



**BECOMING LESS VULNERABLE TO DISASTER**

# TOE RIVER

## REGIONAL HAZARD MITIGATION PLAN

2016 Update

Covers Avery, McDowell,  
Mitchell and Yancey Counties





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# SECTION 1

## INTRODUCTION

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

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

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### 1.1 BACKGROUND

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

The Toe River Region is located in the western mountains of North Carolina and includes the counties of Avery, McDowell, Mitchell, and Yancey. This region is vulnerable to a wide range of natural hazards such as landslides, winter storms, severe thunderstorms, and wildfires. It is also vulnerable to human-caused hazards, including chemical releases, hazardous material spills, and acts of terrorism. These hazards threaten the life and safety of residents and visitors in the Toe River Region, and have the potential to damage or destroy both public and private property, disrupt the local economy and impact the overall quality of life of individuals who live, work, and vacation in the Toe River Region.

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



**FEMA Definition of Hazard Mitigation:**

*“Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.”*

Hazard mitigation techniques include both structural measures (such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards) and non-structural

measures (such as the adoption of sound land use policies and the creation of public awareness programs). It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease a community's overall hazard vulnerability.

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

The four counties participating in the development of the Toe River Regional Hazard Mitigation Plan first joined together in 2010 to develop the initial version of this plan. The Toe River Regional Hazard Mitigation Plan was the first regional hazard mitigation plan to be completed in the State of North Carolina. The plan became a model that NCEM used to promote regionalization of hazard mitigation plans across the entire State. Prior to that, each County was operating under individual County-level hazard mitigation plans. The plan development process for the 2015/2016 update of the plan is detailed in Section 2: Planning Process.

This regional plan draws from each of the existing County plans and documents the region's sustained efforts to incorporate hazard mitigation principles and practices into routine government activities and functions. At its core, the plan recommends specific actions to minimize hazard vulnerability and protect residents from losses to those hazards that pose the greatest risk. These mitigation actions go beyond simply recommending structural solutions to reduce existing vulnerability, such as elevation, retrofitting and acquisition projects. Local policies on community growth and development, incentives for natural resource protection, and public awareness and outreach activities are examples of other actions considered to reduce the Toe River Region's vulnerability to identified hazards. The plan remains a living document, with implementation and evaluation procedures established to help achieve meaningful objectives and successful outcomes over time.

### **1.1.1 The Disaster Mitigation Act and the Flood Insurance Reform Acts**

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



Major federal flood insurance legislation was passed in 2012 under the Biggert-Waters Flood Insurance Reform Act (P.L. 112-141) and the subsequent Homeowner Flood Insurance Affordability Act (HFIAA) in 2014 which revised Biggert-Waters. HFIAA established the requirement that a FEMA-approved Hazard Mitigation Plan is now required if communities wish to be eligible for any of the FEMA mitigation programs. These acts made several changes to the way the National Flood Insurance Program is to be run, including raises in rates to reflect true flood risk and changes in how Flood Insurance Rate Map (FIRM) updates impact policyholders. These acts further emphasize Congress' focus on mitigating vulnerable structures.

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

## 1.2 PURPOSE

The original purpose of the Toe River Regional Hazard Mitigation Plan was to merge the existing Avery McDowell, Mitchell and Yancey County hazard mitigation plans into one regional plan. Purposes of the updated plan and all future versions of the plan are to:

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

## 1.3 SCOPE

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

The geographic scope (i.e., the planning area) for the Plan includes the Counties of Avery, McDowell, Mitchell, and Yancey, as well as their incorporated jurisdictions. **Table 1.1** lists each of these counties and their participating jurisdictions.

**TABLE 1.1: PARTICIPATING AREAS IN THE TOE RIVER REGIONAL HAZARD MITIGATION PLAN**

<b>Avery County</b>	
Banner Elk	Grandfather Village
Crossnore	Sugar Mountain
Elk Park	Newland
<b>McDowell County</b>	
Marion	Old Fort
<b>Mitchell County</b>	
Bakersville	Spruce Pine
<b>Yancey County</b>	
Burnsville	

## 1.4 AUTHORITY

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

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390);
- FEMA's Final Rule published in the Federal Register, at 44 CFR Part 201 (201.6 for local mitigation planning requirements and 201.7 for Tribal planning requirements); and
- Flood Insurance Reform Act of 2004 (P.L. 108-264), Biggert-Waters Flood Insurance Reform Act of 2012 (P.L. 112-141) and the Homeowner Flood Insurance Affordability Act of 2014.

## 1.5 SUMMARY OF PLAN CONTENTS

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

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

The **Community Profile**, located in Section 3, provides a general overview of the Toe River Region, including prevalent geographic, demographic and economic characteristics. In addition, building characteristics and land use patterns are discussed. This baseline information provides a snapshot of

the planning area and helps local officials recognize those social, environmental and economic factors that ultimately play a role in determining the region's vulnerability to hazards.

The Risk Assessment is presented in three sections: Section 4: **Hazard Identification**; Section 5: **Hazard Profiles**; and Section 6: **Vulnerability Assessment**. Together, these sections serve to identify, analyze and assess hazards that pose a threat to the Toe River Region. The risk assessment also attempts to define any hazard risks that may uniquely or exclusively affect specific areas of the Toe River Region.

The Risk Assessment begins by identifying hazards that threaten the Toe River Region. Next, detailed profiles are established for each hazard, building on available historical data from past hazard occurrences, spatial extent, and probability of future occurrence. This section culminates in a hazard risk ranking based on conclusions regarding the frequency of occurrence, spatial extent, and potential impact highlighted in each of the hazard profiles. In the vulnerability assessment, FEMA's HAZUS<sup>®MH</sup> loss estimation methodology is used to evaluate known hazard risks by their relative long-term cost in expected damages. In essence, the information generated through the risk assessment serves a critical function as the Toe River Region seeks to determine the most appropriate mitigation actions to pursue and implement—enabling it to prioritize and focus its efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s).

The **Capability Assessment**, found in Section 7, provides a comprehensive examination of the Toe River Region's capacity to implement meaningful mitigation strategies and identifies opportunities to increase and enhance that capacity. Specific capabilities addressed in this section include planning and regulatory capability, staff and organizational (administrative) capability, technical capability, fiscal capability, and political capability. Information was obtained through the use of 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 in establishing a successful and sustainable local hazard mitigation program.

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

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

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make the Toe River Region less vulnerable to the damaging forces of hazards while improving the economic, social and environmental health of the community. The concept of multi-objective planning was emphasized throughout the planning process, particularly in identifying ways to link, where possible, hazard mitigation policies and programs with



complimentary community goals related to disaster recovery, housing, economic development, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

***Plan Maintenance Procedures***, found in Section 10, includes the measures that the Toe River Region will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

# SECTION 2

## PLANNING PROCESS

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### 44 CFR Requirement

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

This section describes the planning process undertaken by the Toe River Region to update the plan in 2015. Information about the development of the initial plan in 2010 can be found in Appendix X Appendix Name. This section consists of the following seven subsections:

- 2.1 Overview of Hazard Mitigation Planning
- 2.2 History of Hazard Mitigation Planning in the Toe River Region
- 2.3 Updating the Plan in 2015
- 2.4 The Toe River Regional Hazard Mitigation Planning Committee
- 2.5 Community Meetings and Workshops
- 2.6 Involving the Public
- 2.7 Involving the Stakeholders
- 2.8 Documentation of Plan Progress

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### 2.1 OVERVIEW OF HAZARD MITIGATION PLANNING

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. This process culminates in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short-term planning objectives and a long-term community vision.

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

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

- saving lives and property
- saving money

- speeding recovery following disasters
- reducing future vulnerability through wise development and post-disaster recovery and reconstruction
- expediting the receipt of pre-disaster and post-disaster grant funding
- 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 the investments made before a hazard event will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery and reconstruction. Furthermore, mitigation practices will enable local residents, businesses and industries to re-establish themselves in the wake of a disaster, getting the community economy back on track sooner and with less interruption.

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

## 2.2 HISTORY OF HAZARD MITIGATION PLANNING IN THE TOE RIVER REGION

Prior to the development of the initial *Toe River Regional Hazard Mitigation Plan* in 2010, each of the four counties and jurisdictions participating in this Plan had previously adopted a county-level hazard mitigation plan. The FEMA approval dates for each of these plans, along with a list of the participating municipalities for each plan, are listed below:

- *Avery County Multi-Jurisdictional Hazard Mitigation Plan* (July 2005)
  - Town of Banner Elk
  - Town of Crossnore
  - Town of Elk Park
  - Town of Newland
  - Village of Sugar Mountain
  - Grandfather Village
- *McDowell County Multi-Jurisdictional Hazard Mitigation Plan* (September 2006)
  - City of Marion
  - Town of Old Fort
- *Mitchell County Multi-Jurisdictional Hazard Mitigation Plan* (April 2005)
  - Town of Bakersville
  - Town of Spruce Pine
- *Yancey County Multi-Jurisdictional Hazard Mitigation Plan* (April 2005)
  - Town of Burnsville

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



For the development of the 2010 plan, all of the aforementioned jurisdictions joined to form a regional plan. No new jurisdictions joined the process and all of the jurisdictions that previously participated in previous planning efforts participated in the development of the 2010 regional plan. The regional plan was developed in order to simplify planning efforts for the jurisdictions in the Toe River Region and allowed resources to be shared amongst the participating jurisdiction to ease the administrative duties of all of the participants by combining the four existing County-level plans into one multi-jurisdictional plan. The 2010 plan was the first regional plan in the State of North Carolina to be approved as was used as a model across the state to encourage regional plan development statewide.

### 2.3 UPDATING THE PLAN IN 2015

FEMA requires that hazard mitigation plans be updated every five years to remain eligible for federal mitigation and public assistance funding. To prepare the 2015 update to the Emergency Management Directors for Avery, McDowell, Mitchell, and Yancey counties agreed to hire Hawksley Consulting as a consultant to provide professional mitigation planning services. To meet planning requirements of the Community Rating System, the consultant ensured that the planning process was facilitated under the direction of a professional planner. Nathan Slaughter from Hawksley Consulting served as the lead planner for this project and is a member of the American Institute of Certified Planners (AICP).

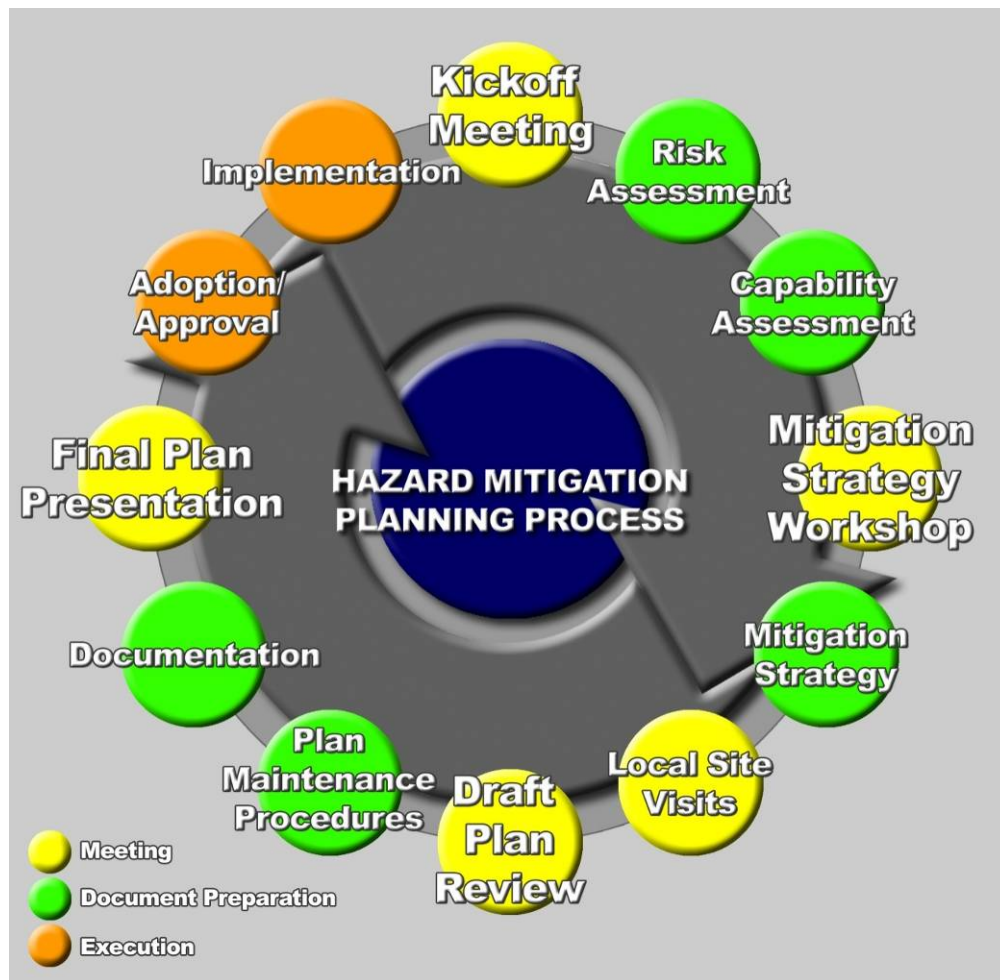
Per the contractual scope of work, the consultant team followed the mitigation planning process recommended by FEMA (Publication Series 386) and recommendations provided by North Carolina Division of Emergency Management (NCEM) mitigation planning staff<sup>1</sup>. The Local Mitigation Plan Review Tool, found in Appendix C, provides a detailed summary of FEMA's current minimum standards of acceptability for compliance with DMA 2000 and notes the location where each requirement is met within this Plan. These standards are based upon FEMA's Final Rule as published in the Federal Register on February 26, 2002 in Part 201 of the Code of Federal Regulations (CFR). The planning team used FEMA's Local Multi-Hazard Mitigation Planning Guidance (last revised in July 2008) for reference as they completed the Plan.

The process used to prepare this updated Plan included revisiting twelve (12) major steps that were completed over the course of approximately nine months beginning in June 2015. Each of these planning steps (illustrated in **Figure 2.1**) resulted in critical work products and outcomes that collectively make up the Plan. Specific plan sections are further described in Section 1: *Introduction*.

Over the past five years, each participating jurisdiction has been actively working to implement the initial Toe River Regional Hazard Mitigation plan. This is documented in the Mitigation Action plan through the implementation status updates for each of the Mitigation Actions. The Capability Assessment also documents changes and improvements in the capabilities of each participating jurisdiction to implement the Mitigation Strategy.

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<sup>1</sup> A copy of the negotiated contractual scope of work for this project is available through the Mitchell County upon request.

**FIGURE 2.1: MITIGATION PLANNING PROCESS FOR THE TOE RIVER REGION**

## 2.4 THE TOE RIVER REGIONAL HAZARD MITIGATION PLANNING COMMITTEE

In order to guide the initial development of this Plan and this subsequent update, the Toe River counties (Avery, McDowell, Mitchell, and Yancey Counties) created the Toe River Regional Hazard Mitigation Planning Committee. The Regional Hazard Mitigation Planning Committee represents 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 June 2015, the HMPC members engaged in regular discussions as well as local meetings and planning workshops to discuss and complete tasks associated with preparing the Plan. This working group coordinated on all aspects of plan preparation and provided valuable input to the process. In addition to regular meetings, committee members routinely communicated and were kept informed through an e-mail distribution list.

Specifically, the tasks assigned to the HMPC members included:

- participate in HMPC meetings and workshops
- provide best available data as required for the risk assessment portion of the Plan
- help update the local Capability Assessment Survey and provide copies of any mitigation or hazard-related documents for review and incorporation into the Plan
- support the update of the Mitigation Strategy, including the review and update and adoption of community goal statements
- help update existing mitigation actions and design and propose any appropriate new mitigation actions for their department/agency for incorporation into the Mitigation Action Plan
- review and provide timely comments on all study findings and draft plan deliverables
- support the adoption of the 2015/2016 *Toe River Regional Hazard Mitigation Plan*

**Table 2.1** lists the members of the HMPC who were responsible for participating in the update of the Plan. Committee members are listed in alphabetical order by last name. Those committee members who participated in the development of the initial plan are also noted.



**TABLE 2.1: MEMBERS OF THE 2015 TOE RIVER REGIONAL  
HAZARD MITIGATION PLANNING COMMITTEE**

NAME	DEPARTMENT / AGENCY	TITLE	2010 Participant
Bailey, Lisa	Mitchell County Transportation	Assistant Director	
Barrier, Phillip	Avery County	Tax Assessor	
Bennett, Nathan	Yancey County	County Manager	✓
Boone, Jeff	Yancey County	Mapping/GIS Supervisor	✓
Buathier, Phoenix	McDowell County Planning	Planning Assistant	
Buchanan, Cheryl	Town of Banner Elk	Zoning Administrator	
Buchanan, Paul	Mitchell County Emergency Management	Director	
Burleson, Tommy	Avery County Planning and Inspections	Director	✓
Canipe, Richard	Town of Spruce Pine	Town Manager	✓
Cotton, Heather	City of Marion	Planning and Development Director	
Davis, Bill	Yancey County Emergency Management	Director	✓
Greene, Tim	Avery County	County Manager	
Harmon, Ronald	McDowell County Planning	Director	✓
Hensley, Anthony	Town of Burnsville	Public Works Director	
Hise, Phillip	Town of Spruce Pine	Mayor	
Hyder, Blair	Mitchell County	Tax Assessor	
Lane, David	Village of Sugar Mountain	Village Manager	
Laws, Kathey	Mitchell County	Register of Deeds	
Ledford, Sue	Mitchell County	Citizen	
McCloskey, Tara	McDowell County	GIS Coordinator	
Parsley, Mavis	Mitchell County	Finance Director	✓
Ramsey, Tiawana	NC Division of Emergency Management	Area Coordinator	✓
Robinson, James	NCDOT Maintenance Yancey County	Maintenance Supervisor	
Robinson, Jason	Yancey County Government	Clerk to the Board	
Seaberg, James	Avery County GIS	GIS Coordinator	✓
Silver, Kegan	Mitchell County	Land Records Manager	
Sparks, Misty	Mitchell County	Building and Fire Inspections Secretary	
Walker, Craig	McDowell County Emergency Management	Director	
Wilson, Geo. A.	Bakersville Town Board	Board Member	
Winchester, Tommy	Mitchell County	Building Inspector	
Wiseman, Stephanie	Mitchell County	911 Director	
Wright, Angie	McDowell County Emergency Management	EM Assistant	
Vance, David	Avery County Emergency Management	Director	✓
Young, Kathy	Mitchell County	Human Resources Director	

**Table 2.2** lists points of contact for several of the jurisdictions who elected to designate their respective county officials to represent their jurisdiction on the planning team, generally because they did not have

the time or staff to be able to attend on their own. Although these members designated county officials to represent them at in-person meetings, each was still contacted throughout the planning process and participated by providing suggestions and comments on the Plan, updates to mitigation actions and the Capability Assessment via email and phone conversations. These members are listed in alphabetical order by last name below.

**TABLE 2.2: MEMBERS DESIGNATING REPRESENTATIVES TO THE TOE RIVER REGIONAL HAZARD MITIGATION PLANNING TEAM**

NAME	DEPARTMENT / AGENCY
Boone, John	Mayor, Town of Elk Park
Fitzgibbon, John	Mayor, Grandfather Village
Hensley, Rick	Mayor, Town of Old Fort
Jaynes, Valerie	Mayor, Town of Newland
Vance, Tudor	Mayor, Town of Crossnore

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

### 2.4.1 Multi-Jurisdictional Participation

The Toe River Regional Multi-Jurisdictional Hazard Mitigation Plan includes four counties and eleven incorporated municipalities. To satisfy multi-jurisdictional participation requirements, each county and its participating jurisdictions were required to perform the following tasks:

- Participate in mitigation planning workshops;
- Complete the *Local Capability Assessment Survey*;
- Identify completed mitigation projects, if applicable; and
- Develop and adopt (or update) their local Mitigation Action Plan

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

## 2.5 COMMUNITY MEETINGS AND WORKSHOPS

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

<sup>2</sup> Copies of the agendas, sign-in sheets, minutes and handout materials for all meetings and workshops can be found in Appendix D.

of specific mitigation actions for their department or agency to undertake and include in the Mitigation Action Plan.

Information about meetings to develop the initial plan in 2010 can be found in Appendix D. Detailed minutes for the meetings listed below held for the development of the 2015/2016 plan update can also be found in Appendix D.

**Plan Update Project Kickoff Meeting**

**June 10, 2015**

**Spruce Pine Fire Station**

**Mitigation Strategy Meeting**

**August 26, 2015**

**Spruce Pine Fire Station**



## 2.6 INVOLVING THE PUBLIC

### 44 CFR Requirement

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

An important component of the mitigation planning process involved public participation. Individual citizen and community-based input provides the entire planning team with a greater understanding of local concerns and increases the likelihood of successfully implementing mitigation actions by developing community “buy-in” from those directly affected by the decisions of public officials. As citizens become more involved in decisions that affect their safety, they are more likely to gain a greater appreciation of the hazards present in their community and take the steps necessary to reduce their impact. Public awareness is a key component of any community’s overall mitigation strategy aimed at making a home, neighborhood, school, business or entire city safer from the potential effects of hazards.

Public involvement in the development of the *Toe River Regional Hazard Mitigation Plan* was sought using two methods: (1) public survey instruments and (2) making copies of draft Plan deliverables available for public review on county websites and at government offices. Public meetings were held by each participating jurisdiction at the conclusion of the planning process, but prior to official plan approval and adoption. These public meetings were held at various locations throughout the planning area to ensure that citizens in each of the four participating counties were afforded an opportunity to participate in the planning process. The public participation survey (discussed in greater detail in Section 2.6.1) was made available during the planning process at various locations throughout the Toe River counties and on each county’s website.

### 2.6.1 Public Participation Survey

Because previous efforts with physical public meetings failed to draw large attendance, the Toe River Region was successful in getting citizens to provide input to the mitigation planning process through the use of the *Public Participation Survey*. The Public Participation Survey was designed to capture data and information from residents of the Toe River Region that might not be able to otherwise participate in the mitigation planning process.

Copies of the *Public Participation Survey* were distributed to the Regional Hazard Mitigation Planning Committee to be made available for residents to complete at local public offices. An electronic version of the survey was also posted on each county’s website. A total of 23 survey responses were received, which provided valuable input for the Regional Hazard Mitigation Planning Committee to consider in the development of the plan update. Selected survey results are presented below.

- Approximately 61 percent of survey respondents had been impacted by a disaster, mainly flooding, wildfires and winter storms.
- Respondents ranked Severe Thunderstorm and Wildfires as the highest threat to their neighborhood (32 percent), followed by Flood (18 percent) and Severe Winter Storms (14 percent).

- Approximately 20 percent of respondents have taken actions to make their homes more resistant to hazards and 86 percent are interested in making their homes more resistant to hazards.
- 67 percent of respondents do not know what office to contact regarding reducing their risks to hazards.
- Emergency Services, and Public Education were ranked as the most important activities for communities to pursue in reducing risks.

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

## 2.7 INVOLVING THE STAKEHOLDERS

### 44 CFR Requirement

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

In addition to the Regional Hazard Mitigation Planning Committee meetings, the Toe River Region encouraged more open and widespread participation in the mitigation planning process through the design and posting of the public survey described above. The survey instrument provided opportunities for local officials, residents, businesses, academia and other private interests in the Toe River Region to be involved and offer input throughout the local mitigation planning process.

In addition, neighboring jurisdictions (counties and municipalities) were notified by email of the plan update process and invited to participate in the planning process. The email was sent to jurisdiction administrators/managers, planners and emergency management coordinators. A complete list of those emailed and a copy of the outreach email can be found in Appendix D.

Despite these outreach efforts, no additional stakeholders participated on the Regional Hazard Mitigation Planning Committee other than those participants listed in Section 2.4. Submissions of the public survey mentioned in section 2.6.1 were anonymous, so it is not possible to tell what, if any, stakeholders submitted hard copy or internet-based surveys.

## 2.8 DOCUMENTATION OF PLAN PROGRESS

Progress in hazard mitigation planning for the participating jurisdictions in the Toe River 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 to natural hazards for the people and property in the Toe River Region. The actions that have been completed have been removed from the active Mitigation Action Plan found in Section 8 and are now documented in Appendix X which is separate from the main body of the plan. Additionally, over time, it has been determined by the HMPC that some actions are not

feasible or otherwise not appropriate to continue including in the plan, so those actions have been removed.

Further documentation of plan implementation progress can be found in the Capability Assessment. Community capability continues to improve for each participating jurisdiction with the implementation of new plans, policies and programs that help to promote hazard mitigation at the local level. The current state of local capabilities for the participating jurisdictions is captured in Section 7: Capability Assessment. The participating jurisdictions continue to demonstrate their commitment to hazard mitigation and hazard mitigation planning and have proven this by reconvening the Hazard Mitigation Planning Team to update the plan and by continuing to involve the public in the hazard mitigation planning process.

# SECTION 3

## COMMUNITY PROFILE

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

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

### 3.1 GEOGRAPHY AND THE ENVIRONMENT

The Toe River Region is a rural area located within the Appalachian Mountains of western North Carolina, along the Tennessee border. For the purposes of this plan, the Toe River Region includes the counties of Avery, McDowell, Mitchell, and Yancey. An orientation map is provided as **Figure 3.1**.

The region is a popular tourist destination for a variety of outdoor activities, including hiking, rafting, kayaking, fishing, bird watching, and snow skiing. Mt. Mitchell, the highest point in the eastern United States at 6,684 feet above sea level, is located in Yancey County. Most of Grandfather Mountain, a popular tourist destination, is located within Avery County and approximately half of Avery County is located within the Pisgah National Forest. The total land area of each of the participating counties is presented in **Table 3.1**.

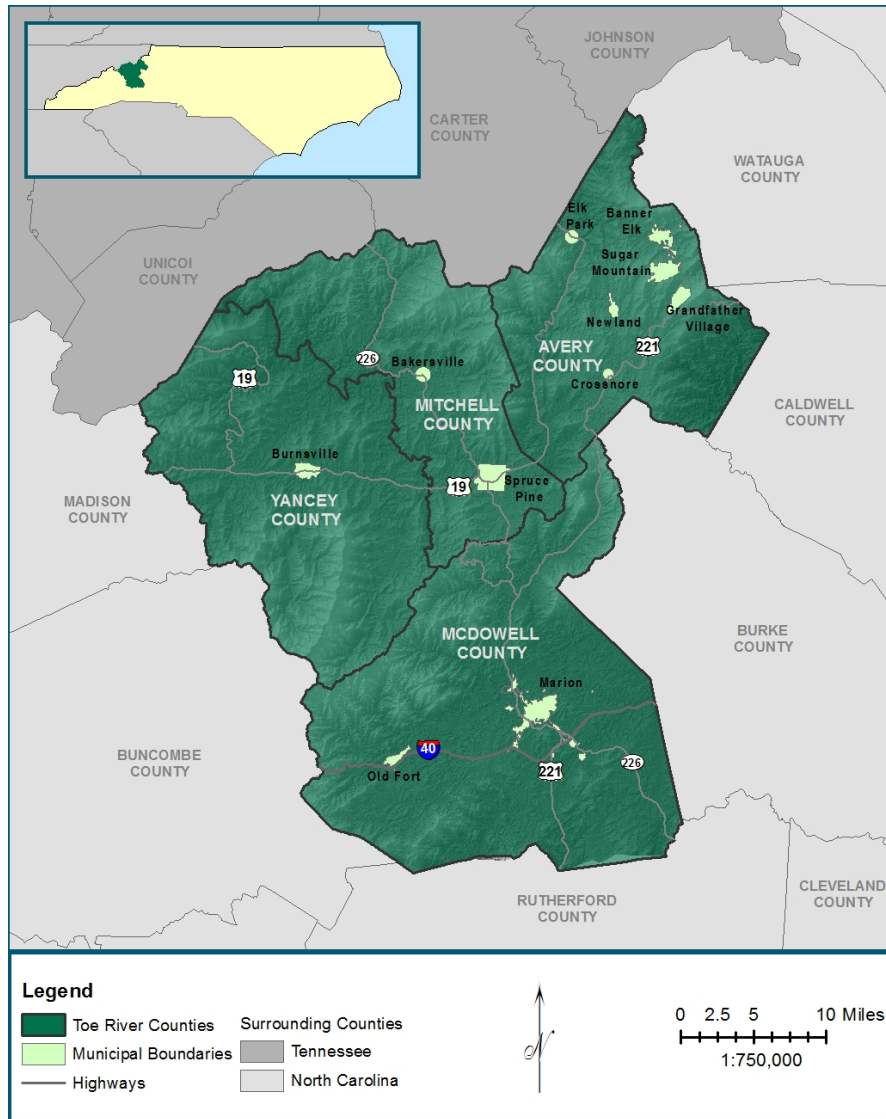
**TABLE 3.1: TOTAL AREAS OF PARTICIPATING COUNTIES**

County	Total Land Area
Avery County	247 square miles
McDowell County	442 square miles
Mitchell County	221 square miles
Yancey County	312 square miles

Source: US Census Bureau

The Toe River Region enjoys four distinct seasons and the climate in the Region is cooler than most other mountain communities due to its elevation. In the summer, average high temperatures (°F) are in the mid-seventies while average low temperatures are in the mid-fifties. In the winter, average high temperatures reach the low forties while average low temperatures are in the low twenties.

**FIGURE 3.1: TOE RIVER REGION ORIENTATION MAP**



### 3.2 POPULATION AND DEMOGRAPHICS

McDowell County is the largest participating county and also has the largest population. Several participating jurisdictions experienced a decrease in population between 2010 and 2014. The Town of Banner Elk experienced the largest percentage increase in population of any participating jurisdiction between 2010 and 2014 with an 8.2 percent increase. Population counts from the US Census Bureau for 1990, 2000, 2010 and estimates for 2014 for each of the participating counties and jurisdictions are presented in Table 3.2.



**TABLE 3.2: POPULATION COUNTS FOR PARTICIPATING JURISDICTIONS**

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	2014 Population Estimate	% Change 2010-2014
<b>AVERY COUNTY</b>	<b>14,867</b>	<b>17,167</b>	<b>17,797</b>	<b>17,773</b>	<b>-0.1%</b>
Town of Banner Elk	933	811	1,028	1,113	8.2%
Town of Crossnore	271	242	192	202	5.2%
Town of Elk Park	486	459	452	445	-1.5%
Town of Newland	645	704	698	692	-0.8%
Village of Sugar Mountain	132	226	198	198	0%
Grandfather Village	34	73	25	25	0%
<b>MCDOWELL COUNTY</b>	<b>35,681</b>	<b>42,151</b>	<b>44,996</b>	<b>44,965</b>	<b>-0.07%</b>
City of Marion	4,765	4,943	7,838	7,885	0.6%
Town of Old Fort	720	963	908	911	0.3%
<b>MITCHELL COUNTY</b>	<b>14,433</b>	<b>15,687</b>	<b>15,579</b>	<b>15,311</b>	<b>-1.7%</b>
Town of Bakersville	332	357	464	455	-1.9%
Town of Spruce Pine	2,010	2,030	2,175	2,123	-2.4%
<b>YANCEY COUNTY</b>	<b>15,419</b>	<b>17,774</b>	<b>17,818</b>	<b>17,614</b>	<b>-1.1%</b>
Town of Burnsville	1,482	1,623	1,693	1,673	-1.1%

Source: US Census Bureau

Based on the 2013 Census estimates, the median age for residents of the participating counties ranges from 38 to 42 years. The racial characteristics of the participating counties are presented in **Table 3.3**. Generally, whites make up the vast majority of the population of the region, accounting for over 92 percent of each county's population.

**TABLE 3.3: DEMOGRAPHICS OF PARTICIPATING COUNTIES**

Jurisdiction	White Persons, Percent (2013)	Black Persons, Percent (2013)	Other Race, Percent (2013)	Persons of Hispanic Origin, Percent (2013)*
AVERY COUNTY	93.8%	4.2%	2.0%	4.7%
MCDOWELL COUNTY	92.9%	4.1%	3.0%	5.5%
MITCHELL COUNTY	96.9%	0.6%	2.5%	4.7%
YANCEY COUNTY	96.6%	1.2%	2.2%	4.7%

Source: US Census Bureau

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

### 3.3 HOUSING, INFRASTRUCTURE AND LAND USE

#### 3.3.1 Housing

According to the US Census Bureau's 2014 Housing Unit Estimates, there are 54,722 housing units in the Toe River Region, most of which are single family homes. Housing information for the four participating

counties is presented in **Table 3.4**. As shown in the table, Avery County has a high percentage of seasonal housing units compared to the other counties.

**TABLE 3.4: HOUSING CHARACTERISTICS**

Jurisdiction	Housing Units (2008)	Housing Units (2014)	Seasonal Units, Percent (2000)	Median Home Value (2009-2013)
AVERY COUNTY	13,718	14,027	39.9%	\$140,800
MCDOWELL COUNTY	19,871	20,909	3.1%	\$101,200
MITCHELL COUNTY	8,340	8,737	6.0%	\$117,300
YANCEY COUNTY	10,598	11,049	12.6%	\$135,100

Source: US Census Bureau

### 3.3.2 Infrastructure

#### Transportation

There are several major highways that traverse the Toe River Region. Interstate 40 runs generally east-west through McDowell County just south of Marion and connects Asheville to the west with Hickory to the east. Interstate 26 runs generally north-south along the western edge of Yancey County, connecting Asheville, NC to the south with Johnson City, TN to the north. NC Highway 226 connects Marion to Spruce Pine in Avery County. US Highway 19E runs north-south through Avery County to Spruce Pine and then east through Mitchell and Yancey Counties to Interstate 26. In addition, the Blue Ridge Parkway runs along through the southern portion of Avery County, along the border between Mitchell and McDowell Counties, and through the southern portion of Yancey County.

There are several small airports within the Toe River Region, including the Avery County Airport (Morrison Field) in Spruce Pine and the Marion Airport (Shiflet Field) in Marion. The nearest major airport to the region is the Asheville Regional Airport, which offers non-stop commercial flights to destinations across the eastern US and is located approximately 40 miles from the center of the Toe River Region.

#### Utilities

Electric power in the Toe River Region is provided by several electricity cooperatives. Rutherford Electric Membership Corporation serves the eastern half of McDowell County. The French Broad Electric Membership Corporation serves Yancey County and Mitchell County. Avery County is served by the Mountain Electric Cooperative.

Water and sewer service is provided by many of the towns in the Toe River Region, but unincorporated areas rely on septic systems and wells. The Towns of Newland, Burnsville, Old Fort, Spruce Pine, and Bakersville, along with the City of Marion, provide water and sewer service. In Yancey County, there are plans for the East Yancey Water and Sewer Project to build a new sewer system and treatment plant east of Burnsville. Construction is scheduled to begin in 2010.

### Community Facilities

There are a number of public buildings and community facilities located throughout the Toe River Region. According to the data collected for the vulnerability assessment (**Section 6.3.3**), there are 47 fire stations, 19 police stations, eight libraries, and 40 public schools located within the study area.

Three hospitals are located in the Toe River Region. The largest is the McDowell Hospital, a 65-bed facility in Marion. Blue Ridge Regional Hospital is a 46-bed facility located in Spruce Pine. Cannon Memorial Hospital is located in Linville in Avery County and has 25 beds.

The Toe River Region contains numerous local and state parks, national forests and recreation areas, including Pisgah National Forest, Grandfather Mountain, Linville Gorge, and Mt. Mitchell. These facilities offer recreational opportunities to area residents and hundreds of thousands of visitors each year.

### **3.3.3 Land Use and Development Trends**

Many areas of the Toe River Region are undeveloped or sparsely developed due to the mountainous terrain and the conservation of land in state and national protected lands. As shown in **Figure 3.1** above, there are a few small incorporated municipalities located throughout the study area, and these areas are where the region's population is generally concentrated. The incorporated areas are where many of the study area's businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area generally consist of rural residential development, agricultural uses, and recreational areas.

As depicted in **Table 3.2**, population growth in the region has been slow. Therefore, new developments has been slow to come to the region. Population growth rates shown in Table 3.2 indicate that growth rates are slow across the region. This pattern has remained consistent since the regional plan was first developed in 2010.

While population growth and development in the region remains relatively slow, growth that is occurring is well-managed by the participating jurisdictions. The Capability Assessment found in Section 7 provides an overview of the land use tools that are in place in each jurisdiction.

### **3.4 EMPLOYMENT AND INDUSTRY**

According to the North Carolina Department of Commerce, in 2015, Avery County's total employment in all industries was 6,292. The Government industry employed 1,525 people, 812 were involved with retail trade and 609 were employed in Accommodation and Food Services. The median household income in Avery County from 2009 to 2013 was \$36,969, compared to \$46,344 for North Carolina.

In 2015, McDowell County's total employment in all industries was 16,008. 6,319 were employed in manufacturing, 2,548 were employed by the government and 1,715 were employed in retail trade. The median household income in McDowell County from 2009 to 2013 was \$35,297.

Mitchell County's total employment in all industries was 4,728 in 2015. 1,076 were employed by the government, 713 in health care and social assistance and 607 in retail trade. The median household income in Mitchell County from 2009 to 2013 was \$37,680.

In 2015, Yancey County's total employment in all industries was 3,436. 891 were employed by the government, 537 were employed in retail trade and 477 in educational services. The median household income in Yancey County from 2009 to 2013 was \$38,579.

# SECTION 4

## HAZARD IDENTIFICATION

### 44 CFR Requirement

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

### OVERVIEW

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

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the participating counties in the Toe River Region (Avery County, McDowell County, Mitchell County, and Yancey County) have identified a number of hazards that are to be addressed in its Regional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from the Toe River Regional Hazard Mitigation Planning Committee members, research of past disaster declarations in the participating counties, and review of the North Carolina State Hazard Mitigation Plan (2013). Readily available information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

**Table 4.1** lists the full range of hazards initially identified for inclusion in the plan and provides a brief description for each. This table includes 23 individual hazards. Some of these hazards are considered to be interrelated or cascading, but for preliminary hazard identification purposes these individual hazards are broken out separately.

Next, **Table 4.2** lists the disaster declarations that have impacted the Toe River region. Declarations marked in **bold** font impacted the entire region.

**Table 4.3** documents the evaluation process used for determining which of the initially identified hazards are considered significant enough for further evaluation in the risk assessment. For each hazard considered, the table indicates whether or not the hazard was identified as a significant hazard to be further assessed, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that *were* identified (and why) but also those that *were not* identified (and why not). Hazard events not identified for inclusion at this time may be addressed during



future evaluations and updates of the risk assessment if deemed necessary by the Regional Planning Committee during the plan update process.

Lastly, **Table 4.4** provides a summary of the hazard identification and evaluation process noting that 15 of the 23 initially identified hazards are considered significant enough for further evaluation through this Plan's risk assessment (marked with a "☑").

**TABLE 4.1: DESCRIPTIONS OF THE FULL RANGE OF INITIALLY IDENTIFIED HAZARDS**

<b>Hazard</b>	<b>Description</b>
<b>ATMOSPHERIC HAZARDS</b>	
<b>Avalanche</b>	A rapid fall or slide of a large mass of snow down a mountainside.
<b>Drought</b>	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. Human demands and actions have the ability to hasten or mitigate drought-related impacts on local communities.
<b>Hailstorm</b>	Any storm that produces hailstones that fall to the ground; usually used when the amount or size of the hail is considered significant. Hail is formed when updrafts in thunderstorms carry raindrops into parts of the atmosphere where the temperatures are below freezing.
<b>Heat Wave</b>	A heat wave may occur when temperatures hover 10 degrees or more above the average high temperature for the region and last for several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a “dome” of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. A heat wave combined with a drought can be very dangerous and have severe economic consequences on a community.
<b>Hurricane and Tropical Storm</b>	Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and with a diameter averaging 10 to 30 miles across. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves and tidal flooding which can be more destructive than cyclone wind. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico during the official Atlantic hurricane season, which extends from June through November.
<b>Lightning</b>	Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a “bolt” when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 73 people are killed each year by lightning strikes in the United States.
<b>Nor'easter</b>	Similar to hurricanes, nor'easters are ocean storms capable of causing substantial damage to coastal areas in the Eastern United States due to their associated 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.
<b>Tornado</b>	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. Tornadoes are most often generated by thunderstorm activity when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size and duration of the storm.
<b>Severe Thunderstorm</b>	Thunderstorms are caused by air masses of varying temperatures meeting in the atmosphere. Rapidly rising warm moist air fuels the formation of thunderstorms. Thunderstorms may occur singularly, in lines, or in clusters. They can move through an area very quickly or linger for several hours. Thunderstorms may result in hail, tornadoes, or straight-line winds. Windstorms pose a threat to lives, property, and vital utilities primarily due to the effects of flying debris and can down trees and power lines.
<b>Winter Storm and Freeze</b>	Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 miles per hour, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
<b>HYDROLOGIC HAZARDS</b>	
<b>Dam and Levee Failure</b>	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam. Dam failure can result from natural events, human-induced events, or a combination of the two. The most common cause of dam 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.
<b>Erosion</b>	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.
<b>Flood</b>	The accumulation of water within a water body which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream ocean, lake or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, or shallow flooding (where shallow flooding refers to sheet flow, ponding and urban drainage).
<b>Storm Surge</b>	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 more than 30 feet in a Category 5 storm. Storm surge heights and associated waves are also dependent upon the shape of the offshore continental shelf (narrow or wide) and the depth of the ocean bottom (bathymetry). A narrow shelf, or one that drops steeply from the

	<p>shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. Storm surge arrives ahead of a storm's actual landfall and the more intense the hurricane is, the sooner the surge arrives. Storm surge can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate coast. Further, water rise caused by storm surge can be very rapid, posing a serious threat to those who have not yet evacuated flood-prone areas.</p>
<b>GEOLOGIC HAZARDS</b>	
<b>Earthquake</b>	<p>A sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the surface. This movement forces the gradual building and accumulation of energy. Eventually, strain becomes so great that the energy is abruptly released, causing the shaking at the earth's surface which we know as an earthquake. Roughly 90 percent of all earthquakes occur at the boundaries where plates meet, although it is possible for earthquakes to occur entirely within plates. 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.</p>
<b>Expansive Soils</b>	<p>Soils that will exhibit some degree of volume change with variations in moisture conditions. The most important properties affecting degree of volume change in a soil are clay mineralogy and the aqueous environment. Expansive soils will exhibit expansion caused by the intake of water and, conversely, will exhibit contraction when moisture is removed by drying. Generally speaking, they often appear sticky when wet, and are characterized by surface cracks when dry. Expansive soils become a problem when structures are built upon them without taking proper design precautions into account with regard to soil type. Cracking in walls and floors can be minor, or can be severe enough for the home to be structurally unsafe.</p>
<b>Landslide</b>	<p>The movements of a mass of rock, debris, or earth down a slope when the force of gravity pulling down the slope exceeds the strength of the earth materials that comprise to hold it in place. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high.</p>
<b>Land Subsidence</b>	<p>The gradual settling or sudden sinking of the Earth's surface due to the subsurface movement of earth materials. Causes of land subsidence include groundwater pumpage, aquifer system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost.</p>
<b>Tsunami</b>	<p>A series of waves generated by an undersea disturbance such as an earthquake. The speed of a tsunami traveling away from its source can range from up to 500 miles per hour in deep water to approximately 20 to 30 miles per hour in shallower areas near coastlines. Tsunamis differ from regular ocean waves in that their currents travel from the water surface all the way down to the sea floor. Wave amplitudes in deep water are typically less than one meter; they are often barely detectable to the human eye. However, as they approach shore, they slow in shallower water, basically causing the waves from behind to effectively "pile up", and wave heights to increase dramatically. As opposed to typical waves which crash at the shoreline, tsunamis bring with them a continuously flowing 'wall of water' with the potential to cause devastating damage in coastal areas located immediately along the shore.</p>
<b>Volcano</b>	<p>A mountain that opens downward to a reservoir of molten rock below the surface of the earth. While most mountains are created by forces pushing up the earth from</p>

	below, volcanoes are different in that they are built up over time by an accumulation of their own eruptive products: lava, ash flows, and airborne ash and dust. Volcanoes erupt when pressure from gases and the molten rock beneath becomes strong enough to cause an explosion.
<b>OTHER HAZARDS</b>	
<b>Hazardous Materials Incident</b>	Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways and on the water. HAZMAT incidents consist of solid, liquid and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind and possibly wildlife as well.
<b>Terror Threat</b>	Terrorism is defined by FEMA as, "the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom." Terrorist acts may include assassinations, kidnappings, hijackings, bomb scares and bombings, cyber attacks (computer-based), and the use of chemical, biological, nuclear and radiological weapons.
<b>Wildfire</b>	An uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by 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.



**Table 4.2: Disaster Declaration in the Toe River Region**

YEAR	DISASTER NUMBER	DESCRIPTION	COUNTIES IMPACTED
2013	4153	Severe Storms, Flooding, Landslides and Mudslides	Avery
2013	4146	Severe Storms, Flooding, Landslides and Mudslides	Avery, Mitchell, Yancey
<b>2010</b>	<b>1871</b>	<b>Severe Winter Storm, Flooding</b>	<b>Avery, McDowell, Mitchell, Yancey</b>
<b>2004</b>	<b>1553</b>	<b>Hurricane Ivan</b>	<b>Avery, McDowell, Mitchell, Yancey</b>
<b>2004</b>	<b>1546</b>	<b>Tropical Storm Frances</b>	<b>Avery, McDowell, Mitchell, Yancey</b>
2002	1448	Severe Ice Storm	McDowell
1998	1200	Severe Storms and Flooding	Avery, Mitchell, Yancey
1996	1103	Winter Storm	Avery, Yancey
<b>1996</b>	<b>1087</b>	<b>Blizzard of '96</b>	<b>Avery, McDowell, Mitchell, Yancey</b>
1995	1073	Severe Storms, Flooding, High Wind	Avery, Mitchell, Yancey
1989	844	Hurricane Hugo	Avery
<b>1977</b>	<b>542</b>	<b>Severe Storms and Flooding</b>	<b>Avery, McDowell, Mitchell, Yancey</b>
1973	394	Severe Storms and Flooding	McDowell

**Table 4.3: Documentation of the Hazard Evaluation Process**

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
<b>ATMOSPHERIC HAZARDS</b>			
Avalanche	NO	<ul style="list-style-type: none"> <li>• Review of US Forest Service National Avalanche Center web site</li> <li>• Review of the NC State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>• Review of previous Hazard Mitigation Plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>• There is no risk of avalanche events in North Carolina. The United States avalanche hazard is limited to mountainous western states including Alaska, as well as some areas of low risk in New England.</li> <li>• Avalanche hazard was removed from the North Carolina State Hazard Mitigation Plan after determining the mountain elevation in Western North Carolina did have enough snow not produce this hazard.</li> <li>• Avalanche was not included in any of the previous Toe River hazard mitigation plans.</li> </ul>
Drought	YES	<ul style="list-style-type: none"> <li>• Review of the NC State Hazard Mitigation Plan</li> <li>• Review of the North Carolina Drought Monitor website</li> <li>• Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>• There are reports of drought conditions in nine out of the last ten years in the Toe River Region, according to the North Carolina Drought Monitor.</li> <li>• Droughts are discussed in NC State Hazard Mitigation Plan as a lesser hazard.</li> <li>• The NC State Hazard Mitigation Plan lists Drought as one of the top hazard for the mountain 1 and mountain 2 regions which include the Toe River counties.</li> <li>• Drought is included in three of the four counties' previous hazard mitigation plans</li> </ul>
Hailstorm	YES	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Hailstorm events are discussed in the state plan under the Severe Thunderstorm hazard.</li> <li>• NCDC reports 219 hailstorm events (3/4 inch size hail to 2.75 inches) for the Toe River Region between 1958 and November 2015. For these events there</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		<ul style="list-style-type: none"> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<p>are over \$2 million in property damages but no deaths or injuries.</p> <ul style="list-style-type: none"> <li>• Although hail is not addressed as an individual hazard in any of the previous county hazard mitigation plans, it is addressed as a sub-item under various hazards. Given the frequency of the event, individual analysis is warranted.</li> </ul>
Heat Wave	NO	<ul style="list-style-type: none"> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of the North Carolina State Hazard Mitigation Plan</li> <li>• Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>• NCDC does not report any extreme heat event for the Toe River counties.</li> <li>• The NC State Hazard Mitigation Plan does not include Heat Wave as a top hazard for the Mountain 1 or Mountain 2 region which includes the Toe River counties.</li> <li>• The NC State Hazard Mitigation Plan reports the western portion of the state as having the lowest vulnerability in the state.</li> <li>• Heat Wave was mentioned in three of the four counties' previous hazard mitigation plans coincided with the drought hazard. However, no events were reported.</li> </ul>
Hurricane and Tropical Storm	YES	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Analysis of NOAA historical tropical cyclone tracks and National Hurricane Center Website</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of historical presidential disaster declarations</li> <li>• FEMA HAZUS-MH storm return periods</li> <li>• Review of previous</li> </ul>	<ul style="list-style-type: none"> <li>• Hurricane and tropical storm events are discussed in the state plan and are listed as a top hazard in the Mountain 1 and Mountain 2 regions which include the Toe River Counties.</li> <li>• NOAA historical records indicate 2 hurricanes, 29 tropical storms, and 11 tropical depressions have come within 75 miles of the Toe River Region between 1851 and 2015.</li> <li>• Three out of ten disaster declarations in the Toe River Region are directly related to hurricane and tropical storm events.</li> <li>• The 50-year return period peak gust for hurricane and tropical storm events in the Toe River Region is between 50-98</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		hazardous mitigation plans in the Toe River counties	mph. <ul style="list-style-type: none"> <li>Hurricane and Tropical Storm hazard was addressed in three of the four previous Toe River county plans.</li> </ul>
Lightning	YES	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>Review of NOAA NCEM Storm Events Database, NOAA lightning statistics</li> <li>Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>Lightning events are discussed in the state plan as part of the Severe Thunderstorm hazard,</li> <li>NCEM reports 6 lightning events for the Toe River Region between July 1994 and November 2015. These events have resulted in a recorded 1 death, 8 injuries and \$26,000 in property damage.</li> <li>Although lightning is not addressed as an individual hazard in any of the previous Toe River county-level hazard mitigation plans, it is addressed under a larger hazard category such as severe thunderstorms. Given the damage and reported death and injuries, individual analysis is warranted.</li> </ul>
Nor'easter	NO	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of NOAA NCEM Storm Events Database</li> <li>Review of previous hazardous mitigation plans in the Toe River</li> </ul>	<ul style="list-style-type: none"> <li>Nor'easters are discussed in the state plan as a part of the Hurricane hazard. The mountain region, which includes the Toe River Region, has the lowest vulnerability in the state.</li> <li>NCEM does not report any Nor'easter activity for the Toe River Region. However, Nor'easter may have affected the region as severe winter storms. In this case, the activity would be</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		counties	<p>reported under winter storm events.</p> <ul style="list-style-type: none"> <li>This hazard was not addressed in any of the previous plans.</li> </ul>
Tornado	YES	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>Review of NOAA NCEM Storm Events Database</li> <li>Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>Tornado events are discussed in the NC State Hazard Mitigation Plan under Severe Thunderstorms.</li> <li>NCEM reports 7 tornado events in Toe River Region Counties between 1979 and November 2015. These events have resulted in no recorded deaths but have caused one injury and \$792,000 in property damage with the most severe being an F2.</li> <li>Tornado events were addressed in three of the four previous Toe River county plans.</li> </ul>
Severe Thunderstorm	YES	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>Review of NOAA NCEM Storm Events Database</li> <li>Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>Severe Thunderstorm events are discussed in the NC State Hazard Mitigation Plan. The Mountain Region, including the Toe River counties, has the greatest vulnerability in the state.</li> <li>According to the NC State Hazard Mitigation Plan, Severe Thunderstorm is top hazard in the Mountain 1 region and Mountain 2 region which include the Toe River counties.</li> <li>NCEM reports 226 thunderstorm events in the Toe River Region counties between 1985 and November 2015. These events have resulted in \$516,000 in property damage.</li> <li>Severe Thunderstorm events were addressed in all of the previous Toe River county plans.</li> </ul>
Winter Storm and	YES	<ul style="list-style-type: none"> <li>Review of NC State</li> </ul>	<ul style="list-style-type: none"> <li>Severe Winter Storms including snow</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Freeze		Hazard Mitigation Plan <ul style="list-style-type: none"> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of historical presidential disaster declarations.</li> <li>• Review of NOAA NCEM Storm Events Database</li> <li>• Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	storms and ice storms are discussed in the state plan. They are listed as a top hazard in the Mountain 1 and Mountain 2 regions which include the Toe River Region counties. The Region has the second highest vulnerability to Severe Winter Storms in the state. <ul style="list-style-type: none"> <li>• NCEM reports that the Toe River Counties have been affected by 583 snow and ice events between 1993 and November 2015. These events resulted in over \$50 million in damages but did not cause any injuries.</li> <li>• Three of the Region’s ten disaster declarations were directly related to winter storm events.</li> <li>• Winter Storm events were addressed in all of the previous Toe River county plans.</li> </ul>
<b>HYDROLOGIC HAZARDS</b>			
Dam and Levee Failure	YES	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of North Carolina Division of Land Management web site</li> <li>• Review of U.S. Army Corps of Engineers National Inventory of Dams database</li> <li>• Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>• Dam Failure is discussed in the state plan as a hazard of concern for Toe River Region Counties (classified under “man-made disasters”). It is a top hazard for Mountain Region 1 which includes McDowell, Mitchell, and Yancey counties. However, the Toe River counties do not have the greatest vulnerability in the state.</li> <li>• Of the 77 dams reported on the National Inventory of Dams, 40 are high hazard (52%), (High hazard is defined as “where failure or mis-operation will probably cause loss of human life.”)</li> <li>• Three of the four previous Toe River hazard mitigation county plans address dam failure.</li> </ul>



Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Erosion	YES	<ul style="list-style-type: none"> <li>• Review of the previous Toe Region County hazard mitigation plans.</li> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Areas of concern were identified in the previous Avery County and Yancey County Multi-Jurisdictional Hazard Mitigation Plans (2005).</li> <li>• Coastal erosion is discussed in the state plan but only for coastal areas (no discussion of riverine erosion).</li> </ul>
Flood	YES	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of historical disaster declarations</li> <li>• Review of NOAA NCDC Storm Events Database</li> <li>• Review of FEMA's NFIP Community Status Book and Community Rating System (CRS)</li> <li>• Review of FEMA Q3 flood data for the Toe River Region counties</li> <li>• Review of previous hazardous mitigation plans in the Toe River counties</li> </ul>	<ul style="list-style-type: none"> <li>• The flood hazard is thoroughly discussed in the state plan.</li> <li>• Four out of ten Presidential Disaster Declarations were flood-related and an additional three were hurricane or tropical storm-related which like brought flooding issues.</li> <li>• NCDC reports that Toe River Region Counties has been affected by 56 flood events between March 1993 and December 2009. These events in total caused no reported deaths or injuries but an estimated \$81 million in property damages.</li> <li>• Nearly 0.03% of the Toe River Region is located in an identified floodplain (100 or 500 year).</li> <li>• Nearly all municipalities participate in the NFIP.</li> <li>• All of the previous counties in the Toe River Region address flood hazard.</li> </ul>
Storm Surge	NO	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of previous hazardous mitigation plans in</li> </ul>	<ul style="list-style-type: none"> <li>• Storm surge is discussed in the state plan under the hurricane hazard and indicates that the mountain region has zero vulnerability to storm surge.</li> <li>• None of the previous hazard mitigation plans in the Toe River Region address</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		the Toe River counties <ul style="list-style-type: none"> <li>Review of NOAA NCEM Storm Events Database</li> </ul>	storm surge. <ul style="list-style-type: none"> <li>No historical events were reported by NCEM</li> <li>Given the inland location of the Toe River Region, Storm Surge would affect the area.</li> </ul>
<b>GEOLOGIC HAZARDS</b>			
Earthquake	YES	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of previous hazardous mitigation plans in the Toe River counties</li> <li>USGS Earthquake Hazards Program web site</li> <li>Review of the National Geophysical Data Center</li> <li>Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>Earthquake events are discussed in the state plan and all of the participating counties in the Toe River Region are considered to be at moderate risk to an earthquake event (no counties are high risk).</li> <li>All of the previous plans in the Toe River region address earthquake.</li> <li>Earthquakes have occurred in and around the State of North Carolina in the past. The state is affected by the Charleston and the New Madrid (near Missouri) Fault lines which have generated a magnitude 8.0 earthquake in the last 200 years.</li> <li>44 events are known to have occurred in the region according to the National Geophysical Data Center. The greatest MMI reported was a 6.</li> <li>According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 10% probability of exceedance in 50 years for the Toe River Region is approximately 5%g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3%g or more.</li> </ul>
Expansive Soils	NO	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of FEMA's Multi-Hazard</li> </ul>	<ul style="list-style-type: none"> <li>Expansive soils are identified in the state plan; however neither Mountain Region 1 nor 2 identifies expansive soils as a top hazard.</li> <li>According to FEMA and USDA sources,</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		Identification and Risk Assessment <ul style="list-style-type: none"> <li>• Review of USDA Soil Conservation Service’s Soil Survey</li> <li>• Review of previous Toe River county hazard mitigation plans</li> </ul>	the Toe River Region is located in an area that has a “little to no” clay swelling potential. <ul style="list-style-type: none"> <li>• Previous Toe River county hazard mitigation plans do not identify Land Subsidence as a hazard.</li> </ul>
Landslide	YES	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of USGS Landslide Incidence and Susceptibility Hazard Map</li> <li>• Review of the North Carolina Geological Survey database of historic landslides</li> <li>• Review of previous Toe River county hazard mitigation plans</li> </ul>	<ul style="list-style-type: none"> <li>• Landslide/Debris Flow events are discussed in the state plan, and ranked as the top hazard in the Mountain 1 and Mountain 2 regions which include the Toe River counties. Further, the mountain region received the highest vulnerability score in the state.</li> <li>• USGS landslide hazard maps indicate “high landslide incidence” (more than 15% of the area is involved in landsliding) for some areas in Mitchell and Yancey counties. The remaining areas are moderate or low incident with high susceptibility.</li> <li>• Data provided by NCGS indicate 87 recorded landslide events in the Toe River Region</li> <li>• All of the previous Toe River county hazard mitigation plans address landslides.</li> </ul>
Land Subsidence	NO	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of previous Toe River county hazard mitigation plans.</li> </ul>	<ul style="list-style-type: none"> <li>• The state plan delineates certain areas that are susceptible to land subsidence hazards in North Carolina; however none of these areas are located in Toe River counties.</li> <li>• The plan identifies the Toe River counties as having a zero on the land subsidence hazard.</li> <li>• Previous Toe River county hazard mitigation plans do not identify Land Subsidence as a hazard.</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Tsunami	NO	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of previous Toe River county hazard mitigation plans.</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of FEMA “How-to” mitigation planning guidance (Publication 386-2, “Understanding Your Risks – Identifying Hazards and Estimating Losses”).</li> </ul>	<ul style="list-style-type: none"> <li>• Tsunamis are discussed in the state plan and described as a “greater” hazard for the state. However, the mountain region scored a zero for tsunami hazard risk.</li> <li>• None of the previous county plans in the Toe River Region address tsunami.</li> <li>• No record exists of a catastrophic Atlantic basin tsunami impacting the mid-Atlantic coast of the United States.</li> <li>• Tsunami inundation zone maps are not available for communities located along the U.S. East Coast.</li> <li>• FEMA mitigation planning guidance suggests that locations along the U.S. East Coast have a relatively low tsunami risk and need not conduct a tsunami risk assessment at this time.</li> </ul>
Volcano	NO	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of USGS Volcano Hazards Program web site</li> </ul>	<ul style="list-style-type: none"> <li>• There are no active volcanoes in North Carolina.</li> <li>• There has not been a volcanic eruption in North Carolina in over 1 million years.</li> <li>• No volcanoes are located remotely near the Toe River Region.</li> </ul>
<b>OTHER HAZARDS</b>			
Hazardous Materials Incident	YES	<ul style="list-style-type: none"> <li>• Review of previous Toe River county hazard mitigation plans.</li> </ul>	<ul style="list-style-type: none"> <li>• The Mitchell County Hazard Mitigation Plan included hazardous materials incident in its previous plan.</li> <li>• Review of Pipeline and Hazardous Materials Safety Administration data indicates HAZMAT incidents occurring in all of the Toe River counties.</li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
			<ul style="list-style-type: none"> <li>EPA Toxic Release Inventory indicates HAZMAT facilities in the Toe River Region.</li> </ul>
Terror Threat	YES	<ul style="list-style-type: none"> <li>Review of previous Toe River county hazard mitigation plans.</li> <li>Review of the NC State Hazard Mitigation Plan</li> <li>Review of local official knowledge</li> </ul>	<ul style="list-style-type: none"> <li>The Mitchell County Hazard Mitigation Plan included terrorism threat as a hazard.</li> <li>The NC State Hazard Mitigation Plan does not include terrorism as a hazard.</li> <li>There are a few high profiles targets in the area.</li> <li>Cyber terrorism is a growing concern and was specifically mentioned at a meeting of the Regional Hazard Mitigation Planning Team during the 2015/2016 update.</li> </ul>
Wildfire	YES	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of previous Toe River county hazard mitigation plans.</li> <li>Review of Southern Wildfire Risk Assessment (SWRA) Data</li> <li>Review of the NC Division of Forest Resources website</li> </ul>	<ul style="list-style-type: none"> <li>Wildfires are discussed in the state plan as a “greater” hazard of concern. Four out of the six wildfire occurrences detailed in the state plan are in Mitchell or McDowell Counties.</li> <li>All of the previous counties in the Toe River Region addressed wildfire.</li> <li>The state plan lists wildfire as a top hazard in Mountain 1 and Mountain 2.</li> <li>A review of SWRA data indicates that there are 0.06 square miles of moderate fire vulnerability in the Toe River Region.</li> <li>According to the North Carolina Division of Forest Resources, the Toe River Region experiences an average of 32 fires each year which burn a combined 95 acres. This data also indicates that McDowell County is at an increased risk with an average of 74 fires annually which burn a combined 176 acres. <i>(Pending updated data as of November 2015)</i></li> </ul>

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
			<ul style="list-style-type: none"> <li>• Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases.</li> </ul>

**TABLE 4.4: SUMMARY RESULTS OF THE HAZARD IDENTIFICATION AND EVALUATION PROCESS**

ATMOSPHERIC HAZARDS	GEOLOGIC HAZARDS
<input type="checkbox"/> Avalanche	<input checked="" type="checkbox"/> Earthquake
<input checked="" type="checkbox"/> Drought	<input type="checkbox"/> Expansive Soils
<input checked="" type="checkbox"/> Hailstorm	<input checked="" type="checkbox"/> Landslide
<input type="checkbox"/> Heat Wave	<input type="checkbox"/> Land Subsidence
<input checked="" type="checkbox"/> Hurricane and Tropical Storm	<input type="checkbox"/> Tsunami
<input checked="" type="checkbox"/> Lightning	<input type="checkbox"/> Volcano
<input type="checkbox"/> Nor'easter	OTHER HAZARDS
<input checked="" type="checkbox"/> Tornado	<input checked="" type="checkbox"/> Hazardous Materials Incident
<input checked="" type="checkbox"/> Severe Thunderstorm	<input checked="" type="checkbox"/> Terror Threat
<input checked="" type="checkbox"/> Winter Storm and Freeze	<input checked="" type="checkbox"/> Wildfire
HYDROLOGIC HAZARDS	
<input checked="" type="checkbox"/> Dam and Levee Failure	
<input checked="" type="checkbox"/> Erosion	
<input checked="" type="checkbox"/> Flood	
<input type="checkbox"/> Storm Surge	

= Hazard considered significant enough for further evaluation in the Toe River Region hazard risk assessment.



# SECTION 5

## HAZARD PROFILES

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### 44 CFR Requirement

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

This section of the Plan provides a detailed assessment of the hazards identified to pose a threat to the Toe River Region. The remainder of this section is comprised of the following subsections:

- 5.1: Overview
- 5.2: Study Area
- 5.3: Drought
- 5.4: Hailstorm
- 5.5: Hurricane and Tropical Storm
- 5.6: Lightning
- 5.7: Severe Thunderstorm
- 5.8: Tornado
- 5.9: Winter Storm and Freeze
- 5.10: Earthquake
  
- 5.11: Landslide
- 5.12: Dam and Levee Failure
- 5.13: Erosion
- 5.14: Flood
- 5.15: Hazardous Materials Incident
- 5.16: Terror Threat
- 5.17: Wildfire
- 5.18: Conclusions of Hazard Risk
- 5.19: Final Determinations

## 5.1 OVERVIEW

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

The following hazards were identified:

- **Atmospheric**
  - Drought
  - Hailstorm
  - Hurricane and Tropical Storm (including Nor'easters)
  - Lightning
  - Severe Thunderstorm (including straight-line winds)
  - Tornado
  - Winter Storm and Freeze
  
- **Geologic**
  - Earthquake
  - Landslide
  
- **Hydrologic**
  - Dam and Levee Failure
  - Erosion
  - Flood
  
- **Other**
  - Hazardous Materials Incident
  - Terror Threat
  - Wildfire

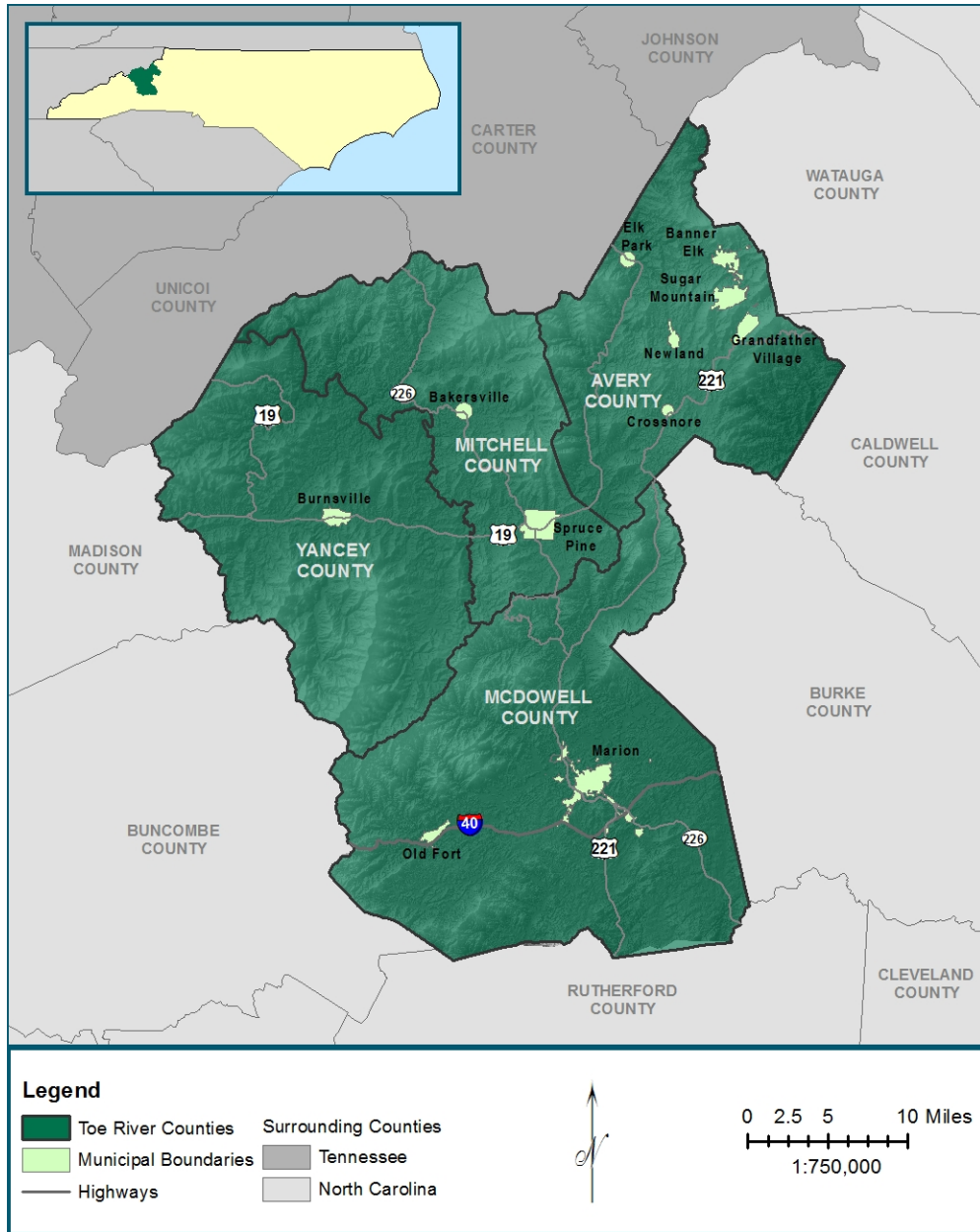
## 5.2 STUDY AREA

The Toe River Region includes four counties: Avery, McDowell, Mitchell, and Yancey. **Table 5.1** provides a summary table of the participating jurisdictions within each county. In addition, **Figure 5.1** provides a base map, for reference, of the Toe River Region.

**TABLE 5.1: PARTICIPATING AREAS IN THE TOE RIVER REGIONAL HAZARD MITIGATION PLAN**

<b>Avery County</b>	
Banner Elk	Grandfather Village
Crossnore	Sugar Mountain
Elk Park	Newland
<b>McDowell County</b>	
Marion	Old Fort
<b>Mitchell County</b>	
Bakersville	Spruce Pine
<b>Yancey County</b>	
Burnsville	

**FIGURE 5.1: TOE RIVER REGION BASE MAP**



**Table 5.2** lists each significant hazard for the Toe River Region and identifies whether or not it has been determined to be a specific hazard of concern for the 11 municipal jurisdictions and each of the four county's unincorporated areas. This is based on the best available data and information from the Toe River Regional Hazard Mitigation Planning Committee. (● = hazard of concern)

**TABLE 5.2 SUMMARY OF IDENTIFIED HAZARD EVENTS IN THE TOE RIVER REGION**

Jurisdiction	Atmospheric							Geologic		Hydrologic			Other		
	Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm	Earthquake	Landslide	Dam Failure	Erosion	Flood	HAZMAT	Terror Threat	Wildfire
<b>Avery County</b>															
Banner Elk	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Crossnore	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Elk Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Grandfather Village	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Newland	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Sugar Mountain	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>McDowell County</b>															
Marion	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Old Fort	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>Mitchell County</b>															
Bakersville	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Spruce Pine	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
<b>Yancey County</b>															
Burnsville	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

## Atmospheric Hazards

### 5.3 DROUGHT

#### 5.3.1 Background

Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. High temperatures, high winds, and low humidity can exacerbate drought conditions. In addition, human actions and demands for water resources can hasten drought-related impacts.

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

**TABLE 5.3 DROUGHT CLASSIFICATION DEFINITIONS**

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

*Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA*

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

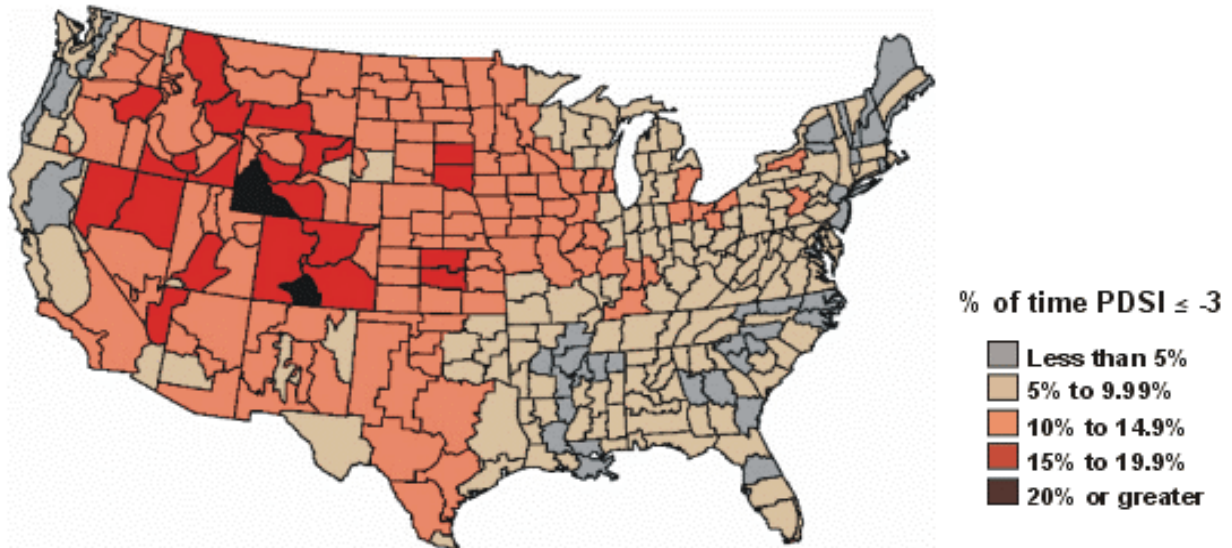
The Palmer Drought Severity Index (PDSI) is based on observed drought conditions and range from -0.5 (incipient dry spell) to -4.0 (extreme drought). Evident in **Figure 5.2**, the Palmer Drought Severity Index Summary Map for the United States, drought affects most areas of the United States, but is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

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

## Palmer Drought Severity Index

1895–1995

Percent of time in severe and extreme drought



Source: National Drought Mitigation Center

### 5.3.2 Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. According to the Palmer Drought Severity Index (Figure 4.2), Western North Carolina has a relatively low risk for drought hazard. However, local areas may experience much more severe and/or frequent drought events than what is represented on the Palmer Drought Severity Index map. Further, it is assumed that the Toe River Region would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

### 5.3.3 Historical Occurrences

Data from the North Carolina Drought Management Advisory Council and National Climatic Data Center (NCDC) were used to ascertain historical drought and heat wave events for the Toe River Region. The North Carolina Drought Management Advisory Council reports data on North Carolina drought conditions from 2000 to 2015 through the North Carolina Drought Monitor. It classifies drought conditions by county on a scale of D0 to D4:

- D0: Abnormally Dry
- D1: Moderate Drought
- D2: Severe Drought
- D3: Extreme Drought



- D4: Exceptional Drought

According to the North Carolina Drought Monitor, all counties in the Toe River Region have had drought occurrences fifteen of the last sixteen years (2000-2015) (**Table 5.4**). In addition, **Table 5.5** shows the most severe drought classification for each year, according to North Carolina Drought Monitor classifications.<sup>1</sup>

**TABLE 5.4: SUMMARY OF DROUGHT OCCURRENCES IN THE TOE RIVER REGION**

Location	Number Years with Drought Occurrences
Avery County	15
McDowell County	14
Mitchell County	15
Yancey County	15
<b>TOE RIVER REGION TOTAL</b>	<b>15</b>

Source: North Carolina Drought Monitor

**TABLE 5.5: HISTORICAL DROUGHT OCCURRENCES IN THE TOE RIVER REGION**

	Avery County	McDowell County	Mitchell County	Yancey County
2000	Extreme Drought	Extreme Drought	Exceptional Drought	Extreme Drought
2001	Extreme Drought	Extreme Drought	Extreme Drought	Extreme Drought
2002	Extreme Drought	Extreme Drought	Extreme Drought	Extreme Drought
2003	Normal	Normal	Normal	Normal
2004	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2005	Moderate Drought	Moderate Drought	Abnormally Dry	Abnormally Dry
2006	Severe Drought	Severe Drought	Severe Drought	Severe Drought
2007	Exceptional Drought	Exceptional Drought	Exceptional Drought	Exceptional Drought
2008	Exceptional Drought	Exceptional Drought	Exceptional Drought	Exceptional Drought
2009	Moderate Drought	Moderate Drought	Moderate Drought	Moderate Drought
2010	Moderate Drought	Moderate Drought	Moderate Drought	Moderate Drought
2011	Abnormally Dry	Moderate Drought	Abnormally Dry	Abnormally Dry
2012	Abnormally Dry	Moderate Drought	Abnormally Dry	Abnormally Dry
2013	Abnormally Dry	Abnormally Dry	Abnormally Dry	Abnormally Dry
2014	Abnormally Dry	Normal	Abnormally Dry	Abnormally Dry
2015	Abnormally Dry	Moderate Drought	Abnormally Dry	Abnormally Dry

Source: North Carolina Drought Monitor

### 5.3.4 Probability of Future Occurrences

It is assumed that all of the Toe River Region has a high probability of future drought events. However, based on historical information, there is a much lower probability for extreme, long-lasting drought conditions.

<sup>1</sup> Each County's Cooperative Extension Office was contacted to determine if drought loss data was available. However, the contacts indicated that such information is not tracked.

## 5.4 HAILSTORM

### 5.4.1 Background

Hailstorms are a potentially damaging outgrowth of severe thunderstorms (thunderstorms are discussed separately in Section 5.7). Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they develop to a sufficient weight and fall as precipitation. Hail typically takes the form of spheres or irregularly-shaped masses greater than 0.75 inches in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size.

### 5.4.2 Location and Spatial Extent

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

### 5.4.3 Historical Occurrences

According to the National Climatic Data Center, 219 recorded hailstorm events have affected the Toe River Region since 1969.<sup>2</sup> **Table 5.6** is a summary of the hail events in the Toe River Region. **Appendix F** provides detailed information about each event that occurred in the county. Although hail can occur anywhere, **Figure 5.3** indicates the location of historical hail occurrences. In all, hail occurrences resulted in over \$2 million in property damages, most of which were reported in McDowell County. Hail ranged in diameter from 0.75 inches to 2.75 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment, so it is likely that damages are greater than the reported value. Further, a single storm event may have affected multiple counties.

The most significant event recorded by NCDC indicated major damage to a car dealership in Marion in June of 1997.

**TABLE 5.6: SUMMARY OF HAIL OCCURRENCES IN THE TOE RIVER REGION**

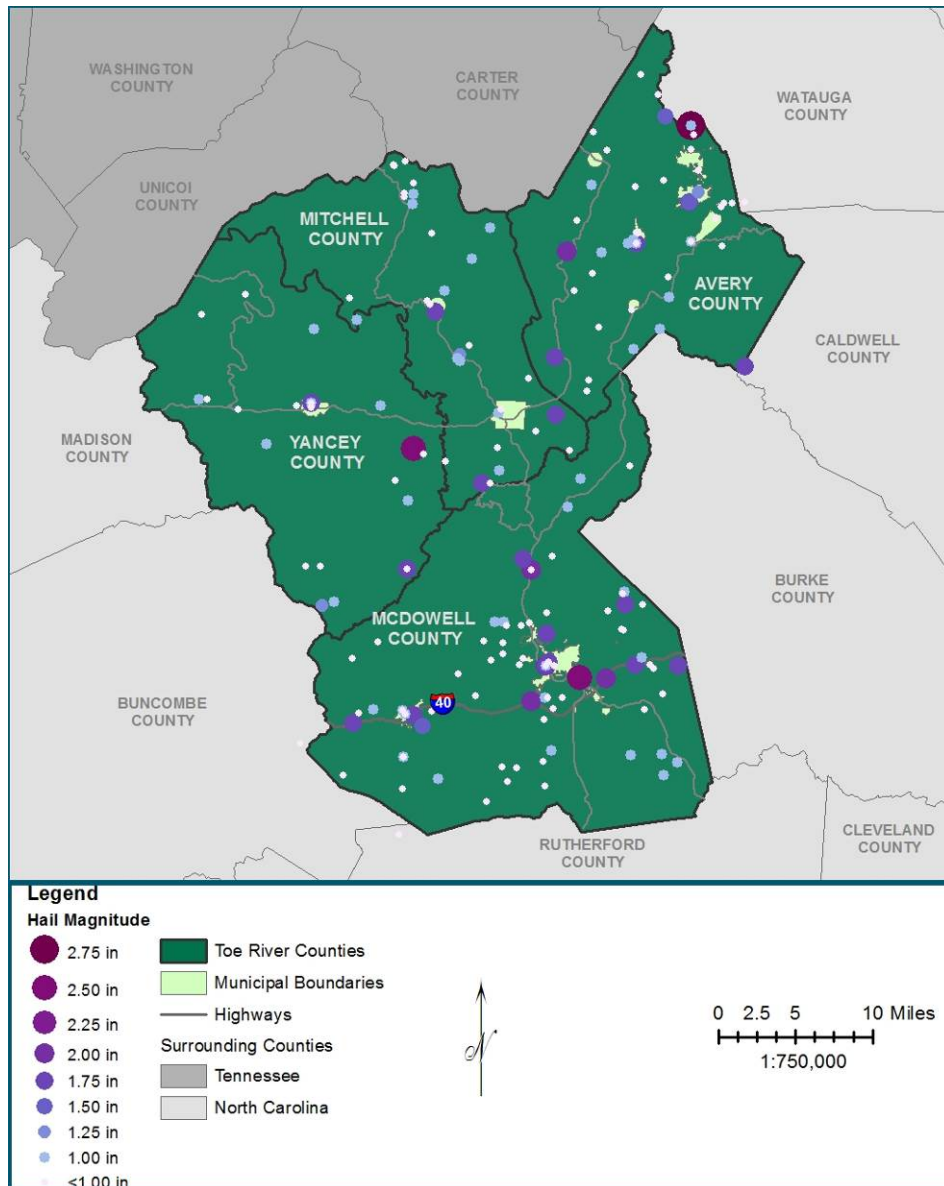
Location	Number of Occurrences	Property Damage
<b>Avery County</b>	<b>53</b>	<b>\$0</b>
Banner Elk	6	\$0
Crossnore	3	\$0
Elk Park	3	\$0
Grandfather Village	1	\$0
Newland	16	\$0
Sugar Mountain	0	\$0

<sup>2</sup> These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional hail events have affected the Toe River Region. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

SECTION 5: HAZARD PROFILES

Unincorporated Area	24	\$0
<b>McDowell County</b>	<b>102</b>	<b>\$2,00,000</b>
Marion	36	\$2,000,000
Old Fort	17	\$0
Unincorporated Area	49	\$0
<b>Mitchell County</b>	<b>32</b>	<b>\$10,000</b>
Bakersville	7	\$0
Spruce Pine	8	\$10,000
Unincorporated Area	17	\$0
<b>Yancey County</b>	<b>32</b>	<b>\$0</b>
Burnsville	16	\$0
Unincorporated Area	16	\$0
<b>TOE RIVER REGION TOTAL</b>	<b>219</b>	<b>\$2,010,000</b>

Source: National Climatic Data Center

**FIGURE 5.3: LOCATION OF HISTORICAL HAIL EVENTS IN THE TOE RIVER REGION**

Source: National Climatic Data Center

#### 5.4.4 Probability of Future Occurrences

Given that severe thunderstorm events will remain a frequent occurrence for the Toe River Region, the probability of future hail occurrences is highly likely. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the region. Further, hail is an atmospheric hazard, so it is assumed that the entire Toe River Region has equal exposure to this hazard.

## 5.5 HURRICANE AND TROPICAL STORM

### 5.5.1 Background

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

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in the Atlantic basin is about six (6).



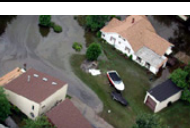


As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Wind Scale (**Table 5.7**), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

**TABLE 5.7: SAFFIR-SIMPSON WIND SCALE**

Category	Maximum Sustained Wind Speed (MPH)
1	74–95
2	96–110
3	111–130
4	131–155
5	155 +

The Saffir-Simpson Scale categorizes hurricane intensity based upon maximum sustained winds, to estimate potential damage. Categories 3, 4, and 5 are classified as “major” hurricanes, and while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. **Table 5.8** describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes, storm surge and inland flooding associated with heavy rainfall that usually accompanies these storms.

**TABLE 5.8: HURRICANE DAMAGE CLASSIFICATIONS**

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.	
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.	

Sources: National Hurricane Center; Federal Emergency Management Agency

Similar to hurricanes, coastal storms are ocean-fueled storm events capable of causing substantial damage due to their associated strong winds and heavy surf. The Nor'easter is a particularly devastating type of coastal storm, named for the winds that blow in from the northeast and drive the storm up the U.S. East Coast alongside 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 and producing hurricane-force winds. **Table 5.9** shows the Dolan-Davis Nor'easter Intensity Scale. It should be noted that strong Nor'easters have increased in recent years.

**TABLE 5.9: DOLAN-DAVIS NOR'EASTER INTENSITY SCALE (1993)**

Storm Class	Beach Erosion	Dune Erosion	Overwash	Property Damage
<b>1</b> (Weak)	Minor changes	None	No	No
<b>2</b> (Moderate)	Modest; mostly to lower beach	Minor	No	Modest
<b>3</b> (Significant)	Erosion extends across beach	Can be significant	No	Loss of many structures at local level
<b>4</b> (Severe)	Severe beach erosion and recession	Severe dune erosion or destruction	On low beaches	Loss of structures at community-scale
<b>5</b> (Extreme)	Extreme beach erosion	Dunes destroyed over extensive areas	Massive in sheets and channels	Extensive losses on a regional-scale

Source: Davis and Dolan, 1993; North Carolina Department of Crime Control and Public Safety

### 5.5.2 Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. While some elements of these storms are not a concern for the region (storm surge in particular), all areas in the region are susceptible to the wind and heavy rains associated coastal storms and nor'easters.

### 5.5.3 Historical Occurrences

According to the National Hurricane Center's historical storm track records, 42 hurricane, tropical storm, or tropical depression tracks have passed within 75 miles of the Toe River Region since 1850.<sup>3</sup> This includes: two (2) hurricanes; twenty-nine (29) tropical storms; and 11 (eleven) tropical depressions. Of the recorded storm events, 2 tropical depressions traversed directly through the Toe River Region. **Table 5.10** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of the Toe River Region) and Category of the storm based on the Saffir-Simpson Scale. **Figure 5.4** shows the track of each recorded storm.

**TABLE 5.10: HISTORICAL STORM TRACKS WITHIN 75 MILES OF THE TOE RIVER REGION (1850–2015)**

Date of Occurrence	Storm Name	Maximum Wind Speed (miles per hour)	Storm Category
9/17/1859	Not Named	40	Tropical Storm
9/11/1882	Not Named	40	Tropical Storm
6/22/1886	Not Named	40	Tropical Storm
9/24/1889	Not Named	45	Tropical Storm
8/28/1893	Not Named	75	Category 1

<sup>3</sup> These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

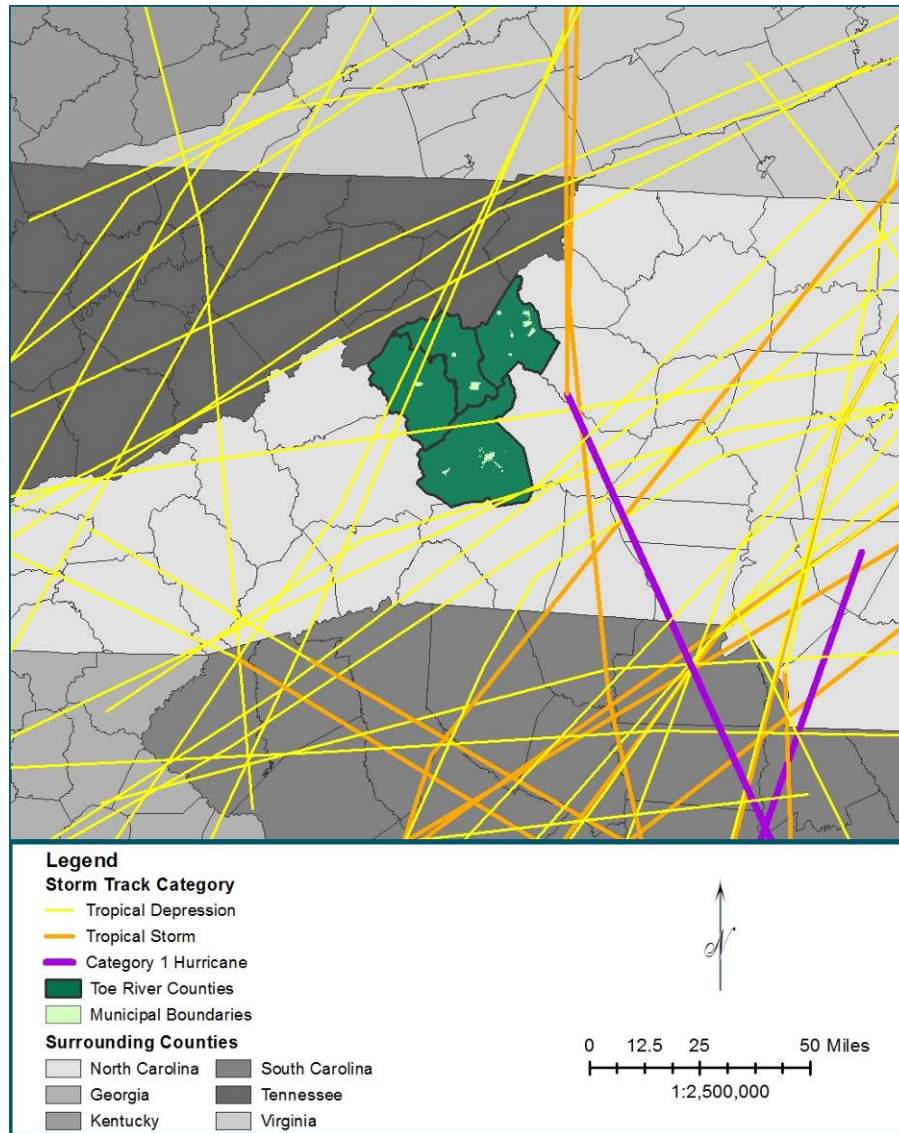


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7/8/1896	Not Named	30	Tropical Depression
9/28/1901	Not Named	35	Tropical Depression
10/11/1902	Not Named	35	Tropical Depression
10/11/1905	Not Named	25	Tropical Depression
9/18/1906	Not Named	40	Tropical Storm
9/23/1907	Not Named	35	Tropical Depression
8/30/1911	Not Named	30	Tropical Depression
9/4/1913	Not Named	30	Tropical Depression
8/3/1915	Not Named	35	Tropical Storm
7/15/1916	Not Named	50	Tropical Storm
9/23/1920	Not Named	30	Tropical Depression
10/3/1927	Not Named	40	Tropical Storm
8/11/1928	Not Named	30	Tropical Depression
8/16/1928	Not Named	30	Tropical Depression
10/18/1932	Not Named	20	Tropical Depression
8/14/1940	Not Named	25	Tropical Depression
8/28/1949	Not Named	55	Tropical Storm
8/31/1952	Able	45	Tropical Storm
9/30/1959	Gracie	60	Tropical Storm
8/31/1964	Cleo	25	Tropical Depression
6/9/1968	Abby	25	Tropical Depression
9/24/1975	Eloise	30	Tropical Depression
9/8/1977	Babe	25	Tropical Depression
8/17/1985	Danny	30	Tropical Depression
8/29/1988	Chris	25	Tropical Depression
9/22/1989	Hugo	85	Category 1
7/21/1994	Not Named	20	Tropical Depression
8/17/1994	Beryl	15	Tropical Depression
7/24/1997	Danny	20	Tropical Depression
7/2/2003	Bill	20	Tropical Depression
9/8/2004	Frances	25	Tropical Depression
9/17/2004	Ivan	20	Tropical Depression
9/28/2004	Jeanne	20	Tropical Depression
7/7/2005	Cindy	20	Tropical Depression

Source: National Hurricane Center

**FIGURE 5.4: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF THE TOE RIVER REGION**



Source: National Hurricane Center

The National Climatic Data Center did not report any event associated with a hurricane, tropical storm, or nor'easter in the participating counties between 1950 and 2015. However, federal records indicate that disaster declarations were made in 1989 (Hurricane Hugo), 2004 (Hurricane Ivan), and 2004 (Tropical Storm Frances).<sup>4</sup>

#### 5.5.4 Probability of Future Occurrences

It is possible that hurricanes and tropical storms will affect the Toe River Region. Given the inland location of the region, it is more likely to be affected by remnants of hurricane and tropical storm

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

systems which may result in flooding or high winds. Further, there is a higher probability that the region will be affected by Nor'easters, which frequently result in large snow and/or ice accumulations during the winter months.

## 5.6 LIGHTNING

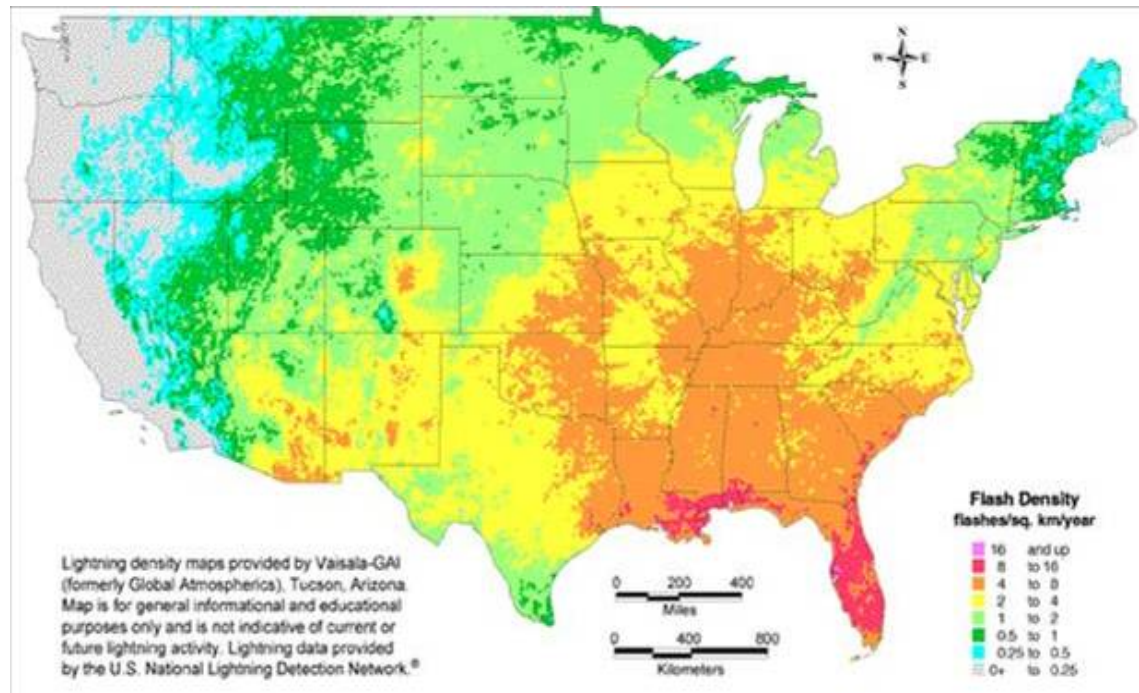
### 5.6.1 Background

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

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

Figure 5.5 shows a lightning flash density map for the years 1996-2000 based upon data provided by Vaisala's U.S. National Lightning Detection Network (NLDN®).

**FIGURE 5.5: LIGHTNING FLASH DENSITY IN THE UNITED STATES**



Source: Vaisala U.S. National Lightning Detection Network

### 5.6.2 Location and Spatial Extent

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

### 5.6.3 Historical Occurrences

According to the National Climatic Data Center, there have been a total of six (6) recorded lightning events in the Toe River Region since 1998.<sup>5</sup> These events resulted in over \$26,000 in damages, as listed in summary **Table 5.11**. Further, lightning caused one (1) fatality and eight (8) injuries throughout the Toe River Region. Detailed information on historical lightning events can be found in **Appendix F**.

**TABLE 5.11: SUMMARY OF LIGHTNING OCCURRENCES IN THE TOE RIVER REGION**

Location	Number of Occurrences	Property Damage (2009)	Deaths/Injuries
<b>Avery County</b>	<b>1</b>	<b>\$25,000</b>	<b>0/0</b>
Banner Elk	0	\$0	0/0
Crossnore	0	\$0	0/0
Elk Park	0	\$0	0/0
Grandfather Village	0	\$0	0/0
Newland	0	\$0	0/0
Sugar Mountain	0	\$0	0/0
Unincorporated Area	1	\$25,000	0/0
<b>McDowell County</b>	<b>2</b>	<b>\$0</b>	<b>1/4</b>
Marion	1	\$0	0/2
Old Fort	0	\$0	0/0
Unincorporated Area	1	\$0	0/0
<b>Mitchell County</b>	<b>2</b>	<b>\$1,000</b>	<b>1/5</b>
Bakersville	1	\$0	1/5
Spruce Pine	1	\$1,000	0/0
Unincorporated Area	0	\$0	1/0
<b>Yancey County</b>	<b>1</b>	<b>\$0</b>	<b>0/1</b>
Burnsville	0	\$0	0/0
Unincorporated Area	1	\$0	0/1
<b>TOE RIVER REGION TOTAL</b>	<b>6</b>	<b>\$26,000</b>	<b>1/8</b>

Source: National Climatic Data Center

### 5.6.4 Probability of Future Occurrences

The probability of occurrence for future lightning events in the Toe River Region is high. According to Vaisala's U.S. National Lightning Detection Network (NLDN<sup>®</sup>), the Toe River Region is located in an area of the country that experienced an average of 2-4 lightning flashes per square kilometer per year between 1997 and 2007. Given this regular frequency of occurrence, it can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the region.

<sup>5</sup> These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional lightning events have occurred in the Toe River Region. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

## 5.7 SEVERE THUNDERSTORM

### 5.7.1 Background

Thunderstorms can produce a variety of accompanying hazards including wind (discussed here), hail, and lightning.<sup>6</sup> Although thunderstorms generally affect a small area, they are very dangerous may cause substantial property damage.

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

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

Thunderstorm events have the capability of producing straight-line winds that can cause severe destruction to communities and threaten the safety of a population. Such wind events, sometimes separate from a thunderstorm event, are common throughout the Toe River Region.

### 5.7.2 Location and Spatial Extent

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

### 5.7.3 Historical Occurrences

Severe storms have resulted in four disaster declarations in the Toe River Region in 1973, 1977, 1995, and 1998.<sup>7</sup> According to NCDC, there have been 226 reported thunderstorm wind events in the Toe River Region since 1950.<sup>8</sup> These events caused \$516,000 million in damages. There were no reports of injuries or fatalities. **Table 5.12** summarizes this information. **Appendix F** presents detailed thunderstorm event reports including date, magnitude, and associated damages for each event.

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<sup>6</sup> Lightning and hail hazards are discussed as separate hazards in this section.

<sup>7</sup>Not all of the participating counties were declared disaster areas for these storms. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: Hazard Identification.

<sup>8</sup> These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional thunderstorm events have occurred in the Toe River Region. As additional local data becomes available, this hazard profile will be amended.



**TABLE 5.12: SUMMARY OF THUNDERSTORM OCCURRENCES IN THE TOE RIVER REGION**

Location	Number of Occurrences	Property Damage
<b>Avery County</b>	<b>42</b>	<b>\$16,000</b>
Banner Elk	9	\$0
Crossnore	1	\$0
Elk Park	3	\$0
Grandfather Village	0	\$0
Newland	14	\$6,000
Sugar Mountain	0	\$0
Unincorporated Area	15	\$10,000
<b>McDowell County</b>	<b>122</b>	<b>\$461,000</b>
Marion	35	\$145,000
Old Fort	19	\$5,000
Unincorporated Area	68	\$311,000
<b>Mitchell County</b>	<b>32</b>	<b>\$2,000</b>
Bakersville	5	\$2,000
Spruce Pine	8	\$0
Unincorporated Area	19	\$0
<b>Yancey County</b>	<b>30</b>	<b>\$37,000</b>
Burnsville	10	\$1,000
Unincorporated Area	20	\$36,000
<b>TOE RIVER REGION TOTAL</b>		<b>\$516,000</b>

Source: National Climatic Data Center

### 5.7.4 Probability of Future Occurrences

Given the high number of previous events, it is likely that thunderstorm events, including straight-line wind events, will occur in the future.

## 5.8 TORNADO

### 5.8.1 Background

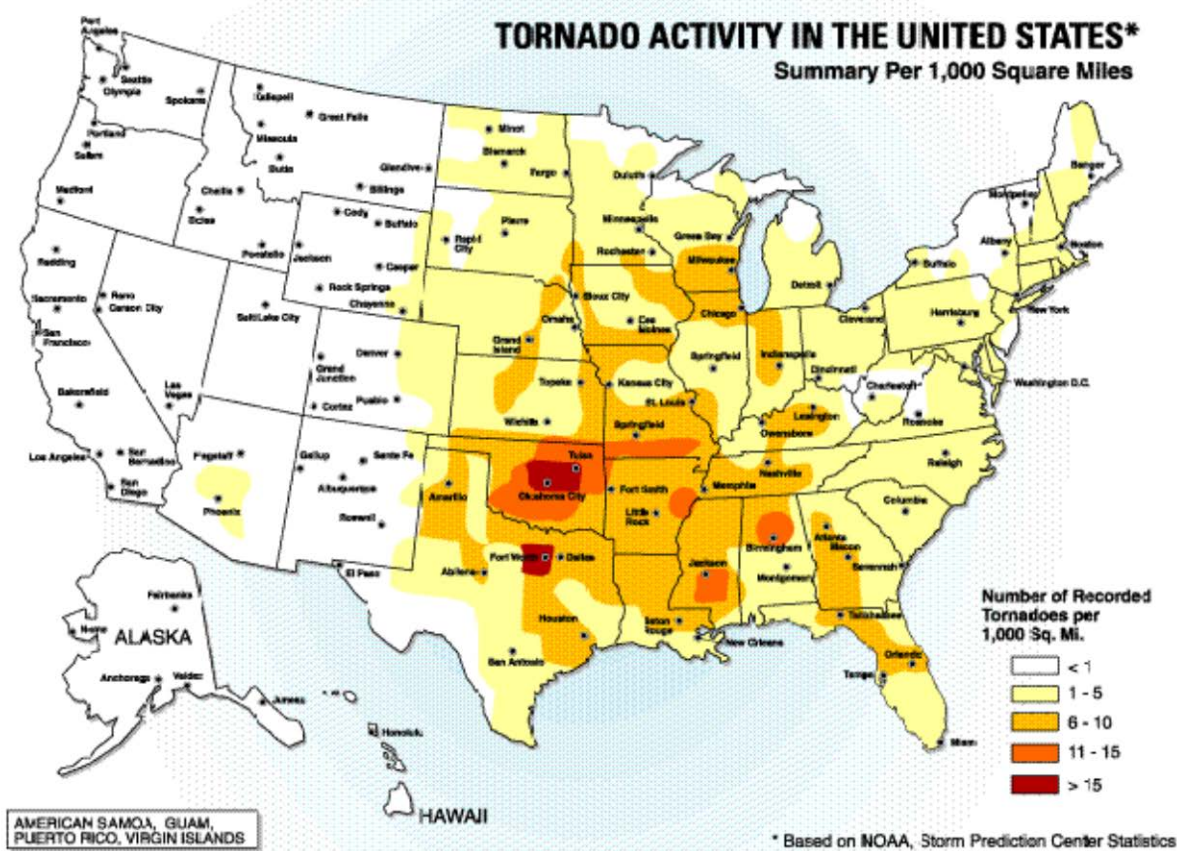
A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air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

Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries.<sup>9</sup> 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

<sup>9</sup> NOAA, 2009.

respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous tornadoes (earning the designation of “tornado alley”), Florida experiences the greatest number of tornadoes per square mile of all U.S. states (SPC, 2002). **Figure 5.6** shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles.

**FIGURE 5.6: TORNADO ACTIVITY IN THE UNITED STATES**



Source: Federal Emergency Management Agency

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

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



**TABLE 5.13: THE FUJITA SCALE (EFFECTIVE PRIOR TO 2005)**

F-SCALE NUMBER	INTENSITY	WIND SPEED	TYPE OF DAMAGE DONE
F0	GALE TORNADO	40–72 MPH	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	MODERATE TORNADO	73–112 MPH	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	SIGNIFICANT TORNADO	113–157 MPH	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	SEVERE TORNADO	158–206 MPH	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	DEVASTATING TORNADO	207–260 MPH	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	INCREDIBLE TORNADO	261–318 MPH	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
F6	INCONCEIVABLE TORNADO	319–379 MPH	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies.

Source: National Weather Service

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

EF-SCALE NUMBER	INTENSITY PHRASE	3 SECOND GUST (MPH)	TYPE OF DAMAGE DONE
F0	GALE	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	MODERATE	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	SIGNIFICANT	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	SEVERE	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	DEVASTATING	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	INCREDIBLE	Over 200	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.

Source: National Weather Service

### 5.8.2 Location and Spatial Extent

Tornadoes occur throughout the state of North Carolina, and thus in the Toe River Region. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the Toe River Region is uniformly exposed to this hazard.

### 5.8.3 Historical Occurrences

According to the National Climatic Data Center, there have been a total of seven (7) recorded tornado events in the Toe River Region between 1979 and November 2015 (**Table 5.15**), resulting in nearly \$792,000 million in property damages.<sup>10</sup> In addition, one injury was reported (**Table 5.16**). The magnitude of these tornadoes ranges from F0 to F2 in intensity, with approximate touchdown locations for events with known coordinates are shown in **Figure 5.7**. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 37 years.

<sup>10</sup> These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional tornadoes have occurred in the Toe River Region. As additional local data becomes available, this hazard profile will be amended.

**TABLE 5.15: SUMMARY OF TORNADO OCCURRENCES IN THE TOE RIVER REGION**

Location	Number of Occurrences	Property Damage
<b>Avery County</b>	<b>1</b>	<b>\$25,000</b>
Banner Elk	0	\$0
Crossnore	0	\$0
Elk Park	0	\$0
Grandfather Village	0	\$0
Newland	0	\$0
Sugar Mountain	0	\$0
Unincorporated Area	1	\$25,000
<b>McDowell County</b>	<b>4</b>	<b>\$522,000</b>
Marion	2	\$20,000
Old Fort	0	\$0
Unincorporated Area	2	\$502,000
<b>Mitchell County</b>	<b>0</b>	<b>\$0</b>
Bakersville	0	\$0
Spruce Pine	0	\$0
Unincorporated Area	0	\$0
<b>Yancey County</b>	<b>2</b>	<b>\$250,000</b>
Burnsville	0	\$0
Unincorporated Area	2	\$250,000
<b>TOE RIVER REGION TOTAL</b>	<b>7</b>	<b>\$797,000</b>

Source: National Climatic Data Center

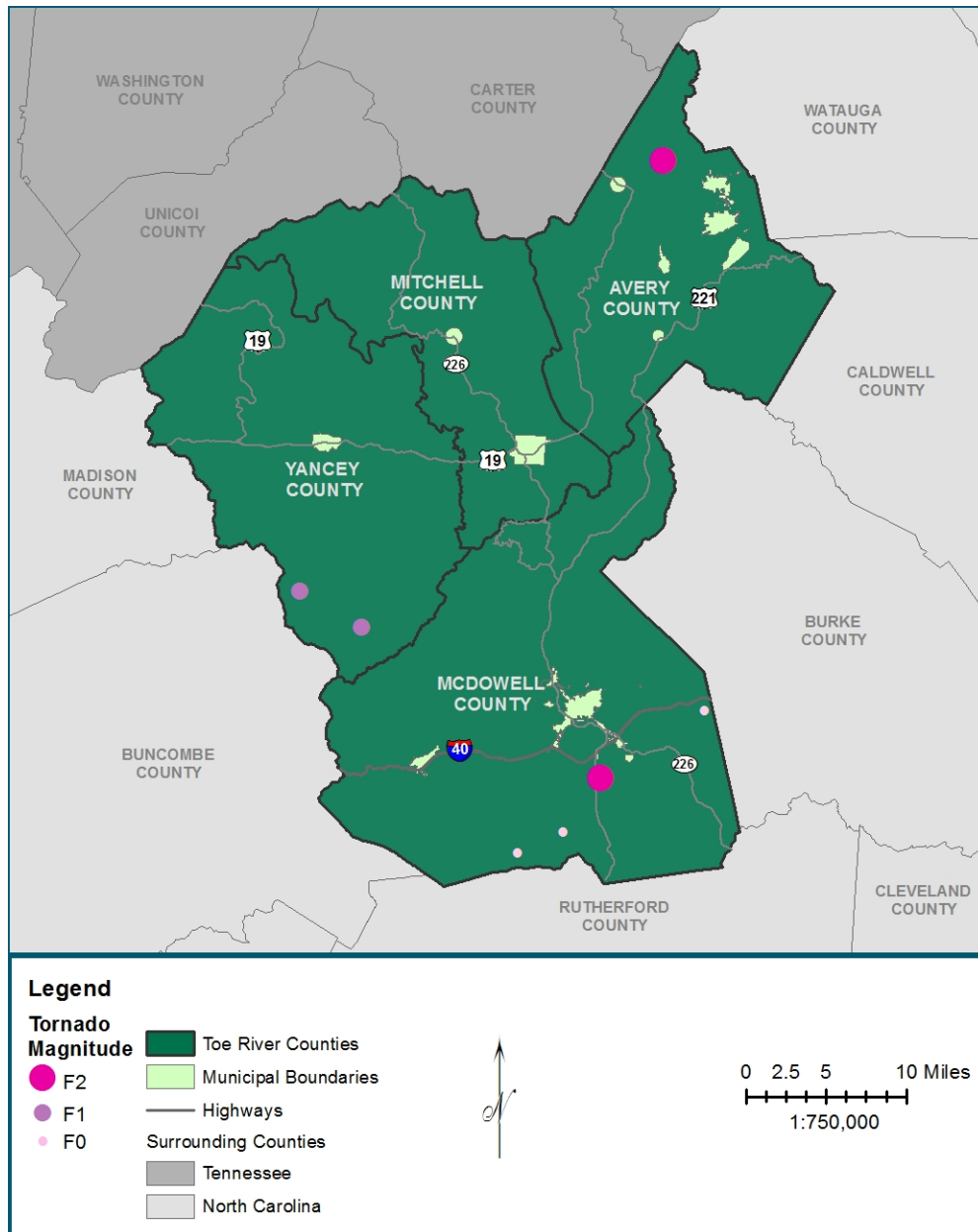
**TABLE 5.16: HISTORICAL TORNADO IMPACTS**

	Date	Magnitude	Deaths/ Injuries	Property Damage	Details
<b>Avery County</b>					
Avery County	04/09/1965	F2	0/1	\$25,000	<i>Not Available</i>
<b>McDowell County</b>					
Marion	04/20/1996	F0	0/0	\$20,000	A small tornado briefly touched down south of Marion. The roof was blown off a carport and part of a house was removed, in addition to several downed trees and antennae. A concrete well lid was blown off and carried several hundred yards.
Glenwood	05/07/1998	F2	0/0	\$502,000	Another supercell which tracked across the mountains spawned a tornado that travelled through a portion of Glenwood. Several homes and mobiles sustained damage or were destroyed. The first tornado of the day in western North Carolina occurred in Madison county. A third supercell that emerged out of the mountains in McDowell

SECTION 5: HAZARD PROFILES

	Date	Magnitude	Deaths/ Injuries	Property Damage	Details
					county produced several tornadoes from the southern part of that county to northern Mecklenburg county. Damage was fairly significant across western North Carolina with numerous homes either damaged or destroyed. Fortunately, no one was killed.
Marion	05/24/2000	F0	0/0	\$0	The most damaging of the supercells developed in northern McDowell county and became severe along the Burke/McDowell county line near Lake James, dropping baseball size hail. This severe storm tracked southeast along the county border, producing golf ball to softball size hail all the way to the Rutherford county line. In addition to the very large hail, this supercell was able to generate a few weak (F0) tornadoes. The first tornado briefly touched down near Bridgewater and blew windows out of a house. It may also have been responsible for wind damage at a nearby mobile home park where 15 to 25 mobile homes sustained damage from both wind and hail. The second tornado developed in extreme eastern McDowell county and blew down trees across Interstate 40 before crossing into Burke county. Several motorists on Interstate 40 sighted the tornado and had their vehicles damaged by softball size hail.
Old Fort	2004		1/0	\$0	This event was reported by during the second mitigation meeting and confirmed by several other members. However, specific information on the event was not found.
<b>Yancey County</b>					
Yancey County	03/08/1956	F1	0/0	\$0	<i>Not Available</i>
Yancey County	06/06/1977	F1	0/0	\$250,000	<i>Not Available</i>

Source: NCDC

**FIGURE 5.7: LOCATIONS OF HISTORICAL TORNADO EVENTS IN THE TOE RIVER REGION**

Source: NCDC

#### 5.8.4 Probability of Future Occurrences

The probability of future tornado occurrences affecting the Toe River Region is likely. However, according to historical information, tornado events are not typically an annual occurrence for the region. While the majority of the reported tornado events are small in terms of size, intensity and duration, they do pose a significant threat should the Toe River Region experience a direct tornado strike.

## 5.9 WINTER STORM AND FREEZE

### 5.9.1 Background

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. Events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Some winter storms might be large enough to affect several states, while others might affect only localized areas. Occasionally, heavy snow might also cause significant property damages, such as roof collapses on older buildings.

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

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

### 5.9.2 Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Toe River Region is accustomed to severe winter weather conditions, and frequently receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire region has uniform exposure to a winter storm.

### 5.9.3 Historical Occurrences

Winter weather has resulted in four disaster declarations in the Toe River Region. This includes the Blizzard of 1996, a subsequent 1996 winter storm, a severe ice storm in 2002 and a winter storm in 2010.<sup>11</sup> According to the National Climatic Data Center, there have been a total of 583 recorded

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<sup>11</sup> Not all of the participating counties were declared disaster areas for these events. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: Hazard Identification.

winter storm events in the Toe River Region since 1996 (**Table 5.17**).<sup>12</sup> The property damage amounts associated with these events are obviously under reported but are the best available data at this time. These results will be updated in the future should better data become available.

There were 27 ice storms reported for the region. Those events are summarized in **Table 5.18**. These events resulted in over \$50 million in damages.

**TABLE 5.17: SUMMARY OF WINTER STORM EVENTS IN THE TOE RIVER REGION**

Location	Number of Occurrences	Property Damage
Avery County	177	\$250
McDowell County	52	\$0
Mitchell County	175	\$250
Yancey County	175	\$250
<b>TOTAL</b>	<b>583</b>	<b>\$750</b>

Source: National Climatic Data Center

**TABLE 5.18: HISTORICAL WINTER STORM IMPACTS**

LOCATION	NUMBER OF ICE STORMS REPORTED	PROPERTY DAMAGE
<b>AVERY COUNTY</b>	<b>7</b>	<b>\$50,025,000</b>
<b>MCDOWELL COUNTY</b>	<b>3</b>	<b>\$0</b>
<b>MITCHELL COUNTY</b>	<b>10</b>	<b>\$25,000</b>
<b>YANCEY COUNTY</b>	<b>7</b>	<b>\$25,000</b>
<b>TOTAL</b>	<b>27</b>	<b>\$50,075,000</b>

Source: National Climatic Data Center

#### 5.9.4 Probability of Future Occurrences

Winter storm events will remain a likely occurrence in the Toe River Region, and the probability of future occurrences is certain. According to historical information, the Toe River Region experiences an average of 26 winter storm events each year. Fortunately, large scale property damages and/or threats to human life and safety are rare with these events.

<sup>12</sup> These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is likely that additional winter storm conditions have affected the Toe River Region. In addition, the 583 events are reported by county, so many of these storms likely affected all of the counties.



## *Geologic Hazards*

### **5.10 EARTHQUAKE**

#### **5.10.1 Background**

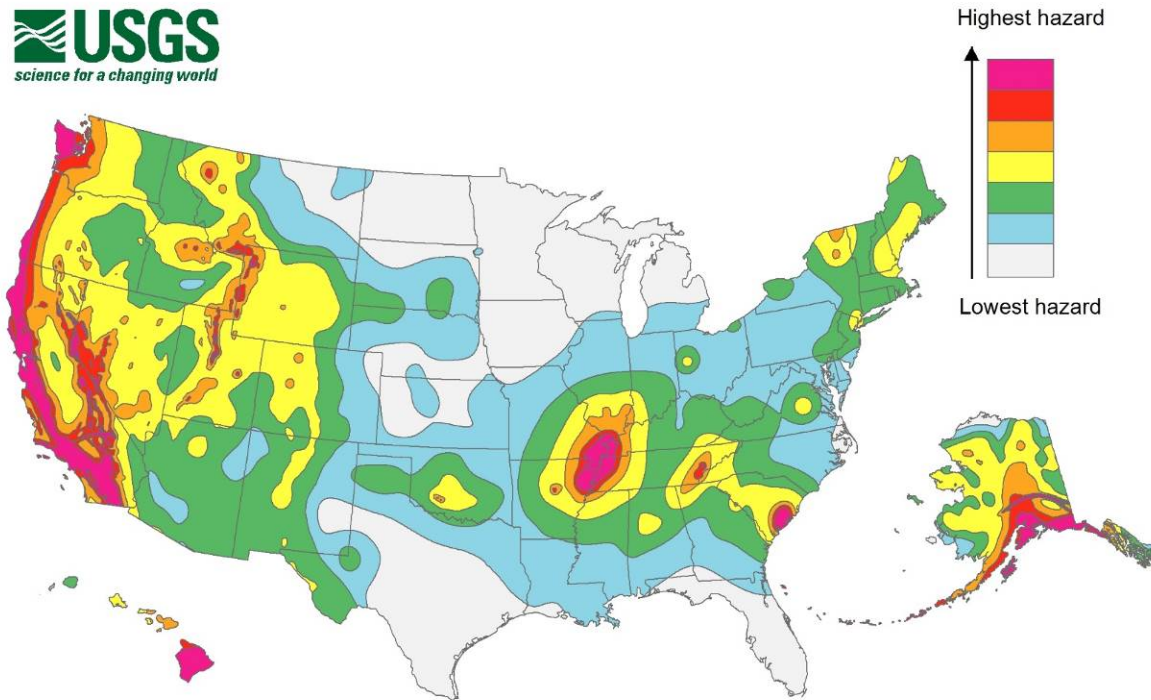
An earthquake is movement or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured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

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

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

The greatest earthquake threat in the United States is along tectonic plate boundaries and seismic fault lines located in the central and western states; however, the Eastern United State does face moderate risk to less frequent, less intense earthquake events. **Figure 5.8** shows relative seismic risk for the United States.

FIGURE 5.8: UNITED STATES EARTHQUAKE HAZARD MAP



Source: United States Geological Survey

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (**Table 5.19**). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, ranging from “I” corresponding to imperceptible (instrumental) events to “XII” for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 5.20**.

**TABLE 5.19: RICHTER SCALE**

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

Source: Federal Emergency Management Agency

**TABLE 5.20: MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES**

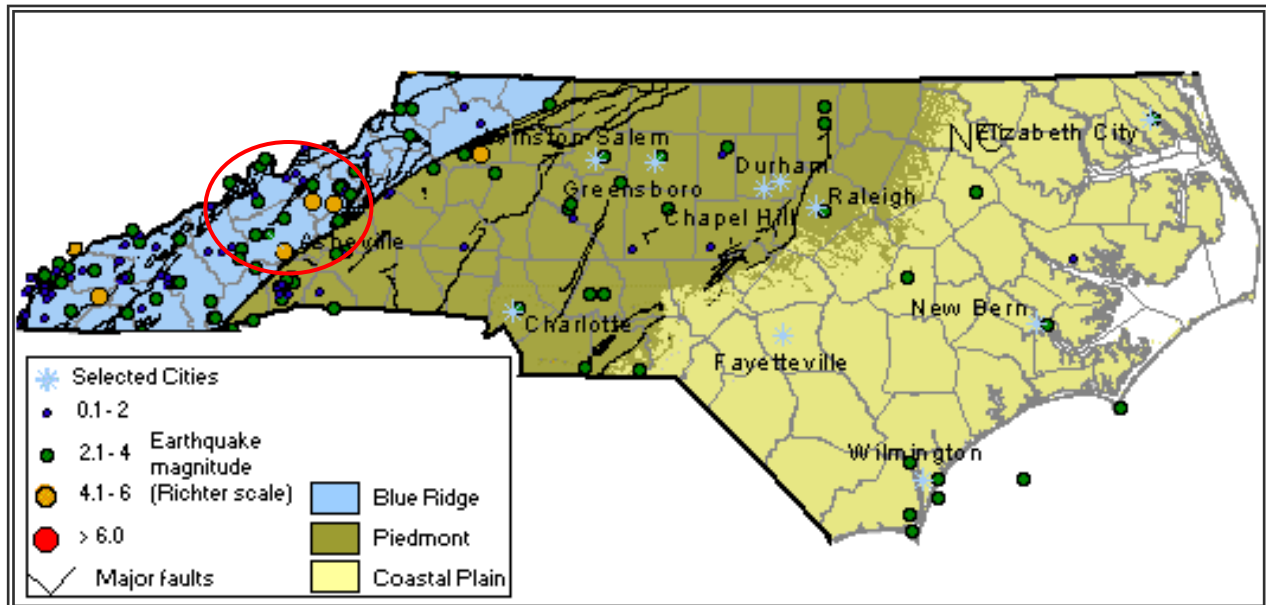
SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	INSTRUMENTAL	Detected only on seismographs.	
II	FEEBLE	Some people feel it.	< 4.2
III	SLIGHT	Felt by people resting; like a truck rumbling by.	
IV	MODERATE	Felt by people walking.	
V	SLIGHTLY STRONG	Sleepers awake; church 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.	
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

Source: Federal Emergency Management Agency

### 5.10.2 Location and Spatial Extent

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure 5.9** is a map showing geological and seismic information for North Carolina.

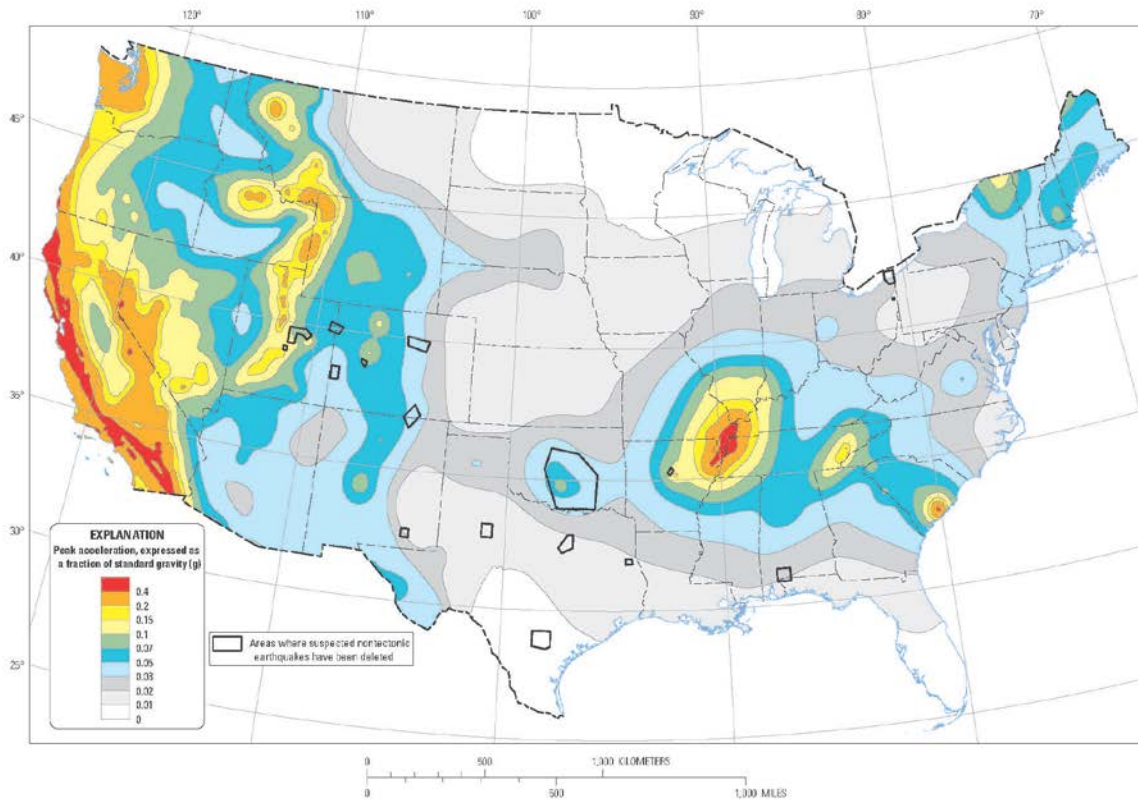
**FIGURE 5.9: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA**



Source: North Carolina Geological Survey

**Figure 5.10** shows the intensity level associated with the Toe River Region, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is 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. According to this maps, all of the Toe River Region lies within an approximate zone of level “5” ground acceleration. This indicates that the region as a whole exists within an area of moderate seismic risk.

**FIGURE 5.10: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS**



Ten-percent probability of exceedance in 50 years map of peak ground acceleration

Source: USGS, 2014

### 5.10.3 Historical Occurrences

At least 44 earthquakes are known to have affected the Toe River Region since 1874. The strongest of these measured a VI on the Modified Mercalli Intensity (MMI) scale. **Table 5.21** provides a summary of earthquake events reported by the National Geophysical Data Center between 1638 and 1985. Note that this data has not been updated since 1985. **Table 5.22** presents a detailed occurrence of each event including the date, distance for the epicenter, and Modified Mercalli Intensity (if known).<sup>13</sup>

**TABLE 5.21: SUMMARY OF SEISMIC ACTIVITY IN THE TOE RIVER REGION**

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
<b>Avery County</b>	<b>9</b>	<b>IV (moderate)</b>	<b>&lt; 4.6</b>
Banner Elk	3	IV	

<sup>13</sup> Due to reporting mechanisms, not all earthquakes events were recorded during this time. Further, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of “unknown” is reported.

Crossnore	2	III	
Elk Park	1	IV	
Grandfather Village	0	-	
Newland	2	IV	
Sugar Mountain	0	-	
Unincorporated Area	0	-	
<b>McDowell County</b>	<b>11</b>	<b>V (slightly strong)</b>	<b>&lt; 4.8</b>
Marion	5	V	
Old Fort	5	V	
Unincorporated Area	1	III	
<b>Mitchell County</b>	<b>6</b>	<b>V (slightly strong)</b>	<b>&lt; 4.8</b>
Bakersville	2	V	
Spruce Pine	3	V	
Unincorporated Area	1	III	
<b>Yancey County</b>	<b>18</b>	<b>VI (strong)</b>	<b>&lt; 5.4</b>
Burnsville	6	V	
Unincorporated Area	12	VI	
<b>TOE RIVER REGION TOTAL</b>	<b>44</b>	<b>VI</b>	<b>&lt; 5.4</b>

Source: National Geophysical Data Center

**TABLE 5.22: SIGNIFICANT SEISMIC EVENTS IN THE TOE RIVER REGION (1638 -1985)**

Location	Date	Magnitude	MMI	Distance from Epicenter (miles)
<b>Avery County</b>				
Newland	11/3/1928	<i>unknown</i>	III	61
Banner Elk	5/13/1957	<i>unknown</i>	IV	47
Elk Park	5/13/1957	<i>unknown</i>	IV	45
Newland	5/13/1957	<i>unknown</i>	IV	38
Crossnore	1/3/1960	<i>unknown</i>	III	<i>unknown</i>
Newland	9/10/1970	<i>unknown</i>	III	47
Banner Elk	11/30/1973	4.7	IV	192
Crossnore	11/30/1973	1.2	III	184
Banner Elk	7/27/1980	5.1	III	287
<b>McDowell County</b>				
Marion	2/21/1916	<i>unknown</i>	V	48
Marion	5/13/1928	<i>unknown</i>	IV	7
Marion	11/3/1928	<i>unknown</i>	<i>unknown</i>	63
Old Fort	5/13/1957	<i>unknown</i>	IV	21
Unincorporated County	1/3/1960	<i>unknown</i>	III	<i>unknown</i>
Old Fort	11/30/1973	4.7	IV	161
Marion	4/9/1981	3.2	IV	22
Old Fort	4/9/1981	3.2	V	19
Old Fort	4/9/1981	3.2	II	<i>unknown</i>

Location	Date	Magnitude	MMI	Distance from Epicenter (miles)
Marion	5/5/1981	3.5	III	54
Old Fort	3/25/1983	3.3	III	40
<b>Mitchell County</b>				
Bakersville	5/13/1957	<i>unknown</i>	V	33
Bakersville	11/20/1969	4.3	IV	185
Spruce Pine	5/13/1957	<i>unknown</i>	V	20
Spruce Pine	1/20/1964	<i>unknown</i>	IV	<i>unknown</i>
Spruce Pine	11/30/1973	4.7	V	170
Unincorporated County	7/8/1926	<i>unknown</i>	VI	0
Unincorporated County	1/3/1960	<i>unknown</i>	III	<i>unknown</i>
<b>Yancey County</b>				
Mount Mitchell	02/10/1874	<i>unknown</i>	V	18
Mount Mitchell	02/22/1874	<i>unknown</i>	V	18
Mount Mitchell	03/17/1874	<i>unknown</i>	V	18
Mount Mitchell	03/26/1874	<i>unknown</i>	V	18
Mount Mitchell	04/14/1874	<i>unknown</i>	V	18
Mount Mitchell	04/17/1874	<i>unknown</i>	V	18
Burnsville	5/13/1957	<i>unknown</i>	IV	32
Micaville	5/13/1957	<i>unknown</i>	VI	26
Pensacola	5/13/1957	<i>unknown</i>	V	30
Bald Creek	5/13/1957	<i>unknown</i>	III	<i>unknown</i>
Busick	5/13/1957	<i>unknown</i>	V	16
Burnsville	1/20/1964	<i>unknown</i>	IV	<i>unknown</i>
Pensacola	1/20/1964	<i>unknown</i>	IV	<i>unknown</i>
Cane River	1/20/1964	<i>unknown</i>	IV	<i>unknown</i>
Burnsville	7/13/1969	3.5	IV	127
Burnsville	11/20/1969	4.3	V	201
Burnsville	10/9/1971	3.4	III	108
Burnsville	4/9/1981	3.2	V	53
Burnsville	1/20/1964	<i>unknown</i>	IV	<i>unknown</i>

Source: National Geophysical Data Center

In addition to those earthquakes specifically affecting the Toe River Region, a list of earthquakes that have caused damage throughout North Carolina is presented below in **Table 5.23**.

**TABLE 5.23: EARTHQUAKES WHICH HAVE CAUSED DAMAGE IN NORTH CAROLINA**

Date	Location	Richter Scale (Magnitude)	MMI (Intensity)	MMI in North Carolina
12/16/1811 - 1	NE Arkansas	8.5	XI	VI
12/16/1811 - 2	NE Arkansas	8.0	X	VI



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

\*This event is accounted for in the Toe River occurrences.

\*\* Conflicting reports on this event, intensity in North Carolina could have been either V or VI

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

#### 5.10.4 Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the Toe River Region is unlikely. However, it is likely that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the region.

### 5.11 LANDSLIDE

#### 5.11.1 Background

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

There are several types of landslides: rock falls, rock topple, slides, and flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Mudflows, sometimes referred to as mudslides, mudflows, lahars or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water. They develop when



water rapidly accumulates in the ground, such as heavy rainfall or rapid snowmelt, changing the soil into a flowing river of mud or “slurry.” Slurry can flow rapidly down slopes or through channels, and can strike with little or no warning at avalanche speeds. Slurry can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. As the flows reach flatter ground, the mudflow spreads over a broad area where it can accumulate in thick deposits.

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

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

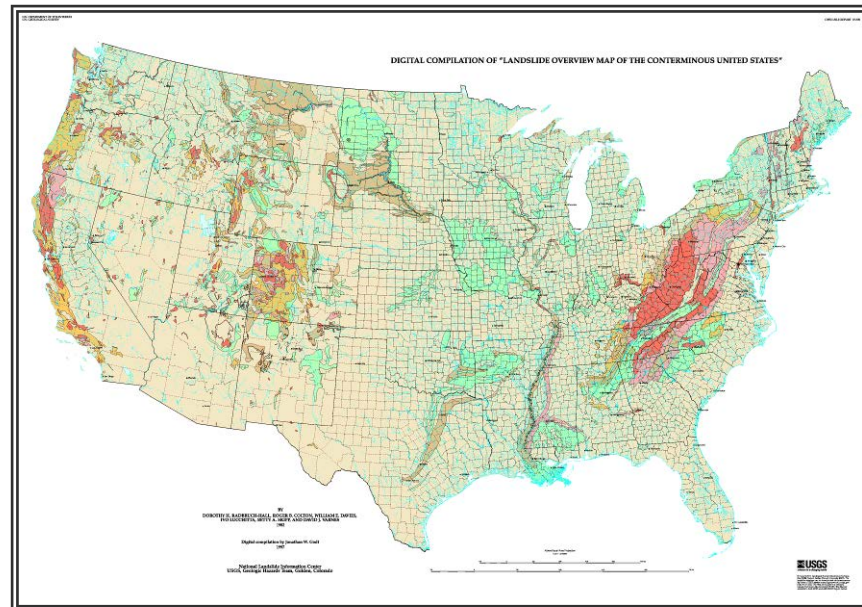
Areas that are generally prone to landslide hazards include previous landslide areas; the bases of steep slopes; the bases of drainage channels; and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved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

According to the United States Geological Survey, each year landslides cause \$5.1 billion in damage and between 25 and 50 deaths in the United States.<sup>14</sup> **Figure 5.11** delineates areas where large numbers of landslides have occurred and areas which are susceptible to landsliding in the conterminous United States.<sup>15</sup>

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<sup>14</sup> United States Geological Survey (USGS). United States Department of the Interior. “Landslide Hazards – A National Threat.” 2005.

<sup>15</sup> 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](http://landslides.usgs.gov/html_files/landslides/nationalmap/national.html).

**FIGURE 5.11: LANDSLIDE OVERVIEW MAP OF THE CONTERMINOUS UNITED STATES****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**

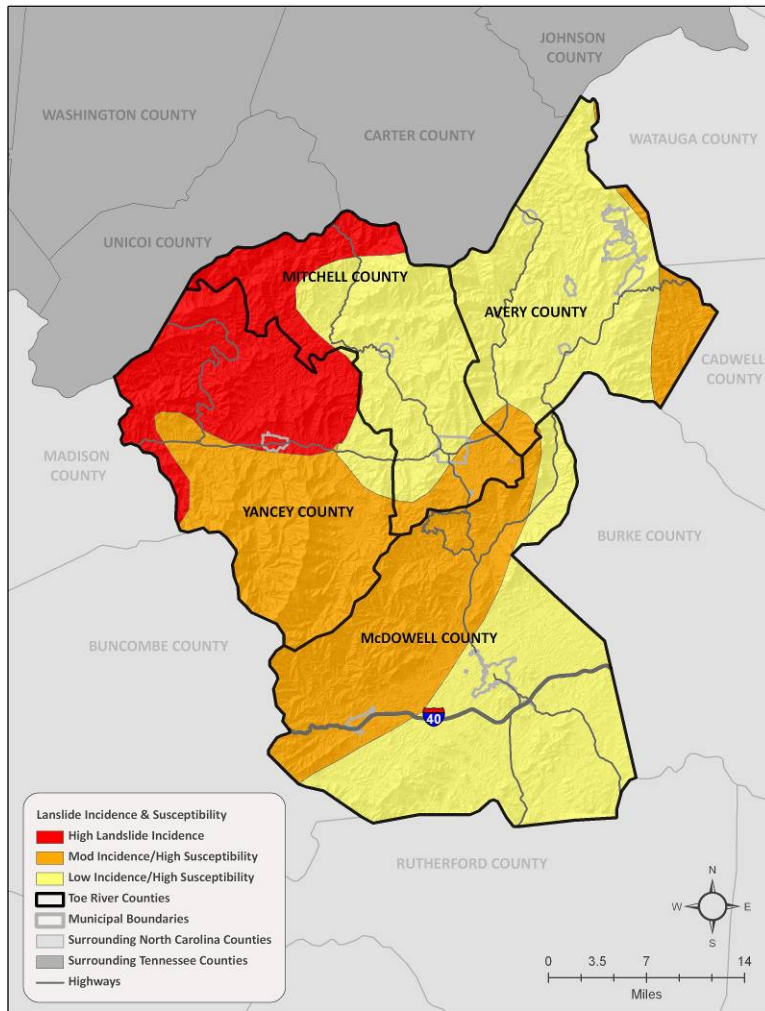
- Moderate susceptibility/low incidence
- High susceptibility/low incidence
- High susceptibility/moderate incidence

Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding was defined as the probable degree of response of [the area] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delineated 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.

Source: USGS

### 5.11.2 Location and Spatial Extent

Landslides are possible throughout the Toe River Region. However, some areas may experience more landslide activities than others. According to **Figure 5.12** below, the northwestern portion of the Region, including Mitchell County and Yancey County, have the greatest landslide activity. A majority of the western portion of the Region has a moderate incidence occurrence rate; a majority of the eastern portion has a low incidence record.

**FIGURE 5.12: LANDSLIDE SUSCEPTIBILITY MAP OF THE TOE RIVER REGION**

Source: USGS

### 5.11.3 Historical Occurrences

**Table 5.24** presents a summary of the landslide occurrence events as provided by the North Carolina Geological Survey<sup>16</sup>. **Table 5.25** presents damage estimates of recent slide events provided by the North Carolina Department of Transportation. The locations of the landslide events presented in the aforementioned tables are presented in **Figure 5.13**.

<sup>16</sup> It should be noted that the North Carolina Geological Survey (NCGS) emphasized the dataset provided was incomplete. Therefore, there may be additional historical landslide occurrences. Further, dates were not included for every event. The earliest date reported was 1940. No damage information was provided by NCGS.

**TABLE 5.24: SUMMARY OF LANDSLIDE ACTIVITY IN THE TOE RIVER REGION**

LOCATION	NUMBER OF OCCURRENCES
<b>Avery County</b>	<b>8</b>
Banner Elk	0
Crossnore	0
Elk Park	1
Grandfather Village	0
Newland	0
Sugar Mountain	0
Unincorporated Area	7
<b>McDowell County</b>	<b>33</b>
Marion	1
Old Fort	7
Unincorporated Area	27
<b>Mitchell County</b>	<b>15</b>
Bakersville	2
Spruce Pine	9
Unincorporated Area	4
<b>Yancey County</b>	<b>24</b>
Burnsville	3
Unincorporated Area	21
<b>TOE RIVER REGION TOTAL</b>	<b>80</b>

Source: North Carolina Geological Survey

The North Carolina Department of Transportation provided damage estimates for several recent landslide occurrences in the Toe River Region. The higher damages associated with Yancey County are reflective of the information provided in the USGS Landslide Susceptibility Map (Figure 5.12, above). This data is used to determine an annualized loss estimate, which is presented in Section 6: Vulnerability Assessment.

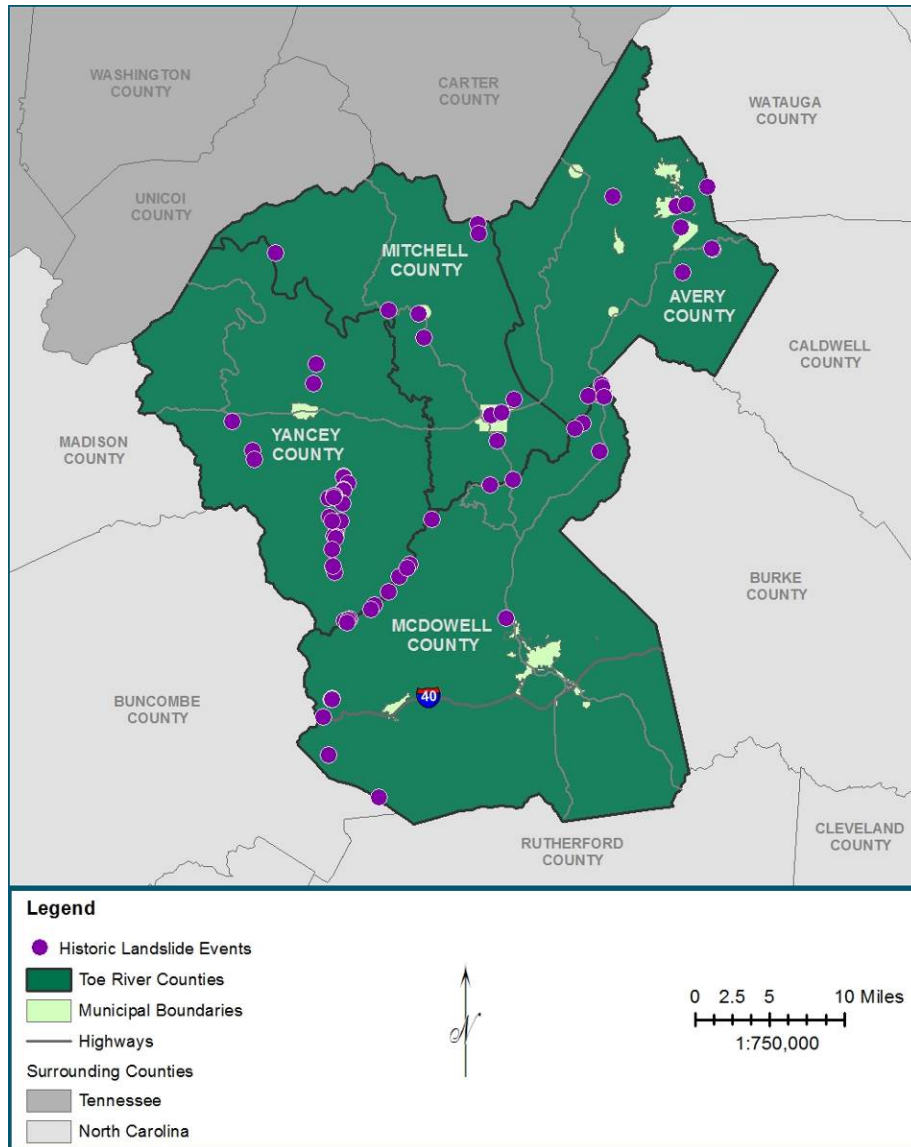
**TABLE 5.25: RECENT LANDSLIDE ACTIVITY WITH ASSOCIATED DAMAGES**

LOCATION	DATE	DAMAGE
<b>Avery County</b>		
US 221	01/1998	\$18,537
<b>McDowell County</b>		
SR 1407	12/2002	\$76,138
<b>Mitchell County</b>		
US 19E	01/1998	\$20,556
<b>Yancey County</b>		
US 19	01/1998	\$5,104
US 80	01/1998	\$7,258
Countywide (40-50 small slides/slope failures)	12/18/2009	\$200,000

US 19W	12/18/2009	\$75,000
<b>TOE RIVER REGION TOTAL</b>		<b>\$402,593</b>

Source: North Carolina Department of Transportation

**FIGURE 5.13: LOCATION OF PREVIOUS LANDSLIDE OCCURRENCES**



Source: North Carolina Geological Survey

#### 5.11.4 Probability of Future Occurrences

Based on historical information and the USGS susceptibility index, the probability of future landslide events is highly likely. Although not all years are reported for previous landslide events, using the earliest date reported (1976), results in an average of 5 landslides per year in the Toe River Region. It should also be noted that some areas in the Toe River Region have greater risk than others.

## Hydrologic Hazards

### 5.12 DAM AND LEVEE FAILURE

#### 5.12.1 Background

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

There are approximately 80,000 dams in the United States today, the majority of which are privately owned. Other owners include state and local authorities, public utilities, and federal agencies. The benefits of dams are numerous: they provide water for drinking, navigation, and agricultural irrigation. Dams also provide hydroelectric power, create lakes for fishing and recreation, and save lives by preventing or reducing floods.

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

#### 5.12.2 Location and Spatial Extent

The North Carolina Division of Land Resources provides information on dams including a hazard potential classification. There are three hazard classifications- high, intermediate, and low- that correspond to qualitative descriptions and quantitative guidelines. **Table 5.26** explains these classifications.

**TABLE 5.26: NORTH CAROLINA DAM HAZARD CLASSIFICATIONS**

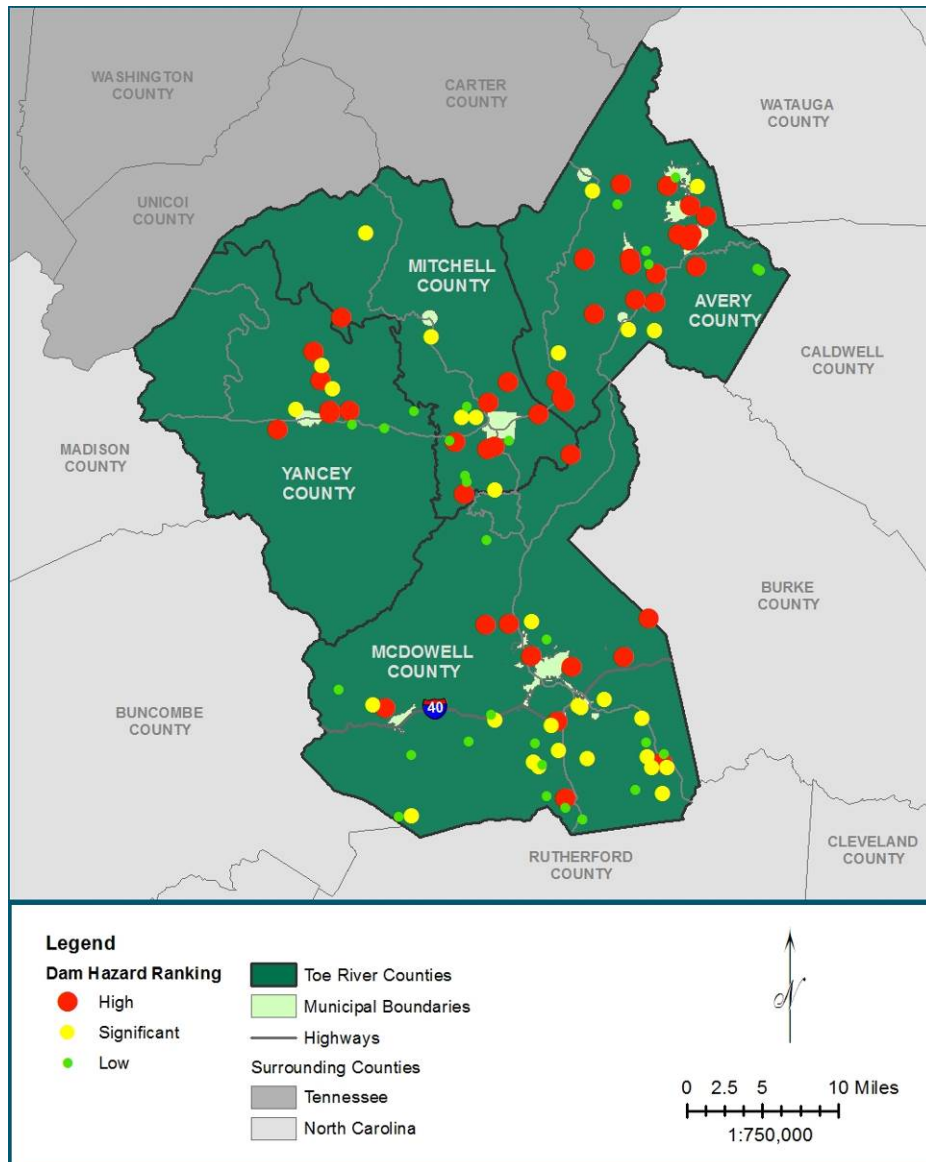
Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low volume roads	Less than 25 vehicles per day
	Economic damage	Less than \$30,000
Intermediate	Damage to highways, Interruption of service	25 to less than 250 vehicles per day
	Economic damage	\$30,000 to less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

Source: North Carolina Division of Land Resources



According to the North Carolina Division of Land Management, there are one hundred and eight (108) dams in the Toe River Region. Figure 5.14 shows the dam location and the corresponding hazard ranking for each. Of these dams, forty-seven (47) are classified as high hazard potential. These high hazard dams are listed in Table 5.27. According to a consensus of local government officials and the Mitigation Advisory Committee, there is an extremely low possibility that any of these state-recognized dams would cause any damage whatsoever should a dam breach or failure occur, despite the hazard classifications assigned to these dams by the state.

**FIGURE 5.14: TOE RIVER REGION DAM LOCATION AND HAZARD RANKING**



Source: North Carolina Division of Land Resources

**TABLE 5.27: TOE RIVER REGION HIGH HAZARD DAMS**

	<b>Dam Name</b>	<b>Hazard Potential</b>	<b>Surface Area (acres)</b>	<b>Max Capacity (Ac-ft)</b>	<b>State Regulated?</b>
<b>Avery County</b>					
	INVER LOCHY DAM	High	3.00	75.00	yes
	BRUSHY CREEK #8	High	10.00	150.00	yes
	GRANDMOTHER DAM	High	38.00	800.00	yes
	GRANDFATHER MTN (LOCH DORNIE)	High	26.90	625.00	yes
	LAND HARBORS DAM	High	150.00	900.00	yes
	BELVUE POND DAM (BREACHED)	High	0.00	0.00	yes
	LINDECAMP POND DAM	High	0.90	6.00	yes
	WEATHERMAN DAM	High	1.00	10.00	yes
	BRUSHY CREEK #7	High	21.00	246.00	yes
	BRUSHY CREEK 6B	High	3.00	42.00	yes
	BRUSHY CREEK 6A	High	3.70	47.00	yes
	TRIANGLE (SECRET)DAM	High	1.00	10.00	yes
	JOHNSON DAM	High	1.50	18.00	yes
	KNIGHT POND DAM (BREACHED)	High	1.00	10.00	yes
	LINVILLE RIDGE DAM	High	1.50	24.00	yes
	WILDCAT LAKE DAM	High	0.00	202.00	yes
	SUGAR MTN DAM (SNOW LAKE)	High	0.70	11.00	yes
	SNYDER POND DAM (BREACHED)	High	0.00	0.00	yes
	RHONEY VIEW POND DAM (BREACHED)	High	0.00	0.00	yes
	WEBER POND DAM (MONTEZUMA DAM)	High	3.0	30.00	yes
	GRANDFATHER SMALL POND	High	0.5	3.0	yes
<b>McDowell County</b>					
	LADY MARION DAM	High	8.00	90.00	yes
	CATAWBA DAM (DUKE FERC)	High	0.00	265182.00	no
	PHILLIPS LAKE	High	40.00	800.00	yes
	2ND BROAD RIVER W.S. #11-15 (BREVARD-ROSS)	High	1.25	38.50	yes
	CAMP GRIER DAM	High	3.00	27.00	yes
	MUDDY CREEK - B. S. A.	High	20.00	440.00	yes
	MUDDY CREEK #8	High	7.00	250.00	yes



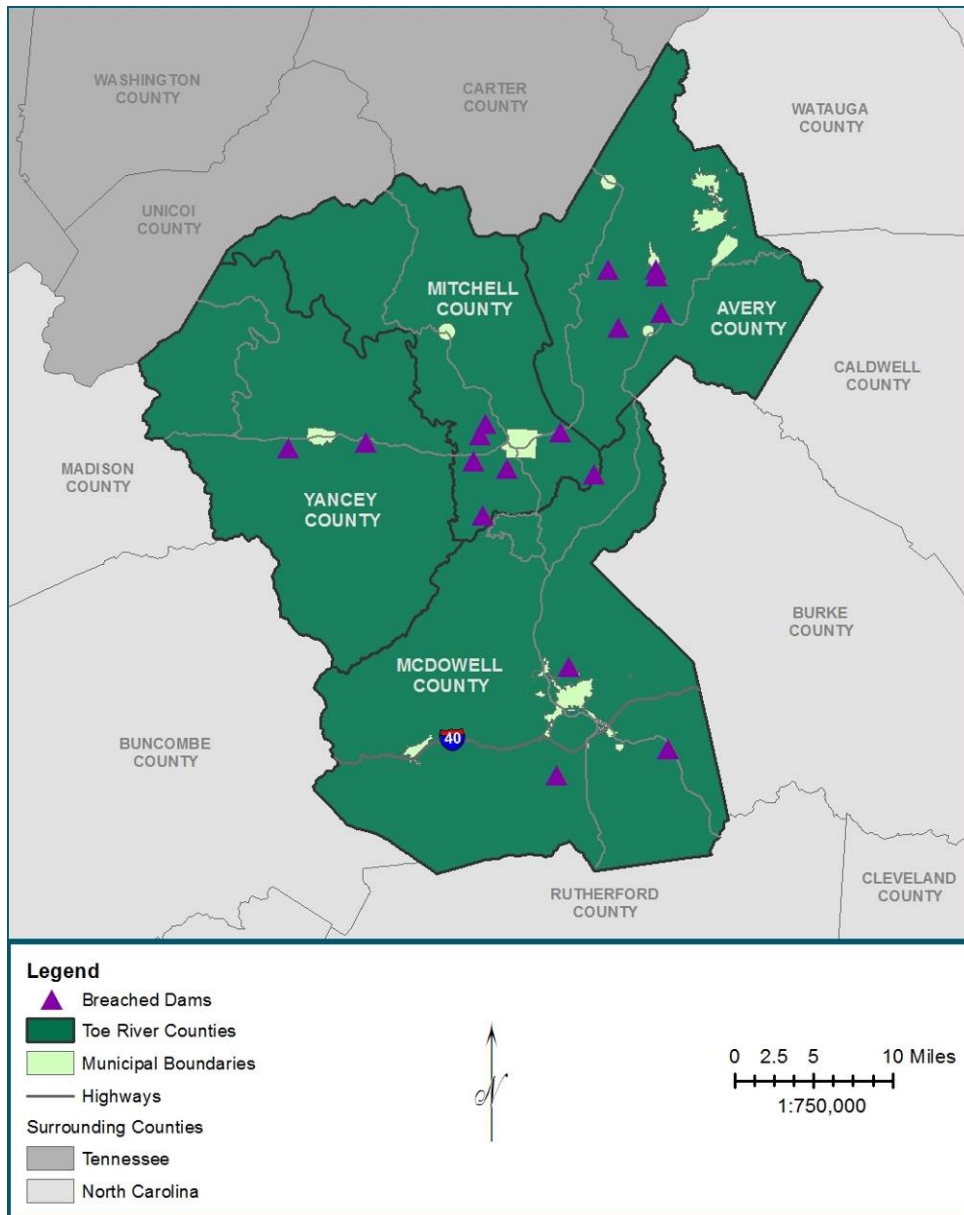
	2ND BROAD RIVER W.S. #11-17(BREVARD)	High	1.50	48.10	yes
	LAKE TAHOMA	High	163.00	7800.00	no
	MUDDY CREEK DAM #3	High	6.0	240	yes
	MARION MANUFACTURING DAM	High	1.5	20	yes
<b>Mitchell County</b>					
	SPRUCE PINE WATER SUPPLY #1	High	2.00	50.00	yes
	STRAWBERRY RIDGE (BREACHED)	High	2.00	32.00	yes
	PHILLIPS POND (BREACHED)	High	0.00	0.00	yes
	SWISS PINE LAKE	High	10.00	124.00	yes
	SPRUCE PINE WATER SUPPLY #2 (BREACHED)	High	2.00	22.00	yes
	EMERALD LAKE DAM (BREACHED)	High	0.00	0.00	yes
	ALTAPASS DAM (BREACHED)	High	2.00	20.00	yes
	UNIMIN RED HILL QUARTZ PLANT DAM	High	4.5	95.00	yes
	UNIMIN HAWKINS SEDIMENT BASIN 4	High	0.0	15	yes
<b>Yancey County</b>					
	AYERS POND DAM	High	0.00	7.00	yes
	CANE RIVER DAM (BREACHED)	High	0.00	0.00	yes
	CLOUSE LAKE DAM	High	0.50	30.00	yes
	MOONSHINE MTN RD DAM (HORTON DAM)	High	0.50	8.00	yes
	PHOENIX POND DAM	High	2.00	16.00	yes
	DEYTON DAM	High	1.20	10.00	yes

Source: North Carolina Division of Land Resources

### 5.12.3 Historical Occurrences

According to information from the North Carolina Division of Land Management, a total of 11 dams have been breached in the Toe River Region. Avery County has sustained five dam breaches. Mitchell County has had five dams breach, and Yancey County has had one dam breach. There are no reports of death, injury, or property damage with any of these events. Further, there are no known levees in the Toe River counties. **Figure 5.15** shows the location of previously breached dams in the Toe River Region.

**FIGURE 5.15: HISTORICAL DAM BREACHES IN THE TOE RIVER REGION**



Source: North Carolina Division of Land Management

#### 5.12.4 Probability of Future Occurrence

Given dams in the dams and historic data, a dam breach is possible in the future. However, with regular monitoring, these events can be prevented as has been demonstrated in the past.

## 5.13 EROSION

### 5.13.1 Background

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

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

An area's potential for erosion is determined by four factors: soil characteristics, vegetative cover, topography, 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.

### 5.13.2 Location and Spatial Extent

Erosion in the Toe River Region is typically caused by flash flooding events. Unlike coastal areas, where the soil is composed mainly of fine grained particles such as sand, Toe River soils have a much greater organic matter content. Further, extensive vegetation also helps to prevent erosion in the area.

### 5.13.3 Historical Occurrences

Although erosion occurs in the Toe River Region, it is not an extreme threat to any of the counties. However, some areas of concern have been reported.

#### Avery County:

Jerry's Creek and Roaring Creek Stream Beds (1998)

- Flash Flooding

#### Other areas of concern

- Banner Elk: Dobbins Road
- Newland: River-front Areas
- Freedom Trail Elementary School and Cranberry Middle School
  - Bank Stabilization

#### McDowell County:

No areas of concern

#### Mitchell County:

No areas of concern

#### Yancey County:

No areas of concern

As depicted in the narrative discussion above, the impact of erosion on the Toe River region is limited to those areas along water courses in the region. Vulnerability would be limited to any structures and infrastructure (roads, bridges etc) that are located close the stream banks. There is no GIS data on where erosion is occurring and noted areas of concern are limited as well.

### **5.13.4 Probability of Future Occurrences**

Erosion remains a natural, dynamic and continuous process for the Toe River Region, and its probability of future occurrence is certain. However, given the lack of historical events and threat to life or property, no further analysis will be done in Section 6: *Vulnerability Assessment*.

## **5.14 FLOOD**

### **5.14.1 Background**

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

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

General floods are usually long-term events that may last for several days. The primary types of general flooding include riverine, coastal and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding, not a concern for the Toe River Region, is typically a result of storm surge, wind-driven waves and heavy rainfall produced by hurricanes, tropical storms and other large coastal storms. Urban flooding occurs where manmade development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.

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

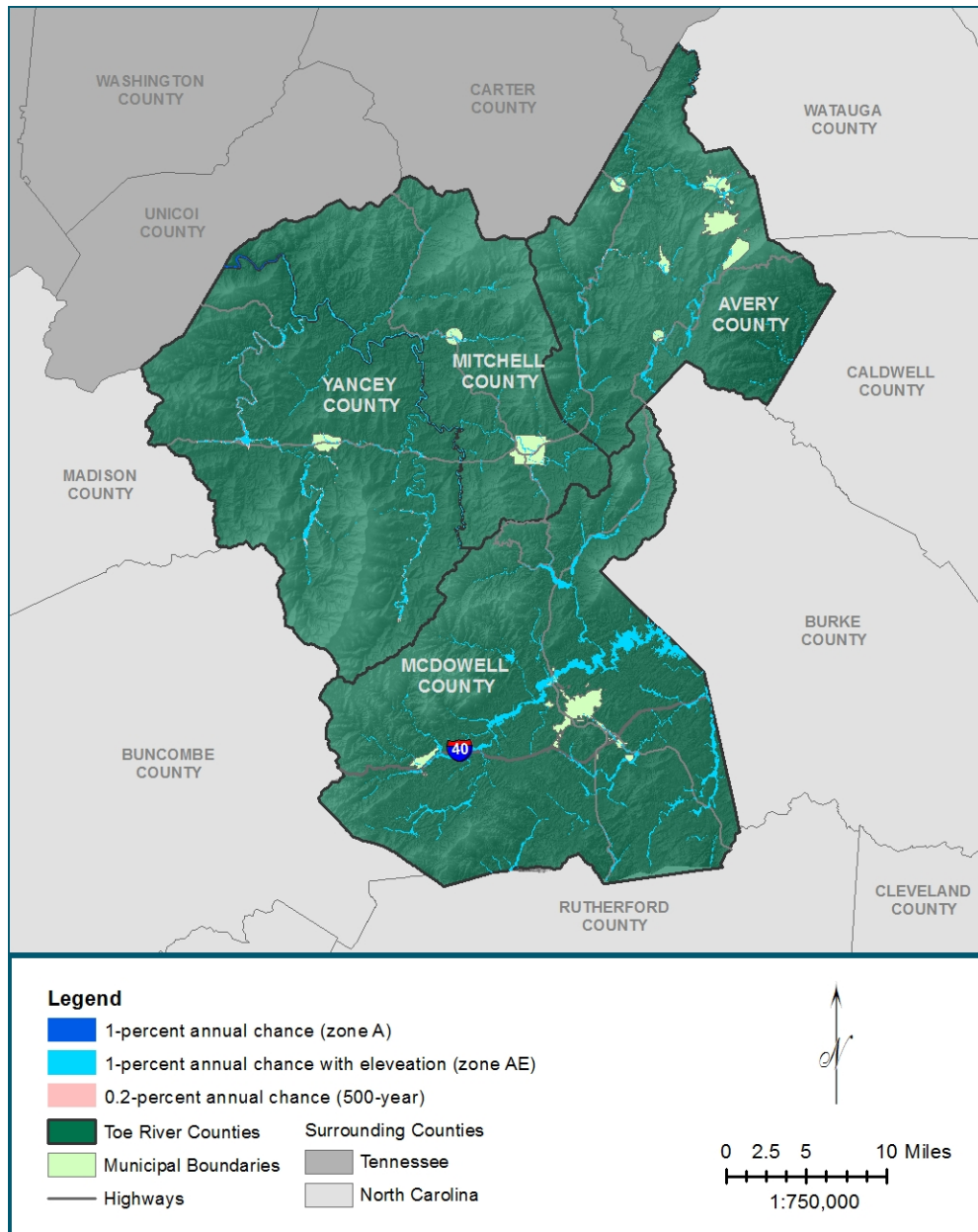
The periodic flooding of lands adjacent to rivers, streams and shorelines (land known as floodplain) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years,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

### **5.14.2 Location and Spatial Extent**

There are areas in the Toe River Region that are susceptible to flooding. Special flood hazard areas in the Toe River Region were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). **Figure 5.16** illustrates the location and extent of currently mapped special flood hazard areas for the Toe River Region based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.<sup>17</sup> This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevation), Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 1,219 square miles that make up the Toe River Region (including the area of Avery County, McDowell County, Mitchell County, and Yancey County), there are 0.325 square miles of land in zone A (1-percent annual chance floodplain), 37.815 square miles of land in zone AE (1-percent annual chance with elevation), and 2.506 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain). These flood zone values account for 0.03 percent of the total land area in the Toe River Region. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas.

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<sup>17</sup> The county-level DFIRM data used for the Toe River Region were last updated in 2009/2010.

**FIGURE 5.16: SPECIAL FLOOD HAZARD AREAS IN THE TOE RIVER REGION**

Source: Federal Emergency Management Agency

### 5.14.3 Historical Occurrences

Information from the National Climatic Data Center was used to ascertain historical flood events. The National Climatic Data Center reported a total of eighty-one (81) events throughout the Toe River Region since March 1993.<sup>18</sup> A list of these events is presented in **Table 5.28**. These events accounted for over \$28.6 million in property damage due to flood events throughout the region.<sup>19</sup> Specific information

<sup>18</sup> These events are only inclusive of those reported by NCDC. It is likely that additional occurrences have occurred and have gone unreported.

<sup>19</sup> The total damage amount was averaged over the number of affected counties when multiple counties were involved in the flood event.

on flood events for each county including date, type of flooding, and deaths and injuries, can be found in **Appendix F**.

**TABLE 5.28: SUMMARY OF FLOOD OCCURRENCES IN THE TOE RIVER REGION**

Location	Number of Occurrences	Property Damage
<b>Avery County</b>	<b>27</b>	<b>\$19,742,000</b>
Banner Elk	0	\$0
Crossnore	3	\$2,000
Elk Park	3	\$100,000
Grandfather Village	0	\$0
Newland	4	\$0
Sugar Mountain	0	\$0
Unincorporated Area	17	\$19,640,000
<b>McDowell County</b>	<b>10</b>	<b>\$275,000</b>
Marion	2	\$0
Old Fort	0	\$0
Unincorporated Area	8	\$275,000
<b>Mitchell County</b>	<b>22</b>	<b>\$6,811,000</b>
Bakersville	3	\$5,010,000
Spruce Pine	3	\$0
Unincorporated Area	16	\$1,801,000
<b>Yancey County</b>	<b>22</b>	<b>\$1,776,000</b>
Burnsville	2	\$40,020
Unincorporated Area	20	\$1,736,000
<b>TOE RIVER REGION TOTAL</b>	<b>81</b>	<b>\$28,604,000</b>

Source: National Climatic Data Center

#### 5.14.4 Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of August 2015, there have been more than 218 flood losses reported in the Toe River through the National Flood Insurance Program (NFIP) since 1970, totaling over \$4.9 million in claims payments. A summary of these figures for each Toe River county is provided in **Table 5.29**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood losses in the Toe River Region were either uninsured, denied claims payment, or not reported.

**TABLE 5.29: SUMMARY OF INSURED FLOOD LOSSES IN THE TOE RIVER REGION**

Location	Flood Losses	Claims Payments
<b>Avery County</b>		
Banner Elk	6	\$85,396
Crossnore	3	\$34,480
Elk Park	1	\$2,487
Grandfather Village	0	\$0



Location	Flood Losses	Claims Payments
Newland	8	\$592,999
Sugar Mountain	0	\$0
Unincorporated Area	100	\$2,049,238
<i>County Total</i>	<i>118</i>	<i>\$2,764,600</i>
<b>McDowell County</b>		
Marion	1	\$56,414
Old Fort	2	\$2,941
Unincorporated Area	30	\$666,139
<i>County Total</i>	<i>33</i>	<i>\$725,494</i>
<b>Mitchell County</b>		
Bakersville	11	\$196,023
Spruce Pine	5	\$291,600
Unincorporated Area	10	\$316,563
<i>County Total</i>	<i>26</i>	<i>\$804,186</i>
<b>Yancey County</b>		
Burnsville	4	\$70,736
Unincorporated Area	37	\$592,653
<i>County Total</i>	<i>41</i>	<i>\$663,389</i>
<b>TOTAL</b>	<b>218</b>	<b>\$4,957,669</b>

Source: FEMA, NFIP as of 8/31/15

### 5.14.5 Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 122,000 repetitive loss properties nationwide.

Table 5.30 provides summary information about the repetitive loss properties in the Toe River region. Currently (as of November 2015), there are 25 non-mitigated repetitive loss properties located in the Toe River Region, which accounted for 62 losses and more than \$1.3 million in claims payments under the NFIP. The average claim amount for these properties is \$21,396. Most of these properties (18) are single family residential and the remaining seven (7) are commercial or government-owned buildings. Without mitigation, these properties will likely continue to experience flood losses.

**TABLE 5.30: SUMMARY OF REPETITIVE LOSS PROPERTIES IN THE TOE RIVER REGION**

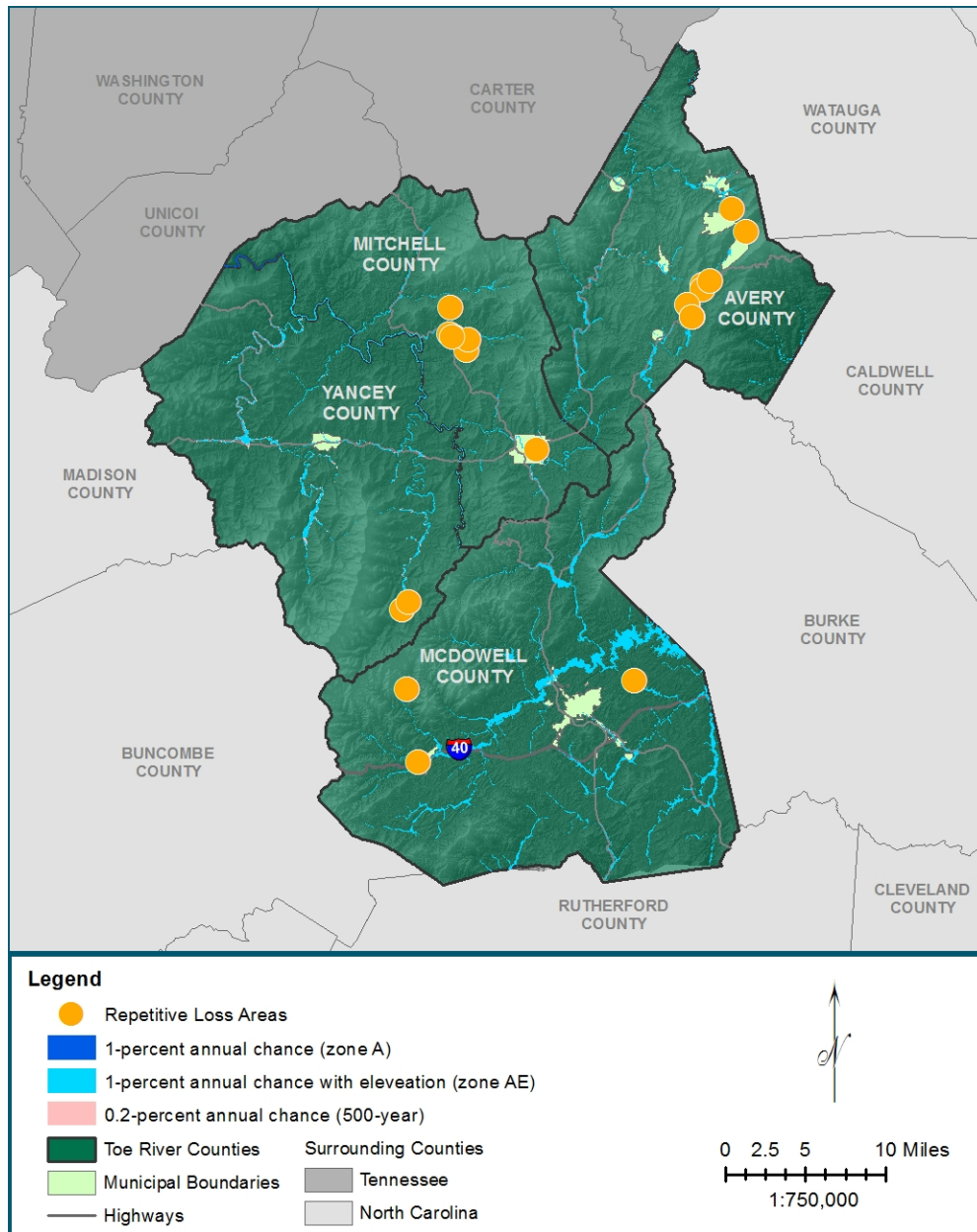
Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
<b>Avery County</b>							
Crossnore	1	1 single family	2	\$8,912	-	\$8,912	\$4,456
Unincorporated Area	12	11 single family, 1 non-residential	26	\$214,876	\$121,749	\$336,652	\$12,948
Total	13		28	\$223,788	\$121,749	\$345,564	\$17,404
<b>McDowell County</b>							

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Unincorporated Area	4	2 single family, 2 non-residential	10	\$217,672	\$240,606	\$458,279	\$85,140
Total	4		10	\$217,672	\$240,606	\$458,279	\$85,140
<b>Mitchell County</b>							
Bakersville	2	2 non-residential	7	\$122,406	\$61,842	\$184,248	\$26,321
Unincorporated Area	4	2 single-family, 2 non-residential	8	\$177,411	\$71,172	\$248,583	\$31,072
Total	6		15	\$299,817	\$133,014	\$432,831	\$57,393
<b>Yancey County</b>							
Burnsville	2	2 single family	9	\$70,191	\$19,730	\$81,922	\$9,103
Total	2		9	\$70,191	\$19,730	\$81,922	\$9,102
<b>Total</b>	<b>25</b>		<b>62</b>	<b>\$811,470</b>	<b>\$515,100</b>	<b>\$1,326,570</b>	<b>\$21,396</b>

Source: National Flood Insurance Program

As shown on the repetitive loss properties map below (**Figure 5.17**), repetitive loss areas are generally clustered together (Avery County) and occasionally are more isolated (McDowell County). In both scenarios, the repetitive loss properties are near flood zones as defined by FEMA's DFIRM maps.

**FIGURE 5.17: REPETITIVE LOSS AREAS IN THE TOE RIVER REGION**



### 5.14.6 Probability of Future Occurrences

Flood events will remain a threat in the Toe River Region, and the probability of future occurrences is certain. The probability of future flood events based on magnitude and according to best available data is illustrated in Figure 5.17 above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

## *Other Hazards*

### **5.15 HAZARDOUS MATERIALS INCIDENTS**

#### **5.15.1 Background**

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

Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 are railroad incidents and 266 are due to other causes.<sup>20</sup> In essence, HAZMAT incidents consist of solid, liquid and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind and possibly wildlife as well.

HAZMAT incidents can also occur as a result of or in tandem with natural hazard events, such as floods, hurricanes, tornadoes and earthquakes, which in addition to causing incidents can also hinder response efforts. In the case of Hurricane Floyd in September 1999, communities along the Eastern United States were faced with flooded junkyards, disturbed cemeteries, deceased livestock, floating propane tanks, uncontrolled fertilizer spills and a variety of other environmental pollutants that caused widespread toxicological concern.

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

#### **5.15.2 Location and Spatial Extent**

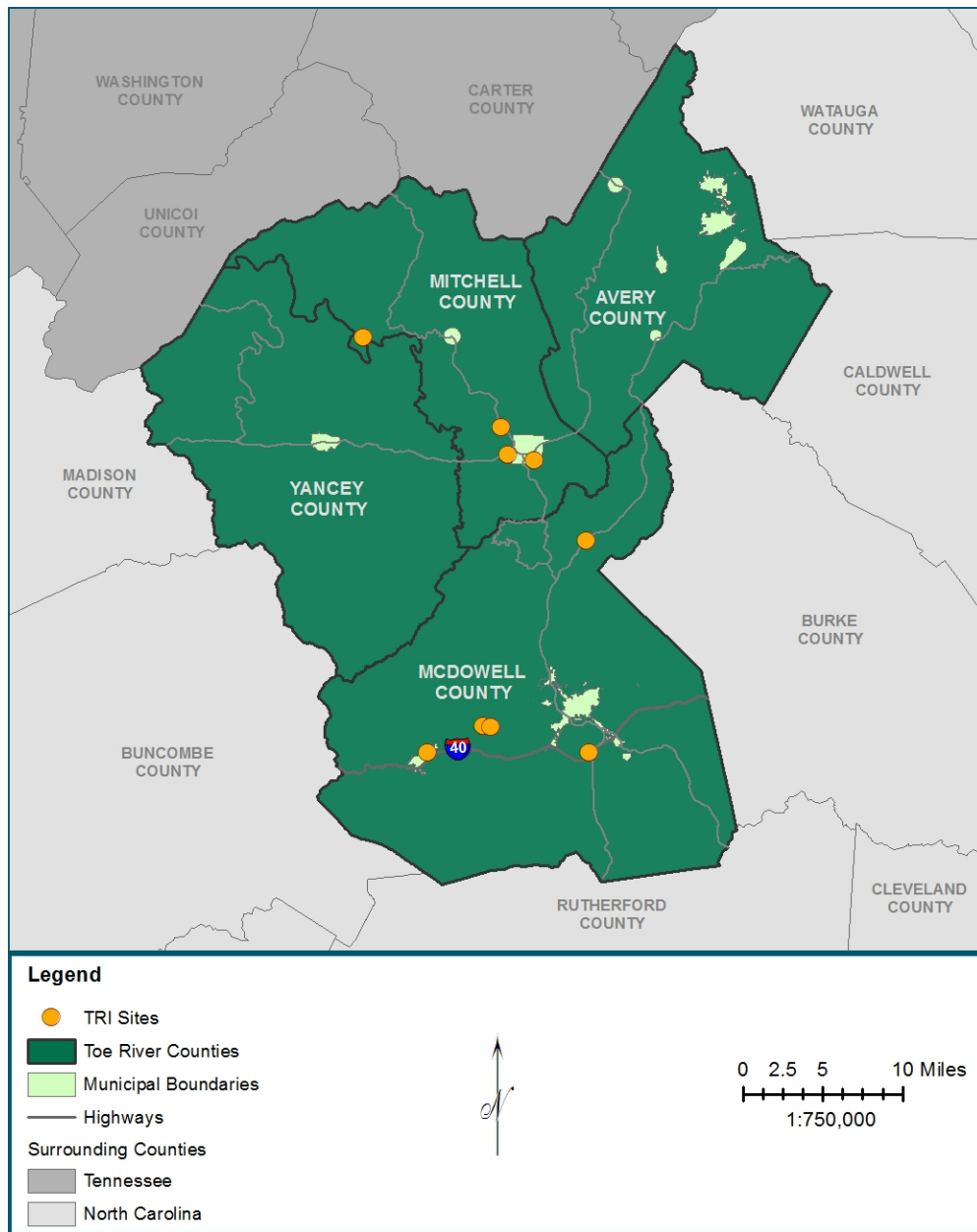
As a result of the 1986 Emergency Planning and Community Right to Know Act (EPCRA), the Environmental Protection Agency provides public information on hazardous materials. One facet of this program is to collection information from industrial facilities on the releases and transfers of certain toxic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

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<sup>20</sup> FEMA, 1997.

indicate where such activity is occurring. The Toe River Region has 10 TRI sites. In addition, there are two Unimin Corporation sites that the Regional Hazard Mitigation Planning Committee included in the analysis due to the presence of hydrochloric acid. These sites are shown in **Figure 5.18**.

**FIGURE 5.18: TOXIC RELEASE INVENTORY (TRI) SITES IN THE TOE RIVER REGION**



Source: EPA

### 5.15.3 Historical Occurrences

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is an agency of the United States Department of Transportation that was established in 2004. The PHMSA maintains a database of hazardous materials incidents for communities across the United States. Summary results of their data for events that have occurred in the Toe River region can be found in **Table 5.31**.

**TABLE 5.31: SUMMARY OF HAZMAT INCIDENTS IN THE TOE RIVER REGION**

Location	Incidents Reported	Injuries	Fatalities	Type	Costs
<b>Avery County</b>	<b>7</b>	<b>0</b>	<b>0</b>		<b>\$845</b>
Banner Elk	1	0	0	Highway	\$0
Crossnore	2	0	0	Highway	\$0
Elk Park	0	0	0	n/a	n/a
Grandfather Village	0	0	0	n/a	n/a
Newland	1	0	0	Highway	\$550
Sugar Mountain	0	0	0	n/a	n/a
Unincorporated Area	3	0	0	Highway	\$295
<b>McDowell County</b>	<b>28</b>	<b>2</b>	<b>0</b>		<b>\$64,222</b>
Marion	18	2	0	Highway and Rail	\$3,325
Old Fort	7	0	0	Highway and Rail	\$56,025
Unincorporated Area	3	0	0	Highway	\$4,872
<b>Mitchell County</b>	<b>7</b>	<b>3</b>	<b>0</b>		<b>\$286,252</b>
Bakersville	0	0	0	n/a	n/a
Spruce Pine	5	1	0	Highway	\$14,247
Unincorporated Area	2	2	0	Highway and Rail	\$272,005
<b>Yancey County</b>	<b>5</b>	<b>0</b>	<b>0</b>		<b>\$2,264,540</b>
Burnsville	3	0	0	Highway	\$13,540
Unincorporated Area	2	0	0	Rail	\$2,251,000
<b>TOTALS</b>	<b>47</b>	<b>5</b>	<b>0</b>		<b>\$2,615,859</b>

Source: Pipeline and Hazardous Materials Safety Administration

#### 5.15.4 Probability of Future Occurrence

Given the location of ten toxic release inventory sites and two recorded Unimin sites in the Toe River Region, it is possible that a hazardous material incident may occur. Official noted that Unimin

mobile transport is of particular in Old Fort on Highway 221. County and town officials are mindful of this possibility and take precautions to prevent such an event from occurring.

## **5.16 TERROR THREAT**

### **5.16.1 Background**

Terrorism is defined by FEMA as, “the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom.” Certain facilities are at greater risk than others to a terrorist attack. A high-risk target is defined by FEMA as military and civilian government facilities, international airports, large cities, and high-profile landmarks. Terrorists may also target large public gatherings, water and food supplies, and utilities.

Acts of terror may include assassinations and armed attacks, kidnappings, hijackings, bomb scares and bombings, cyber attacks (computer-based), and the use of chemical, biological, nuclear and radiological weapons. Each act of terror is described below<sup>21</sup>:

#### **Assassinations/Armed Attack:**

Tactical assault or sniping from a remote location.

#### **Kidnapping:**

Capturing a person or persons against their will and holding them in false imprisonment, often for ransom.

#### **Hijacking:**

Robbing or seizing control of a vehicle by use of force.

#### **Bomb Scares and Bombing:**

A bombing is the result of a detonation of any material that will cause injury, death, or property damage. A bomb scare involves the verbal or written threat to detonate a bomb.

#### **Cyber Attack:**

This refers to the electronic attack using one computer system against another. Cyber terrorism is a growing concern and during the 2015/2016 update of this plan, it was specifically mentioned as a hazard to include in the plan. Future updates of the plan will attempt to provide more information on cyber terrorism for the hazard profiles and the vulnerability assessment.

#### **Chemical Agent:**

Liquid/aerosol contaminants can be dispersed using sprayers or other aerosol generators; liquids vaporizing from puddles or containers; or munitions.

#### **Biological Agent:**

Liquid or solid toxic contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits and moving sprayers.

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<sup>21</sup> Much of this information comes from the FEMA State and Local Mitigation Planning How-to Guide: Integrating Manmade Hazards.



**Nuclear Bomb:**

A nuclear device may be detonated underground, at the surface, in the air or at high altitude.

**Radiological Agent:**

Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits and moving sprayers.

The United States Department of Homeland Security posts terror threat levels corresponding to a certain color. This warning system is shown in **Table 5.32**.

**TABLE 5.32: HOMELAND SECURITY ADVISORY SYSTEM**

Threat Level	Description	Federal Government Agency Response
<b>SEVERE</b>	Severe Risk of Terrorist Attacks	Under a Severe threat level, personnel will be increased or redirected to address emergency needs, specially trained teams will be pre-positioned as needed, transportations systems are to be monitored, redirected, and/or constrained, and public and government facilities may be closed.
<b>HIGH</b>	High Risk of Terrorist Attacks	A High threat level requires coordinating efforts between Federal, State, and local law enforcement agencies, taking additional precautions at public events (including alternate venues and cancellation), restricting threatened facilities to essential personnel only, and preparing to execute contingency procedures if necessary.
<b>ELEVATED</b>	Significant Risk of Terrorist Attacks	In Elevated situations, agencies should increase surveillance of critical places, coordinate emergency plans with neighboring jurisdictions, and implementing emergency response plans, where appropriate.
<b>GUARDED</b>	General Risk of Terrorist Attacks	This threat level requires that agencies check communications with designated emergency response and command locations, reviewing and updating emergency response plans, and providing the public with information to better manage a terrorist attack situation.
<b>LOW</b>	Low Risk of Terrorist Attacks	Requires "proactive measures" such as making sure as personnel is trained to deal with a terrorist attack, identifying vulnerabilities to a terrorist attack, and mitigating any vulnerabilities.

**5.16.2 Location and Spatial Extent**

There are few high risk targets in the Toe River Region. However, Baxter Healthcare, located in Marion, North Carolina, is the sole producer of saline bags for use in administering intravenous fluids, and is therefore a notable facility. Beyond this facility, the region is uniformly at risk to a terrorist attack since such events have no geographic boundaries. However, certain acts of terror, such as a bombing, will affect localized areas while others, such as chemical agents, may affect areas for miles if carried by persons, water, or wind.

Vulnerability of the utility grid was another concern that was brought up by the Regional Hazard Mitigation Planning Committee during the 2015/2016 update of this plan.

### **5.16.3 Historical Occurrences**

There is no known history of an act of terror occurring in the Toe River Region.

### **5.16.4 Probability of Future Occurrence**

The probability of a future terrorist attack in the Toe River Region is unlikely. However, a single event could have devastating effects on human lives, the economy, and future way of life.

## **5.17 WILDFIRE**

### **5.17.1 Background**

A wildfire is any outdoor fire (i.e. grassland, forest, brush land) that is not under control, supervised, or prescribed.<sup>22</sup> Wildfires are part of the natural management of forest ecosystems, but may also be caused by human factors.

Nationally, over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning. In South Carolina, 98 percent of wildfires are human-caused. The number one cause is woods arson, followed by debris burning.

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

Wildfire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural hazards (such as tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. The South Carolina wildfire season runs from late winter to early spring with March being the most severe.

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.

Wildfires can result in severe economic losses as well. Businesses that depend on timber, such as paper mills and lumber companies, experience losses that are often passed along to consumers through higher prices, and sometimes jobs are lost. The high cost of responding to and recovering from wildfires can

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<sup>22</sup> Prescription burning, or “controlled burn,” undertaken by land management agencies is the process of igniting fires under selected conditions, in accordance with strict parameters.

deplete state resources and increase insurance rates. The economic impact of wildfires can also be felt in the tourism industry if roads and tourist attractions are closed due to health and safety concerns.

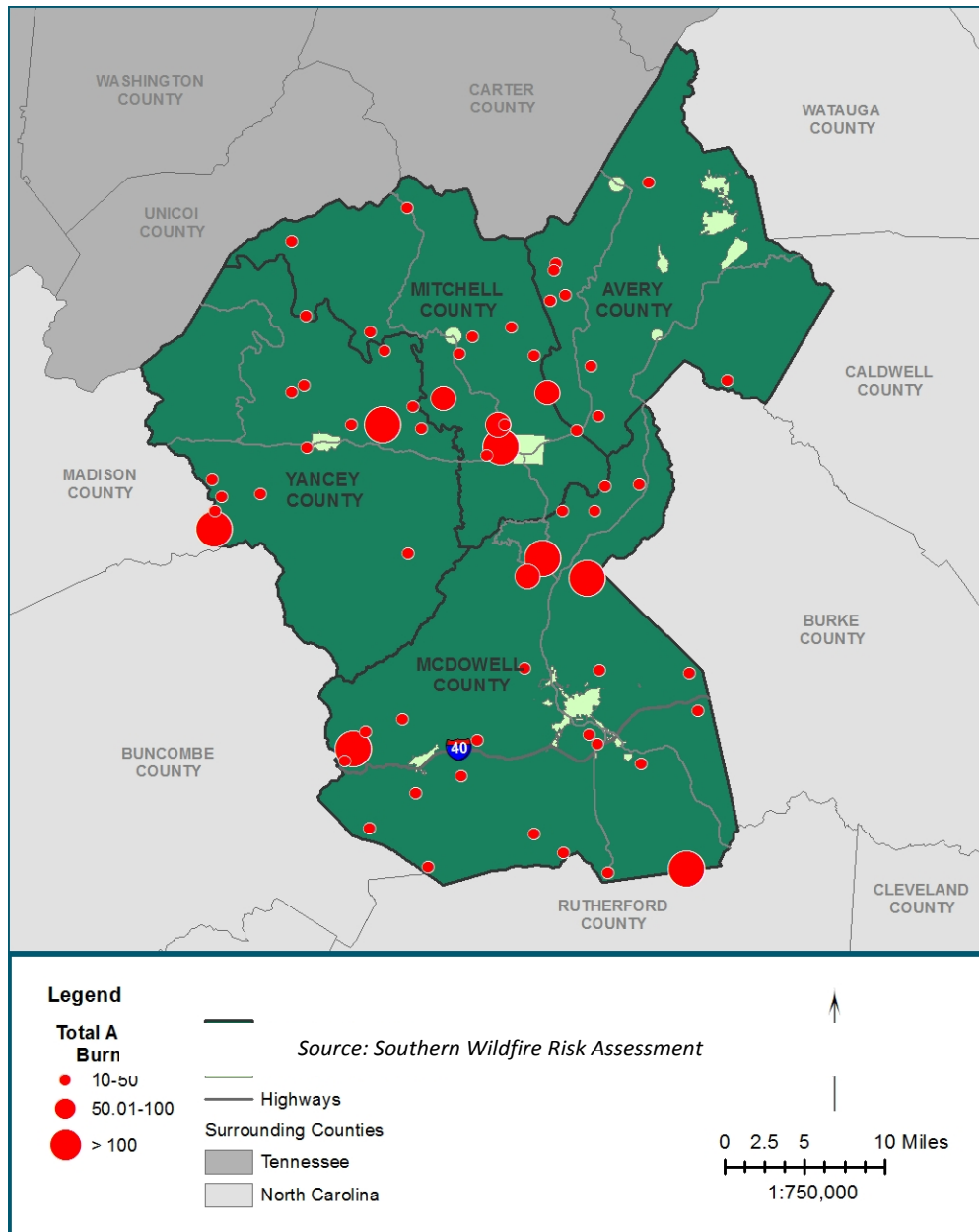
State and local governments can impose fire safety regulations on home sites and developments to help curb wildfire. Land treatment measures such as fire access roads, water storage, helipads, safety zones, buffers, firebreaks, fuel breaks and fuel management can be designed as part of an overall fire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

### **5.17.2 Location and Spatial Extent**

The entire region is at risk to a wildfire occurrence. However, drought conditions may make a fire more likely in those locations. Further, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas.

### **5.17.3 Historical Occurrences**

**Figure 5.19** shows the historic wildfire events that have occurred in the Toe River region. The data was provided by the North Carolina Forest Service and only events greater than 10 acres were mapped.

**FIGURE 5.19: HISTORIC WILDFIRE EVENTS IN THE TOE RIVER REGION**

Based on data from the North Carolina Forest Service from 1970 to 2008 (data through November 2015 has been requested, request still pending), the Toe River Region experiences an average of 32 wildfires annually which burn a combined 95 acres, on average. **Table 5.33** provides a summary table for wildfire occurrences in the Toe River Region. **Table 5.34** lists the number of reported wildfire occurrences in the participating counties between the years 2000 and 2008.

**TABLE 5.33: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (1970 -2008)\***

	Avery County	McDowell County	Mitchell County	Yancey County	Toe River Region
Number of Fires per year	19.56	74.72	18.44	16.18	32.22
Number of Acres Burned per fire	1.68	2.36	6.92	2.71	3.42
Number of Acres Burned per year	32.82	176.64	127.53	43.89	95.22

\*These values reflect averages over a 38 year period. Pending updated data as of November 2015.

Source: North Carolina Forest Service

**TABLE 5.34: HISTORICAL WILDFIRE OCCURRENCES IN THE TOE RIVER REGION**

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
<b>Avery County</b>									
Number of Fires	30	36	24	10	15	10	36	29	21
Number of Acres	95.0	30.8	13.3	7.4	9.9	31.1	61.6	9.5	26.2
<b>McDowell County</b>									
Number of Fires	36	59	57	16	38	35	78	78	52
Number of Acres	62.1	118.0	69.2	9.7	26.3	23.4	132.3	818.0	295.7
<b>Mitchell County</b>									
Number of Fires	24	35	26	12	24	17	25	35	20
Number of Acres	2794.0	237.8	39.8	22.3	24.5	39.2	106.2	151.1	34.9
<b>Yancey County</b>									
Number of Fires	19	36	25	6	15	20	28	25	27
Number of Acres	76.4	120.5	197.6	14.0	17.0	39.0	58.1	36.7	13.9

Source: North Carolina Forest Service, Pending updated data as of November 2015

In addition, the Toe River Regional Hazard Mitigation Planning Committee noted that there was a large wildfire on October 31, 2000 in Tipton Hill (Yancey County). No further information on this event was found through internet searches, but it was characterized as a very large event.

#### 5.17.4 Probability of Future Occurrences

There is a high probability of future wildfire events in the Toe River Region. The likelihood of wildfires increases during drought cycles and abnormally dry conditions. As noted by the fire chief, the 2010

wildfire season is expected to be especially severe in the region. This is due to the severity of the winter and thus an increased build up in fire fuels on the ground. In addition, increased development in the area leads to increased risk.

## 5.18 CONCLUSIONS ON HAZARD RISK

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

### 5.18.1 Hazard Extent

Table 5.35 describes the extent of each natural hazard identified for the Toe River Region. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

**TABLE 5.35 EXTENT OF TOE RIVER REGION HAZARDS**

Atmospheric Hazards	
Drought	Drought extent is defined by the North Carolina Drought Monitor Classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought (see page 5:5). According the North Carolina Drought Monitor Classifications, the most severe drought condition is Exceptional. The participating jurisdictions have received this ranking twice in the sixteen year reported history (2007, 2008). Extreme Drought conditions were reported in 2000, 2001 and 2002.
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the Toe River Region was 2.75 inches. It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.8). The greatest classification of hurricane to impact the Toe River Region was Hurricane Hugo, which was a Category 1 hurricane when it passed through the Region.
Lightning	According to the NOAA flash density map (Figure 5.7), the majority of the Toe River Region is located in an area that experiences 2-8 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Severe Thunderstorm	Thunderstorm extent is defined by the number of thunder events and wind speeds reported. According to a 60-year history from the National Climatic Data Center, the strongest recorded thunderstorm wind in the Toe River Region was reported on May 2, 2003 at 70 knots (approximately 80 mph). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by Tornado Occurrences in the US provided by FEMA (Figure 5.6) as well as the Fujita/Enhanced Fujita Scale (Tables 5.16 and 5.17). The greatest magnitude reported was an F2 (last reported on May 7, 1998).
Winter Storm and Freeze	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall (36 inches) and single storm snowfall

	(50 inches) in North Carolina were recorded in the Toe River Region (both in March 1993 at Mount Mitchell).
<b>Geologic Hazards</b>	
Earthquake	Earthquake extent can be measured by the Richter Scale (Table 5.22) and the Modified Mercalli Intensity (MMI) scale (Table 5.23) and the distance of the epicenter from the Toe River Region. According to data provided by the National Geophysical Data Center, the greatest MMI to impact the Region was reported in Yancey County with a MMI of VI (strong) with a correlating Richter Scale measurement of approximately 5.4.
Landslide	<p>As noted above in the landslide profile, the landslide data provided by the North Carolina Geological survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. Further, dollar damage estimates from the North Carolina Department of Transportation only include recent events.</p> <p>Based on the best available data from the North Carolina Geological Survey, extent is defined an average of events per year. It is known that 88 total landslides have occurred in the Toe River Region between 1940 and 2015. This averages to 1.17 landslide events per year</p>
<b>Hydrologic Hazards</b>	
Dam Failure	Dam Failure extent is defined using the North Carolina Division of Land Resources criteria (Table 5.26). Of the 108 dams in the Toe River Region, 47 are classified as high-hazard.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records located in the Toe River Region.
Flood	<p>Flood extent is measured by the amount of land and property in the floodplain. There are approximately 1,219 square miles in the Toe River Region. Of these, there are approximately 0.325 square miles of land in zone A ( 1-percent annual chance floodplain), 37.815 square miles of land in zone AE (1-percent annual chance with elevation), and 2.506 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain). The amount of land in the floodplain accounts for 0.03 percent of the total land area in the Toe River Region.</p> <p>The greatest depth of flood waters reported in the region was recorded after the 2004 floods. Waters for that event were estimated to be 21 feet above the normal channel of the river. That event serves as the “flood of record” for the region. “Average” flood events typically include flood waters 4-10 feet above flood stage.</p> <p>The depth of flood waters varies across the region, but generally it is not so much the depth of the floodwaters that causes a problem, but the velocity that causes the most problems. Flash flood waters in mountainous terrain such as that of the Toe River region can be very dangerous and often deadly.</p>
<b>Other Hazards</b>	
Wildfire	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county from 1970 to 2008. (Data through November 2015 has been requested but the request is still pending.) The greatest number of fires to occur in any year was 37 fires. This occurred in 1981 and 1992in Yancey County when 96 acres and 57 acres were burned, respectively. The greatest number of acres to burn in a single year occurred in 2000 in Mitchell County



when 2,794 acres were burned in 24 fires.

Analyzing the data by county indicates the following wildfire hazard extent for each county.

***Avery County***

The greatest number of fires to occur in any year was 36 fires. This occurred in 2001 and 2006 when 30.8 acres and 61.6 acres were burned, respectively.

The greatest number of acres to burn in a single year occurred in 1999 when 144.4 acres were burned in 33 fires.

***McDowell County***

The greatest number of fires to occur in any year was 541 fires. This occurred in 1971 when 277.0 acres and were burned.

The greatest number of acres to burn in a single year occurred in 1985 when 1,021 acres were burned in 98 fires.

***Mitchell County***

The greatest number of fires to occur in any year was 35 fires. This occurred in 2001 and 2007 when 237.8 acres and 151.1 acres were burned, respectively.

The greatest number of acres to burn in a single year occurred in 2000 when 2,794 acres were burned in 24 fires.

***Yancey County***

The greatest number of fires to occur in any year was 37 fires. This occurred in 1981 and 1992 when 96 acres and 57 acres were burned, respectively.

The greatest number of acres to burn in a single year occurred in 1970 when 214 acres were burned in 17 fires.

### 5.18.2 Priority Risk Index

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

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

The application of the PRI results in numerical values that allow identified hazards to be ranked against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time and duration). Each degree of risk has been assigned a value (1 to 4) and an agreed upon weighting factor<sup>23</sup>, as summarized in **Table 5.36**. To calculate the PRI value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final PRI value, as demonstrated in the example equation below:

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

According to the weighting scheme and point system applied, the highest possible value for any hazard is 4.0. When the scheme is applied for the Toe River Region, the highest PRI value is 3.3 (winter storm and freeze hazard). Prior to being finalized, PRI values for each identified hazard were reviewed and accepted by the members of the TRRHM Planning Committee.

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<sup>23</sup> The Regional Hazard Mitigation Planning Committee, based upon any unique concerns or factors for the planning area, may adjust the PRI weighting scheme during future plan updates.

**TABLE 5.36: PRIORITY RISK INDEX FOR THE TOE RIVER REGION**

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

### 5.18.3 Priority Risk Index Results

**Table 5.37** summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this section, as well as input from the TRRHM Planning Committee. The results were then used in calculating PRI values and making final determinations for the risk assessment.

**TABLE 5.37: SUMMARY OF PRI RESULTS FOR THE TOE RIVER REGION**

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
<b>Atmospheric Hazards</b>						
Drought	Likely	Minor	Small	More than 24 hours	More than one week	<b>2.1</b>
Hailstorm	Highly Likely	Minor	Moderate	Less than 6 hours	Less than 6 hours	<b>2.6</b>
Hurricane and Tropical Storm	Possible	Minor	Large	More than 24 hours	Less than 24 hours	<b>2.0</b>
Lightning	Highly Likely	Minor	Negligible	Less than 6 hours	Less than 6 hours	<b>2.2</b>
Severe Thunderstorm	Highly Likely	Critical	Moderate	Less than 6 hours	Less than 6 hours	<b>3.2</b>
Tornado	Possible	Limited	Small	Less than 6 hours	Less than 6 hours	<b>2.1</b>
Winter Storm and Freeze	Highly Likely	Critical	Large	More than 24 hours	Less than one week	<b>3.3</b>
<b>Geologic Hazards</b>						
Earthquakes	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	<b>2.3</b>
Landslide	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	<b>2.8</b>
<b>Hydrologic Hazards</b>						
Dam and Levee Failure	Unlikely	Critical	Moderate	More than 24 hours	Less than 6 hours	<b>2.0</b>
Erosion	Possible	Minor	Small	More than 24 hours	More than one week	<b>1.8</b>
Flood	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 24 hours	<b>2.9</b>
<b>Other Hazards</b>						
Hazardous Materials Incident	Possible	Limited	Small	Less than 6 hours	Less than 24 hours	<b>2.2</b>
Terror Threat	Unlikely	Critical	Small	Less than 6 hours	Less than 6 hours	<b>2.1</b>
Wildfire	Likely	Minor	Small	Less than 6 hours	Less than one week	<b>2.1</b>

## 5.19 FINAL DETERMINATIONS

The conclusions drawn from the hazard profiling process for the Toe River Region, including the PRI results and input from the Regional Hazard Mitigation Planning Committee, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk and Low Risk (**Table 5.38**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the Toe River Region. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment*. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

During the 2015/2016 update of the plan, the Regional Hazard Mitigation Planning committee reviewed most recent hazard profile data and voted to increase the risk of the terror threat hazard and wildfire hazard from low to moderate. The table below reflects those changes.

**TABLE 5.38: CONCLUSIONS ON HAZARD RISK FOR THE TOE RIVER REGION**

<b>HIGH RISK</b>	Winter Storm and Freeze Severe Thunderstorm/Wind Storm Flood Landslide
<b>MODERATE RISK</b>	Earthquake Hailstorm Lightning Hazardous Material Incident Wildfire Terror Threat
<b>LOW RISK</b>	Drought Tornado Hurricane and Tropical Storm Dam and Levee Failure Erosion

# SECTION 6

## VULNERABILITY ASSESSMENT

### 44 CFR Requirement

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

The remainder of this section is comprised of the following subsections:

6.1:	Overview	6.10	Winter Storm and Freeze
6.2:	Methodology	6.11	Earthquake
6.3:	Study Area Definition	6.12	Landslide
6.4:	Drought	6.13	Dam and Levee Failure
6.5:	Hailstorm	6.14	Flood
6.6:	Hurricane and Tropical Storm	6.15	Hazardous Materials Incident
6.7:	Lightning	6.16	Terror Threat
6.8:	Severe Thunderstorm	6.17	Wildfire
6.9:	Tornado		

### 6.1 OVERVIEW

This section builds upon the information provided in Section 4: *Hazard Identification and Section 5: Hazard Profiles* by identifying and characterizing an inventory of assets in the Toe River Region. In addition, the potential impact and expected amount of damages caused to these assets by each identified hazard event is assessed. The primary objective of the vulnerability assessment is to quantify exposure and the potential loss estimates for each hazard. In doing so, the Toe River counties and their participating jurisdictions may better understand their unique risks to identified hazards and be better prepared to evaluate and prioritize specific hazard mitigation actions.

This section begins with an explanation of the methodology applied to complete the vulnerability assessment, followed by a summary description of the assets in the Toe River study area including improved property, critical facilities, and population estimates. The remainder of this section focuses on the results of the vulnerability assessment conducted and is organized by hazard as listed below:

- **Atmospheric**
  - Drought
  - Hailstorm
  - Hurricane and Tropical Storm
  - Lightning
  - Severe Thunderstorm
  - Tornado
  - Winter Storm and Freeze
  
- **Geologic**
  - Earthquake
  - Landslide
  
- **Hydrologic**
  - Dam and Levee Failure
  - Flood
  
- **Other**
  - Hazardous Materials Incident
  - Terror Threat
  - Wildfire

## 6.2 METHODOLOGY

This vulnerability assessment was conducted using two distinct methodologies: (1) utilizing a geographic information system (GIS)-based analysis; and (2) applying a statistical risk assessment methodology. Each approach provides estimates for the potential impact of hazards by using a common, systematic framework for evaluation, including historical occurrence information provided in the *Hazard Profile* section. The results of the vulnerability assessment for the aforementioned hazards are provided following the information on hazard identification and analysis.

A GIS-based analysis was conducted for eight hazards:

- Dam and Levee Failure
- Earthquake
- Flood
- Hazardous Materials Incidents
- Hurricane and Tropical Storm
- Landslide
- Wildfire



A statistical risk assessment approach was used to analyze seven hazards:

- Drought
- Hailstorm
- Severe Thunderstorm
- Lightning
- Terror Threat
- Tornado
- Winter Storm and Freeze

A brief description of the two different approaches is provided on the following pages.

### 6.2.1 GIS-Based Analysis

For the GIS-based analysis, digital data was collected from local, regional, state and national sources. ESRI® ArcGIS™ 9.3 was used to assess hazard vulnerability utilizing this digital data, including local tax assessor records for individual parcels and buildings and geo-referenced point locations for identified assets (critical facilities and infrastructure, special populations, etc.). Using these data layers, hazard vulnerability can be quantified by estimating the assessed building value for parcels and/or buildings determined to be located in identified hazard areas. FEMA's HAZUS-MH software (further described below) was also used to model hurricane winds, riverine flood, and earthquake and estimate potential losses for these hazards. To estimate vulnerable populations in hazard areas, digital Census 2000 data by census block was obtained and census blocks intersecting with hazard areas were used to determine exposed population counts.

The objective of the GIS-based analysis was to determine the estimated vulnerability of people, buildings and critical facilities to the identified hazards for Toe River counties and jurisdictions using best available geospatial data. Local databases were made available through Avery County, McDowell County, and Yancey County including tax assessor records, parcel records, building footprints, and critical facilities data, as well as other regional, state, and federal government data sources were used in combination with digital hazard data as described in the *Hazard Identification and Analysis* section. The results of the analysis provided an estimate of the number of people, buildings, and critical facilities, as well as the value of buildings, determined to be potentially at risk to those hazards with delineable geographic hazard boundaries. A more specific description of the GIS-based analysis conducted for each particular hazard is provided in the individual hazard sections.

#### **HAZUS-MH**

HAZUS-MH is a standardized loss estimation software program developed by FEMA. It is built upon an integrated GIS platform to conduct analysis at a regional level (i.e., not on a structure-by-structure basis). The



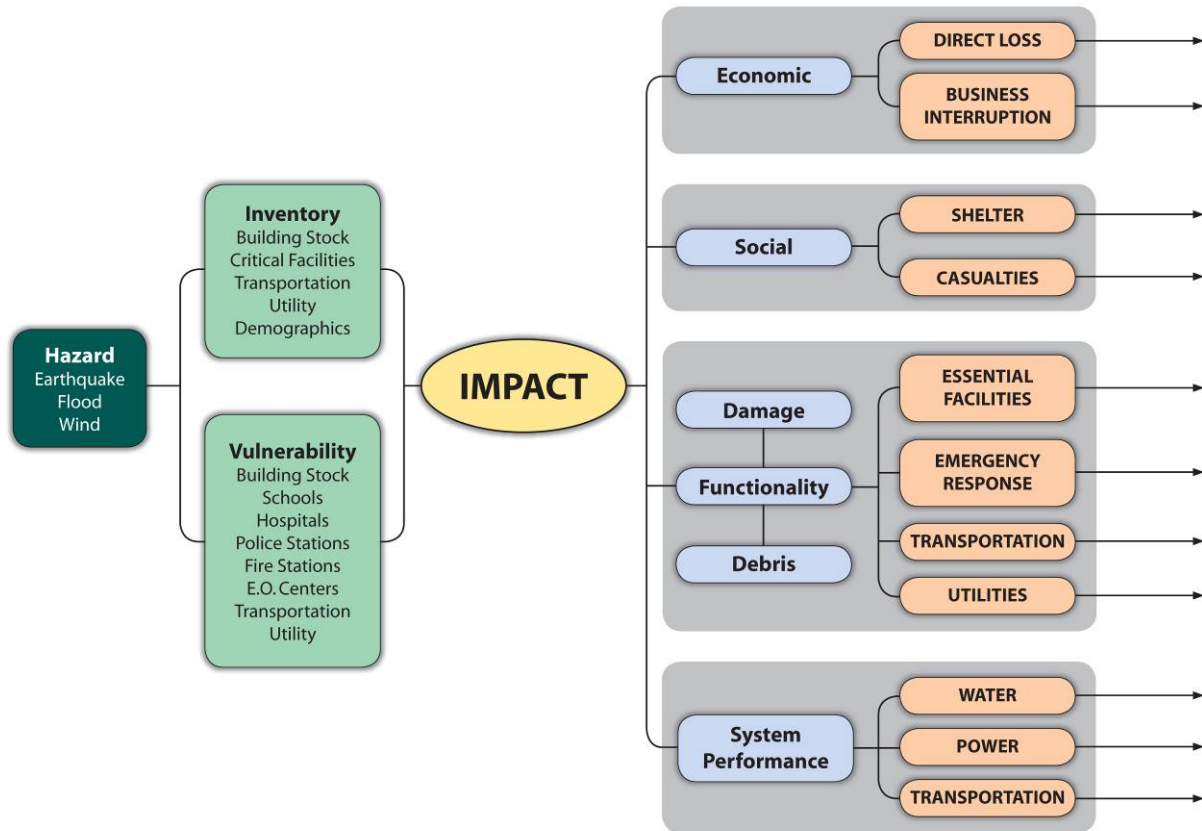
HAZUS-MH risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g., wind speed and building types) can be modeled using the software to determine the impact (i.e., damages and losses) on the built environment.

This risk assessment for the Toe River Region applied HAZUS-MH to produce hazard profiles and estimate losses for four hazards for the planning area. At the time this analysis was completed, HAZUS-MH MR-4 was used to estimate potential losses from hurricane winds, flood, and earthquake hazards using HAZUS-MH methodology. In generating loss estimates through HAZUS-MH, some data normalization was necessary to account for recognized differences between actual assessed building values as provided by the Toe River Region counties and estimated replacement building value data as provided within HAZUS-MH. In order to account for the difference between modeled and actual values, the ratio of estimated losses produced by HAZUS-MH as compared to total HAZUS-MH building inventory was used to estimate percent damage. The percent damage ratio was then applied to the local assessed values in order to estimate annualized potential losses and loss ratios in the Toe River Region for this analysis.

**Figure 6.1** illustrates the conceptual model of the HAZUS-MH methodology as applied to the Toe River Region.

For the 2015 update, Hazus runs were not updated due to limited advancements with the Hazus software and the underlying data used in the analyses (primarily Census data). For future updates of the plan the Regional Hazard Mitigation Planning Committee will evaluate the need to update the Hazus runs.

FIGURE 6.1: CONCEPTUAL MODEL OF HAZUS-MH METHODOLOGY



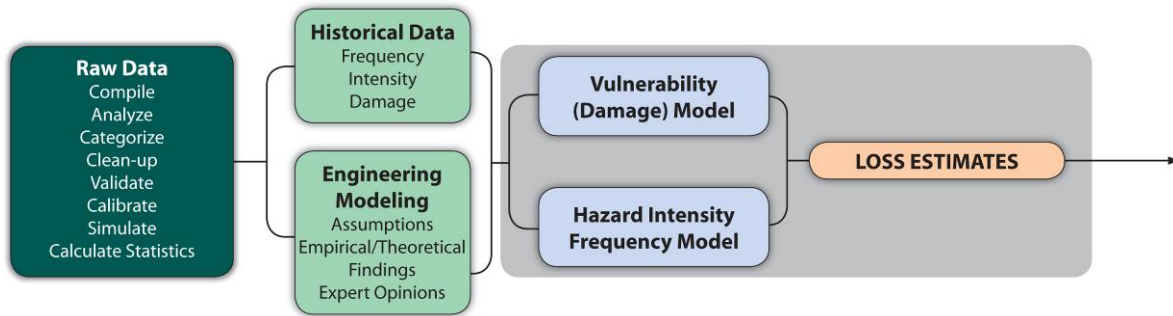
## 6.2.2 Statistical Risk Assessment Methodology

The statistical risk assessment methodology was applied to analyze hazards of concern that were outside the scope of HAZUS-MH and the GIS-based risk assessment. This includes hazards that do not have geographically-definable boundaries and are therefore excluded from spatial analysis through GIS. Examples include hailstorm, lightning, and tornado. This methodology uses a statistical approach and mathematical modeling of risk to predict a hazard's frequency of occurrence and estimated impacts based on recorded or historic damage information (presented in the *Hazard Identification and Analysis* section). Historical data for each hazard as described in the *Hazard Identification and Analysis* section was used and statistical evaluations were performed using manual calculations. The general steps used in the statistical risk assessment methodology are summarized below:

1. Compile data from local, state and national sources, as well as literature;
2. Clean up data, including removal of duplicate records and update losses to account for inflation;
3. Identify patterns in frequency, intensity, vulnerability and loss
4. Statistically and probabilistically extrapolate the patterns; and
5. Produce meaningful results, including the development of annualized loss estimates.

**Figure 6.2** illustrates a conceptual model of the statistical risk assessment methodology as applied to the Toe River Region.

**FIGURE 6.2: CONCEPTUAL MODEL OF THE STATISTICAL RISK ASSESSMENT METHODOLOGY**



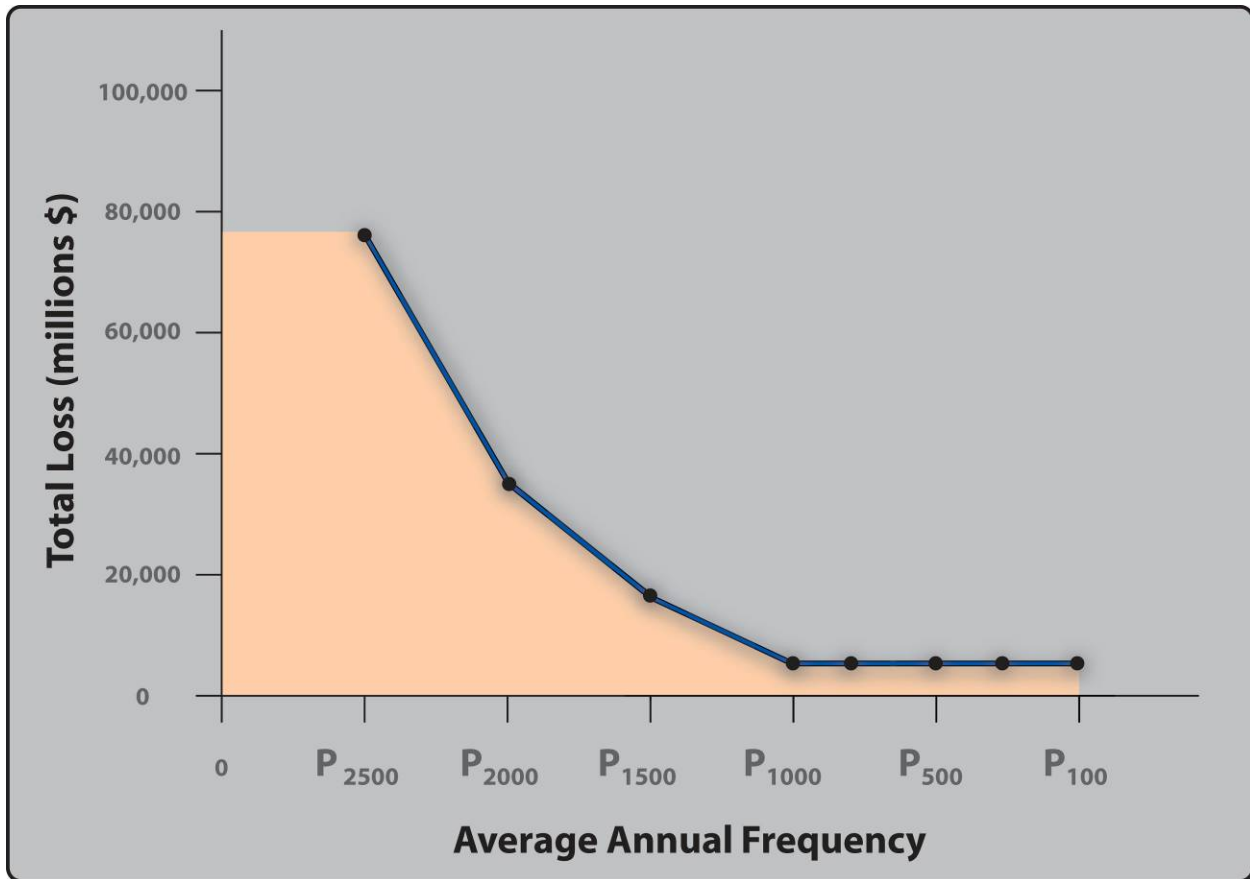
The vulnerability assessment findings are presented in terms of potential annualized losses, whenever possible. In general, presenting results in the annualized form is useful in three ways:

1. This approach accounts for the contribution of potential losses from all future disasters;
2. Annualized results for different hazards are readily comparable, thus easier to rank; and
3. The use of annualized losses is the most objective approach for evaluating mitigation alternatives.

Annualized losses for the hazards where the parametric approach was utilized were computed in a three-step process:

1. Compute/estimate losses for a number of scenario events with different return periods [e.g., 10-year, 100-year, 200-year, 500-year, etc.];
2. Approximate the Probability versus Loss Curve through curve fitting; and
3. Calculate the area under the fitted curve to obtain annualized losses.

This approach is illustrated graphically in **Figure 6.3**. For other hazards where the statistical approach was used, the computations are based primarily on the observed historical losses.

**FIGURE 6.3: GRAPHICAL REPRESENTATION OF THE ANNUALIZED LOSS METHODOLOGY**

The economic loss results are presented here using two interrelated risk indicators: Annualized Loss and Annualized Loss Ratio. The Annualized Loss is the estimated long-term weighted average value of losses to property in any single year in a specified geographic area (i.e., municipal jurisdiction). The Annualized Loss Ratio expresses estimated annualized loss normalized by assessed building value.

The estimated Annualized Loss (AL) addresses the key idea of risk: the probability of the loss occurring in the study area (largely a function of building construction type and quality). By annualizing estimated losses, the AL factors in historic patterns of frequent smaller events with infrequent but larger events to provide a balanced presentation of the risk. The Annualized Loss Ratio (ALR) represents the AL as a fraction of the assessed value of the local inventory. This ratio is calculated using the following formula:

$$\text{ALR} = \text{Annualized Losses} / \text{Total Exposure}$$

The ALR gauges the relationship between average annualized loss and assessed values. This ratio can be used as a measure of vulnerability in the areas and, since it is normalized by assessed value, it can be directly compared across different geographic units such as metropolitan areas, counties or municipalities.

Loss estimates provided in this vulnerability assessment are based on best available data, and the methodologies applied result in an approximation of risk. These estimates should be used to

understand relative risk from hazards and potential losses. Uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from approximations and simplifications that are necessary for a comprehensive analysis (e.g., incomplete inventories, demographics or economic parameters).

All conclusions are presented in “Conclusions on Hazard Vulnerability” (Section 6.18) at the end of this section. Findings for each hazard are detailed in the hazard-by-hazard vulnerability assessment that follows.

## 6.3 STUDY AREA DEFINITION

### 6.3.1 Asset Inventory

An inventory of geo-referenced assets with the Toe River counties was compiled in order to identify and characterize those properties potentially at risk to the identified hazards<sup>1</sup>. By understanding the type and number of assets that exist and where they are located in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed. Under this assessment, two categories of assets were created and then further assessed through GIS analysis. The two categories of assets consist of:

1. **Improved Property:** Includes all improved properties in the Toe River Region according to local parcel data provided by counties when available. The information has been expressed in terms of the number of parcels, number of buildings (based upon building footprint data), and total assessed value of improvements (buildings) that may be exposed to the identified hazards. When parcel information was not available, HAZUS-MH was used to determine the number of buildings and their associated value.
2. **Critical Facilities:** Includes airports, fire stations, hospitals, police stations, airports, schools, and other critical facilities located within the Toe River Region. While this listing is not all-inclusive for assets located in the region, it is anticipated that it will be expanded during future plan updates as more geo-referenced data becomes available for use in GIS analysis.

The following tables (Table 6.1 and Table 6.2) provide a detailed listing of the geo-referenced assets that have been identified for inclusion in the vulnerability assessment for the Toe River Region.

### 6.3.2 Improved Property

**Table 6.1** lists the number of parcels, the estimated number of buildings and the total assessed value of improvements for participating areas of the Toe River Region (study area of vulnerability assessment).<sup>2</sup>

**Table 6.2** lists the building counts for each participating jurisdiction as provided from Hazus MR-4.

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<sup>1</sup> While potentially not all-inclusive for Toe River, “georeferenced” assets include those assets for which specific location data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis.

<sup>2</sup> Total assessed values for improvements is based on most recent tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities.



**TABLE 6.1: IMPROVED PROPERTY IN THE TOE RIVER REGION**

Location	Number of Parcels	2010 Census Housing Count	Building Footprint Layer Building Count	Total Assessed Value of Improvements (as of 2015)
<b>Avery County</b>	<b>24,032</b>	<b>13,890</b>	<b>11,334</b>	<b>\$2,618,365,709</b>
Banner Elk	1,035	611	533	\$155,881,729
Crossnore	178	87	147	\$60,648,200
Elk Park	384	255	238	\$19,865,600
Grandfather Village	418	408	357	\$176,687,125
Newland	522	354	444	\$82,245,474
Sugar Mountain	1,084	1,541	290	\$111,819,800
Unincorporated Area	20,411	10,634	9,325	\$2,011,217,781
<b>McDowell County</b>	<b>31,471</b>	<b>20,808</b>	<b>n/a</b>	<b>\$2,122,747,994</b>
Marion	3,872	3,368	n/a	\$475,926,733
Old Fort	632	492	n/a	\$76,708,200
Unincorporated Area	26,967	16,948	n/a	\$1,570,313,061
<b>Mitchell County</b>	<b>17,459</b>	<b>8,713</b>	<b>11,128</b>	<b>\$1,204,864,800</b>
Bakersville	331	269	267	\$42,219,800
Spruce Pine	1,388	992	1,069	\$172,387,200
Unincorporated Area	15,740	7,452	9,792	\$990,257,800
<b>Yancey County</b>	<b>17,071</b>	<b>11,032</b>	<b>n/a</b>	<b>\$1,344,937,472</b>
Burnsville	976	881	n/a	\$136,597,150
Unincorporated Area	16,095	10,151	n/a	\$1,208,340,322
<b>TOE RIVER REGION TOTAL</b>	<b>95,633</b>	<b>54,443</b>	<b>22,462</b>	<b>\$7,290,915,975</b>

\*Building improvements under \$5,000 are not included in the building count.

Source: Avery County GIS, McDowell County GIS, Mitchell County GIS, Yancey County GIS, US Census

**TABLE 6.2: BUILDING COUNTS FROM HAZUS MR-4**

Location	Total Number of Buildings	Residential Buildings	Commercial Buildings	Other Buildings
<b>Avery County</b>	<b>13,150</b>	<b>12,389</b>	<b>437</b>	<b>324</b>
Banner Elk	417	357	42	18
Crossnore	165	149	8	8
Elk Park	351	329	17	5
Grandfather Village	273	270	2	1
Newland	546	470	54	22
Sugar Mountain	749	715	25	9
Unincorporated Area	10,649	10,099	289	261
<b>McDowell County</b>	<b>20,685</b>	<b>19,632</b>	<b>670</b>	<b>383</b>

Location	Total Number of Buildings	Residential Buildings	Commercial Buildings	Other Buildings
Marion	3,161	2,833	226	102
Old Fort	633	597	24	12
Unincorporated Area	16,891	16,202	420	269
<b>Mitchell County</b>	<b>9,317</b>	<b>8,797</b>	<b>316</b>	<b>204</b>
Bakersville	287	249	21	17
Spruce Pine	1,321	1,133	113	75
Unincorporated Area	7,709	7,415	182	112
<b>Yancey County</b>	<b>10,759</b>	<b>10,342</b>	<b>262</b>	<b>155</b>
Burnsville	1,098	957	94	47
Unincorporated Area	9,661	9,385	168	108
<b>TOE RIVER REGION TOTAL</b>	<b>53,911</b>	<b>51,160</b>	<b>1,685</b>	<b>1,066</b>

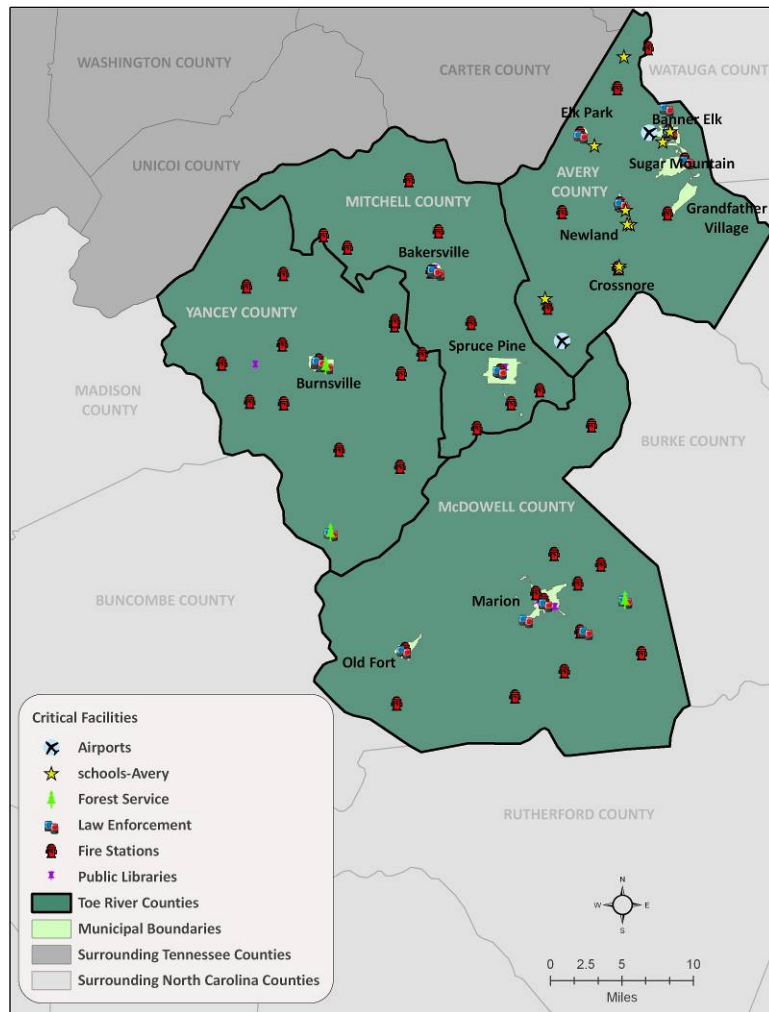
### 6.3.3 Critical Facilities

**Table 6.3** lists the fire stations, police stations, airports, and other essential facilities in the Toe River Region. In addition, **Figure 6.4** shows the locations of essential facilities in the Toe River Region. **Table 6.39**, near the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by the counties.

**TABLE 6.3: CRITICAL FACILITY INVENTORY IN THE TOE RIVER REGION**

Facility	Avery County	McDowell County	Mitchell County	Yancey County	Toe River Region Total
Fire Stations	10	13	10	14	47
Police Stations	8	5	3	3	19
Forest Service	0	1	0	2	3
Hospital	1	0	0	0	0
Schools	10	0	0	0	0
Libraries	1	3	2	2	8
Airports	2	0	0	0	0

Source: Avery County GIS, McDowell County GIS, Yancey County GIS

**FIGURE 6.4: CRITICAL FACILITY LOCATIONS IN THE TOE RIVER REGION**

### 6.3.4 Social Vulnerability

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

**Table 6.4** lists the population by jurisdiction according to U.S. Census population 2014 estimates. Overall, the population in the region is down by about 0.5% since 2010.

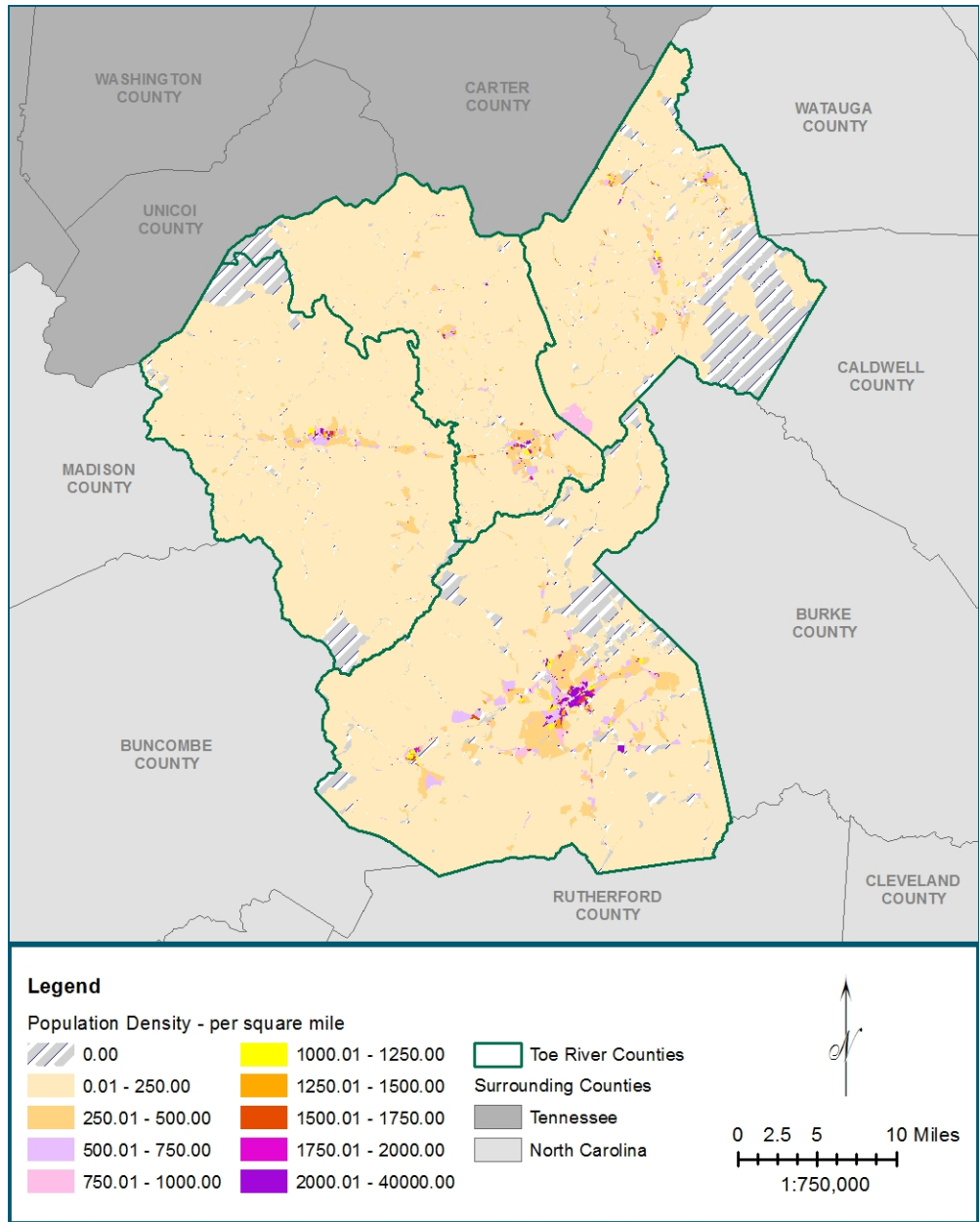
**TABLE 6.4: TOTAL POPULATION IN THE TOE RIVER REGION**

Location	Total Population (2014 Estimate)
<b>Avery County</b>	<b>17,773</b>
Banner Elk	1,113
Crossnore	202
Elk Park	445
Grandfather Village	25
Newland	692
Sugar Mountain	198
<b>McDowell County</b>	<b>44,965</b>
Marion	7,885
Old Fort	911
<b>Mitchell County</b>	<b>15,311</b>
Bakersville	455
Spruce Pine	2,123
<b>Yancey County</b>	<b>17,614</b>
Burnsville	1,673
<b>TOE RIVER REGION TOTAL</b>	<b>95,633</b>

Source: US Census, 2010

**Figure 6.5** illustrates the population density per square mile across the region as it was reported by the U.S. Census Bureau in 2000 at the census block level. The total population in the Toe River Region according to Census data was 95,633 persons. As can be seen in the figure, a majority of the region has less than 250 people per square mile, and McDowell County the highest population concentrations among the participating counties. More specific information on the estimated number of people living within identified hazard areas is provided throughout this section.

**FIGURE 6.5: POPULATION DENSITY IN THE TOE RIVER REGION**

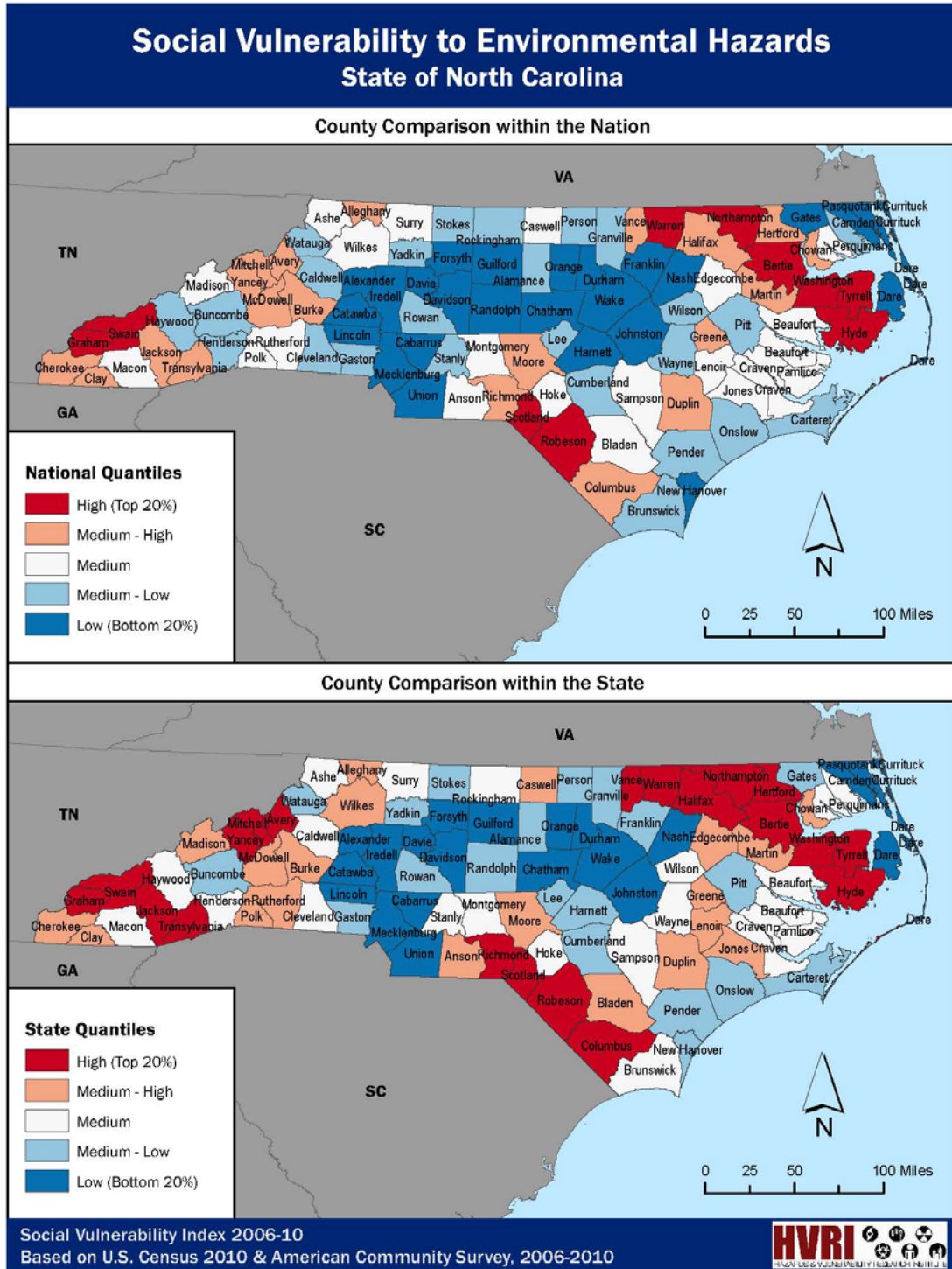


Source: U.S. Census Bureau, 2010

Figures 6. 6 provides social vulnerability results as provided by the University of South Carolina’s Hazards and Vulnerability Research Institute. A comparative metric of 29 socioeconomic variables was used to indicate where there is potential social vulnerability when comparing counties to other counties nationally and against other counties in North Carolina. On the national level, the Toe River counties fall within the “medium-high” social vulnerability category when compared with other counties in the country. In North Carolina, Mitchell, Yancey and Avery counties fall within the top 20% of socially

vulnerable counties (the “High” quantile) when compared with other North Carolina counties. McDowell County falls within the “Medium-High” quantile.

**FIGURE 6.6: SOCIAL VULNERABILITY OF THE TOE RIVER REGION**



## *Atmospheric Hazards*

### 6.4 DROUGHT

**PRI Value: 2.1**

**Annualized Loss Estimate: *Negligible***

According to the qualitative assessment performed using the PRI tool, the drought hazard scored a PRI value of 2.1 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.5** summarizes the risk levels assigned to each PRI category.

**TABLE 6.5: QUALITATIVE ASSESSMENT FOR DROUGHT**

<b>Probability</b>	Likely
<b>Impact</b>	Minor
<b>Spatial Extent</b>	Small
<b>Warning Time</b>	More than 24 hours
<b>Duration</b>	More than one week

Because it cannot be predicted where drought may occur, all existing and future buildings, facilities, agricultural crops, and populations in the Toe River Region are considered to be equally exposed to this hazard and could potentially be impacted. Further, all crops and other natural assets are at risk. An exact value for the total crop value (including shrubbery and tree farms which are prevalent in the area) is unknown.<sup>3</sup> However, drought is typically a regional occurrence, thus posing a threat to all natural assets.

#### **6.4.1 Critical Facility Vulnerability**

All of the inventoried critical facilities in the Toe River Region are equally vulnerable to the drought hazard. However, any anticipated future damages or losses to these facilities are expected to be minimal.

<sup>3</sup> Attempts were made to contact each county's Cooperative Extension Office. These offices did not have a record of the total value or losses on file.



## 6.5 HAILSTORM

**PRI Value: 2.6**

**Annualized Loss Estimate: \$44,666**

According to the qualitative assessment performed using the PRI tool, the hail hazard scored a PRI value of 2.6 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.6** summarizes the risk levels assigned to each PRI category.

**TABLE 6.6: QUALITATIVE ASSESSMENT FOR HAIL**

<b>Probability</b>	Highly Likely
<b>Impact</b>	Minor
<b>Spatial Extent</b>	Moderate
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than 6 hours

Because it cannot be predicted where hail may fall, all existing and future buildings, facilities and populations in the Toe River counties are considered to be equally exposed to this hazard and could potentially be impacted. The total value for improved value property in the region can be found in Table 6.1. It is important to note that only reported hail events have been factored into this vulnerability assessment.<sup>4</sup>

To estimate losses due to hail, NCDC historical lightning loss data was used to develop a lightning stochastic model. In this model, expected annualized losses were calculated through a non-linear regression of historical data.

**Table 6.7** summarizes annualized losses due to hail by county, total exposure, and percent loss ratios resulting from the hail hazard for the Toe River Region. While it is assumed that one major hail event could potentially result in significant losses, annualizing structural losses over a long period of time would most yields very low annualized loss estimates for the Toe River Region counties.

**TABLE 6.7: ANNUALIZED LOSSES FOR HAIL**

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
<b>Avery County</b>	17,773	\$2,618,365,709	\$0	0.00%
<b>McDowell County</b>	44,965	\$2,122,747,994	\$44,666	0.00%
<b>Mitchell County</b>	15,311	\$1,204,864,800	Negligible	n/a

<sup>4</sup> It is possible that additional hail events may have occurred since 1950 that were not reported to NCDC and are not accounted for in this analysis. The North Carolina Department of Insurance was contacted to determine if additional damage reports were available. However, no additional information was obtained.

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
Yancey County	17,614	\$1,344,937,472	\$0	0.00%
TOE RIVER REGION TOTAL	111,385	\$7,290,915,975	\$44,666	0.00%

### 6.5.1 Critical Facility Vulnerability

While all of the inventoried critical facilities in the Toe River Region are equally vulnerable to the hail hazard, although anticipated future damages or losses are expected to be minimal. A list of reported critical facilities for the Toe River Region can be found in **Table 6.39**, near the end of this section.

## 6.6 HURRICANE AND TROPICAL STORM

**PRI Value: 2.0**

**Annualized Loss Estimate: \$87,500**

According to the qualitative assessment performed using the PRI tool, the tropical storm system and hurricane hazard scored a PRI value of 2.0 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.8** summarizes the risk levels assigned to each PRI category.

**TABLE 6.8: QUALITATIVE ASSESSMENT FOR TROPICAL STORM SYSTEM AND HURRICANE**

<b>Probability</b>	Possible
<b>Impact</b>	Minor
<b>Spatial Extent</b>	Large
<b>Warning Time</b>	More than 24 hours
<b>Duration</b>	Less than 24 hours

Hurricanes and tropical storms often impact large areas and cross jurisdictional boundaries, leaving all existing and future buildings, facilities, and populations exposed to the impact of this hazard. Given its inland location, the Toe River Region would be expected to experience a lesser intensity impact than that of coastal areas. However, all areas are still considered at-risk (see Table 6.1 for the total values of improved property in the counties). Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, high winds and precipitation, thus it is difficult to estimate total potential losses from these cumulative effects. The current HAZUS-MH hurricane model only analyzes hurricane winds and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore only hurricane winds are analyzed in this section.

A probabilistic scenario was created using HAZUS-MH to assess the vulnerability of the Toe River Region to hurricane winds. Default HAZUS-MH wind speed data, damage functions, and methodology were used to determine the potential estimated losses for 50-, 100-, 200-, 500-, and 1000-year frequency events and annual expected loss at the census tract level. **Table 6.9** shows estimated potential losses to improved properties for 50-, 100-, 200-, 500- and 1000-year hurricane wind event scenarios.

**TABLE 6.9: ESTIMATED POTENTIAL LOSSES TO IMPROVED PROPERTY FROM TROPICAL STORM SYSTEM AND HURRICANE WIND BY RETURN PERIOD**

Location & Level of Event	Estimated Potential Losses
<b>Avery County</b>	
10-year	Less than \$5,000
50-year	Less than \$5,000
100-year	Less than \$5,000
200-year	<b>\$672,000</b>
500-year	<b>\$2,222,000</b>
<b>McDowell County</b>	
10-year	Less than \$5,000
50-year	Less than \$5,000
100-year	<b>\$705,000</b>
200-year	<b>\$780,000</b>
500-year	<b>\$3,076,000</b>
<b>Mitchell County</b>	
10-year	Less than \$5,000
50-year	Less than \$5,000
100-year	Less than \$5,000
200-year	<b>\$702,000</b>
500-year	<b>\$1,951,000</b>
<b>Yancey County</b>	
10-year	Less than \$5,000
50-year	Less than \$5,000
100-year	<b>\$42,000</b>
200-year	<b>\$1,095,000</b>
500-year	<b>\$2,702,000</b>

Source: HAZUS-MH4

**Table 6.10** shows total exposure and potential annualized property losses and percent loss ratios resulting from the tropical storm system and hurricane wind hazard for the Toe River Region.

**TABLE 6.10: ESTIMATED POTENTIAL ANNUALIZED LOSSES FROM TROPICAL STORM SYSTEM AND HURRICANE WINDS**

Location	Estimated Population at Risk	Total Assessed Value of Improvements (buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
<b>Avery County</b>	<b>17,773</b>	<b>\$2,618,365,709</b>	<b>\$16,292</b>	<b>0.00</b>
Banner Elk	1,113	\$155,881,729	\$716	0.00
Crossnore	202	\$60,648,200	\$190	0.00
Elk Park	445	\$19,865,600	\$208	0.00
Grandfather Village	25	\$176,687,125	\$97	0.00
Newland	692	\$82,245,474	\$486	0.00
Sugar Mountain	198	\$111,819,800	\$2,029	0.00
Unincorporated Area	15,098	2,022,217,781	\$12,566	0.00
<b>McDowell County</b>	<b>44,965</b>	<b>\$2,122,747,994</b>	<b>\$42,728</b>	<b>0.00</b>
Marion	7,885	\$475,926,733	\$9,260	0.00
Old Fort	911	\$76,708,200	\$447	0.00
Unincorporated Area	36,169	\$1,570,313,061	\$33,021	0.00
<b>Mitchell County</b>	<b>15,311</b>	<b>\$1,204,864,800</b>	<b>\$13,491</b>	<b>0.00</b>
Bakersville	455	\$42,219,800	\$317	0.00
Spruce Pine	2,123	\$172,387,200	\$2,461	0.00
Unincorporated Area	12,733	\$990,257,800	\$10,713	0.00
<b>Yancey County</b>	<b>17,614</b>	<b>\$1,344,937,472</b>	<b>\$14,989</b>	<b>0.00</b>
Burnsville	1,673	\$136,597,150	\$1,298	0.00
Unincorporated Area	15,941	\$1,208,340,322	\$13,691	0.00
<b>TOE RIVER REGION TOTAL</b>	<b>95,633</b>	<b>\$7,290,915,975</b>	<b>\$87,500</b>	<b>0.00</b>

Source: HAZUS MH

### 6.6.1 Critical Facility Vulnerability

All of the critical facilities inventoried in the Toe River Region are equally vulnerable to hurricane and tropical storm wind (Table 6.39). Specific vulnerabilities for these facilities will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment, but will be considered during future plan updates.

## 6.7 LIGHTNING

**PRI Value: 2.2**

**Annualized Loss Estimate: *Negligible***

According to the qualitative assessment performed using the PRI tool, the lightning hazard scored a PRI value of 1.9 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.11** summarizes the risk levels assigned to each PRI category.

**TABLE 6.11: QUALITATIVE ASSESSMENT FOR LIGHTNING**

<b>Probability</b>	Highly Likely
<b>Impact</b>	Minor
<b>Spatial Extent</b>	Negligible
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than 6 hours

Because it cannot be predicted where lightning may strike, all existing and future buildings, facilities, and populations in the Toe River Region are considered to be exposed to this hazard and could potentially be impacted. The total improved property values for the Toe River Region are shown in Table 6.1. It is important to note that only reported lightning strikes have been factored into this vulnerability assessment.<sup>5</sup>

To estimate losses due to lightning, NCDC historical lightning loss data was used to develop a lightning stochastic model. In this model, expected annualized losses were calculated through a non-linear regression of historical data.

**Table 6.12** shows total exposure, potential annualized property losses and percent loss ratios resulting from the lightning hazard for the Toe River Region.

**TABLE 6.12: TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES FROM LIGHTNING**

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
Avery County	17,773	\$2,618,365,709	\$1470	n/a
McDowell County	44,965	\$2,122,747,994	\$0	n/a
Mitchell County	15,311	\$1,204,864,800	\$17	n/a
Yancey County	17,614	\$1,344,937,472	\$0	n/a
<b>TOE RIVER REGION TOTAL</b>	<b>95,663</b>	<b>\$7,290,915,975</b>	<b><i>Negligible</i></b>	<b>n/a</b>

<sup>5</sup> It is understood that additional lightning strikes have occurred since 1950 that were not reported to NCDC and are not accounted for in this analysis.

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
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Source: National Climatic Data Center

Given the lack of historical loss data on significant lightning damage occurrences in the Toe River Region, it is assumed that while one major event could potentially result in significant losses due to lightning, annualizing structural losses over a long period of time would most likely yield a very low annualized loss estimate for the region.

### 6.7.1 Critical Facility Vulnerability

While all of the inventoried critical facilities in the Toe River Region are equally vulnerable to the lightning hazard, any anticipated future damages or losses are expected to be minimal. Inventoried critical facilities in the Toe River Region can be found in Table 6.39 near in the end of this section.

## 6.8 SEVERE THUNDERSTORM

**PRI Value: 3.2**

**Annualized Loss Estimate: \$13,500**

According to the qualitative assessment performed using the PRI tool, the wind event hazard scored a PRI value of 3.2 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.13** summarizes the risk levels assigned to each PRI category.

**TABLE 6.13: QUALITATIVE ASSESSMENT FOR SEVERE THUNDERSTORM**

<b>Probability</b>	Highly Likely
<b>Impact</b>	Critical
<b>Spatial Extent</b>	Moderate
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than 6 hours

Historical evidence shows that the region is vulnerable to thunderstorm hazards. This is an atmospheric hazard, so all existing and future buildings, facilities, and populations are considered to be exposed to this hazard and could potentially be impacted. These value of the total buildings in the region are shown in Table 6.1. It is important to note that only reported thunderstorms have been factored into this vulnerability assessment.<sup>6</sup>

To estimate losses due to severe thunderstorm, NCDC data for occurrences in the Toe River Region was used to develop a severe thunderstorm stochastic model. In this model, expected annualized losses were calculated through a non-linear regression of historical data

<sup>6</sup> It is understood that additional thunderstorm events have occurred since 1950 that were not reported to NCDC and, thus, are not accounted for in this analysis. The State Fire Marshall's office was contacted to determine if additional data existed, but no additional data was found.

**Table 6.14** shows total exposure and potential annualized property losses and percent loss ratios resulting from the severe thunderstorm hazard for the Toe River Region.

**TABLE 6.14: TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES FROM SEVERE THUNDERSTORM WIND**

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
<b>Avery County</b>	17,773	\$2,618,365,709	\$533	0.00%
<b>McDowell County</b>	44,965	\$2,122,747,994	\$12,131	0.00%
<b>Mitchell County</b>	15,311	\$1,204,864,800	\$66	0.00%
<b>Yancey County</b>	17,614	\$1,344,937,472	\$770	0.00%
<b>TOE RIVER REGION TOTAL</b>	<b>95,663</b>	<b>\$7,290,915,975</b>	<b>\$13,500</b>	<b>0.00%</b>

### 6.8.1 Critical Facility Vulnerability

All of the inventoried critical facilities in the Toe River Region are equally vulnerable to the severe thunderstorm wind hazard. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment, but will be considered during future plan updates. A complete list of inventoried critical facilities can be found in Table 6.39 near the end of this section.



## 6.9 TORNADO

**PRI Value: 2.1**

**Annualized Loss Estimate: \$16,183**

According to the qualitative assessment performed using the PRI tool, the tornado hazard scored a PRI value of 2.1 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.15** summarizes the risk levels assigned to each PRI category.

**TABLE 6.15: QUALITATIVE ASSESSMENT FOR TORNADO**

<b>Probability</b>	Possible
<b>Impact</b>	Limited
<b>Spatial Extent</b>	Small
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than 6 hours

Historical evidence shows that the region is vulnerable to tornadic activity. This hazard can result from severe thunderstorm activity or may occur during a major tropical storm or hurricane. It cannot be predicted where a tornado may touch down, so all existing and future buildings, facilities, and populations are considered to be exposed to this hazard and could potentially be impacted. These results are shown in Table 6.1. It is important to note that only reported tornadoes have been factored into this vulnerability assessment<sup>7</sup>.

To estimate losses due to tornadoes, NCDC historical tornado loss data for occurrences in the Toe River Region was used to develop a tornado stochastic model. In this model, expected annualized losses were calculated through a non-linear regression of historical data

**Table 6.16** shows total exposure and potential annualized property losses and percent loss ratios resulting from the tornado hazard for the Toe River Region.

**TABLE 6.16: TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES FOR TORNADO**

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
Avery County	17,773	\$2,618,365,709	\$4,384	0.00%
McDowell County	44,965	\$2,122,747,994	\$7,953	0.00%
Mitchell County	15,311	\$1,204,864,800	\$0	0.00%
Yancey County	17,614	\$1,344,937,472	\$3,846	0.00%

<sup>7</sup> It is possible that additional tornado events may have occurred since 1950 that were not reported to NCDC and are not accounted for in this analysis.

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
TOE RIVER REGION TOTAL	95,663	\$7,290,915,975	\$16,183	0.00%

### 6.9.1 Critical Facility Vulnerability

All of the inventoried critical facilities in the Toe River Region are vulnerable to the tornado hazard (Table 6.39). Specific vulnerabilities for these facilities will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment, but will be considered during future plan updates.

## 6.10 WINTER STORM AND FREEZE

**PRI Value: 3.3**

**Annualized Loss Estimate: \$2,635,534**

According to the qualitative assessment performed using the PRI tool, the winter storm and freeze event hazard scored a PRI value of 3.3 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.17** summarizes the risk levels assigned to each PRI category.

**TABLE 6.17: QUALITATIVE ASSESSMENT FOR WINTER STORM AND FREEZE**

<b>Probability</b>	Highly Likely
<b>Impact</b>	Critical
<b>Spatial Extent</b>	Large
<b>Warning Time</b>	More than 24 hours
<b>Duration</b>	Less than one week

Historical evidence shows that the Toe River Region is extremely vulnerable to winter storm and freeze hazards. This is an atmospheric hazard, so all existing and future buildings, facilities, and populations are considered to be exposed to this hazard and could potentially be impacted. These results are shown in Table 6.1. It is important to note that only reported events have been factored into this vulnerability assessment.<sup>8</sup>

To estimate losses due to winter storm and freeze events, NCDC data for occurrences in the Toe River Region was used to develop a winter storm and freeze stochastic model. In this model, expected annualized losses were calculated through a non-linear regression of historical data

**Table 6.18** shows total exposure and potential annualized property losses and percent loss ratios resulting from the winter storm and freeze hazard for the Toe River Region.

<sup>8</sup> It is possible that additional thunderstorm events have occurred since 1950 that were not reported to NCDC and, thus, are not accounted for in this analysis.

**TABLE 6.18: TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES FROM WINTER STORM AND ICE STORMS EVENTS**

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses (Winter Storms)	Annualized Expected Property Losses (Ice Storms)
Avery County	17,773	\$2,618,365,709	Negligible	\$2,632,894
McDowell County	44,965	\$2,122,747,994	Negligible	Negligible
Mitchell County	15,311	\$1,204,864,800	Negligible	\$1,315
Yancey County	17,614	\$1,344,937,472	Negligible	\$1,315
<b>TOE RIVER REGION TOTAL</b>	<b>95,663</b>	<b>\$7,290,915,975</b>	<b>Negligible</b>	<b>\$2,635,534</b>

### 6.10.1 Critical Facility Vulnerability

All of the inventoried critical facilities in the Toe River Region are exposed to the winter storm and freeze hazard. Specific vulnerabilities for these facilities will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment, but will be considered during future plan updates. A complete list of inventoried critical facilities can be found in Table 6.39 near the end of this section.

## Geologic Hazards

### 6.11 EARTHQUAKE

**PRI Value: 2.3**

**Annualized Loss Estimate: \$253,000**

According to the qualitative assessment performed using the PRI tool, the earthquake hazard scored a PRI value of 2.3 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.19** summarizes the risk levels assigned to each PRI category.

**TABLE 6.19: QUALITATIVE ASSESSMENT FOR EARTHQUAKE**

<b>Probability</b>	Possible
<b>Impact</b>	Minor
<b>Spatial Extent</b>	Moderate
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than 6 hours

An earthquake has the potential to impact all existing and future buildings, facilities, and populations. The cumulative figures for population and value of improved structures in the Toe River Region are shown in Table 6.1.

HAZUS-MH ground shaking data, inventory and damage functions, and methodology was used to determine the annual expected loss, as well as exceeding probability curves. **Table 6.20** shows annualized property losses for the Toe River Region. **Table 6.21** shows annualized property losses for the Toe River Region.

**Table 6.20: Estimated Potential Losses from Earthquake**

Location	Level of Event			
	100-year Event (5.5 magnitude)	500-year Event (5.5 magnitude)	1000-year Event (6.5 magnitude)	2500-year Event (7.5 magnitude)
<b>Avery County</b>	\$145,000	\$4,770,000	\$12,890,000	\$40,016,000
<b>McDowell County</b>	\$303,000	\$9,147,000	\$23,673,000	\$70,818,000
<b>Mitchell County</b>	\$131,000	\$4,005,000	\$10,739,000	\$32,543,000
<b>Yancey County</b>	\$144,000	\$4,211,000	\$11,152,000	\$32,803,000
<b>TOE RIVER REGIONAL TOTAL</b>	<b>\$723,000.00</b>	<b>\$22,133,000</b>	<b>\$58,454,000.00</b>	<b>\$176,180,000.00</b>

Source: HAZUS-MH 4

**Table 6.21: Estimated Potential Annualized Losses due to Earthquake**

Location	Estimated Annualized Losses				
	Residential	Commercial	Other	Total	Annualized Loss Ratio
Avery County	\$39,000	\$9,000	\$7,000	\$55,000	0.00%
McDowell County	\$66,000	\$23,000	\$16,000	\$105,000	0.00%
Mitchell County	\$28,000	\$10,000	\$8,000	\$46,000	0.01%
Yancey County	\$34,000	\$8,000	\$5,000	\$47,000	0.00%
TOE RIVER REGIONAL TOTAL	\$167,000.00	\$50,000.00	\$36,000.00	\$253,000.00	0.01%

Source: HAZUS-MH 4

### 6.11.1 Critical Facility Vulnerability

All of the inventoried critical facilities in the Toe River Region are vulnerable to the earthquake hazard (Table 6.39). Specific vulnerabilities for these facilities will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment, but will be considered during future plan updates.

## 6.12 LANDSLIDE

**PRI Value: 2.8**

**Annualized Loss Estimate: \$25,058**

According to the qualitative assessment performed using the PRI tool, the landslide hazard scored a PRI value of 2.8 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.22** summarizes the risk levels assigned to each PRI category.

**TABLE 6.22: QUALITATIVE ASSESSMENT FOR LANDSLIDE**

Probability	Highly Likely
Impact	Critical
Spatial Extent	Small
Warning Time	Less than 6 hours
Duration	Less than 6 hours

Although historical evidence proves that the Toe River Region is susceptible to landslide events, there are few reports of damage. Therefore, it is difficult to calculate an accurate annualized loss figure. However, given the recent landslide occurrence damage information provided by the North Carolina

Department of Transportation, an annualized loss estimate of \$23,681 was determined for the Toe River Region. It is assumed that one major landslide event could potentially result in significant losses, but annualizing structural losses over a long period of time would most likely yield a very low annualized loss estimate for each county. **Table 6.23** summarizes annualized loss estimates for landslide events based on historic damage estimates landslide by county.

**TABLE 6.23: ANNUALIZED LOSSES FOR LANDSLIDE EVENTS**

Location	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
Avery County	17,773	\$2,618,365,709	\$1,090	0.00%
McDowell County	44,965	\$2,122,747,994	\$5,856	0.00%
Mitchell County	15,311	\$1,204,864,800	\$1,209	0.00%
Yancey County	17,614	\$1,344,937,472	\$16,903	0.00%
<b>TOE RIVER REGION TOTAL</b>	<b>95,663</b>	<b>\$7,290,915,975</b>	<b>\$25,058</b>	<b>0.00%</b>

In addition to the annualized loss estimate, the potential total exposure and corresponding value for buildings at risk can be determined using the USGS Landslide Susceptibility Index (detailed in Section 5: *Hazard Profiles*), county level tax data, and GIS analysis. **Table 6.24** presents the potential damage estimated where available. The risk levels of low, moderate, and high correspond to the Landslide Susceptibility Index where “Low” indicates a zone of Low Incident/High Susceptibility, “Mod” indicates a zone of Moderate Incident/High Susceptibility, and “High” indicates a zone of High Landslide Susceptibility. Given some level of risk throughout the Toe River Region, it is assumed that the total population is at risk (Table 6.3).

**TABLE 6.24: TOTAL EXPOSURE FOR LANDSLIDE HAZARD**

Location	Number of Parcels at Risk			Estimated Number of Buildings at Risk			Total Assessed Value of Improvements at Risk		
	Low	Mod	High	Low	Mod	High	Low	Mod	High
<b>Avery County (total)</b>	<b>22,411</b>	<b>1,621</b>	<b>-</b>	<b>10,778</b>	<b>556</b>	<b>-</b>	<b>\$2,380,063,609</b>	<b>\$238,302,100</b>	<b>-</b>
Banner Elk	1,022	13	-	531	2	-	\$155,147,329	\$734,400	-
Crossnore	178	-	-	147	-	-	\$60,648,200	-	-
Elk Park	384	-	-	238	-	-	\$19,865,600	-	-
Grandfather Village	418	-	-	357	-	-	\$176,687,125	-	-
Newland	522	-	-	444	-	-	\$82,245,474	-	-
Sugar Mountain	1,084	-	-	290	-	-	\$111,819,800	-	-
Unincorporated Area	18,803	1,608	-	8,771	554	-	\$1,773,650,081	567,700\$237,	-
<b>McDowell County**</b>	<b>24,327</b>	<b>7,144</b>	<b>-</b>	<b>15,032</b>	<b>5,776</b>	<b>-</b>	<b>\$1,610,884,373</b>	<b>\$511,863,621</b>	<b>-</b>

Location	Number of Parcels at Risk			Estimated Number of Buildings at Risk			Total Assessed Value of Improvements at Risk		
	Low	Mod	High	Low	Mod	High	Low	Mod	High
<b>(total)</b>									
Marion	3,867	5	-	3,368			\$475,326,843	\$599,890	
Old Fort		632	-		492			\$76,508,200	
Unincorporated Area	20,460	6,507	-	11,664	5,284		\$1,135,557,530	\$434,755,531	
<b>Mitchell County (total)</b>	<b>11,655</b>	<b>4,027</b>	<b>1,777</b>	<b>6,987</b>	<b>2,732</b>	<b>1,409</b>	<b>\$706,046,900</b>	<b>\$331,865,900</b>	<b>\$166,952,000</b>
Bakersville	331			267			\$42,219,800		
Spruce Pine	1,093	295		850	219		\$123,863,400	\$48,523,800	
Unincorporated Area	10,231	3,732	1,777	5,870	2,513	1,409	\$539,963,700	\$283,342,100	\$166,952,000
<b>Yancey County** (total)</b>	<b>1,226</b>	<b>7,202</b>	<b>8,643</b>	<b>636</b>	<b>3,655</b>	<b>6,741</b>	<b>\$61,947,150</b>	<b>\$679,843,737</b>	<b>\$603,146,585</b>
Burnsville			976			881			\$136,597,150
Unincorporated Area	1,226	7,202	7,667	636	3,655	5,860	\$61,947,150	\$679,843,737	\$466,549,435
<b>TOE RIVER REGION TOTAL</b>	<b>59,619</b>	<b>19,994</b>	<b>10,420</b>	<b>33,433</b>	<b>12,719</b>	<b>8,150</b>	<b>\$4,758,942,032</b>	<b>\$1,761,875,358</b>	<b>\$770,098,585</b>

\*\*McDowell County and Yancey County building number estimates were taken from Census housing statistics because building footprint data is not available at this time.

Source: Avery County GIS, McDowell County GIS, Mitchell County GIS, Yancey County GIS, US Census Bureau

### 6.12.1 Critical Facility Vulnerability

Each landslide zone from the Landslide Susceptibility Index was analyzed separately to determine where vulnerability lies. For the low incident/high susceptibility zone, there are 56 critical facilities at risk including 26 fire stations, 13 police stations, 10 schools, 5 libraries, 1 park service facility and 1 airport. The moderate incident/high susceptibility zone has a total of 14 critical facilities including 9 fire stations, 2 libraries, and 1 police station, airport and parks service facility which are at vulnerable to landslide occurrence. Finally, the high incidence zone has a total of 13 facilities at risk including 8 fire stations, 3 police stations, 1 library and 1 parks service facility. A list of specific critical facilities at risk can be found in Table 6.39 near the end of this section.

## Hydrologic Hazards

### 6.13 DAM AND LEVEE FAILURE

**PRI Value:** 2.0

**Annualized Loss Estimate:** *Negligible*

According to the qualitative assessment performed using the PRI tool, the dam and levee hazard scored a PRI value of 2.0 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.25** summarizes the risk levels assigned to each PRI category.

**TABLE 6.25: QUALITATIVE ASSESSMENT FOR DAM AND LEVEE FAILURE**

<b>Probability</b>	Unlikely
<b>Impact</b>	Critical
<b>Spatial Extent</b>	Moderate
<b>Warning Time</b>	More than 24 hours
<b>Duration</b>	Less than 24 hours

Vulnerability to dam failures in the Toe River region could not be determined at this time, due to the fact that there is limited information on potential inundation areas created by dam failures. Additionally, there is no other historical data on the breaches that have occurred in the past to conduct a stochastic analysis. The vulnerability assessment for dam failures will be revisited in the future to determine if improved data and/or risk assessment methodologies

Given the lack of historical loss data on significant dam or levee failure in the Toe River Region, it is assumed that while one major event could potentially result in significant losses, annualizing structural losses over a long period of time would most likely yield a very low annualized loss estimate for the focus area.

#### 6.13.1 Critical Facility Vulnerability

There are a total of 3 inventoried assets in the Toe River Region determined to be vulnerable to dam failure – Parkway Fire and Rescue #3 (Strawberry Ridge Dam), Sugar Mountain Police Department (Sugar Mountain Dam) and Linville Ridge Fire Station (Sugar Mountain Dam). All of the assets determined to be at risk to dam failure are listed in Table 6.39 toward the end of this section.

It should be noted that the Swifts Lake Dam was of particular concern in the previous Avery County Hazard Mitigation Plan. Located upstream of Cannon Memorial Hospital in Crossnore, failure would result in the only access road to the hospital being washed out. However, since that plan, the hospital has moved and the dam is no dry to leaks and failed repairs. Therefore, this dam poses no threat to Avery County.



## 6.14 FLOOD

**PRI Value: 2.9**

**Annualized Loss Estimate: \$19,025,000**

According to the qualitative assessment performed using the PRI tool, the flood hazard scored a PRI value of 2.9 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.26** summarizes the risk levels assigned to each PRI category.

**TABLE 6.26: QUALITATIVE ASSESSMENT FOR FLOOD**

<b>Probability</b>	Highly Likely
<b>Impact</b>	Limited
<b>Spatial Extent</b>	Moderate
<b>Warning Time</b>	6 to 12 hours
<b>Duration</b>	Less than 24 hours

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records (as of 2015). The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified Zone A/AE (1-percent-annual-chance floodplain), Zone VE (1-percent-annual-chance coastal flood zone with associated wave action), Zone X500 (0.2-percent-annual-chance floodplain) and the floodway if/where applicable. **Table 6.27** lists the number of properties determined to be located within each of the special flood hazard areas along with the improved values for structures located on those properties. No population figures were included with parcel data, so Hazus-MH was used to estimate those figures.

**TABLE 6.27: ESTIMATED TOTAL EXPOSURE OF IMPROVED PROPERTIES TO FLOOD**

Location	At-Risk 1-Percent Annual Chance Flood			At-Risk 0.2 Percent Annual Chance Flood		
	Number of Parcels	Number of Buildings*	Value of Improved Buildings	Number of Parcels	Number of Buildings*	Value of Improved Buildings
<b>Avery County</b>	<b>2,227</b>	<b>508</b>	<b>\$323,364,891</b>	<b>9849</b>	<b>84</b>	<b>\$20,587,700</b>
Banner Elk	214	52	\$34,798,804	13	7	\$3,259,000
Crossnore	54	19	\$26,745,000	9	2	\$11,956,100
Elk Park	150	45	\$7,100,100	0	0	\$0
Grandfather Village	27	1	\$12,381,400	0	0	\$0
Newland	89	53	\$34,925,787	22	30	\$1,721,300
Sugar Mountain	0	0	\$0	0	0	\$0
Unincorporated Area	1,693	338	207,413,800	55	45	\$3,651,300
<b>McDowell County</b>	<b>3,602</b>	<b>11,219</b>	<b>\$421,633,470</b>	<b>85</b>	<b>53</b>	<b>\$11,428,870</b>
Marion	171	160	\$92,110,550	7	0	\$397,980
Old Fort	166	201	\$45,626,140	11	43	\$8,069,640
Unincorporated Area	3,265	10,858	\$283,896,780	67	10	\$2,961,250
<b>Mitchell County</b>	<b>1,354</b>	<b>335</b>	<b>\$192,753,000</b>	<b>71</b>	<b>91</b>	<b>\$9,487,800</b>
Bakersville	132	63	\$21,088,800	31	38	\$4,006,200
Spruce Pine	106	26	\$18,361,100	22	29	\$3,821,900
Unincorporated Area	1,116	246	\$153,303,100	18	24	\$1,659,700
<b>Yancey County</b>	<b>2,239</b>	<b>7,007</b>	<b>\$197,748,640</b>	<b>188</b>	<b>597</b>	<b>\$16,095,990</b>
Burnsville	144	350	\$20,148,930	18	271	\$2,473,620
Unincorporated Area	2,095	6,657	\$177,599,710	170	326	\$13,622,370
	<b>9,422</b>	<b>19,069</b>	<b>\$1,135,500,001</b>	<b>433</b>	<b>825</b>	<b>\$57,600,360</b>

\*Census block level housing data were used complete the analyses for McDowell and Yancey Counties.

### Riverine Flooding Loss Estimates using HAZUS-MH

HAZUS-MH was used to estimate potential losses in the Toe River Region resulting from potential riverine flood events. A Digital Elevation Model (DEM) was obtained from the USGS for the study area coordinates for input and flood depth was estimated at the pixel level for affected areas, along with the proportion of the area affected within the census block. Transects and stillwater elevations were input from data provided in the 2003 FEMA Flood Insurance Study for this area. HAZUS-MH was utilized to estimate floodplain boundaries, potential exposure for each event frequency, and loss estimates based on probabilistic scenarios for 10-, 50-, 100-, 200- and 500-year flood events using a Level 1 analysis.

6.28 shows estimated potential losses for 10-, 50-, 100-, 200-, and 500-year flood event scenarios that resulted from this analysis.

**TABLE 6.28: ESTIMATED POTENTIAL LOSSES TO IMPROVED PROPERTY FROM FLOOD BY RETURN PERIOD**

	Estimated Losses by Return Period				
	10-year	50-year	100-year	200-year	500-year
<b>Avery County</b>	\$8,446,000	\$11,987,000	\$ 14,440,000	\$15,522,000	\$17,281,000
<b>McDowell County</b>	\$14,817,000	\$20,330,000	\$23,333,000	\$26,573,000	\$29,452,000
<b>Mitchell County</b>	\$8,788,000	\$11,833,000	\$13,688,000	\$15,016,000	\$17,415,000
<b>Yancey County</b>	\$7,522,000	\$10,764,000	\$12,062,000	\$13,399,000	\$15,599,000
<b>TOE RIVER REGIONAL TOTAL</b>	<b>\$\$39,573,000.00</b>	<b>\$54,914,000.00</b>	<b>\$63,523,000.00</b>	<b>\$70,510,000.00</b>	<b>\$79,747,000.00</b>

Source: HAZUS-MH

For the purposes of this risk assessment, the flood hazard was modeled for the 100-year flood hazard, also known as the “1-percent-annual-chance flood.” HAZUS-MH was used to estimate floodplain boundaries and potential losses for the 100-year event frequency. **Table 6.29** shows the estimated number and value of buildings, as well as the number of people that are potentially at risk to flooding by jurisdiction. The losses estimated losses are per event. **Table 6.30** shows potential annualized losses by occupancy type in each jurisdiction. **Table 6.31** shows the total potential annualized losses. The estimated total annualized losses includes losses from each occupancy type (Residential, Commercial, Industrial, Education, Government, Agricultural, and Religious buildings). The total potential losses, according to the HAZUS-MH results are \$10,533,000.

**TABLE 6.29: ESTIMATED POTENTIAL EXPOSURE FOR THE 100-YEAR FLOOD**

Location	Total Number of People in the Jurisdiction*	Number of People Exposed to Flood Hazard*	Total Value of all Buildings in Jurisdiction**	Number of Exposed Buildings to Flood Hazard**	Total Value of Buildings Exposed**
<b>Avery County</b>	<b>17,773</b>	<b>10</b>	<b>\$1,340,624,000</b>	<b>175</b>	<b>\$26,353,000</b>
Banner Elk	1,113	0	\$67,313,000	24	\$1,909,000
Crossnore	202	0	\$12,451,000	0	0
Elk park	445	0	\$20,282,000	0	0
Grandfather Village	25	0	\$32,703,000	0	0
Newland	692	0	\$57,764,000	0	0
Sugar Mountain	198	0	\$119,820,000	0	0
Unincorporated Area	15,098	10	\$1,030,291,000	151	\$24,444,000
<b>McDowell County</b>	<b>44,965</b>	<b>0</b>	<b>\$2,333,842,000</b>	<b>0</b>	<b>0</b>

Location	Total Number of People in the Jurisdiction*	Number of People Exposed to Flood Hazard*	Total Value of all Buildings in Jurisdiction**	Number of Exposed Buildings to Flood Hazard**	Total Value of Buildings Exposed**
Marion	7,885	0	\$417,047,000	0	0
Old Fort	911	0	\$38,540,000	0	0
Unincorporated Area	36,169	0	\$1,878,255,000	0	0
<b>Mitchell County</b>	<b>15,311</b>	<b>5</b>	<b>\$994,769,000</b>	<b>6</b>	<b>\$1,216,000</b>
Bakersville	455	0	\$34,482,000	6	\$1,216,000
Spruce Pine	2,123	0	\$231,156,000	0	0
Unincorporated Area	12,733	5	\$729,131,000	0	0
<b>Yancey County</b>	<b>17,614</b>	<b>0</b>	<b>\$1,448,877,000</b>	<b>0</b>	<b>0</b>
Burnsville	1,673	0	\$141,460,000	0	0
Unincorporated Area	15,941	0	\$1,307,417,000	0	0
<b>TOE RIVER REGION TOTAL</b>	<b>95,663</b>	<b>15</b>	<b>\$6,118,112,000</b>	<b>181</b>	<b>\$27,569,000</b>

Source: HAZUS-MH MR4; FEMA Q3

\* Based on U.S. Census block data (2000). It should be noted that population and structures may be present in these areas based on the parcel level analysis (Table 6.28) from locally provided data. For example, 121 parcels were reported to be at-risk to the 100-year flood in Marion based on parcel data, but zero persons and zero structures were reported to be at risk based on 2000 U.S. Census block level data from HAZUS-MH. Therefore, it should be assumed that some population and structures may be at-risk, and the locally provided data best portrays risk for the communities.

\*\* Based on HAZUS-MH MR4

**TABLE 6.30: POTENTIAL ANNUALIZED LOSSES FROM FLOOD BY OCCUPANCY TYPE**

Location	Res (\$)	Com (\$)	Ind (\$)	Edu (\$)	Gov (\$)	Agr (\$)	Rel (\$)
<b>Avery County</b>							
Banner Elk	61,000	27,000	5,000	0	0	0	0
Crossnore	0	0	0	0	0	0	0
Elk park	0	0	0	0	0	0	0
Grandfather Village	28,000	1,000	0	0	0	0	0
Newland	156,000	221,000	200,000	0	34,000	13,000	0
Sugar mountain	0	0	0	0	0	0	0
Unincorporated Area	2,555,000	273,000	131,000	20,000	14,000	57,000	101,000
<b>McDowell County</b>							
Marion	568,000	1,000	202,000	0	0	0	6,000
Old Fort	142,000	99,000	7,000	0	0	5,000	0
Unincorporated Area	4,572,000	406,000	734,000	13,000	50,000	23,000	54,000
<b>Mitchell County</b>							
Bakersville	173,000	147,000	16,000	6,000	10,000	0	0
Spruce Pine	419,000	366,000	305,000	10,000	1,000	9,000	96,000
Unincorporated Area	1,727,000	447,000	172,000	53,000	4,000	29,000	2,000
<b>Yancey County</b>							
Burnsville	0	0	0	0	0	0	0
Unincorporated Area	3,129,000	558,000	315,000	133,000	1,000	52,000	66,000
<b>TOE RIVER REGION TOTAL</b>	<b>13,530,000</b>	<b>2,546,000</b>	<b>2,087,000</b>	<b>235,000</b>	<b>114,000</b>	<b>188,000</b>	<b>325,000</b>

Source: HAZUS-MH

**TABLE 6.31: POTENTIAL ANNUALIZED LOSSES FROM FLOOD (TOTAL)**

Location	Total Value of Occupancy Buildings*	Estimated Total Annualized Losses	Annualized Loss Ratio (%)
<b>Avery County</b>			
Banner Elk	\$67,313,000	\$93,000	0.14
Crossnore	\$12,451,000	0	0.00
Elk park	\$20,282,000	0	0.00
Grandfather Village	\$32,703,000	\$29,000	0.09
Newland	\$57,764,000	\$624,000	0.01
Sugar mountain	\$119,820,000	0	0.00
Unincorporated Area	\$1,030,291,000	\$3,151,000	0.31
<b>McDowell County</b>			
Marion	\$417,047,000	\$777,000	0.19
Old Fort	\$38,540,000	\$253,000	0.66
Unincorporated Area	\$1,878,255,000	\$5,852,000	0.31
<b>Mitchell County</b>			
Bakersville	\$34,482,000	\$352,000	1.02
Spruce Pine	\$231,156,000	\$1,206,000	0.52
Unincorporated Area	\$729,131,000	\$2,434,000	0.33
<b>Yancey County</b>			
Burnsville	\$141,460,000	0	0.00
Unincorporated Area	\$1,307,417,000	\$4,254,000	0.33
<b>TOE RIVER REGION TOTAL</b>	<b>\$6,118,112,000</b>	<b>\$19,025,000</b>	<b>3.91 percent</b>

Source: HAZUS-MH

\*This includes the combined annual loss values for all commercial, residential, industrial, education, government, religion, and agricultural buildings.

### 6.15.1 Critical Facility Vulnerability

There are a total of 12 inventoried critical facilities in the Toe River Region that are vulnerable to the effects of flood. In the 1-percent annual chance flood zone (100-year floodplain) there are 6 fire stations and 2 police stations. In the 0.2-percent annual chance flood zone (500-year floodplain), there are 2 libraries, 1 fire station, and 1 police station. Specific assets affected by flood are listed in Table 6.39 toward the end of this section.

## Other Hazards

### 6.15 HAZARDOUS MATERIALS INCIDENTS

**PRI Value:** 2.2

**Annualized Loss Estimate:** *Negligible*

According to the qualitative assessment performed using the PRI tool, the hazardous materials incident hazard scored a PRI value of 2.2 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.32** summarizes the risk levels assigned to each PRI category.

**TABLE 6.32: QUALITATIVE ASSESSMENT FOR HAZARDOUS MATERIALS INCIDENTS**

<b>Probability</b>	Possible
<b>Impact</b>	Limited
<b>Spatial Extent</b>	Small
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than 24 hours

Hazardous material or toxic releases can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

The Toxics Release Inventory (TRI) is a publicly available database from the federal Environmental Protection Agency (EPA) that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to EPA and to their state or tribal entity. A facility must report if it meets the following three criteria:

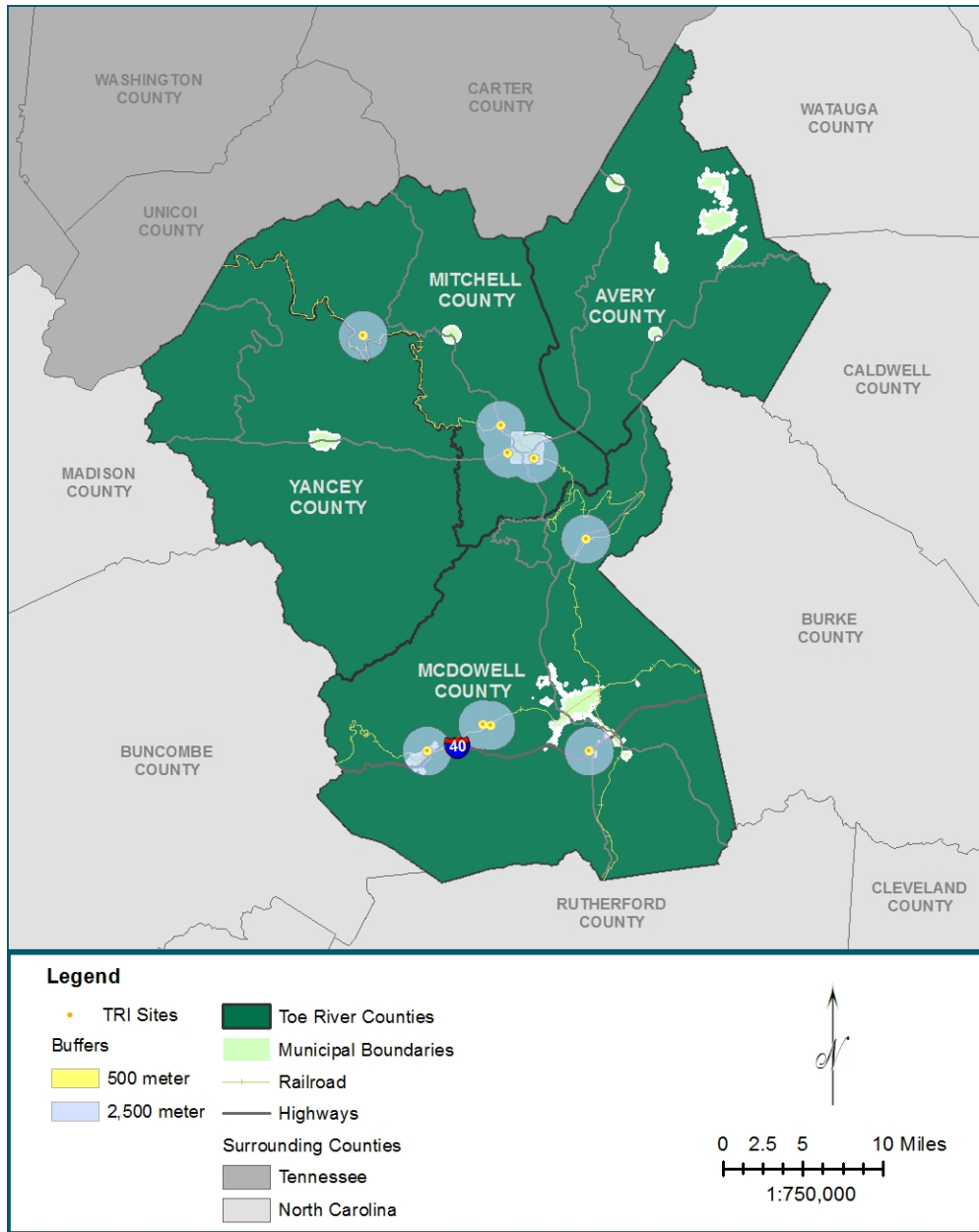
- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; RCRA Subtitle C treatment, storage, and disposal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

(PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds or 0.1 grams depending on the chemical.

Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. **Figure 6.7** shows the locations of TRI listed toxic sites (and two Unimin corporation sites) in the Toe River Region along with buffers used for analysis to account for hazardous materials that spread through the air. For fixed site analysis, only TRI sites that have geo-referenced data available were analyzed. Two sizes of buffers—500 and 2,500 meters—are assumed in respect to the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings and engineering judgment. For mobile analysis, the major roads (Interstate highway, U.S. highway and State highway) and railroads are the transportation corridors where hazardous materials are primarily transported that could adversely impact people and buildings. The buffers along the transportation corridors are drawn with the same size as fixed site analysis. **Table 6.33** shows estimated toxic release exposure of people and buildings for fixed sites and **Table 6.34** and **Table 6.35** show the results for mobile site toxic release for 500 meter buffer analysis and 2,500 meter buffer analysis, respectively.



**FIGURE 6.7 : TRI SITES WITH BUFFERS IN THE TOE RIVER REGION**



Source: EPA

**TABLE 6.33: EXPOSURE OF PERSONS AND IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)**

JURISDICTION	Total Est. Population	Total Property Value	Immediate Impact (500 meter buffer)		Secondary Impact (2,500 meter buffer)	
			Number of People at Risk	Value of Property at Risk	Number of People at Risk	Value of Property at Risk
<b>Avery County</b>	<b>17,773</b>	<b>\$2,618,365,709</b>	<b>0</b>	<b>\$0</b>	<b>0</b>	<b>\$0</b>
Banner Elk	1,113	\$155,881,729	0	\$0	0	\$0
Crossnore	202	\$60,648,200	0	\$0	0	\$0
Elk Park	445	\$19,865,600	0	\$0	0	\$0
Grandfather Village	25	\$176,687,125	0	\$0	0	\$0
Newland	692	\$82,245,474	0	\$0	0	\$0
Sugar Mountain	198	\$111,819,800	0	\$0	0	\$0
Unincorporated Area	15,098	\$2,011,217,781	0	\$0	0	\$0
<b>McDowell County</b>	<b>44,965</b>	<b>\$2,122,747,994</b>	<b>206</b>	<b>\$68,834,190</b>	<b>8,247</b>	<b>\$677,958,515</b>
Marion	7,885	\$475,926,733	201	\$47,782,240	5,161	\$291,761,200
Old Fort	911	\$76,708,200	2	\$7,763,450	580	\$63,332,470
Unincorporated Area	36,169	\$1,570,313,061	3	\$13,288,500	2,506	\$322,864,845
<b>Mitchell County</b>	<b>15,311</b>	<b>\$1,204,864,800</b>	<b>152</b>	<b>\$25,002,000</b>	<b>4,113</b>	<b>\$438,714,000</b>
Bakersville	455	\$42,219,800	0	\$0	\$0	\$0
Spruce Pine	2,123	\$172,387,200	152	\$25,002,000	\$2,799	\$396,355,000
Unincorporated Area	12,733	\$990,257,800	0	\$0	\$1,314	\$42,357,000
<b>Yancey County</b>	<b>17,614</b>	<b>\$1,344,937,472</b>	<b>108</b>	<b>\$23,884,000</b>	<b>1,899</b>	<b>\$189,524,000</b>
Burnsville	1,673	\$136,597,150	108	\$23,884,000	1,426	\$141,460,000
Unincorporated Area	15,941	\$1,208,340,322	0	\$0	473	\$48,064,000
<b>Toe River Region TOTAL</b>	<b>95,633</b>	<b>\$7,290,915,975</b>	<b>466</b>	<b>\$117,720,190</b>	<b>14,259</b>	<b>\$1,306,196,515</b>

**Source:** Avery County GIS, McDowell County GIS, Mitchell County GIS, Yancey County GIS, HAZUS-MH MR-4; U.S. Environmental Protection Agency Toxic Release Inventory (TRI) Sites

**TABLE 6.34: EXPOSURE OF PERSONS AND IMPROVED PROPERTY TO HAZARDOUS MATERIALS - MOBILE SITES (500 METER BUFFER)**

JURISDICTION	Total Est. Population	Total Property Value	Immediate Impact (500 meter buffer)			
			Number of People at Risk		Value of Property at Risk	
			Roads	Railroads	Roads	Railroads
<b>Avery County</b>	<b>17,773</b>	<b>\$2,618,365,709</b>	<b>2,498</b>	<b>0</b>	<b>\$849,221,187</b>	<b>\$0</b>
Banner Elk	1,113	\$155,881,729	476	0	\$102,006,487	\$0
Crossnore	202	\$60,648,200	118	0	\$24,950,000	\$0
Elk Park	445	\$19,865,600	26	0	\$16,846,900	\$0
Grandfather Village	25	\$176,687,125	14	0	\$65,900,900	\$0
Newland	692	\$82,245,474	361	0	\$74,893,200	\$0
Sugar Mountain	198	\$111,819,800	137	0	\$29,052,600	\$0
Unincorporated Area	15,098	\$2,011,217,781	1,366	0	\$535,571,100	\$0
<b>McDowell County</b>	<b>44,965</b>	<b>\$2,122,747,994</b>	<b>5,040</b>	<b>3,810</b>	<b>\$978,111,205</b>	<b>\$473,060,380</b>
Marion	7,885	\$475,926,733	2,588	2,621	\$291,591,210	\$190,816,140
Old Fort	911	\$76,708,200	264	252	\$60,564,820	\$47,706,580
Unincorporated Area	36,169	\$1,570,313,061	2,188	937	\$625,955,175	\$234,537,660
<b>Mitchell County</b>	<b>15,311</b>	<b>\$1,204,864,800</b>	<b>1,328</b>	<b>507</b>	<b>\$119,075,000</b>	<b>\$97,251,000</b>
Bakersville	455	\$42,219,800	141	0	\$27,177,000	\$0
Spruce Pine	2,123	\$172,387,200	459	428	\$55,218,000	\$89,247,000
Unincorporated Area	12,733	\$990,257,800	728	79	\$36,680,000	\$8,004,000
<b>Yancey County</b>	<b>17,614</b>	<b>\$1,344,937,472</b>	<b>1,096</b>	<b>244</b>	<b>\$275,797,000</b>	<b>\$27,265,000</b>
Burnsville	1,673	\$136,597,150	313	2	\$45,903,000	\$1,016,000
Unincorporated Area	15,941	\$1,208,340,322	783	242	\$229,894,000	\$26,249,000
<b>Toe River Region TOTAL</b>	<b>95,633</b>	<b>\$7,290,915,975</b>	<b>9,962</b>	<b>4,561</b>	<b>\$3,071,425,579</b>	<b>\$597,576,380</b>

**Source:** Avery County GIS, McDowell County GIS, Mitchell County GIS, Yancey County GIS, HAZUS-MH MR-4; U.S. Environmental Protection Agency Toxic Release Inventory (TRI) Sites

**TABLE 6.35: EXPOSURE OF PERSONS AND IMPROVED PROPERTY TO HAZARDOUS MATERIALS - MOBILE SITES (2,500 METER BUFFER)**

JURISDICTION	Total Est. Population	Total Property Value	Secondary Impact (2,500 meter buffer)			
			Number of People at Risk		Value of Property at Risk	
			Roads	Railroads	Roads	Railroads
<b>Avery County</b>	<b>17,773</b>	<b>\$2,618,365,709</b>	<b>8,866</b>	<b>0</b>	<b>\$2,412,769,374</b>	<b>\$0</b>
Banner Elk	1,113	\$155,881,729	811	0	\$142,749,787	\$0
Crossnore	202	\$60,648,200	242	0	\$59,721,900	\$0
Elk Park	445	\$19,865,600	339	0	\$19,177,600	\$0
Grandfather Village	25	\$176,687,125	33	0	\$210,965,500	\$0
Newland	692	\$82,245,474	226	0	\$77,856,131	\$0
Sugar Mountain	198	\$111,819,800	73	0	\$104,278,200	\$0
Unincorporated Area	15,098	\$2,011,217,781	7,142	0	\$1,798,020,256	\$0
<b>McDowell County</b>	<b>44,965</b>	<b>\$2,122,747,994</b>	<b>24,261</b>	<b>18,678</b>	<b>\$2,218,490,855</b>	<b>\$1,555,705,870</b>
Marion	7,885	\$475,926,733	4943	7,115	\$429,600,930	\$344,701,890
Old Fort	911	\$76,708,200	580	580	\$63,332,470	\$63,332,470
Unincorporated Area	36,169	\$1,570,313,061	18,738	10,983	\$1,725,557,455	\$1,147,671,510
<b>Mitchell County</b>	<b>15,311</b>	<b>\$1,204,864,800</b>	<b>8,810</b>	<b>4,322</b>	<b>\$582,090,000</b>	<b>\$350,982,000</b>
Bakersville	455	\$42,219,800	357	0	\$34,482,000	\$0
Spruce Pine	2,123	\$172,387,200	1,489	1,489	\$214,504,000	\$214,504,000
Unincorporated Area	12,733	\$990,257,800	6,964	2,833	\$298,622,000	\$136,478,000
<b>Yancey County</b>	<b>17,614</b>	<b>\$1,344,937,472</b>	<b>6,559</b>	<b>2,513</b>	<b>\$842,155,000</b>	<b>\$179,865,000</b>
Burnsville	1,673	\$136,597,150	1,611	886	\$141,460,000	\$71,895,000
Unincorporated Area	15,941	\$1,208,340,322	4,948	1,627	\$700,695,000	\$107,970,000
<b>Toe River Region TOTAL</b>	<b>95,633</b>	<b>\$7,290,915,975</b>	<b>48,496</b>	<b>25,513</b>	<b>\$6,055,505,229</b>	<b>\$2,086,552,870</b>

**Source:** Avery County GIS, McDowell County GIS, Mitchell County GIS, Yancey County GIS, HAZUS-MH MR-4; U.S. Environmental Protection Agency Toxic Release Inventory (TRI) Sites

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. Given the lack of historical loss data on significant hazardous materials incidents resulting in structural losses in the Toe River Region, it is assumed that while one major event could result in significant losses, annualizing structural losses over a long period of time would most likely yield a negligible annualized loss estimate for the Toe River Region.

### 6.16.1 Critical Facility Vulnerability

There are a total of 20 inventoried critical facilities in the Toe River Region determined to be vulnerable to a hazardous materials incident based on the 2500 meter buffer around each hazardous material site. This 6 libraries, 2 U.S. Forest Service Stations, 6 law enforcement facilities, and 6 fire stations. All of the critical facilities determined to be at risk to hazardous materials are listed in Table 6.39 toward the end of this section.

## 6.16 TERROR THREAT

**PRI Value: 2.1**

**Annualized Loss Estimate: Negligible**

According to the qualitative assessment performed using the PRI tool, the terror hazard scored a PRI value of 2.1 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.36** summarizes the risk levels assigned to each PRI category.

**TABLE 6.36: QUALITATIVE ASSESSMENT FOR ACTS OF TERROR**

<b>Probability</b>	Unlikely
<b>Impact</b>	Critical
<b>Spatial Extent</b>	Small
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than 6 hours

It cannot be predicted where an act of terror may occur, so all existing and future buildings, facilities and populations in the Toe River Region are considered to be equally exposed to this hazard and could potentially be impacted. This cumulative vulnerability is shown in Table 6.1.

Given the lack of historical loss data on terror events in the Toe River Region, it is assumed that while one major event could potentially result in significant losses, annualizing structural losses over a long period of time would most likely yield a very low annualized loss estimate for the region.

### 6.16.1 Critical Facility Vulnerability

All of the inventoried critical facilities in the Toe River Region are at risk to a terrorist attack (Table 6.39).

## 6.17 WILDFIRE

**PRI Value:** 2.1

**Annualized Loss Estimate:** *Negligible*

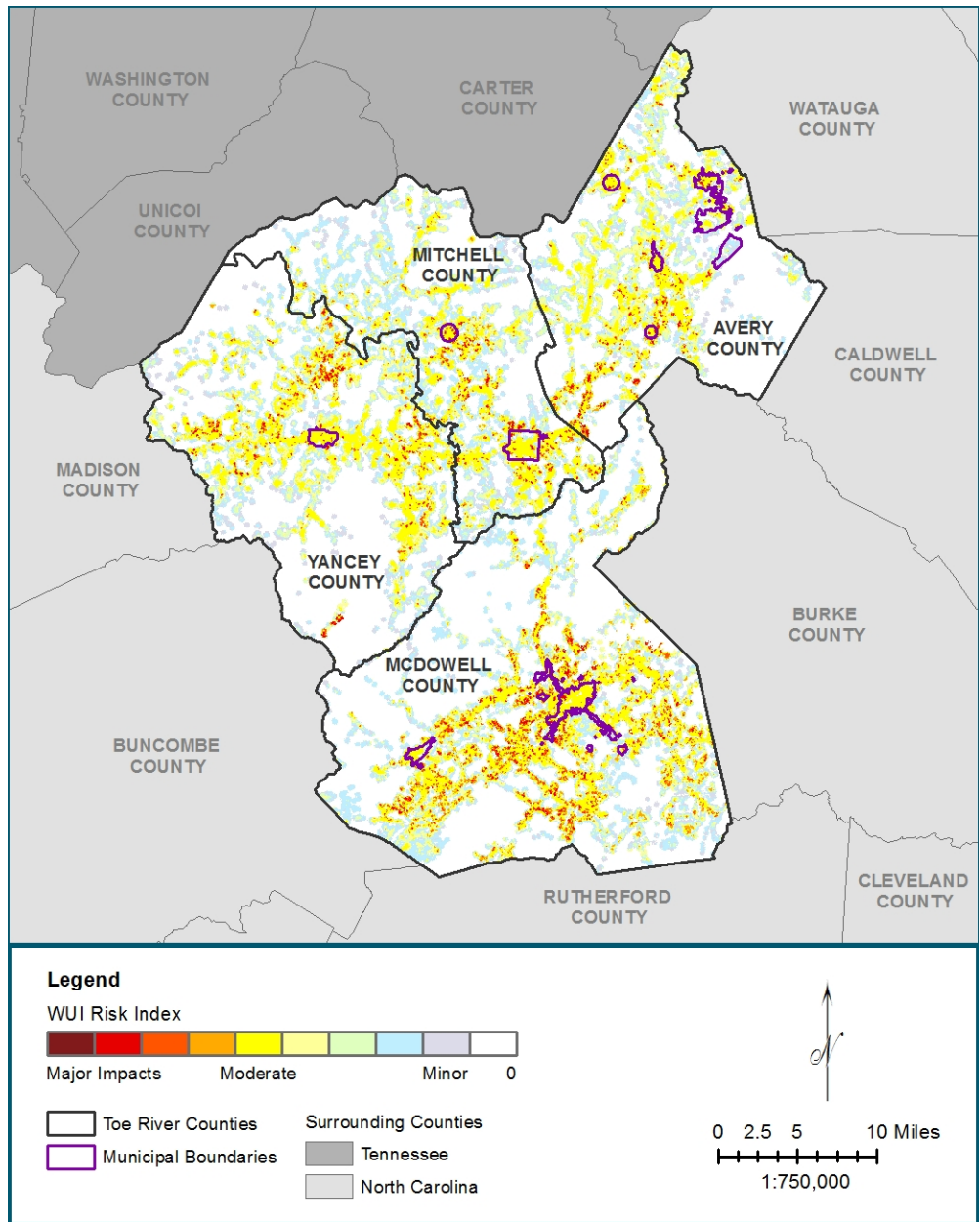
According to the qualitative assessment performed using the PRI tool, the wildfire hazard scored a PRI value of 2.8 (from a scale of 0 to 4, with 4 being the highest risk level). **Table 6.37** summarizes the risk levels assigned to each PRI category.

**TABLE 6.37: QUALITATIVE ASSESSMENT FOR WILDFIRE**

<b>Probability</b>	Highly Likely
<b>Impact</b>	Minor
<b>Spatial Extent</b>	Moderate
<b>Warning Time</b>	Less than 6 hours
<b>Duration</b>	Less than one week

The data used to determine vulnerability of people and property to wildfire in the Toe River Region is based on a GIS layer called the Wildland Urban Interface “WUI” Risk Index. This data was derived from Southern Wildfire Risk Assessment Portal (South WRAP) and provided by the North Carolina Division of Forest Resources. The WUI Risk Index is a rating of the potential impact of a wildfire on people and their homes. Figure 6.8 presents the results, which indicate that there few areas of major potential impacts to wildfires within the region. Future updates of the plan will attempt to identify in more detail the types, numbers and value of properties at risk. A majority of the region has little to no wildfire vulnerability according to the SouthWRAP.

**FIGURE 6.8: WILDFIRE RISK AREAS IN THE TOE RIVER REGION**



Source: Southern Wildfire Risk Assessment Data

Given the lack of historical loss data on wildfire events in the Toe River Region, it is assumed that while one major event could potentially result in significant losses, annualizing structural losses over a long period of time would most likely yield a very low annualized loss estimate for the region.

### 6.17.1 Asset Vulnerability

No assets were found to be at risk to the wildfire hazard.

## 6.18 CONCLUSIONS ON HAZARD VULNERABILITY

The results of this vulnerability assessment are useful in at least three ways:

- Improving our understanding of the risk associated with the natural hazards in the Toe River Region through better understanding of the complexities and dynamics of risk, how levels of risk can be measured and compared, and the myriad of factors that influence risk. An understanding of these relationships is critical in making balanced and informed decisions on managing the risk.
- Providing a baseline for policy development and comparison of mitigation alternatives. The data used for this analysis presents a current picture of risk in the Toe River Region. Updating this risk “snapshot” with future data will enable comparison of the changes in risk with time. Baselines of this type can support the objective analysis of policy and program options for risk reduction in the region.
- Comparing the risk among the natural hazards addressed. The ability to quantify the risk to all these hazards relative to one another helps in a balanced, multi-hazard approach to risk management at each level of governing authority. This ranking provides a systematic framework to compare and prioritize the very disparate natural hazards that are present in the Toe River Region. This final step in the risk assessment provides the necessary information for local officials to craft a mitigation strategy to focus resources on only those hazards that pose the most threat to the Toe River counties.

Exposure to hazards can be an indicator of vulnerability. Economic exposure can be identified through locally assessed values for improvements (buildings), and social exposure can be identified by estimating the population exposed to each hazard. This information is especially important for decision-makers to use in planning for evacuation or other public safety related needs. **Table 6.38** provides a summary of the estimated population counts and improved property values at-risk (exposed) to each hazard.

The types of assets included in these analyses include all building types in the participating jurisdictions. Specific information about the types of assets that are vulnerable to the identified hazards is included in each hazard subsection (for example all building types are considered at risk to the winter storm hazard and commercial, residential and government owned facilities are at risk to repetitive flooding, etc). **Table 6.39** provides a summary of results for the vulnerability assessment conducted for each of the Toe River inventoried critical facility assets. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an “X”).



**TABLE 6.38: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS IN THE TOE RIVER REGION**

Hazard	Estimated Population At Risk	Total Assessed Value of Improvements (Buildings)	Annualized Expected Property Losses	Annualized Percent Loss Ratio
<b>Atmospheric</b>				
Drought	95,633	\$7,290,915,975	<i>Negligible</i>	n/a
Hailstorm	95,633	\$7,290,915,975	\$44,666	0.00%
Hurricane and Tropical Storm	95,633	\$7,290,915,975	\$87,500	0.00%
Lightning	95,633	\$7,290,915,975	<i>Negligible</i>	0.00%
Severe Thunderstorm	95,633	\$7,290,915,975	\$10,312	0.00%
Tornado	95,633	\$7,290,915,975	\$16,183	0.00%
Winter Storm and Freeze	95,633	\$7,290,915,975	\$2,635,000	0.00%
<b>Geologic</b>				
Earthquake	95,633	\$7,290,915,975	\$2,661,495.00253,000	0.00%
Landslide	95,633	\$7,290,915,975	\$25,058	0.00%
<b>Hydrologic</b>				
Dam and Levee Failure	Undetermined	\$7,290,915,975	<i>Negligible</i>	n/a
Flood	15	\$7,290,915,975	\$19,025,000	0.00%
<b>Other</b>				
Hazardous Materials Incident (FIXED - 500 meter buffer)	466	\$7,290,915,975	<i>Negligible</i>	n/a
Hazardous Materials Incident (FIXED - 2,500 meter buffer)	14,259	\$7,290,915,975	<i>Negligible</i>	n/a
Hazardous Materials Incident (MOBILE – Roads - 500m buff)	9,962	\$7,290,915,975	<i>Negligible</i>	n/a
Hazardous Materials Incident (MOBILE – Roads - 500m buff)	4,561	\$7,290,915,975	<i>Negligible</i>	n/a
Hazardous Materials Incident (MOBILE – Rail - 2,500m buff)	48,496	\$7,290,915,975	<i>Negligible</i>	n/a
Hazardous Materials Incident (MOBILE – Rail- 2,500m buff)	25,513	\$7,290,915,975	<i>Negligible</i>	n/a
Terror Threat	95,633	\$7,290,915,975	<i>Negligible</i>	n/a
Wildfire	Undetermined	\$7,290,915,975	<i>Negligible</i>	n/a

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**TABLE 6.39: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS  
IN THE TOE RIVER REGION**

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC							GEOLOGIC				HYDROLOGIC			OTHER		
		Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Severe Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – Low	Landslide – Mod	Landslide- High	Dam and Levee Failure	Flood – 100 yr	Flood – 500 yr	HAZMAT Incidents	Terror Threat	Wildfire
<b>Emergency Facilities</b>																		
Avery County- Banner Elk Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X
Avery County – Banner Elk Fire and Rescue (#2)	Fire Station	X	X	X	X	X	X	X	X	X								X
Avery County- Crossnore Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X
Avery County- Elk Park Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X
Avery County – Fall Creek Volunteer Fire Department (#1)	Fire Station	X	X	X	X	X	X	X	X	X								X
Avery County – Fall Creek Volunteer Fire Department (#2)	Fire Station	X	X	X	X	X	X	X	X					X				X
Avery County – Frank Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X
Avery County – Green Valley Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X
Avery County – Linville Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X				X				X
Avery County- Newland Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X
McDowell County – Ashford North Cove Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X
McDowell County – The Crooked Creek Township Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X

**TABLE 6.39: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS  
IN THE TOE RIVER REGION**

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC							GEOLOGIC				HYDROLOGIC			OTHER			
		Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Severe Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – Low	Landslide – Mod	Landslide- High	Dam and Levee Failure	Flood – 100 yr	Flood – 500 yr	HAZMAT Incidents	Terror Threat	Wildfire	
McDowell County – Dysartsville Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X	
McDowell County – Glenwood Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X	
McDowell County – Hankins-North Fork Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X	
McDowell County – Marion Fire Department	Fire Station	X	X	X	X	X	X	X	X	X							X	X	
McDowell County – Montford Cove Fire Department	Fire Station	X	X	X	X	X	X	X	X									X	
McDowell County – Nebo Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X	
McDowell County – North Carolina Forest Service Fire Department	Fire Station	X	X	X	X	X	X	X	X									X	
McDowell County- Old Fort Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X		X						X	X	
McDowell County – Pleasant Garden Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X	
McDowell County – Sugar Hill Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X								X	
McDowell County – Woodlawn-Sevier Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X							X	X	
Mitchell County – Bakersville Volunteer Fire and Rescue	Fire Station	X	X	X	X	X	X	X	X	X					X			X	
Mitchell County – Bradshaw Volunteer Fire and Rescue	Fire Station	X	X	X	X	X	X	X	X									X	

**TABLE 6.39: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS  
IN THE TOE RIVER REGION**

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC							GEOLOGIC				HYDROLOGIC			OTHER		
		Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Severe Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – Low	Landslide – Mod	Landslide- High	Dam and Levee Failure	Flood – 100 yr	Flood – 500 yr	HAZMAT Incidents	Terror Threat	Wildfire
Mitchell County – Buladean Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X							X	
Mitchell County – Clearmont Volunteer Fire Department (#1)	Fire Station	X	X	X	X	X	X	X	X			X					X	
Mitchell County – Fork Mountain Fire and Rescue Squad	Fire Station	X	X	X	X	X	X	X	X	X							X	
Mitchell County – Ledger Fire Department	Fire Station	X	X	X	X	X	X	X	X	X							X	
Mitchell County – Parkway Fire and Rescue (#1)	Fire Station	X	X	X	X	X	X	X	X	X							X	
Mitchell County – Parkway Fire and Rescue (#2)	Fire Station	X	X	X	X	X	X	X	X	X							X	
Mitchell County – Parkway Fire and Rescue (#3)	Fire Station	X	X	X	X	X	X	X	X	X			X				X	
Mitchell County – Spruce Pine Fire and Rescue	Fire Station	X	X	X	X	X	X	X	X	X						X	X	
Yancey County – Burnsville Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X						X	X	
Yancey County – Clearmont Volunteer Fire Department (#2)	Fire Station	X	X	X	X	X	X	X	X			X					X	
Yancey County – Double Island Volunteer Fire Department (#1)	Fire Station	X	X	X	X	X	X	X	X			X					X	
Yancey County - Double Island Volunteer Fire Department (#2)	Fire Station	X	X	X	X	X	X	X	X			X					X	
Yancey County – Egypt-Ramsey Volunteer Fire Department (#1)	Fire Station	X	X	X	X	X	X	X	X			X					X	

**TABLE 6.39: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS  
IN THE TOE RIVER REGION**

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC							GEOLOGIC				HYDROLOGIC			OTHER		
		Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Severe Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – Low	Landslide – Mod	Landslide- High	Dam and Levee Failure	Flood – 100 yr	Flood – 500 yr	HAZMAT Incidents	Terror Threat	Wildfire
Yancey County - Egypt-Ramsey Volunteer Fire Department (#2)	Fire Station	X	X	X	X	X	X	X	X			X			X		X	
Yancey County –Newdale Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X	X							X	
Yancey County –Pensacola Volunteer Fire Department	Fire Station	X	X	X	X	X	X	X	X		X						X	
Yancey County –South Toe Volunteer Fire and Rescue (#1)	Fire Station	X	X	X	X	X	X	X	X		X			X			X	
Yancey County – South Toe Volunteer Fire and Rescue (#2)	Fire Station	X	X	X	X	X	X	X	X					X			X	
Yancey County – West Yancey Volunteer Fire (#1)	Fire Station	X	X	X	X	X	X	X	X		X			X			X	
Yancey County - West Yancey Volunteer Fire (#2)	Fire Station	X	X	X	X	X	X	X	X		X						X	
Yancey County - West Yancey Volunteer Fire (#3)	Fire Station	X	X	X	X	X	X	X	X		X						X	
Avery County- Police Department	Police Station	X	X	X	X	X	X	X	X	X				X			X	
Avery County – Banner Elk Police Department	Police Station	X	X	X	X	X	X	X	X	X							X	
Avery County – Beech Mountain Police Department	Police Station	X	X	X	X	X	X	X	X	X							X	
Avery County – Elk Park Police Department	Police Station	X	X	X	X	X	X	X	X	X							X	
Avery County – NC Highway Patrol Substation	Police Station	X	X	X	X	X	X	X	X	X							X	

**TABLE 6.39: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS  
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		Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Severe Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – Low	Landslide – Mod	Landslide- High	Dam and Levee Failure	Flood – 100 yr	Flood – 500 yr	HAZMAT Incidents	Terror Threat	Wildfire
Avery County – Newland Police Department	Police Station	X	X	X	X	X	X	X	X	X							X	
Avery County – Sugar Mountain Police Department	Police Station	X	X	X	X	X	X	X	X	X			X				X	
McDowell County – City of Marion Police Department	Police Station	X	X	X	X	X	X	X	X	X						X	X	
McDowell County – McDowell County Sherriff’s Office	Police Station	X	X	X	X	X	X	X	X	X							X	
McDowell County – North Carolina State Highway Patrol	Police Station	X	X	X	X	X	X	X	X	X						X	X	
McDowell County – Old Fort Police Department	Police Station	X	X	X	X	X	X	X	X		X					X	X	
Mitchell County – Bakersville Police Department	Police Station	X	X	X	X	X	X	X	X	X				X			X	
Mitchell County – Sherriff’s Department	Police Station	X	X	X	X	X	X	X	X	X				X			X	
Mitchell County – Spruce Pine Police Department	Police Station	X	X	X	X	X	X	X	X	X						X	X	
Yancey County – Burnsville Police Department	Police Station	X	X	X	X	X	X	X	X			X				X	X	
Yancey County – North Carolina State Highway Patrol	Police Station	X	X	X	X	X	X	X	X			X					X	
Yancey County – Yancey County Sherriff’s Office	Police Station	X	X	X	X	X	X	X	X			X				X	X	
McDowell County- United States Forest Service	Forest Service	X	X	X	X	X	X	X	X	X							X	

**TABLE 6.39: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS  
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FACILITY NAME	FACILITY TYPE	ATMOSPHERIC							GEOLOGIC				HYDROLOGIC			OTHER		
		Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Severe Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – Low	Landslide – Mod	Landslide- High	Dam and Levee Failure	Flood – 100 yr	Flood – 500 yr	HAZMAT Incidents	Terror Threat	Wildfire
Yancey County – United States Forest Service	Forest Service	X	X	X	X	X	X	X	X			X				X	X	
Yancey County - North Carolina Division of Parks	Forest Service	X	X	X	X	X	X	X	X		X						X	
Cannon Memorial Hospital (Linville, Avery County)	Hospital	X	X	X	X	X	X	X	X									
<b>Critical Infrastructure</b>																		
Avery County Airport	Airport	X	X	X	X	X	X	X	X		X							
Avery County – Elk River Airport	Airport	X	X	X	X	X	X	X	X	X								
<b>Public Buildings</b>																		
Avery County Library	Library	X	X	X	X	X	X	X	X	X								
McDowell County Public Library	Library	X	X	X	X	X	X	X	X	X						X		
McDowell County Law Library	Library	X	X	X	X	X	X	X	X	X						X		
McDowell County – Old Fort Branch	Library	X	X	X	X	X	X	X	X		X				X	X		
Mitchell County – Spruce Pine Library	Library	X	X	X	X	X	X	X	X	X								
Mitchell County Library	Library	X	X	X	X	X	X	X	X	X					X			
Yancey County Library	Library	X	X	X	X	X	X	X	X			X				X		
Avery-Mitchell-Yancey Regional Library	Library	X	X	X	X	X	X	X	X		X					X		
Avery County – Beech Mountain Elementary	School	X	X	X	X	X	X	X	X	X								
Avery County – Avery Middle School	School	X	X	X	X	X	X	X	X	X								
Avery County – Avery County High School	School	X	X	X	X	X	X	X	X	X								



**TABLE 6.39: SUMMARY OF TOTAL EXPOSURE AND POTENTIAL ANNUALIZED LOSSES TO IDENTIFIED HAZARDS  
IN THE TOE RIVER REGION**

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC							GEOLOGIC				HYDROLOGIC			OTHER		
		Drought	Hailstorm	Hurricane and Tropical Storm	Lightning	Severe Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – Low	Landslide – Mod	Landslide- High	Dam and Levee Failure	Flood – 100 yr	Flood – 500 yr	HAZMAT Incidents	Terror Threat	Wildfire
Avery County – Banner Elk Elementary	School	X	X	X	X	X	X	X	X	X								
Avery County – Cranberry Middle/Freedom Trail Elem	School	X	X	X	X	X	X	X	X	X								
Avery County – Riverside Elementary	School	X	X	X	X	X	X	X	X	X								
Avery County – Newland Elementary	School	X	X	X	X	X	X	X	X	X								
Avery County – Crossnore Elementary	School	X	X	X	X	X	X	X	X	X								
Avery County – Crossnore School	School	X	X	X	X	X	X	X	X	X								
Avery County – Grandfather Home for Children	School	X	X	X	X	X	X	X	X	X								



# SECTION 7

## CAPABILITY ASSESSMENT

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This section of the Plan discusses the capability of the Toe River Region to implement hazard mitigation activities. It consists of the following five subsections:

- 7.1 What is a Capability Assessment?
- 7.2 Conducting the Capability Assessment
- 7.3 Capability Assessment Findings
- 7.5 Conclusions on Local Capability

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### 7.1 WHAT IS A CAPABILITY ASSESSMENT?

The purpose of conducting a capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs or projects. Conducting a capability assessment also helps the communities meet the FEMA requirement for reviewing and incorporating existing plans, studies, reports and technical information into the plan. As in any planning process, it is important to try to establish which goals, objectives and/or actions are feasible, based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A capability assessment helps to determine which mitigation actions are practical and likely to be implemented over time given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources and current political climate.

A capability assessment has two primary components: 1) an inventory of a local jurisdiction's relevant plans, ordinances or programs already in place; and 2) an analysis of its capacity to carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts.

The capability assessment completed for the Toe River Region serves as a critical planning step and an integral part of the foundation for designing an effective hazard mitigation strategy. Coupled with the Risk Assessment, the Capability Assessment helps identify and target meaningful mitigation actions for incorporation in the Mitigation Strategy portion of the Hazard Mitigation Plan. It not only helps establish the goals and objectives for the Region to pursue under this Plan, but also ensures that those goals and objectives are realistically achievable under given local conditions.

## 7.2 CONDUCTING THE CAPABILITY ASSESSMENT

In order to facilitate the inventory and analysis of local government capabilities within the Toe River counties, a detailed Capability Assessment Survey<sup>1</sup> was distributed to members of the Toe River Regional Hazard Mitigation Planning Committee at the project kickoff meeting during the development of the 2010 plan. 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. Survey respondents were also asked to comment on the current political climate with respect to hazard mitigation, an important consideration for any local planning or decision making process.

At a minimum, survey results provide an extensive 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 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 hazard mitigation strategy.

The information provided in response to the survey questionnaire was incorporated into a database for further analysis. A general scoring methodology<sup>2</sup> was then applied to quantify each jurisdiction’s overall capability. According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation. Additional points were added based on the jurisdiction’s self-assessment of their own planning and regulatory capability, administrative and technical capability, fiscal capability and political capability.

Using this scoring methodology, a total score and an overall capability rating of “High,” “Moderate” or “Limited” could be determined according to the total number of points received. These classifications are designed to provide nothing more than a general assessment of local government capability. 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.

For the 2015 update each jurisdiction reviewed findings from the initial assessment and made changes as needed to reflect implementation of new capabilities in all capability sectors (Planning and Regulatory Capability, Administrative and Technical Capability, Fiscal Capability and Political Capability).

## 7.3 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this Plan to provide insight into the relevant capacity of the Toe River Region to implement hazard mitigation activities. All information is based upon the input provided by local government officials through the Capability Assessment Survey and during meetings of the Toe River Regional Hazard Mitigation Planning Committee.

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<sup>1</sup> The Capability Assessment Survey instrument is available in Appendix B.

<sup>2</sup> The scoring methodology used to quantify and rank the Region’s capability can be found in Appendix B.

### 7.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, development and redevelopment in a responsible manner, while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning and transportation planning, 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 Toe River Region, along with their potential effect on loss reduction. This information will help identify opportunities to address existing gaps, weaknesses or conflicts with other initiatives in addition to integrating the implementation of this Plan with existing planning mechanisms where appropriate.

**Table 7.1** provides a summary of the relevant local plans, ordinances and programs already in place or under development for the Toe River Region. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (\*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances and programs should be considered available mechanisms for incorporating the requirements of the Toe River Regional Hazard Mitigation Plan.

**TABLE 7.1: RELEVANT PLANS, ORDINANCES AND PROGRAMS**

Planning / Regulatory Tool	AVERY COUNTY	Banner Elk	Crossnore	Elk Park	Grandfather Village	Newland	Sugar Mountain	MCDOWELL COUNTY	Marion	Old Fort	MITCHELL COUNTY	Bakersville	Spruce Pine	YANCEY COUNTY	Burnsville
Hazard Mitigation Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Comprehensive Land Use Plan	✓	✓	*		✓	*	✓		✓				✓		
Floodplain Management Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Open Space Management Plan (or Parks & Rec/Greenway	✓	✓	✓	✓	✓	✓	✓	✓	✓						
Stormwater Management Plan/Ordinance	✓	✓	*	*	*	✓	✓					✓			
Natural Resource Protection Plan	✓	✓	✓		✓		✓								
Flood Response Plan	✓	✓	✓	✓	✓	✓	✓	✓							
Emergency Operations Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
Continuity of Operations Plan	✓	✓	✓	✓	✓	✓	✓	✓						*	
Evacuation Plan	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	
Disaster Recovery Plan	✓	✓	✓	✓	✓	✓	✓	✓						✓	
Capital Improvements Plan	✓	✓	✓	✓	✓	✓	✓	*	✓		✓	✓	✓	✓	✓
Economic Development Plan	✓	✓	*	*	*	*	✓	✓			✓	✓	✓	✓	
Historic Preservation Plan		✓	✓	*		*	✓	✓						✓	
Flood Damage Prevention Ordinance	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Zoning Ordinance	✓	✓	*	*	✓	✓	✓	✓	✓				✓		✓
Subdivision Ordinance	✓	✓	*	*	✓		✓	✓	✓						✓
Unified Development Ordinance		✓	*	*	*			*							
Post-Disaster Redevelopment Ordinance	✓	✓	✓	✓	✓	✓	✓	*							
Building Code	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
Fire Code	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
National Flood Insurance Program (NFIP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NFIP Community Rating System															

A more detailed discussion on the Region’s planning and regulatory capability follows, along with the incorporation of additional information based on the narrative comments provided by local officials in response to the survey questionnaire.

### 7.3.2 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases include preparedness, response and recovery. In reality each phase is interconnected with hazard mitigation, as **Figure 7.1** suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before disaster strikes, such as 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 will also be presented during immediate preparedness or response activities (such as installing storm shutters in advance of a hurricane), and certainly during the long-term recovery and redevelopment process following a hazard event.

**FIGURE 7.1: THE FOUR PHASES OF EMERGENCY MANAGEMENT**



Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As a result, the Capability Assessment Survey asked several questions across a range of emergency management plans in order to assess The Toe River Region’s willingness to plan and their level of technical planning proficiency.

**Hazard Mitigation Plan:** A hazard mitigation plan represents a community’s blueprint for how it intends to reduce the impact of natural and human-caused hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment and mitigation strategy.

- Each of the four counties participating in this multi-jurisdictional plan has previously adopted hazard mitigation plans. Each participating jurisdiction was included their respective county's plan.

**Disaster Recovery Plan:** A disaster recovery plan serves to guide the physical, social, environmental and economic recovery and reconstruction process following a disaster. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event.

- Avery County maintains a Disaster Recovery Plan that is a cooperative effort between the Emergency Management and Planning Departments. The County's plan covers the participating jurisdictions within Avery County.
- McDowell County and Yancey County each maintain Disaster Recovery Plans through their respective Emergency Management Departments.
- Mitchell County does not currently maintain a Disaster Recovery Plan. The County should consider developing a plan to guide the recovery and reconstruction process following a disaster.

**Emergency Operations Plan:** An emergency operations plan outlines responsibilities and the means by which resources are deployed during and following an emergency or disaster.

- Avery County, McDowell County, Mitchell County and Yancey County each maintain Emergency Operations Plans through their respective Emergency Management Departments.
- Avery County's Emergency Operations Plan covers the participating jurisdictions of Grandfather Village, Elk Park, and Crossnore. The participating jurisdictions of Newland, Sugar Mountain, and Banner Elk maintain their own Emergency Operations Plans through their respective Town Managers.
- Mitchell County's Emergency Operations Plan covers the participating jurisdictions of Bakersville and Spruce Pine.
- The City of Marion maintains an Emergency Operations Plan through the Administration, Police, Fire, Public Works, and Planning Departments.

**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.

- Avery County and McDowell County currently maintain Continuity of Operations Plans through their respective Emergency Management Departments. The Avery County plan includes the participating jurisdiction of Elk Park.
- The participating jurisdictions of Grandfather Village, Crossnore, Newland, Sugar Mountain, and Banner Elk maintain their own Continuity of Operations Plans.
- Mitchell County does not currently have a Continuity of Operations Plan.
- Yancey County Emergency Management is currently developing a Continuity of Operations Plan.



### 7.3.3 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they are not designed as such. Therefore, the Capability Assessment Survey also asked questions regarding general planning capabilities and the degree to which hazard mitigation is integrated into other on-going planning efforts in the Toe River Region.

**Comprehensive Land Use Plan:** A comprehensive land use plan establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically a comprehensive plan contains sections on demographic conditions, land use, transportation elements and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives and actions.

- Avery County has a comprehensive land use plan that was adopted by the Board of County Commissioners and is maintained by the Planning Department. The participating jurisdictions of Grandfather Village, Sugar Mountain, and Banner Elk maintain their own comprehensive land use plans. The Towns of Crossnore and Newland are currently developing comprehensive land use plans. The Town of Elk Park does not have a comprehensive land use plan.
- McDowell County does not have a comprehensive land use plan. The City of Marion within McDowell County maintains a comprehensive plan through its Planning Department.
- Mitchell County does not have a comprehensive land use plan. The participating jurisdiction of Spruce Pine within Mitchell County maintains a Town Master Plan.
- Yancey County does not have a comprehensive land use plan.

**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.

- Avery County maintains a Capital Improvements Plan through the County Manager. The participating jurisdictions of Grandfather Village, Elk Park, Crossnore, Newland, Sugar Mountain, and Banner Elk maintain their own Capital Improvements Plans.
- McDowell County is currently developing a Capital Improvements Plan through County Administration. The City of Marion maintains a Capital Improvements Plan through its Finance Department.
- Mitchell County maintains a Capital Improvements Plan through County Administration. The participating jurisdictions of Bakersville and Spruce Pine work with the County to maintain this plan.
- Yancey County maintains a Capital Improvements Plan through its Finance Department. The Town of Burnsville maintains its own Capital Improvements Plan.

**Historic Preservation Plan:** A historic preservation plan is intended to preserve historic structures or districts within a community. An often overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards, and the identification of ways to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards, or are within a historic district that cannot easily be relocated out of harm's way.

- McDowell County and Yancey County have Historic Preservation Plans.
- Mitchell County does not have a Historic Preservation Plan.
- Avery County does not have a Historic Preservation Plan. The Towns of Newland and Elk Park are currently developing Historic Preservation Plans. The Village of Sugar Mountain and the Towns of Banner Elk and Crossnore currently have Historic Preservation Plans.
- Mitigation strategies such as applying for federal grant funds (i.e., PDM, FMA, HMGP) to protect identified at-risk historic structures in the Toe River Region could be considered in any future historic planning efforts.

**Zoning Ordinance:** Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas.

- Avery County has a zoning ordinance that is administered by the Planning Department. Grandfather Village, Sugar Mountain, and the Towns of Newland and Banner Elk have adopted zoning ordinances. The Towns of Elk Park and Crossnore are currently developing zoning ordinances.
- McDowell County has a zoning ordinance, but it only covers certain areas of the county. The City of Marion has an adopted zoning ordinance.
- Mitchell County does not have a zoning ordinance. The Town of Spruce Pine within Mitchell County has an adopted zoning ordinance.
- Yancey County does not have a zoning ordinance. The Town of Burnsville within Yancey County has an adopted zoning ordinance.

**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.

- Avery County has a subdivision ordinance that is administered by the Planning Department. Grandfather Village, Sugar Mountain, and Banner Elk have adopted subdivision ordinances. The Towns of Elk Park and Crossnore are currently developing subdivision ordinances.
- McDowell County has a Subdivision Ordinance that was adopted by the Board of County Commissioners in August 2007 and applies to all areas of unincorporated McDowell County.

One of the stated purposes of the ordinance is to “reduce the danger to health or peril from flood, erosion, or water pollution.” Further, the ordinance limits the steepness of streets specifically to reduce the risk of landslides and landslide affects (injury, blocked roads, etc). The City of Marion has adopted a subdivision ordinance.

- Mitchell County does not have a subdivision ordinance.
- Yancey County does not have a subdivision ordinance. The Town of Burnsville within Yancey County has an adopted subdivision ordinance.

**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.

- All of the participating counties and jurisdictions have adopted the North Carolina State Building Code. The building code is enforced by each county’s Building Inspector. The City Marion has its own Building Inspector and enforces the North Carolina State Building Code within the City Limits.

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).<sup>3</sup> 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.

### 7.3.4 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the *National Flood Insurance Program* (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and

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<sup>3</sup>Participation in BCEGS is voluntary and may be declined by local governments if they do not wish to have their local building codes evaluated.

sustaining an effective hazard mitigation program. It is therefore used as part of this assessment as a key indicator for measuring local capability.

In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year flood event, and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties.

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials and the private sector about the likelihood of flooding in their community.

**Table 7.2** provides NFIP policy and claim information for each participating jurisdiction in the Toe River Region. All of the jurisdictions within the Toe River region participate in the NFIP through enforcement of floodplain management ordinances and by regulating development using Flood Insurance Rate Maps. Continued compliance with the NFIP is a priority for the jurisdictions in the Toe River region.

**TABLE 7.2: NFIP POLICY AND CLAIM INFORMATION**

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
<b>AVERY COUNTY</b>	9/28/90	12/3/09	170	\$38,508,300	100	\$2,049,238
Banner Elk	1/15/88	12/3/09	28	\$8,828,000	6	\$85,396
Crossnore	8/19/86	12/3/09 (M)	4	\$629,000	3	\$34,480
Elk Park	4/15/86	12/3/09 (M)	6	\$583,000	1	\$2,487
Grandfather Village	7/15/10	12/3/09	11	\$3,800,000	0	0
Newland	12/8/84	12/3/09	14	\$3,127,200	8	\$592,999
Sugar Mountain	6/1/09	NSFHA	11	\$3,395,000	0	0
<b>McDOWELL COUNTY</b>	7/15/88	1/6/10	78	\$16,684,700	30	\$666,139
Marion	5/1/87	1/6/10	14	\$4,357,100	1	\$56,414
Old Fort	7/15/88	1/6/10	12	\$2,954,500	2	\$2,941
<b>MITCHELL COUNTY</b>	9/4/86	6/2/09	21	\$4,827,200	10	\$316,563
Bakersville	5/1/87	6/2/09	12	\$3,223,600	11	\$196,023
Spruce Pine	9/2/88	6/2/09	1	\$40,000	5	\$291,600
<b>YANCEY COUNTY</b>	4/17/84	6/2/09	114	\$26,801,700	37	\$592,653

Burnsville	4/17/84	6/2/09	12	\$3,039,400	4	\$70,736
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(M) – No elevation determined, all Zone A, C, and X

(NSFHA) – No Special Flood Hazard Area, all Zone C

Source: NFIP claims and policy information as of 8/31/15; NFIP Community Status information as of 11/10/15.

**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 of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in **Table 7.3**. As class ratings improve (the lower the number, the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

**TABLE 7.3: CRS PREMIUM DISCOUNTS, BY CLASS**

CRS Class	Premium Reduction
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0

Source: FEMA

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years, based on community comments intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it.

- None of the counties or local jurisdictions currently participates in the CRS. Participation in the CRS program should be considered as a mitigation action. The program would be most beneficial to Avery and Yancey Counties, which each have more than 100 NFIP policies.

**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.

- All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. All counties and municipalities participating in this hazard mitigation plan also participate in the NFIP and they all have adopted flood damage prevention ordinances.

**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.

- McDowell County's Recreation Department maintains a Parks and Recreation Plan. The City of Marion has an Open Space Management Plan administered by the City's Planning Department.
- Yancey County and Mitchell County do not have Open Space Management Plans, nor do any of the participating jurisdictions within these counties.
- Avery County enforces an Open Space Management Plan as part of their subdivision ordinance and commercial site plan requirements. Each of the participating jurisdictions in Avery County also has some form of Open Space Management Plan.

**Stormwater Management Plan:** A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

- Avery County has an adopted Sedimentation and Erosion Control Ordinance that serves as their Stormwater Ordinance. Sugar Mountain and the Towns of Newland and Banner Elk have adopted Stormwater Management Plans. Grandfather Village and the Towns of Elk Park and Crossnore are currently developing Stormwater Management Plans.
- McDowell County does not have a formal Stormwater Management Plan, but the County follows the North Carolina Department of Environment and Natural Resources (NCDENR) rules for stormwater runoff.
- Mitchell County does not have a Stormwater Management Plan. The Town of Bakersville enforces NCDOT stormwater management regulations.
- Yancey County does not have a formal Stormwater Management Plan.

### 7.3.6 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using Geographic Information

Systems (GIS) to analyze and assess community hazard vulnerability. The Capability Assessment Survey was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

**Table 7.4** provides a summary of the Capability Assessment Survey results for the Toe River Region with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

**TABLE 7.4: RELEVANT STAFF / PERSONNEL RESOURCES**

Staff / Personnel Resource	EVERY COUNTY	Banner Elk	Crossnore	Elk Park	Grandfather Village	Newland	Sugar Mountain	McDOWELL COUNTY	Marion	Old Fort	MITCHELL COUNTY	Bakersville	Spruce Pine	YANCEY COUNTY	Burnsville
Planners with knowledge of land development / land management practices	✓	✓	✓	✓	✓		✓	✓	✓						
Engineers or professionals trained in construction practices related to buildings and/or infrastructure	✓	✓	✓	✓	✓		✓		✓						
Planners or engineers with an understanding of natural and/or human-caused hazards	✓	✓	✓	✓	✓		✓	✓	✓						
Emergency Manager	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
Floodplain Manager	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
Land Surveyors															
Scientists familiar with the hazards of the community															
Staff with education or expertise to assess the community's vulnerability to hazards	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	
Personnel skilled in GIS and/or HAZUS	✓		✓	✓	✓		✓	✓	✓		✓			✓	
Resource development staff or grant writers	✓	✓		✓		✓	✓	✓							

### 7.3.7 Fiscal Capability

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of outside grant funding awards or locally-based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses

are linked to an actual project such as the acquisition of flood-prone homes, which can require a substantial commitment from local, state and federal funding sources.

The Capability Assessment Survey was used to capture information on the region's fiscal capability through the identification of locally available financial resources.

**Table 7.5** provides a summary of the results for the Toe River Region with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

**TABLE 7.5: RELEVANT FISCAL RESOURCES**

Potential Fiscal Resource/Tool	EVERY COUNTY	Banner Elk	Crossnore	Elk Park	Grandfather Village	Newland	Sugar Mountain	McDOWELL COUNTY	Marion	Old Fort	MITCHELL COUNTY	Bakersville	Spruce Pine	YANCEY COUNTY	Burnsville
Capital Improvement Programming	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
Community Development Block Grants (CDBG)	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
Special Purpose Taxes (or taxing districts)	✓						✓		✓		✓			✓	
Gas / Electric Utility Fees															
Water / Sewer Fees		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓
Stormwater Utility Fees		✓				✓									
Development Impact Fees		✓											✓		
General Obligation, Revenue, and/or Special Tax Bonds	✓	✓	✓	✓	✓	✓	✓						✓		
Partnering Arrangements or Intergovernmental Agreements	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓

### 7.3.8 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 Capability Assessment Survey was used to capture information on political capability of the Toe River Region. 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.).

- Some survey responses provided examples of development regulations that go beyond minimum state or federal requirements. The City of Marion indicated that they enforce a two-foot freeboard in the floodplain and have additional regulations for development along steep slopes. Past mitigation activities in the Toe River Region are described in the next section under *Previously Implemented Mitigation Measures*.
- The Town of Bakersville indicated strong support from its Town Board, which has gone through two disaster events.

### 7.3.9 Local Self Assessment

In addition to the inventory and analysis of specific local capabilities, the Capability Assessment Survey asked counties and local jurisdictions within the Toe River Region 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 aforementioned capabilities as either “limited,” “moderate” or “high.”

**Table 7.6** summarizes the results of the self assessment process for the Toe River Region.

**TABLE 7.6: SELF ASSESSMENT OF CAPABILITY**

Jurisdiction	Planning and Regulatory Capability	Administrative and Technical Capability	Fiscal Capability	Political Capability	OVERALL CAPABILITY
AVERY COUNTY	High	High	High	High	High
Banner Elk	High	High	High	High	High
Crossnore	High	High	High	High	High
Elk Park	High	High	High	High	High
Grandfather Village	High	High	High	High	High
Newland	High	High	High	High	High
Sugar Mountain	High	High	High	High	High
McDOWELL COUNTY	Moderate	Moderate	Limited	Moderate	Moderate
Marion	High	High	High	High	High
Old Fort					
MITCHELL COUNTY	Limited	Moderate	Limited	High	Moderate
Bakersville	Limited	Moderate	Limited	High	Moderate
Spruce Pine	Limited	Moderate	Limited	High	Moderate
YANCEY COUNTY	Moderate	Limited	Limited	Moderate	Limited
Burnsville	Limited	Limited	Limited	Limited	Limited

## 7.4 CONCLUSIONS ON LOCAL CAPABILITY

In order to form meaningful conclusions on the assessment of local capability, a quantitative scoring methodology was designed and applied to results of the Capability Assessment Survey. This methodology, further described in Appendix B, attempts to assess the overall level of capability of the Toe River Region to implement hazard mitigation actions.

The overall capability to implement hazard mitigation actions varied among the participating jurisdictions. For planning and regulatory capability, the jurisdictions were in the moderate or high range. The administrative and technical capabilities varied widely among the jurisdictions, with larger jurisdictions generally having greater staff and technical resources. Most jurisdictions were in the low to moderate range for fiscal capability.

**Table 7.7** shows the results of the capability assessment using the designed scoring methodology. The capability score is based solely on the information provided by local officials in response to the Capability Assessment Survey. According to the assessment, the average local capability score for all responding jurisdictions is **44.6**, which falls into the moderate capability ranking.

**Table 7.7: Capability Assessment Results**

Jurisdiction	Overall Capability Score	Overall Capability Rating
AVERY COUNTY	65	High
Banner Elk	64	High
Crossnore	51	High
Elk Park	48	Moderate
Grandfather Village	56	High
Newland	46	Moderate
Sugar Mountain	61	High
McDOWELL COUNTY	51	High
Marion	45	Moderate
Old Fort		
MITCHELL COUNTY	31	Moderate
Bakersville	27	Moderate
Spruce Pine	34	Moderate
YANCEY COUNTY	29	Moderate
Burnsville	17	Limited

As previously discussed, one of the reasons for conducting a Capability Assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified, for each jurisdiction, in the tables found throughout this section. The participating jurisdictions used the Capability Assessment as part of the basis for the Mitigation Actions that are identified in Section 9; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their Mitigation Actions.

### **7.4.1 Linking the Capability Assessment with the Risk Assessment and the Mitigation Strategy**

The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. During the process of identifying specific mitigation actions to pursue, the Regional Hazard Mitigation Planning Committee considered not only each jurisdiction's level of hazard risk but also their existing capability to minimize or eliminate that risk.

# SECTION 8

## MITIGATION STRATEGY

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This section of the Plan provides the blueprint for the participating jurisdictions in the Toe River Region to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Toe River Regional Hazard Mitigation Planning Committee and the findings and conclusions of the *Capability Assessment* and *Risk Assessment*. It consists of the following five subsections:

- 8.1 Introduction
- 8.2 Mitigation Goals
- 8.3 Identification and Analysis of Mitigation Techniques
- 8.4 Selection of Mitigation Techniques for the Toe River Region
- 8.5 Plan Update Requirement

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### 8.1 INTRODUCTION

The intent of the Mitigation Strategy is to provide the Toe River Region with the 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. It is designed to be comprehensive, strategic and functional in nature:

- In being *comprehensive*, the development of the strategy includes a thorough review of all hazards and identifies extensive mitigation measures intended to not only reduce the future impacts of high risk hazards, but also to help the region achieve compatible economic, environmental and social goals.
- In being *strategic*, the development of the strategy ensures that all policies and projects proposed for implementation are consistent with pre-identified, long-term planning goals.
- In being *functional*, each proposed mitigation action is linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the Mitigation Strategy includes the identification of mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific, mitigation actions. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas through a local ordinance), and hazard mitigation projects that seek to address specifically targeted hazard risks (such as the acquisition and relocation of a repetitive loss structure).

The second step involves the identification, consideration and analysis of available mitigation measures to help achieve the identified mitigation goals. This is a long-term, continuous process sustained through the development and maintenance of this Plan. Alternative mitigation measures will continue to be considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as this Plan is maintained over time.

The third and last step in designing the Mitigation Strategy is the selection and prioritization of specific mitigation actions for the Toe River Region (provided separately in Section 8: *Mitigation Action Plan*). Each County and participating jurisdiction has its own Mitigation Action Plan (MAP) that reflect the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process.

The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for the Toe River counties and jurisdictions to complete. Each action has accompanying information, such as those departments or individuals assigned responsibility for implementation, potential funding sources and an estimated target date for completion. The MAP provides those departments or individuals responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring success or progress over time. The cohesive collection of actions listed in the MAP can also serve as an easily understood menu of mitigation policies and projects for those local decision makers who want to quickly review the recommendations and proposed actions of the Regional Hazard Mitigation Plan.

In preparing each Mitigation Action Plan for the Toe River Region, officials considered the overall hazard risk and capability to mitigate the effects of hazards as recorded through the risk and capability assessment process, in addition to meeting the adopted mitigation goals and unique needs of the community. Prioritization of the proposed mitigation actions was based on the following five (5) factors:

### 8.1.1 Mitigation Action Prioritization

In the previous versions of Toe River county plans, not all actions were prioritized. In addition, there needed to be consistency among the counties and jurisdiction regarding how they prioritized their actions. Therefore, for the 2010 Toe River Regional plan, the Regional Hazard Mitigation Planning Committee members were tasked with establishing a priority for each action at the second Regional Hazard Mitigation Planning Committee meeting (February 18, 2010). Prioritization of the proposed mitigation actions was based on the following six (6) factors:

- Effect on overall risk to life and property
- Ease of implementation
- Political and community support
- A general economic cost/benefit review<sup>1</sup>
- Funding availability

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<sup>1</sup> Only a general economic cost/benefit review was considered by the Regional Hazard Mitigation Planning Committee through the process of selecting and prioritizing mitigation actions. Mitigation actions with “high” priority were determined to be the most cost effective and most compatible with the participating jurisdictions’ unique needs. A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.

- Continued compliance with the NFIP

The point of contact for each county helped coordinate the prioritization process by reviewing each action and working with the lead agency/department responsible to determine a priority for each action using the six factors listed above.

Using these criteria, actions were classified as high, moderate, or low priority by the participating jurisdiction officials.

## 8.2 MITIGATION GOALS

### 44 CFR Requirement

**44 CFR Part 201.6(c)(3)(i):** The mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The primary goal of all local governments is to promote the public health, safety, and welfare of its citizens. In keeping with this standard, the Toe River counties and the participating municipalities have developed six goal statements for local hazard mitigation planning in the region. In developing these goals for the initial version of this plan in 2010, the previous four county hazard mitigation plans were reviewed to determine areas of consistency. The project consultant reviewed the goals from each of the four existing plans that were combined to form this regional plan. Many of the goals were similar and regional goals were formulated based on commonalities found between the goals in each plan. These proposed regional goals and their corresponding goals or objectives from the previous plans are presented in **Table 8.1**.

The proposed regional goals were presented, reviewed, voted on, and accepted by the Planning Committee at the second Regional Hazard Mitigation Planning Committee meeting (2/18/10) during the development of the first version of this regional plan. This process of combining goals from the previous plans served to highlight the planning process that had occurred in each county prior to joining this regional planning effort. Each goal, purposefully broad in nature, serves to establish parameters that were used in developing more mitigation actions. The Toe River Region Mitigation Goals are presented in **Table 8.2**. Consistent implementation of actions over time will ensure that community goals are achieved.

As part of the development of the 2015/2016 update of this plan, the goals found in Table 8.2 were reviewed and discussed at the 8/26/15 meeting of the Regional Hazard Mitigation Planning Committee. It was determined that the goals, as written, are still applicable for the region and no revisions were recommended.

**TABLE 8.1: PROPOSED MITIGATION GOALS**

	Proposed Goal	Former Plan Reference			
		Avery County	McDowell County	Mitchell County	Yancey County
Goal #1	Establish or participate in local, state, and federal mitigation-oriented and disaster-based programs that lessen the damaging effects of natural hazards thereby protecting life and property.	Goal 1	Obj. 1.1	Goal 9	Goal 1
Goal #2	Investigate, seek funding, and implement unspecified special projects and planning efforts that will reduce the damaging effects of natural hazards.	Goal 4	Goal 3	Goal 9	Goal 2, Goal 4
Goal #3	Enhance or create new policies that will help reduce the damaging effects of natural hazards.	Goal 4	Goal 3	Goal 10	Goal 4
Goal #4	Bolster emergency service capabilities by identifying and seeking funding for necessary equipment, as well as fostering regional cooperation for response and recovery.	Goal 2	Goal 2	Goal 8	Goal 3
Goal #5	Identify and mitigate development and infrastructure in known hazard areas, and avoid building new structures in known hazard areas.	Goal 3	Obj. 2.1	Goal 2, Goal 4	
Goal #6	Increase public awareness of hazard mitigation and hazard risk.		Obj. 1.1	Goal 7	



**TABLE 8.2: TOE RIVER MITIGATION GOALS**

	Goal
Goal #1	Establish or participate in local, state, and federal mitigation-oriented and disaster-based programs that lessen the damaging effects of natural hazards thereby protecting life and property.
Goal #2	Investigate, seek funding, and implement unspecified special projects and planning efforts that will reduce the damaging effects of natural hazards.
Goal #3	Enhance or create new policies that will help reduce the damaging effects of natural hazards.
Goal #4	Bolster emergency service capabilities by identifying and seeking funding for necessary equipment, as well as fostering regional cooperation for response and recovery.
Goal #5	Identify and mitigate development and infrastructure in known hazard areas, and avoid building new structures in known hazard areas.
Goal #6	Increase public awareness of hazard mitigation and hazard risk.

### 8.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

#### 44 CFR Requirement

**44 CFR Part 201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effect of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In formulating the Mitigation Strategy for the Toe River Region, a wide range of activities were considered in order to help achieve the established mitigation goals, in addition to addressing any specific hazard concerns. These activities were discussed during the Toe River Regional Hazard Mitigation Planning Committee meetings. In general, all activities considered by the Regional Hazard Mitigation Planning Committee can be classified under one of the following six (6) broad categories of mitigation techniques: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, and Public Awareness and Education. These are discussed in detail below.

#### 8.3.1 Prevention

Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- Planning and zoning

- Building codes
- Open space preservation
- Floodplain regulations
- Stormwater management regulations
- Drainage system maintenance
- Capital improvements programming
- Riverine / fault zone setbacks

### **8.3.2 Property Protection**

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations.

Examples include:

- Acquisition
- Relocation
- Building elevation
- Critical facilities protection
- Retrofitting (e.g., windproofing, floodproofing, seismic design techniques, etc.)
- Safe rooms, shutters, shatter-resistant glass
- Insurance

### **8.3.3 Natural Resource Protection**

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes and sand dunes. Parks, recreation or conservation agencies and organizations often implement these protective measures. Examples include:

- Floodplain protection
- Watershed management
- Riparian buffers
- Forest and vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.)
- Erosion and sediment control
- Wetland preservation and restoration
- Habitat preservation
- Slope stabilization

### **8.3.4 Structural Projects**

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Reservoirs
- Dams / levees / dikes / floodwalls
- Diversions / detention / retention
- Channel modification
- Storm sewers

### 8.3.5 Emergency Services

Although not typically considered a “mitigation” technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems
- Evacuation planning and management
- Emergency response training and exercises
- Sandbagging for flood protection
- Installing temporary shutters for wind protection

### 8.3.6 Public Education and Awareness

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects
- Speaker series / demonstration events
- Hazard map information
- Real estate disclosure
- Library materials
- School children educational programs
- Hazard expositions

## 8.4 SELECTION OF MITIGATION TECHNIQUES FOR THE TOE RIVER REGION

In order to determine the most appropriate mitigation techniques for the communities in the Toe River Region, the Regional Hazard Mitigation Planning Committee members thoroughly reviewed and considered the findings of the *Capability Assessment* and *Risk Assessment* to determine the best activities for their respective communities. Other considerations included the effect of each mitigation action on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if necessary).

## 8.5 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the Mitigation Actions identified in the previous Toe River Region county plans and in the 2010 version of this regional hazard mitigation plan were evaluated to determine their 2015 implementation status. Updates on the implementation status of each action are provided. The mitigation actions provided in *Section 9: Mitigation Action Plan* include the mitigation actions from the previous plans as well as any new mitigation actions proposed through the 2015 planning process.

Also as part of the 2015 update, the participating jurisdiction also reviewed the assigned priority for each action to determine if that priority has changed over the past five year. Any actions that were

determined to be of higher priority were adjusted accordingly as were any actions that were determined to be a lower priority.

# SECTION 9

## MITIGATION ACTION PLAN

### 44 CFR Requirement

**44 CFR Part 201.6(c)(3)(iii):** The mitigation strategy shall include an action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction.

This section of the Plan includes the listing of the mitigation actions proposed by the participating jurisdictions in the Toe River Region.

- 9.1: Overview
- 9.2: Mitigation Action Plans

### 9.1 OVERVIEW

As described in the previous section, the Mitigation Action Plan, or MAP, provides a functional plan of action for each jurisdiction. It is designed to achieve the mitigation goals established in Section 8: *Mitigation Strategy*, and will be maintained on a regular basis according to the plan maintenance procedures established in Section 10: *Plan Maintenance Procedures*.

Each proposed mitigation action has been identified as an effective measure (policy or project) to reduce hazard risk for the Toe River Region. Each action is listed in the MAP in conjunction with background information such as priority, hazard(s) addressed and estimated cost. Other information provided in the MAP includes potential funding sources to implement the action should funding be required (not all proposed actions are contingent upon funding). Most importantly, implementation mechanisms are provided for each action, including the designation of a lead agency or department responsible for carrying the action out as well as a timeframe for its completion. These implementation mechanisms ensure that the Toe River Regional Hazard Mitigation Plan remains a functional document that can be monitored for progress over time. The proposed actions are not listed in priority order, though each has been assigned a priority level of “high,” “moderate” or “low” as described below and in Section 8 (page 8.2).

**Table 9.1** describes the key elements of the Mitigation Action Plan.

**Table 9.1: Key Elements of the Mitigation Action Plan**

Jurisdiction Name Mitigation Action Number	Title of Action (Description of action to be undertaken.)
Hazard(s) Addressed:	Hazard which the action addresses.
Category:	Category of Mitigation Strategy that is met: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, Public Education and Awareness
Priority (High, Moderate, Low):	In preparing their own individual Mitigation Actions Place, each jurisdiction considered their overall hazard risk and capability to mitigate natural hazards as recorded through the risk and capability assessment process, in addition to meeting the adopted countywide mitigation goals and the unique needs of the unique needs of their community. Prioritizing mitigation actions for each jurisdiction was based on the following five (5) factors: (1) effect on overall risk to life and property; (2) ease of implementation; (3) political and community support; (4) a general economic cost/benefit review; and (5) funding availability. This process is also described on page 8:2, Section 8: <i>Mitigation Strategy</i> .
Lead Agency/Department Responsible:	Department responsible for undertaking the action.
Estimated Cost:	Anticipated cost of the action.
Potential Funding Sources:	Local, State, or Federal sources of funds are noted here, where applicable.
Implementation Schedule:	Date by which the action the action should be completed. More information is provided when possible.
Implementation Status (2015):	An indication of completion, progress, deferment, or no change with each action since the previous (2010) plan. If the action is new, that will be noted here.

## 9.2 MITIGATION ACTION PLANS

The mitigation actions proposed by each of the participating jurisdictions are listed in fifteen individual MAPs on the following pages. **Table 9.2** shows the location of each jurisdiction's MAP within this section as well as the number of mitigation actions proposed by each jurisdiction.

A number of mitigation actions have been completed by the participating jurisdictions over the years. Completed mitigation actions have been removed from the main mitigation action plan and placed in **Appendix E**. Similarly, some actions have been removed from the plan as they were identified to be irrelevant or unimplementable for various reasons. The specific reasons for the removal of each of those actions has been documented in the previous version of this plan and those actions are no longer found in the mitigation action plan.

**TABLE 9.2: INDIVIDUAL MAP LOCATIONS**

Location	Page	Number of Mitigation Actions
<b>Avery County</b>	<b>9:4</b>	<b>4</b>
Banner Elk	9:6	5
Crossnore	9:8	4
Elk Park	9:10	4
Grandfather Village	9:12	5
Newland	9:15	4
Sugar Mountain	9:17	4
<b>McDowell County</b>	<b>9:19</b>	<b>12</b>
Marion	9:24	8
Old Fort	9:28	6
<b>Mitchell County</b>	<b>9:31</b>	<b>42</b>
Bakersville	9:51	3
Spruce Pine	9:52	3
<b>Yancey County</b>	<b>9:54</b>	<b>10</b>
Burnsville	9:58	4

## AVERY COUNTY MITIGATION ACTION PLAN

<b>Avery County Mitigation Action 4</b>	<b>Avery County Schools – Conduct annual earthquake drills at each school</b>
Hazard(s) Addressed:	Earthquake
Category:	Public Information and Awareness
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	County Building Inspector/County Schools Facilities Director/Principals/County Fire Marshal
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	Begin during the 2016-2019 school year
2015 Implementation Status:	There has been limited progress in implementing this action over the past 5 years because state technical assistance is no longer available. The County will evaluate the feasibility of providing local funds for implementing the action or will utilize external funds for implementing should they become available.

<b>Avery County Mitigation Action 5</b>	<b>Avery County Schools – At Cranberry Middle School and Freedom Trail Elementary School, perform detailed inspection of school buildings and retaining walls during and after severe rains.</b>
Hazard(s) Addressed:	Landslide; Flood-induced erosion
Category:	Natural Resource Protection, Property Protection
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	County Building Inspector/County Schools Facilities Director/Principals/County Fire Marshal
Estimated Cost:	Minimal for inspections; Costs could rise if problems are found and construction must take place for stabilization
Potential Funding Sources:	Local Funds; Grant funds through FEMA
Implementation Schedule:	Begin during the 2016 school year.
2015 Implementation Status:	The walls were reinforced and no problems have occurred since then. No inspections have been done since the reinforcement.



<b>Avery County Mitigation Action 7</b>	<b>Evaluate floodplain ordinance and identify potential improvements (also considering impacts to present and future buildings and infrastructure)</b>
Hazard(s) Addressed:	Flooding
Category:	Prevention, Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Avery County Floodplain Manager
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2016-2019
2015 Implementation Status:	Over the past five years, the County has been successfully implementing the Flood Damage Prevention Ordinance which regulates new development in the floodplain. By requiring new development to be built above the BFE, Avery County is reducing future vulnerability to the flood hazard. At this time we have no changes to make to the floodplain ordinance but will continue to evaluate the ordinance and make changes as potential improvements are identified.

<b>Avery County Mitigation Action 8</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Avery County Emergency Management
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

## Town of Banner Elk Mitigation Action Plan

<b>Banner Elk Mitigation Action 3</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Banner Elk Mitigation Action 4</b>	<b>The Town will continue to work with Avery County and other Agencies to reduce the impacts of all hazards to the Town and its citizens.</b>
Hazard(s) Addressed:	All Hazards
Category:	Property Protection, Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Banner Elk Town Council, Planning Department
Estimated Cost:	Minimal
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new mitigation action.

<b>Banner Elk Mitigation Action 5</b>	<b>Work with Banner Elk Police Department and Avery County Sheriff's office to bring awareness of the new threats for terrorism, more specifically, cyber terrorism. Also work with Banner Elk Elementary to highlight the awareness of our changing world and the potential dangers associated with terrorism.</b>
Hazard(s) Addressed:	Terrorism
Category:	Property Protection, Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Banner Elk Town Council, Planning Department
Estimated Cost:	Minimal
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new mitigation action.

<b>Banner Elk Mitigation Action 6</b>	<b>Determine if there are any Town or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Banner Elk Town Council
Estimated Cost:	To be determined
Potential Funding Sources:	Federal Grant funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

<b>Banner Elk Mitigation Action 7</b>	<b>In addition to maintaining basic required compliance actions of the NFIP, periodically evaluate feasibility of implementing the following higher regulatory standards</b> <b>a) Require critical facilities protection to 500-year flood levels</b> <b>b) Require parking lots to be elevated (no more than six inches deep in any parking space during Community Flood event)</b> <b>c) Require dry land access for new or substantially improved buildings (above Community Base Flood Elevation)</b> <b>d) Levee restrictions</b> <b>e) Floors of new or substantially improved buildings allowed by variance in the floodplain must be elevated at least one (1) foot above the Community (future) Base Flood Elevation.</b> <b>f) Prohibit basements below flood level on filled lots</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Banner Elk Town Council
Estimated Cost:	None needed
Potential Funding Sources:	Local Staff Time
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## Town of Crossnore Mitigation Action Plan

<b>Crossnore Mitigation Action 2</b>	<b>Evaluate the feasibility of developing a plan for floodplain protection within Town Limits (also considering impacts to present and future buildings and infrastructure)</b>
Hazard(s) Addressed:	Flooding
Category:	Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Moderate
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015 through 2020
2015 Implementation Status:	This action remains ongoing: The town is working with the county to put together a team that can complete this action. Funding and staff time are needed to fully implement this action.

<b>Crossnore Mitigation Action 3</b>	<b>The Town will continue to work with the County to enforce the floodplain ordinance within its jurisdiction.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the Town of Crossnore has coordinated with the County to successfully implement the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, Crossnore and Avery County are reducing future vulnerability to the flood hazard. The Town will continue their partnership with Avery County in enforcing this important ordinance.

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<b>Crossnore Mitigation Action 4</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Crossnore Mitigation Action 5</b>	<b>Determine if there are any Town or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council
Estimated Cost:	To be determined
Potential Funding Sources:	Federal Grant funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## Town of Elk Park Mitigation Action Plan

<b>Elk Park Mitigation Action 3</b>	<b>The Town will continue to work with the County to enforce the floodplain ordinance within its jurisdiction.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the Town of Elk Park has coordinated with the County to successfully implement the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, Elk Park and Avery County are reducing future vulnerability to the flood hazard. The Town will continue their partnership with Avery County in enforcing this important ordinance.

<b>Elk Park Mitigation Action 4</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Elk Park Mitigation Action 5</b>	<b>Determine if there are any Town or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Elk Park Town Council
Estimated Cost:	To be determined
Potential Funding Sources:	Federal Grant funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

<b>Elk Park Mitigation Action 6</b>	<p>In addition to maintaining basic required compliance actions of the NFIP, periodically evaluate feasibility of implementing the following higher regulatory standards</p> <ul style="list-style-type: none"> <li>a) Require critical facilities protection to 500-year flood levels</li> <li>b) Require parking lots to be elevated (no more than six inches deep in any parking space during Community Flood event)</li> <li>c) Require dry land access for new or substantially improved buildings (above Community Base Flood Elevation)</li> <li>d) Levee restrictions</li> <li>e) Floors of new or substantially improved buildings allowed by variance in the floodplain must be elevated at least one (1) foot above the Community (future) Base Flood Elevation.</li> <li>f) Prohibit basements below flood level on filled lots</li> </ul>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council
Estimated Cost:	None needed
Potential Funding Sources:	Local Staff Time
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## Grandfather Village Mitigation Action Plan

<b>Grandfather Village Mitigation Action 3</b>	<b>Educate the Public through a newsletter about the new second exit out of the gated community since few people know about it.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Information and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Village Controller
Estimated Cost:	Low, approximate \$500
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is an ongoing action. Notice of the second exit out of the community is posted twice a year in community newsletter and at public gathering spaces in the community. This notification will continue in the future.

<b>Grandfather Village Mitigation Action 4</b>	<b>The Town will continue to work with the County to enforce the floodplain ordinance within its jurisdiction.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Village Planning Board, Zoning
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, Grandfather Village has coordinated with the County to successfully implement the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, Grandfather Village and Avery County are reducing future vulnerability to the flood hazard. The Town will continue their partnership with Avery County in enforcing this important ordinance.



<b>Grandfather Village Mitigation Action 5</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Village Governing Board
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Grandfather Village Mitigation Action 6</b>	<b>Determine if there are any Village or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Village Governing Board
Estimated Cost:	To be determined
Potential Funding Sources:	Federal Grant funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

<b>Grandfather Village Mitigation Action 7</b>	<p>In addition to maintaining basic required compliance actions of the NFIP, periodically evaluate feasibility of implementing the following higher regulatory standards</p> <ul style="list-style-type: none"> <li>a) Require critical facilities protection to 500-year flood levels</li> <li>b) Require parking lots to be elevated (no more than six inches deep in any parking space during Community Flood event)</li> <li>c) Require dry land access for new or substantially improved buildings (above Community Base Flood Elevation)</li> <li>d) Levee restrictions</li> <li>e) Floors of new or substantially improved buildings allowed by variance in the floodplain must be elevated at least one (1) foot above the Community (future) Base Flood Elevation.</li> <li>f) Prohibit basements below flood level on filled lots</li> </ul>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Banner Elk Town Council
Estimated Cost:	None needed
Potential Funding Sources:	Local Staff Time
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## Town of Newland Mitigation Action Plan

<b>Newland Mitigation Action 3</b>	<b>The Town will continue to work with the County to enforce the floodplain ordinance within its jurisdiction.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Town Planning Board, Zoning
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the Town of Newland has coordinated with the County to successfully implement the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, Newland and Avery County are reducing future vulnerability to the flood hazard. The Town will continue their partnership with Avery County in enforcing this important ordinance.

<b>Newland Mitigation Action 4</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Newland Mitigation Action 5</b>	<b>Determine if there are any Town or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Newland Town Council
Estimated Cost:	To be determined
Potential Funding Sources:	Federal Grant funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

<b>Newland Mitigation Action 6</b>	<p>In addition to maintaining basic required compliance actions of the NFIP, periodically evaluate feasibility of implementing the following higher regulatory standards</p> <ul style="list-style-type: none"> <li>a) Require critical facilities protection to 500-year flood levels</li> <li>b) Require parking lots to be elevated (no more than six inches deep in any parking space during Community Flood event)</li> <li>c) Require dry land access for new or substantially improved buildings (above Community Base Flood Elevation)</li> <li>d) Levee restrictions</li> <li>e) Floors of new or substantially improved buildings allowed by variance in the floodplain must be elevated at least one (1) foot above the Community (future) Base Flood Elevation.</li> <li>f) Prohibit basements below flood level on filled lots</li> </ul>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council
Estimated Cost:	None needed
Potential Funding Sources:	Local Staff Time
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## Village of Sugar Mountain Mitigation Action Plan

<b>Sugar Mountain Mitigation Action 4</b>	<b>The Village will continue to work with the County to enforce the floodplain ordinance within its jurisdiction.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the Village of Sugar Mountain has coordinated with the County to successfully implement the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, Sugar Mountain and Avery County are reducing future vulnerability to the flood hazard. The Town will continue their partnership with Avery County in enforcing this important ordinance.

<b>Sugar Mountain Mitigation Action 5</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Sugar Mountain Mitigation Action 6</b>	<b>Determine if there are any Town or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Sugar Mountain Town Council
Estimated Cost:	To be determined
Potential Funding Sources:	Federal Grant funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

<b>Sugar Mountain Mitigation Action 7</b>	<p>In addition to maintaining basic required compliance actions of the NFIP, periodically evaluate feasibility of implementing the following higher regulatory standards</p> <ul style="list-style-type: none"> <li>a) Require critical facilities protection to 500-year flood levels</li> <li>b) Require parking lots to be elevated (no more than six inches deep in any parking space during Community Flood event)</li> <li>c) Require dry land access for new or substantially improved buildings (above Community Base Flood Elevation)</li> <li>d) Levee restrictions</li> <li>e) Floors of new or substantially improved buildings allowed by variance in the floodplain must be elevated at least one (1) foot above the Community (future) Base Flood Elevation.</li> <li>f) Prohibit basements below flood level on filled lots</li> </ul>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council
Estimated Cost:	None needed
Potential Funding Sources:	Local Staff Time
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## McDOWELL COUNTY MITIGATION ACTION PLAN

<b>McDowell County Mitigation Action 7</b>	<b>Any and all portions of buildings that have been submerged for any length of time will be inspected for flood related damage as well as other conditions that may be dangerous to life, health or other property. The following is the inspection plan for damaged structures: 1) Overall damage assessment/data collection (visual inspection from roadways); 2) Data compiled and geographical areas assigned to teams; 3) Second detailed assessment by area teams; 4) Portions of walls, floors, ceilings, etc. that have been exposed to water will be opened for evaluation; 5) all construction that is repaired, replaced, dried, or sealed will be inspected before covered; 6) Structure inspected for certificate of compliance.</b>
Hazard(s) Addressed:	Flood
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	McDowell County Inspections
Estimated Cost:	Varies
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This action is completed and ongoing. McDowell County Inspections follows these procedures for submerged properties. As this action is now considered part of the County's capabilities to implement mitigation, the action will be removed from future plan updates.

<b>McDowell County Mitigation Action 8</b>	<b>Policy and procedures related to storm damage and disconnected utility services: 1) inform public via television, radio, and newspaper of the necessary steps to have utilities restored; 2) restrict travel as necessary while collecting damage assessment data; 3) conduct inspections on a first come, first served basis; 4) work overtime to expedite utility reconnections.</b>
Hazard(s) Addressed:	All
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	McDowell County Inspections
Estimated Cost:	minimal
Potential Funding Sources:	Local funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This action has been completed and is ongoing through enforcement of these procedures. Over the past five years, these procedures have been implemented when needed. As this action is now considered part of the County's capabilities to implement mitigation, the action will be removed from future plan updates.

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<b>McDowell County Mitigation Action 9</b>	<b>Create a zoning map (digital) that can be easily reproduced/ updated for staff and public use.</b>
Hazard(s) Addressed:	All
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	McDowell County Planning and Zoning
Estimated Cost:	minimal (using in-place staff)
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This action remain ongoing as of 2015. There is currently no zoning on a county-wide basis, only through voluntary means when requested by a landowner. McDowell County’s GIS layer of zoning in the County is currently up to date with all zoning in place in the County. The County’s GIS will continue to ensure that this layer is kept up to date.

<b>McDowell County Mitigation Action 10</b>	<b>Create and maintain a list of repetitive flood loss properties.</b>
Hazard(s) Addressed:	Flood
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	McDowell County Planning and Zoning
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This action has been completed (list of 4 repetitive loss properties maintained in County Building Inspections office) and remains ongoing as long as there are repetitive loss properties in the County. This action will remain in the plan as a reminder to County staff to actively attempt to mitigation all repetitive loss properties when feasible.

<b>McDowell County Mitigation Action 11</b>	<b>Ensure adequate evacuation warning in case of major hazard event.</b>
Hazard(s) Addressed:	All
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	McDowell County Emergency Services
Estimated Cost:	\$17,500 per year
Potential Funding Sources:	Grant Funding/General Operating Budget
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. The project grant that was mentioned during the previous version of this plan did not come through as originally stated and the County is still looking at other options. Currently, the County uses Nixle, Facebook, Local Churches, Calling Trees and Church Signs.



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<b>McDowell County Mitigation Action 12</b>		<b>Improve shelter capacities with alternate power/heat sources.</b>
Hazard(s) Addressed:	Winter Storm	
Category:	Emergency Services	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	McDowell County Emergency Services	
Estimated Cost:	Unknown at this time	
Potential Funding Sources:	Grant Funding	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Ongoing. Working with Red Cross and County on alternative heating sources. We have obtained one heating unit to date that can be used. More funding needed for further implementation.	

<b>McDowell County Mitigation Action 13</b>		<b>Establish program to maintain continuity of government operations.</b>
Hazard(s) Addressed:	All	
Category:	Emergency Services	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	McDowell County Emergency Services	
Estimated Cost:	Minimal (use in-place staff)	
Potential Funding Sources:	Local Funds	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Completed/Ongoing Updated as needed when changes are needed or made. Continuity of government operations in outlined in the McDowell County Emergency Operations Plan. As this action is now considered part of the County's capabilities to implement mitigation, the action will be removed from future plan updates.	

<b>McDowell County Mitigation Action 14</b>		<b>Identify alternate Emergency Operations Center locations.</b>
Hazard(s) Addressed:	All	
Category:	Emergency Services	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	McDowell County Emergency Services	
Estimated Cost:	Unknown; dependent on various options	
Potential Funding Sources:	Local Funds	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Ongoing. We do have alternative site for EOC upstairs from the 911 center in the Marion Police Department and also the option of going to Mitchell County if needed. We are looking at setting up an EOC at a different location in our County so it will be in a different building and location away from the current 911 center.	

<b>McDowell County Mitigation Action 15</b>	<b>Identify alternate detour routes from major arteries in the county.</b>
Hazard(s) Addressed:	All
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	McDowell County Emergency Services
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing and constantly identifying alternative routes as needed throughout the County. The county has identified and completed detour routes for Interstate 40, but may also consider routes from other major arteries. These detour routes can be found in the county's Detour Plan.

<b>McDowell County Mitigation Action 16</b>	<b>Place flood protection and other hazard education materials in all branches of the McDowell County public library system.</b>
Hazard(s) Addressed:	All
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	McDowell County Planning and Zoning
Estimated Cost:	Costs of reproducing a plan and materials (minimal)
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Completed and ongoing. We hand out flyers at PR events and also plans are on the County website (mcdowellgov.com). We also use Facebook to put out messages on different safety issues.

<b>McDowell County Mitigation Action 17</b>	<b>The McDowell Planning and Zoning Director has received training on erosion and sedimentation control methods and on floodplain surveying certification. On an annual basis, this official or his designee makes numerous site visits to assist property owners and developers with problems and potential problems associated with drainage, erosion, and flooding. Site visits are made at the request of the property owner or developer and are usually handled through the Planning and Zoning Department.</b>
Hazard(s) Addressed:	All
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	McDowell County Planning and Zoning/Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Completed and ongoing. This procedure is in place with all land use ordinances in McDowell County. Planning works alongside Building Inspections on this task. As needed with visits as requested from property owners or developers. Continued training done when additional training is made available or when updates/changes made.

<b>McDowell County Mitigation Action 18</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	McDowell County Emergency Services
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

## City of Marion Mitigation Action Plan

<b>City of Marion Mitigation Action 1</b>	<b>The City will continue to enforce the floodplain ordinance within its jurisdiction.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	City Planning and Development Services Department
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the City of Marion successfully implemented the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, the City is reducing future vulnerability to the flood hazard. The City will continue to enforce this important ordinance.

<b>City of Marion Mitigation Action 2</b>	<b>Develop a community awareness program to educate the citizens of Marion on hazard risks.</b>
Hazard(s) Addressed:	All
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Planning
Estimated Cost:	Minimal
Potential Funding Sources:	State and local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve community awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>City of Marion Mitigation Action 3</b>	<b>Develop a stormwater management plan to address with stormwater issues throughout the city.</b>
Hazard(s) Addressed:	Flood, Severe Thunderstorm, Winter Storm and Freeze
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Planning and Zoning, Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	State and Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, there has been no progress in implementing this action. The action will remain ongoing pending funding and staff time for implementation.

SECTION 9: MITIGATION ACTION PLAN

<b>City of Marion Mitigation Action 4</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	City of Marion Planning and Development/City Manager's Office
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>City of Marion Mitigation Action 5</b>	<b>Continue to attend NFIP and NIMS trainings annually to effectively administer and respond to flood and other natural disasters.</b>
Hazard(s) Addressed:	All Hazards
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Planning and Development Services / All Department Supervisors
Estimated Cost:	Moderate
Potential Funding Sources:	State and local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	All City Staff are required to have NIMS 100 and 700. The Development Services Director, while not a CFM, has had extensive training in floodplain management and has attended several NC Flood Management Workshops in past years. All Development Services Staff (i.e. building inspectors and planning staff) are being required to complete the following NFIP training courses by the end of January 2016.  <ol style="list-style-type: none"> <li>1. <i>EC Made Easy: Elevation Certificate Overview</i> (IS-1105), <a href="https://www.training.fema.gov/is/courseoverview.aspx?code=IS-1105">https://www.training.fema.gov/is/courseoverview.aspx?code=IS-1105</a>. (2 hrs)</li> <li>2. <i>Theory of Elevation Rating</i> (IS-1102), <a href="http://training.fema.gov/is/courseoverview.aspx?code=IS-1102">http://training.fema.gov/is/courseoverview.aspx?code=IS-1102</a> (2 hrs)</li> <li>3. <i>Increased Cost of Compliance</i> (IS-1100), <a href="https://www.training.fema.gov/is/courseoverview.aspx?code=IS-1100">https://www.training.fema.gov/is/courseoverview.aspx?code=IS-1100</a>. (1 hr)</li> <li>4. <i>Elevation Certificate for Surveyors</i> (IS-1103), <a href="http://training.fema.gov/is/courseoverview.aspx?code=IS-1103">http://training.fema.gov/is/courseoverview.aspx?code=IS-1103</a>. (2 hrs)</li> <li>5. <i>FEMA Mapping Changes</i> (IS-1106), <a href="http://training.fema.gov/is/courseoverview.aspx?code=IS-1106">http://training.fema.gov/is/courseoverview.aspx?code=IS-1106</a> (1 hr)</li> </ol>

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<b>City of Marion Mitigation Action 6</b>		<b>Provide public notification of impending/occurring severe weather events to the public.</b>
Hazard(s) Addressed:	Flood, Severe Thunderstorm, Winter Storm and Freeze	
Category:	Public Education and Awareness	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	City Manager's Office/Police and Fire Departments	
Estimated Cost:	Minimal	
Potential Funding Sources:	State and local funds	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	The City of Marion entered into an inter-local agreement with McDowell County in 2011 for consolidated 911 communication services. The McDowell County 911/Emergency Management office has a Nixle system that sends out notifications regarding severe weather events, the City Manager's office sends out alerts to local media outlets including McDowell News and WBRM radio, the Marion Police Department maintains a Facebook page to send out alerts, and the City website has a color coded emergency alert status on the homepage that is updated with information during impending and/or occurring severe weather events.	

<b>City of Marion Mitigation Action 7</b>		<b>Determine if there are any City or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards	
Category:	Emergency Services	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	City Manager's Office/Police and Fire Departments	
Estimated Cost:	To be determined	
Potential Funding Sources:	Federal Grant funds	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	This is a new action.	

<b>City of Marion Mitigation Action 8</b>	<p>In addition to maintaining basic required compliance actions of the NFIP, periodically evaluate feasibility of implementing the following higher regulatory standards</p> <ul style="list-style-type: none"> <li>a) Require critical facilities protection to 500-year flood levels</li> <li>b) Require parking lots to be elevated (no more than six inches deep in any parking space during Community Flood event)</li> <li>c) Require dry land access for new or substantially improved buildings (above Community Base Flood Elevation)</li> <li>d) Levee restrictions</li> <li>e) Floors of new or substantially improved buildings allowed by variance in the floodplain must be elevated at least one (1) foot above the Community (future) Base Flood Elevation.</li> <li>f) Prohibit basements below flood level on filled lots</li> </ul>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Planning and Development Services, City Council
Estimated Cost:	None needed
Potential Funding Sources:	Local Staff Time
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## Town of Old Fort Mitigation Action Plan

<b>Town of Old Fort Mitigation Action 1</b>	<b>The Town will continue to work with the County to enforce the floodplain ordinance within its jurisdiction.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the Town of Old Fort has coordinated with the County to successfully implement the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, Old Fort and McDowell County are reducing future vulnerability to the flood hazard. The Town will continue their partnership with McDowell County in enforcing this important ordinance.

<b>Town of Old Fort Mitigation Action 2</b>	<b>Develop a community awareness program to education the citizens of Old Fort on hazard risks.</b>
Hazard(s) Addressed:	All
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Planning
Estimated Cost:	Minimal
Potential Funding Sources:	State and local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve community awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Town of Old Fort Mitigation Action 3</b>	<b>Develop a stormwater management plan to address with stormwater issues throughout the town.</b>
Hazard(s) Addressed:	Flood, Severe Thunderstorm, Winter Storm and Freeze
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Planning and Zoning, Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	State and Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, there has been no progress in implementing this action. The action will remain ongoing pending funding and staff time for implementation.



<b>Town of Old Fort Mitigation Action 4</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Town of Old Fort Mitigation Action 5</b>	<b>Determine if there are any Town or County-owned critical facilities that should have a back-up generator. If so, seek funding to purchase a generator for the facility for improved resilience to all hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Old Fort Town Council
Estimated Cost:	To be determined
Potential Funding Sources:	Federal Grant funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

<b>Town of Old Fort Mitigation Action 6</b>	<p>In addition to maintaining basic required compliance actions of the NFIP, periodically evaluate feasibility of implementing the following higher regulatory standards</p> <ul style="list-style-type: none"> <li>a) Require critical facilities protection to 500-year flood levels</li> <li>b) Require parking lots to be elevated (no more than six inches deep in any parking space during Community Flood event)</li> <li>c) Require dry land access for new or substantially improved buildings (above Community Base Flood Elevation)</li> <li>d) Levee restrictions</li> <li>e) Floors of new or substantially improved buildings allowed by variance in the floodplain must be elevated at least one (1) foot above the Community (future) Base Flood Elevation.</li> <li>f) Prohibit basements below flood level on filled lots</li> </ul>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council
Estimated Cost:	None needed
Potential Funding Sources:	Local Staff Time
Implementation Schedule:	2015-2020
2015 Implementation Status:	This is a new action.

## MITCHELL COUNTY MITIGATION ACTION PLAN

<b>Mitchell County Mitigation Action 1</b>	<b>Promote Sustainable Development in Mitchell County</b>
Hazard(s) Addressed:	All
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners
Estimated Cost:	Unknown
Potential Funding Sources:	Federal, state, and local funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: Mitchell County promotes sustainable development in the county. The County received a state grant to assist a local company (PRC) review their building to make it more efficient. This company refurbishes goods.

<b>Mitchell County Mitigation Action 2</b>	<b>Delineate preferred growth areas and develop area plans for target locations.</b>
Hazard(s) Addressed:	All
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Board of Commissioners
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, State, and private funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Mitchell County is currently moving towards GIS which can be used to accomplish this action.

<b>Mitchell County Mitigation Action 3</b>	<b>Develop an open space plan; target properties for acquisition/fund acquisition program.</b>
Hazard(s) Addressed:	All
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Board of Commissioners
Estimated Cost:	\$1,000,000+
Potential Funding Sources:	Federal, State, and private funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	<p>Deferred due to lack of funding: The County was in the process of buying several sawmills along the streams in Mitchell County using state and federal grants and local funds. The plan was to buy out the properties, beginning with one mill, and create open space on the land. However, funds at the local level are not sufficient at this time to complete the task. This is still a priority for the county and will be revisited in the future.</p> <p>In addition, an open space recreation plan was developed for the county.</p>

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<b>Mitchell County Mitigation Action 4</b>	<b>Consider amending subdivision ordinance to allow clustering to maximize density while preserving flood hazard areas.</b>	
Hazard(s) Addressed:	All	
Category:	Prevention	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections	
Estimated Cost:	minimal	
Potential Funding Sources:	Federal, State, and private funds	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Deferred: At this time, Mitchell County does not have a subdivision ordinance in place. However, officials have considered one in the past and it may be revisited in the future.	

<b>Mitchell County Mitigation Action 10</b>	<b>Develop an impervious surface limit requirement.</b>	
Hazard(s) Addressed:	Flood	
Category:	Prevention	
Priority (High, Moderate, Low):	Low	
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections	
Estimated Cost:	Minimal	
Potential Funding Sources:	Local, state, and federal sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Deferred: This issue is not currently being discussed in the county, but may be in the future if stormwater issues arise.	

<b>Mitchell County Mitigation Action 11</b>	<b>Develop a requirement to limit or mitigate the impacts of increased storm water.</b>	
Hazard(s) Addressed:	Flood	
Category:	Prevention	
Priority (High, Moderate, Low):	Low	
Lead Agency/Department Responsible:	Board of Commissioners	
Estimated Cost:	Minimal	
Potential Funding Sources:	Federal, state, and local sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Deferred: Stormwater is not an issue in the county at this time. However, it may become in the future with increased developed and/or state regulations may requirement a stormwater management plan.	

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<b>Mitchell County Mitigation Action 13</b>	<b>Develop a requirement for all lots to have a buildable zone in non hazard areas</b>
Hazard(s) Addressed:	All Hazards
Category:	Prevention
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Implementation Schedule:	Deferred
2015 Implementation Status:	Deferred: This action would fall under a subdivision ordinance. At this time, Mitchell County does not have a subdivision ordinance in place. However, officials have considered one in the past and it may be revisited in the future.

<b>Mitchell County Mitigation Action 14</b>	<b>Develop a requirement to build developments in a hazard-resilient manner.</b>
Hazard(s) Addressed:	All Hazards
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	Local and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: Mitchell County will continue to require such measures through the floodplain ordinance and encourage responsible development elsewhere. However, there are no requirements beyond those in the floodplain ordinance at this time.

<b>Mitchell County Mitigation Action 15</b>	<b>Develop a provision for protection or creation of natural areas for hazardous areas.</b>
Hazard(s) Addressed:	All Hazards
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, state, and local funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	The county completed a master recreation plan that identifies potential green space areas in the county. For example, the county intends to eventually mitigate the mills around the streams in the county.

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<b>Mitchell County Mitigation Action 18</b>		<b>Develop a Storm Water Management Plan</b>
Hazard(s) Addressed:	Flood	
Category:	Prevention	
Priority (High, Moderate, Low):	Low	
Lead Agency/Department Responsible:	NCDENR, Board of Commissioners	
Estimated Cost:	\$30,000	
Potential Funding Sources:	Federal, State, and Local Funding Sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Deferred: Stormwater is not an issue in the county at this time. However, it may become in the future with increased developed and/or state regulations may requirement a stormwater management plan.	

<b>Mitchell County Mitigation Action 19</b>		<b>Require retention facilities on developments to hold storm water from smaller storms so as to allow seepage on site.</b>
Hazard(s) Addressed:	Flood	
Category:	Prevention	
Priority (High, Moderate, Low):	Low	
Lead Agency/Department Responsible:	NCDENR, Board of Commissioners, Building Inspections	
Estimated Cost:	Private funds	
Potential Funding Sources:	Federal, State, and Local Funding Sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Deferred: Stormwater is not an issue in the county at this time. However, it may become in the future with increased developed and/or state regulations may requirement a stormwater management plan.	

<b>Mitchell County Mitigation Action 20</b>		<b>Consider storm water detention facilities (perhaps as public improvements for multiple developments) to store storm water during peak runoff to be released at off-peak times.</b>
Hazard(s) Addressed:	Flood	
Category:	Prevention	
Priority (High, Moderate, Low):	Low	
Lead Agency/Department Responsible:	NCDENR, Board of Commissioners, Building Inspections	
Estimated Cost:	Private funds	
Potential Funding Sources:	Federal, State, and Local Funding Sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Deferred: Stormwater is not an issue in the county at this time. However, it may become in the future with increased developed and/or state regulations may requirement a stormwater management plan.	

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<b>Mitchell County Mitigation Action 21</b>	<b>Make storm water management a public purpose and implement a program to “take back” major drainage areas or streams within the community through acquisition or easements and maintain them as essential public facilities.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	NC DENR, NRCS, Board of Commissioners, Building Inspections
Estimated Cost:	Private funds
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Deferred: Stormwater is not an issue in the county at this time. However, it may become in the future with increased developed and/or state regulations may require a stormwater management plan.

<b>Mitchell County Mitigation Action 22</b>	<b>Improve and maintain streams throughout the community to the fullest extent possible.</b>
Hazard(s) Addressed:	Flood, Winter Storm and Freeze, Severe Thunderstorm
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	NC DENR, Core of Engineers
Estimated Cost:	1998-\$986,000; 2004-\$1,000,000 (future events expected to be similar to these costs)
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: The previous clean-ups were a result of Ivan and Francis and the associated presidential disaster declaration money. Extensive sediment was removed by dredging and some mitigation measures were put in place (flood walls, etc). No flooding has occurred since the 2004 clean-up.

<b>Mitchell County Mitigation Action 26</b>	<b>Several flood monitoring facilities can be placed on the streams and be coupled with a disaster warning system to give early warning of flood problems. A flood warning system, including stream monitoring devices to warn emergency personnel, radio/television announcements, door-to-door contact by fire or police, and mobile public-address would provide more early warning of flood problems.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	NC DENR
Estimated Cost:	Unknown
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: The state has a program to monitor all streams in the state called I-Flow. The County Emergency Manager has access to I-Flow. At this time, the County feels that I-Flow is sufficient for their needs and does not have any plans to upgrade flood warning capabilities.

<b>Mitchell County Mitigation Action 28</b>	<b>Review/Update Flood Damage Prevention Ordinance to ensure maximum protection from flood hazard events.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Inspections
Estimated Cost:	Minimal, done by the county
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Completed/ongoing: The floodplain ordinance was reviewed and updated in 2010. Updates include mandating set-backs in floodplains.
Additional Notes:	<p>Potential improvements to consider in the future.</p> <ul style="list-style-type: none"> <li>• Consider adopting temporary moratorium on new construction and new subdivisions within flood hazard areas until Flood Damage Prevention Ordinance has been updated.</li> <li>• Review rebuilding activities in wake of last floods and consider policies/procedures for minimizing repetitive losses.</li> <li>• Continue to require and maintain FEMA elevation certificates for all permits for new buildings or improvements to buildings on lots including any portion of 100-year floodplain.</li> <li>• Advise/assist property owners in retrofitting their homes and businesses. Retrofitting means modifying an existing building or yard to protect the property from flood damage.</li> <li>• Limit development that would increase flood height</li> <li>• Identify specific properties for wetland preservation or other use</li> <li>• Include measures to preserve the floodplain natural function</li> <li>• Address mobile home parks location</li> </ul>

<b>Mitchell County Mitigation Action 31</b>	<b>Implement the emergency operations plan</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the EOP has been used to manage emergencies as needed. The plan will continue to be implemented as needed and through training exercises.



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Mitchell County Mitigation Action 32	Review/update the emergency operations plan
Hazard(s) Addressed:	All-Hazards
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management Office
Estimated Cost:	Minimal to none
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: The county's emergency operation plan is reviewed annually to be compliant with state requirements under the Emergency Management Program Grant. The plan was reviewed on September 16, 2009.
Additional Notes:	<ul style="list-style-type: none"> <li>• Review the Emergency Management Operational Plan on an annual basis to insure that it is kept current. – Completed, 2010</li> <li>• Include human caused disasters in the plan – Completed</li> <li>• Provide more specific procedures and guidelines for the emergency manager</li> </ul>

Mitchell County Mitigation Action 33	Develop an Evacuation Plan
Hazard(s) Addressed:	All Hazards
Category:	Prevention
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Board of Commissioners, Emergency Management
Estimated Cost:	Unknown
Potential Funding Sources:	State grants
Implementation Schedule:	2015-2020
2015 Implementation Status:	Deferred: At a recent branch level meeting among regional coordinators, it was determined that western north Carolina was not in immediate of an evacuation plan. Most residents shelter in place. Money was available at the time but it was determined to be best spent on a different project.

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<b>Mitchell County Mitigation Action 35</b>	<b>Government facilities, especially those that house emergency services, should not be located in high-hazard areas.</b>
Hazard(s) Addressed:	All-Hazards
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections
Estimated Cost:	\$1,000,000
Potential Funding Sources:	Federal, state, local; federal disaster declaration money was used to relocate the building in 1998.
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. Completed to date: There are no government facilities located in flood hazard areas. A sheriff's building was relocated in 1998 after flooding, and that was the last of the buildings (approximate cost \$1,000,000). No future buildings will be located in such areas per the floodplain ordinance and hazard mitigation plan.

<b>Mitchell County Mitigation Action 36</b>	<b>A basic plan to inform employers about the hazards in the region; provide information and funding sources available at different levels for mitigation efforts; and to plan for specific needs of businesses for future development would be of great use.</b>
Hazard(s) Addressed:	All-Hazards
Category:	Prevention
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Chamber of Commerce, Board of Commissioners
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds, state grants
Implementation Schedule:	2015-2020
2015 Implementation Status:	Deferred: While there is no plan in place, officials felt that most industries have an understanding of the area's risks. This issue may be revisited in the future.
Additional Notes:	There is no existing plan about the business and industries in the region. Several of them are located in harm's way and the local economy needs to do its best to prevent damage to its assets.

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<b>Mitchell County Mitigation Action 37</b>	<b>Develop an inclement weather plan that would detail specific actions to be taken when inclement weather occurs, such as ice, snow, and severe storm damage.</b>
Hazard(s) Addressed:	All-Hazards
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Emergency Management Office
Estimated Cost:	Minimal
Potential Funding Sources:	State or local money
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: The county addresses inclement weather through the media and websites. However an official plan is not in plan and the need to implement one due to tourists in the area is recognized.
Additional Notes:	Inclement weather is the most common emergency in the county, highlighting the need for a plan. The plan would be coupled with a section in the emergency operational guideline that designates county personnel responsible for different tasks when inclement weather occurs.

<b>Mitchell County Mitigation Action 38</b>	<b>Develop an inclement weather plan that would detail specific actions to be taken when inclement weather occurs, such as ice, snow, and severe storm damage.</b>
Hazard(s) Addressed:	All Hazards
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Emergency Management
Estimated Cost:	Minimal
Potential Funding Sources:	State or local money
Implementation Schedule:	2015-2020
Implementation Status:	Ongoing: The county addresses inclement weather through the media and websites. However an official plan is not in plan and the need to implement one due to tourists in the area is recognized.

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<b>Mitchell County Mitigation Action 39</b>		<b>Protect Critical Facilities</b>
Hazard(s) Addressed:	All Hazards	
Category:	Property Protection	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	Engineering with support from EMS, Utility Companies, Hospital, NCDOT	
Estimated Cost:	Unknown	
Potential Funding Sources:	Federal, State, local, and private funding sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Ongoing: Over the past five years, three new critical facilities have been built (Spruce Pine Police Station, an EMS station and an office annex to the hospital). All three facilities are located out of the floodplain and thus protected against the flood hazard. The facilities are also built to current codes and therefore protected from wind and seismic hazards. Over the next five years, the County will work to identify any vulnerabilities to existing critical facilities and work to mitigate the facilities from hazard impacts.	
Additional Notes:	Critical facilities are essential to the health, safety and viability of a community. These are the buildings, services, and utilities without which residents and businesses cannot survive for long, such as hospitals, police stations, fire stations and sewage treatment plants. Therefore, the security of these facilities is imperative to ensure the public's health and safety in the aftermath of a hazard event. Steps that communities can take to better protect their critical facilities include such measures as retrofitting, relocation and acquisition. While considering the protection of these facilities, a multi hazard approach should be taken.	

<b>Mitchell County Mitigation Action 40</b>		<b>Use acquisition as a strategy if there are signs of repetitive losses or the reviewed flood maps show intensive construction on flood prone areas.</b>
Hazard(s) Addressed:	All Hazards	
Category:	Property Protection	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	Building Inspections, Planning Board Commission, FEMA	
Estimated Cost:	Varies	
Potential Funding Sources:	Federal, State, local and private funding sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	The county has bought out some properties, such as the Bakersville Fire Department and residential homes. The county will continue to use this strategy as means to reduce repetitive loss properties.	

<b>Mitchell County Mitigation Action 41</b>	<b>Consider relocation as strategy for mitigation</b>
Hazard(s) Addressed:	All Hazards
Category:	Property Protection
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Building Inspections, Planning Board Commission, FEMA
Estimated Cost:	Varies
Potential Funding Sources:	Federal, State, local and private funding sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	The county has relocated some properties, such as the Sheriff's Department in the past. The county will continue to use this strategy as means to reduce flood losses.
Additional Notes:	Relocation means moving a building or facility to a less hazard-prone area, either within the same parcel or on a new parcel. This technique is typically used to avoid coastal or riverine flood hazards. "Relocation" can also be used to describe the process of demolishing a building and reconstructing it outside the hazard area.
	One way to make relocation work is to adopt what Pilkey et al. call a 10/100-year relocation plan. Under this approach, a community develops a relocation strategy for its hazard-prone structures within 10 years, then implements that plan over the ensuing 100 years. Issues that need to be addressed in the planning stage include: cost-benefit comparisons of relocating structures intact or rebuilding; and whether buildings can be relocated on the same property or if new property must be acquired. Mobile homes and manufactured housing have been shown to be highly vulnerable to floods and should not be located in the floodplain. Where such housing can be relocated, this step should be taken. Communities may wish to require a bond against the damage to public streets and utilities incurred during a move.

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<b>Mitchell County Mitigation Action 42</b>	<b>Provide advanced training to enhance the knowledge, experience and dedication of staff on the local inspections team.</b>
Hazard(s) Addressed:	All Hazards
Category:	Property Protection
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	State and local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. The County hired a new Building Inspector in March of 2015. He has met most of his Level 1 certifications from the Department of Insurance and has met several of his Level 2 certifications. Continued maintenance of these certifications is required, which means staying up to date with trainings and knowledge. These trainings are not provided by the county. In the future, this action will be amended to reflect this information.
Additional Notes:	Well-trained inspectors are more likely to recognize building practices that are suspect with regard to hazard resilience, and can pass on their expertise to junior staff, thereby fostering a tradition of sustainable education within the inspections department. Brief training sessions could be provided to county inspectors who are working on local projects, to ensure that these supplemental staff are aware of local codes that are more stringent than county or state codes (such as free-board requirements). This method is one of the best alternatives to structural mitigation measures. By training building inspectors it is possible to tailor solutions for each home separately and come up with more economical and sound solutions than imposing change by regulations to all existing units.

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<b>Mitchell County Mitigation Action 44</b>		<b>Mandate tie-downs on propane tanks and mobile homes.</b>
Hazard(s) Addressed:	All Hazards	
Category:	Property Protection	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	Building Inspections, NCDENR	
Estimated Cost:	Minimal	
Potential Funding Sources:	Federal, state, local, and private sources	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Ongoing: Mobile Homes that are on wheels (not a fixed foundation) are required to have tie-downs through the County's Floodplain Ordinance. Fixed mobile homes and trailers and propane tanks are not required to have tie-downs at this time.	
Additional Notes:	Propane tanks and mobile homes should be mandated with standard tie-downs to prevent tanks and mobile homes from being lifted by floodwaters or winds and becoming ballistic hazards. Due to inexpensive land values, mobile homes are often located in floodplains; elevated mobile homes are at an increased risk of wind uplift and should be securely attached to foundation. Enforcement of a tank tie-down ordinance may need to be coordinated with the State Agriculture Department. However, even with tie-downs, residents should not remain in mobile homes during severe storms.	

<b>Mitchell County Mitigation Action 45</b>		<b>Development regulations that provide guidelines for future settlement should be revised from an emergency management point of view.</b>
Hazard(s) Addressed:	All Hazards	
Category:	Property Protection	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	Board of Commissioners, building inspections	
Estimated Cost:	Minimal	
Potential Funding Sources:	Local funds	
Implementation Schedule:	2015-2020	
2015 Implementation Status:	Ongoing: Over the past five years, there have been no new development regulations put in place that provide guidelines for future settlement from an EM point of view. The floodplain ordinance continues to consider some of these issues. However, a future subdivision ordinance would best address these issues, taking into account, street interconnectivity, width, and slope steepness when permitting development. At this time, a subdivision is not in place but feasibility of implementing one will be evaluated over the next five years.	

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<b>Mitchell County Mitigation Action 46</b>	<b>Consider acquiring (or not selling) parcels of land in hazard areas to conserve or restore as parks, in order to reduce the number of structures and infrastructure elements vulnerable to natural hazards.</b>
Hazard(s) Addressed:	Flood
Category:	Natural Resource Protection
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners
Estimated Cost:	Varies
Potential Funding Sources:	Federal, state, and local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Mitchell County has been successful in completing this action in the past. The County continues to pursue acquisition projects such as the mills along the streams in Mitchell County. This action is largely disaster driven since a disaster declaration results in money that is necessary to complete this action (such as HMGP). In Mitchell County, property of this nature would be deeded to the county where it would be a green space.
Additional Notes:	This approach would also be a solution to the recreational area need for the county.

<b>Mitchell County Mitigation Action 50</b>	<b>Raise Low-Lying Bridges or install culverts</b>
Hazard(s) Addressed:	All Hazards
Category:	Structural Project
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Engineering with support from NCDOT, FEMA
Estimated Cost:	\$25,000 cap for state funds
Potential Funding Sources:	State and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: Bridges in the County are state or privately maintained (the county has none). Following a disaster that destroys a bridge, the state may provide a maximum of \$25,000 to replace the bridge. In this case, private funds are often necessary to remedy the bridge as the cost exceeds the funds received. The County maintains a policy through the floodplain management ordinance that any new bridges or culvert built on private lands be inspected however only 2 such inspections have been needed over the past 12 years.
Additional Notes:	Raising low-lying bridges will decrease the likelihood that large objects carried by floodwaters to lodge against a bridge and subsequently dam the river course. Of particular concern are fallen trees, which, when swept into a river and snagged by a bridge, can quickly capture floating debris, potentially, forming a solid dam. As a result, areas upstream and adjacent to the unintended dam can receive flood levels unanticipated by hazard mapping and risk assessments. Finally, under the weight of a newly formed reservoir, the bridge may tear from its foundation, allowing a destructive wall of water to rush downstream.



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<b>Mitchell County Mitigation Action 52</b>	<b>Routinely clean and repair storm water drains to avoid unnoticed clogs that may hamper the efficiency of the storm water system.</b>
Hazard(s) Addressed:	All Hazards
Category:	Structural Project
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Maintenance, Utilities Companies
Estimated Cost:	\$25,000
Potential Funding Sources:	Local and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	This action is not relevant to the county at this time as stormwater is not managed by county. This action will be deleted from future versions of this plan.
Additional Notes:	Drains are the major entryways into the storm water system and the filters of large floating debris. When drain covers are broken or clogged, the storm water system does not function well and localized flooding is possible.  Services announcements via utility bills can recruit citizens as surveillance of the drains in their respective neighborhoods, as well as remind them that poor storm water collection can lead to flooded yards and basements. The task of inspection and maintenance, particularly of remote drains, could be on the monthly schedule of the public work staff, with a special round of drains inspections after major storm events.

<b>Mitchell County Mitigation Action 54</b>	<b>Develop a Community Awareness Program to educate citizens on hazard threats and mitigation.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Information
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Emergency Management Office with support from the Board of Commissioners
Estimated Cost:	Minimal
Potential Funding Sources:	Local and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	The county typically defers to the Red Cross and local county websites (which link to state websites) to disseminate information regarding hazard threats. The county may look into providing specific county information regarding hazard threats in the future through media, flyers, and on utility bills.

<b>Mitchell County Mitigation Action 56</b>	<b>Use the County's website to notify residents and other about flood hazard areas.</b>
Hazard(s) Addressed:	Flood
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management Office with support from the Board of Commissioners
Estimated Cost:	Minimal
Potential Funding Sources:	Local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Completed/Ongoing: The county's website site links to floodplains maps (DFIRMS) for the county. Updated maps will be posted to the website as needed.
Additional Notes:	Flood maps can be placed on the County's web site along with key sections of the Hazard Mitigation Plan. Visitors to the web site will be able to pull up maps of properties within the County's jurisdiction showing the boundaries of the floodplains. Excerpts from the Plan will provide additional information about the County's Hazard Mitigation Plan.

<b>Mitchell County Mitigation Action 57</b>	<b>Prepare the community for disaster response.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Information
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Emergency Management Office with support from the Board of Commissioners
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, state, and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: Currently, this is predominately completely through the volunteer fire department. In the past, the county attempted to initiate a CERT, but the program was not successfully started due to turn over in the county. A CERT may be investigated in the future. Other options, such as having emergency response officials work with church groups may be investigated in the future.
Additional Notes:	Another goal to reach with awareness programs is to prepare the community to respond to disasters. Many different programs such as Community Emergency Response Team (CERT) have been initiated countrywide and even if there is no such direct need as to start a training program in Mitchell County. Basic concepts and information can be passed to community members through different means: Flyers, Series of writing in the local newspaper, Ads in most frequented places (downtown stores, schools, churches, etc), and Using water bills to convey short messages.

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<b>Mitchell County Mitigation Action 58</b>	<b>Develop a disaster warning system (an emergency broadcast system (local radio, television channel, and website), a siren system, a mobile public address systems and/or a door-to-door contact).</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management Office with support from the Planning Office
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, state, and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Completed/Ongoing: At the local level, Mitchell County uses the Code Red program which sends a message to each resident's phone or email. There is also a reverse 911 system, door-to-door operations, and the Fire trucks are equipped with PA Speakers. There is also a statewide program in place. These programs will be updated as needed.
Additional Notes:	<p>The first step in responding to a potential disaster is to know that one is coming. Disaster warning refers to both the monitoring of local conditions and the broadcasting of pre-event alerts.</p> <p>These assets need to be prioritized and one official warning system should be publicized. This does not mean that the county would rely only on that one, but rather would form a focus for the community to access information in times of need.</p>

<b>Mitchell County Mitigation Action 59</b>	<b>Identify and strengthen facilities that would be used as emergency shelters.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Information
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Planning with support from the Office of Emergency Management
Estimated Cost:	Unknown, project dependent
Potential Funding Sources:	Federal (homeland security grants, etc), state, and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: Churches have also been identified as shelters in the area. These facilities can be strengthened to better meet sheltering needs as funding becomes available. The quick-connect program through homeland security money ensures that at least one shelter in the county has a quick connect generator switch. Mitchell County was in the process of identifying the best shelter locations for this while this plan was being prepared.
Additional Notes:	Mitchell County has identified the schools as emergency shelters. The large number of churches and their wide dispersion within the county make them a good candidate for becoming shelters. Several can be chosen as alternative shelters to be used in case of a mass casualty event and those structures can be upgraded to meet necessary standards.

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Mitchell County Mitigation Action 62	Integrate technology into Mitchell County Emergency Management
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management Office with support from the Board of Commissioners
Estimated Cost:	Minimal to several thousand dollars
Potential Funding Sources:	Federal, state, and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: To date, Mitchell County has implemented the inter-gov system, allowing county maps and flood maps to be viewed remotely; an address database; and is moving towards GIS. Additional improvements will be incorporated as funding and opportunities become available.
Additional Notes:	Municipal and other computer systems and networks for use in mitigation and response efforts can be linked together to better share information, be more coordinated in times response and benefit from a more efficient and effective use of resources. The essential point is that those integrated systems would probably not make a great difference in the everyday emergency operations but will have a huge impact should any large scale incident occur. Those County computer systems would collect and process hazard data in order to provide information on hazard mitigation opportunities and to assist in disaster response and recovery efforts. There are numerous computer software products on the market or in development that could be used to integrate multiple data sources and assess the data collected. An example to these data programs is the GIS (Geographical Information System) that divides community into layers (topographic, residential, infrastructure, etc) and can, thus, be used for many different purposes.

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<b>Mitchell County Mitigation Action 63</b>	<b>Identify response equipment that needs to be replaced or upgraded.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management Office
Estimated Cost:	Varies by project, averaging several thousand dollars
Potential Funding Sources:	Federal, state, and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: Mitchell County Emergency Management continues to watch for grants in order to upgrade and replace equipment as the need and funding become available. However, there is no specific process in place which may be enacted in the future. Recently, a bus was replaced with a mobile command truck. Cabinets were also added to a trailer with Department of Homeland Security Money.
Additional Notes:	Interviews with local authorities have shown an obvious need for response equipment. Although the technology upgrade described above can also be considered as equipment buyout, what is meant here is response equipment to be used on the field. The needs should be identified and a proposal for a grant can be developed accordingly.

<b>Mitchell County Mitigation Action 64</b>	<b>Start public/citizen emergency management and involvement initiatives as the County most likely lacks funds to support new responder posts and risk having its existing capacity overwhelmed should an event of large scale occur.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Emergency Management Office with support from the Board of Commissioners; Local volunteer fire department
Estimated Cost:	Low
Potential Funding Sources:	Local and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	This action is largely completed through the volunteer fire department, off-duty police officers, amateur radio groups, and church groups. In the future, county officials may work to implement a more formal training program.

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<b>Mitchell County Mitigation Action 67</b>	<b>Strengthen Mass Casualty Training throughout the county.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Emergency Management Office
Estimated Cost:	Training exercises and planning ( \$30,000)
Potential Funding Sources:	Federal, state, and private sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the County has participated in several mass casualty trainings (Quake, Quake 2.0 and Quake 3.0). The county will continue to seek funding to strengthen mass casualty training and overall emergency response. As funds become available, these activities will continue to be completed.
Additional Notes:	Due to its relatively recent emergence, at least as a result of deliberate action, its high impact, and the lack of expertise that is involved due to its low frequency of occurrence, local response capacity to mass casualty incidents are behind expectations. While purchasing equipment would help partially, the essential point is to train the local responders about this specific and unique issue. Different training programs like the one offered from the Department of Justice are available at this regard and county officials can obtain further information about standards, program contents and financial issues from federal organizations such as the Department of Homeland Security or the Department of Justice.

<b>Mitchell County Mitigation Action 68</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Emergency Management Office
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

## Town of Bakersville Mitigation Action Plan

<b>Bakersville Mitigation Action 1</b>	<b>Adopt policies that discourage growth in flood hazard areas, including policy on not extending public services and utilities into flood hazard zones.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Public Works, Zoning Enforcement Officer
Estimated Cost:	None
Potential Funding Sources:	Local funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. The jurisdictions in Mitchell County are responsible for permitting and extending public services. The jurisdictions are committed to not extending public services into flood zones per their zoning ordinances and the county floodplain ordinance.

<b>Bakersville Mitigation Action 2</b>	<b>Develop a community awareness program to educate the citizens of Bakersville on hazard risks.</b>
Hazard(s) Addressed:	All
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Board, team with County Emergency Management
Estimated Cost:	Minimal
Potential Funding Sources:	State and local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve community awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Bakersville Mitigation Action 3</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Board, team with County Emergency Management
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

## Town of Spruce Pine Mitigation Action Plan

<b>Spruce Pine Mitigation Action 1</b>	<b>Adopt policies that discourage growth in flood hazard areas, including policy on not extending public services and utilities into flood hazard zones.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Town Board, planning
Estimated Cost:	None
Potential Funding Sources:	Local funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. The jurisdictions in Mitchell County are responsible for permitting and extending public services. The jurisdictions are committed to not extending public services into flood zones per their zoning ordinances and the county floodplain ordinance.

<b>Spruce Pine Mitigation Action 2</b>	<b>Develop a community awareness program to educate the citizens of Spruce Pine on hazard risks.</b>
Hazard(s) Addressed:	All
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Board, team with County Emergency Management
Estimated Cost:	Minimal
Potential Funding Sources:	State and local sources
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve community awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.



<b>Spruce Pine Mitigation Action 3</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Board, team with County Emergency Management
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

## YANCEY COUNTY MITIGATION ACTION PLAN

<b>Yancey County Mitigation Action 2</b>	<b>Purchase and install a disconnect for use at the Higgins Methodist Church, which is used as a shelter facility.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	\$4,500
Potential Funding Sources:	Local Funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Underway: The materials have been purchased, we are awaiting installation.

<b>Yancey County Mitigation Action 3</b>	<b>Establish a flood damage prevention program for crops, in particular for the Cane River Township area along streams.</b>
Hazard(s) Addressed:	Flood
Category:	Programs
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Undetermined
Potential Funding Sources:	United States Department of Agriculture funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Incomplete: Due to the reduction of tobacco productions in Yancey County post 2004, the necessity for a crop damage prevention program has become a low priority.

<b>Yancey County Mitigation Action 4</b>	<b>Establish program to address the protection and/or preservation of historic (Civil War-era) properties on the Toe River.</b>
Hazard(s) Addressed:	Flood
Category:	Programs
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Undetermined
Potential Funding Sources:	National Trust for Historic Preservation's Preservation Services Fund; Historic Preservation fund through the National Park Service
Implementation Schedule:	2015-2020
2015 Implementation Status:	Incomplete: Due to the lack of significant historical evidence along the Toe River this action has been deemed a low priority.

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<b>Yancey County Mitigation Action 6</b>	<b>Secure computers, shelves, windows, lighting, etc. in schools, local government buildings, etc. within the county with respect to seismic activity.</b>
Hazard(s) Addressed:	Earthquakes
Category:	Prevention
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Undetermined
Potential Funding Sources:	Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Department of Homeland Security funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Incomplete: Due to the large amount of shelves in our school system, funding has been slow and this action has now been placed on a low priority list.

<b>Yancey County Mitigation Action 9</b>	<b>Implement inter-operable communications system.</b>
Hazard(s) Addressed:	All Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	> \$1 million
Potential Funding Sources:	Department of Homeland Security funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing: New EMS Radio, new Viper Radio have been installed, generator has been installed for our 911 center, and the EOC is wired for internet.

<b>Yancey County Mitigation Action 10</b>	<b>Evaluate and enhance as necessary the Yancey County Flood Damage Prevention Ordinance, in part to ensure that the ordinance continues to address new buildings and infrastructure.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Internal administrative costs only
Potential Funding Sources:	General funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Yancey County has adopted a Flood Damage Prevention Ordinance and continues to monitor the ordinance for opportunities to enhance the ordinance.

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<b>Yancey County Mitigation Action 11</b>	<b>Implement enhanced security measures at the Yancey County Courthouse to include security cameras and the appropriate securing of all entrances and exits (Phase 1).</b>
Hazard(s) Addressed:	Terrorism
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management and the LEPC
Estimated Cost:	\$15,000
Potential Funding Sources:	Department of Homeland Security funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Completed: The county has implemented a comprehensive video surveillance system throughout the courthouse with 24 hour monitoring by the sheriff's department. This action will be removed from future updates of this plan.

<b>Yancey County Mitigation Action 12</b>	<b>Implement enhanced security measures in the Yancey County Courthouse's Courtroom to include metal detectors/wands and the elimination of non-essential entrances/exits (Phase 2).</b>
Hazard(s) Addressed:	Terrorism
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management and the LEPC
Estimated Cost:	\$10,000
Potential Funding Sources:	Department of Homeland Security funds
Implementation Schedule:	2015-2020
2015 Implementation Status:	Incomplete: Due to the inability to secure a funding source, the courthouse has been unable to complete this action item.

<b>Yancey County Mitigation Action 14</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

<b>Yancey County Mitigation Action 15</b>	<b>Develop a continuity of operations plan (COOP).</b>
Hazard(s) Addressed:	All Hazards
Category:	Property Protection
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	\$10,000
Potential Funding Sources:	Local Funds, Potential state and federal funds
Implementation Schedule:	2016-2017
2015 Implementation Status:	This is a new mitigation action.

## Town of Burnsville Mitigation Action Plan

<b>Town of Burnsville Mitigation Action 1a</b>	<b>Mitigate the Burnsville sewage treatment plant in the event that the facility is heavily damaged by flooding.</b>
Hazard(s) Addressed:	Flood
Category:	Property Protection
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Burnsville Public Works
Estimated Cost:	\$3,000,000
Potential Funding Sources:	Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program
Implementation Schedule:	2015-2020
2015 Implementation Status:	Incomplete due to lack of funding.

<b>Town of Burnsville Mitigation Action 1b</b>	<b>Mitigate the Burnsville sewage treatment plant in the event that the facility is heavily damaged by flooding.</b>
Hazard(s) Addressed:	Flood
Category:	Property Protection
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Burnsville Public Works
Estimated Cost:	\$4,500,000
Potential Funding Sources:	Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program
Implementation Schedule:	2015-2020
2015 Implementation Status:	Incomplete due to lack of funding.

<b>Town of Burnsville Mitigation Action 6</b>	<b>Continue to enforce the town's Flood Damage Prevention Ordinance to keep structures out of the floodplain.</b>
Hazard(s) Addressed:	Flood
Category:	Property Protection, Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Yancey County Emergency Management and the LEPC
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, state, and local sources.
Implementation Schedule:	2015-2020
2015 Implementation Status:	Over the past five years, the Town of Burnsville has coordinated with the County to successfully implement the Flood Damage Prevention Ordinance by regulating new development in the floodplain. By requiring new development to be built above the BFE, Burnsville and Yancey County are reducing future vulnerability to the flood hazard. The Town will continue their partnership with Yancey County in enforcing this important ordinance.

SECTION 9: MITIGATION ACTION PLAN

<b>Town of Burnville Mitigation Action 7</b>	<b>Increase public awareness about the hazards identified in this plan and the mitigation techniques that can be used to reduce the impacts of the hazards.</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Education and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council and Yancey County Emergency Management
Estimated Cost:	Public education and awareness materials are often available free of charge from FEMA, NCEM, Red Cross and other organizations
Potential Funding Sources:	None needed
Implementation Schedule:	2015-2020
2015 Implementation Status:	Ongoing. We are continuing to improve public awareness about hazards and ways to prevent or reduce the impacts of the hazards. This is done by handing out materials at different events throughout the year, social media posts with materials/information before expected seasons or events such as hurricane season, or winter weather. We are constantly looking for ways to increase awareness and teach prevention.

# SECTION 10

## PLAN MAINTENANCE PROCEDURES

### 44 CFR Requirement

#### **44 CFR Part 201.6(c)(4)(i):**

The plan shall include a plan maintenance process that includes a section describing the method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle.

#### **44 CFR Part 201.6(c)(4)(ii):**

The plan maintenance process shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

This section discusses how the Toe River Region Mitigation Strategy and Mitigation Action Plan will be implemented and how the Regional Hazard Mitigation Plan will be evaluated and enhanced over time. This section also discusses how the public will continue to be involved in a sustained hazard mitigation planning process. It consists of the following three subsections:

- 10.1 Implementation and Integration
- 10.2 Monitoring, Evaluation and Enhancement
- 10.3 Continued Public Involvement
- 10.4 Evaluation of Monitoring, Evaluation and Update Process

### 10.1 IMPLEMENTATION AND INTEGRATION

Each agency, department or other partner participating under the Toe River Regional Hazard Mitigation Plan is responsible for implementing specific mitigation actions as prescribed in the Mitigation Action Plan. Every proposed action listed in the Mitigation Action Plan is assigned to a specific “lead” agency or department in order to assign responsibility and accountability and increase the likelihood of subsequent implementation.

In addition to the assignment of a local lead department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion. The counties in the Toe River Region will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the Mitigation Action Plan.

The participating jurisdictions will integrate this Hazard Mitigation Plan into relevant City and County government decision-making processes or mechanisms, where feasible. This includes integrating the



requirements of the Hazard Mitigation Plan into other local planning documents, processes or mechanisms, such as comprehensive or capital improvement plans, when appropriate. The members of the Toe River Regional Hazard Mitigation Planning Committee will remain charged with ensuring that the goals and mitigation actions of new and updated local planning documents for their agencies or departments are consistent, or do not conflict with, the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in the Toe River Region.

Since the previous four plans were adopted in 2005 (Avery, Mitchell, Yancey Counties) and 2006 (McDowell County), and since the development of the initial regional plan in 2010/2011, each County and participating jurisdiction has worked to integrate the hazard mitigation plan into other planning mechanisms where applicable/feasible. Examples of how this integration has occurred have been documented in the Implementation Status discussion provided for each of the mitigation actions found in Section 9. Specific examples of how integration has occurred include:

- Integrating the mitigation plan into reviews and updates of floodplain management ordinances
- Integrating the mitigation plan into reviews and updates of County emergency operations plans
- Integrating the mitigation plan into review and updates of building codes
- Integrating the mitigation plan into the capital improvements plan through identification of mitigation actions that require local funding.

Opportunities to further integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the Regional Hazard Mitigation Planning Committee, individual county meetings, and the annual review process described herein. Although it is recognized that there are many possible benefits to integrating components of this Plan into other local planning mechanisms, the development and maintenance of this stand-alone Regional Hazard Mitigation Plan is deemed by the Toe River Regional Hazard Mitigation Planning Committee to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

## **10.2 MONITORING, EVALUATION, AND ENHANCEMENT**

Periodic revisions and updates of the Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the Plan is in full compliance with applicable federal and state regulations. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to the Mitigation Action Plan.

When determined necessary, the Toe River Regional Hazard Mitigation Planning Committee shall meet in March of every year to evaluate and monitor the progress attained and to revise, where needed, the activities set forth in the Plan. The findings and recommendations of the Regional Hazard Mitigation Planning Committee shall be documented in the form of a report that can be shared with interested City and County Council members. The Regional Hazard Mitigation Planning Committee will also meet following any disaster events warranting a reexamination of the mitigation actions being implemented or proposed for future implementation. This will ensure that the Plan is continuously updated to reflect changing conditions and needs within the Toe River Region which includes the counties of Avery, McDowell, Mitchell, and Yancey. The Mitchell County Emergency Management Coordinator will continue to be responsible for reconvening the Regional Hazard Mitigation Planning Committee for these reviews.

### **Five (5) Year Plan Review**

The Plan will be thoroughly reviewed by the Regional Hazard Mitigation Planning Committee every five years to determine whether there have been any significant changes in the Toe River Region that may, in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, an increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the necessary content of the Plan.

The plan review provides participating jurisdiction officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. The Mitchell County Emergency Management Coordinator will be responsible for reconvening the Regional Hazard Mitigation Planning Committee and conducting the five-year review.

During the five-year plan review process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Has the nature or magnitude of risks changed?
- Are the current resources appropriate for implementing the Plan?
- Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did County departments participate in the plan implementation process as assigned?

Following the five-year review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and plan amendment process outlined herein. Upon completion of the review and update/amendment process, the Toe River Regional Hazard Mitigation Plan will be submitted to the State Hazard Mitigation Officer at the North Carolina Division of Emergency Management (NCEM) for final review and approval in coordination with the Federal Emergency Management Agency (FEMA).

### **Disaster Declaration**

Following a disaster declaration, the Toe River Regional Hazard Mitigation Plan will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. It will be the responsibility of the Mitchell County Emergency Management Coordinator to reconvene the Regional Hazard Mitigation Planning Committee and ensure the appropriate stakeholders are invited to participate in the plan revision and update process following declared disaster events.

### **Reporting Procedures**

The results of the five-year review will be summarized by the Regional Hazard Mitigation Planning Committee in a report that will include an evaluation of the effectiveness of the Plan and any required or recommended changes or amendments. The report will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommended strategies to overcome them.

### Plan Amendment Process

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

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

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

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

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

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

## 10.3 CONTINUED PUBLIC INVOLVEMENT

### 44 CFR Requirement

#### **44 CFR Part 201.6(c)(4)(iii):**

The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process

Public participation is an integral component to the mitigation planning process and will continue to be essential as this Plan evolves over time. As described above, significant changes or amendments to the Plan shall require a public hearing prior to any adoption procedures.

Other efforts to involve the public in the maintenance, evaluation and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Regional Hazard Mitigation Planning Committee in local newspapers, public bulletin boards and/or County office buildings
- Designating willing and voluntary citizens and private sector representatives as official members of the Regional Hazard Mitigation Planning Committee
- Utilizing local media to update the public on any maintenance and/or periodic review activities taking place
- Utilizing the Toe River county websites to advertise any maintenance and/or periodic review activities taking place, and
- Keeping copies of the Plan in public libraries.

#### **10.4 EVALUATION OF PREVIOUS MONITORING, EVALUATION AND UPDATE PROCESS**

Over the past five years, the participating jurisdictions have been independently implementing, monitoring and evaluating their own mitigation action plans. Progress made in implementing actions has been documented in Section 9: Mitigation Action Plan where each action contains a narrative about the implementation status of the action as of 2015. That said, the jurisdiction did waiver slightly from the monitoring and evaluation process defined in the original version of the plan, but still made significant process in implementing their mitigation action plans. During the 2015 update of this plan, the Regional Hazard Mitigation Planning Committee determined that the procedures for the upcoming five year monitoring and evaluation process will remain as defined above and will be re-evaluated during the next plan update process.

The five year comprehensive update process began as early as 2013 when lead points of contact from each of the four participating counties began having conversations about the updating process. These conversations were facilitated by the NCEM Area Coordinator and Mitigation Staff in Raleigh, NC and including discussion about the need to apply for a grant to update the plan. Once the grant was obtained, early conversations in 2014 centered around more detailed components of the planning process such as which county would lead the process and would the counties seek consultant assistance for updating the plan. These early conversations led to a successful update and will be used in future updates of the plan.

# Appendix A: Plan Adoption

## 44 CFR Requirement

**44 CFR Part 201.6(c)(5):** The plan shall include documentation that the plan has been formally adopted by the local governing body of the jurisdiction requesting approval of the plan.

This section of the Plan includes a copy of the local adoption resolution passed by the participating jurisdictions in the Toe River Region:

Jurisdiction
Avery County
Banner Elk
Crossnore
Elk Park
Grandfather Village
Newland
Sugar Mountain
McDowell County
Marion
Old Fort
Mitchell County
Bakersville
Spruce Pine
Yancey County
Burnsville

# Appendix B: Planning Tools

This section of the Plan includes three (3) Items:

1. *A Blank Public Participation Survey*
2. *A Blank Capability Assessment Survey*
3. *Scoring Criteria for the Capability Assessment*

## PUBLIC PARTICIPATION SURVEY FOR HAZARD MITIGATION PLANNING

### **We need your help!**

The Counties of Avery, McDowell, Mitchell, and Yancey are currently engaged in a planning process to become less vulnerable to natural disasters, and your participation is important to us!

Avery County, McDowell County, Mitchell County, and Yancey County, along with participating local jurisdictions and other participating partners, are now working to update the region's multi-jurisdictional *Hazard Mitigation Plan*. The purpose of this Plan is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks. Upon completion, the Plan will represent a comprehensive multi-jurisdictional *Hazard Mitigation Plan* for the four-county region.

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

**Please help us by completing this survey by August 10, 2015 and returning it to:**

Nathan Slaughter, Hawksley Consulting  
1606 Oakland Hills Way  
Raleigh, NC 27604

Surveys can also be emailed to [nathan.slaughter@hawksley.com](mailto:nathan.slaughter@hawksley.com)

If you have any questions regarding this survey or would like to learn about more ways you can participate in the development of the *Toe River Regional Multi-Jurisdictional Hazard Mitigation Plan*, please contact Hawksley Consulting, planning consultant for the project. You may reach Nathan Slaughter at 919-629-2533 or at the email address above.

This survey is also available online at:

<http://www.surveygizmo.com/s3/2180581/Toe-River-Regional-Hazard-Mitigation-Plan-Update-Public-Survey>

### **1. Where do you live?**

- |   |  |
|---|--|
| <input type="checkbox"/> Unincorporated Avery County    | <input type="checkbox"/> Town of Old Fort    |
| <input type="checkbox"/> Unincorporated McDowell County | <input type="checkbox"/> Town of Bakersville |
| <input type="checkbox"/> Unincorporated Mitchell County | <input type="checkbox"/> Town of Spruce Pine |
| <input type="checkbox"/> Unincorporated Yancey County   | <input type="checkbox"/> Town of Burnsville  |
| <input type="checkbox"/> Town of Banner Elk             | <input type="checkbox"/> Other               |
| <input type="checkbox"/> Town of Crossnore              |  |
| <input type="checkbox"/> Town of Elk Park               |  |
| <input type="checkbox"/> Town of Newland                |  |
| <input type="checkbox"/> Town of Sugar Mountain         |  |
| <input type="checkbox"/> Grandfather Village            |  |
| <input type="checkbox"/> City of Marion                 |  |

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

- Yes
- No

**a. If “Yes,” please explain:**

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

- Extremely concerned
- Somewhat concerned
- Not concerned

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

- |  |  |
|--|--|
| <input type="checkbox"/> Acts of Terror      | <input type="checkbox"/> Hurricane Remnants              |
| <input type="checkbox"/> Dam / Levee Failure | <input type="checkbox"/> Land Subsidence                 |
| <input type="checkbox"/> Drought             | <input type="checkbox"/> Landslide                       |
| <input type="checkbox"/> Earthquake          | <input type="checkbox"/> Lightning                       |
| <input type="checkbox"/> Expansive Soils     | <input type="checkbox"/> Severe Winter/Ice Storm         |
| <input type="checkbox"/> Extreme Heat        | <input type="checkbox"/> Severe Thunderstorm / High Wind |
| <input type="checkbox"/> Flood               | <input type="checkbox"/> Tornado                         |
| <input type="checkbox"/> Hailstorm           | <input type="checkbox"/> Wildland Fire                   |

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

- |  |  |
|--|--|
| <input type="checkbox"/> Acts of Terror      | <input type="checkbox"/> Hurricane Remnants              |
| <input type="checkbox"/> Dam / Levee Failure | <input type="checkbox"/> Land Subsidence                 |
| <input type="checkbox"/> Drought             | <input type="checkbox"/> Landslide                       |
| <input type="checkbox"/> Earthquake          | <input type="checkbox"/> Lightning                       |
| <input type="checkbox"/> Expansive Soils     | <input type="checkbox"/> Severe Winter/Ice Storm         |
| <input type="checkbox"/> Extreme Heat        | <input type="checkbox"/> Severe Thunderstorm / High Wind |
| <input type="checkbox"/> Flood               | <input type="checkbox"/> Tornado                         |
| <input type="checkbox"/> Hailstorm           | <input type="checkbox"/> Wildland Fire                   |

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

- Yes (please explain): \_\_\_\_\_
- No



**7. Is your home located in a floodplain?**

- Yes
- No
- I don't know

**8. Do you have flood insurance?**

- Yes
- No
- I don't know

**a. If "No," why not?**

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

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

- Yes
- No

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

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

- Yes
- No

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

- Yes
- No

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

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

**13. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?**

**14. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?**

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

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

**THANK YOU FOR YOUR PARTICIPATION!**

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

**Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_  
 \_\_\_\_\_

**Phone:** \_\_\_\_\_ **E-Mail:** \_\_\_\_\_

## **Local Capability Assessment for Hazard Mitigation**

The intent of this survey questionnaire is to initiate an assessment of the existing capabilities to implement hazard mitigation activities for the participating jurisdictions in the Toe River Regional Hazard Mitigation Plan. The information provided in response to this survey will help provide us with a broad overview of how local programs are currently being used to lessen the impacts of potential hazards. In order to accurately assess your jurisdiction's capability, it is critical that representatives who are familiar with existing local government programs help complete this survey.

A capability assessment has two components: (1) an inventory of a jurisdiction's existing planning and regulatory tools and (2) an analysis of its capacity to carry them out. The assessment process will help identify existing gaps, conflicts or weaknesses that may need to be addressed through future mitigation planning goals, objectives and actions. It will also highlight the positive measures in place or already being performed that should continue to be supported and enhanced through future mitigation efforts.

Most importantly, the capability assessment will help to ensure that proposed mitigation actions are deemed practical considering the local ability to implement them. In so doing, the results of the capability assessment will help build the general foundation for determining the type of mitigation strategy your jurisdiction develops and ultimately adopts as part of the Toe River Regional Hazard Mitigation Plan.

Responses to this questionnaire can be provided using the attached hard copy or an electronic version. Once completed, surveys should be submitted to Nathan Slaughter at Hawksley Consulting. Hard copies can be mailed to the address below or electronic versions can be sent by e-mail to [nathan.slaughter@hawksley.com](mailto:nathan.slaughter@hawksley.com).

**Attention:** Nathan Slaughter, Project Manager  
Hawksley Consulting  
1606 Oakland Hills Way, Raleigh NC 27604

**Phone:** (919) 629-2533

**Email:** [nathan.nslaughter@hawksley.com](mailto:nathan.nslaughter@hawksley.com)

## Local Capability Assessment Survey

Jurisdiction/Agency: \_\_\_\_\_

Phone: \_\_\_\_\_

Point of Contact: \_\_\_\_\_

E-mail: \_\_\_\_\_

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

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

### Local Capability Assessment Survey

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

## Local Capability Assessment Survey

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

Staff / Personnel Resources	Yes	No	Department / Agency	Comments
Planners with knowledge of land development and land management practices				
Engineers or professionals trained in construction practices related to buildings and/or infrastructure				
Planners or engineers with an understanding of natural and/or human-caused hazards				
Emergency manager				
Floodplain manager				
Land surveyors				
Scientist familiar with the hazards of the community				
Staff with education or expertise to assess the community's vulnerability to hazards				
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program				
Resource development staff or grant writers				

### Local Capability Assessment Survey

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

Financial Resources	Yes	No	Department / Agency	Comments
Capital Improvement Programming				
Community Development Block Grants (CDBG)				
Special Purpose Taxes (or taxing districts)				
Gas / Electric Utility Fees				
Water / Sewer Fees				
Stormwater Utility Fees				
Development Impact Fees				
General Obligation, Revenue and/or Special Tax Bonds				
Partnering arrangements or intergovernmental agreements				
Other: _____				



## Local Capability Assessment Survey

**4. POLITICAL CAPABILITY** - Political capability can be generally measured by the degree to which local political leadership is willing to enact policies and programs that reduce hazard vulnerabilities in your community, even if met with some opposition. Examples may include guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum State or Federal requirements (e.g., building codes, floodplain management, etc.). Please identify some general examples of these efforts if available and/or reference where more documentation can be found.

**Local Capability Assessment Survey**

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

	DEGREE OF CAPABILITY		
	LIMITED	MODERATE	HIGH
Planning and Regulatory Capability			
Administrative and Technical Capability			
Fiscal Capability			
Political Capability			
<b>OVERALL CAPABILITY</b>			

## Points System for Capability Ranking

**0-19 points = Limited overall capability**  
**20-39 points = Moderate overall capability**  
**40-68 points = High overall capability**

### **I. Planning and Regulatory Capability (Up to 43 points)**

*Yes = 3 points*

*Under Development = 1 point*

*Included under County plan/code/ordinance/program = 1 point*

*No = 0 points*

- Hazard Mitigation Plan
- Comprehensive Land Use Plan
- Floodplain Management Plan
- National Flood Insurance Program
- NFIP Community Rating System

*Yes = 2 points*

*Under Development = 1 point*

*Included under County plan/code/ordinance/program = 1 point*

*No = 0 points*

- Open Space Management Plan / Parks & Recreation Plan
- Stormwater Management Plan
- Natural Resource Protection Plan
- Flood Response Plan
- Emergency Operations Plan
- Continuity of Operations Plan
- Evacuation Plan
- Disaster Recovery Plan
- Flood Damage Prevention Ordinance
- Post-disaster Redevelopment / Reconstruction Ordinance

*Yes = 1 point*

*No = 0 points*

- Capital Improvements Plan
- Economic Development Plan
- Historic Preservation Plan
- Zoning Ordinance
- Subdivision Ordinance
- Unified Development Ordinance
- Building Code
- Fire Code

## **II. Administrative and Technical Capability (Up to 15 points)**

*Yes = 2 points*

*Service provided by County = 1 point*

*No = 0 points*

- Planners with knowledge of land development and land management practices
- Engineers or professionals trained in construction practices related to buildings and/or infrastructure
- Planners or engineers with an understanding of natural and/or human-caused hazards
- Emergency manager
- Floodplain manager

*Yes = 1 point*

*No = 0 points*

- Land surveyors
- Scientist familiar with the hazards of the community
- Staff with education or expertise to assess the community's vulnerability to hazards
- Personnel skilled in Geographical Information Systems (GIS) and/or Hazus
- Resource development staff or grant writers

## **III. Fiscal Capability (Up to 10 points)**

*Yes = 1 point*

*No = 0 points*

- Capital Improvement Programming
- Community Development Block Grants (CDBG)
- Special Purpose Taxes (or tax districts)
- Gas / Electric Utility Fees
- Water / Sewer Fees
- Stormwater Utility Fees
- Development Impact Fees
- General Obligation / Revenue / Special Tax Bonds
- Partnering arrangements or intergovernmental agreements
- Other

# Appendix C: Local Mitigation Plan Review Tool

This section of the Plan includes a completed Local Mitigation Plan Review Tool.

## LOCAL MITIGATION PLAN REVIEW TOOL

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The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

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

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

<b>Jurisdiction:</b>	<b>Title of Plan:</b> Toe River Regional Hazard Mitigation Plan – 2015 Update	<b>Date of Plan:</b> DRAFT - November 2015
<b>Local Point of Contact:</b> Paul Buchanan	<b>Address:</b>	
<b>Title:</b> Director		
<b>Agency:</b> Mitchell County Emergency Management		
<b>Phone Number:</b> 828-688-4771	<b>E-Mail:</b> <a href="mailto:MitchellEM@mitchellcounty.org">MitchellEM@mitchellcounty.org</a>	

<b>State Reviewer:</b>	<b>Title:</b>	<b>Date:</b>
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<b>FEMA Reviewer:</b>	<b>Title:</b>	<b>Date:</b>
<b>Date Received in FEMA Region</b> <i>(insert #)</i>		
<b>Plan Not Approved</b>		
<b>Plan Approvable Pending Adoption</b>		
<b>Plan Approved</b>		

**SECTION 1:  
REGULATION CHECKLIST**

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

<b>1. REGULATION CHECKLIST</b>	<b>Location in Plan</b> (section and/or page number)	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>			
<b>ELEMENT A. PLANNING PROCESS</b>			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 2; App. D		
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 2.4, Section 2.7; App. D		
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 2.6; App. D		
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 7.		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 10.3		
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 10.2		
<b><u>ELEMENT A: REQUIRED REVISIONS</u></b>			
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 4; Section 5		

<b>1. REGULATION CHECKLIST</b>		<b>Location in Plan</b> (section and/or page number)	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 5; Appendix F			
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 5; Section 6			
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 5.14.5			
<b><u>ELEMENT B: REQUIRED REVISIONS</u></b>				
<b>ELEMENT C. MITIGATION STRATEGY</b>				
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 7			
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 5.14.4 Section 7.3.4			
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 8.2			
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 8.3-8.4; Section 9.2			
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 8.1.1; Section 9.2			
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 10.1			
<b><u>ELEMENT C: REQUIRED REVISIONS</u></b>				
<b>ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION</b> (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 3.3.3			
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 9			



<b>1. REGULATION CHECKLIST</b>		<b>Location in Plan</b> (section and/or page number)	<b>Met</b>	<b>Not Met</b>
<b>Regulation (44 CFR 201.6 Local Mitigation Plans)</b>				
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 8.5			
<b><u>ELEMENT D: REQUIRED REVISIONS</u></b>				
<b>ELEMENT E. PLAN ADOPTION</b>				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Pending NCEM and FEMA review and APA status.			
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Pending NCEM and FEMA review and APA status.			
<b><u>ELEMENT E: REQUIRED REVISIONS</u></b>				
<b>ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)</b>				
F1.				
F2.				
<b><u>ELEMENT F: REQUIRED REVISIONS</u></b>				

## SECTION 2: PLAN ASSESSMENT

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

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

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

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

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

## **A. Plan Strengths and Opportunities for Improvement**

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

### **Element A: Planning Process**

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

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

### **Element B: Hazard Identification and Risk Assessment**

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

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

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

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

### **Element C: Mitigation Strategy**

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

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

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

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

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

## **B. Resources for Implementing Your Approved Plan**

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

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

# Appendix D: Planning Process Documentation

This section of the Plan includes five (5) categories of items:

1. *Toe River Regional Hazard Mitigation Planning Committee Meeting Agendas*
2. *Toe River Regional Hazard Mitigation Planning Committee Meeting Sign-in Sheets*
3. *Toe River Regional Hazard Mitigation Planning Committee Meeting Minutes*
4. *Neighboring Jurisdiction Outreach Documentation*
5. *Public Survey Summary Results*
6. *Documentation of 2010 Plan Development Process*

# **AGENDA**

## **Toe River Regional Hazard Mitigation Plan Update Project Kickoff Meeting**

**June 10, 2015  
10:00 AM – Noon**

### **1) Introductions**

### **2) Mitigation Refresher**

### **3) Icebreaker Exercise**

### **4) Project Overview**

- a) Key Objectives
- b) Project Tasks
- c) Project Schedule

### **5) Roles & Responsibilities**

- a) Hawksley Consulting
- b) County Leads
- c) Participating Jurisdictions

### **6) Next Steps**

- a) Determine members to participate on the Hazard Mitigation Planning Team
- b) Initiate data collection efforts
- c) Begin public outreach
- d) Discuss Next Hazard Mitigation Planning Team meeting

### **7) Questions, Issues or Concerns**

# **AGENDA**

Toe River Regional Hazard Mitigation Plan  
Second Hazard Mitigation Planning Team (HMPT) Meeting  
August 26, 2015  
10:00 AM – Noon

## **1) Introductions**

## **2) Recap / Status Update**

## **3) Risk Assessment Findings**

- a) Hazard Identification & Analysis
- b) Vulnerability Assessment

## **4) Capability Assessment Findings**

## **5) Public Involvement Activities**

- a) Public Participation Survey Update

## **6) Mitigation Strategy Development**

- a) Review of Existing Plan Goals, Objectives and Actions
- b) Mitigation Action Worksheets (Existing Actions)
- c) Identification of New Actions

## **7) Discussion on Plan Maintenance / Implementation**

## **8) Wrap-up and Next Steps**



**Toe River Regional Hazard Mitigation Plan Update  
Project Kickoff Meeting**

June 10, 2015  
10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
David Vance	AVERY CO. EMERGENCY	Newland NC	828-533-8213	emergency@average.org @averageorg
Richard Canine	Town of Spruce Pine	Spruce Pine	828-765-3000	SPMR@BellSouth.net
Bill Davis	YANCEY COUNTY EM	Bakersville	828-284-0725	bdavis@yanceycounty.nc.gov
Sue Ledford	Michael	Bakersville, NC	828-688-3456	mthprosoe@gmail.com
STEPHANIE WISEMAN	Michael	Bakersville NC	828 385 0795	step911use@yahoo.com
Kisaq Bailey	Transportation Mitchell Co.	Bakersville NC	828 688 4715	lbaileymeta@gmail.com
Tommy Burleson	Jury Co.	Newland	828-733-8204	avery.planning@average.org
Paul Buckner	MITCHELL CO. EM	Bakersville	828-385-0911	MITCHELLEME MITCHELLCOUNTY.ORG

**Toe River Regional Hazard Mitigation Plan Update  
Project Kickoff Meeting**

June 10, 2015  
10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
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Geo. A. Wilcox	Town Board	Bakersville	467-6313	
Phillip Hise	Town of Spruce Pine	Spruce Pine	828-385-1360	Philliphise1@hotmail.com
KEGAN SILVER	MITCHELL CO <i>GIS</i>	BAKERVILLE	828-537-1629	KEGAN.SILVER@MITCHELLCOUNTY.ORG
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Craig Walker	McDowell Em	Marion	828-652-3982	craig.walker@mcdoell.gov
Angie Wright	,,	,,	,,	angie.wright@mcdoell.gov
Tara McCloskey	McDowell GIS	Marion	828 652 7121 314	tara.mccloskey@mcdoell.gov

**Toe River Regional Hazard Mitigation Plan Update  
Project Kickoff Meeting**

June 10, 2015  
10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
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Tommy Winchester	Mitchell Co. Inspections	Spruce Pine	688-4771	tommy.winchester @mitchellco.org
Kathy Lantz	Mitchell Co. P&S Mitchell Co.	Bakersville	688-2139	Kathy.Lantz@mitchellco.org
Misty Sparks	Bldg Insp	Mitchell Co.	688-4771	misty.sparks@mitchell county.org
James Robinson	NC DOT Maint Yancey County	Burnsville	682-2441	JROBINSON@ NC DOT GOV
Jason Robinson	Yancey County Government	Burnsville	682-3971	jason.robinson@yancey countygov.com
Nathan Bennett	Yancey County Government	Burnsville	682-3971	nathan.bennett@yanceycounty nc.gov
Anthony Hendry	Town of Burnsville	Burnsville	682-2420	admin@townofburnsville.org

Toe River Regional Hazard Mitigation Plan Update  
Second HMPT Meeting

August 26, 2015  
10:00 AM - Noon

Name	Agency	Phone Number	Email Address
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Richard Lampe	Town of Spive Run	828-765-3000	SLM4R@Be15outh.net
Nathan Bennett	Yancey County	828-692-3971	Nathan.Bennett@yanceycounty.nc.gov
KEGAN SILVER	MITCHELL CO.	828-537-1629	KEGAN.SILVER@MITCHELLCOUNTY.ORG
Blair Hyder	Mitchell Co.	828-537-1407	assessor@mitche1lcounty.org
STEPHANIE WISEMAN	Midwell Co	828 385 0795	skf911u@yaho@.com
Jason Robinson	Yancey Co.	828-682-3971	jason.robinson@yanceycountync.gov



Toe River Regional Hazard Mitigation Plan Update  
Second HMPT Meeting

August 26, 2015  
10:00 AM - Noon

Name	Agency	Phone Number	Email Address
JAMES SEABERG	AVERY	828-733-7001	james.seaberg@averycountync.gov
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Bill Davis	TAMMY EM	828 284 0925	bdavis @ tammy@emtam.com
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Tommy Winkler	Mitchell	828-688-4771	Tommy.Winkler@mitchellcounty.org
Mavis Parsley	Mitchell	828 537 1397	Mavis.Parsley@mitchellcounty.org

**Toe River Regional Hazard Mitigation Plan Update  
Second HMP Meeting**

**August 26, 2015  
10:00 AM - Noon**

Name	Agency	Phone Number	Email Address
Paul Buchanan	Mitchell EM	828-385-0911	
Nathan Slaughter	Hawksey	919-264-4583	nathan.slaughter@hawksey.com

## **MEETING MINUTES**

### **Plan Update Project Kickoff Meeting**

**June 10, 2015**

#### **Spruce Pine Fire Station**

Nathan Slaughter, Project Manager from Hawksley Consulting and Project Manager for the development of the initial Toe River Regional Hazard Mitigation Plan, began the meeting by welcoming the attendees and giving a brief overview of the project and the purpose of the meeting.

Mr. Slaughter led the meeting of the Regional Hazard Mitigation Planning Committee and began by having attendees introduce themselves. The 26 attendees included representatives from various departments and local jurisdictions within each of the four counties participating in the plan update. Mr. Slaughter then provided an overview of the items to be discussed at the meeting and briefly reviewed each of the handouts that were distributed in the meeting packets (agenda, project description, presentation slides, and Public Participation Survey). He then defined mitigation and gave a review of the Disaster Mitigation Act of 2000 and NC Senate Bill 300.

Mr. Slaughter then provided information about the project. He indicated that the project is funded by a FEMA PDM grant, representatives from each County met together to hire Hawksley Consulting to manage the update thus ensuring that Mr. Slaughter would remain the Project Manager. Funding match requirements will be met by providing "in-kind" services.

Mr. Slaughter then explained some of the basic concepts of mitigation. He explained that we want to mitigate hazard impacts on the existing development in our communities (houses, businesses, infrastructure, critical facilities, etc). Secondly, but not less important, we want to ensure that future development is conducted in a way that doesn't increase our vulnerability. This is done by having good plans, policies and procedures in place.

Following the overview, Mr. Slaughter led the group in an "icebreaker" exercise to refamiliarize meeting participants to various mitigation techniques. He briefly recapped the six different categories of mitigation techniques: emergency services; prevention; natural resource protection; structural projects; public education and awareness; and property protection. Each attendee was then given \$20 in mock currency and asked to "spend" their mitigation money as they personally deemed appropriate among the six mitigation categories. Money was "spent" by placing it in cups labeled with each of the mitigation techniques. Upon completion of the exercise, Mr. Slaughter stated that the results would be tabulated and shared with the group at the next meeting. The results would also be compared against those from the previous plan development's ice breaker exercise. This would help demonstrate how priorities in mitigation actions have changed over the past 5 years.

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

- Complete update of existing plans to demonstrate progress and reflect current conditions
- Current plan expires 5/19/16
- Public awareness and education
- Maintain grant eligibility for participating jurisdictions
- Maintain compliance with State and Federal requirements.

Mr. Slaughter reviewed a list of the participating jurisdictions and then explained the mitigation planning process and specific tasks to be accomplished for this project, including the planning process, risk assessment, capability assessment, mitigation strategy, mitigation action plan and plan maintenance procedures. For the risk assessment portion of the process, Mr. Slaughter asked each county to designate a point person to coordinate the gathering of GIS data required for the analysis. He also reviewed the list of identified hazards and asked the committee members if they still agreed with the list of identified hazards. He also asked if there were any new hazards they wanted to consider for the plan. Committee members voted to add cyber terrorism as a hazard. They also voted to include wind as a separate hazard. Committee members also asked to address vulnerability to the utility grid.

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

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

Mr. Slaughter then reviewed the roles and responsibilities of Hawksley Consulting, the County leads, and the participating jurisdictions. The presentation concluded with a discussion of the next steps to be taken in the project development. He encouraged meeting participants to distribute the Public Participation Survey. The next HMPT meeting was scheduled for some time in August 2015 to discuss the findings of the risk and capability assessments and begin updating existing and identifying any new mitigation actions.



**MEETING MINUTES**  
**Mitigation Strategy Meeting**  
**August 26, 2015**  
**Spruce Pine Fire Station**

Nathan Slaughter from Hawksley Consulting began the meeting by welcoming the attendees and reviewing the meeting handouts, which included an agenda, existing plan goals for the regional plan, mitigation actions from each county's existing mitigation action plan, and mitigation action worksheets for new mitigation actions. Mr. Slaughter asked meeting attendees to introduce themselves and gave a refresher on mitigation, why we plan and the key objectives of the project. He reviewed the participating jurisdictions, project tasks and project schedule. He stated that a draft of the updated Regional Hazard Mitigation Plan would be presented in November.

Mr. Slaughter then presented the findings of the risk assessment. He reviewed the process for preparing Hazard Profiles. She explained how each hazard falls into one of four basic categories: Atmospheric, Hydrologic, Geologic, and Other, and each must be evaluated and formally ruled out if it is not applicable to the study area, even where it seems obvious (such as in the case of volcano).

Mr. Slaughter discussed a couple of caveats for the risk assessment. He indicated that best available data was used. While that information is useful, often events are under-reported. He asked committee members to keep the end goal in sight. The purpose of the risk assessment is to compare hazards and determine which should be the focus of your mitigation actions. The detailed numbers are informative, but remember the 10,000 foot view. And finally, he told committee members that this is their risk assessment. The data we provide is good, but their recommendations for adjustment are welcomed and encouraged.

Mr. Slaughter stated that since the initial regional plan was developed, there have been three Presidential disaster declarations that have impacted the region and all counties have been impacted. This helps emphasize the need to continue updating the mitigation plan.

Mr. Slaughter reviewed the Hazard Profiles and the following bullets summarize the information presented:

- DROUGHT. There were fifteen events recorded in the Toe River Region between 2000 and 2015 and future occurrences are likely.
- HAILSTORM. There have been 219 recorded events since 1969. Future occurrences are likely.
- HURRICANE REMNANTS. NOAA data shows that 42 storm tracks have come within 75 miles of the Toe River Region since 1850. Two of those storms were hurricanes, twenty nine were tropical storms, and eleven were tropical depressions. Future occurrences are likely.
- LIGHTNING. There have been six recorded lightning events since 1998, causing one death, eighteen injuries, and \$26,000 in reported property damages. Future occurrences are likely.
- TORNADOES. There have been seven recorded tornado events in the Toe River Region since 1979. \$792,000 in property damages and 1 injury have been reported. Future occurrences are likely.

- SEVERE THUNDERSTORM WINDS. There have been 132 severe thunderstorm events since 1967 with \$495,000 in reported property damages. Future occurrences are likely.
- WINTER STORM. There have been 583 recorded winter events in the Toe River Region since 1996 resulting in over \$50 million in reported property damages. Future occurrences are highly likely.
- DAM FAILURE. There are 108 dams in the Toe River Region, 47 of which are classified as high hazard dams. There have been 17 reported breaches and future occurrences are likely.
- EROSION. Erosion was included in the previous Avery County and Yancey County plans. Several areas of concern were noted in Avery County, but none were noted in Yancey County. Future occurrences are possible.
- FLOOD. According to the National Climatic Data Center (NCDC) there have been 81 flood events recorded in the Toe River Region since 1993, resulting in \$28.6 million in property damage. There have been 280 NFIP losses since 1978 and approximately \$4.9 million in claims. 25 repetitive loss properties in the region account for 62 of the recorded losses. Future occurrences are likely.
- EARTHQUAKES. The Toe River Region is vulnerable to earthquakes. The strongest earthquake recorded in NC had a recorded magnitude of 5.2 on the Richter scale. Future occurrences are likely.
- LANDSLIDE. There have been 88 recorded landslide events in the Toe River Region. 1 death was reported and property damages were documented. Many slides were associated with tropical systems Frances and Ivan. Future occurrences are likely.
- HAZARDOUS MATERIALS INCIDENTS. 47 HAZMAT events have been reported for the region. There are 7 Toxic Release Inventory sites in the region and based on feedback from the initial version of the plan, the Unimin sites in the region are a HAZMAT concern. Future occurrences are likely.
- TERROR THREATS. There have been no reported terrorism events in the Toe River Region. The Baxter Healthcare facility in Marion is included in the plan as a possible target for a terror threat. In addition, several other potential targets including government buildings and community gathering areas are vulnerable to attacks. Future occurrences are unlikely.
- WILDFIRE. There have been 65 historic wildfires recorded for the Toe River Region. 2,785 acres have burned in these events. Future occurrences are likely.

In concluding the review of Hazard Profiles, Mr. Slaughter stated if anyone had additional information for the hazard profiles, or disagreed with any of the data presented, they should call or email him with their concerns.

The results of the hazard identification process were used to generate a Priority Risk Index (PRI), which categorizes and prioritizes potential hazards as high, moderate or low risk based on probability, impact, spatial extent, warning time, and duration. The highest PRI was assigned to Winter Storms and Freeze, followed by Severe Thunderstorm and Flood. The committee reviewed most recent hazard profile data and voted to increase the risk of the terror threat hazard and wildfire hazard from low to moderate.

Mr. Slaughter then reviewed some maps that presented findings on social vulnerability as documented by the University of South Carolina. The maps present County-wide data on how socially vulnerable the counties in the Toe River Region are as compared to the rest of the State and nationally. Using various indicators of determining social vulnerability, the Toe River counties are in the medium-high category nationally and in the high and medium high categories when compared with other counties in the State of North Carolina. Mr. Slaughter stated that this is an important element to consider when considering mitigation actions to reduce vulnerability.

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

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

Mr. Slaughter then transitioned to the Mitigation Strategy portion of the presentation. He began by reviewing some of the major concepts of mitigation and then gave the results of the icebreaker exercise from the first Regional Hazard Mitigation Planning Committee meeting, where attendees were given “money” to spend on various hazard mitigation techniques. The results were as follows:

■ Prevention	\$107
■ Emergency Services	\$79
■ Structural Projects	\$46
■ Public Education and Awareness	\$44
■ Property Protection	\$33
■ Natural Resources Protection	\$31

Mr. Slaughter gave an overview of the process for updating the Mitigation Strategy and presented the existing mitigation goals for the regional plan. He asked the Regional Hazard Mitigation Planning Committee to review the goals to determine whether or not they still reflect current vulnerabilities and current mitigation priorities. The committee members agreed that the existing goals should remain unchanged.

Mr. Slaughter then indicated that each participating jurisdiction would need to provide a status update for their existing mitigation actions (completed, deleted, or deferred) by September 18, 2015. Mr. Slaughter also discussed the Mitigation Action Worksheets to be completed for any new mitigation actions and requested that all worksheets be returned by September 18, 2015. Mr. Slaughter then presented

some sample mitigation actions for the committee members to consider to include in their plan update. The sample actions were based on findings from the risk assessment and capability assessment.

Mr. Slaughter also discussed the results of the public participation survey that was posted on several of the participating counties' websites. As of the meeting date, 20 responses had been received. Based on preliminary survey results, respondents felt that severe thunderstorms posed the greatest threat to their neighborhood, followed by severe winter storm, flood and wildfire. Nearly all respondents were interested in making their homes more resistant to hazards. However, 67 percent of them don't know who to contact regarding reducing their risks to hazards.

Mr. Slaughter discussed next steps in the planning process. These included returning mitigation action updates and delivery of a draft in November 2015. He then thanked the group for taking the time to attend and the meeting was adjourned.

**From:** Nathan Slaughter  
**To:** "mayorgreglynch@yahoo.com"; "dhensley@erwintn.org"; "jenniferg@unicoitn.com"; "johnsoncountymayor@embarqmail.com"; "mayor@cartercountytyn.gov"; "ema@cartercountytyn.gov"; "planning@cartercountytyn.gov"; "jkitchens@cityofelizabethton.org"; "nesema@earthlink.net"; "fgilliam@madisoncountync.gov"; "officestaff@townofmarshall.org"; "administrator@townofmarshall.org"; "angela.ledford@buncombcounty.org"; "jon.creighton@buncombcounty.org"; "gjackson@ashevillenc.gov"; "townhall@biltmoreforest.org"; "townmanager@townofblackmountain.org"; "rnalley@townofmontreat.org"; "tgupton@weaverville.org"; "jasonyoung@woodfin-nc.gov"; "roger.hollifield@rutherfordcountync.gov"; "danny.searcy@rutherfordcountync.gov"; "johncondrey@townofforestcity.com"; "TownMgr@TownofLakeLure.com"; "dbarrick@rutherfordton.net"; "gswebber@spindalenc.net"; "Bryan.Steen@burkenc.org"; "citymanager@ci.morganton.nc.us"; "sbradshaw@townofdrexel.net"; "townhall@hildebrannc.org"; "david.epley@mail.ci.longview.nc.us"; "townmanager@rutherfordcollegenc.us"; "seckard@ci.valdese.nc.us"; "sstevens@caidwellcountync.org"; "kteague@caidwellcountync.org"; "townofgamewell@bellsouth.net"; "church@granitefallsnc.com"; "mberry@hickorync.gov"; "rebecca.bentley@townofhudsonnc.com"; "shildebran@ci.lenoir.nc.us"; "townadmin@townofsawmills.com"; "jennifer.storie@watgov.org"; "steve.sudderth@watgov.org"; "manager@townofbeechmountain.com"; "townofbr@bellsouth.net"; "john.ward@townofboone.net"; "townmanager@sevendevils.net"  
**Subject:** Notification: Toe River Regional Hazard Mitigation Plan  
**Date:** Monday, November 09, 2015 2:10:00 PM  
**Attachments:** [image003.png](#)  
[image002.png](#)  
[image005.png](#)  
**Importance:** Low

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## FOR NOTIFICATION PURPOSES

Good afternoon all

You are receiving this email because jurisdictions in a neighboring County (Avery County, McDowell County, Mitchell County, and Yancey County), along with participating local jurisdictions and other participating partners, are now working to update the region's multi-jurisdictional *Toe River Regional Hazard Mitigation Plan* as required by the Federal Emergency Management Agency (FEMA). The purpose of this plan is to identify and assess the region's natural hazard risks and determine strategies for how to best minimize or manage those risks. Upon completion, the plan will represent a comprehensive multi-jurisdictional *Hazard Mitigation Plan* for the four-county region.

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

- 1) FEMA requires that neighboring jurisdictions be provided an opportunity to be involved in the planning process.
- 2) You may want to contribute information to these jurisdictions to consider as they update their hazard mitigation plan.

I serve as the Project Manager for the update of the plan and I hope you will let me know if you would like to know of any upcoming meetings in the development of the plan or if you would like to receive a copy of the draft plan once it is complete.

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

**Nathan Slaughter, AICP, CFM**

*Managing Consultant*

Tel: (919) 629 2533

Mobile: (919) 601 3758

nathan.slaughter@hawksley.com

[www.hawksley.com](http://www.hawksley.com)



View my profile on **LinkedIn**

*Welcome to our exciting future!*

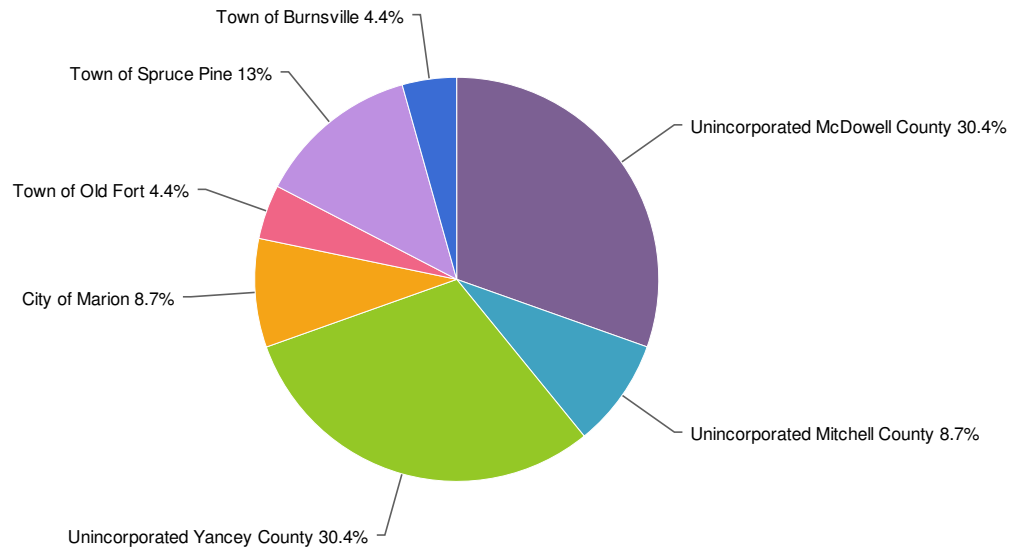
*The MWH management consulting team is now operating as Hawksley Consulting.*

Neighboring Jurisdictions for Toe River Region

Jurisdiction	Name	Title	Email
Unicoi County	Greg Lynch	Mayor	<a href="mailto:mayorgreglynch@yahoo.com">mayorgreglynch@yahoo.com</a>
Erwin	Doris Hensley	Mayor	<a href="mailto:dhensley@erwintn.org">dhensley@erwintn.org</a>
Unicoi (Town)	Jennifer Gryder	County Development Director	<a href="mailto:jenniferg@unicoitn.com">jenniferg@unicoitn.com</a>
Johnson County	Larry D. Potter	Mayor	<a href="mailto:johnsoncountymayor@embarqmail.com">johnsoncountymayor@embarqmail.com</a>
Mountain City			
Carter County	Leon Humphrey	Mayor	<a href="mailto:mayor@cartercountyttn.gov">mayor@cartercountyttn.gov</a>
	Gary Smith	EM Director	<a href="mailto:ema@cartercountyttn.gov">ema@cartercountyttn.gov</a>
	Chris Schuettler	Planner	<a href="mailto:planning@cartercountyttn.gov">planning@cartercountyttn.gov</a>
Elizabethton	Jereome Kitchens	City Manager	<a href="mailto:jkitchens@cityofelizabethton.org">jkitchens@cityofelizabethton.org</a>
Johnson City	Nes Levotch	EM Director	<a href="mailto:nesema@earthlink.net">nesema@earthlink.net</a>
Watauga (City)			
Madison County	Forest Gilliam	County Manager	<a href="mailto:fgilliam@madisoncountync.gov">fgilliam@madisoncountync.gov</a>
Hot Springs			
Mars Hill	Office Staff	General Email Box	<a href="mailto:officestaff@townofmarshall.org">officestaff@townofmarshall.org</a>
Marshall	Karen Kienha	Town Administrator	<a href="mailto:administrator@townofmarshall.org">administrator@townofmarshall.org</a>
Buncombe County	Angela Ledford	Emergency Management	<a href="mailto:angela.ledford@buncombecounty.org">angela.ledford@buncombecounty.org</a>
	Jon Creighton	Planning	<a href="mailto:jon.creighton@buncombecounty.org">jon.creighton@buncombecounty.org</a>
Asheville	Gary Jackson	City Manager	<a href="mailto:gjackson@ashevillenc.gov">gjackson@ashevillenc.gov</a>
Biltmore Forest	General Inquiries		<a href="mailto:townhall@biltmoreforest.org">townhall@biltmoreforest.org</a>
Black Mountain	Town Manager		<a href="mailto:townmanager@townofblackmountain.org">townmanager@townofblackmountain.org</a>
Montreat	Ron Nalley	Town Administrator	<a href="mailto:rnalley@townofmontreat.org">rnalley@townofmontreat.org</a>
Weaverville	Taylor Gupton	Planner	<a href="mailto:tgupton@weavervillenc.org">tgupton@weavervillenc.org</a>
Woodfin	Jason Young	Town Administrator	<a href="mailto:jasonyoung@woodfin-nc.gov">jasonyoung@woodfin-nc.gov</a>
Rutherford County	Roger Hollifield	Emergency Management	<a href="mailto:roger.hollifield@rutherfordcountync.gov">roger.hollifield@rutherfordcountync.gov</a>
Rutherford County	Danny Searcy	Planning	<a href="mailto:danny.searcy@rutherfordcountync.gov">danny.searcy@rutherfordcountync.gov</a>
Bostic			
Ellenboro			
Forest City	John Condrey	City Manager	<a href="mailto:johncondrey@townofforestcity.com">johncondrey@townofforestcity.com</a>
Lake Lure	Chris Braund	Town Manager	<a href="mailto:TownMgr@TownofLakeLure.com">TownMgr@TownofLakeLure.com</a>
Ruth			
Rutherfordton	Doug Barrick	Town Manager	<a href="mailto:dbarrick@rutherfordton.net">dbarrick@rutherfordton.net</a>
Spindale	Scott Webber	Town Manager	<a href="mailto:gwebber@spindalenc.net">gwebber@spindalenc.net</a>
Chimney Rock			
Burke County	Bryan Steen	County Manager	<a href="mailto:Bryan.Steen@burkenc.org">Bryan.Steen@burkenc.org</a>
Morganton	Sally Sandy	City Manager	<a href="mailto:citymanager@ci.morganton.nc.us">citymanager@ci.morganton.nc.us</a>
Connelly Springs			
Drexel	Sherri Bradshaw	Town Manager	<a href="mailto:sbradshaw@townofdrexel.net">sbradshaw@townofdrexel.net</a>
Glen Alpine			
Hildebran	Erin Schotte	Planner	<a href="mailto:townhall@hildebrannc.org">townhall@hildebrannc.org</a>
Long View	David Epley	Town Administrator	<a href="mailto:david.epley@mail.ci.longview.nc.us">david.epley@mail.ci.longview.nc.us</a>
Rhodhiss			
Rutherford College	Kenneth Geathers, Jr.	Town Manager	<a href="mailto:townmanager@rutherfordcollegenc.us">townmanager@rutherfordcollegenc.us</a>
Valdese	Seth Eckard	Town Manager	<a href="mailto:seckard@ci.valdese.nc.us">seckard@ci.valdese.nc.us</a>
Caldwell County	Shelley Stevens	Planner	<a href="mailto:sstevens@caldwellcountync.org">sstevens@caldwellcountync.org</a>
	Kenneth Teague	EM Director	<a href="mailto:kteague@caldwellcountync.org">kteague@caldwellcountync.org</a>
Cajah's Mountain			
Gamewell	General Inquiries		<a href="mailto:townofgamewell@bellsouth.net">townofgamewell@bellsouth.net</a>
Granite Falls	Jerry Church	Town Manager	<a href="mailto:church@granitefallsncc.com">church@granitefallsncc.com</a>
Hickory	Mick Berry	City Manager	<a href="mailto:mberry@hickorync.gov">mberry@hickorync.gov</a>
Hudson	Rebecca Bently	Town Manager	<a href="mailto:rebecca.bentley@townofhudsonnc.com">rebecca.bentley@townofhudsonnc.com</a>
Lenoir	Scott Hildebran	City Manager	<a href="mailto:shildebran@ci.lenoir.nc.us">shildebran@ci.lenoir.nc.us</a>
Sawmills	Christopher Todd	Town Administrator	<a href="mailto:townadmin@townofsawmills.com">townadmin@townofsawmills.com</a>
Watauga County	Jennifer Storie	Planner	<a href="mailto:jennifer.storie@watgov.org">jennifer.storie@watgov.org</a>
	Steve Sudderth	EM Director	<a href="mailto:steve.sudderth@watgov.org">steve.sudderth@watgov.org</a>
Beech Mountain	Ed Evans	Town Manager	<a href="mailto:manager@townofbeechmountain.com">manager@townofbeechmountain.com</a>
Blowing Rock	Scott Fogleman	Town Manager	<a href="mailto:townofbr@bellsouth.net">townofbr@bellsouth.net</a>
Boone	John Ward	Town Manager	<a href="mailto:johnn.ward@townofboone.net">johnn.ward@townofboone.net</a>
Seven Devils	Ed Evans	Town Manager	<a href="mailto:townmanager@sevendevis.net">townmanager@sevendevis.net</a>

# New Summary Report - 10 November 2015

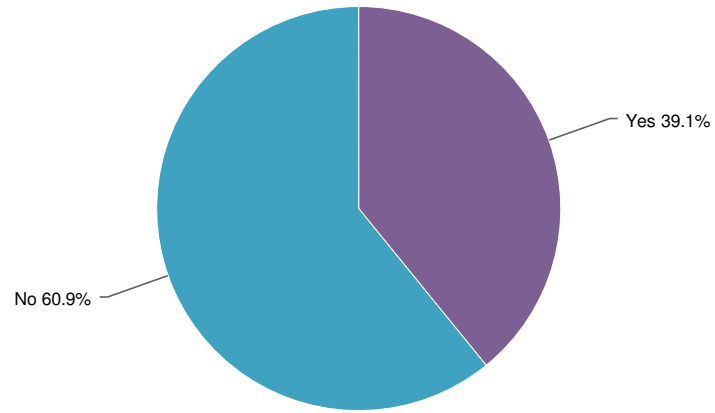
## 1. Where do you live?





Unincorporated Avery County	0.0%		0
Unincorporated McDowell County	30.4%		7
Unincorporated Mitchell County	8.7%		2
Unincorporated Yancey County	30.4%		7
Town of Banner elk	0.0%		0
Town of Crossnore	0.0%		0
Town of Elk Park	0.0%		0
Town of Newland	0.0%		0
Town of Sugar Mountain	0.0%		0
Grandfather Village	0.0%		0
City of Marion	8.7%		2
Town of Old Fort	4.4%		1
Town of Bakersville	0.0%		0
Town of Spruce Pine	13.0%		3
Town of Burnsville	4.4%		1
Other	0.0%		0
Total			23



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

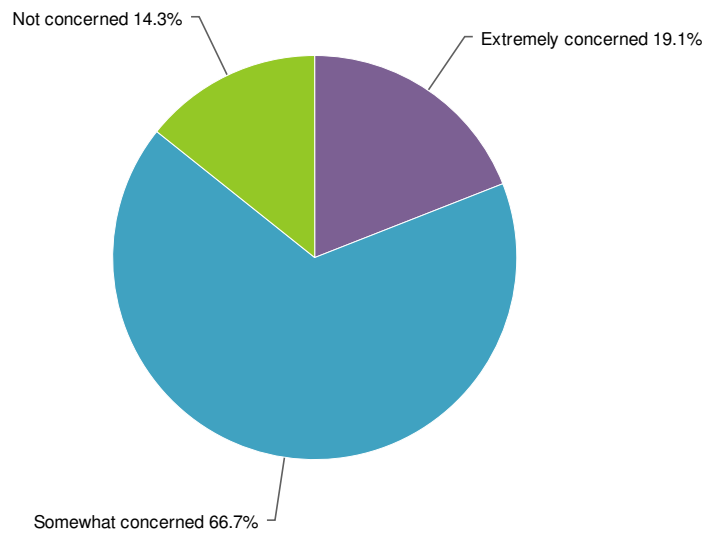





Yes	39.1%		9
No	60.9%		14
Total			23

3. If "Yes," please explain:

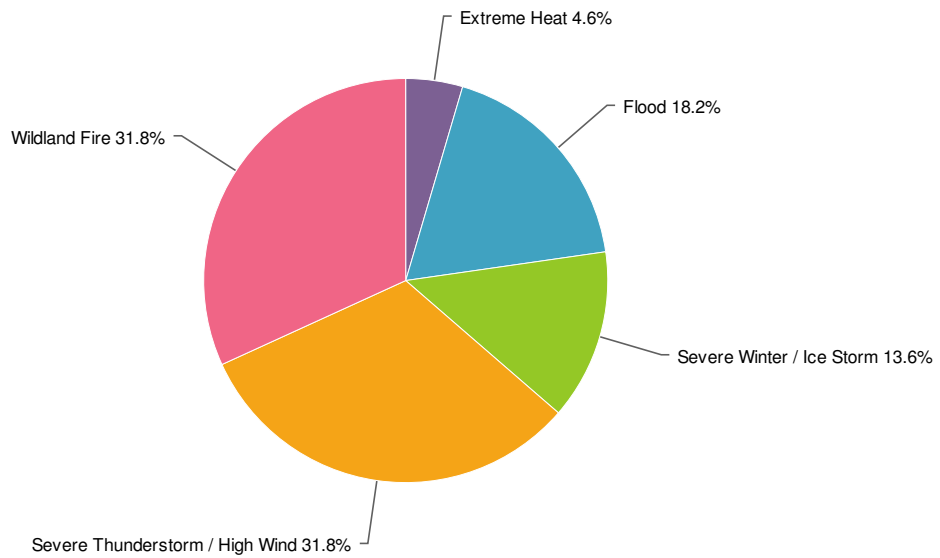
<b>Count</b>	<b>Response</b>
1	1997 Flood
1	Blizzard of 1993
1	Chemical explosion at a plant near my home at 93 Creekside Ct.
1	Flooding, roads washed out, and under water
1	High winds blowing down trees striking my house and causing minor damage
1	Wildfire
1	Wildfire, severe storms, etc.
1	hurricanes and microbursts
1	Couldn't return to my home for 24 hrs. at 93 Creekside Ct., Spruce Pine because of an explosion at a plant located beside Deyton Elementary School.
1	Couldn't return to my home at 93 Creekside Ct. Spruce Pine for 24 hrs. due to a chemical explosion from a plant next to Deyton Elementary School.

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



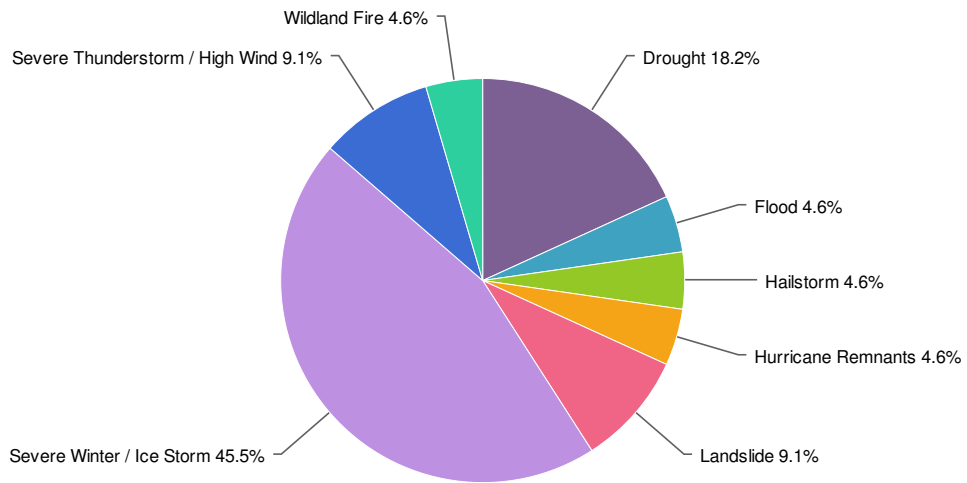
Extremely concerned	19.1%		4
Somewhat concerned	66.7%		14
Not concerned	14.3%		3
Total			21

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



Acts of Terror	0.0%	<div style="width: 0%;"></div>	0
Dam /Levee Failure	0.0%	<div style="width: 0%;"></div>	0
Drought	0.0%	<div style="width: 0%;"></div>	0
Earthquake	0.0%	<div style="width: 0%;"></div>	0
Expansive Soils	0.0%	<div style="width: 0%;"></div>	0
Extreme Heat	4.6%	<div style="width: 4.6%;"></div>	1
Flood	18.2%	<div style="width: 18.2%;"></div>	4
Hailstorm	0.0%	<div style="width: 0%;"></div>	0
Hurricane Remnants	0.0%	<div style="width: 0%;"></div>	0
Land Subsidence	0.0%	<div style="width: 0%;"></div>	0
Landslide	0.0%	<div style="width: 0%;"></div>	0
Lightning	0.0%	<div style="width: 0%;"></div>	0
Severe Winter / Ice Storm	13.6%	<div style="width: 13.6%;"></div>	3
Severe Thunderstorm / High Wind	31.8%	<div style="width: 31.8%;"></div>	7
Tornado	0.0%	<div style="width: 0%;"></div>	0
Wildland Fire	31.8%	<div style="width: 31.8%;"></div>	7
	Total		22

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

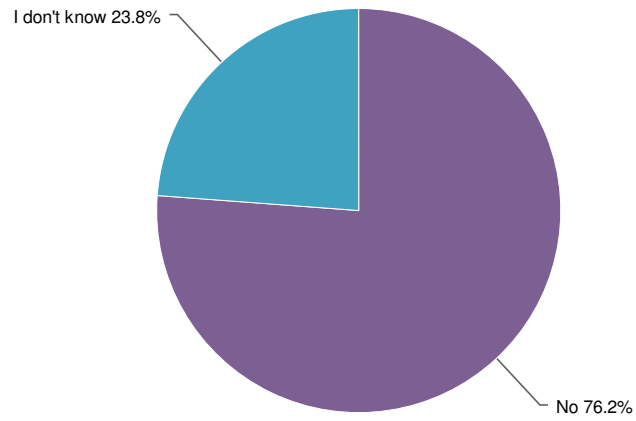


Acts of Terror	0.0%		0
Dam / Levee Failure	0.0%		0
Drought	18.2%		4
Earthquake	0.0%		0
Expansive Soils	0.0%		0
Extreme Heat	0.0%		0
Flood	4.6%		1
Hailstorm	4.6%		1
Hurricane Remnants	4.6%		1
Land Subsidence	0.0%		0
Landslide	9.1%		2
Lightning	0.0%		0
Severe Winter / Ice Storm	45.5%		10
Severe Thunderstorm / High Wind	9.1%		2
Tornado	0.0%		0
Wildland Fire	4.6%		1
		<b>Total</b>	<b>22</b>

7. Please explain if you think there is another hazard not listed above that you think is a wide-scale threat to your neighborhood

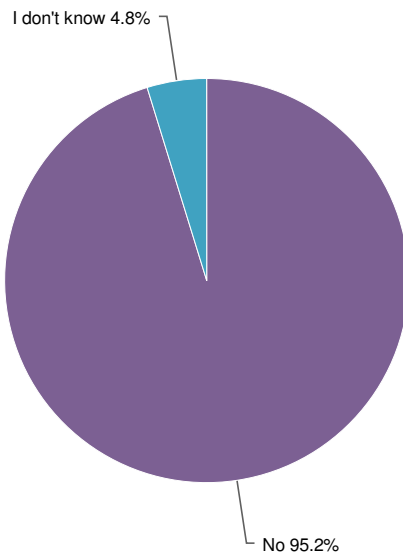
<b>Count</b>	<b>Response</b>
1	A gas or other hazardous content exploding from a tanker train traveling through our area.
1	Fuek explosion on a tanker train passing through Spruce Pine
1	Plane,train, major wreck or hazmat spill.
1	Prices rising
1	Wildfire
1	trail derailment along toe river is my most important concern above all else
1	To the North, South and West there are a limited number of ways to exit the county if there was an emergency

## 8. Is your home located in a floodplain?



Yes	0.0%		0
No	76.2%		16
I don't know	23.8%		5
Total			21

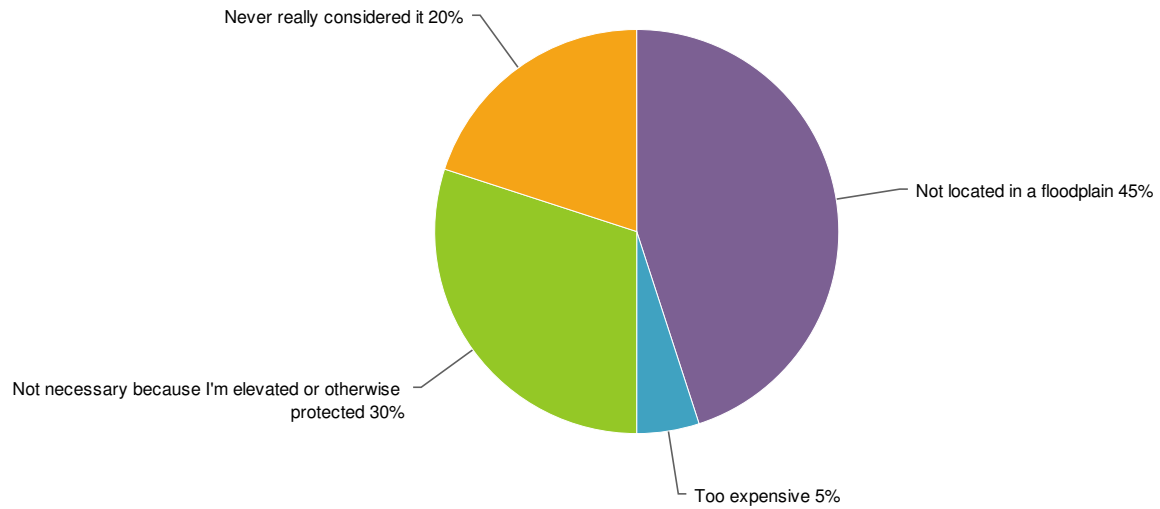
## 9. Do you have flood insurance



Yes	0.0%		0
No	95.2%		20
I don't know	4.8%		1
Total			21



10. If "No," why not?



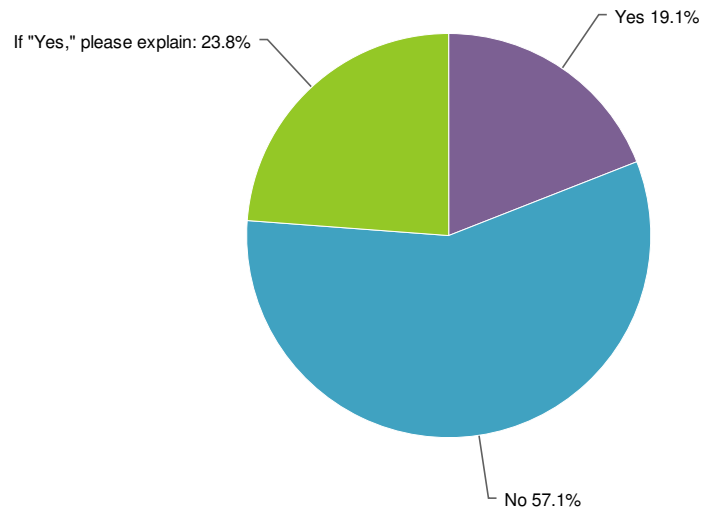
Not located in a floodplain	45.0%		9
Too expensive	5.0%		1
Not necessary because it never floods	0.0%		0
Not necessary because I'm elevated or otherwise protected	30.0%		6
Never really considered it	20.0%		4
Other (please explain)	0.0%		0
Total			20

Responses "Other (please explain)"

Count

Left Blank	23
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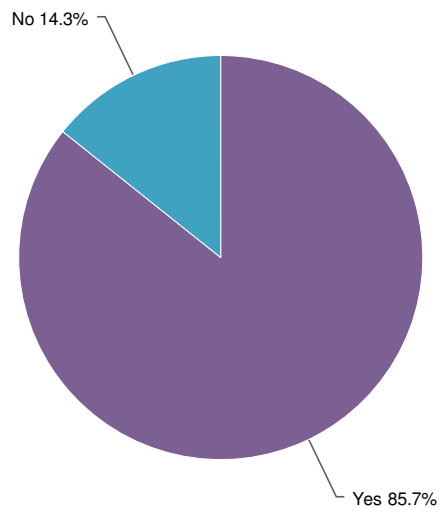
11. Have you taken any actions to make your home or neighborhood more resistant to hazards?


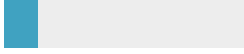


Yes	19.1%		4
No	57.1%		12
If "Yes," please explain:	23.8%		5
Total			21

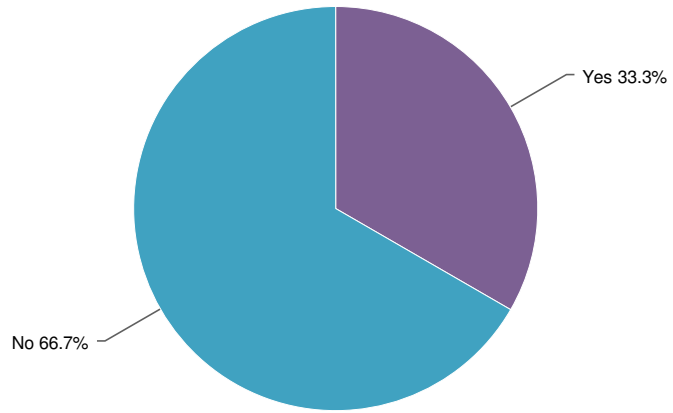
Responses "If "Yes," please explain:"	Count
Left Blank	18
Have cut down many trees, especially pines, that are closeto house or which were dead or dying	1
Keep a close eye on anything to help make sure our home is safe and up to codes and inspections	1
Removed trees close to house	1
clean up debris following leaf fall to reduce fire threat	1
removed debris from home	1



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



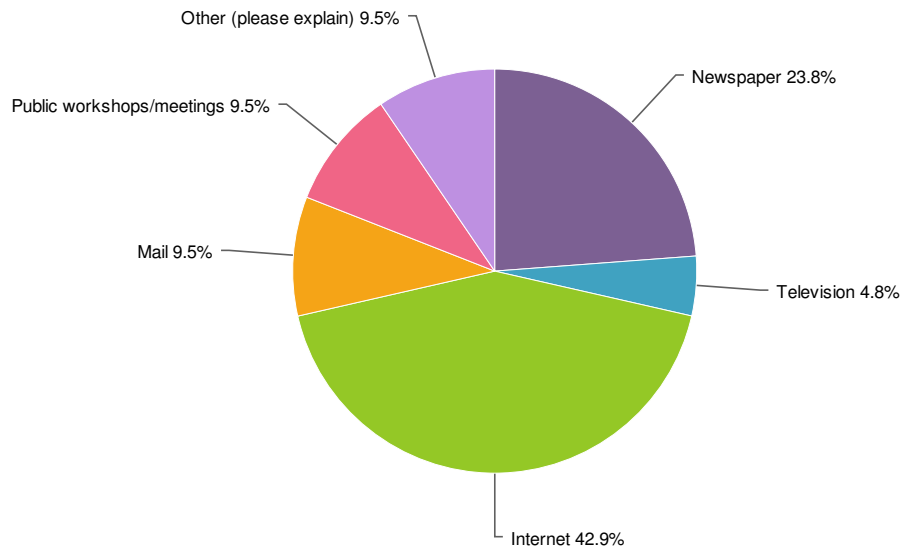
Yes	85.7%		18
No	14.3%		3
Total			21

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



Yes	33.3%		7
No	66.7%		14
Total			21

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



Method	Percentage	Count
Newspaper	23.8%	5
Television	4.8%	1
Radio	0.0%	0
Internet	42.9%	9
Mail	9.5%	2
Public workshops/meetings	9.5%	2
School meetings	0.0%	0
Other (please explain)	9.5%	2
<b>Total</b>		<b>21</b>

Responses "Other (please explain)"	Count
Left Blank	21
contact local officials such as EM, Fire Marshall, Forest Ranger	1
text message alerts.	1

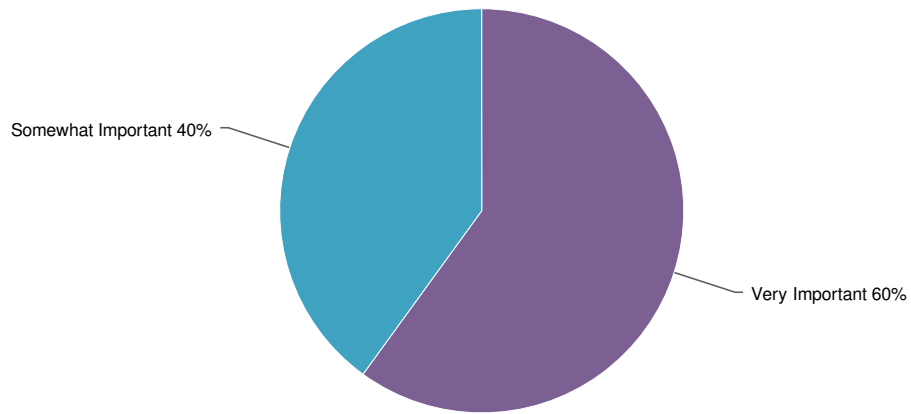
15. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?



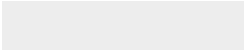
Count	Response
1	Be prepared.
1	Complete high speed internet into private communities
1	Keep educating public of hazards
1	Listen to our communities ideas and worries. Involve the community more when it comes to this.
1	None.
1	Remove debris from streams.
1	They should make sure that the streets do not flood, causing cars to hydroplane.
1	Tree trimming, road upkeep.
1	identify potential toxic or hazardous materials being transported along the rails
1	Reduce the use of fossil fuels to mitigate their effect on climate change. Colder winters, erratic summer temps, and hurricane activity have all increased in the last several years.
1	Inspect businesses that operate in our counties on a regular basis to determine if they are operating safely. Have regular town and county meetings for the public to discuss and plan for such emergencies.
1	I'm not sure what can be done, but here are my concerns: There is a small creek/stream that extends throughout our neighborhood/street, and during heavy, sustained rains it can flood the flat ground around it. It's possible that some of the houses close to it could receive extensive flood damage if it rained enough. I don't think our house is in immediate danger since it is elevated, but the houses nearby are in potential danger. Other than the risk of flood, I sometimes worry about landslides. I live on Hicks Chapel Loop in Marion, and there are rock quarries and excavation sites nearby, and one is just above/behind a few houses. With the work being done to excavate the rocks and the ground being transformed by the operations -- if it hasn't already -- I worry it may eventually destabilize the ground (removal of trees, root systems that hold the ground in place) and make it likely for landslides to happen.

16. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

Count	Response
1	Can't think if any at this time.
1	Community awareness.
1	Educating us citizens is a priority.
1	Mitigate flood prone areas
1	the large amount of runoff, sediments and other debris that are going into the toe river.
1	Property owners must take responsibility of protecting themselves, not expecting government to do it for them. Also, property owners who do not prepare for emergencies put emergency workers at risk during an emergency!
1	Factory fires and/or explosions. Inspections conducted by local fire marshal. I was in a factory fire. Could have been prevented by cleaning. Someone trained to recognize these dangers.
1	Maybe a siren system installed to alert people that may not have service on their phones or in their homes.

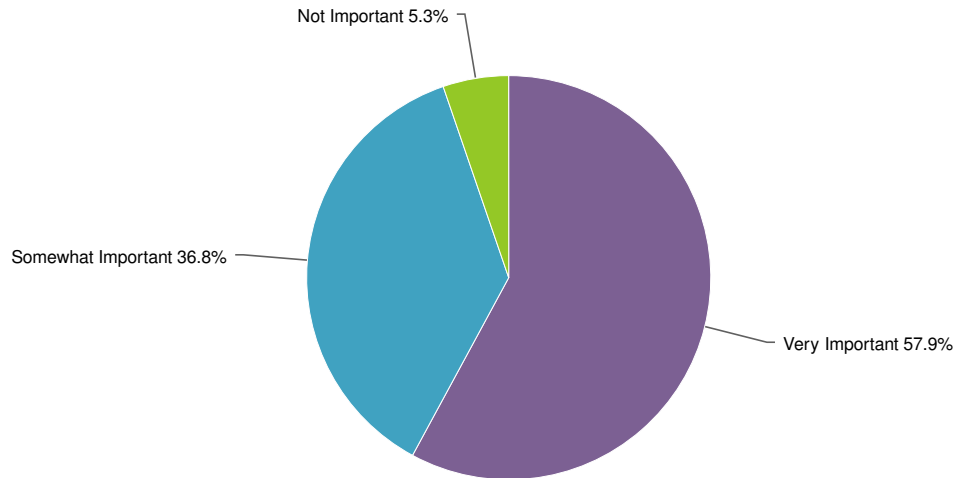
17. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing. Prevention Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.



Very Important	60.0%		12
Somewhat Important	40.0%		8
Not Important	0.0%		0
Total			20

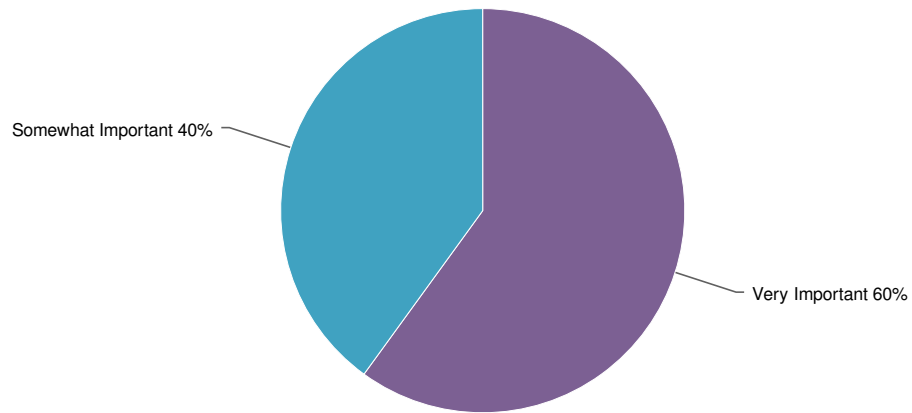




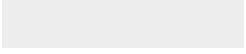
18. Property Protection Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.



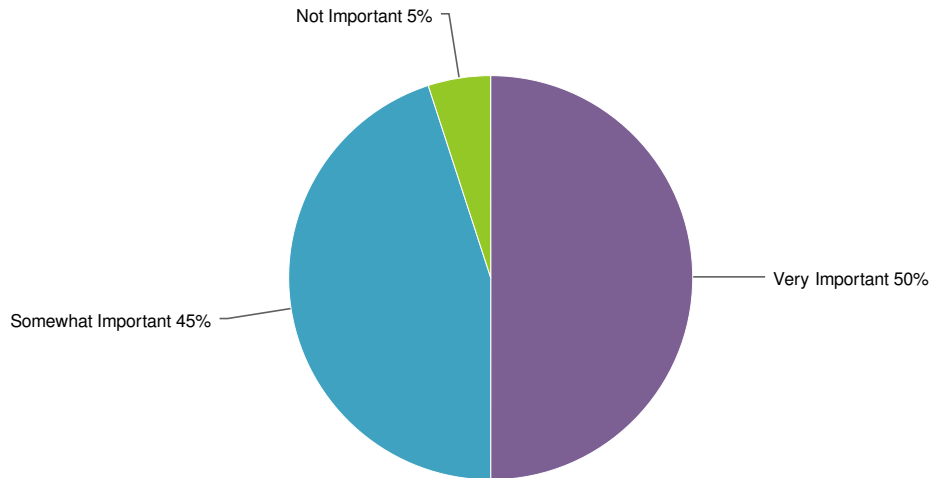
Very Important	57.9%		11
Somewhat Important	36.8%		7
Not Important	5.3%		1
		Total	19




19. Natural Resource Protection Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.



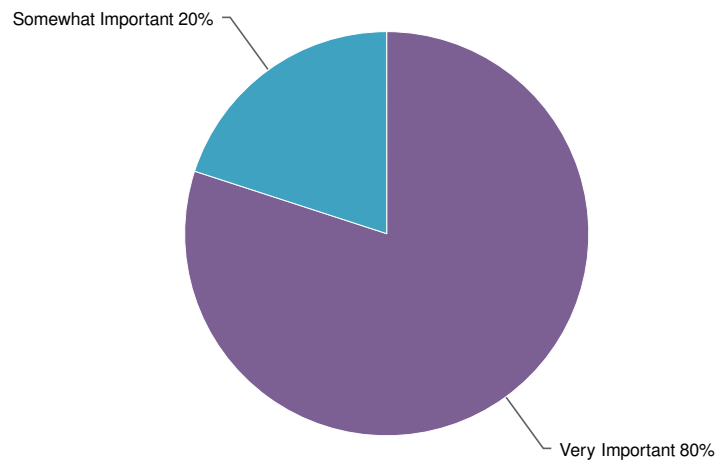
Very Important	60.0%		12
Somewhat Important	40.0%		8
Not Important	0.0%		0
Total			20

20. Structural Projects Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, detention/retention basins, channel modification, retaining walls and storm sewers.



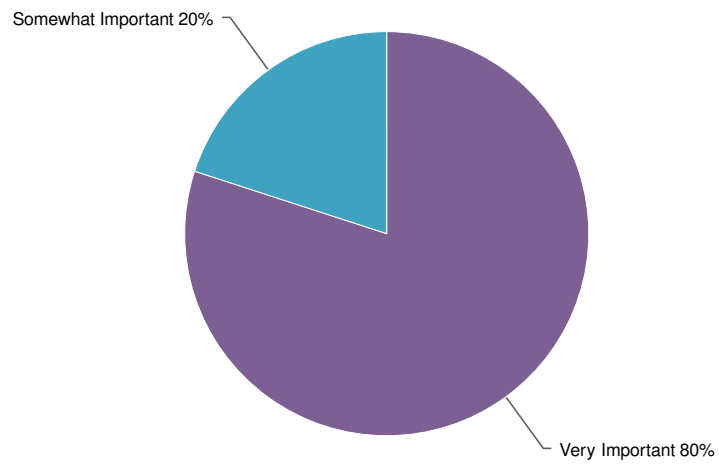
Very Important	50.0%		10
Somewhat Important	45.0%		9
Not Important	5.0%		1
Total			20

21. Emergency Services Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.



Very Important	80.0%		16
Somewhat Important	20.0%		4
Not Important	0.0%		0
Total			20

22. Public Education and Awareness Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials and demonstration events.

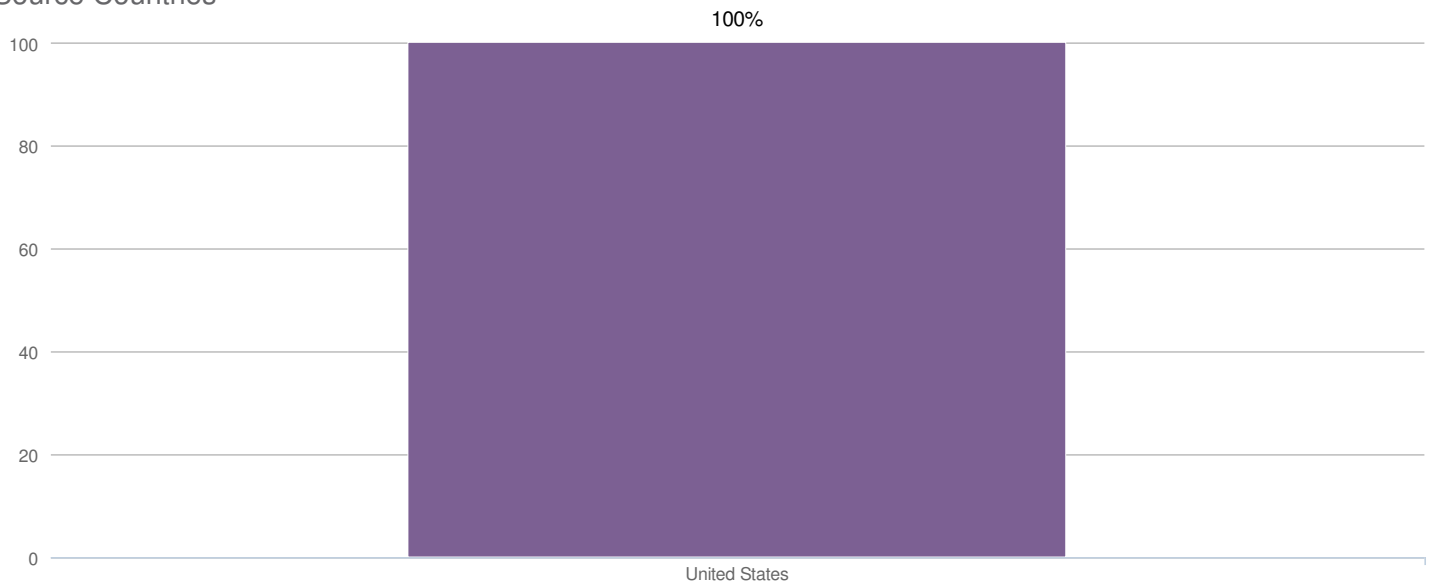



Very Important	80.0%		16
Somewhat Important	20.0%		4
Not Important	0.0%		0
Total			20

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

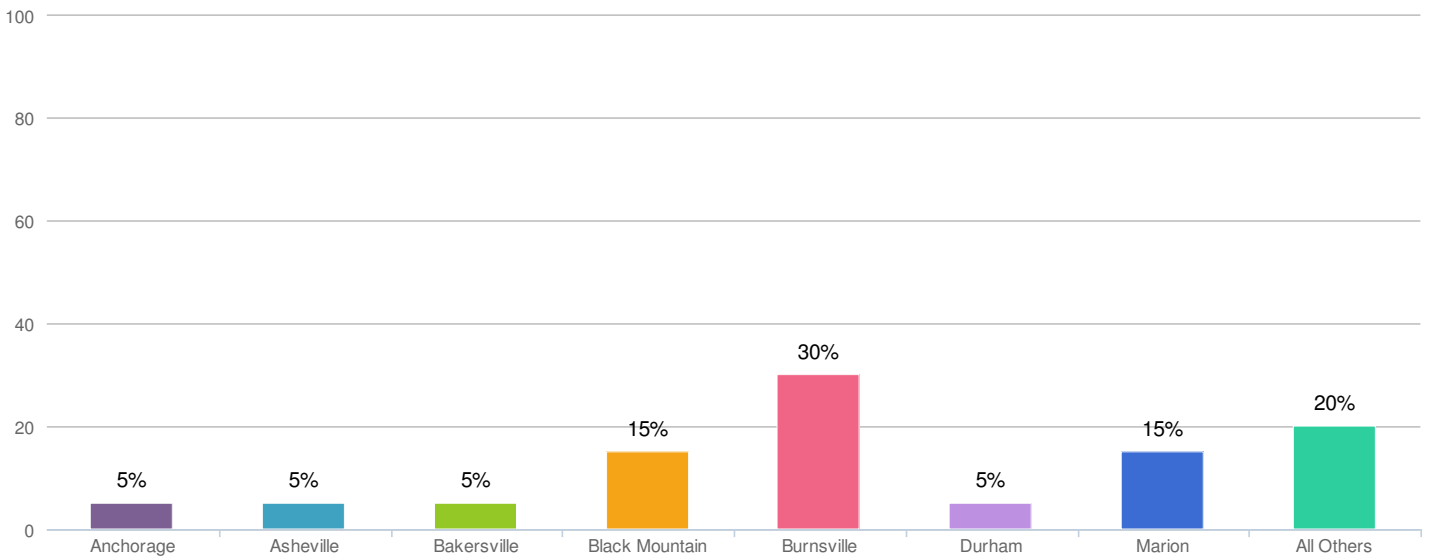
<b>Count</b>	<b>Response</b>
1	Barbara Coursey, parkhound333@gmail.com
1	Jessica Church 21 Glenwood Avenue Marion, NC 28752 Email: puffyandshawn2015@gmail.com
1	Joe Shoupe joe.shoupe@gmail.net
1	Name: Cody Jones contact (email): jonescodyryan@gmail.com
1	Pat Turner Mitchell mitchelljackpatr@bellsouth.net
1	Robert Scott 135 old log road green mountain nc 28740
1	Sam Stebbins 5860 Bald Mtn Rd Burnsville NC. 38714 828 536-4140 Sam.thebuckhouse@ gmail.com

## Source Countries



United States	100.0%		22
		Total	22

## Source Cities



Anchorage	5.0%		1
Asheville	5.0%		1
Bakersville	5.0%		1
Black Mountain	15.0%		3
Burnsville	30.0%		6
Durham	5.0%		1
Marion	15.0%		3
Mars Hill	5.0%		1
Monroe	5.0%		1
Newport	5.0%		1
Raleigh	5.0%		1
<b>Total</b>			<b>20</b>





# **AGENDA**

## **Toe River Regional Hazard Mitigation Plan Project Kickoff Meeting**

October 29, 2009

10:00 AM – Noon

### **1) Introductions**

### **2) Project Overview**

- a) Key Objectives
- b) Project Tasks
- c) Project Schedule
- d) Project Staffing

### **3) Roles & Responsibilities**

- a) PBS&J
- b) County Leads
- c) Participating Jurisdictions

### **4) Next Steps**

- a) Determine members to participate on the Hazard Mitigation Planning Team
- b) Initiate data collection efforts
- c) Begin public outreach
- d) Schedule Hazard Mitigation Planning Team meeting

### **5) Questions, Issues or Concerns**

# **AGENDA**

Toe River Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Team Meeting

November 19, 2009

10:00 AM – Noon

## **1) Introductions**

## **2) Overview of Mitigation/Icebreaker Exercise**

## **3) Project Overview**

- a) Key Objectives
- b) Project Tasks
- c) Project Schedule
- d) Project Staffing

## **4) Data Collection**

- a) GIS Data Inventory
- b) Capability Assessment Survey
- c) Public Participation Survey
- d) Existing Mitigation Actions

## **5) Roles & Responsibilities**

- a) PBS&J
- b) County Leads
- c) Participating Jurisdictions

## **6) Next Steps**

- a) Data collection efforts
- b) Begin public outreach
- c) Discuss next Hazard Mitigation Planning Team meeting

## **7) Questions, Issues or Concerns**

# **AGENDA**

Toe River Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Team (HMPT) Meeting  
February 18, 2010  
10:00 AM – Noon

## **1) Introductions**

## **2) Recap / Status Update**

## **3) Risk Assessment Findings**

- a) Hazard Identification & Analysis
- b) Vulnerability Assessment

## **4) Capability Assessment Findings**

## **5) Public Involvement Activities**

- a) Public Participation Survey Update

## **6) Mitigation Strategy Development**

- a) Review of Existing Plan Goals, Objectives and Actions
- b) Mitigation Action Worksheets (Existing Actions)
- c) Identification of New Actions

## **7) Discussion on Plan Maintenance / Implementation**

## **8) Wrap-up and Next Steps**

Toe River Regional Hazard Mitigation Plan  
Project Kickoff Meeting

October 29, 2009  
10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
Bob Boyette	City of Marion	Marion	(828) 652-3551	bboyette@marionnc.org
Wika Elliott	Marion Police Dept	Marion	828-652-3231	welliott@marionnc.org
Jim Neal	Marion Fire Dept.	Marion	828-652-5201	mfolso1@charterinternet.com
DANNY McINTOSH	Town of Burnsville	Burnsville	828-682-7224	mayer@townofburnsville.org
Nathan Bennett	Yancey County Managers	Burnsville	828-682-3971	Nbennett@yanceycountync.gov
Bill Davis	YANCEY COUNTY	BURNVILLE	828-678-9463	bdavis@YANCEYCOUNTYNC.GOV
David Vance	AVERY COUNTY Emerg. Mgmt.	Newland	828-733-8213	EmergencyManagement@ncmail.net
Tommy Burleson	Avery County Planning & Inspections	Newland	828-733-8204	averyplanning@ncmail.net

Name	Agency	City	Phone Number	E-mail Address
Mario Parsley	Mitchell Co Finance Office	Mitchell Co. Bakersville	828 688 2139 x 325	mmparsley@hotmail.com
Richard Cruipe	Town Manager	Town of Spruce Pine	828-765-3000	SPMGR@BALLSOUTH .NET
ERIC WISEMAN	MITCHELL CO. EMERGENCY MANAGEMENT	BAKERSVILLE MITCHELL CO.	808-385-0911	mitem@main.nc.us
Tiawana Ramsey	NCEM	Marshall, NC	808-230-8184	tramsey@ncem.org
TERRY YOUNG	McDowell Co EMA	MARION, NC	828-654- 3982	terry.young@mcdoell gov.com

Toe River Regional Hazard Mitigation Plan  
Hazard Mitigation Planning Team Meeting

November 19, 2009  
10:00 AM - Noon

Name	Agency	City	Phone Number	E-mail Address
JAMES SEABERG, GISP	AVERY COUNTY	NEWLAND	828-733-7001	jseaberg@ncmail.net
David Vance	AVERY CO. - EMERGENCY MGMT.	Newland N.C.	828-533-8213	emergency.mgmt@ncmail.net
BRIAN BUCHANAN	BURNSVILLE POLICE	BURNSVILLE NC	828 682 4683	BPDE TOWN OF BURNSVILLE. ORG
Isaac McCurry	Burnsville FD	Burnsville NC	828-682-1184	BFD@townofburnsville.org
Bill DAVIS	YANCEY COUNTY EMERGENCY MANAGEMENT	BURNSVILLE NC	828 678 9462	bdavis@yanceycountync.gov
Nathan Bennett	Yancey County manager	Burnsville	828/682-3971	nbennett@yanceycountync.gov
Deborah Godwin	McDowell Tax Officer	Moreen	828/652-7121	deborah.godwin@mcdoowellgov.com
Ronald Harmon	McDowell Planning Admin	Marion	828-652-7121	rharmon@mcdoowellgov.com

Name	Agency	City	Phone Number	E-mail Address
TERRY YOUNG	McDOWELL CO EM	MARION, NC	828-652-3982	terry.young@mcDowell.gov.com
Tiawana Ramsley	NCEM	Marshall, NC	828-230-8184	tramsley@ncem.org
ERIC WISEMAN	MITCHELL CO. EM	BAKERSVILLE	828-688-2139	mitem@main.nc.us
CHARLES VINES	MITCHELL County MGR	BAKERSVILLE	828 688-2139 X-311	MANAGER@MITCHELL.MAN.NC.US
Richard CAMIRE	Town of Spruce Pine MGR	Spruce Pine	828-765-3000	SPMGR@BeUsouth.net
MAVIS Parsley	Mitchell County Finance	Bakersville	828 688 2139 x 325	mitfin@main.nc.us
Tommy Buleson	Avery County Planning & Inspection	Newland	828-733-8204	averyoplanning@ncmail.net



Name	Agency	City	Phone Number	E-mail Address
<p>Donald E. Odium</p> <p>Thompson</p>	<p>Dis McDowell</p>	<p>Marion</p>	<p>828.652.7121</p>	<p>fd. e h t</p> <p>debi@at-j.org  mcdowell@dis.net</p>

Name	Agency	City	Phone Number	E-mail Address

## **PUBLIC NOTICE**

Avery County, McDowell County, Mitchell County, and Yancey County, along with participating local jurisdictions and other participating partners, are now working to prepare a multi-jurisdictional Hazard Mitigation Plan. The purpose of this Plan, titled the *Toe River Regional Hazard Mitigation Plan*, is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks.

Public participation is a valuable component of the planning process and therefore a public meeting will be held on February 18, 2010 at the Avery County Commissioners Board Room (Room 116) located on the second floor of the Avery County Offices Complex Building, 175 Linville Street, Newland, NC 28657 from 6:00 pm to 7:00 pm. Anyone interested in learning more about the *Toe River Regional Hazard Mitigation Plan* and helping us make the community less vulnerable to natural disasters is encouraged to attend.

## **PUBLIC NOTICE**

Avery County, McDowell County, Mitchell County, and Yancey County, along with participating local jurisdictions and other participating partners, are now working to prepare a multi-jurisdictional Hazard Mitigation Plan. The purpose of this Plan, titled the *Toe River Regional Hazard Mitigation Plan*, is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks.

Public participation is a valuable component of the planning process and therefore a public meeting will be held on February 18, 2010 at the McDowell County Commissioners Board Room located in the County Administration Building, 60 East Court Street, Marion, NC 28752 from 6:00 to 7:00 pm. Anyone interested in learning more about the *Toe River Regional Hazard Mitigation Plan* and helping us make the community less vulnerable to natural disasters is encouraged to attend.

## PUBLIC NOTICE

Avery County, McDowell County, Mitchell County, and Yancey County, along with participating local jurisdictions and other participating partners, are now working to prepare a multi-jurisdictional Hazard Mitigation Plan. The purpose of this Plan, titled the *Toe River Regional Hazard Mitigation Plan*, is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks.

Public participation is a valuable component of the planning process and therefore a public meeting will be held on February 18, 2010 at the Mitchell County Commissioners' Conference Room located in the Mitchell County Administration Building, Bakersville, NC 28705 from 5:30 pm to 6:30 pm. Anyone interested in learning more about the *Toe River Regional Hazard Mitigation Plan* and helping us make the community less vulnerable to natural disasters is encouraged to attend.

## **PUBLIC NOTICE**

Avery County, McDowell County, Mitchell County, and Yancey County, along with participating local jurisdictions and other participating partners, are now working to prepare a multi-jurisdictional Hazard Mitigation Plan. The purpose of this Plan, titled the *Toe River Regional Hazard Mitigation Plan*, is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks.

Public participation is a valuable component of the planning process and therefore a public meeting will be held on February 18, 2010 at the Yancey County Commissioners Board Room located in the Yancey County Courthouse, Burnsville, NC 28714 from 6:00 pm to 7:00 pm. Anyone interested in learning more about the *Toe River Regional Hazard Mitigation Plan* and helping us make the community less vulnerable to natural disasters is encouraged to attend.

# Appendix E: Completed Mitigation Actions

This section of the Plan includes the mitigation actions that have been completed by the participating jurisdictions.

**Avery County Completed Mitigation Actions**

<b>Avery County Mitigation Action 1</b>	<b>Attempt to acquire/create digital data in order to produce a land use map (including areas of present and future development) in digital format and overlay hazard vulnerability</b>
Hazard(s) Addressed:	All Hazards
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	County Manager/County GIS Department/County Planning and Inspections Department
Estimated Cost:	Unknown
Potential Funding Sources:	Local Funds
Implementation Notes:	Completed – The County now has digital data in place to produce land use map in digital format and can overlay hazard vulnerability data such as DFIRM, iRISK and data that was used in developing this hazard mitigation plan.

<b>Avery County Mitigation Action 2</b>	<b>Avery County Schools – Update the Shelter-In-Place (SIP) Plan</b>
Hazard(s) Addressed:	All hazards
Category:	Prevention, Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	County Schools Facilities Director/Principals/County Schools Bus Transportation/County Schools Food Service
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Implementation Notes:	Completed by the end of the 2004-2005 school year.

<b>Avery County Mitigation Action 3</b>	<b>Avery County Schools – Inspect school buildings for cracks and structural flaws annually, as well as immediately after seismic events</b>
Hazard(s) Addressed:	Earthquake
Category:	Prevention, Property Protection
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	County Building Inspector/County Schools Facilities Director/Principals/County Fire Marshal
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	<b>COMPLETED by the beginning of the 2004-2005.</b> Bi-annual Inspections in place



**Town of Banner Elk Completed Mitigation Actions**

<b>Banner Elk Mitigation Action 1</b>	<b>Evaluate flooding potential along streams in Town Limits (including developed areas as well areas of future development)</b>
Hazard(s) Addressed:	Flooding
Category:	Prevention, Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council, Town Maintenance Department
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	<b>COMPLETED.</b> New flood maps were developed in 2009. As a result, some areas were rezoned. The Town also maintains an inventory of areas of localized flooding and has been actively taking steps to alleviate flooding in these areas.

<b>Banner Elk Mitigation Action 2</b>	<b>Update evaluation of floodplain ordinance to protect present and future buildings and infrastructure.</b>
Hazard(s) Addressed:	Flooding
Category:	Prevention, Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council, Town Planning Board
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	<p>Banner Elk has its own Flood Damage Prevention Ordinance as well as a Steep Slope Ordinance. Additionally, Banner Elk has in place a 2010-2030 Comprehensive Land Use Plan that prompts reduced density requirements in the Zoning Ordinance and protects Open Space in those identified hazard areas; such as flooding and steep slopes, encouraging these areas to become conservation easements in place of development.</p> <p>This amends the previous Action #2 by updating the information on ordinance protection that is in place. Banner Elk's Flood Damage Prevention Ordinance has some stricter guidelines in place than Avery County's ordinance.</p>

<b>Banner Elk Completed Mitigation Action</b>	<b>Implemented extensive Stream Bank Restoration measures in order to protect property and infrastructure from flooding along Shawneehaw Creek</b>	
Hazard(s) Addressed:	Flooding	
Category:	Prevention, Natural Resource Protection	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	Mayor and Town Council, Planning Department	
Estimated Cost:	Total cost of project: \$582,800	
Potential Funding Sources:	CWMTF and Matching Local Funds	
Implementation Notes:	<p>Complete. Began in 2012, ended in 2014. This mitigation action was implemented to protect the residents of Crooked Creek Subdivision in an area that is prone to flooding each year. Funds were granted by the Clean Water Management Trust Fund along with matching local funds.</p> <p>This action was never included in the Mitigation Action Plan but the Town added it to the 2015 update of the plan to demonstrate progress made in mitigation.</p>	

<b>Banner Elk Completed Mitigation Action</b>	<b>Replaced culverts under Highway 194 East. Culverts were too small to accommodate flow.</b>	
Hazard(s) Addressed:	Flooding	
Category:	Prevention, Natural Resource Protection	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	NCDOT	
Estimated Cost:	Unknown	
Potential Funding Sources:	NCDOT funds	
Implementation Notes:	<p>Completed in 2014. This action was necessary to prevent flooding of an area that could not adequately manage the flow of runoff under a major thoroughfare, causing flooding.</p> <p>This action was never included in the Mitigation Action Plan but the Town added it to the 2015 update of the plan to demonstrate progress made in mitigation.</p>	

<b>Banner Elk Completed Mitigation Action</b>	<b>Replaced culverts under Highway 194 East. Culverts were too small to accommodate flow.</b>	
Hazard(s) Addressed:	Flooding	
Category:	Prevention, Natural Resource Protection	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	NCDOT	
Estimated Cost:	Unknown	
Potential Funding Sources:	NCDOT funds	
Implementation Notes:	<p>Completed in 2014. This action was necessary to prevent flooding of an area that could not adequately manage the flow of runoff under a major thoroughfare, causing flooding.</p> <p>This action was never included in the Mitigation Action Plan but the Town added it to the 2015 update of the plan to demonstrate progress made in mitigation.</p>	

<b>Banner Elk Completed Mitigation Action</b>	<b>Replaced a catch basin at intersection of Highway 184 and Orchard Lane.</b>	
Hazard(s) Addressed:	Flooding	
Category:	Structural Projects	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	NCDOT	
Estimated Cost:	Unknown	
Potential Funding Sources:	NCDOT funds	
Implementation Notes:	<p>Completed in 2014. This action was initiated by the Town in order to prevent flooding of a major thoroughfare resulting in unsafe conditions for traffic and the damage to property in the area.</p> <p>This action was never included in the Mitigation Action Plan but the Town added it to the 2015 update of the plan to demonstrate progress made in mitigation.</p>	

Banner Elk Completed Mitigation Action	Mitigate stormwater runoff
Hazard(s) Addressed:	Flooding
Category:	Prevention, Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council, Blue Ridge Environmentals
Estimated Cost:	\$150,000
Potential Funding Sources:	Local Funds
Implementation Notes:	<p>Curb and guttering was installed on Dogwood Road along with a catch basin for regular stormwater runoff to alleviate flooding of properties along this town street. Retention ponds were installed to capture the stormwater and allow it to cool before returning to Shawneehaw Creek in a slower manner.</p> <p>This action was never included in the Mitigation Action Plan but the Town added it to the 2015 update of the plan to demonstrate progress made in mitigation.</p>

### Town of Crossnore Completed Mitigation Actions

<b>Crossnore Mitigation Action 1</b>	<b>Evaluate having Town water system mapped for applying for lower fire ratings for structural fire protection within Town Limits</b>
Hazard(s) Addressed:	Wildfire, Earthquake, Lightning, any other hazard which could induce structural fire
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council, Town Water Department, Crossnore Volunteer Fire Department
Estimated Cost:	Moderate
Potential Funding Sources:	Local Funds
Implementation Notes:	The Town's water system was mapped in 2006. As a result, the town earned a lower fire rating (went from a 9 to a 7).

### Town of Elk Park Completed Mitigation Action

<b>Elk Park Mitigation Action 1</b>	<b>Study the feasibility of creating and implementing a new Floodplain Ordinance within Town Limits (which would also consider impacts to present and future buildings and infrastructure)</b>
Hazard(s) Addressed:	Flooding
Category:	Prevention, Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	Elk Park uses the County's ordinance which has been updated since 2004. There are no plans to develop a separate ordinance for the Town.

### Grandfather Village Completed Mitigation Actions

<b>Grandfather Village Mitigation Action 1</b>	<b>Investigate the feasibility of performing a study on dam stabilization</b>
Hazard(s) Addressed:	Dam Failure
Category:	Structural projects
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Governing Board
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	The lake level was dropped in 2006 and the dam was stabilized. The dam is now back at full level. This eliminated the need for the study.

<b>Grandfather Village Mitigation Action 2</b>	<b>Conduct an evacuation drill for all residents within Village and evaluate current evacuation plan</b>
Hazard(s) Addressed:	All Hazards
Category:	Public Information and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Governing Board and Local Security
Estimated Cost:	Low
Potential Funding Sources:	Local Funds
Implementation Notes:	<b>COMPLETED in 2006.</b> The town developed a new evacuation plan and conducted a drill.

**Town of Newland Completed Mitigation Actions**

<b>Newland Mitigation Action 1</b>	<b>Channel Modification (through the US Army Corps of Engineers)</b>
Hazard(s) Addressed:	Flooding
Category:	Structural Projects
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council
Estimated Cost:	\$150,000
Potential Funding Sources:	Army Corps of Engineers
Implementation Notes:	Channel modification was completed in 2009 by the Corps. This helped alleviate flood problems in certain parts of the Town.

<b>Newland Mitigation Action 2</b>	<b>Review and update current floodplain regulations (also considering impacts to present and future buildings and infrastructure)</b>
Hazard(s) Addressed:	Flooding
Category:	Prevention, Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Planning Board
Estimated Cost:	Undetermined
Potential Funding Sources:	Local funds
Implementation Notes:	The Town uses the County's ordinance which has been updated since 2004. There are no plans to develop a separate ordinance for the Town.

**Village of Sugar Mountain Completed Mitigation Actions**

<b>Sugar Mountain Mitigation Action 1</b>	<b>Evaluate sheltering-in-place capabilities for all persons within Village Limits</b>
Hazard(s) Addressed:	All hazards, particularly Winter Storms
Category:	Public Information and Awareness
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Town Manager, Town Council, Town Police Department
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	<b>COMPLETED in 2005.</b> The Town uses the County's ordinance which has been updated since 2004.

<b>Sugar Mountain Mitigation Action 2</b>	<b>Evaluate action plan for snow removal of roadways and parking areas</b>
Hazard(s) Addressed:	Winter Storm
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Mayor and Town Council, Town Maintenance Department
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	<b>COMPLETED in 2006.</b> In addition to a snow removal plan, the Town also has new equipment now.

<b>Sugar Mountain Mitigation Action 3</b>	<b>Evaluate wildfire preparedness (including the consideration of impacts to present and future buildings and infrastructure)</b>
Hazard(s) Addressed:	Wildfire
Category:	Natural Resource Protection, Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council, Town Manager
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	Action completed in 2005. The Town continues to work with the North Carolina Forest Service through close coordination with the County Forester.

**McDowell County Completed Mitigation Actions**

<b>McDowell County Mitigation Action 2</b>	<b>Develop a policy to minimize public services to proposed new structures that will be located in 100-year floodplain areas.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	McDowell County Planning and Zoning
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	<b>COMPLETED.</b> The 2008 update to the floodplain ordinance places restrictions on buildings in flood prone areas. There is no plan to implement any additional policies to minimize public services to structures in the floodplain.

<b>McDowell County Mitigation Action 3</b>	<b>Update the Floodplain Ordinance to raise the minimum flood protection level.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	McDowell County Planning and Zoning
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Implementation Notes:	<b>COMPLETED in October 2008.</b> McDowell County requires development in the floodplain be built 1 foot above the base flood elevation.

<b>McDowell County Mitigation Action 4</b>	<b>Update the Subdivision Ordinance by reviewing and incorporating hazard mitigation objectives.</b>
Hazard(s) Addressed:	All
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Minimal
Potential Funding Sources:	Local Funds
Lead Agency/Department Responsible:	McDowell County Planning and Zoning
Implementation Notes:	<b>COMPLETED.</b> McDowell County adopted subdivision rules (through a Subdivision Ordinance) in 2007. Hazard mitigation objectives were taken into consideration during this process. One of the stated purposes of the ordinance is to “reduce the danger to health or peril from flood, erosion, or water pollution.” Further, the ordinance limits the steepness of streets specifically to reduce the risk of landslides and landslide affects (injury, blocked roads, etc).



<b>McDowell County Mitigation Action 5</b>	<b>Review and revise the Planning Ordinance to allow for clustering of residential lots.</b>	
Hazard(s) Addressed:	Flood	
Category:	Prevention	
Priority (High, Moderate, Low):	Moderate	
Lead Agency/Department Responsible:	McDowell County Planning and Zoning	
Estimated Cost:	Minimal	
Potential Funding Sources:	Local Funds	
Implementation Notes: COMPLETED	<b>COMPLETED in 2007.</b> McDowell County Subdivision Ordinance (updated in 2007) allows for clustering of lots if certain criteria are met.	

<b>McDowell County Mitigation Action 6</b>	<b>Revise and update the regulatory floodplain maps.</b>	
Hazard(s) Addressed:	Flood	
Category:	Public Information	
Priority (High, Moderate, Low):	High	
Lead Agency/Department Responsible:	McDowell County Planning and Zoning	
Estimated Cost:	unknown	
Potential Funding Sources:	Federal/State Funds	
Implementation Notes: COMPLETED	<b>COMPLETED.</b> McDowell County in adopted a new FIRM in October 2008.	

**Mitchell County Completed Mitigation Actions**

<b>Mitchell County Mitigation Action 7</b>	<b>Extend zoning to the unincorporated areas of the county.</b>
Hazard(s) Addressed:	Multiple
Category:	Prevention
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Board of Commissions
Estimated Cost:	Minimal
Potential Funding Sources:	Local
Implementation Notes:	Completed: A Floodplain Ordinance and Watershed zoning ordinance are in place. They are the only zoning-related ordinances in the county. No other zoning ordinances are being considered by the Board at this time.

<b>Mitchell County Mitigation Action 8</b>	<b>Revise zoning ordinance to take into account structures damaged by hazards in non-conforming use provisions.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Building Inspections (floodplain manager)
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Implementation Notes:	Completed: Although there is no zoning ordinance in the county, the county floodplain ordinance covers this action. Further, it is a state requirement to not rebuild once a hazard has been substantially damaged while in a floodplain.

<b>Mitchell County Mitigation Action 9</b>	<b>Write more specific criteria in the subdivision regulations for flood damage minimization.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections (floodplain manager)
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Implementation Notes:	Completed: Although no subdivision ordinance exists, the recently updated floodplain ordinance sought to minimize flood damage by requiring set-backs and adhering to state and federal flood regulations.

<b>Mitchell County Mitigation Action 12</b>	<b>Develop setback requirements in hazard zones.</b>
Hazard(s) Addressed:	Multiple
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Implementation Notes:	<b>COMPLETED:</b> Set-backs are required in the county by the recently updated floodplain ordinance.

<b>Mitchell County Mitigation Action 16</b>	<b>Develop an open space preservation plan that plans for further recreational areas in different locations</b>
Hazard(s) Addressed:	Multiple
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners
Estimated Cost:	\$25,000
Potential Funding Sources:	State Grant
Implementation Notes:	<b>COMPLETED:</b> The county completed a master recreation plan that identifies potential green space and preserves existing green space areas in the county.

<b>Mitchell County Mitigation Action 17</b>	<b>Integrate open space preservation plan into the comprehensive plan to combine need for recreational area with unused land due to potential hazards (i.e. floodplain).</b>
Hazard(s) Addressed:	Multiple
Category:	Prevention
Priority (High, Moderate, Low):	Low
Lead Agency/Department Responsible:	Board of Commissions
Estimated Cost:	Minimal
Potential Funding Sources:	Local funds
Implementation Notes:	<b>COMPLETED:</b> The county does not have a comprehensive plan in place at this time. The intention of this action, to preserve unused floodplain land as recreation space, is completed through the county's master recreation plan.

<b>Mitchell County Mitigation Action 24</b>	<b>Evaluate the relocation/elevation/flood proofing needs of all critical public structures or facilities within the floodplain and implement necessary improvements.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Notes:	<b>COMPELTED:</b> All of the critical buildings in the county have been relocated out of the floodplain or elevated and the floodplain ordinance prohibits building future buildings in the floodplain.

<b>Mitchell County Mitigation Action 25</b>	<b>Minimize placing new critical public facilities within the floodplain, unless they promote an overriding public benefit, will not worsen hazard risk, will not directly promote development in floodplains, and are designed to withstand flood damage.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Board of Commissioners, Building Inspections
Estimated Cost:	Unknown
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Notes:	<b>COMPELTED:</b> All of the critical buildings in the county have been removed from known hazard areas.

<b>Mitchell County Mitigation Action 27</b>	<b>Remap the entire floodplain to properly align existing small scale FIRM maps that approximate floodplain boundaries with larger scale, detailed maps in order to provide detailed flood hazard information.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Building Inspections, state
Estimated Cost:	Unknown
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Notes:	<b>COMPLETED:</b> Following Floyd and under Risk Map, all floodplain maps in the county were converted to Digital FIRM (DFIRM) maps.

<b>Mitchell County Mitigation Action 29</b>	<b>Adopt countywide zoning or adopt zoning in floodplain areas to better control future development in these hazard susceptible areas.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Inspections
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, State, and Local Funding Sources
Implementation Notes:	<b>COMPLETED:</b> This action is completed through the county floodplain ordinance by not permitting development in such areas. There is no countywide zoning.

<b>Mitchell County Mitigation Action 30</b>	<b>Set up centralized, coordinated permitting process, including effective filing/permitting system to ensure compliance with floodplain regulations. Count building improvements cumulatively (maintain permit history so when cumulative improvements equal 50% of building value, (substantial improvement) building must be brought up to flood protection standards for new construction). Goal to eventually have all flood hazard endangered buildings brought up to flood protection standards.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Building Inspections
Estimated Cost:	unknown
Potential Funding Sources:	Local Funding Sources
Implementation Notes:	<b>Completed to date:</b> A system is in place (inner-gov) that allows maps and permits of the entire county to be viewed online. A floodplain layer is included to ensure compliance.

<b>Mitchell County Mitigation Action 49</b>	<b>Complete a Natural Resource Protection Plan</b>
Hazard(s) Addressed:	Multiple
Category:	Natural Resource Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	US Forestry Service, NC Forestry Commission
Estimated Cost:	25,000
Potential Funding Sources:	State and local sources
Implementation Notes:	<b>COMPLETED:</b> The County completed a Recreation Plan that covers natural areas in the county. The NC Forestry Commission and US Forestry Service manage forests in the area.
Additional Notes:	The county does not have a natural resource protection plan as the forests are mostly under federal protection. Still, it is important to integrate their procedures into the local response procedures to be more efficient in case of an emergency.

Mitchell County Mitigation Action 53	Create a Repetitive Loss Plan that identifies repetitive loss structures and mitigation measures
Hazard(s) Addressed:	Multiple
Category:	Structural Project
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	NFIP, NCEM, Board of Commissioners, Building Inspections
Estimated Cost:	Unknown
Potential Funding Sources:	Federal, state, and private sources
Implementation Notes:	Completed: The county's floodplain management plan identifies the six properties totaling 15 losses in the county (completed with federal information from the NFIP). The county has commitment to reducing flood losses and will acquire repetitive loss properties as the opportunity arises.
Additional Notes:	It is very frequent that a part of the losses suffered through different disasters happens in specific places; places that are vulnerable for different reasons (i.e. location, construction or other specific reason) and will continue to endure loss unless taken care of. A plan identifying these structures should be made and their specific reasons should be investigated. From that analysis, the county can decide on a method to mitigate loss for them. A repetitive loss plan is probably one of the best, quickest and most guaranteed methods of mitigation as it deals directly with a recurring problem.

Mitchell County Mitigation Action 61	Identify Assembly Points
Hazard(s) Addressed:	Multiple
Category:	Public Information
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Planning with support from the Office of Emergency Management
Estimated Cost:	Minimal
Potential Funding Sources:	Federal, state, and private sources
Implementation Notes:	<p>Completed: County officials (and appropriate officials from each locations) have completed identified assembly points for each high school (through the safe schools program), Hospital, and Unimen (a local business with hazardous materials on site). No additional assembly points have been identified. This may be revisited in the future if needed.</p>
Additional Notes:	<p>The concept of assembly point differs from emergency shelter in the way that they are for a short period of time. The aim here is to take people away from danger as quick as possible and to account for them. An assembly point is generally in open air, at a location that can be reached easily, away from different potential source of dangers and big enough to contain large number of people for a short time period. These can be indicated by a simple painted sign on the ground but should be publicized. They can be used in residential areas prone to earthquake or wild fire and people would meet there first to account for the community and possible missing persons needing to be rescued. They would then either proceed back to their job/home/etc or go to a shelter/hospital for further care.</p> <p>The essential issue in assembly points is to extract as many people as quick as possible from the danger zone by gathering them in predefined locations, account for them and make preliminary assessment of the situation's gravity. Each assembly point should be assigned a supervisor that is living or working in that region and knows the community at a certain extent.</p> <p>Assembly points can be a safe spot away from buildings, a recreational area or a park. Places that have other purposes in everyday use. And they need not to be everywhere but, rather where high concentration of people occur (downtown area, mobile home park, schools, etc).</p>

<b>Mitchell County Mitigation Action 65</b>	<b>Designate volunteer local coordinators in small communities that do not have a Fire or Police station.</b>
Hazard(s) Addressed:	Multiple
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management Office with support from the Board of Commissioners
Estimated Cost:	unknown
Potential Funding Sources:	Federal, state, local and private sources
Additional Notes:	These individuals would be contact points and possibly information dissemination agents who would be used in case of an emergency that is overwhelming local response capacity.

<b>Mitchell County Mitigation Action 66</b>	<b>The local Emergency Management Office should also develop Mutual Agreements of Understanding (MOU) with neighboring counties and regional organizations so that they can plan ahead to strengthen the regional capability at once.</b>
Hazard(s) Addressed:	Multiple
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Emergency Management Office with support from the Board of Commissioners
Estimated Cost:	None
Potential Funding Sources:	Federal, state, and private sources
Implementation Notes:	<b>COMPLETED:</b> there are statewide MOUs as well as in Mitchell County and the municipalities.
Additional Notes:	Such a dialogue would permit them to plan for an efficient and effective use of funding available (i.e. avoid equipment duplication) and increase the overall response capacity of the region.



### Yancey County Completed Mitigation Actions

<b>Yancey County Mitigation Action 1</b>	<b>Purchase and install a generator for use at the Yancey County Emergency Operations Center.</b>
Hazard(s) Addressed:	Winter Storms, Flood, Severe Thunderstorms and Tornadoes, Hurricanes and Tropical Storms, and Other Hazards
Category:	Emergency Services
Priority (High, Moderate, Low):	High
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	\$17,000
Potential Funding Sources:	A grant has been applied for through North Carolina Emergency Management (Mitigation Section) — status of funding is pending
Implementation Notes:	Completed in 2011. The generator has been purchased and installed.

<b>Yancey County Mitigation Action 5</b>	<b>Preservation of vital governmental records (such as those located in the Yancey County Register of Deeds Office) by ensuring that records are kept in areas of buildings not subject flooding, in areas of buildings away from glass windows, in locked cabinets to prevent tipping and damage, or by storing duplicate records at locations in low risk areas.</b>
Hazard(s) Addressed:	Flood, Hurricanes and Tropical Storms, Severe Thunderstorms and Tornadoes, Earthquakes, Winter Storms, Other Hazards
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Undetermined
Potential Funding Sources:	Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Department of Homeland Security funds
Implementation Notes:	COMPLETED in 2011: Vital government record has been secured in the register of deeds office by eliminating windows in the room and proper maintenance of the records vault.

<b>Yancey County Mitigation Action 7</b>	<b>Install a brochure rack in the Yancey County Courthouse to hold FEMA, American Red Cross, and other free disaster-related publications for use by the public.</b>
Hazard(s) Addressed:	Flood, Hurricanes and Tropical Storms, Severe Thunderstorms and Tornadoes, Earthquakes, Winter Storms, Other Hazards
Category:	Public Information and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Less than \$500 for the installation of the brochure rack. All publications distributed will be those available at no cost.
Potential Funding Sources:	Internal funds
Implementation Notes:	The brochure rack was installed in 2005 and is kept stocked with disaster-related publications that are free of charge for the public.

<b>Yancey County Mitigation Action 8</b>	<b>Reinforce repeater sites and other communications towers and antennas to withstand greater winds, lightning strikes, and ice storms.</b>
Hazard(s) Addressed:	Flood, Hurricanes and Tropical Storms, Severe Thunderstorms and Tornadoes, Earthquakes, Winter Storms, Other Hazards
Category:	Property Protection/Emergency Services
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Undetermined
Potential Funding Sources:	Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Department of Homeland Security funds
Implementation Notes:	Completed in 2004. All equipment was placed in racks strapped to roof and walls and ice bridges were installed on the towers.

<b>Yancey County Mitigation Action 13</b>	<b>Implement enhance security measures at the new EMS facility</b>
Hazard(s) Addressed:	Civil Disruption/ Disobedience
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management and the LEPC
Estimated Cost:	\$10,000
Potential Funding Sources:	Department of Homeland Security funds
Implementation Notes:	Completed in 2004. Electronic door locks, intercom system, and key card entry were installed.

**Town of Burnsville Completed Mitigation Actions**

<b>Town of Burnsville Mitigation Action 2</b>	<b>Install a brochure rack in the Town of Burnsville Town Hall to hold FEMA, American Red Cross, and other free disaster-related publications for use by the public.</b>
Hazard(s) Addressed:	Flood, Hurricanes and Tropical Storms, Severe Thunderstorms and Tornadoes, Earthquakes, Winter Storms, Other Hazards
Category:	Public Information and Awareness
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management
Estimated Cost:	Less than \$500 for the installation of the brochure rack. All publications distributed will be those available at no cost.
Potential Funding Sources:	Internal funds
Implementation Notes:	The brochure rack was installed in 2005 and is kept stocked with disaster-related publications that are free of charge for the public.

<b>Town of Burnsville Mitigation Action 3</b>	<b>Evaluate and enhance as necessary the Town of Burnsville Flood Damage Prevention Ordinance, in part to ensure that the ordinance continues to address new buildings and infrastructure.</b>
Hazard(s) Addressed:	Flood
Category:	Prevention
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Town Council
Estimated Cost:	Internal administrative costs only
Potential Funding Sources:	General funds
Implementation Notes:	Action completed. Burnsville joined the National Flood Insurance Program in 1984 and adopted a Flood Prevention Ordinance then. This Ordinance was updated in 1992 and then again in 2009 which is still current. The Town has always elected to adopt North Carolina's model ordinance without modifications. At this time, Burnsville does not anticipate making any changes to the floodplain ordinance in the future.

<b>Town of Burnsville Mitigation Action 4</b>	<b>Implement enhanced security measures at the Burnsville Town Hall to include security cameras and recorders.</b>
Hazard(s) Addressed:	Civil Disruption/ Disobedience
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management and the LEPC
Estimated Cost:	\$5,000
Potential Funding Sources:	Department of Homeland Security funds
Implementation Notes:	Completed in 2005 with installation of enhanced exterior lighting, controlled access to all interior offices, video surveillance. In addition, the Town has adopted and posted an emergency action plan for the building.

<b>Town of Burnsville Mitigation Action 5</b>	<b>Implement enhanced security measures at the Burnsville water treatment plant to include security cameras and recorders.</b>
Hazard(s) Addressed:	Civil Disruption/ Disobedience
Category:	Property Protection
Priority (High, Moderate, Low):	Moderate
Lead Agency/Department Responsible:	Yancey County Emergency Management and the LEPC
Estimated Cost:	\$5,000
Potential Funding Sources:	Department of Homeland Security funds
Implementation Notes:	Completed in 2005 with installation of a secure fence around the entire perimeter and video surveillance with controlled access.

# Appendix F: NCDC Storm Event Data

This section of the Plan includes the historic storm event data as reported to the National Climatic Data Center.

NCDC Drought  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5661148	YANCEY (ZONE)	7/1/1998	Drought	0	0	0	0	GOVT OFFICIAL
5661121	AVERY (ZONE)	7/1/1998	Drought	0	0	0	0	GOVT OFFICIAL
5661139	MITCHELL (ZONE)	7/1/1998	Drought	0	0	0	0	GOVT OFFICIAL
5672300	YANCEY (ZONE)	10/1/1998	Drought	0	0	0	0	NEWSPAPER
5672291	MITCHELL (ZONE)	10/1/1998	Drought	0	0	0	0	NEWSPAPER
5672273	AVERY (ZONE)	10/1/1998	Drought	0	0	0	0	NEWSPAPER
5677156	AVERY (ZONE)	11/1/1998	Drought	0	0	0	0	NEWSPAPER
5677183	YANCEY (ZONE)	11/1/1998	Drought	0	0	0	0	NEWSPAPER
5677174	MITCHELL (ZONE)	11/1/1998	Drought	0	0	0	0	NEWSPAPER
5714244	AVERY (ZONE)	8/1/1999	Drought	0	0	0	0	NEWSPAPER
5714262	MITCHELL (ZONE)	8/1/1999	Drought	0	0	0	0	NEWSPAPER
5714271	YANCEY (ZONE)	8/1/1999	Drought	0	0	0	0	NEWSPAPER
5716873	AVERY (ZONE)	9/1/1999	Drought	0	0	0	0	NEWSPAPER
5716900	YANCEY (ZONE)	9/1/1999	Drought	0	0	0	0	NEWSPAPER
5716891	MITCHELL (ZONE)	9/1/1999	Drought	0	0	0	0	NEWSPAPER
5722228	AVERY (ZONE)	10/1/1999	Drought	0	0	0	0	NEWSPAPER
5722255	YANCEY (ZONE)	10/1/1999	Drought	0	0	0	0	NEWSPAPER
5722246	MITCHELL (ZONE)	10/1/1999	Drought	0	0	0	0	NEWSPAPER
5170640	YANCEY (ZONE)	8/1/2000	Drought	0	0	0	0	NEWSPAPER
5170322	AVERY (ZONE)	8/1/2000	Drought	0	0	0	0	NEWSPAPER
5170340	MITCHELL (ZONE)	8/1/2000	Drought	0	0	0	0	NEWSPAPER
5175092	MITCHELL (ZONE)	9/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5174603	AVERY (ZONE)	9/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5175101	YANCEY (ZONE)	9/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5161803	YANCEY (ZONE)	10/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5158015	MITCHELL (ZONE)	10/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5157997	AVERY (ZONE)	10/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5160005	MITCHELL (ZONE)	11/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5159527	AVERY (ZONE)	11/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5160014	YANCEY (ZONE)	11/1/2000	Drought	0	0	0	0	GOVT OFFICIAL
5232477	MITCHELL (ZONE)	2/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5232378	AVERY (ZONE)	2/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5232486	YANCEY (ZONE)	2/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5237688	MITCHELL (ZONE)	3/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5237697	YANCEY (ZONE)	3/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5237670	AVERY (ZONE)	3/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5241203	YANCEY (ZONE)	4/1/2001	Drought	0	0	0	0	NEWSPAPER
5241194	MITCHELL (ZONE)	4/1/2001	Drought	0	0	0	0	NEWSPAPER
5241108	AVERY (ZONE)	4/1/2001	Drought	0	0	0	0	NEWSPAPER
5242929	MITCHELL (ZONE)	5/1/2001	Drought	0	0	0	0	NEWSPAPER
5242826	AVERY (ZONE)	5/1/2001	Drought	0	0	0	0	NEWSPAPER
5242938	YANCEY (ZONE)	5/1/2001	Drought	0	0	0	0	NEWSPAPER

NCDC Drought  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5266773	AVERY (ZONE)	8/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5266790	MITCHELL (ZONE)	8/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5266799	YANCEY (ZONE)	8/1/2001	Drought	0	0	0	0	OFFICIAL NWS OBS.
5272842	AVERY (ZONE)	11/1/2001	Drought	0	0	0	0	NEWSPAPER
5272869	YANCEY (ZONE)	11/1/2001	Drought	0	0	0	0	NEWSPAPER
5272860	MITCHELL (ZONE)	11/1/2001	Drought	0	0	0	0	NEWSPAPER
5275837	AVERY (ZONE)	12/1/2001	Drought	0	0	0	0	NEWSPAPER
5275863	YANCEY (ZONE)	12/1/2001	Drought	0	0	0	0	NEWSPAPER
5275854	MITCHELL (ZONE)	12/1/2001	Drought	0	0	0	0	NEWSPAPER
5312793	YANCEY (ZONE)	8/1/2002	Drought	0	0	0	0	NEWSPAPER
5314375	AVERY (ZONE)	8/1/2002	Drought	0	0	0	0	NEWSPAPER
5312784	MITCHELL (ZONE)	8/1/2002	Drought	0	0	0	0	NEWSPAPER
36061	MITCHELL (ZONE)	5/1/2007	Drought	0	0	0	0	County Official
36032	AVERY (ZONE)	5/1/2007	Drought	0	0	0	0	County Official
36077	YANCEY (ZONE)	5/1/2007	Drought	0	0	0	0	County Official
36043	EASTERN MCDOWELL (ZONE)	5/1/2007	Drought	0	0	0	0	County Official
36059	MCDOWELL MOUNTAINS (ZONE)	5/1/2007	Drought	0	0	0	0	County Official
45102	MITCHELL (ZONE)	6/1/2007	Drought	0	0	0	0	County Official
45084	EASTERN MCDOWELL (ZONE)	6/1/2007	Drought	0	0	0	0	County Official
45071	AVERY (ZONE)	6/1/2007	Drought	0	0	0	0	County Official
45114	YANCEY (ZONE)	6/1/2007	Drought	0	0	0	0	County Official
45100	MCDOWELL MOUNTAINS (ZONE)	6/1/2007	Drought	0	0	0	0	County Official
50506	MITCHELL (ZONE)	7/1/2007	Drought	0	0	0	0	County Official
50491	EASTERN MCDOWELL (ZONE)	7/1/2007	Drought	0	0	0	0	County Official
50515	YANCEY (ZONE)	7/1/2007	Drought	0	0	0	0	County Official
50484	AVERY (ZONE)	7/1/2007	Drought	0	0	0	0	County Official
50504	MCDOWELL MOUNTAINS (ZONE)	7/1/2007	Drought	0	0	0	0	County Official
58172	YANCEY (ZONE)	8/1/2007	Drought	0	0	0	0	County Official
58148	EASTERN MCDOWELL (ZONE)	8/1/2007	Drought	0	0	0	0	County Official
58140	AVERY (ZONE)	8/1/2007	Drought	0	0	0	0	County Official
58161	MCDOWELL MOUNTAINS (ZONE)	8/1/2007	Drought	0	0	0	0	County Official
58163	MITCHELL (ZONE)	8/1/2007	Drought	0	0	0	0	County Official
60949	MCDOWELL MOUNTAINS (ZONE)	9/1/2007	Drought	0	0	0	0	County Official
60962	YANCEY (ZONE)	9/1/2007	Drought	0	0	0	0	County Official
60936	EASTERN MCDOWELL (ZONE)	9/1/2007	Drought	0	0	0	0	County Official
60928	AVERY (ZONE)	9/1/2007	Drought	0	0	0	0	County Official
60951	MITCHELL (ZONE)	9/1/2007	Drought	0	0	0	0	County Official
64528	EASTERN MCDOWELL (ZONE)	10/1/2007	Drought	0	0	0	0	County Official
64545	MITCHELL (ZONE)	10/1/2007	Drought	0	0	0	0	County Official
64520	AVERY (ZONE)	10/1/2007	Drought	0	0	0	0	County Official
64554	YANCEY (ZONE)	10/1/2007	Drought	0	0	0	0	County Official
64541	MCDOWELL MOUNTAINS (ZONE)	10/1/2007	Drought	0	0	0	0	County Official

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66022	EASTERN MCDOWELL (ZONE)	11/1/2007	Drought	0	0	0	0	County Official
66037	MITCHELL (ZONE)	11/1/2007	Drought	0	0	0	0	County Official
66046	YANCEY (ZONE)	11/1/2007	Drought	0	0	0	0	County Official
66035	MCDOWELL MOUNTAINS (ZONE)	11/1/2007	Drought	0	0	0	0	County Official
66013	AVERY (ZONE)	11/1/2007	Drought	0	0	0	0	County Official
71401	MITCHELL (ZONE)	12/1/2007	Drought	0	0	0	0	County Official
71386	EASTERN MCDOWELL (ZONE)	12/1/2007	Drought	0	0	0	0	County Official
71378	AVERY (ZONE)	12/1/2007	Drought	0	0	0	0	County Official
71399	MCDOWELL MOUNTAINS (ZONE)	12/1/2007	Drought	0	0	0	0	County Official
71410	YANCEY (ZONE)	12/1/2007	Drought	0	0	0	0	County Official
76605	YANCEY (ZONE)	1/1/2008	Drought	0	0	0	0	County Official
76581	EASTERN MCDOWELL (ZONE)	1/1/2008	Drought	0	0	0	0	County Official
76596	MITCHELL (ZONE)	1/1/2008	Drought	0	0	0	0	County Official
76573	AVERY (ZONE)	1/1/2008	Drought	0	0	0	0	County Official
76594	MCDOWELL MOUNTAINS (ZONE)	1/1/2008	Drought	0	0	0	0	County Official
121550	AVERY (ZONE)	6/1/2008	Drought	0	0	0	0	County Official
121582	YANCEY (ZONE)	6/1/2008	Drought	0	0	0	0	County Official
121571	MCDOWELL MOUNTAINS (ZONE)	6/1/2008	Drought	0	0	0	0	County Official
121558	EASTERN MCDOWELL (ZONE)	6/1/2008	Drought	0	0	0	0	County Official
121573	MITCHELL (ZONE)	6/1/2008	Drought	0	0	0	0	County Official
128202	AVERY (ZONE)	7/1/2008	Drought	0	0	0	0	County Official
128234	YANCEY (ZONE)	7/1/2008	Drought	0	0	0	0	County Official
128210	EASTERN MCDOWELL (ZONE)	7/1/2008	Drought	0	0	0	0	County Official
128225	MITCHELL (ZONE)	7/1/2008	Drought	0	0	0	0	County Official
128223	MCDOWELL MOUNTAINS (ZONE)	7/1/2008	Drought	0	0	0	0	County Official
132649	YANCEY (ZONE)	8/1/2008	Drought	0	0	0	0	Newspaper
132625	EASTERN MCDOWELL (ZONE)	8/1/2008	Drought	0	0	0	0	Newspaper
132617	AVERY (ZONE)	8/1/2008	Drought	0	0	0	0	Newspaper
132640	MITCHELL (ZONE)	8/1/2008	Drought	0	0	0	0	Newspaper
132638	MCDOWELL MOUNTAINS (ZONE)	8/1/2008	Drought	0	0	0	0	Newspaper
135750	MITCHELL (ZONE)	9/1/2008	Drought	0	0	0	0	County Official
135748	MCDOWELL MOUNTAINS (ZONE)	9/1/2008	Drought	0	0	0	0	County Official
135760	YANCEY (ZONE)	9/1/2008	Drought	0	0	0	0	County Official
135727	AVERY (ZONE)	9/1/2008	Drought	0	0	0	0	County Official
135735	EASTERN MCDOWELL (ZONE)	9/1/2008	Drought	0	0	0	0	County Official
138479	YANCEY (ZONE)	10/1/2008	Drought	0	0	0	0	County Official
138466	EASTERN MCDOWELL (ZONE)	10/1/2008	Drought	0	0	0	0	County Official
138460	AVERY (ZONE)	10/1/2008	Drought	0	0	0	0	County Official
138477	MCDOWELL MOUNTAINS (ZONE)	10/1/2008	Drought	0	0	0	0	County Official
138478	MITCHELL (ZONE)	10/1/2008	Drought	0	0	0	0	County Official
142099	MCDOWELL MOUNTAINS (ZONE)	11/1/2008	Drought	0	0	0	0	County Official
142096	AVERY (ZONE)	11/1/2008	Drought	0	0	0	0	County Official

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142095	MITCHELL (ZONE)	11/1/2008	Drought	0	0	0	0	County Official
142104	EASTERN MCDOWELL (ZONE)	11/1/2008	Drought	0	0	0	0	County Official
142094	YANCEY (ZONE)	11/1/2008	Drought	0	0	0	0	County Official



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10087520	YANCEY CO.		6/10/1969	1500	Hail	2.5	0	0	0	0	
10088079	AVERY CO.		6/3/1971	1300	Hail	1.5	0	0	0	0	
10090944	MCDOWELL CO.		6/20/1974	1300	Hail	0.75	0	0	0	0	
10087685	AVERY CO.		12/18/1977	130	Hail	0.75	0	0	0	0	
10089979	MCDOWELL CO.		6/16/1980	1500	Hail	1.75	0	0	0	0	
10089053	MITCHELL CO.		6/5/1985	1710	Hail	0.88	0	0	0	0	
10089055	AVERY CO.		6/5/1985	1715	Hail	0.75	0	0	0	0	
10090194	MITCHELL CO.		6/7/1985	1315	Hail	0.75	0	0	0	0	
10090197	AVERY CO.		6/7/1985	1325	Hail	1	0	0	0	0	
10090198	MCDOWELL CO.		6/7/1985	1325	Hail	1.75	0	0	0	0	
10087962	MCDOWELL CO.		7/10/1985	1715	Hail	0.75	0	0	0	0	
10089085	YANCEY CO.		4/23/1988	1355	Hail	0.75	0	0	0	0	
10088300	YANCEY CO.		7/17/1988	1420	Hail	0.75	0	0	0	0	
10091647	AVERY CO.		4/27/1989	1600	Hail	1.75	0	0	0	0	
10087300	MCDOWELL CO.		6/5/1989	1200	Hail	1.75	0	0	0	0	
10087356	MCDOWELL CO.		8/21/1990	1300	Hail	0.75	0	0	0	0	
5550376	MITCHELL CO.	SPRUCE PINE	5/5/1996	1910	Hail	0.75	0	0	0	0	
5550377	AVERY CO.	INGALLS	5/5/1996	1915	Hail	1.75	0	0	0	0	
5550562	MCDOWELL CO.	MARION	5/25/1996	1544	Hail	1	0	0	0	0	
5566173	MITCHELL CO.	SPRUCE PINE	8/22/1996	1610	Hail	0.75	0	0	0	0	
5594137	AVERY CO.	BANNER ELK	3/5/1997	1625	Hail	0.75	0	0	0	0	
5594138	AVERY CO.	GRANDFATHER MOUNTAIN	3/5/1997	1632	Hail	0.75	0	0	0	0	
5603181	MCDOWELL CO.	MARION	6/2/1997	502	Hail	1	0	0	0	0	
5603182	MCDOWELL CO.	MARION	6/2/1997	523	Hail	2	0	0	2000000	0	
5603192	AVERY CO.	HUGHES	6/2/1997	700	Hail	1	0	0	0	0	
5608989	MCDOWELL CO.	MARION	7/4/1997	1915	Hail	0.88	0	0	0	0	
5619183	AVERY CO.	BANNER ELK	9/11/1997	1220	Hail	1.5	0	0	0	0	
5638503	AVERY CO.	NEWLAND	3/20/1998	945	Hail	0.75	0	0	0	0	
5646311	AVERY CO.	NEWLAND	5/7/1998	1503	Hail	0.88	0	0	0	0	
5646315	YANCEY CO.	BURNSVILLE	5/7/1998	1527	Hail	1.75	0	0	0	0	
5646435	AVERY CO.	LINVILLE	5/7/1998	1550	Hail	0.75	0	0	0	0	
5646557	YANCEY CO.	BURNSVILLE	5/7/1998	2115	Hail	1	0	0	0	0	
5651561	MITCHELL CO.	SPRUCE PINE	5/7/1998	2137	Hail	0.88	0	0	0	0	LAW ENFORCEMENT
5646558	AVERY CO.	INGALLS	5/7/1998	2137	Hail	0.88	0	0	0	0	
5646559	AVERY CO.	CROSSNORE	5/7/1998	2152	Hail	1	0	0	0	0	
5646567	MCDOWELL CO.	MARION	5/26/1998	1643	Hail	0.75	0	0	0	0	
5646701	MCDOWELL CO.	MARION	5/27/1998	1352	Hail	0.75	0	0	0	0	
5651660	YANCEY CO.	BURNSVILLE	6/3/1998	500	Hail	1	0	0	0	0	LAW ENFORCEMENT
5667787	MCDOWELL CO.	OLD FT	9/28/1998	1415	Hail	0.75	0	0	0	0	FIRE DEPT/RESCUE SQUAD
5692236	MCDOWELL CO.	PLEASANT GARDENS	4/27/1999	1548	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5692239	MCDOWELL CO.	MARION	4/27/1999	1637	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5697818	AVERY CO.	NEWLAND	5/13/1999	1905	Hail	1	0	0	0	0	LAW ENFORCEMENT
5712335	YANCEY CO.	BURNSVILLE	7/24/1999	1200	Hail	1	0	0	0	0	GENERAL PUBLIC
5714163	YANCEY CO.	RAMSEYTOWN	8/20/1999	55	Hail	0.75	0	0	0	25000	NEWSPAPER
5714167	MCDOWELL CO.	ASHFORD	8/20/1999	150	Hail	1	0	0	0	0	PARK/FORREST SERVICE
5141725	MCDOWELL CO.	NEBO	4/17/2000	1423	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5141726	MCDOWELL CO.	MARION	4/17/2000	1436	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5141727	AVERY CO.	LINVILLE	4/17/2000	1555	Hail	1	0	0	0	0	TRAINED SPOTTER
5145028	MCDOWELL CO.	OLD FT	5/13/2000	1452	Hail	0.88	0	0	0	0	TRAINED SPOTTER
5145373	MCDOWELL CO.	SUGAR HILL	5/20/2000	1525	Hail	0.75	0	0	0	0	FIRE DEPT/RESCUE SQUAD
5144957	MCDOWELL CO.	MARION	5/24/2000	1641	Hail	1.75	0	0	0	0	GENERAL PUBLIC
5144960	MCDOWELL CO.	MARION	5/24/2000	1650	Hail	1.75	0	0	0	0	LAW ENFORCEMENT
5152245	MCDOWELL CO.	MARION	6/3/2000	1525	Hail	0.75	0	0	0	0	LAW ENFORCEMENT

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5152248	MCDOWELL CO.	MARION	6/14/2000	1147	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5254964	MCDOWELL CO.	OLD FT	6/4/2001	1830	Hail	1	0	0	0	0	GENERAL PUBLIC
5293250	MITCHELL CO.	BULADEAN	4/28/2002	1736	Hail	0.75	0	0	0	0	FIRE DEPT/RESCUE SQUAD
5293251	AVERY CO.	NEWLAND	4/28/2002	1747	Hail	1	0	0	0	0	LAW ENFORCEMENT
5298174	AVERY CO.	LINVILLE	5/27/2002	1145	Hail	1	0	0	0	0	GENERAL PUBLIC
5305567	YANCEY CO.	BURNSVILLE	6/4/2002	1503	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5305568	YANCEY CO.	BUSICK	6/4/2002	1515	Hail	1.75	0	0	0	0	GENERAL PUBLIC
5305569	MCDOWELL CO.	OLD FT	6/4/2002	1520	Hail	0.88	0	0	0	0	EMERGENCY MANAGER
5305577	MCDOWELL CO.	OLD FT	6/4/2002	1626	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5310603	AVERY CO.	LINVILLE	7/2/2002	1615	Hail	0.75	0	0	0	0	GENERAL PUBLIC
5310679	AVERY CO.	MINNEAPOLIS	7/2/2002	1700	Hail	0.75	0	0	0	0	DEPT OF HIGHWAYS
5310684	MITCHELL CO.	BAKERSVILLE	7/2/2002	1720	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5313890	MCDOWELL CO.	PLEASANT GARDENS	8/2/2002	1505	Hail	0.75	0	0	0	0	EMERGENCY MANAGER
5354389	YANCEY CO.	BUSICK	4/30/2003	1405	Hail	1	0	0	0	0	PARK/FOREST SERVICE
5354391	YANCEY CO.	BURNSVILLE	4/30/2003	1440	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5354392	YANCEY CO.	BUSICK	4/30/2003	1515	Hail	1	0	0	0	0	PARK/FOREST SERVICE
5354393	YANCEY CO.	CELO	4/30/2003	1515	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5354462	YANCEY CO.	BUSICK	4/30/2003	1700	Hail	1	0	0	0	0	LAW ENFORCEMENT
5356090	MITCHELL CO.	BAKERSVILLE	5/15/2003	1450	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5356091	MITCHELL CO.	LEDGER	5/15/2003	1510	Hail	1	0	0	0	0	LAW ENFORCEMENT
5356092	AVERY CO.	LINVILLE	5/15/2003	1515	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5356094	MITCHELL CO.	SPRUCE PINE	5/15/2003	1520	Hail	1.75	0	0	0	0	TRAINED SPOTTER
5356093	AVERY CO.	NEWLAND	5/15/2003	1520	Hail	1.75	0	0	0	0	TRAINED SPOTTER
5356095	AVERY CO.	NEWLAND	5/15/2003	1520	Hail	1.75	0	0	0	0	TRAINED SPOTTER
5356097	MCDOWELL CO.	OLD FT	5/15/2003	1525	Hail	1	0	0	0	0	TRAINED SPOTTER
5363273	MCDOWELL CO.	OLD FT	6/8/2003	1734	Hail	1	0	0	0	0	LAW ENFORCEMENT
5363274	AVERY CO.	CROSSNORE	6/8/2003	1740	Hail	0.88	0	0	0	0	LAW ENFORCEMENT
5329533	MCDOWELL CO.	SUGAR HILL	7/12/2003	2105	Hail	0.75	0	0	0	0	EMERGENCY MANAGER
5329752	MCDOWELL CO.	MARION	7/18/2003	1510	Hail	0.88	0	0	0	0	EMERGENCY MANAGER
5374145	MCDOWELL CO.	SUGAR HILL	8/9/2003	1910	Hail	0.75	0	0	0	0	EMERGENCY MANAGER
5403088	MITCHELL CO.	BULADEAN	5/8/2004	1745	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5403089	MCDOWELL CO.	LITTLE SWITZERLAND	5/8/2004	2300	Hail	1.75	0	0	0	0	GENERAL PUBLIC
5403090	MITCHELL CO.	SPRUCE PINE	5/8/2004	2305	Hail	1	0	0	0	0	LAW ENFORCEMENT
5403091	MCDOWELL CO.	MARION	5/8/2004	2315	Hail	1.75	0	0	0	0	TRAINED SPOTTER
5403179	MCDOWELL CO.	MARION	5/19/2004	1548	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5403180	MCDOWELL CO.	ASHFORD	5/19/2004	1655	Hail	0.88	0	0	0	75000	EMERGENCY MANAGER
5403181	AVERY CO.	CROSSNORE	5/21/2004	1523	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5401165	MCDOWELL CO.	MARION	5/23/2004	1335	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5401256	YANCEY CO.	BURNSVILLE	5/26/2004	1810	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5453417	MITCHELL CO.	SPRUCE PINE	5/10/2005	1608	Hail	0.88	0	0	10000	0	TRAINED SPOTTER
5453418	YANCEY CO.	BUSICK	5/10/2005	1620	Hail	0.75	0	0	0	0	PARK/FOREST SERVICE
5453514	MCDOWELL CO.	MARION	5/14/2005	1550	Hail	0.88	0	0	0	0	EMERGENCY MANAGER
5470203	MCDOWELL CO.	MARION	7/27/2005	1840	Hail	0.88	0	0	0	0	PARK/FOREST SERVICE
5472524	AVERY CO.	ELK PARK	8/3/2005	1500	Hail	0.88	0	0	0	0	TRAINED SPOTTER
5472530	AVERY CO.	NEWLAND	8/4/2005	1610	Hail	0.75	0	0	0	0	DEPT OF HIGHWAYS
5502345	YANCEY CO.	BURNSVILLE	4/2/2006	2050	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5502347	AVERY CO.	ELK PARK	4/2/2006	2130	Hail	1	0	0	0	0	DEPT OF HIGHWAYS
5504644	MCDOWELL CO.	MARION	4/3/2006	447	Hail	0.88	0	0	0	0	TRAINED SPOTTER
5504648	MCDOWELL CO.	DYSORTVILLE	4/3/2006	525	Hail	1	0	0	0	0	TRAINED SPOTTER
5503810	MCDOWELL CO.	PLEASANT GARDENS	4/8/2006	328	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5502622	AVERY CO.	NEWLAND	4/19/2006	520	Hail	0.75	0	0	0	0	LAW ENFORCEMENT
5507961	YANCEY CO.	ESKOTA	5/13/2006	1900	Hail	0.75	0	0	0	0	PARK/FOREST SERVICE
5507963	MCDOWELL CO.	MARION	5/13/2006	2006	Hail	0.88	0	0	0	0	TRAINED SPOTTER

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5508029	AVERY CO.	LINVILLE	5/14/2006	1120	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5508136	MITCHELL CO.	BULADEAN	5/18/2006	2002	Hail	0.88	0	0	0	0	TRAINED SPOTTER
5509014	AVERY CO.	ELK PARK	5/30/2006	1431	Hail	0.88	0	0	0	0	DEPT OF HIGHWAYS
5509015	AVERY CO.	BANNER ELK	5/30/2006	1620	Hail	0.75	0	0	0	0	COOP STATION
5509096	MCDOWELL CO.	MARION	5/31/2006	1220	Hail	0.75	0	0	0	0	TRAINED SPOTTER
5509099	MCDOWELL CO.	OLD FT	5/31/2006	1250	Hail	0.75	0	0	0	0	FIRE DEPT/RESCUE SQUAD
5517636	MCDOWELL CO.	MARION	6/2/2006	1223	Hail	0.88	0	0	0	0	TRAINED SPOTTER
5517138	MCDOWELL CO.	MARION	6/11/2006	1433	Hail	0.88	0	0	0	0	GENERAL PUBLIC
5517729	YANCEY CO.	BURNSVILLE	6/23/2006	530	Hail	0.75	0	0	0	0	GENERAL PUBLIC
5516558	MCDOWELL CO.	MARION	6/23/2006	1425	Hail	1.75	0	0	0	0	GENERAL PUBLIC
5524040	MCDOWELL CO.	OLD FT	7/20/2006	1335	Hail	0.75	0	0	0	0	POST OFFICE
5528399	MCDOWELL CO.	SUGAR HILL	8/8/2006	1402	Hail	0.75	0	0	0	0	GENERAL PUBLIC
5534153	MCDOWELL CO.	MARION	9/28/2006	1617	Hail	0.88	0	0	0	0	TRAINED SPOTTER
29273	MCDOWELL CO.	MARION	4/15/2007	1105	Hail	0.75	0	0	0	0	Public
39344	MITCHELL CO.	SPRUCE PINE	6/8/2007	1435	Hail	0.75	0	0	0	0	Public
39345	YANCEY CO.	BURNSVILLE	6/8/2007	1435	Hail	0.75	0	0	0	0	Public
39350	MCDOWELL CO.	MARION	6/8/2007	1450	Hail	1	0	0	0	0	Trained Spotter
39351	MCDOWELL CO.	MARION	6/8/2007	1520	Hail	0.88	0	0	0	0	Trained Spotter
40868	AVERY CO.	NEWLAND	6/12/2007	1345	Hail	0.88	0	0	0	0	County Official
41368	MCDOWELL CO.	MARION	6/23/2007	2050	Hail	0.88	0	0	0	0	County Official
42170	AVERY CO.	LINVILLE	6/26/2007	140	Hail	0.75	0	0	0	0	Trained Spotter
42210	MCDOWELL CO.	OLD FT	6/28/2007	1503	Hail	0.75	0	0	0	0	Public
42215	YANCEY CO.	BURNSVILLE	6/28/2007	1540	Hail	0.75	0	0	0	0	County Official
42222	MCDOWELL CO.	OLD FT	6/29/2007	1345	Hail	0.75	0	0	0	0	Public
57949	AVERY CO.	NEWLAND	8/23/2007	1708	Hail	0.75	0	0	0	0	Trained Spotter
58089	AVERY CO.	INGALLS	8/24/2007	1320	Hail	0.75	0	0	0	0	Law Enforcement
119038	MCDOWELL CO.	OLD FT	6/7/2008	1605	Hail	0.75	0	0	0	0	County Official
119040	MCDOWELL CO.	OLD FT	6/7/2008	1610	Hail	0.75	0	0	0	0	Public
119042	AVERY CO.	NEWLAND	6/7/2008	1702	Hail	0.75	0	0	0	0	Trained Spotter
119052	MITCHELL CO.	BULADEAN	6/9/2008	1600	Hail	0.88	0	0	0	0	CoCoRaHS
119054	AVERY CO.	BANNER ELK	6/9/2008	1605	Hail	2.75	0	0	0	0	Post Office
119063	MITCHELL CO.	BULADEAN	6/9/2008	1642	Hail	0.88	0	0	0	0	Trained Spotter
119064	AVERY CO.	BANNER ELK	6/9/2008	1715	Hail	1	0	0	0	0	Law Enforcement
121227	MITCHELL CO.	BAKERSVILLE	6/22/2008	1200	Hail	0.75	0	0	0	0	Public
121231	MCDOWELL CO.	MARION	6/22/2008	1355	Hail	0.88	0	0	0	0	Public
121234	MCDOWELL CO.	MARION	6/22/2008	1439	Hail	0.75	0	0	0	0	Trained Spotter
121237	MCDOWELL CO.	MARION	6/22/2008	1459	Hail	1	0	0	0	0	Public
121239	MITCHELL CO.	BAKERSVILLE	6/22/2008	1525	Hail	0.75	0	0	0	0	Trained Spotter
121241	YANCEY CO.	GREEN MTN	6/22/2008	1525	Hail	1	0	0	0	0	Public
121395	MITCHELL CO.	SPRUCE PINE	6/26/2008	1405	Hail	1	0	0	0	0	Public
131740	MITCHELL CO.	BULADEAN	8/2/2008	1615	Hail	0.88	0	0	0	0	CoCoRaHS
164307	YANCEY CO.	HAMRICK	4/10/2009	1520	Hail	1	0	0	0	0	COOP Observer
166584	YANCEY CO.	CAVE RIVER	4/24/2009	1740	Hail	0.75	0	0	0	0	Public
181280	MCDOWELL CO.	DAVISTOWN	6/9/2009	1525	Hail	0.75	0	0	0	0	Trained Spotter
181252	MITCHELL CO.	LEDGER	6/9/2009	1627	Hail	1	0	0	0	0	County Official
182183	MCDOWELL CO.	NEBO	6/10/2009	1607	Hail	0.75	0	0	0	0	County Official
182699	MCDOWELL CO.	CROSS MILL	6/10/2009	1708	Hail	0.88	0	0	0	0	Trained Spotter
182725	YANCEY CO.	BURNSVILLE	6/11/2009	1445	Hail	0.88	0	0	0	0	Public
190683	AVERY CO.	NEWLAND	7/20/2009	1740	Hail	0.75	0	0	0	0	County Official
235614	MCDOWELL CO.	DYSORTVILLE	5/28/2010	1645	Hail	0.88	0	0	0	0	Trained Spotter
299086	MCDOWELL CO.	OLD FT	4/9/2011	1435	Hail	1	0	0	0	0	County Official
299099	MCDOWELL CO.	WEST MARION	4/9/2011	1450	Hail	2	0	0	0	0	NWS Employee
299219	AVERY CO.	NEWLAND	4/9/2011	1630	Hail	0.88	0	0	0	0	COOP Observer

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299224	MITCHELL CO.	BAKERSVILLE	4/9/2011	1635	Hail	1.75	0	0	0	0	Emergency Manager
299260	YANCEY CO.	BURNSVILLE	4/9/2011	1725	Hail	1	0	0	0	0	County Official
299307	MCDOWELL CO.	MARION ARPT	4/9/2011	1800	Hail	1.75	0	0	0	0	Trained Spotter
299317	MCDOWELL CO.	EAST MARION	4/9/2011	1802	Hail	2.5	0	0	0	0	Fire Department/Rescue
299319	MCDOWELL CO.	EAST MARION	4/9/2011	1802	Hail	2	0	0	0	0	Public
299562	YANCEY CO.	ESKOTA	4/9/2011	1820	Hail	1.25	0	0	0	0	COOP Observer
299565	MCDOWELL CO.	OLD FT	4/9/2011	1830	Hail	1	0	0	0	0	Trained Spotter
312427	MCDOWELL CO.	OLD FT	5/13/2011	1504	Hail	1.75	0	0	0	0	County Official
312452	MCDOWELL CO.	SUGAR HILL	5/13/2011	1608	Hail	0.75	0	0	0	0	Amateur Radio
317166	MCDOWELL CO.	MARION	5/26/2011	1750	Hail	0.75	0	0	0	0	Trained Spotter
317185	MCDOWELL CO.	MARION	5/26/2011	1858	Hail	0.75	0	0	0	0	Public
319278	MITCHELL CO.	ALTAPASS	6/7/2011	1850	Hail	0.75	0	0	0	0	Fire Department/Rescue
319307	AVERY CO.	PYATTE	6/8/2011	1304	Hail	0.88	0	0	0	0	Trained Spotter
319892	MCDOWELL CO.	PLEASANT GARDENS	6/9/2011	1325	Hail	1	0	0	0	0	Public
319939	MITCHELL CO.	BULADEAN	6/9/2011	1620	Hail	1	0	0	0	0	Trained Spotter
319942	YANCEY CO.	BALD CREEK	6/9/2011	1706	Hail	0.75	0	0	0	0	Trained Spotter
320064	AVERY CO.	NEWLAND	6/10/2011	1414	Hail	1	0	0	0	0	Public
329554	MCDOWELL CO.	NORTH COVE CROSSING	6/21/2011	1442	Hail	1	0	0	0	0	Trained Spotter
331087	MCDOWELL CO.	LITTLE SWITZERLAND	6/28/2011	1339	Hail	0.88	0	0	0	0	Trained Spotter
337612	MCDOWELL CO.	CROSS MILL	7/6/2011	1503	Hail	0.88	0	0	0	0	Trained Spotter
370317	YANCEY CO.	BURNSVILLE	3/2/2012	2055	Hail	0.75	0	0	0	0	County Official
371340	MCDOWELL CO.	WOODLAWN	3/24/2012	1154	Hail	0.75	0	0	0	0	County Official
378120	MCDOWELL CO.	WOODLAWN	4/17/2012	1456	Hail	1.75	0	0	0	0	Public
378121	MCDOWELL CO.	WOODLAWN	4/17/2012	1457	Hail	2	0	0	0	0	Trained Spotter
378542	MITCHELL CO.	BULADEAN	4/27/2012	1610	Hail	1	0	0	0	0	Trained Spotter
378541	AVERY CO.	DARK RIDGE	4/30/2012	1640	Hail	0.75	0	0	0	0	COOP Observer
378543	MITCHELL CO.	GLEN AYRE	4/30/2012	1650	Hail	1	0	0	0	0	Public
378533	AVERY CO.	ROARING CREEK	4/30/2012	1712	Hail	2	0	0	0	0	Fire Department/Rescue
378545	MITCHELL CO.	BULADEAN	4/30/2012	1725	Hail	1	0	0	0	0	Trained Spotter
378547	AVERY CO.	NEWLAND	4/30/2012	1810	Hail	0.75	0	0	0	0	Trained Spotter
378553	YANCEY CO.	BURNSVILLE	4/30/2012	1917	Hail	1	0	0	0	0	CoCoRaHS
378554	MITCHELL CO.	PENLAND	4/30/2012	1938	Hail	1.25	0	0	0	0	Public
383375	MCDOWELL CO.	NEBO	5/1/2012	1345	Hail	1.75	0	0	0	0	Emergency Manager
383752	MCDOWELL CO.	PLEASANT GARDENS	5/1/2012	1557	Hail	0.75	0	0	0	0	Public
383754	MCDOWELL CO.	MARION ARPT	5/1/2012	1653	Hail	1	0	0	0	0	Public
383759	AVERY CO.	LINVILLE	5/2/2012	1640	Hail	1.75	0	0	0	0	Broadcast Media
383760	AVERY CO.	BANNER ELK	5/2/2012	1655	Hail	0.75	0	0	0	0	Broadcast Media
387036	MCDOWELL CO.	NEBO	6/13/2012	2037	Hail	1	0	0	0	0	Public
396300	YANCEY CO.	BURNSVILLE	6/30/2012	1928	Hail	1	0	0	0	0	County Official
397329	MCDOWELL CO.	OLD FT	7/1/2012	1710	Hail	1.5	0	0	0	0	911 Call Center
400506	AVERY CO.	PINEOLA	7/3/2012	1207	Hail	1	0	0	0	0	Public
400507	AVERY CO.	BALM	7/3/2012	1235	Hail	1.25	0	0	0	0	Post Office
400511	MITCHELL CO.	BULADEAN	7/3/2012	1335	Hail	0.75	0	0	0	0	Public
407890	MCDOWELL CO.	SUGAR HILL	8/2/2012	1330	Hail	0.75	0	0	0	0	Public
409157	MCDOWELL CO.	WEST MARION	8/8/2012	1507	Hail	0.75	0	0	0	0	Trained Spotter
409158	MCDOWELL CO.	GLENWOOD	8/8/2012	1530	Hail	1	0	0	0	0	Public
456703	MITCHELL CO.	BAKERSVILLE	5/21/2013	2030	Hail	1	0	0	0	0	County Official
506343	AVERY CO.	NEWLAND	5/12/2014	1540	Hail	0.75	0	0	0	0	Trained Spotter
517580	MITCHELL CO.	BAKERSVILLE	6/4/2014	2015	Hail	1	0	0	0	0	Public
519411	MCDOWELL CO.	NEBO	6/11/2014	1354	Hail	1	0	0	0	0	Broadcast Media
520419	MCDOWELL CO.	DAVISTOWN	6/16/2014	1335	Hail	1	0	0	0	0	Emergency Manager
520420	MCDOWELL CO.	DAVISTOWN	6/16/2014	1335	Hail	0.75	0	0	0	0	Public
522785	MCDOWELL CO.	WHITEHOUSE	6/19/2014	1300	Hail	0.75	0	0	0	0	Fire Department/Rescue

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522800	MCDOWELL CO.	DAVISTOWN	6/19/2014	1625	Hail	1	0	0	0	0	Broadcast Media
523134	MCDOWELL CO.	NEBO	6/20/2014	1825	Hail	0.75	0	0	0	0	Public
523135	MCDOWELL CO.	NEBO	6/20/2014	1825	Hail	0.75	0	0	0	0	Public
525171	AVERY CO.	BALM	7/2/2014	1805	Hail	0.75	0	0	0	0	Public
525172	MCDOWELL CO.	MARION	7/2/2014	1837	Hail	0.88	0	0	0	0	911 Call Center
533907	MCDOWELL CO.	MARION ARPT	8/20/2014	1145	Hail	0.88	0	0	0	0	911 Call Center
533906	MCDOWELL CO.	MARION	8/20/2014	1156	Hail	1	0	0	0	0	Trained Spotter
589588	MCDOWELL CO.	PLEASANT GARDENS	6/17/2015	1448	Hail	0.88	0	0	0	0	Broadcast Media
589589	MCDOWELL CO.	MARION	6/17/2015	1511	Hail	1	0	0	0	0	Trained Spotter
589590	MCDOWELL CO.	FERO	6/17/2015	1538	Hail	1	0	0	0	0	Fire Department/Rescue

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EVENT_ID	CZ_NAME_STR	BEGIN_LOCATION	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5646555	YANCEY CO.	NEWDALE	5/7/1998	1915	Lightning	0	1	0	0	
5714168	MCDOWELL CO.	COUNTYWIDE	8/20/1999	200	Lightning	0	0	0	0	NEWSPAPER
5154389	MITCHELL CO.	BAKERSVILLE	6/25/2000	1300	Lightning	1	5	0	0	NEWSPAPER
5374460	MCDOWELL CO.	MARION	8/4/2003	1630	Lightning	0	2	0	0	NEWSPAPER
5403265	MITCHELL CO.	SPRUCE PINE	5/30/2004	1635	Lightning	0	0	1000	0	EMERGENCY MANAGER
172926	AVERY CO.	MONTEZUMA	5/15/2009	1400	Lightning	0	0	25000	0	Newspaper

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10090885	YANCEY CO.		4/17/1967	1615	Thunderstorm Wind	0	0	0	0	0		
10089202	YANCEY CO.		5/24/1973	1700	Thunderstorm Wind	0	0	0	0	0		
10091018	YANCEY CO.		6/6/1977	1430	Thunderstorm Wind	0	0	0	0	0		
10091022	MCDOWELL CO.		6/6/1977	1445	Thunderstorm Wind	0	0	0	0	0		
10088815	MCDOWELL CO.		2/1/1979	900	Thunderstorm Wind	0	0	0	0	0		
10087932	YANCEY CO.		6/3/1985	244	Thunderstorm Wind	0	0	0	0	0		
10089054	MITCHELL CO.		6/5/1985	1710	Thunderstorm Wind	0	0	0	0	0		
10090196	MITCHELL CO.		6/7/1985	1315	Thunderstorm Wind	0	0	0	0	0		
10090200	MCDOWELL CO.		6/7/1985	1325	Thunderstorm Wind	87	0	0	0	0		
10090201	AVERY CO.		6/7/1985	1325	Thunderstorm Wind	51	0	0	0	0		
10087274	YANCEY CO.		5/26/1989	2043	Thunderstorm Wind	0	0	0	0	0		
10088385	MCDOWELL CO.		6/12/1989	1520	Thunderstorm Wind	0	0	0	0	0		
10089596	MCDOWELL CO.		4/9/1991	1600	Thunderstorm Wind	0	0	0	0	0		
10089600	MCDOWELL CO.		4/9/1991	1710	Thunderstorm Wind	0	0	0	0	0		
10087239	MCDOWELL CO.		6/4/1992	1500	Thunderstorm Wind	0	0	0	0	0		
10090753	MCDOWELL CO.		7/5/1992	2030	Thunderstorm Wind	0	0	0	0	0		
10090811	AVERY CO.		8/27/1992	2300	Thunderstorm Wind	0	0	0	0	0		
10338429	MITCHELL CO.	Spruce Pine	7/16/1995	1430	Thunderstorm Wind	0	0	0	0	0		
10338441	MITCHELL CO.	Guilford	7/16/1995	1500	Thunderstorm Wind	0	0	0	0	0		
10338442	MITCHELL CO.	Davidson	7/16/1995	1505	Thunderstorm Wind	0	0	0	0	0		
10338548	AVERY CO.	Randolph	7/16/1995	1550	Thunderstorm Wind	0	0	0	0	0		
10338412	MCDOWELL CO.	Pleasant Garden	7/25/1995	2030	Thunderstorm Wind	0	0	0	0	0		
10338413	MCDOWELL CO.	Marion	8/11/1995	1525	Thunderstorm Wind	0	0	0	5000	0		
5567850	MCDOWELL CO.	MARION	7/14/1996	1340	Thunderstorm Wind	50	0	0	0	0		
5566005	MCDOWELL CO.	MARION	8/16/1996	1500	Thunderstorm Wind	50	0	0	0	0		
5566174	MITCHELL CO.	PENLAND	8/22/1996	1610	Thunderstorm Wind	50	0	0	0	0		
5594133	YANCEY CO.	BURNSVILLE	3/5/1997	1600	Thunderstorm Wind	50	0	0	0	0		
5594135	MITCHELL CO.	BULADEAN	3/5/1997	1612	Thunderstorm Wind	50	0	0	0	0		
5594136	AVERY CO.	BANNER ELK	3/5/1997	1625	Thunderstorm Wind	50	0	0	0	0		
5608985	MCDOWELL CO.	OLD FT	7/4/1997	1852	Thunderstorm Wind	50	0	0	0	0		
5608988	MCDOWELL CO.	MARION	7/4/1997	1915	Thunderstorm Wind	50	0	0	0	0		
5608990	AVERY CO.	INGALLS	7/4/1997	1915	Thunderstorm Wind	50	0	0	0	0		
5609237	MCDOWELL CO.	SUGAR HILL	7/28/1997	1330	Thunderstorm Wind	50	0	0	0	0		
5610716	MCDOWELL CO.	MARION	8/4/1997	1700	Thunderstorm Wind	50	0	0	10000	0		
5610725	AVERY CO.	BANNER ELK	8/17/1997	1713	Thunderstorm Wind	50	0	0	0	0		
5610726	AVERY CO.	BANNER ELK	8/17/1997	1725	Thunderstorm Wind	50	0	0	0	0		
5635568	YANCEY CO.	BEE LOG	2/17/1998	1100	Thunderstorm Wind	50	0	0	15000	0		
5646308	AVERY CO.	NEWLAND	5/3/1998	1746	Thunderstorm Wind	50	0	0	0	0		
5646314	YANCEY CO.	BURNSVILLE	5/7/1998	1535	Thunderstorm Wind	50	0	0	0	0		
5646434	AVERY CO.	LINVILLE	5/7/1998	1550	Thunderstorm Wind	50	0	0	0	0		
5646568	MCDOWELL CO.	MARION	5/26/1998	1643	Thunderstorm Wind	50	0	0	20000	0		
5651778	MCDOWELL CO.	MARION	6/16/1998	1250	Thunderstorm Wind	50	0	0	0	0		LAW ENFORCEMENT
5651781	MCDOWELL CO.	MARION	6/16/1998	1315	Thunderstorm Wind	50	0	0	0	0		UNKNOWN
5651886	MCDOWELL CO.	PLEASANT GARDENS	6/22/1998	2105	Thunderstorm Wind	50	0	0	0	0		EMERGENCY MANAGER
5651888	YANCEY CO.	BURNSVILLE	6/22/1998	2110	Thunderstorm Wind	50	0	0	0	0		LAW ENFORCEMENT
5651887	MCDOWELL CO.	EAST MARION	6/22/1998	2120	Thunderstorm Wind	50	0	0	0	0		EMERGENCY MANAGER
5660750	MCDOWELL CO.	OLD FT	7/19/1998	1810	Thunderstorm Wind	52	0	0	0	0		LAW ENFORCEMENT
5660864	MCDOWELL CO.	ASHFORD	7/21/1998	1535	Thunderstorm Wind	50	0	0	0	0		UNKNOWN
5660867	MCDOWELL CO.	SUGAR HILL	7/22/1998	1620	Thunderstorm Wind	50	0	0	0	0		UNKNOWN
5667786	MCDOWELL CO.	OLD FT	9/28/1998	1415	Thunderstorm Wind	50	0	0	0	0		LAW ENFORCEMENT
5697808	AVERY CO.	ROARING CREEK	5/7/1999	1930	Thunderstorm Wind	60	0	0	10000	0		NEWSPAPER
5703979	MITCHELL CO.	BAILEY	6/10/1999	1210	Thunderstorm Wind	50	0	0	0	0		LAW ENFORCEMENT
5714162	YANCEY CO.	RAMSEYTOWN	8/20/1999	55	Thunderstorm Wind	60	0	0	20000	25000		LAW ENFORCEMENT
5714164	YANCEY CO.	SWISS	8/20/1999	110	Thunderstorm Wind	55	0	0	0	0		LAW ENFORCEMENT
5714165	MITCHELL CO.	BAKERSVILLE	8/20/1999	130	Thunderstorm Wind	50	0	0	0	0		LAW ENFORCEMENT
5714166	MITCHELL CO.	SPRUCE PINE	8/20/1999	145	Thunderstorm Wind	50	0	0	0	0		LAW ENFORCEMENT
5714169	AVERY CO.	NEWLAND	8/20/1999	215	Thunderstorm Wind	50	0	0	0	0		LAW ENFORCEMENT
5145374	MCDOWELL CO.	GLENWOOD	5/20/2000	1545	Thunderstorm Wind	52	0	0	0	0	E	LAW ENFORCEMENT

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5154391	MCDOWELL CO.	PLEASANT GARDENS	6/25/2000	1330	Thunderstorm Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5176670	YANCEY CO.	SIQUX	7/14/2000	2233	Thunderstorm Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5169567	AVERY CO.	NEWLAND	8/10/2000	110	Thunderstorm Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5169570	MCDOWELL CO.	OLD FT	8/10/2000	119	Thunderstorm Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5159178	MCDOWELL CO.	GLENWOOD	11/9/2000	2010	Thunderstorm Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5261144	AVERY CO.	NEWLAND	7/8/2001	1630	Thunderstorm Wind	55	0	0	0	0	E	NEWSPAPER
5261146	MITCHELL CO.	COUNTYWIDE	7/8/2001	1645	Thunderstorm Wind	55	0	0	0	0	E	NEWSPAPER
5261148	YANCEY CO.	COUNTYWIDE	7/8/2001	1645	Thunderstorm Wind	55	0	0	0	0	E	NEWSPAPER
5261147	AVERY CO.	NEWLAND	7/8/2001	1645	Thunderstorm Wind	55	0	0	0	0	E	NEWSPAPER
5261152	MCDOWELL CO.	MARION	7/8/2001	1705	Thunderstorm Wind	55	0	0	0	0	E	NEWSPAPER
5261213	MCDOWELL CO.	OLD FT	7/8/2001	1714	Thunderstorm Wind	50	0	0	0	0	E	TRAINED SPOTTER
5261215	MCDOWELL CO.	NEBO	7/8/2001	1718	Thunderstorm Wind	50	0	0	0	0	E	TRAINED SPOTTER
5261216	MCDOWELL CO.	MARION	7/8/2001	1720	Thunderstorm Wind	55	0	0	0	0	E	NEWSPAPER
5297976	MCDOWELL CO.	MARION	5/2/2002	2021	Thunderstorm Wind	55	0	0	5000	0	E	LAW ENFORCEMENT
5297977	MCDOWELL CO.	PLEASANT GARDENS	5/2/2002	2021	Thunderstorm Wind	55	0	0	0	0	E	LAW ENFORCEMENT
5298068	MCDOWELL CO.	DYSORTVILLE	5/2/2002	2040	Thunderstorm Wind	55	0	0	0	0	E	LAW ENFORCEMENT
5305576	MCDOWELL CO.	OLD FT	6/4/2002	1626	Thunderstorm Wind	50	0	0	3000	0	E	TRAINED SPOTTER
5305583	MCDOWELL CO.	PLEASANT GARDENS	6/4/2002	1800	Thunderstorm Wind	50	0	0	1000	0	E	NEWSPAPER
5305678	MCDOWELL CO.	MARION	6/6/2002	1330	Thunderstorm Wind	50	0	0	0	0	E	NEWSPAPER
5305765	MCDOWELL CO.	OLD FT	6/13/2002	1815	Thunderstorm Wind	50	0	0	1000	0	E	LAW ENFORCEMENT
5310678	AVERY CO.	MINNEAPOLIS	7/2/2002	1700	Thunderstorm Wind	50	0	0	0	0	E	DEPT OF HIGHWAYS
5356485	MCDOWELL CO.	OLD FT	5/2/2003	1519	Thunderstorm Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5356487	MCDOWELL CO.	GLENWOOD	5/2/2003	1530	Thunderstorm Wind	70	0	0	250000	0	EG	EMERGENCY MANAGER
5363272	MCDOWELL CO.	OLD FT	6/8/2003	1734	Thunderstorm Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5330341	MCDOWELL CO.	MARION	7/5/2003	1330	Thunderstorm Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5330344	AVERY CO.	NEWLAND	7/9/2003	1545	Thunderstorm Wind	50	0	0	1000	0	EG	LAW ENFORCEMENT
5330349	MITCHELL CO.	BAKERSVILLE	7/9/2003	1555	Thunderstorm Wind	55	0	0	2000	0	EG	LAW ENFORCEMENT
5330350	AVERY CO.	NEWLAND	7/9/2003	1602	Thunderstorm Wind	50	0	0	1000	0	EG	LAW ENFORCEMENT
5330351	AVERY CO.	NEWLAND	7/9/2003	1620	Thunderstorm Wind	50	0	0	1000	0	EG	LAW ENFORCEMENT
5330354	MCDOWELL CO.	MARION	7/9/2003	1640	Thunderstorm Wind	50	0	0	1000	0	EG	EMERGENCY MANAGER
5330355	MCDOWELL CO.	MARION	7/9/2003	1700	Thunderstorm Wind	50	0	0	2000	0	EG	EMERGENCY MANAGER
5329426	MCDOWELL CO.	MARION	7/9/2003	1715	Thunderstorm Wind	50	0	0	1000	0	EG	EMERGENCY MANAGER
5331073	MCDOWELL CO.	MARION	11/19/2003	630	Thunderstorm Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5403178	MCDOWELL CO.	MARION	5/19/2004	1548	Thunderstorm Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5401164	MCDOWELL CO.	MARION	5/23/2004	1335	Thunderstorm Wind	55	0	0	1000	0	EG	TRAINED SPOTTER
5401248	AVERY CO.	NEWLAND	5/26/2004	1725	Thunderstorm Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5401249	AVERY CO.	NEWLAND	5/26/2004	1726	Thunderstorm Wind	50	0	0	3000	0	EG	EMERGENCY MANAGER
5401250	MITCHELL CO.	BULADEAN	5/26/2004	1727	Thunderstorm Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5401255	YANCEY CO.	BURNSVILLE	5/26/2004	1810	Thunderstorm Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5403264	MITCHELL CO.	SPRUCE PINE	5/30/2004	1635	Thunderstorm Wind	50	0	0	0	0	EG	TRAINED SPOTTER
5403278	MITCHELL CO.	BULADEAN	5/31/2004	420	Thunderstorm Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5403279	YANCEY CO.	BURNSVILLE	5/31/2004	420	Thunderstorm Wind	50	0	0	1000	0	EG	LAW ENFORCEMENT
5403280	MITCHELL CO.	BAKERSVILLE	5/31/2004	430	Thunderstorm Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5403281	YANCEY CO.	BUSICK	5/31/2004	430	Thunderstorm Wind	50	0	0	1000	0	EG	LAW ENFORCEMENT
5453525	AVERY CO.	NEWLAND	5/20/2005	50	Thunderstorm Wind	50	0	0	0	0	EG	TRAINED SPOTTER
5458585	MCDOWELL CO.	DYSORTVILLE	6/29/2005	1730	Thunderstorm Wind	50	0	0	0	0	EG	FIRE DEPT/RESCUE SQUAD
5470143	MCDOWELL CO.	WOODLAWN	7/13/2005	1230	Thunderstorm Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5472526	AVERY CO.	ELK PARK	8/3/2005	1510	Thunderstorm Wind	50	0	0	0	0	EG	DEPT OF HIGHWAYS
5502344	YANCEY CO.	BURNSVILLE	4/2/2006	2045	Thunderstorm Wind	55	0	0	0	0	EG	LAW ENFORCEMENT
5502343	MITCHELL CO.	BULADEAN	4/2/2006	2045	Thunderstorm Wind	50	0	0	0	0	EG	TRAINED SPOTTER
5502346	AVERY CO.	BANNER ELK	4/2/2006	2115	Thunderstorm Wind	57	0	0	0	0	MG	TRAINED SPOTTER
5502348	AVERY CO.	NEWLAND	4/2/2006	2130	Thunderstorm Wind	50	0	0	0	0	EG	DEPT OF HIGHWAYS
5507964	MCDOWELL CO.	OLD FT	5/13/2006	2030	Thunderstorm Wind	50	0	0	0	0	EG	GENERAL PUBLIC
5508901	AVERY CO.	BANNER ELK	5/26/2006	1600	Thunderstorm Wind	50	0	0	0	0	EG	DEPT OF HIGHWAYS
5509097	MITCHELL CO.	LEDGER	5/31/2006	1235	Thunderstorm Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5509098	MCDOWELL CO.	OLD FT	5/31/2006	1250	Thunderstorm Wind	55	0	0	0	0	EG	LAW ENFORCEMENT
5516559	MCDOWELL CO.	MARION	6/23/2006	1425	Thunderstorm Wind	55	0	0	0	0	EG	GENERAL PUBLIC
55708	MCDOWELL CO.	MARION	8/3/2007	1653	Thunderstorm Wind	50	0	0	0	0	EG	County Official



EVENT_ID	CZ_NAME_STR	BEGIN_LOCATION	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	MAGNITUDE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	MAGNITUDE_TYPE	SOURCE
57858	MCDOWELL CO.	OLD FT	8/21/2007	1422	Thunderstorm Wind	55	0	0	0	0	EG	County Official
57950	AVERY CO.	NEWLAND	8/23/2007	1708	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
58057	MCDOWELL CO.	DYSORTVILLE	8/23/2007	2018	Thunderstorm Wind	50	0	0	0	0	EG	County Official
58093	MITCHELL CO.	SPRUCE PINE	8/24/2007	1345	Thunderstorm Wind	50	0	0	0	0	EG	County Official
58080	MITCHELL CO.	SPRUCE PINE	8/24/2007	1345	Thunderstorm Wind	50	0	0	0	0	EG	County Official
58104	MCDOWELL CO.	MARION	8/25/2007	1627	Thunderstorm Wind	55	0	0	10000	0	EG	County Official
84684	MCDOWELL CO.	OLD FT	3/4/2008	1758	Thunderstorm Wind	50	0	0	0	0	EG	Public
86167	MCDOWELL CO.	DYSORTVILLE	3/4/2008	1820	Thunderstorm Wind	60	0	0	10000	0	EG	Newspaper
119041	MCDOWELL CO.	MARION	6/7/2008	1620	Thunderstorm Wind	60	0	0	0	0	EG	Public
119086	MCDOWELL CO.	MARION	6/10/2008	1537	Thunderstorm Wind	50	0	0	0	0	EG	County Official
128263	AVERY CO.	BANNER ELK	7/21/2008	1618	Thunderstorm Wind	50	0	0	0	0	EG	Fire Department/Rescue
182698	MCDOWELL CO.	CROSS MILL	6/10/2009	1708	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
182714	MITCHELL CO.	SPRUCE PINE	6/11/2009	1415	Thunderstorm Wind	50	0	0	0	0	EG	County Official
182717	MCDOWELL CO.	SUGAR HILL	6/11/2009	1417	Thunderstorm Wind	50	0	0	0	0	EG	County Official
183749	MCDOWELL CO.	DYSORTVILLE	6/15/2009	1225	Thunderstorm Wind	50	0	0	0	0	EG	Fire Department/Rescue
184589	AVERY CO.	BANNER ELK	6/18/2009	1455	Thunderstorm Wind	50	0	0	0	0	EG	COOP Observer
184590	AVERY CO.	NEWLAND	6/18/2009	1455	Thunderstorm Wind	50	0	0	0	0	EG	County Official
184996	MITCHELL CO.	BULADEAN	6/18/2009	1625	Thunderstorm Wind	50	0	0	0	0	EG	County Official
194616	AVERY CO.	SPEAR	8/5/2009	1340	Thunderstorm Wind	55	0	0	0	0	EG	Public
197698	MCDOWELL CO.	MARION	9/9/2009	1330	Thunderstorm Wind	50	0	0	0	0	EG	County Official
245704	MITCHELL CO.	EWART	6/21/2010	1815	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
245706	AVERY CO.	MINNEAPOLIS	6/21/2010	1835	Thunderstorm Wind	50	0	0	0	0	EG	County Official
245716	MCDOWELL CO.	DYSORTVILLE	6/22/2010	1435	Thunderstorm Wind	50	0	0	0	0	EG	Public
245718	MCDOWELL CO.	DYSORTVILLE	6/22/2010	1435	Thunderstorm Wind	50	0	0	30000	0	EG	Newspaper
245747	MCDOWELL CO.	DYSORTVILLE	6/23/2010	1730	Thunderstorm Wind	55	0	0	0	0	EG	County Official
246144	MCDOWELL CO.	OLD FT	6/28/2010	1803	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
251733	MCDOWELL CO.	DYSORTVILLE	7/17/2010	1355	Thunderstorm Wind	50	0	0	0	0	EG	Public
252384	MCDOWELL CO.	MARION	7/20/2010	1725	Thunderstorm Wind	50	0	0	0	0	EG	County Official
252639	MCDOWELL CO.	ASHFORD	7/26/2010	2105	Thunderstorm Wind	50	0	0	0	0	EG	COOP Observer
252651	MCDOWELL CO.	MARION ARPT	7/27/2010	1245	Thunderstorm Wind	50	0	0	0	0	EG	Public
252652	MCDOWELL CO.	SUGAR HILL	7/27/2010	1320	Thunderstorm Wind	50	0	0	0	0	EG	Department of Highways
256689	MCDOWELL CO.	DAVISTOWN	8/4/2010	1630	Thunderstorm Wind	50	0	0	0	0	EG	Fire Department/Rescue
256811	MCDOWELL CO.	SUNNY VALE	8/5/2010	1345	Thunderstorm Wind	50	0	0	0	0	EG	Public
256926	YANCEY CO.	DAY BOOK	8/5/2010	1600	Thunderstorm Wind	50	0	0	0	0	EG	County Official
256927	AVERY CO.	ELK PARK	8/5/2010	1612	Thunderstorm Wind	50	0	0	0	0	EG	County Official
256928	AVERY CO.	MONTEZUMA	8/5/2010	1612	Thunderstorm Wind	50	0	0	0	0	EG	County Official
257717	MCDOWELL CO.	EAST MARION	8/18/2010	1730	Thunderstorm Wind	50	0	0	0	0	EG	Department of Highways
257718	MCDOWELL CO.	WEST MARION	8/18/2010	1730	Thunderstorm Wind	50	0	0	0	0	EG	County Official
258857	MITCHELL CO.	BAKERSVILLE	8/19/2010	1524	Thunderstorm Wind	50	0	0	0	0	EG	County Official
258858	MCDOWELL CO.	NEBO	8/19/2010	1700	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
265750	YANCEY CO.	SPIVEY GAP	10/25/2010	736	Thunderstorm Wind	50	0	0	0	0	EG	County Official
283779	AVERY CO.	LINVILLE	2/28/2011	1352	Thunderstorm Wind	50	0	0	0	0	EG	Newspaper
283781	YANCEY CO.	HAMRICK	2/28/2011	1540	Thunderstorm Wind	50	0	0	0	0	EG	COOP Observer
283783	MCDOWELL CO.	GLENWOOD	2/28/2011	1609	Thunderstorm Wind	55	0	0	0	0	EG	Emergency Manager
294992	MCDOWELL CO.	SUNNY VALE	4/4/2011	2247	Thunderstorm Wind	55	0	0	0	0	EG	County Official
294993	AVERY CO.	PINEOLA	4/4/2011	2257	Thunderstorm Wind	55	0	0	0	0	EG	Newspaper
299064	YANCEY CO.	HAMRICK	4/9/2011	1247	Thunderstorm Wind	50	0	0	0	0	EG	COOP Observer
299262	YANCEY CO.	BURNSVILLE	4/9/2011	1725	Thunderstorm Wind	50	0	0	0	0	EG	COOP Observer
306904	MCDOWELL CO.	GRAPHITE	5/3/2011	1707	Thunderstorm Wind	60	0	0	0	0	EG	County Official
307171	MCDOWELL CO.	DAVISTOWN	5/3/2011	1713	Thunderstorm Wind	60	0	0	0	0	EG	County Official
308106	AVERY CO.	ELK PARK	5/10/2011	2153	Thunderstorm Wind	55	0	0	0	0	EG	County Official
309442	MCDOWELL CO.	MARION ARPT	5/10/2011	2226	Thunderstorm Wind	55	0	0	0	0	EG	Trained Spotter
312448	AVERY CO.	BANNER ELK	5/13/2011	1601	Thunderstorm Wind	55	0	0	0	0	EG	Law Enforcement
316615	AVERY CO.	THREE MILE	5/22/2011	1725	Thunderstorm Wind	50	0	0	0	0	EG	Department of Highways
316619	YANCEY CO.	BANKS CREEK	5/22/2011	1740	Thunderstorm Wind	50	0	0	0	0	EG	Department of Highways
319279	MITCHELL CO.	ALTAPASS	6/7/2011	1900	Thunderstorm Wind	50	0	0	0	0	EG	Post Office
319310	AVERY CO.	AVERY CO ARPT	6/8/2011	1325	Thunderstorm Wind	50	0	0	0	0	EG	Public
319315	YANCEY CO.	GREEN MTN	6/8/2011	1524	Thunderstorm Wind	50	0	0	0	0	EG	Post Office

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319897	MCDOWELL CO.	MARION	6/9/2011	1335	Thunderstorm Wind	55	0	0	0	0	EG	County Official
319937	MITCHELL CO.	BULADEAN	6/9/2011	1613	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
319943	YANCEY CO.	SWISS	6/9/2011	1706	Thunderstorm Wind	50	0	0	0	0	EG	Public
326500	AVERY CO.	BANNER ELK	6/18/2011	1313	Thunderstorm Wind	50	0	0	0	0	EG	County Official
326501	MITCHELL CO.	SPRUCE PINE	6/18/2011	1328	Thunderstorm Wind	50	0	0	0	0	EG	Public
326504	MCDOWELL CO.	MARION	6/18/2011	1350	Thunderstorm Wind	55	0	0	0	0	EG	Emergency Manager
337614	MCDOWELL CO.	CROSS MILL	7/6/2011	1505	Thunderstorm Wind	50	0	0	0	0	EG	County Official
347260	AVERY CO.	LINVILLE	9/2/2011	1906	Thunderstorm Wind	50	0	0	0	0	EG	Law Enforcement
378256	YANCEY CO.	BURNSVILLE	4/26/2012	722	Thunderstorm Wind	55	0	0	0	0	EG	County Official
378262	MCDOWELL CO.	OLD FT	4/26/2012	748	Thunderstorm Wind	50	0	0	0	0	EG	Fire Department/Rescue
378263	MCDOWELL CO.	OLD FT	4/26/2012	748	Thunderstorm Wind	50	0	0	0	0	EG	Fire Department/Rescue
387038	MCDOWELL CO.	NEBO	6/13/2012	2040	Thunderstorm Wind	50	0	0	0	0	EG	County Official
400072	YANCEY CO.	BURNSVILLE	7/1/2012	2355	Thunderstorm Wind	50	0	0	0	0	EG	Public
400512	MITCHELL CO.	BULADEAN	7/3/2012	1335	Thunderstorm Wind	50	0	0	0	0	EG	Public
400683	MITCHELL CO.	GLEN AYRE	7/5/2012	1524	Thunderstorm Wind	55	0	0	0	0	EG	911 Call Center
400687	YANCEY CO.	SIoux	7/5/2012	1536	Thunderstorm Wind	55	0	0	0	0	EG	911 Call Center
400695	MCDOWELL CO.	EAST MARION	7/5/2012	1620	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
403758	MCDOWELL CO.	SUGAR HILL	7/18/2012	1436	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
407889	MCDOWELL CO.	MARION	8/2/2012	1253	Thunderstorm Wind	50	0	0	0	0	EG	Emergency Manager
409155	MCDOWELL CO.	WEST MARION	8/8/2012	1505	Thunderstorm Wind	50	0	0	0	0	EG	Trained Spotter
409161	MCDOWELL CO.	SUGAR HILL	8/8/2012	1535	Thunderstorm Wind	55	0	0	0	0	EG	Emergency Manager
409449	MCDOWELL CO.	GLENWOOD	8/10/2012	2045	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
462786	YANCEY CO.	SWISS	6/13/2013	1342	Thunderstorm Wind	60	0	0	0	0	EG	County Official
463167	MCDOWELL CO.	MARION	6/24/2013	1355	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
463170	AVERY CO.	CROSSNORE	6/24/2013	1630	Thunderstorm Wind	50	0	0	0	0	EG	Department of Highways
463174	MITCHELL CO.	SPRUCE PINE	6/25/2013	1540	Thunderstorm Wind	50	0	0	0	0	EG	Department of Highways
471132	MCDOWELL CO.	OLD FT	7/12/2013	2045	Thunderstorm Wind	50	0	0	0	0	EG	County Official
471157	MITCHELL CO.	HAWK	7/17/2013	1323	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
471349	MCDOWELL CO.	GLENWOOD	7/24/2013	1642	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
471360	MCDOWELL CO.	MARION	7/25/2013	1613	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
473466	MCDOWELL CO.	FERO	8/10/2013	1322	Thunderstorm Wind	50	0	0	0	0	EG	Broadcast Media
508179	YANCEY CO.	BURNSVILLE	5/23/2014	733	Thunderstorm Wind	55	0	0	0	0	EG	911 Call Center
517309	MCDOWELL CO.	MARION	5/27/2014	1445	Thunderstorm Wind	50	0	0	0	0	EG	Broadcast Media
528982	MCDOWELL CO.	DYSORTVILLE	6/10/2014	2113	Thunderstorm Wind	50	0	0	0	0	EG	Newspaper
522770	MCDOWELL CO.	GREENLEE	6/19/2014	1420	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
522776	MCDOWELL CO.	PROVIDENCE	6/19/2014	1634	Thunderstorm Wind	50	0	0	0	0	EG	Broadcast Media
522778	MCDOWELL CO.	NEBO	6/19/2014	1653	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
533903	MCDOWELL CO.	MARION	8/20/2014	1153	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
533900	MITCHELL CO.	BAKERSVILLE	8/20/2014	1702	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
538297	MCDOWELL CO.	EAST MARION	8/21/2014	1434	Thunderstorm Wind	50	0	0	0	0	EG	Broadcast Media
538312	MCDOWELL CO.	MARION	9/2/2014	1450	Thunderstorm Wind	50	0	0	0	0	EG	Fire Department/Rescue
541542	MCDOWELL CO.	OLD FT	9/2/2014	2206	Thunderstorm Wind	50	0	0	0	0	EG	Emergency Manager
589575	MCDOWELL CO.	GLENWOOD	6/8/2015	1815	Thunderstorm Wind	60	0	0	5000	0	EG	Emergency Manager
589591	MCDOWELL CO.	MARION	6/17/2015	1452	Thunderstorm Wind	50	0	0	0	0	EG	Emergency Manager
591340	MCDOWELL CO.	PROVIDENCE	6/17/2015	1516	Thunderstorm Wind	50	0	0	0	0	EG	Broadcast Media
591342	MCDOWELL CO.	PLEASANT GARDENS	6/17/2015	1529	Thunderstorm Wind	50	0	0	0	0	EG	Broadcast Media
590386	MCDOWELL CO.	FERO	6/19/2015	1322	Thunderstorm Wind	50	0	0	0	0	EG	911 Call Center
590708	MCDOWELL CO.	GREENLEE	6/30/2015	1647	Thunderstorm Wind	55	0	0	10000	0	EG	Emergency Manager
590707	MCDOWELL CO.	SUGAR HILL	6/30/2015	1659	Thunderstorm Wind	55	0	0	0	0	EG	Emergency Manager
590709	MCDOWELL CO.	GLENWOOD	6/30/2015	1719	Thunderstorm Wind	50	0	0	0	0	EG	Emergency Manager
594515	MCDOWELL CO.	OLD FT	7/8/2015	1335	Thunderstorm Wind	50	0	0	1000	0	EG	Broadcast Media
595764	MCDOWELL CO.	SUGAR HILL	7/13/2015	1912	Thunderstorm Wind	40	0	0	5000	0	EG	Trained Spotter

NCDC High/Strong Wind  
as of Nov 2015

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5537202	MITCHELL (ZONE)	1/18/1996	2000	High Wind		0	0	0	0		
5537201	YANCEY (ZONE)	1/18/1996	2000	High Wind		0	0	0	0		
5537199	AVERY (ZONE)	1/18/1996	2000	High Wind		0	0	0	0		
5594140	AVERY (ZONE)	3/5/1997	2100	High Wind	55	0	0	0	0		
5635448	YANCEY (ZONE)	2/3/1998	1200	High Wind		0	0	14290	0		
5635572	MITCHELL (ZONE)	2/23/1998	1900	High Wind	50	0	0	0	0		
5635571	AVERY (ZONE)	2/23/1998	1900	High Wind	50	0	0	0	0		
5635574	YANCEY (ZONE)	2/23/1998	1900	High Wind	50	0	0	0	0		
5691508	MITCHELL (ZONE)	3/16/1999	1300	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5691515	YANCEY (ZONE)	3/16/1999	1300	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5691499	AVERY (ZONE)	3/16/1999	1300	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5720937	MITCHELL (ZONE)	11/2/1999	200	High Wind	55	0	0	0	0		LAW ENFORCEMENT
5720930	AVERY (ZONE)	11/2/1999	200	High Wind	55	0	0	0	0		LAW ENFORCEMENT
5720940	MITCHELL (ZONE)	11/2/1999	1800	High Wind	55	0	0	0	0		LAW ENFORCEMENT
5720463	AVERY (ZONE)	12/26/1999	1800	High Wind	50	0	0	0	0		NEWSPAPER
5720467	YANCEY (ZONE)	12/26/1999	1800	Strong Wind		0	0	0	0		NEWSPAPER
5720466	MITCHELL (ZONE)	12/26/1999	1800	Strong Wind		0	0	0	0		NEWSPAPER
5720468	AVERY (ZONE)	12/28/1999	2000	Strong Wind		0	0	0	0		NEWSPAPER
5130003	AVERY (ZONE)	1/13/2000	1200	High Wind	52	0	0	0	0	E	LAW ENFORCEMENT
5130009	YANCEY (ZONE)	1/13/2000	1200	High Wind	52	0	0	0	0	E	LAW ENFORCEMENT
5130008	MITCHELL (ZONE)	1/13/2000	1200	High Wind	52	0	0	0	0	E	LAW ENFORCEMENT
5137385	AVERY (ZONE)	3/19/2000	2000	High Wind	55	0	0	0	0	E	LAW ENFORCEMENT
5137389	MITCHELL (ZONE)	3/19/2000	2000	High Wind	55	0	0	0	0	E	LAW ENFORCEMENT
5141203	AVERY (ZONE)	4/8/2000	1400	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5141207	MITCHELL (ZONE)	4/8/2000	1400	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5160428	AVERY (ZONE)	11/9/2000	1200	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5159063	MITCHELL (ZONE)	11/9/2000	1200	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5166386	YANCEY (ZONE)	11/9/2000	1200	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5168667	AVERY (ZONE)	12/12/2000	300	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5168668	MITCHELL (ZONE)	12/12/2000	300	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5168159	YANCEY (ZONE)	12/16/2000	1800	High Wind	55	0	0	0	0	E	NEWSPAPER
5237524	YANCEY (ZONE)	3/6/2001	0	High Wind	55	0	0	0	0	E	GENERAL PUBLIC
5237518	MITCHELL (ZONE)	3/6/2001	0	High Wind	55	0	0	0	0	E	GENERAL PUBLIC
5237510	AVERY (ZONE)	3/6/2001	0	High Wind	55	0	0	0	0	E	GENERAL PUBLIC
5237661	MITCHELL (ZONE)	3/20/2001	700	High Wind	55	0	0	0	0	E	GENERAL PUBLIC
5237668	YANCEY (ZONE)	3/20/2001	700	High Wind	55	0	0	0	0	E	GENERAL PUBLIC
5272672	AVERY (ZONE)	11/29/2001	2200	High Wind	50	0	0	0	0	E	EMERGENCY MANAGER
5283295	AVERY (ZONE)	2/4/2002	1200	High Wind	50	0	0	0	0	E	NEWSPAPER
5283521	YANCEY (ZONE)	2/4/2002	1200	High Wind	50	0	0	0	0	E	NEWSPAPER
5283522	MITCHELL (ZONE)	2/4/2002	1200	High Wind	50	0	0	0	0	E	NEWSPAPER
5285710	AVERY (ZONE)	3/10/2002	600	High Wind	50	0	0	1000	0	E	LAW ENFORCEMENT
5285770	MITCHELL (ZONE)	3/10/2002	600	High Wind	50	0	0	1000	0	E	LAW ENFORCEMENT
5320991	YANCEY (ZONE)	9/26/2002	2100	Strong Wind		0	0	0	0		NEWSPAPER
5320988	AVERY (ZONE)	9/26/2002	2100	Strong Wind		0	0	0	0		NEWSPAPER
5320992	MITCHELL (ZONE)	9/26/2002	2100	Strong Wind		0	0	0	0		NEWSPAPER
5321013	YANCEY (ZONE)	9/27/2002	300	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5321012	AVERY (ZONE)	9/27/2002	300	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5321014	MITCHELL (ZONE)	9/27/2002	300	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5321397	MITCHELL (ZONE)	11/6/2002	1000	High Wind	50	0	0	0	0	E	LAW ENFORCEMENT
5321407	AVERY (ZONE)	11/17/2002	300	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5321410	MITCHELL (ZONE)	11/17/2002	300	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5321409	YANCEY (ZONE)	11/17/2002	300	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5321418	AVERY (ZONE)	11/22/2002	600	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5321421	MITCHELL (ZONE)	11/22/2002	600	Strong Wind		0	0	0	0		LAW ENFORCEMENT

NCDC High/Strong Wind  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	MAGNITUDE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	MAGNITUDE_TYPE	SOURCE
5321420	YANCEY (ZONE)	11/22/2002	600	Strong Wind		0	0	0	0		LAW ENFORCEMENT
5321426	MITCHELL (ZONE)	11/30/2002	1200	High Wind	50	0	0	0	0	E	NEWSPAPER
5326644	MITCHELL (ZONE)	12/25/2002	1000	High Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5326641	AVERY (ZONE)	12/25/2002	1000	High Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5341001	YANCEY (ZONE)	1/20/2003	615	High Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5344834	YANCEY (ZONE)	2/4/2003	900	High Wind	60	0	0	0	0	EG	LAW ENFORCEMENT
5344835	MITCHELL (ZONE)	2/4/2003	900	High Wind	60	0	0	0	0	EG	LAW ENFORCEMENT
5358195	AVERY (ZONE)	5/12/2003	300	High Wind	58	0	0	0	0	EG	LAW ENFORCEMENT
5358196	YANCEY (ZONE)	5/12/2003	300	High Wind	58	0	0	0	0	EG	LAW ENFORCEMENT
5372333	YANCEY (ZONE)	10/14/2003	2000	High Wind	50	0	0	1000	0	EG	EMERGENCY MANAGER
5372330	AVERY (ZONE)	10/14/2003	2000	High Wind	50	0	0	1000	0	EG	EMERGENCY MANAGER
5372334	MITCHELL (ZONE)	10/14/2003	2000	High Wind	50	0	0	1000	0	EG	EMERGENCY MANAGER
5331079	YANCEY (ZONE)	11/13/2003	600	High Wind	50	0	0	500	0	EG	EMERGENCY MANAGER
5331076	AVERY (ZONE)	11/13/2003	600	High Wind	50	0	0	500	0	EG	EMERGENCY MANAGER
5331080	MITCHELL (ZONE)	11/13/2003	600	High Wind	50	0	0	500	0	EG	EMERGENCY MANAGER
5331090	MITCHELL (ZONE)	11/18/2003	2200	High Wind	50	0	0	1000	0	EG	EMERGENCY MANAGER
5331088	AVERY (ZONE)	11/18/2003	2200	High Wind	50	0	0	1000	0	EG	EMERGENCY MANAGER
5389004	YANCEY (ZONE)	3/7/2004	1800	High Wind	50	0	0	10000	0	EG	LAW ENFORCEMENT
5389005	MITCHELL (ZONE)	3/7/2004	1800	High Wind	50	0	0	20000	0	EG	LAW ENFORCEMENT
5389002	AVERY (ZONE)	3/7/2004	1800	High Wind	50	0	0	5000	0	EG	LAW ENFORCEMENT
5418027	YANCEY (ZONE)	7/5/2004	1930	High Wind	55	0	0	1000	0	EG	EMERGENCY MANAGER
5423487	AVERY (ZONE)	9/7/2004	1100	High Wind	50	0	0	250000	0	EG	EMERGENCY MANAGER
5423501	YANCEY (ZONE)	9/16/2004	1700	High Wind	55	0	0	30000	0	EG	EMERGENCY MANAGER
5423499	AVERY (ZONE)	9/16/2004	1700	High Wind	55	0	0	40000	0	EG	EMERGENCY MANAGER
5423502	MITCHELL (ZONE)	9/16/2004	1700	High Wind	55	0	0	30000	0	EG	EMERGENCY MANAGER
5423592	MITCHELL (ZONE)	9/17/2004	2000	High Wind	50	0	0	10000	0	EG	EMERGENCY MANAGER
5423591	YANCEY (ZONE)	9/17/2004	2000	High Wind	50	0	0	10000	0	EG	EMERGENCY MANAGER
5423589	AVERY (ZONE)	9/17/2004	2000	High Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5429586	MITCHELL (ZONE)	12/1/2004	600	High Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5435539	AVERY (ZONE)	1/22/2005	2200	High Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5435541	MITCHELL (ZONE)	1/22/2005	2200	High Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5435540	YANCEY (ZONE)	1/22/2005	2200	High Wind	50	0	0	0	0	EG	EMERGENCY MANAGER
5441957	MITCHELL (ZONE)	2/10/2005	2000	High Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5445110	AVERY (ZONE)	3/8/2005	800	High Wind	60	0	0	0	0	EG	LAW ENFORCEMENT
5447379	YANCEY (ZONE)	4/2/2005	2000	High Wind	60	0	0	5000	0	EG	LAW ENFORCEMENT
5447380	MITCHELL (ZONE)	4/2/2005	2000	High Wind	60	0	0	5000	0	EG	LAW ENFORCEMENT
5447377	AVERY (ZONE)	4/2/2005	2000	High Wind	60	0	0	5000	0	EG	LAW ENFORCEMENT
5472849	AVERY (ZONE)	8/30/2005	600	High Wind	50	0	0	0	0	EG	LAW ENFORCEMENT
5491631	MITCHELL (ZONE)	1/25/2006	200	High Wind	55	0	0	0	0	EG	LAW ENFORCEMENT
5491629	AVERY (ZONE)	1/25/2006	200	High Wind	55	0	0	20000	0	EG	LAW ENFORCEMENT
5491630	YANCEY (ZONE)	1/25/2006	200	High Wind	55	0	0	0	0	EG	LAW ENFORCEMENT
5502337	AVERY (ZONE)	4/3/2006	1900	High Wind	50	0	0	20000	0	EG	EMERGENCY MANAGER
9118	MCDOWELL MOUNTAINS (ZONE)	12/1/2006	700	High Wind	55	0	0	0	0	EG	County Official
18761	MCDOWELL MOUNTAINS (ZONE)	2/22/2007	1400	High Wind	50	0	0	0	0	EG	Trained Spotter
18760	YANCEY (ZONE)	2/22/2007	1400	High Wind	55	0	0	0	0	EG	County Official
29330	MITCHELL (ZONE)	4/15/2007	1700	High Wind	70	0	0	0	0	EG	County Official
29329	YANCEY (ZONE)	4/15/2007	1700	High Wind	70	0	0	0	0	EG	County Official
29326	AVERY (ZONE)	4/15/2007	1700	High Wind	70	0	0	0	0	EG	County Official
29341	EASTERN MCDOWELL (ZONE)	4/15/2007	1700	High Wind	70	0	0	0	0	EG	County Official
29340	MCDOWELL MOUNTAINS (ZONE)	4/15/2007	1700	High Wind	70	0	0	0	0	EG	County Official
29365	EASTERN MCDOWELL (ZONE)	4/16/2007	800	High Wind	65	0	0	500000	0	EG	County Official
29366	MCDOWELL MOUNTAINS (ZONE)	4/16/2007	800	High Wind	65	0	0	500000	0	EG	County Official
29392	MITCHELL (ZONE)	4/16/2007	900	High Wind	60	0	0	500000	0	EG	County Official
29384	YANCEY (ZONE)	4/16/2007	900	High Wind	60	0	0	500000	0	EG	County Official

NCDC High/Strong Wind  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	MAGNITUDE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	MAGNITUDE_TYPE	SOURCE
29378	AVERY (ZONE)	4/16/2007	900	High Wind	60	0	0	50000	0	EG	County Official
79212	EASTERN MCDOWELL (ZONE)	2/10/2008	1000	High Wind	55	0	0	0	0	EG	County Official
79201	YANCEY (ZONE)	2/10/2008	1000	High Wind	55	0	0	0	0	EG	County Official
79211	MCDOWELL MOUNTAINS (ZONE)	2/10/2008	1000	High Wind	55	0	0	0	0	EG	County Official
79199	AVERY (ZONE)	2/10/2008	1000	High Wind	55	0	0	0	0	EG	County Official
79202	MITCHELL (ZONE)	2/10/2008	1000	High Wind	55	0	0	0	0	EG	County Official
107888	MCDOWELL MOUNTAINS (ZONE)	5/11/2008	2000	High Wind	60	0	0	0	0	EG	County Official
107876	MITCHELL (ZONE)	5/11/2008	2000	High Wind	60	0	0	0	0	EG	County Official
107870	AVERY (ZONE)	5/11/2008	2000	High Wind	60	0	0	0	0	EG	County Official
107873	YANCEY (ZONE)	5/11/2008	2000	High Wind	60	0	0	0	0	EG	County Official
107908	EASTERN MCDOWELL (ZONE)	5/12/2008	0	High Wind	50	0	0	0	0	EG	County Official
146474	AVERY (ZONE)	12/31/2008	600	High Wind	50	0	0	0	0	EG	County Official
146475	YANCEY (ZONE)	12/31/2008	600	High Wind	50	0	0	0	0	EG	County Official
208572	AVERY (ZONE)	12/9/2009	1000	High Wind	55	0	0	0	0	EG	County Official
208576	MITCHELL (ZONE)	12/9/2009	1000	High Wind	55	0	0	0	0	EG	County Official
208589	MCDOWELL MOUNTAINS (ZONE)	12/9/2009	1000	High Wind	55	0	0	0	0	EG	County Official
208575	YANCEY (ZONE)	12/9/2009	1000	High Wind	55	0	0	0	0	EG	County Official
217963	EASTERN MCDOWELL (ZONE)	2/10/2010	1200	High Wind	50	0	0	0	0	EG	County Official
294287	EASTERN MCDOWELL (ZONE)	3/6/2011	930	Strong Wind	35	0	0	20000	0	EG	Newspaper
294288	EASTERN MCDOWELL (ZONE)	3/6/2011	1930	Strong Wind	35	0	0	50000	0	EG	Newspaper
367836	MCDOWELL MOUNTAINS (ZONE)	2/11/2012	2000	High Wind	50	0	0	0	0	EG	Newspaper
367837	EASTERN MCDOWELL (ZONE)	2/11/2012	2000	High Wind	50	0	0	0	0	EG	Newspaper
423365	YANCEY (ZONE)	12/21/2012	1200	High Wind	55	0	0	0	0	EG	County Official
423363	AVERY (ZONE)	12/21/2012	1200	High Wind	55	0	0	0	0	EG	County Official
423364	MITCHELL (ZONE)	12/21/2012	1200	High Wind	55	0	0	0	0	EG	County Official
423380	MCDOWELL MOUNTAINS (ZONE)	12/21/2012	1800	High Wind	55	0	0	0	0	EG	County Official
423381	EASTERN MCDOWELL (ZONE)	12/21/2012	1800	High Wind	55	0	0	0	0	EG	County Official
429384	MCDOWELL MOUNTAINS (ZONE)	1/30/2013	1400	High Wind	50	0	0	0	0	EG	County Official
505316	MCDOWELL MOUNTAINS (ZONE)	3/29/2014	2200	High Wind	56	0	0	0	0	EG	911 Call Center
505317	EASTERN MCDOWELL (ZONE)	3/29/2014	2200	High Wind	50	0	0	0	0	EG	911 Call Center
505305	AVERY (ZONE)	3/29/2014	2200	High Wind	56	0	0	0	0	EG	911 Call Center
505306	YANCEY (ZONE)	3/29/2014	2200	High Wind	56	0	0	0	0	EG	911 Call Center
505307	MITCHELL (ZONE)	3/29/2014	2200	High Wind	56	0	0	0	0	EG	911 Call Center
544982	MCDOWELL MOUNTAINS (ZONE)	10/14/2014	2003	Strong Wind	40	0	0	20000	0	EG	Emergency Manager
562080	AVERY (ZONE)	2/14/2015	2200	High Wind	50	0	0	1000	0	EG	911 Call Center
562081	MITCHELL (ZONE)	2/14/2015	2200	High Wind	50	0	0	1000	0	EG	911 Call Center
562082	YANCEY (ZONE)	2/14/2015	2200	High Wind	50	0	0	1000	0	EG	911 Call Center

NCDC Tornado  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_LOCATION	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	TOR_F_SCALE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
10075764	YANCEY CO.		3/8/1956	1100	Tornado	F1	0	0	0	0	
10078013	AVERY CO.		4/9/1965	245	Tornado	F2	0	1	25000	0	
10091024	YANCEY CO.		6/6/1977	1500	Tornado	F1	0	0	250000	0	
5543333	MCDOWELL CO.	MARION	4/20/1996	1250	Tornado	F0	0	0	20000	0	
5646445	MCDOWELL CO.	GLENWOOD	5/7/1998	1655	Tornado	F2	0	0	482000	0	
5144959	MCDOWELL CO.	MARION	5/24/2000	1650	Tornado	F0	0	0	0	0	LAW ENFORCEMENT
544975	MCDOWELL CO.	SUGAR HILL	10/14/2014	1948	Tornado	EF0	0	0	15000	5000	NWS Storm Survey

NCDC Blizzards  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5237393	YANCEY (ZONE)	3/6/2001	0	Blizzard	0	0	0	0	GENERAL PUBLIC
5237392	MITCHELL (ZONE)	3/6/2001	0	Blizzard	0	0	0	0	GENERAL PUBLIC
5237390	AVERY (ZONE)	3/6/2001	0	Blizzard	0	0	0	0	GENERAL PUBLIC
216748	MITCHELL (ZONE)	2/10/2010	400	Blizzard	0	0	0	0	County Official
216747	AVERY (ZONE)	2/10/2010	400	Blizzard	0	0	0	0	County Official
216749	YANCEY (ZONE)	2/10/2010	400	Blizzard	0	0	0	0	County Official

NCDC Frost and Freezing Fog  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5488264	AVERY (ZONE)	12/16/2005	0	Freezing Fog	0	0	0	0	LAW ENFORCEMENT
29615	AVERY (ZONE)	4/8/2007	100	Frost/Freeze	0	0	0	1000000	County Official
29623	EASTERN MCDOWELL (ZONE)	4/8/2007	100	Frost/Freeze	0	0	0	2000000	County Official
29640	MITCHELL (ZONE)	4/8/2007	100	Frost/Freeze	0	0	0	1000000	County Official
29649	YANCEY (ZONE)	4/8/2007	100	Frost/Freeze	0	0	0	1000000	County Official
29637	MCDOWELL MOUNTAINS (ZONE)	4/8/2007	100	Frost/Freeze	0	0	0	0	County Official



NCDC Sleet  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5586098	MITCHELL (ZONE)	1/8/1997	1200	Sleet	0	0	0	0	
5586097	YANCEY (ZONE)	1/8/1997	1200	Sleet	0	0	0	0	
5586093	AVERY (ZONE)	1/8/1997	1200	Sleet	0	0	0	0	
5635460	YANCEY (ZONE)	2/16/1998	400	Sleet	0	0	0	0	
5635458	AVERY (ZONE)	2/16/1998	400	Sleet	0	0	0	0	
5635459	MITCHELL (ZONE)	2/16/1998	400	Sleet	0	0	0	0	
5677018	YANCEY (ZONE)	11/8/1998	200	Sleet	0	0	0	0	LAW ENFORCEMENT
5677016	AVERY (ZONE)	11/8/1998	200	Sleet	0	0	0	0	LAW ENFORCEMENT
5677017	MITCHELL (ZONE)	11/8/1998	200	Sleet	0	0	0	0	LAW ENFORCEMENT
5675179	YANCEY (ZONE)	12/23/1998	900	Sleet	0	0	0	0	LAW ENFORCEMENT
5675171	MITCHELL (ZONE)	12/23/1998	900	Sleet	0	0	0	0	LAW ENFORCEMENT
5675051	AVERY (ZONE)	12/23/1998	900	Sleet	0	0	0	0	LAW ENFORCEMENT
5680936	YANCEY (ZONE)	1/31/1999	1200	Sleet	0	0	0	0	LAW ENFORCEMENT
5680928	AVERY (ZONE)	1/31/1999	1200	Sleet	0	0	0	0	LAW ENFORCEMENT
5680932	MITCHELL (ZONE)	1/31/1999	1200	Sleet	0	0	0	0	LAW ENFORCEMENT
5232508	YANCEY (ZONE)	2/22/2001	300	Sleet	0	0	0	0	NEWSPAPER
5344800	AVERY (ZONE)	2/16/2003	1100	Sleet	0	0	0	0	LAW ENFORCEMENT
5380271	MITCHELL (ZONE)	12/13/2003	2100	Sleet	0	0	0	0	EMERGENCY MANAGER
5388159	MITCHELL (ZONE)	2/2/2004	2200	Sleet	0	0	0	0	LAW ENFORCEMENT
5388157	AVERY (ZONE)	2/2/2004	2200	Sleet	0	0	0	0	LAW ENFORCEMENT
5388158	YANCEY (ZONE)	2/2/2004	2200	Sleet	0	0	0	0	LAW ENFORCEMENT
429355	MITCHELL (ZONE)	1/25/2013	700	Sleet	0	0	0	0	County Official
429347	AVERY (ZONE)	1/25/2013	700	Sleet	0	0	0	0	County Official

NCDC Heavy Snow  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5535896	MITCHELL (ZONE)	2/12/1996	1200	Heavy Snow	0	0	0	0	
5535893	AVERY (ZONE)	2/12/1996	1200	Heavy Snow	0	0	0	0	
5535895	YANCEY (ZONE)	2/12/1996	1200	Heavy Snow	0	0	0	0	
5535928	YANCEY (ZONE)	2/16/1996	1600	Heavy Snow	0	0	0	0	
5535926	AVERY (ZONE)	2/16/1996	1600	Heavy Snow	0	0	0	0	
5535929	MITCHELL (ZONE)	2/16/1996	1600	Heavy Snow	0	0	0	0	
5540700	MITCHELL (ZONE)	3/8/1996	400	Heavy Snow	0	0	0	0	
5540697	AVERY (ZONE)	3/8/1996	400	Heavy Snow	0	0	0	0	
5540699	YANCEY (ZONE)	3/8/1996	400	Heavy Snow	0	0	0	0	
5541411	MITCHELL (ZONE)	3/20/1996	1	Heavy Snow	0	0	0	0	
5541408	AVERY (ZONE)	3/20/1996	1	Heavy Snow	0	0	0	0	
5541410	YANCEY (ZONE)	3/20/1996	1	Heavy Snow	0	0	0	0	
5541417	MITCHELL (ZONE)	3/20/1996	2100	Heavy Snow	0	0	0	0	
5541414	AVERY (ZONE)	3/20/1996	2100	Heavy Snow	0	0	0	0	
5541416	YANCEY (ZONE)	3/20/1996	2100	Heavy Snow	0	0	0	0	
5578067	AVERY (ZONE)	12/5/1996	1200	Heavy Snow	0	0	0	0	
5578084	MITCHELL (ZONE)	12/8/1996	1600	Heavy Snow	0	0	0	0	
5578082	AVERY (ZONE)	12/8/1996	1600	Heavy Snow	0	0	0	0	
5578083	YANCEY (ZONE)	12/8/1996	1600	Heavy Snow	0	0	0	0	
5578089	AVERY (ZONE)	12/18/1996	1800	Heavy Snow	0	0	0	0	
5586284	AVERY (ZONE)	1/10/1997	2000	Heavy Snow	0	0	0	0	
5586286	YANCEY (ZONE)	1/10/1997	2000	Heavy Snow	0	0	0	0	
5586287	MITCHELL (ZONE)	1/10/1997	2000	Heavy Snow	0	0	0	0	
5624702	AVERY (ZONE)	12/5/1997	500	Heavy Snow	0	0	0	0	
5624704	MITCHELL (ZONE)	12/5/1997	500	Heavy Snow	0	0	0	0	
5624705	YANCEY (ZONE)	12/5/1997	500	Heavy Snow	0	0	0	0	
5624873	YANCEY (ZONE)	12/27/1997	0	Heavy Snow	0	0	0	0	
5624729	AVERY (ZONE)	12/27/1997	0	Heavy Snow	0	0	0	0	
5624871	MITCHELL (ZONE)	12/27/1997	0	Heavy Snow	0	0	0	0	
5624891	AVERY (ZONE)	12/29/1997	1000	Heavy Snow	0	0	0	0	
5624898	MITCHELL (ZONE)	12/29/1997	1000	Heavy Snow	0	0	0	0	
5624903	YANCEY (ZONE)	12/29/1997	1000	Heavy Snow	0	0	0	0	
5624916	YANCEY (ZONE)	12/30/1997	1700	Heavy Snow	0	0	0	0	
5624905	AVERY (ZONE)	12/30/1997	1700	Heavy Snow	0	0	0	0	
5624911	MITCHELL (ZONE)	12/30/1997	1700	Heavy Snow	0	0	0	0	
5627394	YANCEY (ZONE)	1/18/1998	2200	Heavy Snow	0	0	0	0	
5627386	AVERY (ZONE)	1/18/1998	2200	Heavy Snow	0	0	0	0	
5627404	AVERY (ZONE)	1/27/1998	400	Heavy Snow	0	0	0	0	
5627414	MITCHELL (ZONE)	1/27/1998	400	Heavy Snow	0	0	0	0	
5627421	YANCEY (ZONE)	1/27/1998	400	Heavy Snow	0	0	0	0	
5635439	YANCEY (ZONE)	2/3/1998	0	Heavy Snow	0	0	0	0	
5635449	AVERY (ZONE)	2/3/1998	1500	Heavy Snow	0	0	0	0	
5635575	YANCEY (ZONE)	2/23/1998	300	Heavy Snow	0	0	0	0	
5638497	AVERY (ZONE)	3/11/1998	1800	Heavy Snow	0	0	0	0	
5688795	YANCEY (ZONE)	2/13/1999	700	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5688792	AVERY (ZONE)	2/13/1999	700	Heavy Snow	0	0	0	0	LAW ENFORCEMENT

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5688793	MITCHELL (ZONE)	2/13/1999	700	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5688803	AVERY (ZONE)	2/19/1999	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5692284	YANCEY (ZONE)	3/3/1999	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5692174	AVERY (ZONE)	3/3/1999	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5692282	MITCHELL (ZONE)	3/3/1999	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5691416	YANCEY (ZONE)	3/9/1999	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5692289	AVERY (ZONE)	3/9/1999	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5691415	MITCHELL (ZONE)	3/9/1999	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5691430	AVERY (ZONE)	3/13/1999	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5691521	MITCHELL (ZONE)	3/26/1999	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5720461	AVERY (ZONE)	12/24/1999	800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5720462	MITCHELL (ZONE)	12/24/1999	800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130000	MITCHELL (ZONE)	1/4/2000	2000	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130002	YANCEY (ZONE)	1/4/2000	2000	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129998	AVERY (ZONE)	1/4/2000	2000	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130024	AVERY (ZONE)	1/18/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130532	YANCEY (ZONE)	1/18/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130530	MITCHELL (ZONE)	1/18/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130535	MITCHELL (ZONE)	1/20/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130533	AVERY (ZONE)	1/20/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5130536	YANCEY (ZONE)	1/20/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129467	AVERY (ZONE)	1/22/2000	1500	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129473	MITCHELL (ZONE)	1/22/2000	1500	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129476	YANCEY (ZONE)	1/22/2000	1500	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129080	AVERY (ZONE)	1/26/2000	0	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129082	MITCHELL (ZONE)	1/26/2000	0	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129079	YANCEY (ZONE)	1/26/2000	0	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129598	YANCEY (ZONE)	1/31/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129523	AVERY (ZONE)	1/31/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5129596	MITCHELL (ZONE)	1/31/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5134800	MITCHELL (ZONE)	2/4/2000	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5132434	AVERY (ZONE)	2/4/2000	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5134798	YANCEY (ZONE)	2/4/2000	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5137397	YANCEY (ZONE)	3/20/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5137395	AVERY (ZONE)	3/20/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5137396	MITCHELL (ZONE)	3/20/2000	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5141218	YANCEY (ZONE)	4/8/2000	1400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5141208	AVERY (ZONE)	4/8/2000	1400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5141214	MITCHELL (ZONE)	4/8/2000	1400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5166939	YANCEY (ZONE)	11/19/2000	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5166409	AVERY (ZONE)	11/19/2000	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5166930	MITCHELL (ZONE)	11/19/2000	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168279	AVERY (ZONE)	12/3/2000	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168664	YANCEY (ZONE)	12/3/2000	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168660	MITCHELL (ZONE)	12/3/2000	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168278	YANCEY (ZONE)	12/17/2000	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT

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5168162	AVERY (ZONE)	12/17/2000	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168273	MITCHELL (ZONE)	12/17/2000	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168821	YANCEY (ZONE)	12/19/2000	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168815	AVERY (ZONE)	12/19/2000	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5168819	MITCHELL (ZONE)	12/19/2000	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5169202	MITCHELL (ZONE)	12/30/2000	0	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5169328	YANCEY (ZONE)	12/30/2000	0	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5169200	AVERY (ZONE)	12/30/2000	0	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5169333	YANCEY (ZONE)	12/30/2000	2100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5169331	AVERY (ZONE)	12/30/2000	2100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5230216	YANCEY (ZONE)	1/1/2001	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5230217	MITCHELL (ZONE)	1/1/2001	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5230214	AVERY (ZONE)	1/1/2001	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5230229	YANCEY (ZONE)	1/2/2001	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5230227	AVERY (ZONE)	1/2/2001	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5230228	MITCHELL (ZONE)	1/2/2001	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5230230	AVERY (ZONE)	1/8/2001	300	Heavy Snow	0	0	0	0	NEWSPAPER
5230354	MITCHELL (ZONE)	1/8/2001	2100	Heavy Snow	0	0	0	0	NEWSPAPER
5230351	AVERY (ZONE)	1/8/2001	2100	Heavy Snow	0	0	0	0	NEWSPAPER
5230353	YANCEY (ZONE)	1/8/2001	2100	Heavy Snow	0	0	0	0	NEWSPAPER
5230369	YANCEY (ZONE)	1/20/2001	1800	Heavy Snow	0	0	0	0	NEWSPAPER
5230366	AVERY (ZONE)	1/20/2001	1800	Heavy Snow	0	0	0	0	NEWSPAPER
5230368	MITCHELL (ZONE)	1/20/2001	1800	Heavy Snow	0	0	0	0	NEWSPAPER
5230463	YANCEY (ZONE)	1/25/2001	600	Heavy Snow	0	0	0	0	NEWSPAPER
5230376	AVERY (ZONE)	1/25/2001	600	Heavy Snow	0	0	0	0	NEWSPAPER
5232494	MITCHELL (ZONE)	2/22/2001	300	Heavy Snow	0	0	0	0	GENERAL PUBLIC
5232491	AVERY (ZONE)	2/22/2001	300	Heavy Snow	0	0	0	0	GENERAL PUBLIC
5237389	YANCEY (ZONE)	3/4/2001	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5237387	AVERY (ZONE)	3/4/2001	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5237388	MITCHELL (ZONE)	3/4/2001	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5237525	AVERY (ZONE)	3/15/2001	100	Heavy Snow	0	0	0	0	GENERAL PUBLIC
5238743	YANCEY (ZONE)	3/20/2001	800	Heavy Snow	0	0	0	0	GENERAL PUBLIC
5238738	MITCHELL (ZONE)	3/20/2001	800	Heavy Snow	0	0	0	0	GENERAL PUBLIC
5237534	AVERY (ZONE)	3/20/2001	800	Heavy Snow	0	0	0	0	GENERAL PUBLIC
5241011	YANCEY (ZONE)	4/1/2001	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5241007	AVERY (ZONE)	4/1/2001	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5241010	MITCHELL (ZONE)	4/1/2001	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5278961	MITCHELL (ZONE)	1/6/2002	900	Heavy Snow	0	0	0	0	NEWSPAPER
5278958	AVERY (ZONE)	1/6/2002	900	Heavy Snow	0	0	0	0	NEWSPAPER
5278960	YANCEY (ZONE)	1/6/2002	900	Heavy Snow	0	0	0	0	NEWSPAPER
5283538	MITCHELL (ZONE)	2/3/2002	1600	Heavy Snow	0	0	0	0	NEWSPAPER
5283536	AVERY (ZONE)	2/3/2002	1600	Heavy Snow	0	0	0	0	NEWSPAPER
5283657	MITCHELL (ZONE)	2/17/2002	900	Heavy Snow	0	0	0	0	NEWSPAPER
5283655	AVERY (ZONE)	2/17/2002	900	Heavy Snow	0	0	0	0	NEWSPAPER
5283656	YANCEY (ZONE)	2/17/2002	900	Heavy Snow	0	0	0	0	NEWSPAPER
5283661	MITCHELL (ZONE)	2/26/2002	2000	Heavy Snow	0	0	0	0	NEWSPAPER

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5283658	AVERY (ZONE)	2/26/2002	2000	Heavy Snow	0	0	0	0	NEWSPAPER
5283660	YANCEY (ZONE)	2/26/2002	2000	Heavy Snow	0	0	0	0	NEWSPAPER
5321406	MITCHELL (ZONE)	11/17/2002	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5321403	AVERY (ZONE)	11/17/2002	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5321405	YANCEY (ZONE)	11/17/2002	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5321415	YANCEY (ZONE)	11/22/2002	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5321416	MITCHELL (ZONE)	11/22/2002	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5321413	AVERY (ZONE)	11/22/2002	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5326392	YANCEY (ZONE)	12/4/2002	1100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5326393	MITCHELL (ZONE)	12/4/2002	1100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5326390	AVERY (ZONE)	12/4/2002	1100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5339933	YANCEY (ZONE)	1/16/2003	1800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5339932	MITCHELL (ZONE)	1/16/2003	1800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5339931	AVERY (ZONE)	1/16/2003	1800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5339946	MITCHELL (ZONE)	1/23/2003	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5339944	AVERY (ZONE)	1/23/2003	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5339945	YANCEY (ZONE)	1/23/2003	400	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5344689	MITCHELL (ZONE)	2/6/2003	2000	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5344686	AVERY (ZONE)	2/6/2003	2000	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5344688	YANCEY (ZONE)	2/6/2003	2000	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5348547	YANCEY (ZONE)	3/30/2003	800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5348548	MITCHELL (ZONE)	3/30/2003	800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5348546	AVERY (ZONE)	3/30/2003	800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5354470	YANCEY (ZONE)	4/10/2003	1100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5354471	MITCHELL (ZONE)	4/10/2003	1100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5354468	AVERY (ZONE)	4/10/2003	1100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5380282	MITCHELL (ZONE)	12/18/2003	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5380279	AVERY (ZONE)	12/18/2003	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5380281	YANCEY (ZONE)	12/18/2003	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5383008	AVERY (ZONE)	1/25/2004	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5383015	MITCHELL (ZONE)	1/25/2004	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5383014	YANCEY (ZONE)	1/25/2004	1200	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5388170	MITCHELL (ZONE)	2/7/2004	1500	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5388168	AVERY (ZONE)	2/7/2004	1500	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5388169	YANCEY (ZONE)	2/7/2004	1500	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5388173	AVERY (ZONE)	2/12/2004	0	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5388175	YANCEY (ZONE)	2/12/2004	0	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5388176	MITCHELL (ZONE)	2/12/2004	0	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5388179	AVERY (ZONE)	2/15/2004	1500	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5388280	YANCEY (ZONE)	2/26/2004	1000	Heavy Snow	0	0	1000	0	EMERGENCY MANAGER
5388281	MITCHELL (ZONE)	2/26/2004	1000	Heavy Snow	0	0	1000	0	EMERGENCY MANAGER
5388278	AVERY (ZONE)	2/26/2004	1000	Heavy Snow	0	0	1000	0	EMERGENCY MANAGER
5429572	MITCHELL (ZONE)	12/11/2004	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5429569	AVERY (ZONE)	12/11/2004	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5429571	YANCEY (ZONE)	12/11/2004	600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5429580	MITCHELL (ZONE)	12/19/2004	1800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT

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5429577	AVERY (ZONE)	12/19/2004	1800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5429579	YANCEY (ZONE)	12/19/2004	1800	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5435389	YANCEY (ZONE)	1/22/2005	2300	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5435390	MITCHELL (ZONE)	1/22/2005	2300	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5435388	AVERY (ZONE)	1/22/2005	2300	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5441947	MITCHELL (ZONE)	2/10/2005	2100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5441946	AVERY (ZONE)	2/10/2005	2100	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5441956	AVERY (ZONE)	2/28/2005	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5441949	YANCEY (ZONE)	2/28/2005	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5441950	MITCHELL (ZONE)	2/28/2005	300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5445116	YANCEY (ZONE)	3/1/2005	1600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5445117	MITCHELL (ZONE)	3/1/2005	1600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5445114	AVERY (ZONE)	3/1/2005	1600	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5445118	AVERY (ZONE)	3/11/2005	2300	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5447270	MITCHELL (ZONE)	4/2/2005	1700	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5447269	AVERY (ZONE)	4/2/2005	1700	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5491522	AVERY (ZONE)	1/14/2006	1200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5490360	AVERY (ZONE)	2/5/2006	900	Heavy Snow	0	0	0	0	LAW ENFORCEMENT
5490369	MITCHELL (ZONE)	2/11/2006	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5490366	AVERY (ZONE)	2/11/2006	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5490368	YANCEY (ZONE)	2/11/2006	2200	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5499004	AVERY (ZONE)	3/25/2006	1000	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
5499006	MITCHELL (ZONE)	3/25/2006	1000	Heavy Snow	0	0	0	0	EMERGENCY MANAGER
13313	MITCHELL (ZONE)	1/9/2007	1000	Heavy Snow	0	0	0	0	County Official
13312	YANCEY (ZONE)	1/9/2007	1000	Heavy Snow	0	0	0	0	County Official
13307	AVERY (ZONE)	1/9/2007	1000	Heavy Snow	0	0	0	0	County Official
18748	MITCHELL (ZONE)	2/17/2007	1900	Heavy Snow	0	0	0	0	County Official
18746	AVERY (ZONE)	2/17/2007	1900	Heavy Snow	0	0	0	0	County Official
18747	YANCEY (ZONE)	2/17/2007	1900	Heavy Snow	0	0	0	0	County Official
29588	YANCEY (ZONE)	4/6/2007	1900	Heavy Snow	0	0	0	0	County Official
29589	MITCHELL (ZONE)	4/6/2007	1900	Heavy Snow	0	0	0	0	County Official
29585	AVERY (ZONE)	4/6/2007	1900	Heavy Snow	0	0	0	0	County Official
29594	MITCHELL (ZONE)	4/15/2007	1800	Heavy Snow	0	0	0	0	County Official
29593	YANCEY (ZONE)	4/15/2007	1800	Heavy Snow	0	0	0	0	County Official
29591	AVERY (ZONE)	4/15/2007	1800	Heavy Snow	0	0	0	0	County Official
76072	AVERY (ZONE)	1/1/2008	2000	Heavy Snow	0	0	0	0	County Official
76074	YANCEY (ZONE)	1/1/2008	2000	Heavy Snow	0	0	0	0	County Official
76075	MITCHELL (ZONE)	1/1/2008	2000	Heavy Snow	0	0	0	0	County Official
76099	MCDOWELL MOUNTAINS (ZONE)	1/16/2008	2000	Heavy Snow	0	0	0	0	County Official
76083	AVERY (ZONE)	1/16/2008	2000	Heavy Snow	0	0	0	0	County Official
76086	YANCEY (ZONE)	1/16/2008	2000	Heavy Snow	0	0	0	0	County Official
76087	MITCHELL (ZONE)	1/16/2008	2000	Heavy Snow	0	0	0	0	County Official
76100	EASTERN MCDOWELL (ZONE)	1/16/2008	2000	Heavy Snow	0	0	0	0	County Official
80822	YANCEY (ZONE)	2/26/2008	2200	Heavy Snow	0	0	0	0	County Official
80820	AVERY (ZONE)	2/26/2008	2200	Heavy Snow	0	0	0	0	County Official
80821	MITCHELL (ZONE)	2/26/2008	2200	Heavy Snow	0	0	0	0	County Official

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EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
142131	YANCEY (ZONE)	11/21/2008	0	Heavy Snow	0	0	0	0	County Official
142132	MITCHELL (ZONE)	11/21/2008	0	Heavy Snow	0	0	0	0	County Official
142130	AVERY (ZONE)	11/21/2008	0	Heavy Snow	0	0	0	0	County Official
146479	AVERY (ZONE)	12/1/2008	300	Heavy Snow	0	0	0	0	County Official
146480	MITCHELL (ZONE)	12/1/2008	300	Heavy Snow	0	0	0	0	County Official
146481	YANCEY (ZONE)	12/1/2008	300	Heavy Snow	0	0	0	0	County Official
150937	AVERY (ZONE)	1/8/2009	600	Heavy Snow	0	0	0	0	County Official
150939	YANCEY (ZONE)	1/8/2009	600	Heavy Snow	0	0	0	0	County Official
150938	MITCHELL (ZONE)	1/8/2009	600	Heavy Snow	0	0	0	0	County Official
150944	AVERY (ZONE)	1/18/2009	2000	Heavy Snow	0	0	0	0	County Official
150949	MITCHELL (ZONE)	1/18/2009	2000	Heavy Snow	0	0	0	0	County Official
150952	YANCEY (ZONE)	1/18/2009	2200	Heavy Snow	0	0	0	0	County Official
163179	YANCEY (ZONE)	4/7/2009	0	Heavy Snow	0	0	0	0	County Official
163177	AVERY (ZONE)	4/7/2009	0	Heavy Snow	0	0	0	0	County Official
163178	MITCHELL (ZONE)	4/7/2009	0	Heavy Snow	0	0	0	0	County Official
212740	AVERY (ZONE)	1/2/2010	200	Heavy Snow	0	0	0	0	County Official
212753	AVERY (ZONE)	1/4/2010	2300	Heavy Snow	0	0	0	0	County Official
212762	AVERY (ZONE)	1/7/2010	1800	Heavy Snow	0	0	0	0	County Official
212764	YANCEY (ZONE)	1/7/2010	1800	Heavy Snow	0	0	0	0	County Official
212765	MITCHELL (ZONE)	1/7/2010	1800	Heavy Snow	0	0	0	0	County Official
213316	EASTERN MCDOWELL (ZONE)	1/29/2010	1700	Heavy Snow	0	0	0	0	County Official
213301	AVERY (ZONE)	1/29/2010	1700	Heavy Snow	0	0	0	0	County Official
213305	YANCEY (ZONE)	1/29/2010	1700	Heavy Snow	0	0	0	0	County Official
213306	MITCHELL (ZONE)	1/29/2010	1700	Heavy Snow	0	0	0	0	County Official
213315	MCDOWELL MOUNTAINS (ZONE)	1/29/2010	1700	Heavy Snow	0	0	0	0	County Official
218026	MITCHELL (ZONE)	2/15/2010	1900	Heavy Snow	0	0	0	0	County Official
218028	AVERY (ZONE)	2/15/2010	1900	Heavy Snow	0	0	0	0	County Official
218027	YANCEY (ZONE)	2/15/2010	1900	Heavy Snow	0	0	0	0	County Official
218040	YANCEY (ZONE)	2/24/2010	2100	Heavy Snow	0	0	0	0	County Official
218038	AVERY (ZONE)	2/24/2010	2100	Heavy Snow	0	0	0	0	County Official
218041	MITCHELL (ZONE)	2/24/2010	2100	Heavy Snow	0	0	0	0	County Official
220803	MCDOWELL MOUNTAINS (ZONE)	3/2/2010	700	Heavy Snow	0	0	0	0	County Official
220796	AVERY (ZONE)	3/2/2010	700	Heavy Snow	0	0	0	0	County Official
220799	MITCHELL (ZONE)	3/2/2010	700	Heavy Snow	0	0	0	0	County Official
220798	YANCEY (ZONE)	3/2/2010	700	Heavy Snow	0	0	0	0	County Official
271609	AVERY (ZONE)	12/12/2010	200	Heavy Snow	0	0	0	0	County Official
271612	MITCHELL (ZONE)	12/12/2010	200	Heavy Snow	0	0	0	0	County Official
271611	YANCEY (ZONE)	12/12/2010	200	Heavy Snow	0	0	0	0	County Official
271910	MCDOWELL MOUNTAINS (ZONE)	12/25/2010	600	Heavy Snow	0	0	0	0	County Official
271883	MITCHELL (ZONE)	12/25/2010	700	Heavy Snow	0	0	0	0	County Official
271879	AVERY (ZONE)	12/25/2010	700	Heavy Snow	0	0	0	0	County Official
271882	YANCEY (ZONE)	12/25/2010	700	Heavy Snow	0	0	0	0	County Official
271942	EASTERN MCDOWELL (ZONE)	12/25/2010	900	Heavy Snow	0	0	0	0	County Official
276654	YANCEY (ZONE)	1/7/2011	1200	Heavy Snow	0	0	0	0	County Official
276652	AVERY (ZONE)	1/7/2011	1200	Heavy Snow	0	0	0	0	County Official
276653	MITCHELL (ZONE)	1/7/2011	1200	Heavy Snow	0	0	0	0	County Official

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EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
277889	EASTERN MCDOWELL (ZONE)	1/10/2011	200	Heavy Snow	0	0	0	0	County Official
276813	MCDOWELL MOUNTAINS (ZONE)	1/10/2011	400	Heavy Snow	0	0	0	0	County Official
276810	YANCEY (ZONE)	1/10/2011	400	Heavy Snow	0	0	0	0	County Official
276811	MITCHELL (ZONE)	1/10/2011	400	Heavy Snow	0	0	0	0	County Official
278386	AVERY (ZONE)	1/26/2011	1100	Heavy Snow	0	0	0	0	County Official
278387	MITCHELL (ZONE)	1/26/2011	1100	Heavy Snow	0	0	0	0	County Official
367810	MITCHELL (ZONE)	2/11/2012	600	Heavy Snow	0	0	0	0	County Official
367808	AVERY (ZONE)	2/11/2012	600	Heavy Snow	0	0	0	0	County Official
418131	MITCHELL (ZONE)	10/29/2012	500	Heavy Snow	0	0	0	0	County Official
418129	AVERY (ZONE)	10/29/2012	500	Heavy Snow	0	0	0	0	County Official
418130	YANCEY (ZONE)	10/29/2012	500	Heavy Snow	0	0	0	0	County Official
429250	MITCHELL (ZONE)	1/17/2013	1600	Heavy Snow	0	0	0	0	County Official
429249	YANCEY (ZONE)	1/17/2013	1600	Heavy Snow	0	0	0	0	County Official
429248	AVERY (ZONE)	1/17/2013	1600	Heavy Snow	0	0	0	0	County Official
436059	AVERY (ZONE)	2/2/2013	1900	Heavy Snow	0	0	0	0	Public
436058	YANCEY (ZONE)	2/2/2013	1900	Heavy Snow	0	0	0	0	Public
436060	MITCHELL (ZONE)	2/2/2013	1900	Heavy Snow	0	0	0	0	Public
503091	AVERY (ZONE)	3/6/2014	2000	Heavy Snow	0	0	0	0	CoCoRaHS
503094	YANCEY (ZONE)	3/6/2014	2000	Heavy Snow	0	0	0	0	CoCoRaHS
507960	MITCHELL (ZONE)	3/6/2014	2000	Heavy Snow	0	0	0	0	CoCoRaHS
507962	MCDOWELL MOUNTAINS (ZONE)	3/6/2014	2000	Heavy Snow	0	0	0	0	CoCoRaHS
542251	AVERY (ZONE)	11/1/2014	0	Heavy Snow	0	0	0	0	CoCoRaHS
542257	YANCEY (ZONE)	11/1/2014	0	Heavy Snow	0	0	0	0	CoCoRaHS
542255	MITCHELL (ZONE)	11/1/2014	0	Heavy Snow	0	0	0	0	CoCoRaHS



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EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5537241	MITCHELL (ZONE)	1/26/1996	1100	Ice Storm	0	0	0	0	
5537238	AVERY (ZONE)	1/26/1996	1100	Ice Storm	0	0	0	0	
5537240	YANCEY (ZONE)	1/26/1996	1100	Ice Storm	0	0	0	0	
5536396	YANCEY (ZONE)	2/2/1996	300	Ice Storm	0	0	0	0	
5536390	AVERY (ZONE)	2/2/1996	300	Ice Storm	0	0	5000000	0	
5536397	MITCHELL (ZONE)	2/2/1996	300	Ice Storm	0	0	0	0	
5586112	AVERY (ZONE)	1/9/1997	0	Ice Storm	0	0	0	0	
5586265	YANCEY (ZONE)	1/9/1997	0	Ice Storm	0	0	0	0	
5586266	MITCHELL (ZONE)	1/9/1997	0	Ice Storm	0	0	0	0	
5680911	MITCHELL (ZONE)	1/2/1999	1500	Ice Storm	0	0	0	0	LAW ENFORCEMENT
5129092	YANCEY (ZONE)	1/29/2000	2100	Ice Storm	0	0	0	0	LAW ENFORCEMENT
5129083	AVERY (ZONE)	1/29/2000	2100	Ice Storm	0	0	0	0	LAW ENFORCEMENT
5129089	MITCHELL (ZONE)	1/29/2000	2100	Ice Storm	0	0	0	0	LAW ENFORCEMENT
5283270	MITCHELL (ZONE)	2/6/2002	1600	Ice Storm	0	0	0	0	FIRE DEPT/RESCUE SQUAD
5441943	MITCHELL (ZONE)	2/3/2005	300	Ice Storm	0	0	0	0	LAW ENFORCEMENT
5488734	MITCHELL (ZONE)	12/15/2005	1000	Ice Storm	0	0	25000	0	EMERGENCY MANAGER
5488733	YANCEY (ZONE)	12/15/2005	1000	Ice Storm	0	0	25000	0	EMERGENCY MANAGER
5488731	AVERY (ZONE)	12/15/2005	1000	Ice Storm	0	0	25000	0	EMERGENCY MANAGER
80816	MCDOWELL MOUNTAINS (ZONE)	2/1/2008	0	Ice Storm	0	0	0	0	County Official
80810	MITCHELL (ZONE)	2/1/2008	0	Ice Storm	0	0	0	0	County Official
80808	AVERY (ZONE)	2/1/2008	0	Ice Storm	0	0	0	0	County Official
80809	YANCEY (ZONE)	2/1/2008	0	Ice Storm	0	0	0	0	County Official
207326	AVERY (ZONE)	12/24/2009	2300	Ice Storm	0	0	0	0	County Official
207327	YANCEY (ZONE)	12/24/2009	2300	Ice Storm	0	0	0	0	County Official
207332	MCDOWELL MOUNTAINS (ZONE)	12/24/2009	2300	Ice Storm	0	0	0	0	County Official
207328	MITCHELL (ZONE)	12/24/2009	2300	Ice Storm	0	0	0	0	County Official
436472	MCDOWELL MOUNTAINS (ZONE)	2/26/2013	100	Ice Storm	0	0	0	0	County Official

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EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5536965	YANCEY (ZONE)	1/6/1996	1200	Winter Storm	0	0	0	0	
5536963	AVERY (ZONE)	1/6/1996	1200	Winter Storm	0	0	0	0	
5536966	MITCHELL (ZONE)	1/6/1996	1200	Winter Storm	0	0	0	0	
5536986	AVERY (ZONE)	1/11/1996	1800	Winter Storm	0	0	0	0	
5536988	YANCEY (ZONE)	1/11/1996	1800	Winter Storm	0	0	0	0	
5536989	MITCHELL (ZONE)	1/11/1996	1800	Winter Storm	0	0	0	0	
5588798	YANCEY (ZONE)	2/13/1997	1000	Winter Storm	0	0	0	0	
5380112	MITCHELL (ZONE)	12/4/2003	600	Winter Storm	0	0	0	0	LAW ENFORCEMENT
5380109	AVERY (ZONE)	12/4/2003	600	Winter Storm	0	0	0	0	LAW ENFORCEMENT
5380111	YANCEY (ZONE)	12/4/2003	600	Winter Storm	0	0	0	0	LAW ENFORCEMENT
5435391	AVERY (ZONE)	1/29/2005	800	Winter Storm	0	0	0	0	EMERGENCY MANAGER
5435394	YANCEY (ZONE)	1/29/2005	1000	Winter Storm	0	0	0	0	EMERGENCY MANAGER
5435395	MITCHELL (ZONE)	1/29/2005	1000	Winter Storm	0	0	0	0	EMERGENCY MANAGER
5485649	AVERY (ZONE)	11/22/2005	300	Winter Storm	0	0	0	0	LAW ENFORCEMENT
156331	AVERY (ZONE)	2/2/2009	2000	Winter Storm	0	0	0	0	County Official
156333	YANCEY (ZONE)	2/2/2009	2000	Winter Storm	0	0	0	0	County Official
156332	MITCHELL (ZONE)	2/2/2009	2000	Winter Storm	0	0	0	0	County Official
161393	MITCHELL (ZONE)	3/1/2009	1300	Winter Storm	0	0	0	0	County Official
161397	MCDOWELL MOUNTAINS (ZONE)	3/1/2009	1300	Winter Storm	0	0	0	0	County Official
161394	YANCEY (ZONE)	3/1/2009	1300	Winter Storm	0	0	0	0	County Official
161392	AVERY (ZONE)	3/1/2009	1300	Winter Storm	0	0	0	0	County Official
207268	AVERY (ZONE)	12/18/2009	700	Winter Storm	0	0	0	0	County Official
207274	MCDOWELL MOUNTAINS (ZONE)	12/18/2009	700	Winter Storm	0	0	0	0	County Official
207271	MITCHELL (ZONE)	12/18/2009	700	Winter Storm	0	0	0	0	County Official
207270	YANCEY (ZONE)	12/18/2009	700	Winter Storm	0	0	0	0	County Official
207279	EASTERN MCDOWELL (ZONE)	12/18/2009	800	Winter Storm	0	0	0	0	County Official
216731	AVERY (ZONE)	2/4/2010	2100	Winter Storm	0	0	0	0	County Official
216740	EASTERN MCDOWELL (ZONE)	2/4/2010	2100	Winter Storm	0	0	0	0	County Official
216739	MCDOWELL MOUNTAINS (ZONE)	2/4/2010	2100	Winter Storm	0	0	0	0	County Official
216734	MITCHELL (ZONE)	2/4/2010	2100	Winter Storm	0	0	0	0	County Official
216733	YANCEY (ZONE)	2/4/2010	2100	Winter Storm	0	0	0	0	County Official
271651	AVERY (ZONE)	12/15/2010	2300	Winter Storm	0	0	0	0	County Official
271652	MITCHELL (ZONE)	12/15/2010	2300	Winter Storm	0	0	0	0	County Official
442149	YANCEY (ZONE)	3/5/2013	2200	Winter Storm	0	0	0	0	Trained Spotter
442302	MITCHELL (ZONE)	3/25/2013	0	Winter Storm	0	0	0	0	Public
442301	AVERY (ZONE)	3/25/2013	0	Winter Storm	0	0	0	0	Public
442304	YANCEY (ZONE)	3/25/2013	0	Winter Storm	0	0	0	0	Public
501159	MCDOWELL MOUNTAINS (ZONE)	2/12/2014	500	Winter Storm	0	0	0	0	County Official
501160	EASTERN MCDOWELL (ZONE)	2/12/2014	500	Winter Storm	0	0	0	0	County Official
501164	YANCEY (ZONE)	2/12/2014	700	Winter Storm	0	0	0	0	County Official
501165	MITCHELL (ZONE)	2/12/2014	700	Winter Storm	0	0	0	0	County Official
501162	AVERY (ZONE)	2/12/2014	700	Winter Storm	0	0	0	0	County Official
561547	MCDOWELL MOUNTAINS (ZONE)	2/16/2015	1300	Winter Storm	0	0	0	0	COOP Observer
561549	EASTERN MCDOWELL (ZONE)	2/16/2015	1300	Winter Storm	0	0	0	0	COOP Observer
561586	MITCHELL (ZONE)	2/16/2015	1400	Winter Storm	0	0	0	0	CoCoRaHS
561585	AVERY (ZONE)	2/16/2015	1400	Winter Storm	0	0	0	0	CoCoRaHS

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561587	YANCEY (ZONE)	2/16/2015	1400	Winter Storm	0	0	0	0	CoCoRaHS
561809	AVERY (ZONE)	2/25/2015	1800	Winter Storm	0	0	0	0	COOP Observer
561812	YANCEY (ZONE)	2/25/2015	1800	Winter Storm	0	0	0	0	COOP Observer
561813	MITCHELL (ZONE)	2/25/2015	1800	Winter Storm	0	0	0	0	COOP Observer
561824	MCDOWELL MOUNTAINS (ZONE)	2/25/2015	1800	Winter Storm	0	0	0	0	COOP Observer
561825	EASTERN MCDOWELL (ZONE)	2/25/2015	1800	Winter Storm	0	0	0	0	COOP Observer

NCDL Avery Winter Weather  
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EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5535866	AVERY (ZONE)	2/7/1996	1200	Winter Weather	0	0	0	0	
5535879	AVERY (ZONE)	2/11/1996	2300	Winter Weather	0	0	0	0	
5535902	AVERY (ZONE)	2/16/1996	200	Winter Weather	0	0	0	0	
5543147	AVERY (ZONE)	4/1/1996	2000	Winter Weather	0	0	0	0	
5543156	AVERY (ZONE)	4/8/1996	400	Winter Weather	0	0	0	0	
5579287	AVERY (ZONE)	11/9/1996	0	Winter Weather	0	0	0	0	
5579294	AVERY (ZONE)	11/10/1996	0	Winter Weather	0	0	0	0	
5578079	AVERY (ZONE)	12/8/1996	0	Winter Weather	0	0	0	0	
5578102	AVERY (ZONE)	12/22/1996	2100	Winter Weather	0	0	0	0	
5586310	AVERY (ZONE)	1/15/1997	2100	Winter Weather	0	0	0	0	
5594151	AVERY (ZONE)	3/31/1997	0	Winter Weather	0	0	0	0	
5592852	AVERY (ZONE)	4/18/1997	0	Winter Weather	0	0	0	0	
5624706	AVERY (ZONE)	12/8/1997	1100	Winter Weather	0	0	0	0	
5627260	AVERY (ZONE)	1/15/1998	130	Winter Weather	0	0	0	0	
5627262	AVERY (ZONE)	1/15/1998	2100	Winter Weather	0	0	0	0	
5627265	AVERY (ZONE)	1/18/1998	2000	Winter Weather	0	0	0	0	
5627399	AVERY (ZONE)	1/24/1998	600	Winter Weather	0	0	0	0	
5627400	AVERY (ZONE)	1/24/1998	1800	Winter Weather	0	0	0	0	
5635456	AVERY (ZONE)	2/6/1998	100	Winter Weather	0	0	0	0	
5638311	AVERY (ZONE)	3/2/1998	0	Winter Weather	0	0	0	0	
5638322	AVERY (ZONE)	3/3/1998	0	Winter Weather	0	0	0	0	
5638325	AVERY (ZONE)	3/10/1998	400	Winter Weather	0	0	0	0	
5638327	AVERY (ZONE)	3/10/1998	1800	Winter Weather	0	0	0	0	
5638428	AVERY (ZONE)	3/11/1998	1600	Winter Weather	0	0	0	0	
5677015	AVERY (ZONE)	11/6/1998	1100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5675034	AVERY (ZONE)	12/17/1998	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688820	AVERY (ZONE)	2/19/1999	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688172	AVERY (ZONE)	2/28/1999	1400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692146	AVERY (ZONE)	3/1/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692150	AVERY (ZONE)	3/3/1999	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5691435	AVERY (ZONE)	3/15/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5691526	AVERY (ZONE)	3/26/1999	1400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692242	AVERY (ZONE)	4/29/1999	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5720941	AVERY (ZONE)	11/2/1999	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5130010	AVERY (ZONE)	1/16/2000	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5168803	AVERY (ZONE)	12/13/2000	1700	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5168149	AVERY (ZONE)	12/16/2000	300	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5282663	AVERY (ZONE)	1/21/2002	400	Winter Weather	0	0	0	0	NEWSPAPER
5282666	AVERY (ZONE)	1/22/2002	2300	Winter Weather	0	0	0	0	NEWSPAPER
5283636	AVERY (ZONE)	2/6/2002	900	Winter Weather	0	0	0	0	NEWSPAPER
5326517	AVERY (ZONE)	12/14/2002	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5326619	AVERY (ZONE)	12/22/2002	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5326630	AVERY (ZONE)	12/25/2002	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT

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5338936	AVERY (ZONE)	1/3/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5338940	AVERY (ZONE)	1/6/2003	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5339038	AVERY (ZONE)	1/19/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5340993	AVERY (ZONE)	1/26/2003	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5344830	AVERY (ZONE)	2/1/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345069	AVERY (ZONE)	2/9/2003	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345084	AVERY (ZONE)	2/14/2003	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5344836	AVERY (ZONE)	2/18/2003	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5344936	AVERY (ZONE)	2/23/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345236	AVERY (ZONE)	2/27/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5348549	AVERY (ZONE)	3/30/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5348703	AVERY (ZONE)	3/30/2003	1500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5331203	AVERY (ZONE)	11/28/2003	1500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5380293	AVERY (ZONE)	12/3/2003	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379774	AVERY (ZONE)	12/5/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379785	AVERY (ZONE)	12/10/2003	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379791	AVERY (ZONE)	12/14/2003	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379794	AVERY (ZONE)	12/17/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379799	AVERY (ZONE)	12/18/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5383175	AVERY (ZONE)	1/9/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5383307	AVERY (ZONE)	1/27/2004	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5388398	AVERY (ZONE)	2/5/2004	1300	Winter Weather	0	0	250	0	LAW ENFORCEMENT
5385064	AVERY (ZONE)	2/15/2004	700	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389133	AVERY (ZONE)	3/18/2004	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389169	AVERY (ZONE)	3/30/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389288	AVERY (ZONE)	3/31/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389291	AVERY (ZONE)	3/31/2004	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5429592	AVERY (ZONE)	12/14/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5435545	AVERY (ZONE)	1/16/2005	1700	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5435921	AVERY (ZONE)	1/21/2005	2000	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5436283	AVERY (ZONE)	1/29/2005	400	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5441964	AVERY (ZONE)	2/2/2005	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442083	AVERY (ZONE)	2/10/2005	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442054	AVERY (ZONE)	2/27/2005	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442074	AVERY (ZONE)	2/28/2005	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445518	AVERY (ZONE)	3/1/2005	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445119	AVERY (ZONE)	3/8/2005	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445425	AVERY (ZONE)	3/11/2005	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445427	AVERY (ZONE)	3/17/2005	200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5447489	AVERY (ZONE)	4/2/2005	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5447394	AVERY (ZONE)	4/23/2005	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5477991	AVERY (ZONE)	10/25/2005	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5485655	AVERY (ZONE)	11/21/2005	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488841	AVERY (ZONE)	12/3/2005	1000	Winter Weather	0	0	0	0	LAW ENFORCEMENT

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5488850	AVERY (ZONE)	12/8/2005	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488870	AVERY (ZONE)	12/11/2005	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488945	AVERY (ZONE)	12/15/2005	200	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5488871	AVERY (ZONE)	12/26/2005	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5491747	AVERY (ZONE)	1/14/2006	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5491760	AVERY (ZONE)	1/30/2006	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490487	AVERY (ZONE)	2/4/2006	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490457	AVERY (ZONE)	2/8/2006	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490469	AVERY (ZONE)	2/11/2006	200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490493	AVERY (ZONE)	2/18/2006	700	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5499009	AVERY (ZONE)	3/3/2006	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5499012	AVERY (ZONE)	3/20/2006	1200	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5499104	AVERY (ZONE)	3/22/2006	2100	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5926	AVERY (ZONE)	11/19/2006	1700	Winter Weather	0	0	0	0	County Official
9102	AVERY (ZONE)	12/7/2006	1400	Winter Weather	0	0	0	0	County Official
9097	AVERY (ZONE)	12/26/2006	1600	Winter Weather	0	0	0	0	County Official
13353	AVERY (ZONE)	1/18/2007	600	Winter Weather	0	0	0	0	County Official
13540	AVERY (ZONE)	1/21/2007	600	Winter Weather	0	0	0	0	County Official
13577	AVERY (ZONE)	1/25/2007	900	Winter Weather	0	0	0	0	County Official
13589	AVERY (ZONE)	1/28/2007	500	Winter Weather	0	0	0	0	County Official
18724	AVERY (ZONE)	2/1/2007	700	Winter Weather	0	0	0	0	County Official
76146	AVERY (ZONE)	1/19/2008	1100	Winter Weather	0	0	0	0	County Official
76246	AVERY (ZONE)	1/31/2008	2100	Winter Weather	0	0	0	0	County Official
138489	AVERY (ZONE)	10/27/2008	1700	Winter Weather	0	0	0	0	County Official
141961	AVERY (ZONE)	11/16/2008	400	Winter Weather	0	0	0	0	County Official
141970	AVERY (ZONE)	11/18/2008	0	Winter Weather	0	0	0	0	County Official
143103	AVERY (ZONE)	11/25/2008	1000	Winter Weather	0	0	0	0	County Official
146495	AVERY (ZONE)	12/23/2008	1630	Winter Weather	0	0	0	0	County Official
151734	AVERY (ZONE)	1/10/2009	800	Winter Weather	0	0	0	0	County Official
151740	AVERY (ZONE)	1/13/2009	2100	Winter Weather	0	0	0	0	County Official
156354	AVERY (ZONE)	2/22/2009	400	Winter Weather	0	0	0	0	County Official
200392	AVERY (ZONE)	10/17/2009	1400	Winter Weather	0	0	0	0	County Official
207319	AVERY (ZONE)	12/8/2009	1900	Winter Weather	0	0	0	0	County Official
207298	AVERY (ZONE)	12/12/2009	1800	Winter Weather	0	0	0	0	County Official
212770	AVERY (ZONE)	1/9/2010	1800	Winter Weather	0	0	0	0	County Official
212833	AVERY (ZONE)	1/12/2010	500	Winter Weather	0	0	0	0	County Official
212846	AVERY (ZONE)	1/18/2010	500	Winter Weather	0	0	0	0	Newspaper
212887	AVERY (ZONE)	1/21/2010	900	Winter Weather	0	0	0	0	County Official
216415	AVERY (ZONE)	2/2/2010	300	Winter Weather	0	0	0	0	County Official
217987	AVERY (ZONE)	2/12/2010	1800	Winter Weather	0	0	0	0	County Official
218012	AVERY (ZONE)	2/15/2010	600	Winter Weather	0	0	0	0	County Official
220807	AVERY (ZONE)	3/3/2010	500	Winter Weather	0	0	0	0	County Official
220816	AVERY (ZONE)	3/22/2010	1400	Winter Weather	0	0	0	0	County Official
271562	AVERY (ZONE)	12/4/2010	600	Winter Weather	0	0	0	0	County Official

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276632	AVERY (ZONE)	1/5/2011	1900	Winter Weather	0	0	0	0	County Official
276814	AVERY (ZONE)	1/10/2011	500	Winter Weather	0	0	0	0	County Official
277913	AVERY (ZONE)	1/11/2011	2200	Winter Weather	0	0	0	0	County Official
278330	AVERY (ZONE)	1/17/2011	1700	Winter Weather	0	0	0	0	County Official
278351	AVERY (ZONE)	1/24/2011	300	Winter Weather	0	0	0	0	County Official
293838	AVERY (ZONE)	3/6/2011	1000	Winter Weather	0	0	0	0	County Official
293848	AVERY (ZONE)	3/11/2011	1600	Winter Weather	0	0	0	0	County Official
351705	AVERY (ZONE)	10/1/2011	2100	Winter Weather	0	0	0	0	County Official
354824	AVERY (ZONE)	11/29/2011	1200	Winter Weather	0	0	0	0	County Official
356384	AVERY (ZONE)	12/7/2011	1500	Winter Weather	0	0	0	0	County Official
360995	AVERY (ZONE)	1/2/2012	1900	Winter Weather	0	0	0	0	County Official
361015	AVERY (ZONE)	1/4/2012	1700	Winter Weather	0	0	0	0	County Official
361011	AVERY (ZONE)	1/12/2012	1800	Winter Weather	0	0	0	0	County Official
367822	AVERY (ZONE)	2/19/2012	0	Winter Weather	0	0	0	0	County Official
372588	AVERY (ZONE)	3/4/2012	2000	Winter Weather	0	0	0	0	County Official
423386	AVERY (ZONE)	12/21/2012	500	Winter Weather	0	0	0	0	County Official
423390	AVERY (ZONE)	12/26/2012	2100	Winter Weather	0	0	0	0	County Official
423393	AVERY (ZONE)	12/28/2012	2000	Winter Weather	0	0	0	0	County Official
423403	AVERY (ZONE)	12/29/2012	1700	Winter Weather	0	0	0	0	County Official
436038	AVERY (ZONE)	2/1/2013	0	Winter Weather	0	0	0	0	County Official
436061	AVERY (ZONE)	2/7/2013	1400	Winter Weather	0	0	0	0	County Official
436064	AVERY (ZONE)	2/15/2013	1800	Winter Weather	0	0	0	0	County Official
436444	AVERY (ZONE)	2/19/2013	400	Winter Weather	0	0	0	0	Public
436458	AVERY (ZONE)	2/22/2013	100	Winter Weather	0	0	0	0	County Official
436462	AVERY (ZONE)	2/26/2013	0	Winter Weather	0	0	0	0	County Official
436486	AVERY (ZONE)	2/27/2013	2200	Winter Weather	0	0	0	0	County Official
436492	AVERY (ZONE)	3/1/2013	0	Winter Weather	0	0	0	0	Public
442155	AVERY (ZONE)	3/5/2013	2300	Winter Weather	0	0	0	0	Trained Spotter
442171	AVERY (ZONE)	3/20/2013	2100	Winter Weather	0	0	0	0	Public
447345	AVERY (ZONE)	4/4/2013	600	Winter Weather	0	0	0	0	County Official
485749	AVERY (ZONE)	11/25/2013	1700	Winter Weather	0	0	0	0	County Official
485804	AVERY (ZONE)	11/26/2013	2300	Winter Weather	0	0	0	0	County Official
488812	AVERY (ZONE)	12/8/2013	700	Winter Weather	0	0	0	0	County Official
488827	AVERY (ZONE)	12/14/2013	200	Winter Weather	0	0	0	0	County Official
501071	AVERY (ZONE)	2/10/2014	500	Winter Weather	0	0	0	0	County Official
503116	AVERY (ZONE)	3/17/2014	500	Winter Weather	0	0	0	0	Trained Spotter
505289	AVERY (ZONE)	3/24/2014	2300	Winter Weather	0	0	0	0	CoCoRaHS
505308	AVERY (ZONE)	3/29/2014	2100	Winter Weather	0	0	0	0	CoCoRaHS
542265	AVERY (ZONE)	10/31/2014	1900	Winter Weather	0	0	0	0	911 Call Center
547636	AVERY (ZONE)	11/26/2014	400	Winter Weather	0	0	0	0	COOP Observer
557052	AVERY (ZONE)	1/13/2015	1800	Winter Weather	0	0	0	0	911 Call Center
557034	AVERY (ZONE)	1/23/2015	600	Winter Weather	0	0	0	0	CoCoRaHS
557042	AVERY (ZONE)	1/26/2015	300	Winter Weather	0	0	0	0	CoCoRaHS
561510	AVERY (ZONE)	2/2/2015	1000	Winter Weather	0	0	0	0	COOP Observer

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561642	AVERY (ZONE)	2/18/2015	1300	Winter Weather	0	0	0	0	CoCoRaHS
562093	AVERY (ZONE)	3/1/2015	400	Winter Weather	0	0	0	0	911 Call Center
562115	AVERY (ZONE)	3/27/2015	1900	Winter Weather	0	0	0	0	COOP Observer



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13490	MCDOWELL MOUNTAINS (ZONE)	1/9/2007	1000	Winter Weather	0	0	0	0	County Official
13374	MCDOWELL MOUNTAINS (ZONE)	1/18/2007	600	Winter Weather	0	0	0	0	County Official
13378	EASTERN MCDOWELL (ZONE)	1/18/2007	600	Winter Weather	0	0	0	0	County Official
13560	EASTERN MCDOWELL (ZONE)	1/21/2007	600	Winter Weather	0	0	0	0	County Official
13559	MCDOWELL MOUNTAINS (ZONE)	1/21/2007	600	Winter Weather	0	0	0	0	County Official
13614	EASTERN MCDOWELL (ZONE)	1/28/2007	2100	Winter Weather	0	0	0	0	County Official
13613	MCDOWELL MOUNTAINS (ZONE)	1/28/2007	2100	Winter Weather	0	0	0	0	County Official
18735	EASTERN MCDOWELL (ZONE)	2/1/2007	700	Winter Weather	0	0	0	0	County Official
18734	MCDOWELL MOUNTAINS (ZONE)	2/1/2007	700	Winter Weather	0	0	0	0	County Official
18755	MCDOWELL MOUNTAINS (ZONE)	2/17/2007	1800	Winter Weather	0	0	0	0	County Official
29601	MCDOWELL MOUNTAINS (ZONE)	4/6/2007	2100	Winter Weather	0	0	0	0	County Official
76165	MCDOWELL MOUNTAINS (ZONE)	1/19/2008	1100	Winter Weather	0	0	0	0	County Official
76166	EASTERN MCDOWELL (ZONE)	1/19/2008	1100	Winter Weather	0	0	0	0	County Official
76254	MCDOWELL MOUNTAINS (ZONE)	1/31/2008	2100	Winter Weather	0	0	0	0	County Official
138497	MCDOWELL MOUNTAINS (ZONE)	10/27/2008	1700	Winter Weather	0	0	0	0	County Official
141980	MCDOWELL MOUNTAINS (ZONE)	11/18/2008	0	Winter Weather	0	0	0	0	County Official
142080	MCDOWELL MOUNTAINS (ZONE)	11/21/2008	0	Winter Weather	0	0	0	0	County Official
146489	MCDOWELL MOUNTAINS (ZONE)	12/1/2008	300	Winter Weather	0	0	0	0	County Official
151773	MCDOWELL MOUNTAINS (ZONE)	1/19/2009	2100	Winter Weather	0	0	0	0	County Official
151783	EASTERN MCDOWELL (ZONE)	1/20/2009	200	Winter Weather	0	0	0	0	County Official
161416	EASTERN MCDOWELL (ZONE)	3/1/2009	1400	Winter Weather	0	0	0	0	County Official
207314	EASTERN MCDOWELL (ZONE)	12/12/2009	1800	Winter Weather	0	0	0	0	County Official
207313	MCDOWELL MOUNTAINS (ZONE)	12/12/2009	1800	Winter Weather	0	0	0	0	County Official
207340	EASTERN MCDOWELL (ZONE)	12/25/2009	100	Winter Weather	0	0	0	0	County Official
207356	MCDOWELL MOUNTAINS (ZONE)	12/30/2009	2100	Winter Weather	0	0	0	0	County Official
207357	EASTERN MCDOWELL (ZONE)	12/30/2009	2100	Winter Weather	0	0	0	0	County Official
212860	EASTERN MCDOWELL (ZONE)	1/18/2010	500	Winter Weather	0	0	0	0	Newspaper
212859	MCDOWELL MOUNTAINS (ZONE)	1/18/2010	500	Winter Weather	0	0	0	0	Newspaper
212895	MCDOWELL MOUNTAINS (ZONE)	1/21/2010	900	Winter Weather	0	0	0	0	County Official
216421	MCDOWELL MOUNTAINS (ZONE)	2/2/2010	300	Winter Weather	0	0	0	0	County Official
218056	MCDOWELL MOUNTAINS (ZONE)	2/10/2010	400	Winter Weather	0	0	0	0	County Official
217998	MCDOWELL MOUNTAINS (ZONE)	2/12/2010	1800	Winter Weather	0	0	0	0	County Official
217997	EASTERN MCDOWELL (ZONE)	2/12/2010	1800	Winter Weather	0	0	0	0	County Official
218037	MCDOWELL MOUNTAINS (ZONE)	2/15/2010	1900	Winter Weather	0	0	0	0	County Official
220793	EASTERN MCDOWELL (ZONE)	3/2/2010	700	Winter Weather	0	0	0	0	County Official
271574	MCDOWELL MOUNTAINS (ZONE)	12/4/2010	600	Winter Weather	0	0	0	0	County Official
271586	EASTERN MCDOWELL (ZONE)	12/12/2010	0	Winter Weather	0	0	0	0	County Official
271585	MCDOWELL MOUNTAINS (ZONE)	12/12/2010	0	Winter Weather	0	0	0	0	County Official
271636	MCDOWELL MOUNTAINS (ZONE)	12/15/2010	2100	Winter Weather	0	0	0	0	County Official
271668	EASTERN MCDOWELL (ZONE)	12/16/2010	0	Winter Weather	0	0	0	0	County Official
276646	MCDOWELL MOUNTAINS (ZONE)	1/6/2011	600	Winter Weather	0	0	0	0	County Official
276647	EASTERN MCDOWELL (ZONE)	1/6/2011	600	Winter Weather	0	0	0	0	County Official
276663	MCDOWELL MOUNTAINS (ZONE)	1/7/2011	1400	Winter Weather	0	0	0	0	County Official
278337	MCDOWELL MOUNTAINS (ZONE)	1/17/2011	1700	Winter Weather	0	0	0	0	County Official
278341	EASTERN MCDOWELL (ZONE)	1/18/2011	400	Winter Weather	0	0	0	0	County Official

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278367	MCDOWELL MOUNTAINS (ZONE)	1/24/2011	300	Winter Weather	0	0	0	0	County Official
361010	MCDOWELL MOUNTAINS (ZONE)	1/2/2012	1900	Winter Weather	0	0	0	0	County Official
367833	MCDOWELL MOUNTAINS (ZONE)	2/19/2012	0	Winter Weather	0	0	0	0	County Official
417654	MCDOWELL MOUNTAINS (ZONE)	10/29/2012	900	Winter Weather	0	0	0	0	County Official
423402	EASTERN MCDOWELL (ZONE)	12/28/2012	2000	Winter Weather	0	0	0	0	County Official
423401	MCDOWELL MOUNTAINS (ZONE)	12/28/2012	2000	Winter Weather	0	0	0	0	County Official
429272	MCDOWELL MOUNTAINS (ZONE)	1/17/2013	1700	Winter Weather	0	0	0	0	County Official
429305	MCDOWELL MOUNTAINS (ZONE)	1/25/2013	600	Winter Weather	0	0	0	0	County Official
429343	EASTERN MCDOWELL (ZONE)	1/25/2013	600	Winter Weather	0	0	0	0	County Official
436479	EASTERN MCDOWELL (ZONE)	2/26/2013	300	Winter Weather	0	0	0	0	County Official
447354	MCDOWELL MOUNTAINS (ZONE)	4/4/2013	600	Winter Weather	0	0	0	0	County Official
485756	MCDOWELL MOUNTAINS (ZONE)	11/25/2013	1700	Winter Weather	0	0	0	0	County Official
485819	MCDOWELL MOUNTAINS (ZONE)	11/26/2013	2300	Winter Weather	0	0	0	0	County Official
488833	MCDOWELL MOUNTAINS (ZONE)	12/14/2013	200	Winter Weather	0	0	0	0	County Official
503114	EASTERN MCDOWELL (ZONE)	3/6/2014	2100	Winter Weather	0	0	0	0	CoCoRaHS
503129	MCDOWELL MOUNTAINS (ZONE)	3/17/2014	500	Winter Weather	0	0	0	0	Trained Spotter
557064	MCDOWELL MOUNTAINS (ZONE)	1/13/2015	1800	Winter Weather	0	0	0	0	911 Call Center
557041	MCDOWELL MOUNTAINS (ZONE)	1/23/2015	600	Winter Weather	0	0	0	0	CoCoRaHS
562104	MCDOWELL MOUNTAINS (ZONE)	3/1/2015	400	Winter Weather	0	0	0	0	911 Call Center
562100	EASTERN MCDOWELL (ZONE)	3/1/2015	400	Winter Weather	0	0	0	0	911 Call Center

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5535869	MITCHELL (ZONE)	2/7/1996	1200	Winter Weather	0	0	0	0	
5535882	MITCHELL (ZONE)	2/11/1996	2300	Winter Weather	0	0	0	0	
5535905	MITCHELL (ZONE)	2/16/1996	200	Winter Weather	0	0	0	0	
5543150	MITCHELL (ZONE)	4/1/1996	2000	Winter Weather	0	0	0	0	
5543159	MITCHELL (ZONE)	4/8/1996	400	Winter Weather	0	0	0	0	
5579290	MITCHELL (ZONE)	11/9/1996	0	Winter Weather	0	0	0	0	
5579297	MITCHELL (ZONE)	11/10/1996	0	Winter Weather	0	0	0	0	
5578061	MITCHELL (ZONE)	12/5/1996	1200	Winter Weather	0	0	0	0	
5578081	MITCHELL (ZONE)	12/8/1996	0	Winter Weather	0	0	0	0	
5588794	MITCHELL (ZONE)	2/10/1997	800	Winter Weather	0	0	0	0	
5594153	MITCHELL (ZONE)	3/31/1997	0	Winter Weather	0	0	0	0	
5624707	MITCHELL (ZONE)	12/8/1997	1100	Winter Weather	0	0	0	0	
5627261	MITCHELL (ZONE)	1/15/1998	130	Winter Weather	0	0	0	0	
5627274	MITCHELL (ZONE)	1/18/1998	2000	Winter Weather	0	0	0	0	
5627402	MITCHELL (ZONE)	1/24/1998	1800	Winter Weather	0	0	0	0	
5635437	MITCHELL (ZONE)	2/3/1998	0	Winter Weather	0	0	0	0	
5635457	MITCHELL (ZONE)	2/6/1998	100	Winter Weather	0	0	0	0	
5638316	MITCHELL (ZONE)	3/2/1998	0	Winter Weather	0	0	0	0	
5638426	MITCHELL (ZONE)	3/10/1998	1800	Winter Weather	0	0	0	0	
5638492	MITCHELL (ZONE)	3/11/1998	1600	Winter Weather	0	0	0	0	
5688816	MITCHELL (ZONE)	2/19/1999	1200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688905	MITCHELL (ZONE)	2/19/1999	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688059	MITCHELL (ZONE)	2/23/1999	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688072	MITCHELL (ZONE)	2/24/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688174	MITCHELL (ZONE)	2/28/1999	1400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692148	MITCHELL (ZONE)	3/1/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692154	MITCHELL (ZONE)	3/3/1999	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5691433	MITCHELL (ZONE)	3/13/1999	1200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5691439	MITCHELL (ZONE)	3/15/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5691529	MITCHELL (ZONE)	3/26/1999	1400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692249	MITCHELL (ZONE)	4/29/1999	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5130017	MITCHELL (ZONE)	1/16/2000	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5168811	MITCHELL (ZONE)	12/13/2000	1700	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5282664	MITCHELL (ZONE)	1/21/2002	400	Winter Weather	0	0	0	0	NEWSPAPER
5283639	MITCHELL (ZONE)	2/6/2002	900	Winter Weather	0	0	0	0	NEWSPAPER
5326520	MITCHELL (ZONE)	12/14/2002	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5326622	MITCHELL (ZONE)	12/22/2002	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5326633	MITCHELL (ZONE)	12/25/2002	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5338938	MITCHELL (ZONE)	1/3/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5338943	MITCHELL (ZONE)	1/6/2003	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5339039	MITCHELL (ZONE)	1/19/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5340994	MITCHELL (ZONE)	1/26/2003	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5344833	MITCHELL (ZONE)	2/1/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT

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5345071	MITCHELL (ZONE)	2/9/2003	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345085	MITCHELL (ZONE)	2/14/2003	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5344932	MITCHELL (ZONE)	2/18/2003	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345138	MITCHELL (ZONE)	2/23/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345571	MITCHELL (ZONE)	2/27/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5348551	MITCHELL (ZONE)	3/30/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5348706	MITCHELL (ZONE)	3/30/2003	1500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5331207	MITCHELL (ZONE)	11/28/2003	1500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5380296	MITCHELL (ZONE)	12/3/2003	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379777	MITCHELL (ZONE)	12/5/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379787	MITCHELL (ZONE)	12/10/2003	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379793	MITCHELL (ZONE)	12/14/2003	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379797	MITCHELL (ZONE)	12/17/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379802	MITCHELL (ZONE)	12/18/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5383182	MITCHELL (ZONE)	1/9/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5383310	MITCHELL (ZONE)	1/27/2004	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5388299	MITCHELL (ZONE)	2/2/2004	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5388400	MITCHELL (ZONE)	2/5/2004	1300	Winter Weather	0	0	250	0	LAW ENFORCEMENT
5385067	MITCHELL (ZONE)	2/15/2004	1200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389136	MITCHELL (ZONE)	3/18/2004	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389171	MITCHELL (ZONE)	3/30/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389289	MITCHELL (ZONE)	3/31/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389293	MITCHELL (ZONE)	3/31/2004	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5429595	MITCHELL (ZONE)	12/14/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5435548	MITCHELL (ZONE)	1/16/2005	1700	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5435925	MITCHELL (ZONE)	1/22/2005	400	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5436280	MITCHELL (ZONE)	1/29/2005	300	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5441961	MITCHELL (ZONE)	2/2/2005	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442084	MITCHELL (ZONE)	2/10/2005	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442057	MITCHELL (ZONE)	2/27/2005	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442077	MITCHELL (ZONE)	2/28/2005	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445521	MITCHELL (ZONE)	3/1/2005	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445122	MITCHELL (ZONE)	3/8/2005	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445419	MITCHELL (ZONE)	3/11/2005	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445434	MITCHELL (ZONE)	3/17/2005	200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5447410	MITCHELL (ZONE)	4/2/2005	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5447397	MITCHELL (ZONE)	4/23/2005	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5477993	MITCHELL (ZONE)	10/25/2005	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5485658	MITCHELL (ZONE)	11/21/2005	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488856	MITCHELL (ZONE)	12/8/2005	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488156	MITCHELL (ZONE)	12/11/2005	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488948	MITCHELL (ZONE)	12/15/2005	200	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5488874	MITCHELL (ZONE)	12/26/2005	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT

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5491750	MITCHELL (ZONE)	1/14/2006	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5491763	MITCHELL (ZONE)	1/30/2006	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490379	MITCHELL (ZONE)	2/4/2006	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490460	MITCHELL (ZONE)	2/8/2006	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490473	MITCHELL (ZONE)	2/11/2006	200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490496	MITCHELL (ZONE)	2/18/2006	700	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5499011	MITCHELL (ZONE)	3/3/2006	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5499015	MITCHELL (ZONE)	3/20/2006	1200	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5499107	MITCHELL (ZONE)	3/22/2006	2100	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5943	MITCHELL (ZONE)	11/19/2006	1700	Winter Weather	0	0	0	0	County Official
9105	MITCHELL (ZONE)	12/7/2006	1400	Winter Weather	0	0	0	0	County Official
9099	MITCHELL (ZONE)	12/26/2006	1600	Winter Weather	0	0	0	0	County Official
13358	MITCHELL (ZONE)	1/18/2007	600	Winter Weather	0	0	0	0	County Official
13545	MITCHELL (ZONE)	1/21/2007	600	Winter Weather	0	0	0	0	County Official
13580	MITCHELL (ZONE)	1/25/2007	900	Winter Weather	0	0	0	0	County Official
13592	MITCHELL (ZONE)	1/28/2007	500	Winter Weather	0	0	0	0	County Official
18727	MITCHELL (ZONE)	2/1/2007	700	Winter Weather	0	0	0	0	County Official
76151	MITCHELL (ZONE)	1/19/2008	1100	Winter Weather	0	0	0	0	County Official
76248	MITCHELL (ZONE)	1/31/2008	2100	Winter Weather	0	0	0	0	County Official
138498	MITCHELL (ZONE)	10/27/2008	1700	Winter Weather	0	0	0	0	County Official
141965	MITCHELL (ZONE)	11/16/2008	400	Winter Weather	0	0	0	0	County Official
141973	MITCHELL (ZONE)	11/18/2008	0	Winter Weather	0	0	0	0	County Official
143104	MITCHELL (ZONE)	11/25/2008	1000	Winter Weather	0	0	0	0	County Official
146496	MITCHELL (ZONE)	12/23/2008	1630	Winter Weather	0	0	0	0	County Official
151737	MITCHELL (ZONE)	1/10/2009	800	Winter Weather	0	0	0	0	County Official
151741	MITCHELL (ZONE)	1/13/2009	2100	Winter Weather	0	0	0	0	County Official
156355	MITCHELL (ZONE)	2/22/2009	400	Winter Weather	0	0	0	0	County Official
200383	MITCHELL (ZONE)	10/17/2009	1400	Winter Weather	0	0	0	0	County Official
207303	MITCHELL (ZONE)	12/12/2009	1800	Winter Weather	0	0	0	0	County Official
207345	MITCHELL (ZONE)	12/30/2009	2100	Winter Weather	0	0	0	0	County Official
212746	MITCHELL (ZONE)	1/2/2010	200	Winter Weather	0	0	0	0	County Official
212756	MITCHELL (ZONE)	1/4/2010	2300	Winter Weather	0	0	0	0	County Official
212773	MITCHELL (ZONE)	1/9/2010	1800	Winter Weather	0	0	0	0	County Official
212842	MITCHELL (ZONE)	1/12/2010	500	Winter Weather	0	0	0	0	County Official
212849	MITCHELL (ZONE)	1/18/2010	500	Winter Weather	0	0	0	0	Newspaper
212889	MITCHELL (ZONE)	1/21/2010	900	Winter Weather	0	0	0	0	County Official
216418	MITCHELL (ZONE)	2/2/2010	300	Winter Weather	0	0	0	0	County Official
217999	MITCHELL (ZONE)	2/12/2010	1800	Winter Weather	0	0	0	0	County Official
218015	MITCHELL (ZONE)	2/15/2010	600	Winter Weather	0	0	0	0	County Official
220810	MITCHELL (ZONE)	3/3/2010	500	Winter Weather	0	0	0	0	County Official
220819	MITCHELL (ZONE)	3/22/2010	1400	Winter Weather	0	0	0	0	County Official
271565	MITCHELL (ZONE)	12/4/2010	600	Winter Weather	0	0	0	0	County Official
276633	MITCHELL (ZONE)	1/5/2011	1900	Winter Weather	0	0	0	0	County Official

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277912	MITCHELL (ZONE)	1/11/2011	2200	Winter Weather	0	0	0	0	County Official
278331	MITCHELL (ZONE)	1/17/2011	1700	Winter Weather	0	0	0	0	County Official
278352	MITCHELL (ZONE)	1/24/2011	300	Winter Weather	0	0	0	0	County Official
293841	MITCHELL (ZONE)	3/6/2011	1000	Winter Weather	0	0	0	0	County Official
293849	MITCHELL (ZONE)	3/11/2011	1600	Winter Weather	0	0	0	0	County Official
351706	MITCHELL (ZONE)	10/1/2011	2100	Winter Weather	0	0	0	0	County Official
354827	MITCHELL (ZONE)	11/29/2011	1200	Winter Weather	0	0	0	0	County Official
356383	MITCHELL (ZONE)	12/7/2011	1500	Winter Weather	0	0	0	0	County Official
360998	MITCHELL (ZONE)	1/2/2012	1900	Winter Weather	0	0	0	0	County Official
361017	MITCHELL (ZONE)	1/4/2012	1700	Winter Weather	0	0	0	0	County Official
361014	MITCHELL (ZONE)	1/12/2012	1800	Winter Weather	0	0	0	0	County Official
372592	MITCHELL (ZONE)	3/4/2012	2000	Winter Weather	0	0	0	0	County Official
423387	MITCHELL (ZONE)	12/21/2012	500	Winter Weather	0	0	0	0	County Official
423392	MITCHELL (ZONE)	12/26/2012	2100	Winter Weather	0	0	0	0	County Official
423394	MITCHELL (ZONE)	12/28/2012	2000	Winter Weather	0	0	0	0	County Official
423406	MITCHELL (ZONE)	12/29/2012	1700	Winter Weather	0	0	0	0	County Official
436041	MITCHELL (ZONE)	2/1/2013	0	Winter Weather	0	0	0	0	County Official
436062	MITCHELL (ZONE)	2/7/2013	1400	Winter Weather	0	0	0	0	County Official
436067	MITCHELL (ZONE)	2/15/2013	1800	Winter Weather	0	0	0	0	County Official
436445	MITCHELL (ZONE)	2/19/2013	400	Winter Weather	0	0	0	0	Public
436459	MITCHELL (ZONE)	2/22/2013	100	Winter Weather	0	0	0	0	County Official
436464	MITCHELL (ZONE)	2/26/2013	0	Winter Weather	0	0	0	0	County Official
436463	MITCHELL (ZONE)	2/26/2013	0	Winter Weather	0	0	0	0	County Official
436487	MITCHELL (ZONE)	2/27/2013	2200	Winter Weather	0	0	0	0	County Official
436493	MITCHELL (ZONE)	3/1/2013	0	Winter Weather	0	0	0	0	Public
442156	MITCHELL (ZONE)	3/5/2013	2300	Winter Weather	0	0	0	0	Trained Spotter
442170	MITCHELL (ZONE)	3/20/2013	2100	Winter Weather	0	0	0	0	Public
447346	MITCHELL (ZONE)	4/4/2013	600	Winter Weather	0	0	0	0	County Official
485751	MITCHELL (ZONE)	11/25/2013	1700	Winter Weather	0	0	0	0	County Official
485806	MITCHELL (ZONE)	11/26/2013	2300	Winter Weather	0	0	0	0	County Official
488814	MITCHELL (ZONE)	12/8/2013	700	Winter Weather	0	0	0	0	County Official
488829	MITCHELL (ZONE)	12/14/2013	200	Winter Weather	0	0	0	0	County Official
501074	MITCHELL (ZONE)	2/10/2014	500	Winter Weather	0	0	0	0	County Official
503121	MITCHELL (ZONE)	3/17/2014	500	Winter Weather	0	0	0	0	Trained Spotter
505293	MITCHELL (ZONE)	3/24/2014	2300	Winter Weather	0	0	0	0	CoCoRaHS
505310	MITCHELL (ZONE)	3/29/2014	2100	Winter Weather	0	0	0	0	CoCoRaHS
542269	MITCHELL (ZONE)	10/31/2014	1900	Winter Weather	0	0	0	0	911 Call Center
545076	MITCHELL (ZONE)	11/17/2014	1900	Winter Weather	0	0	0	0	CoCoRaHS
547641	MITCHELL (ZONE)	11/26/2014	400	Winter Weather	0	0	0	0	COOP Observer
557056	MITCHELL (ZONE)	1/13/2015	1800	Winter Weather	0	0	0	0	911 Call Center
557037	MITCHELL (ZONE)	1/23/2015	600	Winter Weather	0	0	0	0	CoCoRaHS
557045	MITCHELL (ZONE)	1/26/2015	300	Winter Weather	0	0	0	0	CoCoRaHS
561514	MITCHELL (ZONE)	2/2/2015	1000	Winter Weather	0	0	0	0	COOP Observer

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561645	MITCHELL (ZONE)	2/18/2015	1300	Winter Weather	0	0	0	0	CoCoRaHS
562105	MITCHELL (ZONE)	3/1/2015	400	Winter Weather	0	0	0	0	911 Call Center
562119	MITCHELL (ZONE)	3/27/2015	1900	Winter Weather	0	0	0	0	COOP Observer

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5535868	YANCEY (ZONE)	2/7/1996	1200	Winter Weather	0	0	0	0	
5535881	YANCEY (ZONE)	2/11/1996	2300	Winter Weather	0	0	0	0	
5535904	YANCEY (ZONE)	2/16/1996	200	Winter Weather	0	0	0	0	
5543149	YANCEY (ZONE)	4/1/1996	2000	Winter Weather	0	0	0	0	
5543158	YANCEY (ZONE)	4/8/1996	400	Winter Weather	0	0	0	0	
5579289	YANCEY (ZONE)	11/9/1996	0	Winter Weather	0	0	0	0	
5579296	YANCEY (ZONE)	11/10/1996	0	Winter Weather	0	0	0	0	
5578060	YANCEY (ZONE)	12/5/1996	1200	Winter Weather	0	0	0	0	
5578080	YANCEY (ZONE)	12/8/1996	0	Winter Weather	0	0	0	0	
5586312	YANCEY (ZONE)	1/15/1997	2100	Winter Weather	0	0	0	0	
5588793	YANCEY (ZONE)	2/10/1997	800	Winter Weather	0	0	0	0	
5594152	YANCEY (ZONE)	3/31/1997	0	Winter Weather	0	0	0	0	
5624708	YANCEY (ZONE)	12/8/1997	1100	Winter Weather	0	0	0	0	
5627385	YANCEY (ZONE)	1/18/1998	2000	Winter Weather	0	0	0	0	
5627403	YANCEY (ZONE)	1/24/1998	1800	Winter Weather	0	0	0	0	
5638321	YANCEY (ZONE)	3/2/1998	0	Winter Weather	0	0	0	0	
5638496	YANCEY (ZONE)	3/11/1998	1600	Winter Weather	0	0	0	0	
5643356	YANCEY (ZONE)	4/10/1998	500	Winter Weather	0	0	0	0	
5675039	YANCEY (ZONE)	12/17/1998	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688716	YANCEY (ZONE)	2/1/1999	0	Winter Weather	0	0	0	0	NEWSPAPER
5688819	YANCEY (ZONE)	2/19/1999	1200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688054	YANCEY (ZONE)	2/19/1999	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688061	YANCEY (ZONE)	2/23/1999	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688171	YANCEY (ZONE)	2/24/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5688175	YANCEY (ZONE)	2/28/1999	1400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692149	YANCEY (ZONE)	3/1/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692157	YANCEY (ZONE)	3/3/1999	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5691434	YANCEY (ZONE)	3/13/1999	1200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5691441	YANCEY (ZONE)	3/15/1999	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692293	YANCEY (ZONE)	3/26/1999	1400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5692251	YANCEY (ZONE)	4/29/1999	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5720945	YANCEY (ZONE)	11/2/1999	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5720460	YANCEY (ZONE)	12/24/1999	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5130022	YANCEY (ZONE)	1/16/2000	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5168812	YANCEY (ZONE)	12/13/2000	1700	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5282665	YANCEY (ZONE)	1/21/2002	400	Winter Weather	0	0	0	0	NEWSPAPER
5283638	YANCEY (ZONE)	2/6/2002	900	Winter Weather	0	0	0	0	NEWSPAPER
5326519	YANCEY (ZONE)	12/14/2002	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5326621	YANCEY (ZONE)	12/22/2002	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5326632	YANCEY (ZONE)	12/25/2002	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5338937	YANCEY (ZONE)	1/3/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5338942	YANCEY (ZONE)	1/6/2003	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5339040	YANCEY (ZONE)	1/19/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT



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EVENT_ID	CZ_NAME_STR	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5340995	YANCEY (ZONE)	1/26/2003	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5344832	YANCEY (ZONE)	2/1/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345072	YANCEY (ZONE)	2/9/2003	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345087	YANCEY (ZONE)	2/14/2003	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5344938	YANCEY (ZONE)	2/23/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5345570	YANCEY (ZONE)	2/27/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5348550	YANCEY (ZONE)	3/30/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5348705	YANCEY (ZONE)	3/30/2003	1500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5331206	YANCEY (ZONE)	11/28/2003	1500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5380295	YANCEY (ZONE)	12/3/2003	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379776	YANCEY (ZONE)	12/5/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379786	YANCEY (ZONE)	12/10/2003	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379792	YANCEY (ZONE)	12/14/2003	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379796	YANCEY (ZONE)	12/17/2003	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5379801	YANCEY (ZONE)	12/18/2003	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5383181	YANCEY (ZONE)	1/9/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5383309	YANCEY (ZONE)	1/27/2004	1800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5388298	YANCEY (ZONE)	2/2/2004	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5388399	YANCEY (ZONE)	2/5/2004	1300	Winter Weather	0	0	250	0	LAW ENFORCEMENT
5385068	YANCEY (ZONE)	2/15/2004	1200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389135	YANCEY (ZONE)	3/18/2004	600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389170	YANCEY (ZONE)	3/30/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389290	YANCEY (ZONE)	3/31/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5389292	YANCEY (ZONE)	3/31/2004	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5429594	YANCEY (ZONE)	12/14/2004	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5435547	YANCEY (ZONE)	1/16/2005	1700	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5435924	YANCEY (ZONE)	1/22/2005	400	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5436279	YANCEY (ZONE)	1/29/2005	300	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5441967	YANCEY (ZONE)	2/2/2005	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5441973	YANCEY (ZONE)	2/10/2005	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442056	YANCEY (ZONE)	2/27/2005	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5442076	YANCEY (ZONE)	2/28/2005	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445520	YANCEY (ZONE)	3/1/2005	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445121	YANCEY (ZONE)	3/8/2005	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445418	YANCEY (ZONE)	3/11/2005	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5445433	YANCEY (ZONE)	3/17/2005	200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5447409	YANCEY (ZONE)	4/2/2005	800	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5447396	YANCEY (ZONE)	4/23/2005	2100	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5477992	YANCEY (ZONE)	10/25/2005	500	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5485657	YANCEY (ZONE)	11/21/2005	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488843	YANCEY (ZONE)	12/3/2005	1000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488855	YANCEY (ZONE)	12/8/2005	1600	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5488155	YANCEY (ZONE)	12/11/2005	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT

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5488947	YANCEY (ZONE)	12/15/2005	200	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5488873	YANCEY (ZONE)	12/26/2005	0	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5491749	YANCEY (ZONE)	1/14/2006	400	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5491762	YANCEY (ZONE)	1/30/2006	1900	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490378	YANCEY (ZONE)	2/4/2006	2200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490459	YANCEY (ZONE)	2/8/2006	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490472	YANCEY (ZONE)	2/11/2006	200	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5490495	YANCEY (ZONE)	2/18/2006	700	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5499010	YANCEY (ZONE)	3/3/2006	2000	Winter Weather	0	0	0	0	LAW ENFORCEMENT
5499014	YANCEY (ZONE)	3/20/2006	1200	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5499106	YANCEY (ZONE)	3/22/2006	2100	Winter Weather	0	0	0	0	EMERGENCY MANAGER
5939	YANCEY (ZONE)	11/19/2006	1700	Winter Weather	0	0	0	0	County Official
9104	YANCEY (ZONE)	12/7/2006	1400	Winter Weather	0	0	0	0	County Official
9098	YANCEY (ZONE)	12/26/2006	1600	Winter Weather	0	0	0	0	County Official
13357	YANCEY (ZONE)	1/18/2007	600	Winter Weather	0	0	0	0	County Official
13544	YANCEY (ZONE)	1/21/2007	600	Winter Weather	0	0	0	0	County Official
13579	YANCEY (ZONE)	1/25/2007	900	Winter Weather	0	0	0	0	County Official
13591	YANCEY (ZONE)	1/28/2007	500	Winter Weather	0	0	0	0	County Official
18726	YANCEY (ZONE)	2/1/2007	700	Winter Weather	0	0	0	0	County Official
76150	YANCEY (ZONE)	1/19/2008	1100	Winter Weather	0	0	0	0	County Official
76247	YANCEY (ZONE)	1/31/2008	2100	Winter Weather	0	0	0	0	County Official
138503	YANCEY (ZONE)	10/27/2008	1700	Winter Weather	0	0	0	0	County Official
141967	YANCEY (ZONE)	11/16/2008	400	Winter Weather	0	0	0	0	County Official
141972	YANCEY (ZONE)	11/18/2008	0	Winter Weather	0	0	0	0	County Official
143105	YANCEY (ZONE)	11/25/2008	1000	Winter Weather	0	0	0	0	County Official
146497	YANCEY (ZONE)	12/23/2008	1630	Winter Weather	0	0	0	0	County Official
151736	YANCEY (ZONE)	1/10/2009	800	Winter Weather	0	0	0	0	County Official
151742	YANCEY (ZONE)	1/13/2009	2100	Winter Weather	0	0	0	0	County Official
156356	YANCEY (ZONE)	2/22/2009	400	Winter Weather	0	0	0	0	County Official
200382	YANCEY (ZONE)	10/17/2009	1400	Winter Weather	0	0	0	0	County Official
207302	YANCEY (ZONE)	12/12/2009	1800	Winter Weather	0	0	0	0	County Official
207344	YANCEY (ZONE)	12/30/2009	2100	Winter Weather	0	0	0	0	County Official
212745	YANCEY (ZONE)	1/2/2010	200	Winter Weather	0	0	0	0	County Official
212755	YANCEY (ZONE)	1/4/2010	2300	Winter Weather	0	0	0	0	County Official
212772	YANCEY (ZONE)	1/9/2010	1800	Winter Weather	0	0	0	0	County Official
212841	YANCEY (ZONE)	1/12/2010	500	Winter Weather	0	0	0	0	County Official
212848	YANCEY (ZONE)	1/18/2010	500	Winter Weather	0	0	0	0	Newspaper
212888	YANCEY (ZONE)	1/21/2010	900	Winter Weather	0	0	0	0	County Official
216417	YANCEY (ZONE)	2/2/2010	300	Winter Weather	0	0	0	0	County Official
218001	YANCEY (ZONE)	2/12/2010	1800	Winter Weather	0	0	0	0	County Official
218014	YANCEY (ZONE)	2/15/2010	600	Winter Weather	0	0	0	0	County Official
220809	YANCEY (ZONE)	3/3/2010	500	Winter Weather	0	0	0	0	County Official
220818	YANCEY (ZONE)	3/22/2010	1400	Winter Weather	0	0	0	0	County Official

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271564	YANCEY (ZONE)	12/4/2010	600	Winter Weather	0	0	0	0	County Official
271623	YANCEY (ZONE)	12/15/2010	2100	Winter Weather	0	0	0	0	County Official
276634	YANCEY (ZONE)	1/5/2011	1900	Winter Weather	0	0	0	0	County Official
277911	YANCEY (ZONE)	1/11/2011	2200	Winter Weather	0	0	0	0	County Official
278332	YANCEY (ZONE)	1/17/2011	1700	Winter Weather	0	0	0	0	County Official
278353	YANCEY (ZONE)	1/24/2011	300	Winter Weather	0	0	0	0	County Official
278379	YANCEY (ZONE)	1/26/2011	1000	Winter Weather	0	0	0	0	County Official
293840	YANCEY (ZONE)	3/6/2011	1000	Winter Weather	0	0	0	0	County Official
293850	YANCEY (ZONE)	3/11/2011	1600	Winter Weather	0	0	0	0	County Official
351707	YANCEY (ZONE)	10/1/2011	2100	Winter Weather	0	0	0	0	County Official
354826	YANCEY (ZONE)	11/29/2011	1200	Winter Weather	0	0	0	0	County Official
356382	YANCEY (ZONE)	12/7/2011	1500	Winter Weather	0	0	0	0	County Official
360997	YANCEY (ZONE)	1/2/2012	1900	Winter Weather	0	0	0	0	County Official
361016	YANCEY (ZONE)	1/4/2012	1700	Winter Weather	0	0	0	0	County Official
361013	YANCEY (ZONE)	1/12/2012	1800	Winter Weather	0	0	0	0	County Official
367818	YANCEY (ZONE)	2/11/2012	700	Winter Weather	0	0	0	0	County Official
372591	YANCEY (ZONE)	3/4/2012	2000	Winter Weather	0	0	0	0	County Official
423388	YANCEY (ZONE)	12/21/2012	500	Winter Weather	0	0	0	0	County Official
423391	YANCEY (ZONE)	12/26/2012	2100	Winter Weather	0	0	0	0	County Official
423395	YANCEY (ZONE)	12/28/2012	2000	Winter Weather	0	0	0	0	County Official
423405	YANCEY (ZONE)	12/29/2012	1700	Winter Weather	0	0	0	0	County Official
429287	YANCEY (ZONE)	1/25/2013	600	Winter Weather	0	0	0	0	County Official
436040	YANCEY (ZONE)	2/1/2013	0	Winter Weather	0	0	0	0	County Official
436063	YANCEY (ZONE)	2/7/2013	1400	Winter Weather	0	0	0	0	County Official
436066	YANCEY (ZONE)	2/15/2013	1800	Winter Weather	0	0	0	0	County Official
436446	YANCEY (ZONE)	2/19/2013	400	Winter Weather	0	0	0	0	Public
436465	YANCEY (ZONE)	2/26/2013	0	Winter Weather	0	0	0	0	County Official
436488	YANCEY (ZONE)	2/27/2013	2200	Winter Weather	0	0	0	0	County Official
436494	YANCEY (ZONE)	3/1/2013	0	Winter Weather	0	0	0	0	Public
442169	YANCEY (ZONE)	3/20/2013	2100	Winter Weather	0	0	0	0	Public
447347	YANCEY (ZONE)	4/4/2013	600	Winter Weather	0	0	0	0	County Official
485750	YANCEY (ZONE)	11/25/2013	1700	Winter Weather	0	0	0	0	County Official
485805	YANCEY (ZONE)	11/26/2013	2300	Winter Weather	0	0	0	0	County Official
488813	YANCEY (ZONE)	12/8/2013	700	Winter Weather	0	0	0	0	County Official
488828	YANCEY (ZONE)	12/14/2013	200	Winter Weather	0	0	0	0	County Official
501073	YANCEY (ZONE)	2/10/2014	500	Winter Weather	0	0	0	0	County Official
503120	YANCEY (ZONE)	3/17/2014	500	Winter Weather	0	0	0	0	Trained Spotter
505292	YANCEY (ZONE)	3/24/2014	2300	Winter Weather	0	0	0	0	CoCoRaHS
505309	YANCEY (ZONE)	3/29/2014	2100	Winter Weather	0	0	0	0	CoCoRaHS
542271	YANCEY (ZONE)	10/31/2014	1900	Winter Weather	0	0	0	0	911 Call Center
545077	YANCEY (ZONE)	11/17/2014	1900	Winter Weather	0	0	0	0	CoCoRaHS
547644	YANCEY (ZONE)	11/26/2014	400	Winter Weather	0	0	0	0	COOP Observer
557055	YANCEY (ZONE)	1/13/2015	1800	Winter Weather	0	0	0	0	911 Call Center

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557036	YANCEY (ZONE)	1/23/2015	600	Winter Weather	0	0	0	0	CoCoRaHS
557044	YANCEY (ZONE)	1/26/2015	300	Winter Weather	0	0	0	0	CoCoRaHS
561512	YANCEY (ZONE)	2/2/2015	1000	Winter Weather	0	0	0	0	COOP Observer
561644	YANCEY (ZONE)	2/18/2015	1300	Winter Weather	0	0	0	0	CoCoRaHS
562107	YANCEY (ZONE)	3/1/2015	400	Winter Weather	0	0	0	0	911 Call Center
562121	YANCEY (ZONE)	3/27/2015	1900	Winter Weather	0	0	0	0	COOP Observer

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5565988	MITCHELL CO.	BULADEAN	8/3/1996	1800	Flash Flood	0	0	0	0		
5566001	MCDOWELL CO.	WOODLAWN	8/12/1996	1000	Flash Flood	0	0	0	0		
5579282	AVERY CO.	COUNTYWIDE	11/8/1996	400	Flash Flood	0	0	0	0		
5628656	AVERY CO.	COUNTYWIDE	1/7/1998	2000	Flash Flood	0	0	0	0		
5628658	YANCEY CO.	COUNTYWIDE	1/7/1998	2000	Flash Flood	0	0	0	0		
5628659	MITCHELL CO.	BAKERSVILLE	1/7/1998	2100	Flash Flood	0	0	5000000	0		
5628663	YANCEY CO.	COUNTYWIDE	1/7/1998	2300	Flash Flood	0	0	200000	0		
5628664	AVERY CO.	PLUMTREE	1/7/1998	2300	Flash Flood	0	0	5500000	0		
5628665	MCDOWELL CO.	WEST PORTION	1/7/1998	2300	Flash Flood	0	0	25000	0		
5628667	AVERY CO.	COUNTYWIDE	1/8/1998	300	Flash Flood	0	0	0	0		
5628782	YANCEY CO.	COUNTYWIDE	1/8/1998	300	Flash Flood	0	0	0	0		
5635454	MITCHELL CO.	COUNTYWIDE	2/3/1998	1900	Flash Flood	0	0	0	0		
5635567	AVERY CO.	COUNTYWIDE	2/17/1998	1015	Flash Flood	0	0	0	0		
5635566	MITCHELL CO.	COUNTYWIDE	2/17/1998	1015	Flash Flood	0	0	0	0		
5144963	MITCHELL CO.	COUNTYWIDE	5/24/2000	1700	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5254204	YANCEY CO.	CELO	6/28/2001	1615	Flash Flood	0	0	0	0		EMERGENCY MANAGER
5278976	YANCEY CO.	COUNTYWIDE	1/23/2002	1300	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5309544	AVERY CO.	SOUTH PORTION	7/2/2002	1630	Flash Flood	0	0	0	0		DEPT OF HIGHWAYS
5344611	MITCHELL CO.	BAKERSVILLE	2/22/2003	2000	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5344612	YANCEY CO.	BURNSVILLE	2/22/2003	2000	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5344613	AVERY CO.	ELK PARK	2/22/2003	2130	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5363113	MCDOWELL CO.	NEBO	6/15/2003	2230	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5334515	YANCEY CO.	NORTHWEST PORTION	7/5/2003	1600	Flash Flood	0	0	100000	0		NEWSPAPER
5334522	MCDOWELL CO.	MARION	7/12/2003	2030	Flash Flood	0	0	0	0		EMERGENCY MANAGER
5329841	YANCEY CO.	PENSACOLA	7/22/2003	1500	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5330109	MCDOWELL CO.	SUGAR HILL	7/30/2003	2100	Flash Flood	0	0	0	0		EMERGENCY MANAGER
5374449	MITCHELL CO.	BULADEAN	8/23/2003	400	Flash Flood	0	0	0	0		EMERGENCY MANAGER
5411577	AVERY CO.	NEWLAND	6/12/2004	1710	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5423025	AVERY CO.	LINVILLE	9/1/2004	2045	Flash Flood	0	0	10000	0		LAW ENFORCEMENT
5423026	MITCHELL CO.	BAKERSVILLE	9/2/2004	145	Flash Flood	0	0	10000	0		LAW ENFORCEMENT
5469879	YANCEY CO.	CELO	7/11/2005	2045	Flash Flood	0	0	0	0		LAW ENFORCEMENT
5469839	MCDOWELL CO.	MARION	7/18/2005	1650	Flash Flood	0	0	0	0		TRAINED SPOTTER
5469840	MITCHELL CO.	SPRUCE PINE	7/18/2005	1650	Flash Flood	0	0	0	0		TRAINED SPOTTER
5469841	YANCEY CO.	BURNSVILLE	7/19/2005	1645	Flash Flood	0	0	40000	0		LAW ENFORCEMENT
5472739	MCDOWELL CO.	NEBO	8/18/2005	0	Flash Flood	0	0	0	0		POST OFFICE
50475	AVERY CO.	NEWLAND	7/26/2007	1655	Flash Flood	0	0	0	0		County Official
121606	MITCHELL CO.	SPRUCE PINE	6/14/2008	1255	Flash Flood	0	0	0	0		Trained Spotter
131029	MCDOWELL CO.	DAVISTOWN	8/26/2008	1130	Flash Flood	0	0	0	0		County Official
131036	YANCEY CO.	WINDOM	8/26/2008	2000	Flash Flood	0	0	50000	0		County Official
170551	AVERY CO.	MINNEAPOLIS	5/15/2009	1550	Flash Flood	0	0	0	5000		County Official
170574	AVERY CO.	CRANBERRY	5/16/2009	2140	Flash Flood	0	0	10000	0		Emergency Manager
257453	YANCEY CO.	BALD MTN	8/17/2010	1700	Flash Flood	0	0	20000	0		County Official
294119	MCDOWELL CO.	NORTH COVE CROSSING	3/6/2011	1030	Flash Flood	0	0	0	0		Emergency Manager
353942	AVERY CO.	ELK PARK	11/28/2011	2200	Flash Flood	0	0	0	0		County Official
353944	AVERY CO.	CROSSNORE	11/28/2011	2200	Flash Flood	0	0	0	0		County Official
390789	YANCEY CO.	SPIVEY GAP	6/22/2012	1900	Flash Flood	0	0	10000	0		Emergency Manager
413999	AVERY CO.	THREE MILE	9/5/2012	2100	Flash Flood	0	0	100000	0		Newspaper
414333	MITCHELL CO.	SPRUCE PINE	9/18/2012	926	Flash Flood	0	0	0	0		911 Call Center
414605	AVERY CO.	CROSSNORE	9/18/2012	1030	Flash Flood	0	0	0	0		Department of Highways
414608	AVERY CO.	INGALLS	9/18/2012	1030	Flash Flood	0	0	0	0		Department of Highways
431825	AVERY CO.	NEWLAND	1/30/2013	1715	Flash Flood	0	0	0	0		Emergency Manager
458022	YANCEY CO.	DAY BOOK	5/19/2013	1530	Flash Flood	0	0	150000	0		Social Media
456707	MITCHELL CO.	WEBBS	5/21/2013	2115	Flash Flood	0	0	10000	0		Broadcast Media
470277	MITCHELL CO.	TOECANE	7/3/2013	1105	Flash Flood	0	0	600000	0		911 Call Center
470294	AVERY CO.	ROARING CREEK	7/3/2013	1710	Flash Flood	0	0	10000	0		Emergency Manager
470432	AVERY CO.	NEWLAND	7/7/2013	1630	Flash Flood	0	0	0	0		County Official

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544977	YANCEY CO.	BUSICK	10/14/2014	2008	Flash Flood	0	0	5000	0	911 Call Center	Heavy Rain
567126	AVERY CO.	CROSSNORE	4/19/2015	1650	Flash Flood	0	0	2000	0	911 Call Center	Heavy Rain
574053	AVERY CO.	BANNER ELK	5/11/2015	2122	Flash Flood	0	0	5000	0	Fire Department/Rescue	Heavy Rain

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EVENT_ID	CZ_NAME_STR	BEGIN_LOCATION	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE	FLOOD_CAUSE
5537228	AVERY (ZONE)		1/18/1996	2300	Flood	0	0	0	0		
5537227	MITCHELL (ZONE)		1/18/1996	2300	Flood	0	0	0	0		
5537232	AVERY (ZONE)		1/19/1996	100	Flood	0	0	0	0		
5537234	MITCHELL (ZONE)		1/19/1996	300	Flood	0	0	0	0		
5537450	YANCEY (ZONE)		1/27/1996	45	Flood	0	0	0	0		
5328478	AVERY (ZONE)		11/19/2003	700	Flood	0	0	10000	0	EMERGENCY MANAGER	
5328477	MITCHELL (ZONE)		11/19/2003	700	Flood	0	0	10000	0	LAW ENFORCEMENT	
5328481	YANCEY (ZONE)		11/19/2003	1000	Flood	0	0	0	0	LAW ENFORCEMENT	
5328587	MITCHELL (ZONE)		11/19/2003	1400	Flood	0	0	0	0	EMERGENCY MANAGER	
5423027	MITCHELL (ZONE)		9/2/2004	745	Flood	0	0	0	0	LAW ENFORCEMENT	
5423142	MITCHELL (ZONE)		9/7/2004	1730	Flood	0	0	1000000	0	EMERGENCY MANAGER	
5423143	AVERY (ZONE)		9/7/2004	1730	Flood	0	0	7000000	3000000	EMERGENCY MANAGER	
5423140	YANCEY (ZONE)		9/7/2004	1730	Flood	0	0	1000000	0	EMERGENCY MANAGER	
5423375	YANCEY (ZONE)		9/17/2004	0	Flood	0	0	200000	900	EMERGENCY MANAGER	
5423380	MITCHELL (ZONE)		9/17/2004	100	Flood	0	0	181000	0	EMERGENCY MANAGER	
5423381	AVERY (ZONE)		9/17/2004	100	Flood	0	0	7000000	4000000	EMERGENCY MANAGER	
5423435	YANCEY (ZONE)		9/28/2004	30	Flood	0	0	0	0	EMERGENCY MANAGER	
5472838	YANCEY (ZONE)		8/30/2005	800	Flood	0	0	0	0	LAW ENFORCEMENT	
457500	MCDOWELL CO.	NORTH COVE CROSSING	5/5/2013	2230	Flood	0	0	250000	0	Newspaper	Heavy Rain
457503	AVERY CO.	ELK PARK	5/6/2013	215	Flood	0	0	100000	0	Social Media	Heavy Rain
457504	MITCHELL CO.	WEBBS	5/6/2013	700	Flood	0	0	0	0	Social Media	Heavy Rain
470298	MITCHELL CO.	TOECANE	7/3/2013	2100	Flood	0	0	0	0	County Official	Heavy Rain
544980	YANCEY CO.	BUSICK	10/14/2014	2200	Flood	0	0	1000	0	River/Stream Gage	Heavy Rain

NCDC Heavy Rain  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_LOCATION	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM
5549992	UNION (ZONE)		4/30/1996	100	Heavy Rain	0	0	0	0
5543342	UNION (ZONE)		4/30/1996	100	Heavy Rain	0	0	0	0
5543341	MECKLENBURG (ZONE)		4/30/1996	100	Heavy Rain	0	0	0	0
5578057	MCDOWELL CO.	COUNTYWIDE	12/1/1996	1600	Heavy Rain	0	0	0	0
5261145	AVERY CO.	NEWLAND	7/8/2001	1630	Heavy Rain	0	0	0	0
5282667	SWAIN (ZONE)		1/23/2002	1500	Heavy Rain	0	0	0	0
5326523	AVERY CO.	COUNTYWIDE	12/19/2002	1800	Heavy Rain	0	0	0	0
5344934	MITCHELL CO.	SPRUCE PINE	2/22/2003	935	Heavy Rain	0	0	0	0
5401166	MCDOWELL CO.	MARION	5/23/2004	1300	Heavy Rain	0	0	0	0
5470658	MCDOWELL CO.	MARION	7/7/2005	1200	Heavy Rain	0	0	0	0
447374	MCDOWELL CO.	MARION	4/12/2013	130	Heavy Rain	0	0	50000	0
471156	AVERY CO.	MINNEAPOLIS	7/16/2013	1810	Heavy Rain	0	0	0	0
530756	MCDOWELL CO.	LITTLE SWITZERLAND	6/29/2014	1955	Heavy Rain	0	0	0	0



NCDC Wildfires  
as of Nov 2015

EVENT_ID	CZ_NAME_STR	BEGIN_LOCATION	BEGIN_DATE	BEGIN_TIME	EVENT_TYPE	DEATHS_DIRECT	INJURIES_DIRECT	DAMAGE_PROPERTY_NUM	DAMAGE_CROPS_NUM	SOURCE
5161826	MCDOWELL CO.	ASHFORD	10/28/2000	600	Wildfire	0	0	0	0	OTHER FEDERAL AGENCY
5159774	YANCEY CO.	BURNSVILLE	11/1/2000	0	Wildfire	0	0	0	0	GOVT OFFICIAL
5159773	MITCHELL CO.	SPRUCE PINE	11/1/2000	0	Wildfire	0	0	0	0	GOVT OFFICIAL
5159772	MCDOWELL CO.	ASHFORD	11/1/2000	0	Wildfire	0	0	0	0	GOVT OFFICIAL