corresponding circle for each natural hazard.)

Answered: 576 Skipped: 3

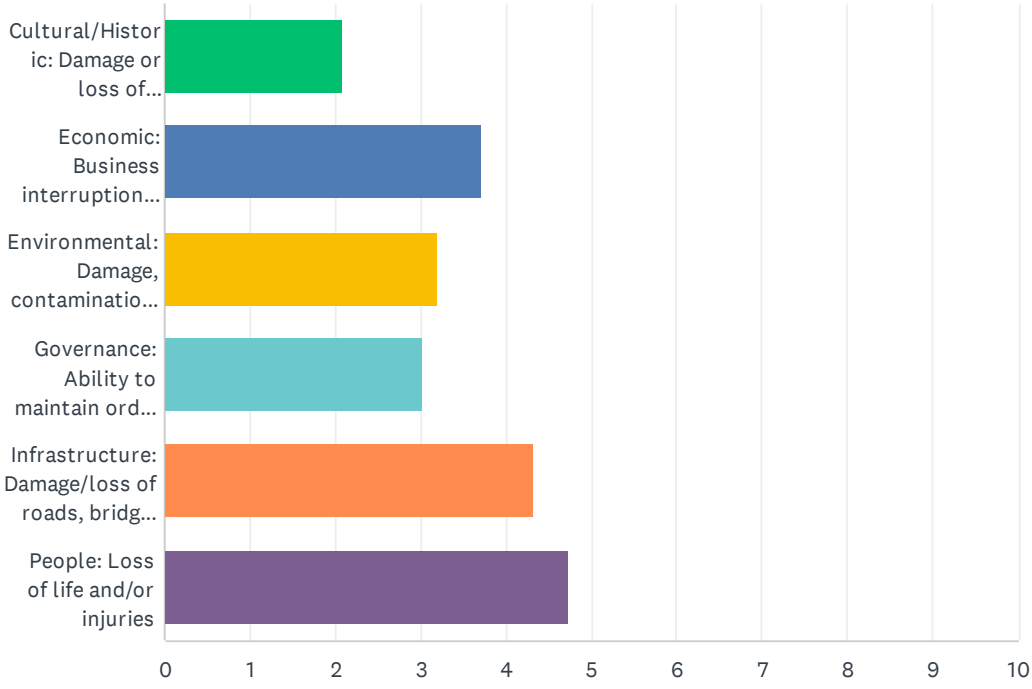



Landslide
Sinkhole
Thunderstorm/Hail/Lightning
Tornado
Wildfire
Winter weather
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Not Concer...
Somewhat ...
Very Conce...

	NOT CONCERNED	SOMEWHAT CONCERNED	VERY CONCERNED	TOTAL	WEIGHTED AVERAGE
Dam/levee failure	64.62% 358	31.41% 174	3.97% 22	554	1.39
Drought/extreme heat	19.82% 112	60.88% 344	19.29% 109	565	1.99
Earthquake	65.11% 362	31.65% 176	3.24% 18	556	1.38
Erosion	53.06% 295	39.75% 221	7.19% 40	556	1.54
Flood	23.94% 136	54.23% 308	21.83% 124	568	1.98
Hurricane	27.66% 156	56.03% 316	16.31% 92	564	1.89
Landslide	71.32% 393	25.59% 141	3.09% 17	551	1.32
Sinkhole	44.95% 249	45.85% 254	9.21% 51	554	1.64
Thunderstorm/Hail/Lightning	6.53% 37	49.03% 278	44.44% 252	567	2.38
Tornado	8.47% 48	50.62% 287	40.92% 232	567	2.32
Wildfire	27.37% 153	47.23% 264	25.40% 142	559	1.98
Winter weather	27.22% 153	55.69% 313	17.08% 96	562	1.90

Q5 In your opinion, which of the following categories are most susceptible to natural hazards in your community? (Rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable.) Please note, the list will automatically re-order itself as you make your selections. You can also drag and drop the items on the list to reorder them.

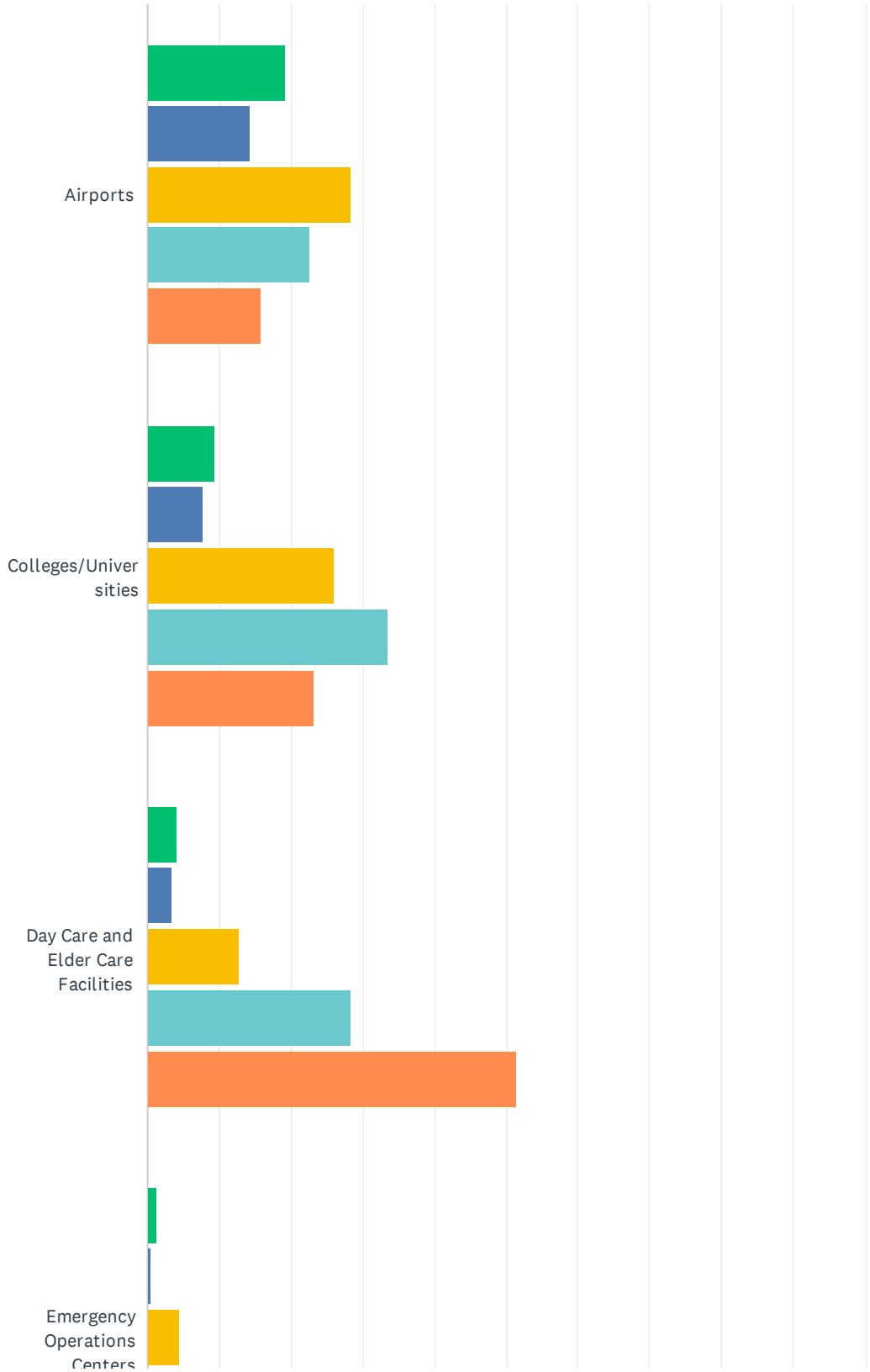
Answered: 572 Skipped: 7

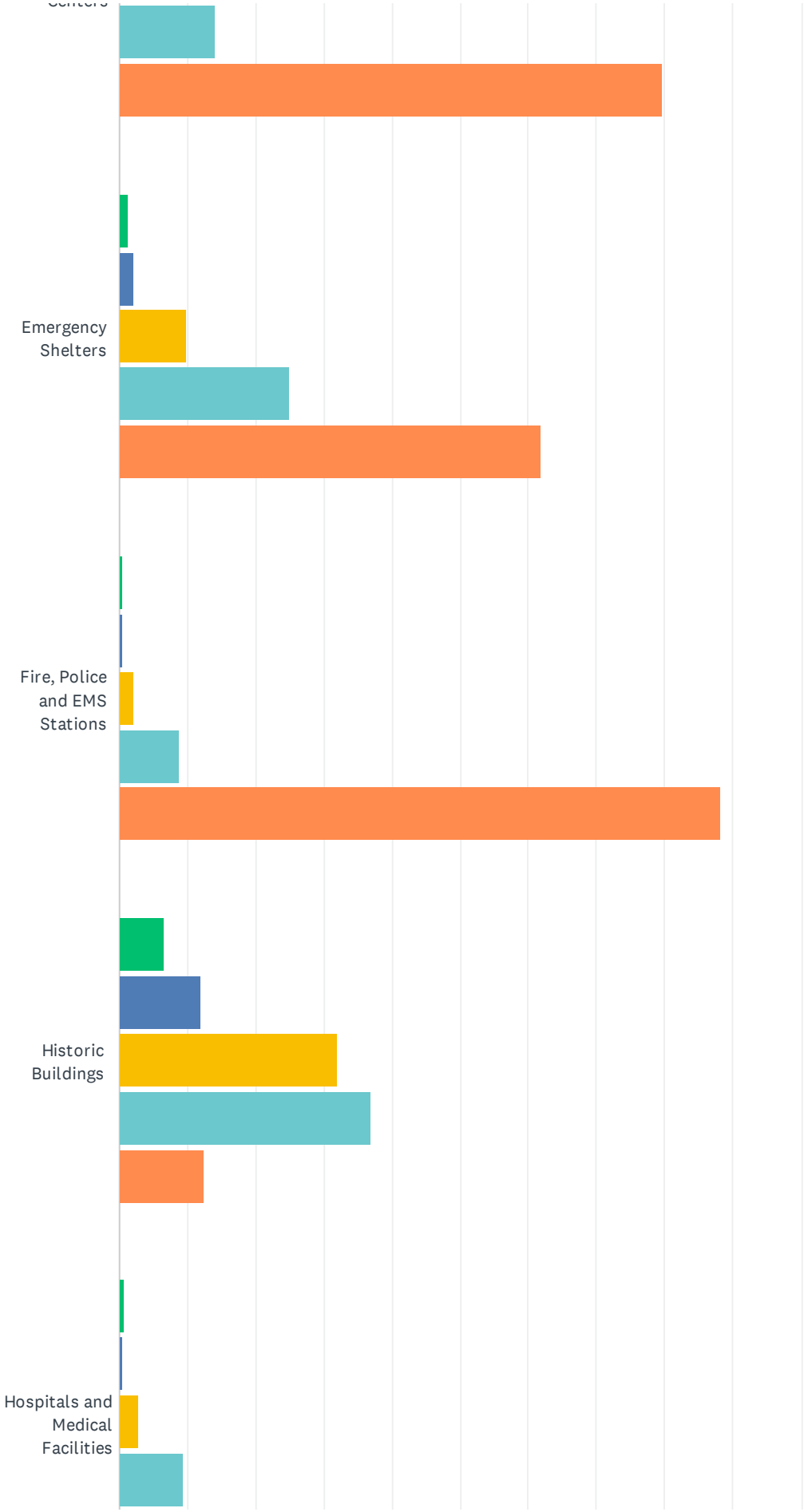


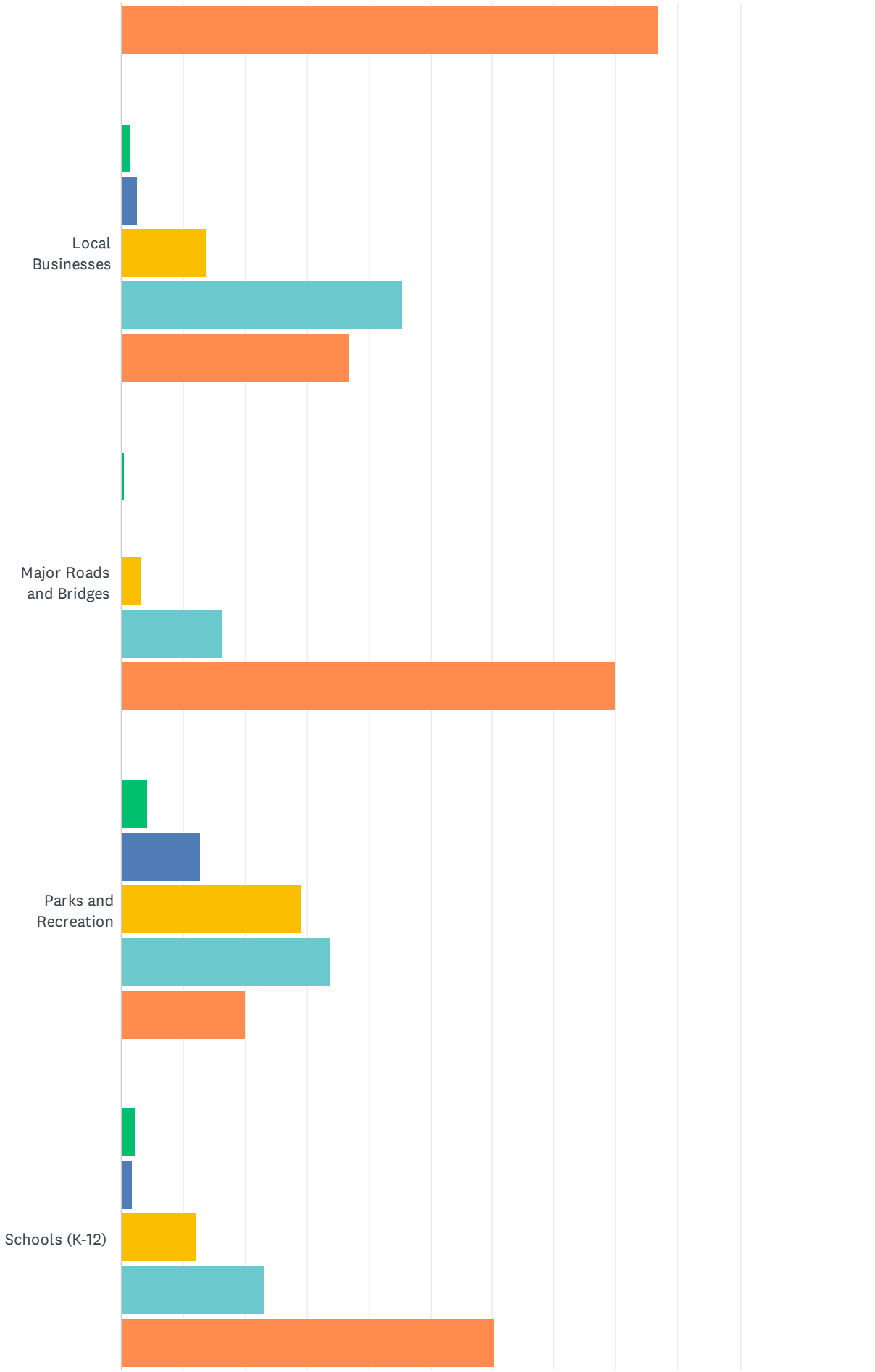
	1	2	3	4	5	6	TOTAL	SCORE
Cultural/Historic: Damage or loss of libraries, museums, historic properties, etc.	5.31% 28	5.31% 28	6.83% 36	10.25% 54	20.49% 108	51.80% 273	527	2.09
Economic: Business interruptions/closures, job losses, etc.	11.00% 57	16.99% 88	28.76% 149	23.75% 123	13.51% 70	5.98% 31	518	3.70
Environmental: Damage, contamination or loss of forests, wetlands, waterways, etc.	7.37% 39	13.42% 71	18.15% 96	23.82% 126	26.28% 139	10.96% 58	529	3.19
Governance: Ability to maintain order and/or provide public amenities and services	5.79% 31	12.71% 68	17.01% 91	24.67% 132	22.06% 118	17.76% 95	535	3.02
Infrastructure: Damage/loss of roads, bridges, utilities, schools, etc.	17.53% 95	38.93% 211	19.56% 106	10.52% 57	10.15% 55	3.32% 18	542	4.33
People: Loss of life and/or injuries	52.41% 294	13.55% 76	11.94% 67	7.66% 43	5.70% 32	8.73% 49	561	4.73

Q6 How important is each of the following specific community assets to you? (Check the appropriate circle for each asset.)

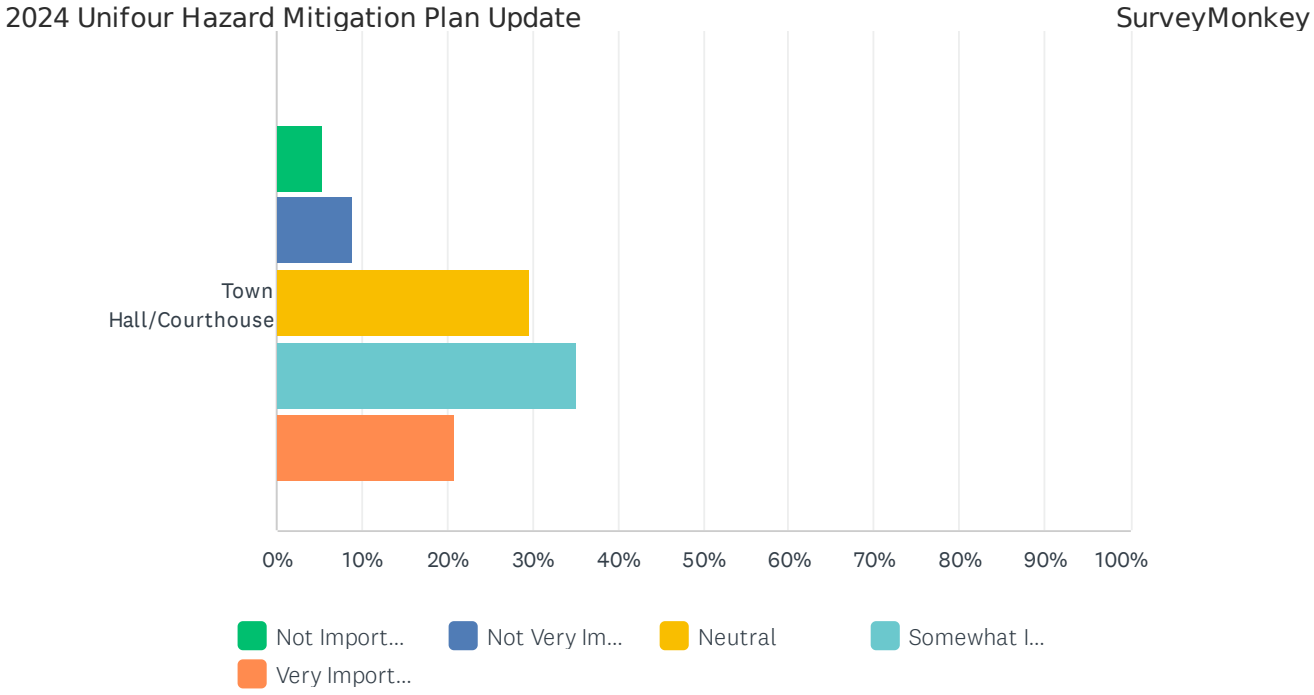
Answered: 576 Skipped: 3




Emergency Shelters
Fire, Police and EMS Stations
Historic Buildings
Hospitals and Medical Facilities


Local Businesses
Major Roads and Bridges
Parks and Recreation
Schools (K-12)

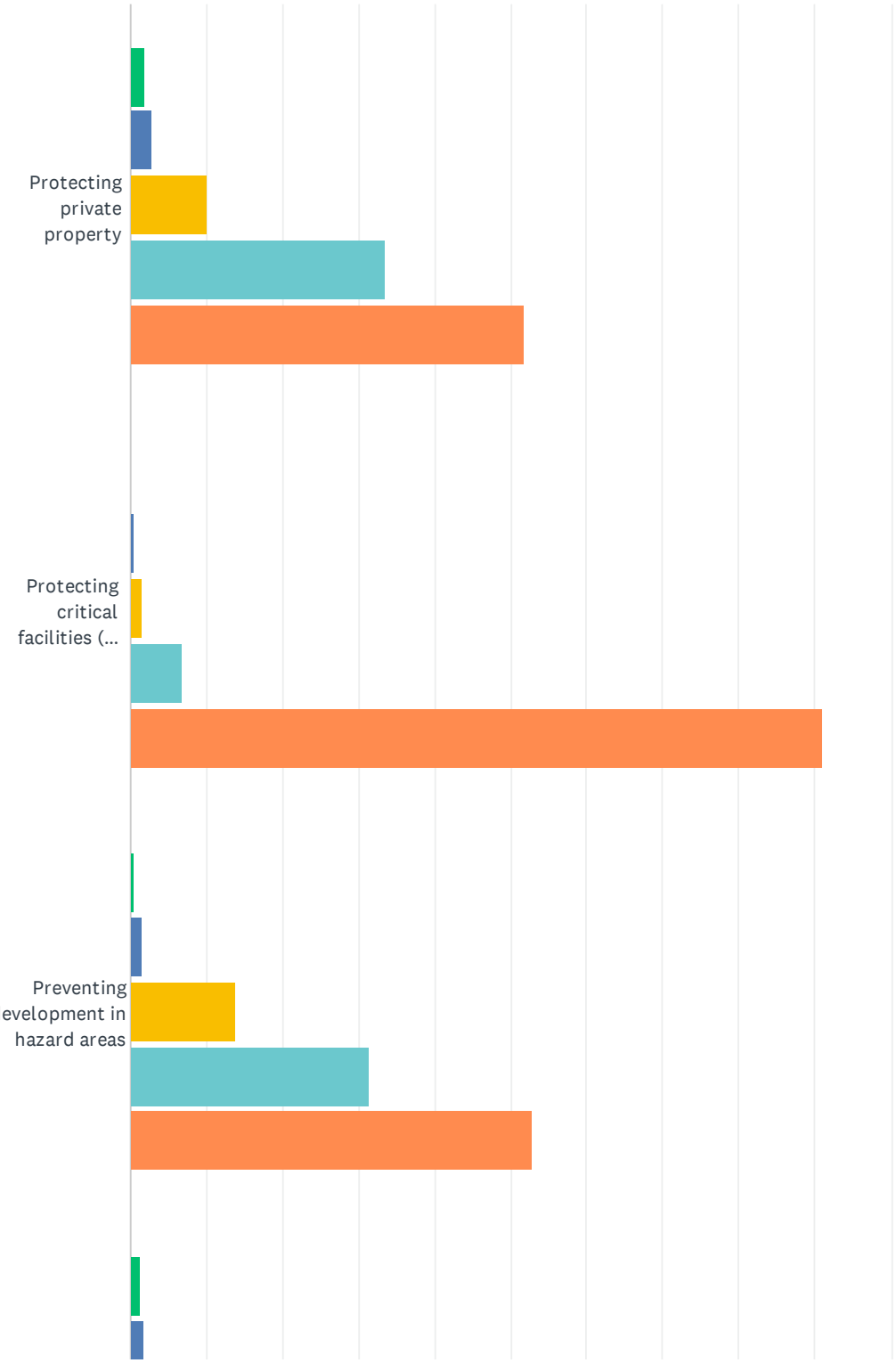
Appendix D: Public Survey Results



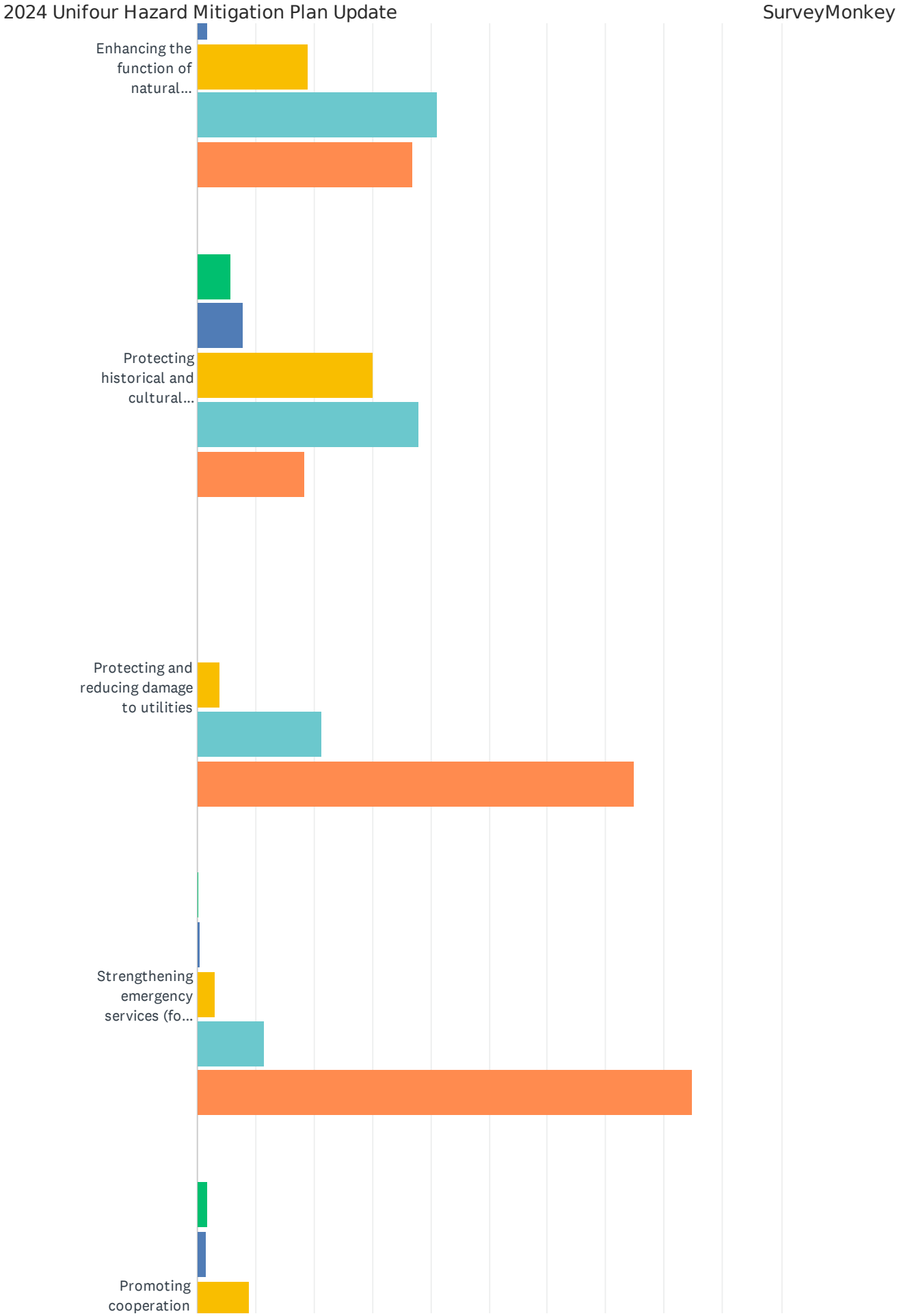
	NOT IMPORTANT	NOT VERY IMPORTANT	NEUTRAL	SOMEWHAT IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Airports	19.11% 107	14.29% 80	28.39% 159	22.50% 126	15.71% 88	560	3.01
Colleges/Universities	9.35% 53	7.76% 44	26.10% 148	33.51% 190	23.28% 132	567	3.54
Day Care and Elder Care Facilities	4.01% 23	3.49% 20	12.74% 73	28.27% 162	51.48% 295	573	4.20
Emergency Operations Centers	1.22% 7	0.52% 3	4.51% 26	14.06% 81	79.69% 459	576	4.70
Emergency Shelters	1.22% 7	2.09% 12	9.91% 57	25.04% 144	61.74% 355	575	4.44
Fire, Police and EMS Stations	0.52% 3	0.35% 2	2.09% 12	8.70% 50	88.35% 508	575	4.84
Historic Buildings	6.65% 38	11.91% 68	32.05% 183	36.95% 211	12.43% 71	571	3.37
Hospitals and Medical Facilities	0.70% 4	0.35% 2	2.78% 16	9.39% 54	86.78% 499	575	4.81
Local Businesses	1.40% 8	2.62% 15	13.79% 79	45.38% 260	36.82% 211	573	4.14
Major Roads and Bridges	0.35% 2	0.17% 1	3.13% 18	16.35% 94	80.00% 460	575	4.75
Parks and Recreation	4.18% 24	12.89% 74	29.27% 168	33.62% 193	20.03% 115	574	3.52
Schools (K-12)	2.45% 14	1.75% 10	12.24% 70	23.25% 133	60.31% 345	572	4.37
Town Hall/Courthouse	5.24% 30	8.90% 51	29.67% 170	35.25% 202	20.94% 120	573	3.58

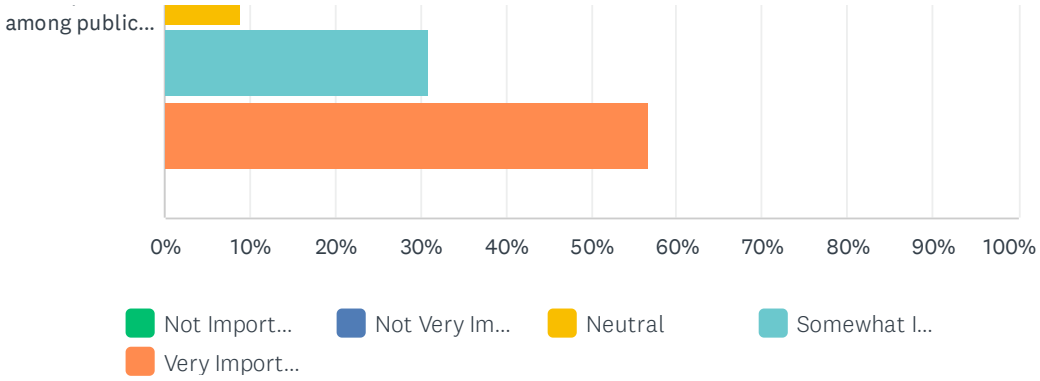
Q7 Natural hazards can have a significant impact on a community, but planning for these types of events can help lessen the impacts. Please tell us how important each statement is to you by checking the appropriate circle for each.

Answered: 576 Skipped: 3



Appendix D: Public Survey Results

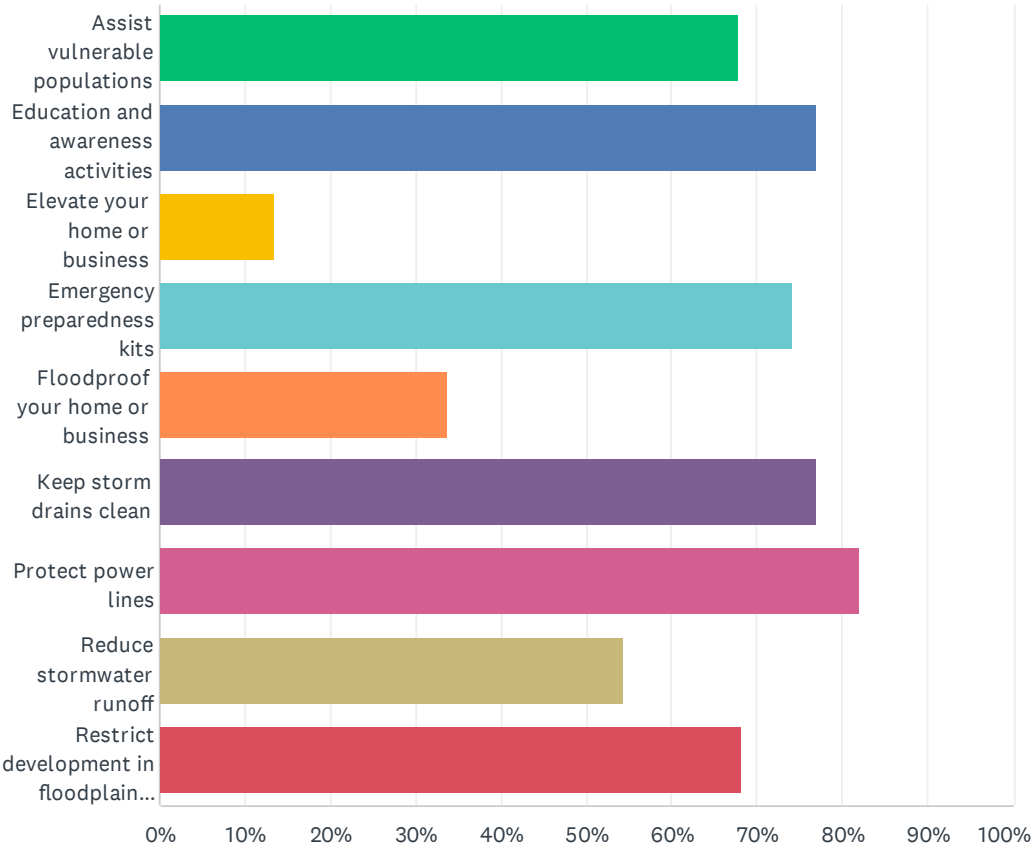




	NOT IMPORTANT	NOT VERY IMPORTANT	NEUTRAL	SOMEWHAT IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Protecting private property	1.82% 10	2.73% 15	10.02% 55	33.52% 184	51.91% 285	549	4.31
Protecting critical facilities (for example, hospitals, police stations, fire stations, etc.)	0.00% 0	0.52% 3	1.57% 9	6.81% 39	91.10% 522	573	4.88
Preventing development in hazard areas	0.35% 2	1.40% 8	13.96% 80	31.41% 180	52.88% 303	573	4.35
Enhancing the function of natural features (for example, streams, wetlands, etc.)	1.23% 7	1.75% 10	18.95% 108	41.23% 235	36.84% 210	570	4.11
Protecting historical and cultural landmarks	5.81% 33	7.92% 45	30.11% 171	37.85% 215	18.31% 104	568	3.55
Protecting and reducing damage to utilities	0.00% 0	0.00% 0	3.84% 22	21.29% 122	74.87% 429	573	4.71
Strengthening emergency services (for example, police, fire, ambulance)	0.17% 1	0.52% 3	2.97% 17	11.54% 66	84.79% 485	572	4.80
Promoting cooperation among public agencies, citizens, non-profit organizations, and businesses	1.74% 10	1.57% 9	8.89% 51	31.01% 178	56.79% 326	574	4.40

Q8 What are some steps that you and/or your local government could take to reduce or eliminate the risk of future natural hazard damages in your neighborhood?

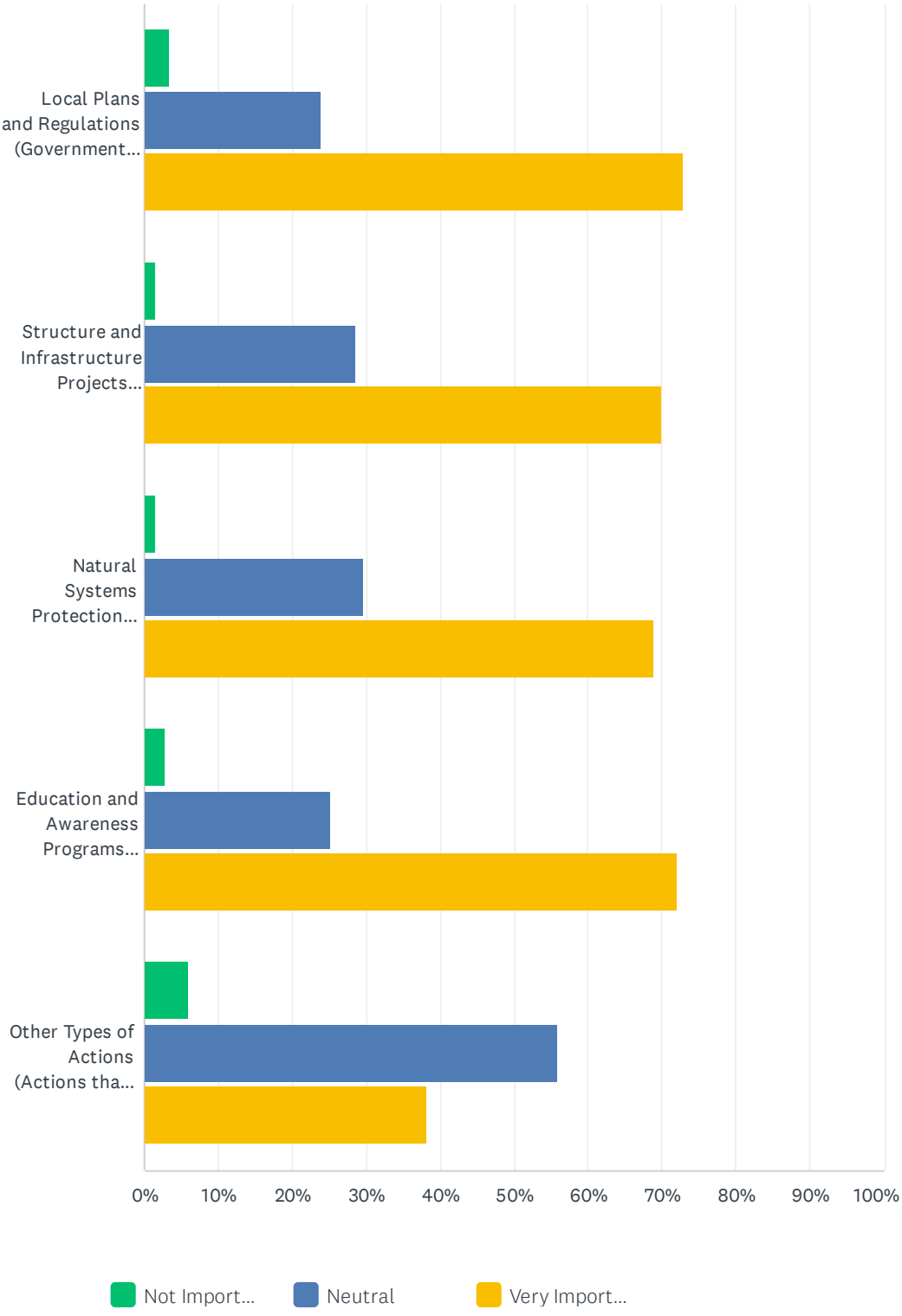
Answered: 571 Skipped: 8



ANSWER CHOICES	RESPONSES	
Assist vulnerable populations	67.78%	387
Education and awareness activities	77.06%	440
Elevate your home or business	13.49%	77
Emergency preparedness kits	74.26%	424
Floodproof your home or business	33.63%	192
Keep storm drains clean	76.88%	439
Protect power lines	82.14%	469
Reduce stormwater runoff	54.47%	311
Restrict development in floodplain areas	68.13%	389
Total Respondents: 571		

Q9 A number of community-wide activities can reduce risk from natural hazards. Please tell us how important you think each one is for your community to consider pursuing.

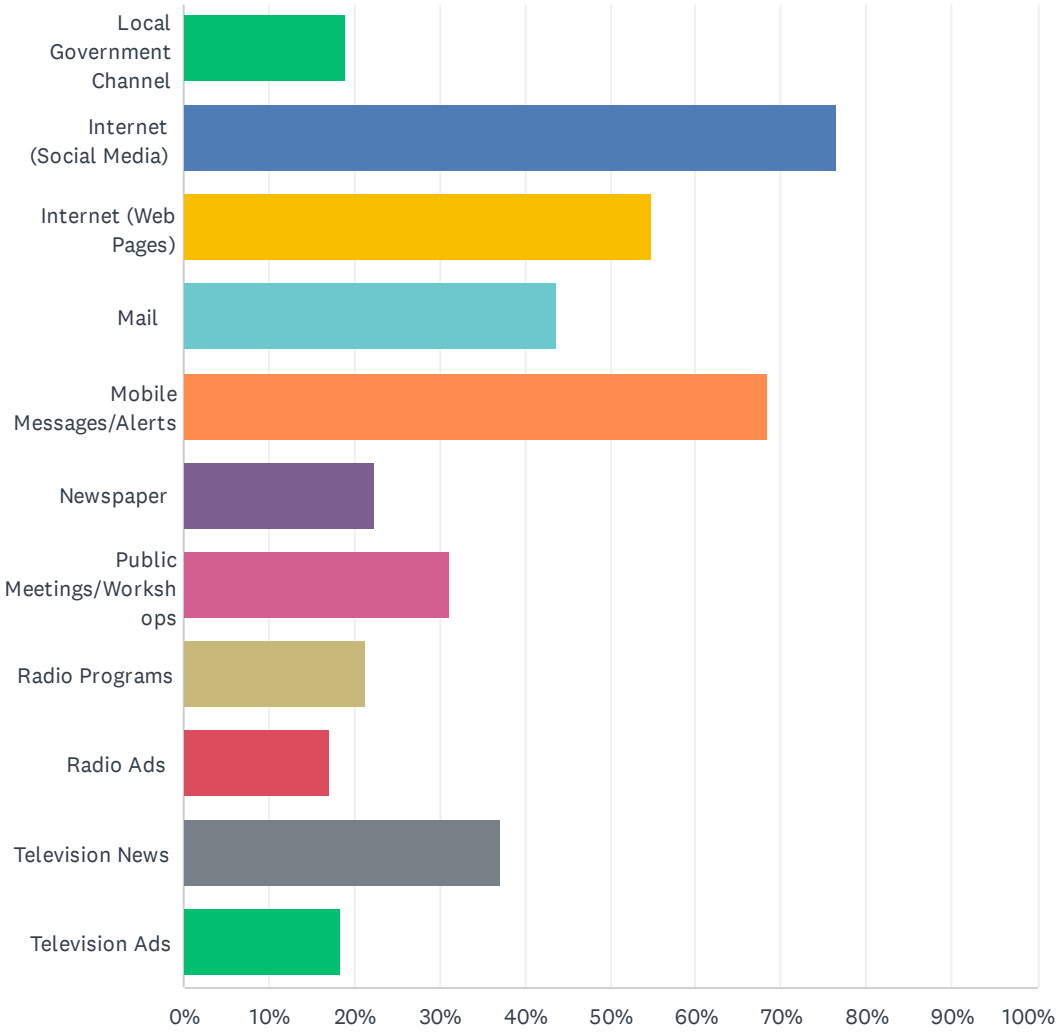
Answered: 572 Skipped: 7



	NOT IMPORTANT	NEUTRAL	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Local Plans and Regulations (Government policies or codes that influence the way land and buildings are developed and built.)	3.32% 19	23.78% 136	72.90% 417	572	2.70
Structure and Infrastructure Projects (Modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area.)	1.40% 8	28.60% 163	70.00% 399	570	2.69
Natural Systems Protection (Actions that minimize damage and losses and also preserve or restore the functions of natural systems.)	1.41% 8	29.70% 169	68.89% 392	569	2.67
Education and Awareness Programs (Actions that inform and educate citizens, elected officials and property owners about hazards and potential ways to mitigate them.)	2.81% 16	25.09% 143	72.11% 411	570	2.69
Other Types of Actions (Actions that are related to mitigation in ways that make sense to the local government that do not fall into one of the categories above.)	6.05% 34	55.87% 314	38.08% 214	562	2.32

Q10 What are the most effective ways for you to receive information about how to make your home and neighborhood more resistant to natural hazards?

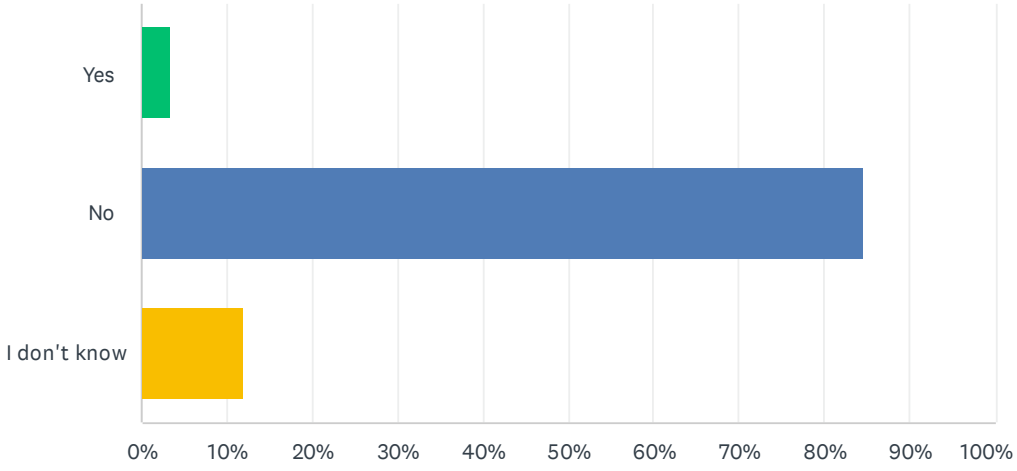
Answered: 570 Skipped: 9



ANSWER CHOICES	RESPONSES	
Local Government Channel	18.95%	108
Internet (Social Media)	76.49%	436
Internet (Web Pages)	54.74%	312
Mail	43.68%	249
Mobile Messages/Alerts	68.42%	390
Newspaper	22.46%	128
Public Meetings/Workshops	31.05%	177
Radio Programs	21.23%	121
Radio Ads	17.02%	97
Television News	37.19%	212
Television Ads	18.42%	105
Total Respondents: 570		

Q11 Is your home located in a floodplain?

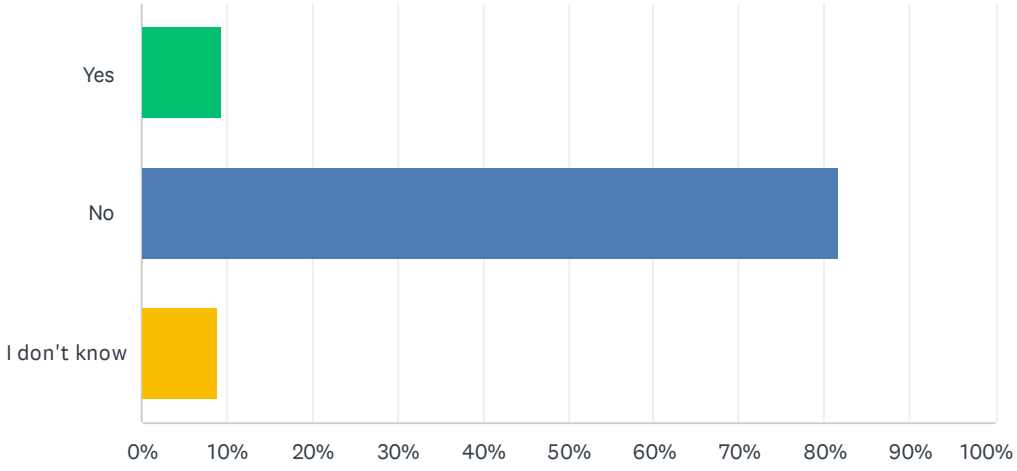
Answered: 574 Skipped: 5



ANSWER CHOICES	RESPONSES	
Yes	3.48%	20
No	84.67%	486
I don't know	11.85%	68
TOTAL		574

Q12 Do you have flood insurance?

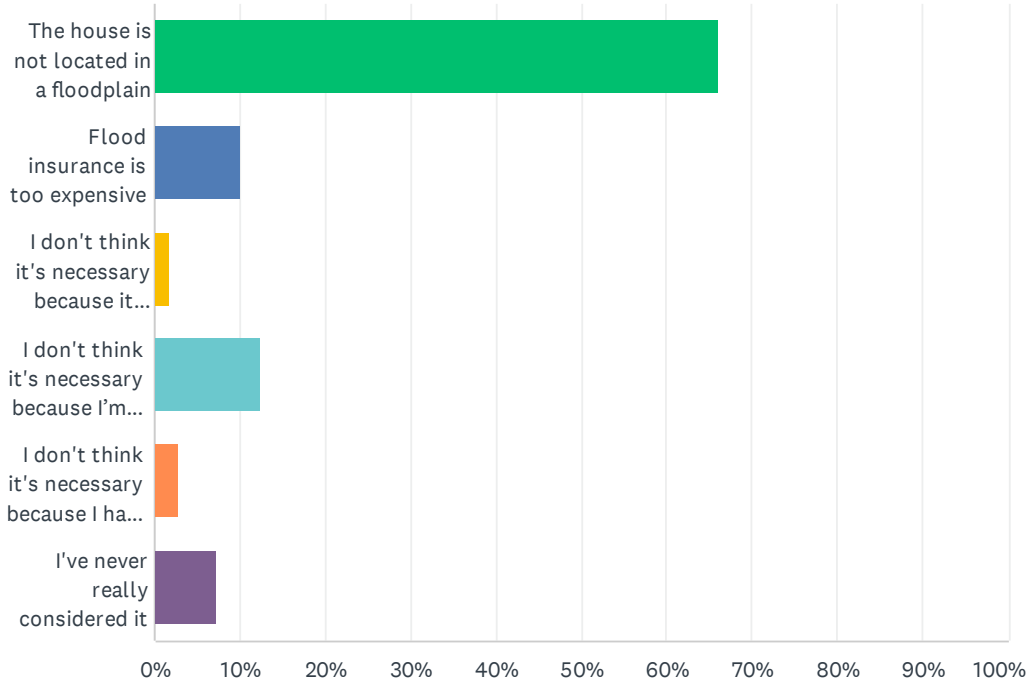
Answered: 575 Skipped: 4



ANSWER CHOICES	RESPONSES	
Yes	9.39%	54
No	81.57%	469
I don't know	9.04%	52
TOTAL		575

Q13 If “No,” why not?

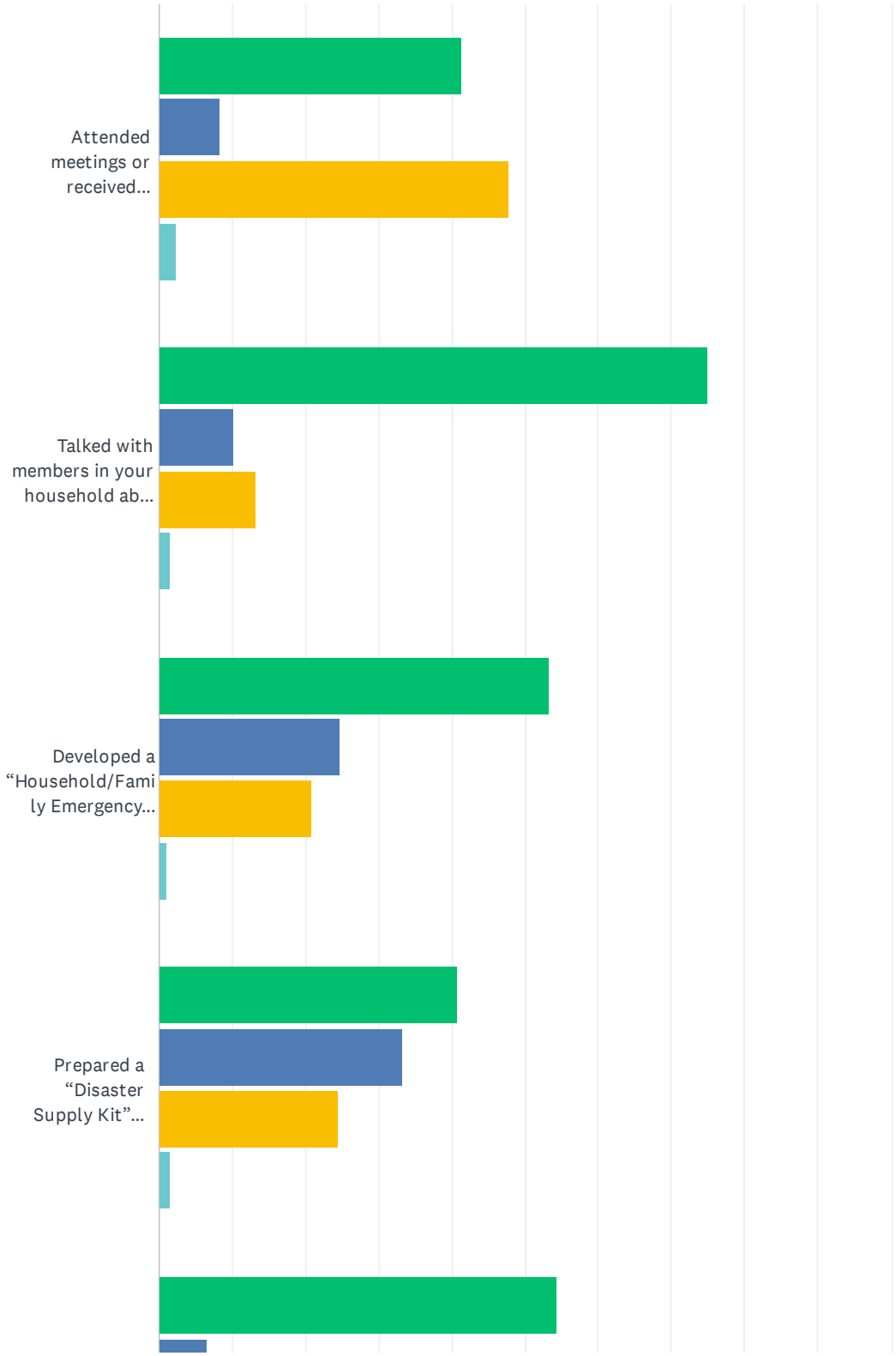
Answered: 487 Skipped: 92



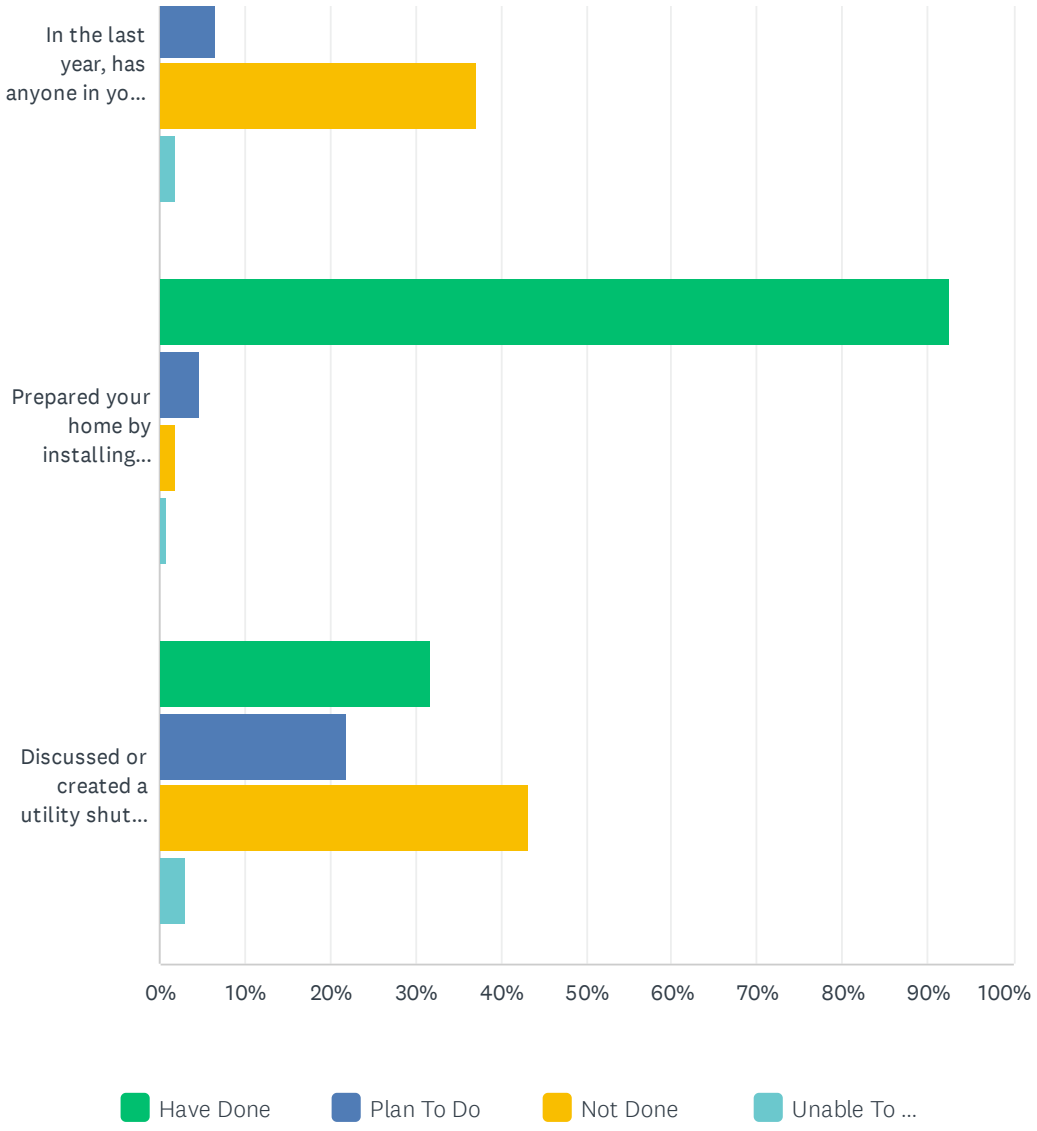
ANSWER CHOICES	RESPONSES	
The house is not located in a floodplain	66.12%	322
Flood insurance is too expensive	10.06%	49
I don't think it's necessary because it never floods	1.64%	8
I don't think it's necessary because I’m elevated or otherwise protected	12.32%	60
I don't think it's necessary because I have homeowners insurance	2.67%	13
I've never really considered it	7.19%	35
TOTAL		487

Q14 In the following list, please check the activities that you have done in your household, plan to do in the near future, have not done, or are unable to do. (Please check one response for each preparedness activity.)

Answered: 574 Skipped: 5



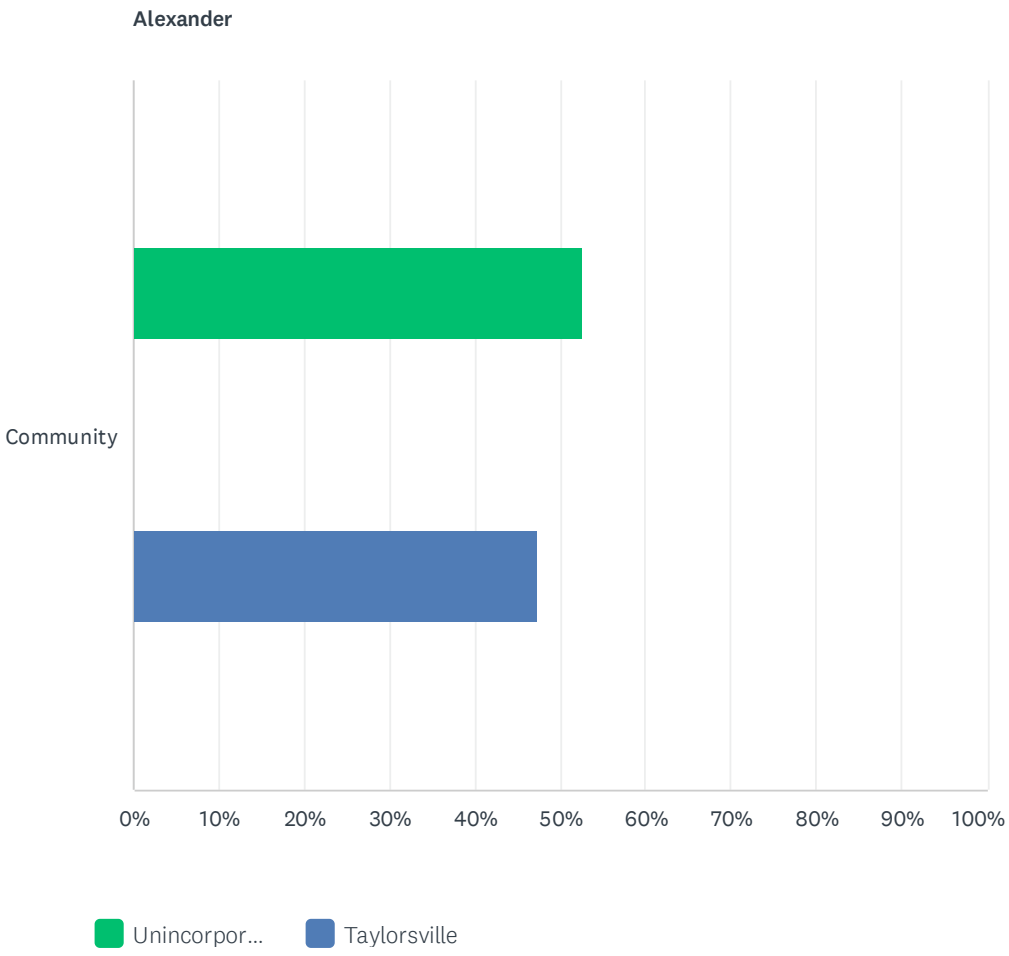
Appendix D: Public Survey Results

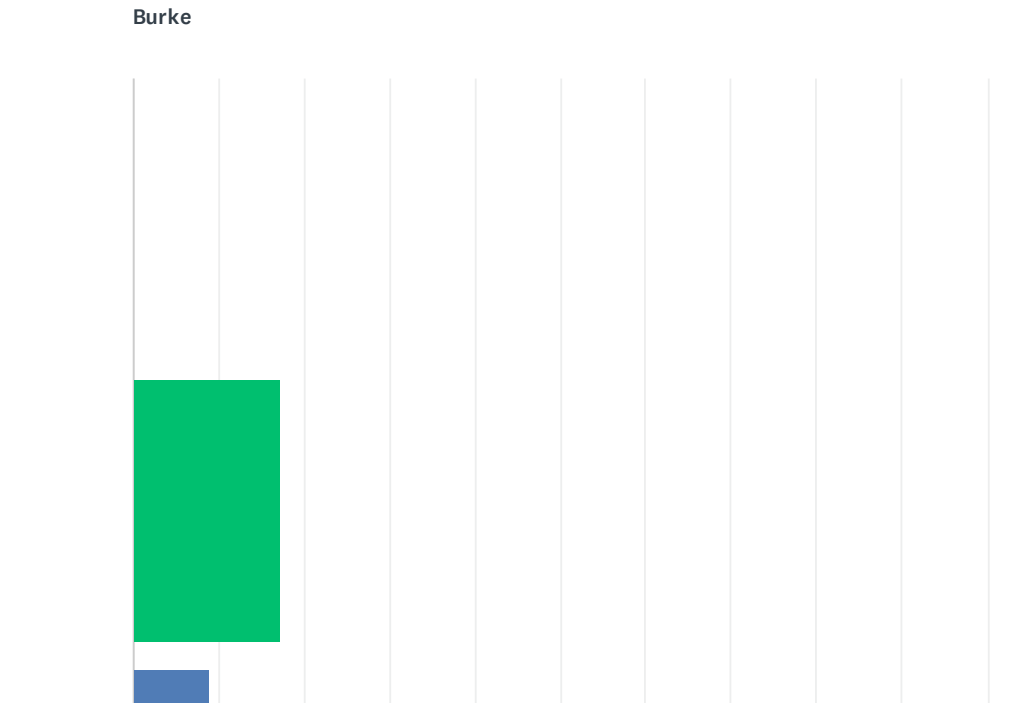


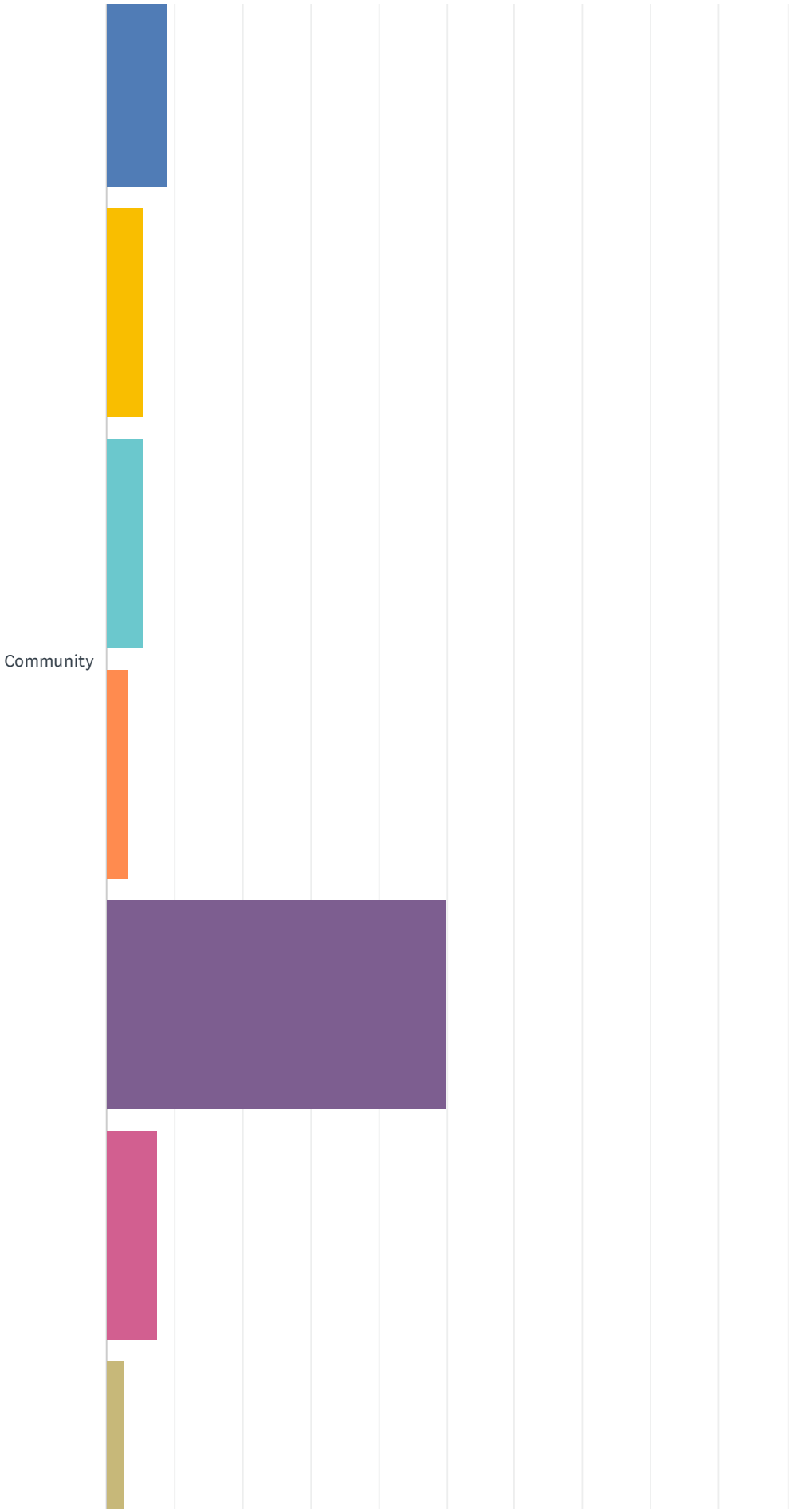
	HAVE DONE	PLAN TO DO	NOT DONE	UNABLE TO DO	TOTAL
Attended meetings or received written information on natural disasters or emergency preparedness?	41.46% 238	8.36% 48	47.74% 274	2.44% 14	574
Talked with members in your household about what to do in case of a natural disaster or emergency?	74.96% 428	10.33% 59	13.31% 76	1.40% 8	571
Developed a “Household/Family Emergency Plan” in order to decide what everyone would do in the event of a disaster?	53.32% 305	24.65% 141	20.98% 120	1.05% 6	572
Prepared a “Disaster Supply Kit” (stored extra food, water, batteries or other emergency supplies)?	40.77% 234	33.28% 191	24.56% 141	1.39% 8	574
In the last year, has anyone in your household been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR)?	54.36% 312	6.62% 38	37.11% 213	1.92% 11	574
Prepared your home by installing smoke detectors on each level of the house?	92.48% 529	4.72% 27	1.92% 11	0.87% 5	572
Discussed or created a utility shutoff procedure in the event of a natural disaster?	31.82% 182	22.03% 126	43.18% 247	2.97% 17	572

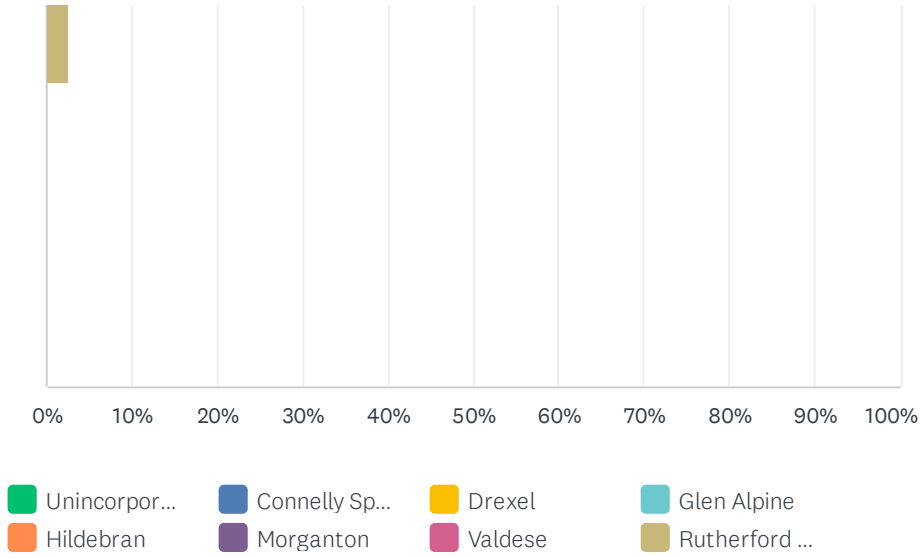
Q15 In which community do you live?

Answered: 543 Skipped: 36

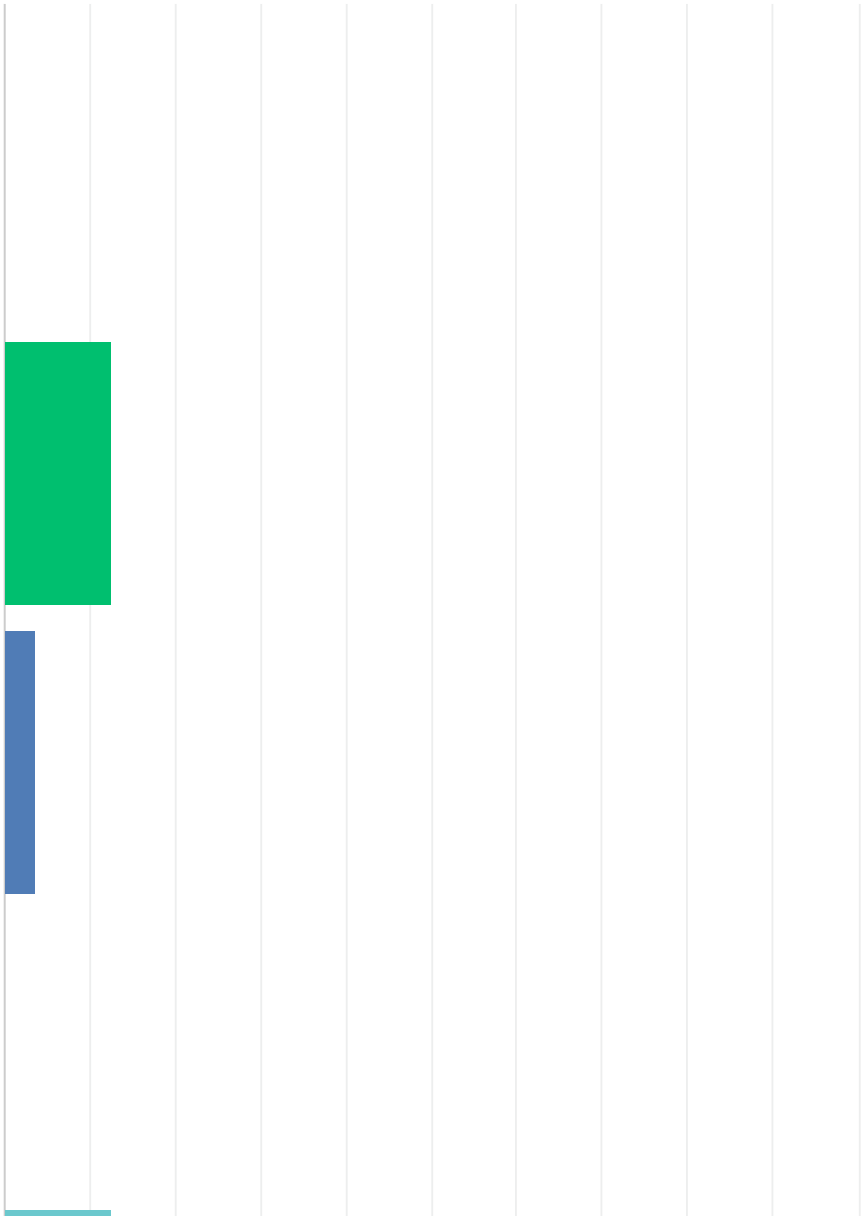




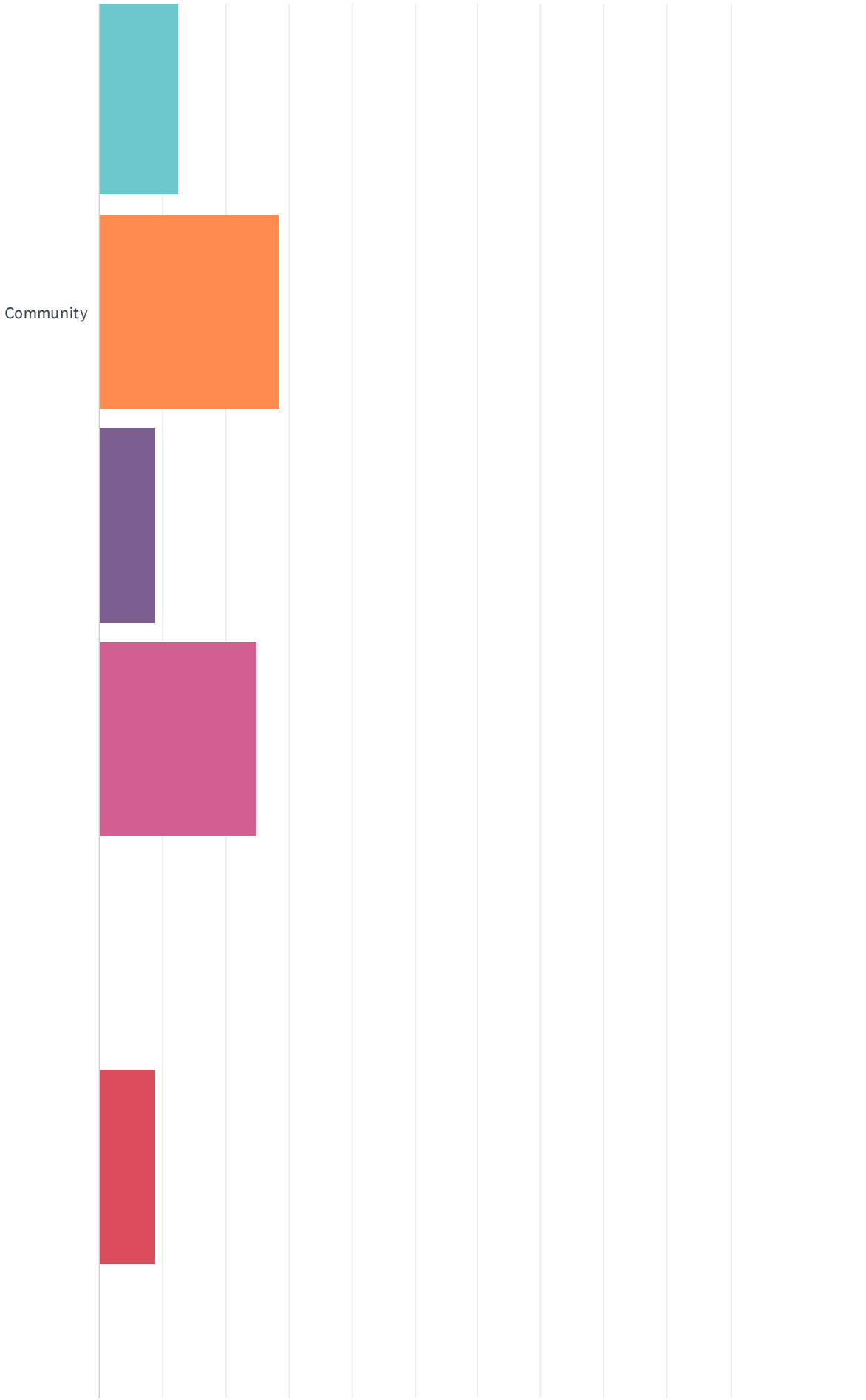

Community

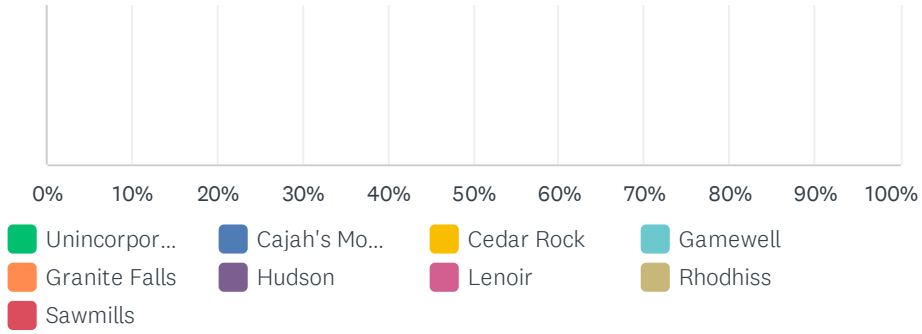

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Drexel
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Hildebran
Morganton
Valdese
Rutherford ...

Caldwell

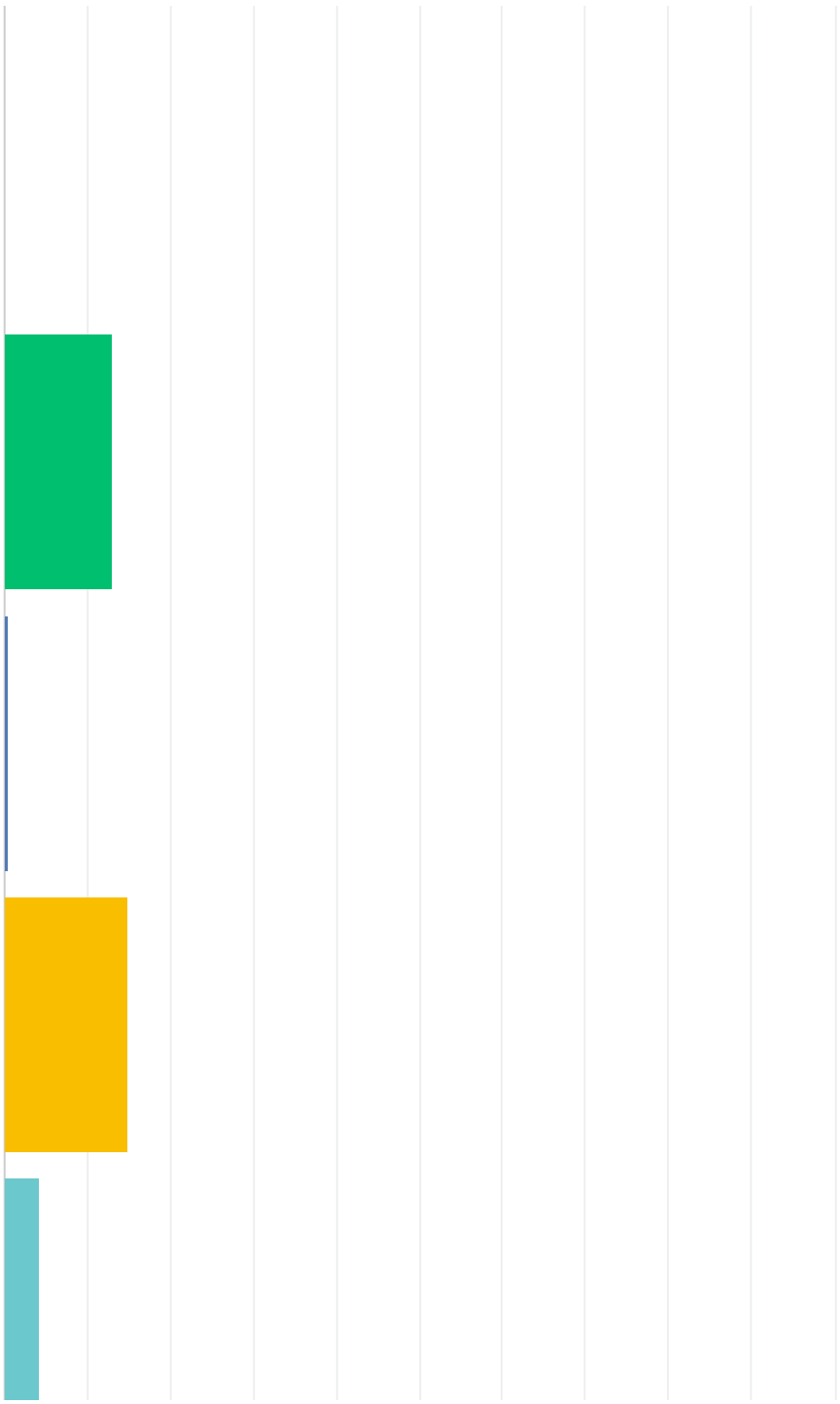


Appendix D: Public Survey Results

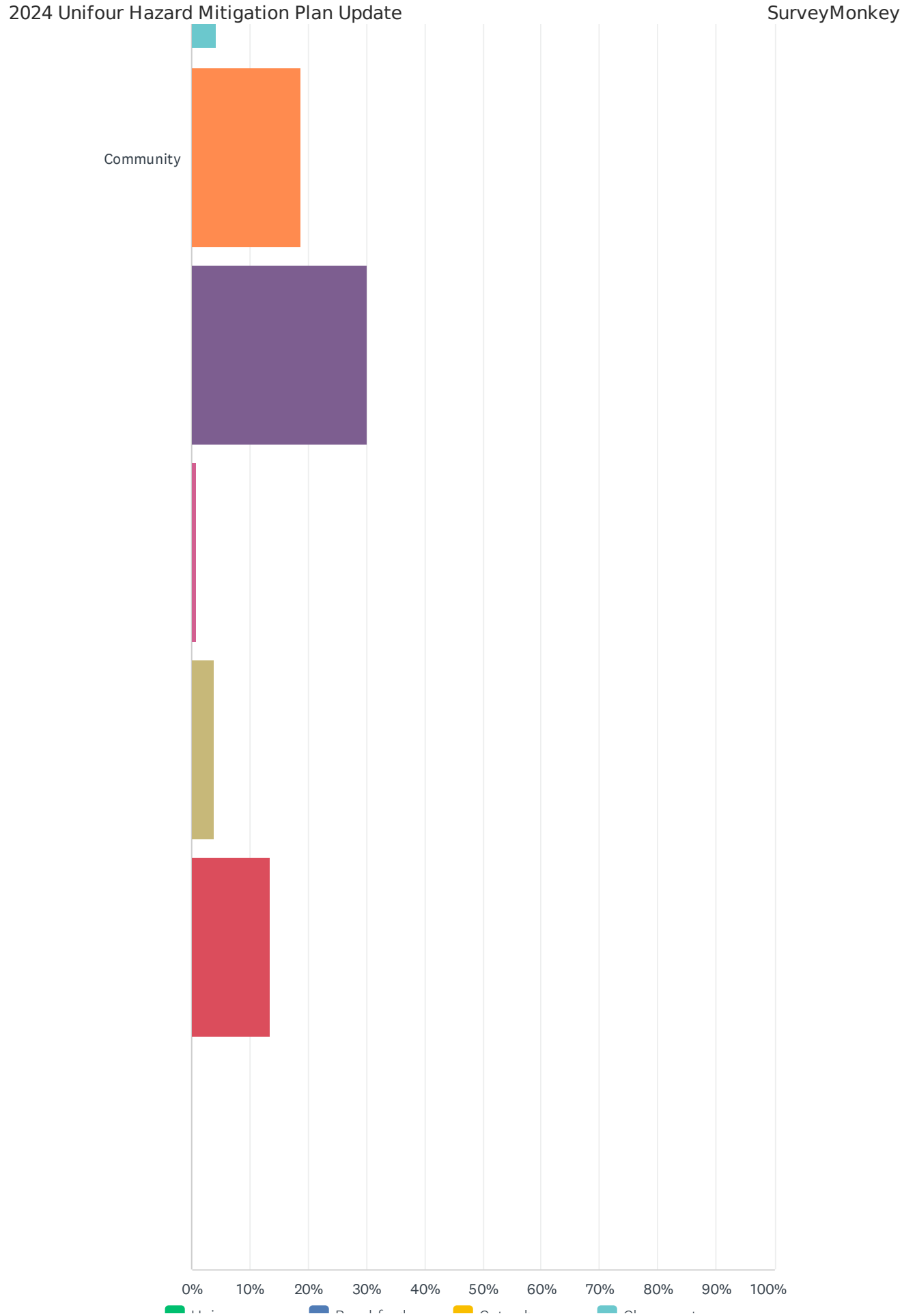


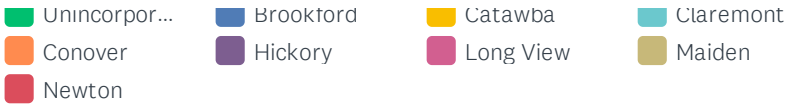

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Unincorpor...
Cajah's Mo...
Cedar Rock
Gamewell
Granite Falls
Hudson
Lenoir
Rhodhiss
Sawmills

Catawba



Appendix D: Public Survey Results





Alexander		
	UNINCORPORATED	TAYLORSVILLE	TOTAL
Community	52.70% 39	47.30% 35	74

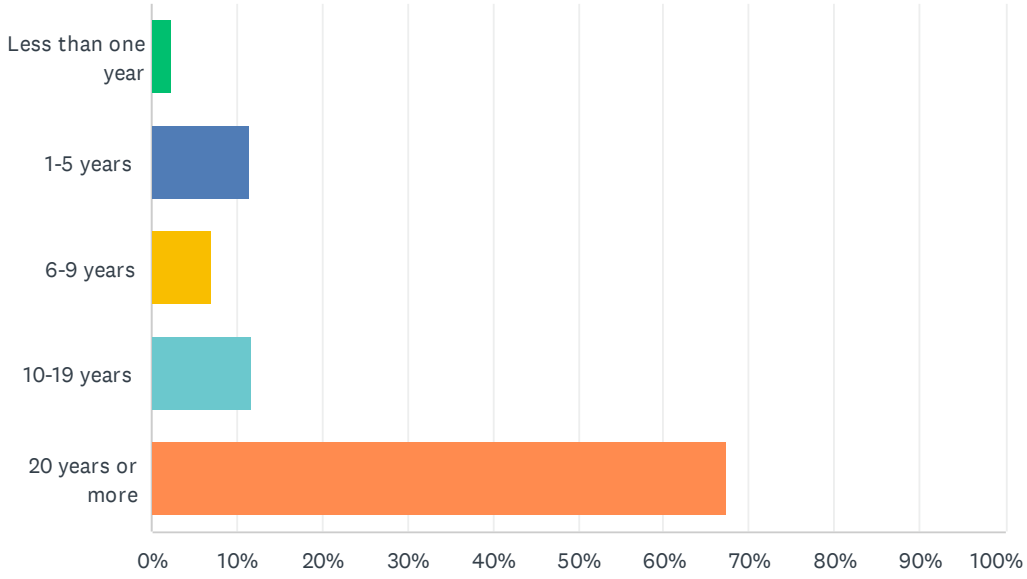
Burke								
	UNINCORPORATED	CONNELLY SPRINGS	DREXEL	GLEN ALPINE	HILDEBRAN	MORGANTON	VALDESE	RUTHERF COLLEGE
Community	17.37% 33	8.95% 17	5.26% 10	5.26% 10	3.16% 6	50.00% 95	7.37% 14	2

Caldwell									
	UNINCORPORATED	CAJAH'S MOUNTAIN	CEDAR ROCK	GAMEWELL	GRANITE FALLS	HUDSON	LENOIR	RHODHISS	SA
Community	12.50% 7	3.57% 2	0.00% 0	12.50% 7	28.57% 16	8.93% 5	25.00% 14	0.00% 0	

Catawba								
	UNINCORPORATED	BROOKFORD	CATAWBA	CLAREMONT	CONOVER	HICKORY	LONG VIEW	MAIDEN
Community	13.10% 30	0.44% 1	14.85% 34	4.37% 10	18.78% 43	30.13% 69	0.87% 2	3.93% 9

Q16 How long have you lived in the Unifour region?

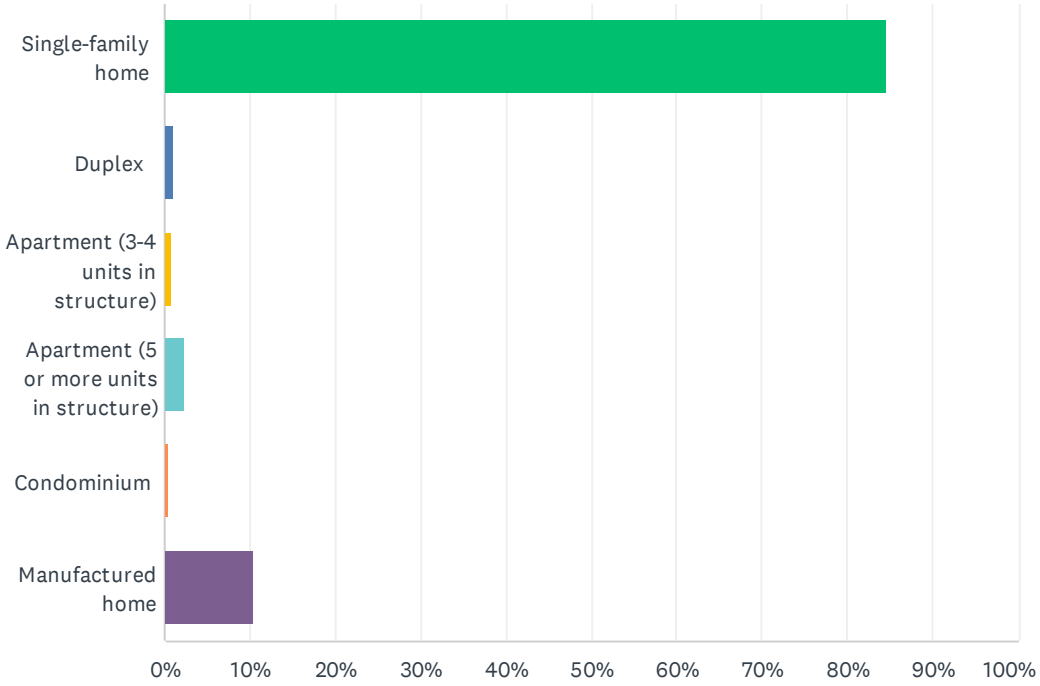
Answered: 573 Skipped: 6



ANSWER CHOICES	RESPONSES	
Less than one year	2.44%	14
1-5 years	11.52%	66
6-9 years	6.98%	40
10-19 years	11.69%	67
20 years or more	67.36%	386
TOTAL		573

Q17 What type of building do you live in?

Answered: 564 Skipped: 15



ANSWER CHOICES	RESPONSES	
Single-family home	84.75%	478
Duplex	1.06%	6
Apartment (3-4 units in structure)	0.89%	5
Apartment (5 or more units in structure)	2.30%	13
Condominium	0.53%	3
Manufactured home	10.46%	59
TOTAL		564

Q18 Additional Comments

Answered: 55 Skipped: 524

Plan Incorporation and Monitoring Tool:

<table>
<tr><td rowspan="9">1. Comprehensive Plan</td><td>a. Plan Name</td><td>b. Plan Lead or Lead Agency</td></tr>
<tr><td></td><td></td></tr>
<tr><td>c. Plan Status</td><td>☐Implemented
☐Plan Development In Progress
☐Plan Implementation Delayed
☐Other:</td></tr>
<tr><td rowspan="2">d. Next Designated Review Period or Public Meeting</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td rowspan="2">e. Next Designated Time to Review Progress</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td colspan="2">f. What Progress is Expected to be Complete Before the Next Review Period?</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">g. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Comprehensive Plan and related actions:</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td rowspan="7">2. Capital Improvement Plan</td><td>a. Plan Name</td><td>b. Plan Lead or Lead Agency</td></tr>
<tr><td></td><td></td></tr>
<tr><td>c. Plan Status</td><td>☐Implemented
☐Plan Development In Progress
☐Plan Implementation Delayed
☐Other:</td></tr>
<tr><td rowspan="2">d. Next Designated Review Period or Public Meeting</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td></td><td>Click or tap to enter a date.</td></tr>
</table>

	e. Next Designated Time to Review Progress	Meeting Details:
	f. What Progress is Expected to be Complete Before the Next Review Period?	
	g. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Capital Improvement Plan and related actions:	
3. Economic Development Plan	**a. Plan Name**	**b. Plan Lead or Lead Agency**
	c. Plan Status	☐Implemented ☐Plan Development In Progress ☐Plan Implementation Delayed ☐Other:
	d. Next Designated Review Period or Public Meeting	Click or tap to enter a date.
		Meeting Details:
	e. Next Designated Time to Review Progress	Click or tap to enter a date.
		Meeting Details:
	f. What Progress is Expected to be Complete Before the Next Review Period?	
	g. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Economic Development Plan and related actions:	
	a. Plan Name	**b. Plan Lead or Lead Agency**

<table>
<tr><td rowspan="8">4. Emergency Operations Plan</td><td></td><td></td></tr>
<tr><td>c. Plan Status</td><td>☐Implemented
☐Plan Development In Progress
☐Plan Implementation Delayed
☐Other:</td></tr>
<tr><td rowspan="2">d. Next Designated Review Period or Public Meeting</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td rowspan="2">e. Next Designated Time to Review Progress</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td colspan="2">f. What Progress is Expected to be Complete Before the Next Review Period?</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">g. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Emergency Operations Plan and related actions:</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td rowspan="8">5. Transportation Plan</td><td>a. Plan Name</td><td>b. Plan Lead or Lead Agency</td></tr>
<tr><td></td><td></td></tr>
<tr><td>c. Plan Status</td><td>☐Implemented
☐Plan Development In Progress
☐Plan Implementation Delayed
☐Other:</td></tr>
<tr><td rowspan="2">d. Next Designated Review Period or Public Meeting</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td rowspan="2">e. Next Designated Time to Review Progress</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td colspan="2">f. What Progress is Expected to be Complete Before the Next Review Period?</td></tr>
</table>

<table>
<tr><td rowspan="3"></td><td colspan="2"></td></tr>
<tr><td colspan="2">g. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Emergency Operations Plan and related actions:</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td rowspan="9">6. Housing Plan</td><td>a. Plan Name</td><td>b. Plan Lead or Lead Agency</td></tr>
<tr><td></td><td></td></tr>
<tr><td>c. Plan Status</td><td>☐Implemented
☐Plan Development In Progress
☐Plan Implementation Delayed
☐Other:</td></tr>
<tr><td rowspan="2">d. Next Designated Review Period or Public Meeting</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td rowspan="2">e. Next Designated Time to Review Progress</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
<tr><td colspan="2">f. What Progress is Expected to be Complete Before the Next Review Period?</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">g. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Housing Plan and related actions:</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td rowspan="3">7. Building Codes</td><td>a. Responsible Agency</td><td></td></tr>
<tr><td rowspan="2">b. Next Designated Review Period or Public Meeting</td><td>Click or tap to enter a date.</td></tr>
<tr><td>Meeting Details:</td></tr>
</table>

	c. Next Designated Time to Review Progress	Click or tap to enter a date. Meeting Details:
	d. What design standards need to be implemented to ensure new development can withstand natural hazards?	
	e. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Building Codes related Requirements:	
8. Zoning Ordinances	**a. Responsible Agency**	
	b. Next Designated Review Period or Public Meeting	Click or tap to enter a date. Meeting Details:
	c. Next Designated Time to Review Progress	Click or tap to enter a date. Meeting Details:
	d. What design standards need to be implemented to ensure new zoning ordinances can withstand natural hazards?	
	e. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Zoning Ordinances:	

9. Natural Hazard Ordinance	**a. Responsible Agency**	
	b. Next Designated Review Period or Public Meeting	Click or tap to enter a date. Meeting Details:
	c. Next Designated Time to Review Progress	Click or tap to enter a date. Meeting Details:
	d. What design standards need to be implemented to ensure new zoning ordinances can withstand natural hazards?	
	e. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Zoning Ordinances:	
10. Maintenance Programs for Hazard Mitigation	**a. Responsible Agency**	
	b. Next Designated Review Period or Public Meeting	Click or tap to enter a date. Meeting Details:
	c. Next Designated Time to Review Progress	Click or tap to enter a date. Meeting Details:
	d. What design standards need to be implemented to ensure new zoning ordinances can withstand natural hazards?	
	e. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Zoning Ordinances:	

11. Maintenance Programs for Hazard Mitigation	**a. Responsible Agency**	
	b. Next Designated Review Period or Public Meeting	Click or tap to enter a date. Meeting Details:
	c. Next Designated Time to Review Progress	Click or tap to enter a date. Meeting Details:
	d. What design standards need to be implemented to ensure new zoning ordinances can withstand natural hazards?	
	e. Questions to be considered in follow up meetings to ensure Hazard Mitigation Actions are included in the Zoning Ordinances:	

Technical Resources	Available (Yes/No)	Details	Changes Since Last Review	Considerations for Next Capability Review
12. Warning Systems	☐Yes ☐No			
13. Hazard Data and Information	☐Yes ☐No			
14. Grant Writing	☐Yes ☐No			
15. Geographic Information Systems Analysis	☐Yes ☐No			

Technical Resources	Available (Yes/No)	Details	Changes Since Last Review	Considerations for Next Capability Review
16. Fire Safety Programs	☐Yes ☐No			
17. Natural Disaster Safety Programs	☐Yes ☐No			
18. Gatherings and Celebrations Outreach Programs	☐Yes ☐No			

Figure 1: Invitation for the Unifour Regional Hazard Mitigation Plan Public Meeting on June 12, 2024 in person in Newton, NC. 2
Figure 2: In-Person Sign in sheet for the Unifour HMP Meeting #2 (Emails and phone numbers redacted) 4
Figure 3: Unifour HMP Meeting Sign in from the 06/12/2024 in person meeting (emails and phone numbers redacted) 5
Figure 4: Alexander County Facebook Post and Alexander County Health Department inviting the public and stakeholders to participate in the in-person Unifour Public Meeting on June 12, 2024 6
Figure 5: Flyers placed around the Alexander County County Administration, Senior Center, Department of Social Services, Health Department, and Volunteer Rescue Squad inviting the public to participate in the Unifour HMP Update Process for the public meeting on June 12, 2024 7

Table 1: Unifour HMP Kickoff Meeting Attendance Sheet from Virtual Meeting (02/16/2024) 3
Table 2: Attendance sign in for the virtual Unifour Hazard Mitigation Planning Meeting #2 (4/11/2024) 3
Table 3: Unifour Hazard Mitigation Meeting Sign in from June 12, 2024 5

Announcement

Unifour Regional Hazard Mitigation Plan Public Meeting

What: Public meeting to obtain and incorporate communities' thoughts and concerns about the Unifour Regional Hazard Mitigation Plan

When: Wednesday, June 12th, 2024
"Come and go" anytime starting at 11:30am to 12:30pm ET

Where: 25 Government Drive, Newton, NC 28658, 2nd Floor Meeting Room






Floods, Wildfires, Tornadoes, Winter Storms, Hurricanes...What Concerns You?

Do you have ideas for helping our community become better prepared for future natural disasters?

You are invited to come share your thoughts and concerns about your community's resiliency against natural disasters and leave your comments for the final decision-making process.

About the Unifour Regional Hazard Mitigation Plan

The counties of the Unifour Region in coordination with their participating municipal jurisdictions, are finalizing a regional hazard mitigation plan that covers the multi-county area. The Unifour Regional Hazard Mitigation Plan identifies local policies and actions for reducing risk and future losses from natural hazards such as floods, severe storms, wildfires, and winter weather.

For More Information

If you would like to learn more, please contact one of the following county coordinators for this project:

Daniel Fox, Alexander County Emergency Management
828.352.7709/dmfox@alexandercountync.gov

Michael Willis, Burke County Emergency Management
828.413.5229/Michael.willis@burkenc.org

Vic Misenheimer, Caldwell County Emergency Management
828.757.1419/vmisenheimer@caldwellcountync.org

Jason Williams, Catawba County Emergency Management
828.465.8989/JasonW@catawbacountyNC.gov

You can also visit https://www.ncdps.gov/our-organization/emergency-management/hazard-mitigation/hazard-mitigation-plans#UnifourRegionalPlan-6718 for more information

We hope to see you June 12th, 2024!

Figure 1: Invitation for the Unifour Regional Hazard Mitigation Plan Public Meeting on June 12, 2024 in person in Newton, NC.

Table 1: Unifour HMP Kickoff Meeting Attendance Sheet from Virtual Meeting (02/16/2024)

Name	Role
Houston, McKenzie M	Organizer
Jimmy E Drum	Attendee
Caleb Bynum	Attendee
Curt Willis	Attendee
Catawba County	Attendee
Franks, Richard (Clifton)	Attendee
Baker, Carl (NCEM)	Attendee
Alex Fulbright	Attendee
Bryan Blanton	Attendee
Keefe, Kelly	Presenter
Burgess, Brian	Attendee
Cal Overby	Attendee
Hamby, Karen (NCEM)	Attendee
Jason Williams, Catawba County	Attendee
Peterson, Kelsey	Attendee
Mello, John (NCEM)	Attendee
Holbrook, Seth	Attendee
Chris Timberlake	Attendee
Larry Johnson	Attendee
Martha Blanton	Attendee
Samuel Abernethy	Attendee
City of Morganton (Guest)	Attendee
Michael Willis	Attendee
Crew, John (NCEM)	Attendee
Greene, Russell (NCEM)	Attendee
Daniel Fox	Attendee
Teresa Kinney	Attendee
Daniel Fox	Attendee

Table 2: Attendance sign in for the virtual Unifour Hazard Mitigation Planning Meeting #2 (4/11/2024)

Name	Role
Houston, McKenzie M	Organizer
Catawba County Government Center	Presenter
Mario Sclarandis (Guest)	Presenter
Chaiyo Vang-Caldwell County	Presenter
Michael Willis	Presenter
Bill Carroll (Drexel)	Presenter
Kudla, Kymberly	Presenter
Jodie Yoder- Program Manager Samaritan's Purse U.S. Disaster Relief	Presenter
Baker, Carl (NCEM)	Presenter
Peterson, Kelsey	Presenter

Cal Overby	Presenter
Ashure Ministry - Kristal Manning	Presenter
Holbrook, Seth	Presenter
Crew, John (NCEM)	Presenter
Cramer, Jordan	Presenter
Curt Willis	Presenter
Russell Greene	Presenter
Truman Walton, Town of Valdese	Presenter
Katelyn Smith	Presenter
Teresa Kinney	Presenter



Unifour

Hazard Mitigati

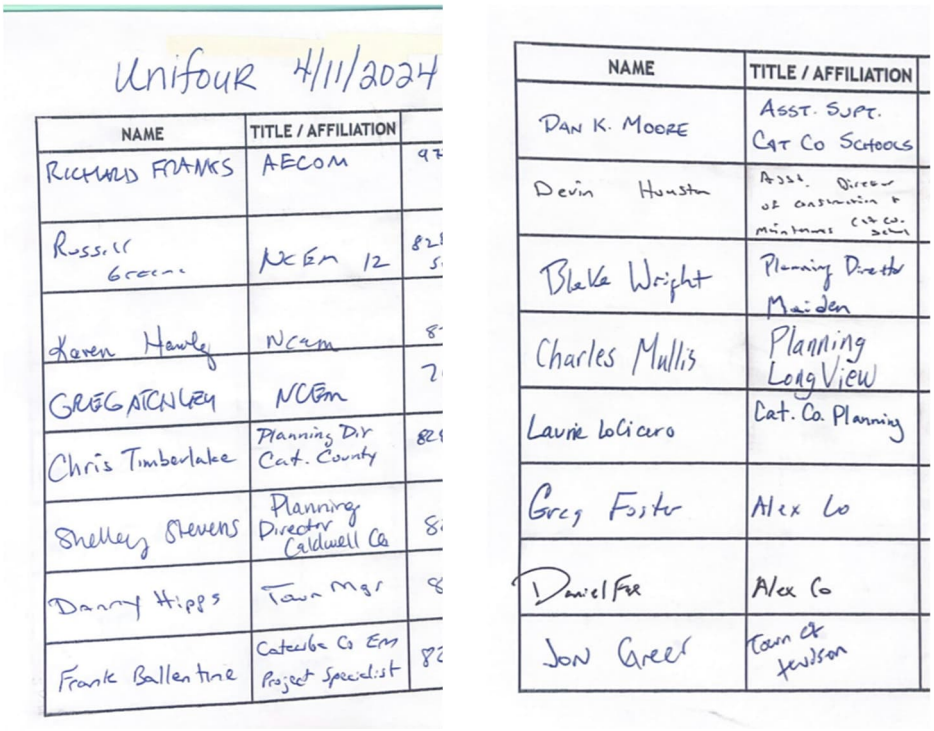
Name	Affiliation
kelly keefe	AECOM Planner
Frank Ballentine	Catawba Co EM
Bryan Blanton	Catawba Co ES
Daniel Fox	Alex Co EM
Chaniye Vang	Caldwell HD
Charles Mullis	Long View
Alex Fulbright	Newton
Jon Greer	Hudson
Shelley Stevens	Caldwell Co.

Unifour

Hazard Mitigati

Name	Affiliation
Jason Williams	Catawba County EM
Brian Rogers	Alexander County

Figure 2: In-Person Sign in sheet for the Unifour HMP Meeting #2 (Emails and phone numbers redacted)



Unifour 4/11/2024

NAME	TITLE / AFFILIATION
RICHARD FRANKS	AECOM
Russell Green	NCEM 12
Karen Hawley	NCem
GREG ATCHLEY	NCEM
Chris Timberlake	Planning Dir Cat. County
Shelley Stevens	Planning Director Caldwell Co
Danny Hipps	Town Mgr
Frank Ballentine	Catawba Co EM Project Specialist

NAME	TITLE / AFFILIATION
DAN K. MOORE	ASST. SUPT. CAT CO SCHOOLS
Devin Houston	Asst. Director of construction & maintenance Cat Co. Schools
Blake Wright	Planning Director Maiden
Charles Mullis	Planning Long View
Laurie LoCicero	Cat. Co. Planning
Greg Foster	Alex Co
Daniel Fox	Alex Co
JON Greer	Town of Jewson

Figure 3: Unifour HMP Meeting Sign in from the 06/12/2024 in person meeting (emails and phone numbers redacted)

Table 3: Unifour Hazard Mitigation Meeting Sign in from June 12, 2024

Name	Affiliation
Mckenzie Houston	AECOM, Planner
Curt Willis	Emergency Management Planner, WPCOG
Chris Crew	NCEM, Mitigation Plans Manager
Blake Wright	Planning Director, Town of Maiden
Caleb Bynum	Senior Utilities Engineer, City of Hickory
Kaine Riggan	NCDPS, BRIC Development Lead
Marti Blanton	Burke County EM
Gerg Wilson	Town Planner, Granite Falls
Dustin Millsaps	WPCOG (Town of Catawba and Town Sawmills)
Daniel Odom	WPCOG, Village of Cedar Rock
Jonathan Cook	EMS Director, Caldwell County EMS
Dallas Goodnight	WPCOG, GIS Specialist

Seth Holbrook	GIS Specialist, AECOM
Kelly Christensen	GIS Tech, WPCOG
Chad Fisher	Deputy Chief, Hickory Fire Department
Mario Sclarandis	Director of Development Services
Wendy Smith	Design Services
Vic Misenheimer	Caldwell County EM
Russell Greene	NCEM
Stephen Craig	Fire Marshal, Hickory Fire Department
Kelsey Peterson	Environmental Planner, AECOM
Katelyn Smith	WPCOG, Town of Hildebran and Rutherford College
Greg Foster	911 EM Director, Alexander County

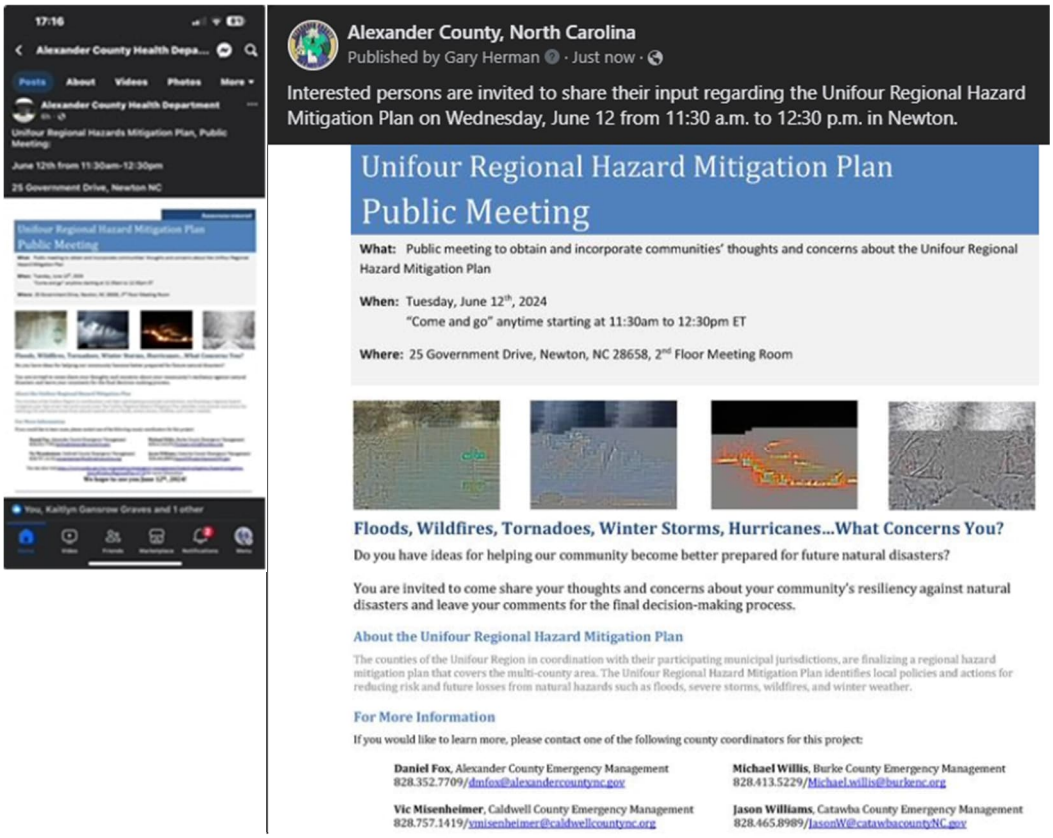


Figure 4: Alexander County Facebook Post and Alexander County Health Department inviting the public and stakeholders to participate in the in-person Unifour Public Meeting on June 12, 2024

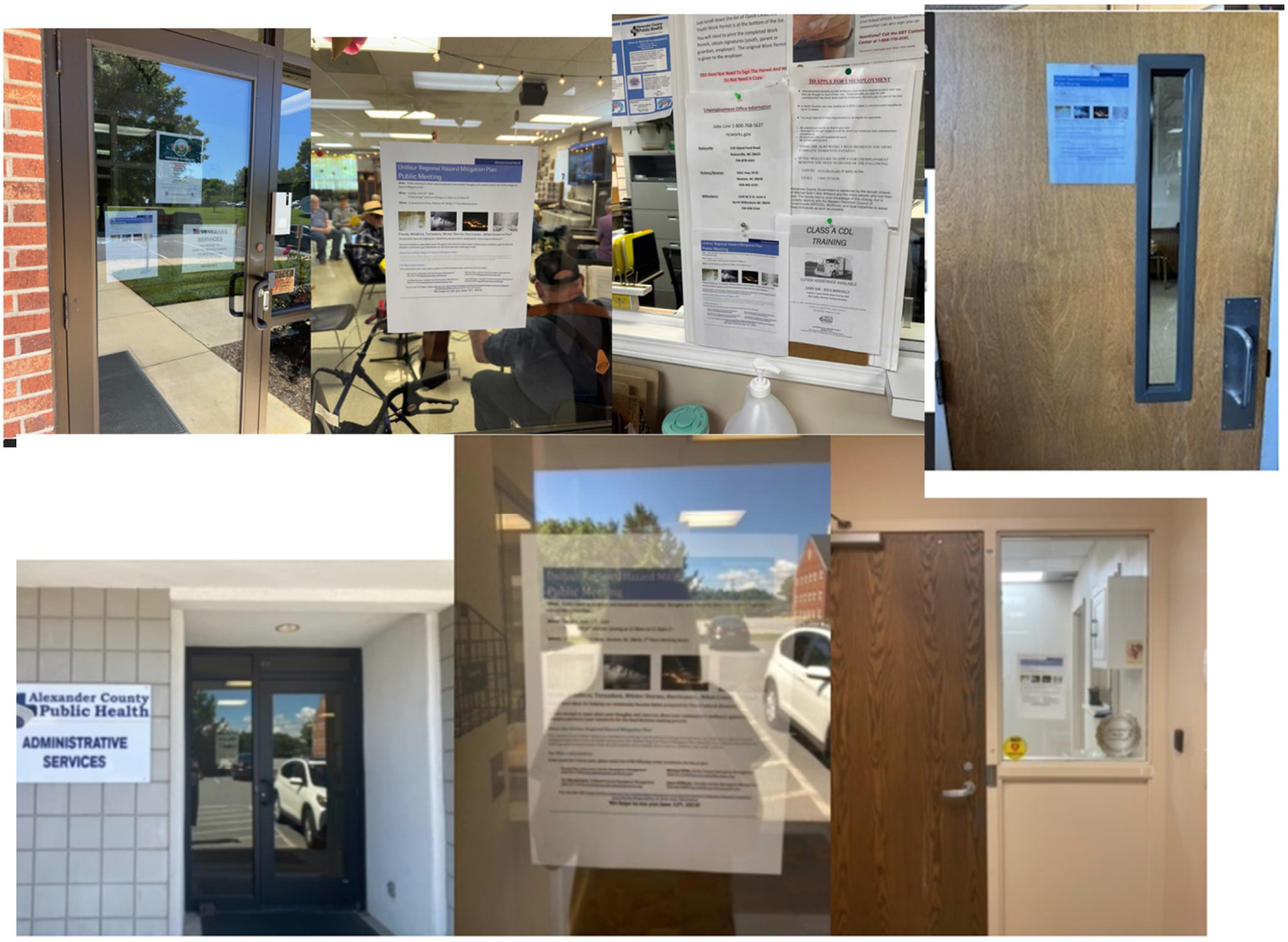


Figure 5: Flyers placed around the Alexander County County Administration, Senior Center, Department of Social Services, Health Department, and Volunteer Rescue Squad inviting the public to participate in the Unifour HMP Update Process for the public meeting on June 12, 2024

Figure 6: Plan Adoption Resolution –

RESOLUTION
ADOPTING PLAN NAME REGIONAL
HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within County/Town are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

WHEREAS, the County desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has enacted General Statute Section 166A-19.41 (*State emergency assistance funds*) which provides that for a state of emergency declared pursuant to G.S. 166A-19.20(a) after the deadline established by the Federal Emergency Management Agency pursuant to the Disaster Mitigation Act of 2002, P.L. 106-390, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act; and.

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the County/Town has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

WHEREAS, it is the intent of the Board of Commissioners of County/Town to fulfill this obligation in order that the County will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, THEREFORE, be it resolved that the Board of Commissioners of XXXXXX hereby:

1. Adopts the Plan Name Regional Hazard Mitigation Plan.

2. Vests County/Town Agency Emergency Management with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.
   (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.

3. Appoints County/Town Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the XXXXX County Board of Commissioners for consideration.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted this the xxth day of xxxxx, xxxx.

_____
Name, Chair
XXXXX Board of Commissioners

Attest:

_____
Name, Clerk
XXXXXX Board of Commissioners

Certified by: _____ (SEAL)

Date: _____

Appendix G: Alternate Participation

Re: Unifour Hazard Mitigation Plan Update (Connelly Springs)

Tamara Brooks <clerk@ci.connelly-springs.nc.us>
Thu 9/5/2024 7:15 PM
To:Keefe, Kelly <kelly.keefe@aecom.com>
Cc:sjp@ci.connelly-springs.nc.us <sjp@ci.connelly-springs.nc.us>;Martha Blanton <martha.blanton@burkenc.org>;Houston, McKenzie M <McKenzie.Houston@aecom.com>;Campbell, Peyton <peyton.campbell@aecom.com>

This Message Is From an Untrusted Sender
You have not previously corresponded with this sender.

Report Suspicious

Good evening,

I have attempted to access the link provided for the Town of Connelly Springs, however it seems to be sending information for/to the Town of Brookford. Can someone take a look and send the correct link?

Regards,
Tamara Brooks
Town Administrator / Notary Public
Ph: (828) 879-2321
Fax: (828) 879-2325

On Thu, Aug 29, 2024 at 3:48 PM Keefe, Kelly <kelly.keefe@aecom.com> wrote:

> Hello!
>
> Can we work together to get Connelly Springs' Mitigation Actions complete?
>
> We have a link to complete your mitigation actions here:
> Section7_Mitigation_Action_Plans_4_10_24.xlsx
>
> Attached is a tutorial to help walk with through the process so that you can view just your jurisdictions mitigation actions.

Kelly Keefe, CFM
Senior Planner

AECOM, a member of Compass PTS JV
M +1-954-461-3374
kelly.keefe@aecom.com

From: Keefe, Kelly
Sent: Friday, August 16, 2024 1:06 PM
To: michael.willis@burkenc.org; Martha Blanton <martha.blanton@burkenc.org>; clerk@ci.connelly-springs.nc.us
Cc: Houston, McKenzie M <McKenzie.Houston@aecom.com>; Campbell, Peyton <peyton.campbell@aecom.com>
Subject: Unifour Hazard Mitigation Plan Update (Connelly Springs)

Hello,

Can we work together to get Connelly Springs Capability Assessment and Connelly Springs Mitigation Actions complete?

We assume the Capability Assessment will be similar to the county's but we need to verify.

This email communication is in lieu of Connelly Springs in person attendance at the HMPC meeting.

Thanks,

Kelly Keefe, CFM
Senior Planner

AECOM, a member of Compass PTS JV
M +1-954-461-3374
kelly.keefe@aecom.com

Figure G- 1: Connely Springs Participation email

Re: Unifour Hazard Mitigation Plan Updates (Glen Alpine)

Crystal Reed <creed@townofglenalpine.org>
Mon 8/19/2024 9:02 AM

To:Martha Blanton <martha.blanton@burkenc.org>
Cc:Keefe, Kelly <kelly.keefe@aecom.com>;Michael Willis <michael.willis@burkenc.org>;Campbell, Peyton <peyton.campbell@aecom.com>;Houston, McKenzie M <McKenzie.Houston@aecom.com>

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You have not previously corresponded with this sender.

Report Suspicious

That would be great!

On Fri, Aug 16, 2024 at 3:22 PM Martha Blanton <martha.blanton@burkenc.org> wrote:

I will follow up with both municipalities.

Thanks,

Marti Blanton
Emergency Management Planner
Burke County
200 Avery Avenue
Morganton, NC 28655
828.764.9320 Office
828.764.3708 Cell
martha.blanton@burkenc.org

From: Keefe, Kelly <kelly.keefe@aecom.com>
Sent: Friday, August 16, 2024 12:55:17 PM
To: Michael Willis <michael.willis@burkenc.org>; Martha Blanton <martha.blanton@burkenc.org>; creed@townofglenalpine.org <creed@townofglenalpine.org>
Cc: Campbell, Peyton <peyton.campbell@aecom.com>; Houston, McKenzie M <McKenzie.Houston@aecom.com>
Subject: Unifour Hazard Mitigation Plan Updates (Glen Alpine)

CAUTION: Don't be quick to click! We're counting on you! This email is from an external sender! **Don't click** on links or open attachments from unknown sources. If you know this is spam delete the message. If you believe this message is a phish attack, Click the Phish Alert button above. If you are unsure what to do, contact the helpdesk at 9410.

Hello,

Can we work together to get Glen Alpine's Capability Assessment complete? We assume it will be similar to the county's but we want to verify.

We are also in receipt of Glen Alpine's Mitigation Actions (thank you) and this email communication is in lieu of Glen Alpine's n person attendance at the HMPC meeting.

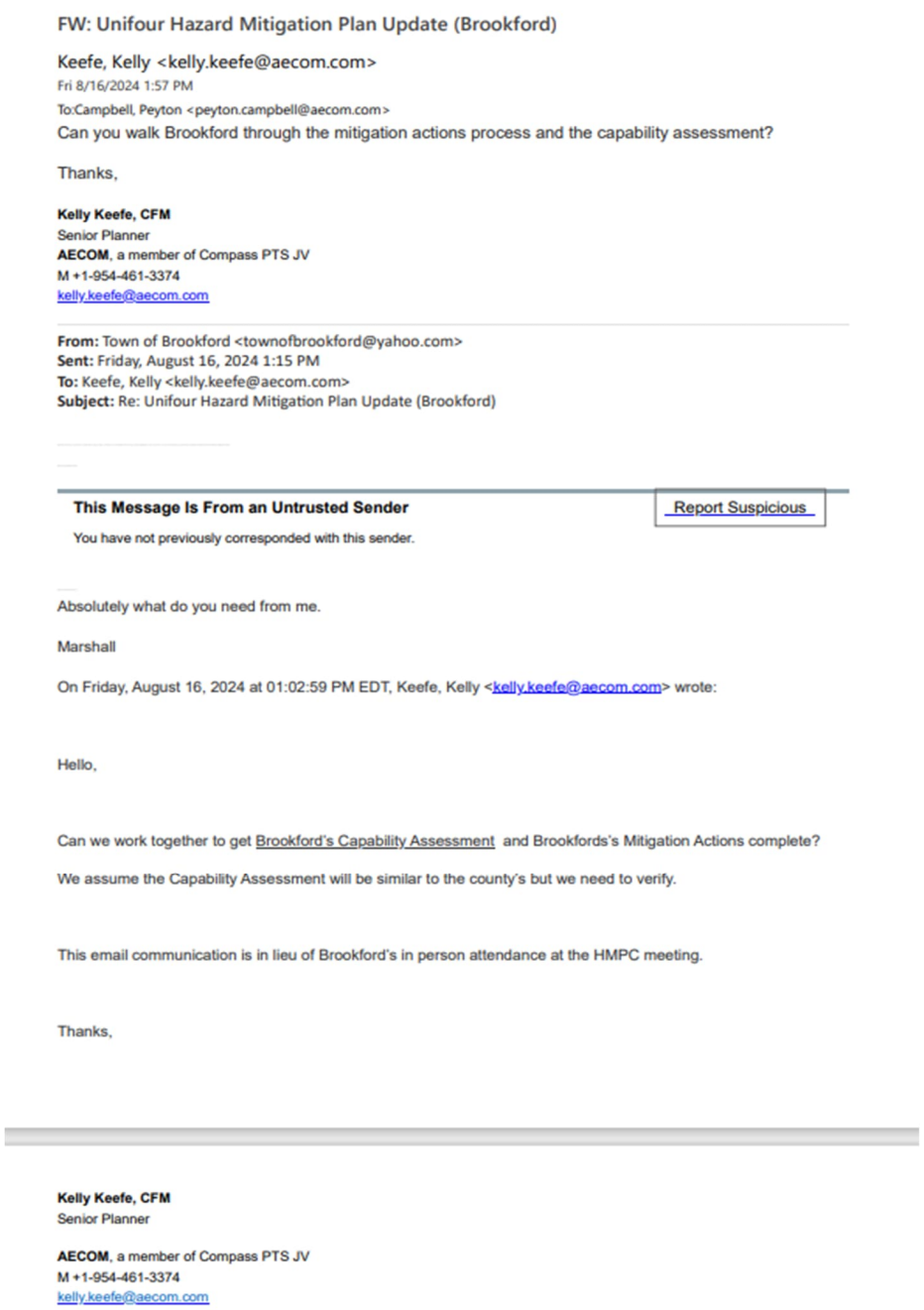
Thanks,

Kelly Keefe, CFM
Senior Planner

AECOM, a member of Compass PTS JV
M +1-954-461-3374
kelly.keefe@aecom.com

--
Crystal Reed
Town Administrator/Clerk
Glen Alpine
103 Pitts Street
Glen Alpine, NC
828-584-2622 office

Figure G- 2: Town of Glen Alpine Participation Email



FW: Unifour Hazard Mitigation Plan Update (Brookford)

Keefe, Kelly <kelly.keefe@aecom.com>
Fri 8/16/2024 1:57 PM
To:Campbell, Peyton <peyton.campbell@aecom.com>
Can you walk Brookford through the mitigation actions process and the capability assessment?

Thanks,

Kelly Keefe, CFM
Senior Planner
AECOM, a member of Compass PTS JV
M +1-954-461-3374
kelly.keefe@aecom.com

From: Town of Brookford <townofbrookford@yahoo.com>
Sent: Friday, August 16, 2024 1:15 PM
To: Keefe, Kelly <kelly.keefe@aecom.com>
Subject: Re: Unifour Hazard Mitigation Plan Update (Brookford)

This Message Is From an Untrusted Sender Report Suspicious
You have not previously corresponded with this sender.

Absolutely what do you need from me.

Marshall

On Friday, August 16, 2024 at 01:02:59 PM EDT, Keefe, Kelly <kelly.keefe@aecom.com> wrote:

Hello,

Can we work together to get Brookford's Capability Assessment and Brookfords's Mitigation Actions complete?

We assume the Capability Assessment will be similar to the county's but we need to verify.

This email communication is in lieu of Brookford's in person attendance at the HMPC meeting.

Thanks,

Kelly Keefe, CFM
Senior Planner

AECOM, a member of Compass PTS JV
M +1-954-461-3374
kelly.keefe@aecom.com

Figure G- 3: Town of Brookford Participation email

RE: Unifour Hazard Mitigation Plan Update (Claremont)

Bryce Carter <Bcarter@cityofclaremont.org>
Wed 9/11/2024 8:58 AM
To:Keefe, Kelly <kelly.keefe@aecom.com>;Jason Brown <jbrown@cityofclaremont.org>
Cc:Campbell, Peyton <peyton.campbell@aecom.com>;Houston, McKenzie M <McKenzie.Houston@aecom.com>

1 attachments (39 KB)
Unifour_CapabilityAssessment Claremont.xlsx;

This Message Is From an External Sender
This message came from outside your organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Report Suspicious

Kelly,

Here is Claremont's Capability Assessment. Let me know if there is anything else I need to do.

Bryce Carter, MPA, CZO
Planning Director
3288 E Main St
Claremont, NC 28610
(828) 466-7255 - (c) (704) 437-2526

From: Keefe, Kelly <kelly.keefe@aecom.com>
Sent: Friday, August 16, 2024 3:05 PM
To: Bryce Carter <Bcarter@cityofclaremont.org>
Cc: Campbell, Peyton <peyton.campbell@aecom.com>; Houston, McKenzie M <McKenzie.Houston@aecom.com>
Subject: RE: Unifour Hazard Mitigation Plan Update (Claremont)

Byrce,

Thank you so much. Reach out if you get hung up anywhere.

You will find lots of common ground with the county capability assessment. You can just edit that one based on your city's unique circumstances.

There are no "wrong" answers; just answer to the best of your ability.

Have a great weekend.

Kelly Keefe, CFM
Senior Planner
AECOM, a member of Compass PTS JV
M +1-954-461-3374

From: Keefe, Kelly
Sent: Friday, August 16, 2024 1:10 PM
To: JasonW@catawbacountync.gov; jbrown@cityofclaremont.org
Cc: Houston, McKenzie M <McKenzie.Houston@aecom.com>; Campbell, Peyton <peyton.campbell@aecom.com>
Subject: Unifour Hazard Mitigation Plan Update (Claremont)

Hello,

Can we work together to get Claremont's Capability Assessment complete? We assume it will be similar to the county's but we want to verify.

We are also in receipt of Claremont's Mitigation Actions (thank you) and this email communication is in lieu of Claremont's in person attendance at the HMPC meeting.

Thanks,

Kelly Keefe, CFM
Senior Planner
AECOM, a member of Compass PTS JV
M +1-954-461-3374
kelly.keefe@aecom.com

Figure G- 4: City of Claremont Email Participation