Guilford County, NC

Guilford County Multi-Jurisdictional Hazard Mitigation Plan

DRAFT NOVEMBER 2025













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SECTION 1
INTRODUCTION

This section provides a general introduction to the Guilford County Multi-Jurisdictional Hazard Mitigation Plan. It consists of the following five subsections:

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

1.1 BACKGROUND

Natural and man-made hazards, such as floods, hurricanes, and hazardous materials incidents, are a part of the world around us. In some cases, their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. In others, we have more power to control the intensity and probability but can never truly eliminate the threat entirely. In either case, we must consider these hazards to be legitimate and significant threats to human life, safety, and property.

Guilford County is located in the Piedmont area of North Carolina. The County includes the Town of Gibsonville, City of Greensboro, City of High Point, Town of Jamestown, Town of Oak Ridge, Town of Pleasant Garden, Town of Sedalia, Town of Stokesdale, Town of Summerfield, Town of Whitsett, and all unincorporated areas within the county. This area is vulnerable to a wide range of natural hazards such as hurricanes, floods, severe thunderstorms, and tornados. It is also vulnerable to human-caused hazards including nuclear accidents and hazardous material spills. These hazards threaten the life and safety of residents in Guilford County 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 Guilford County.

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

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

Hazard mitigation techniques include both structural measures (such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards) and non-structural measures (such as the adoption of sound land use policies and the creation of public awareness programs). It is widely accepted

that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease a community's overall hazard vulnerability.

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

The county and ten municipalities participating in the Guilford County Multi-Jurisdictional Hazard Mitigation Plan have an existing hazard mitigation plan that has evolved over the years, as described in Section 2: *Planning Process*. This update of the plan draws from the previous plan to document the efforts of each jurisdiction 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 Guilford County'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 Flood Mitigation Assistance Program (FMA) 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.

In addition to federal requirements for hazard mitigation planning, the State of North Carolina also requires a hazard mitigation plan be in place for jurisdictions to receive mitigation and public assistance funds after a state-declared disaster. This requirement is codified in NC Senate Bill 300, which lays out the need for mitigation planning and ties it to disaster funding at the state level.

Major federal flood insurance legislation was enacted in 2012 under the Biggert-Waters Flood Insurance Reform Act (P.L. 112-141), followed by the Homeowner Flood Insurance Affordability Act of 2014, which revised Biggert-Waters.. 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 Guilford County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in coordination with FEMA Region 4 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 purpose of the Guilford County Multi-Jurisdictional Hazard Mitigation Plan is to:

- Completely update the existing Guilford County Multi-Jurisdictional Hazard Mitigation Plan to demonstrate progress and the reflect current conditions;
- Reduce risk to people, property, and the critical infrastructure;
- Increase public awareness and education about the plan and the planning process;
- Maintain grant eligibility for participating jurisdictions;
- Update the plan in accordance with Community Rating System requirements; and
- Maintain compliance with state and federal legislative requirements for local hazard mitigation plans.

1.3 SCOPE

The focus of the Guilford County Multi-Jurisdictional Hazard Mitigation Plan is on those hazards determined to be “high” or “moderate” risks to Guilford County 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 jurisdictions 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 all of Guilford County including all of its incorporated jurisdictions (see below) and unincorporated areas. **Table 1.1** indicates the participating jurisdictions.

TABLE 1.1: PARTICIPATING JURISDICTIONS IN GUILFORD COUNTY HAZARD MITIGATION PLAN

Guilford County	
Gibsonville	Pleasant Garden
Greensboro	Sedalia
High Point	Stokesdale
Jamestown	Summerfield
Oak Ridge	Whitsett

1.4 AUTHORITY

The Guilford County Multi-Jurisdictional 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 describes how the public and other stakeholders were involved. It also includes a detailed summary for each of the key meetings held along with any associated outcomes.

The ***Community Profile***, located in Section 3, provides a general overview of Guilford County, 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*** serves to identify, analyze and assess hazards that pose a threat to Guilford County. The risk assessment also attempts to define any hazard risks that may uniquely or exclusively affect specific areas of Guilford County.

The Risk Assessment begins by identifying hazards that threaten Guilford County. 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, NCEM's Risk Management section's loss estimation methodology is used in to evaluate known hazard risks by their relative long-term cost in expected damages. In essence, the information generated through the risk assessment serves a critical function as the participating jurisdictions in Guilford County seek to determine the most appropriate mitigation actions to pursue and implement—enabling them to prioritize and focus their efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s).

The ***Capability Assessment***, found in Section 5, provides a comprehensive examination of Guilford County's capacity to implement meaningful mitigation strategies and identifies opportunities to increase and enhance that capacity. Specific capabilities addressed in this section include planning and regulatory capability, staff and organizational (administrative) capability, technical capability, fiscal capability, and political capability. Information was obtained through the use of a detailed survey questionnaire and an inventory and analysis of existing plans, ordinances, and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses, or conflicts in programs or activities that may hinder mitigation efforts and to identify those activities that should be built upon in establishing a successful and sustainable local hazard mitigation program.

The *Risk Assessment* and *Capability Assessment* collectively serve as a basis for determining the goals for the Guilford County Multi-Jurisdictional 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 6, consists of broad goal statements as well as an analysis of hazard mitigation techniques for the jurisdictions participating in the Guilford County Multi- Jurisdictional Hazard Mitigation Plan to consider in reducing hazard vulnerabilities. The strategy provides the foundation for a detailed ***Mitigation Action Plan***, found in Section 7, which links specific mitigation actions for each jurisdiction to locally assigned implementation mechanisms and target completion dates. Together, these sections are designed to make the Plan both strategic, through the identification of long-term goals, and functional, through the identification of 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 Guilford County less vulnerable to the damaging forces of hazards while improving the economic, social, and environmental health of the community. The concept of multi-objective planning was emphasized throughout the planning process, particularly in identifying ways to link, where possible, hazard mitigation policies and programs with complimentary community goals related to disaster recovery, housing, economic development, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

Plan Maintenance, found in Section 8, includes the measures that the jurisdictions participating in the plan will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

SECTION 2
PLANNING PROCESS

This section describes the planning process undertaken to develop the Guilford County Multi-Jurisdictional Hazard Mitigation Plan. It consists of the following eight subsections:

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

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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.

2.1 OVERVIEW OF HAZARD MITIGATION PLANNING

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

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

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

- Saving lives and property,
- Saving money,
- Speeding recovery following disasters,

- Reducing future vulnerability through wise development and post-disaster recovery and reconstruction,
- Expediting the receipt of pre-disaster and post-disaster grant funding, and
- Demonstrating a firm commitment to improving community health and safety.

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

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

2.2 HISTORY OF HAZARD MITIGATION PLANNING IN THE COUNTY

Each of the eleven participating jurisdictions has previously adopted the Guilford County Hazard Mitigation Plan. This plan was developed using the multi-jurisdictional planning process recommended by the Federal Emergency Management Agency (FEMA). The FEMA approval date for this plan pertains to all communities listed below:

- *Guilford County Hazard Mitigation Plan*
  - Guilford County
  - City of Greensboro
  - City of High Point
  - Town of Gibsonville
  - Town of Jamestown
  - Town of Oak Ridge
  - Town of Pleasant Garden
  - Town of Sedalia
  - Town of Stokesdale
  - Town of Summerfield
  - Town of Whitsett

In 2016, all participating communities collaborated to create a multi-jurisdiction plan. This approach aimed to streamline planning for the jurisdictions in Guilford County, allowing resources to be shared among participants and reducing the administrative burdens on smaller, lower capacity communities.

The 2016 plan marked an important and successful beginning for multi-jurisdictional hazard mitigation planning, and that success has continued into the 2026 update. For the development of the 2026 plan, all the jurisdictions that participated in the development of the 2020 plan participated in this plan's development.

2.3 PREPARING THE 2026 PLAN

FEMA requires hazard mitigation plans to be updated every five years to maintain eligibility for federal mitigation and public assistance funding. To prepare the 2026 Guilford County Multi-Jurisdictional Hazard Mitigation Plan, ESP Associates, Inc. was contracted by North Carolina Emergency Management to provide professional mitigation planning services.

According to the scope of work, the consultant team adhered to the mitigation planning process recommended by FEMA (Publication Series 386 and the Local Mitigation Plan Review Guide) as well as guidelines from North Carolina Emergency Management (NCEM) mitigation planning staff. A notable change in the 2026 update is the inclusion of substantial damage estimates in the capability assessment. This information helps to better understand the potential financial impacts and vulnerabilities of the participating communities.

The 2026 update incorporated requirements from the FEMA Community Rating System (CRS) and the Community Wildfire Protection Plan (CWPP). **Tables 2.1** and **2.2** below provide an overview of how the Community Rating System and Community Wildfire Protection Plan requirements were integrated into the updated plan.

TABLE 2.1 FEMA HAZARD MITIGATION PLANNING REQUIREMENTS AND THE CRS 10-STEP PLANNING PROCESS REFERENCE TABLE

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

TABLE 2.2 COMMUNITY WILDFIRE PROTECTION PLAN PROCESS INTEGRATION REFERENCE TABLE

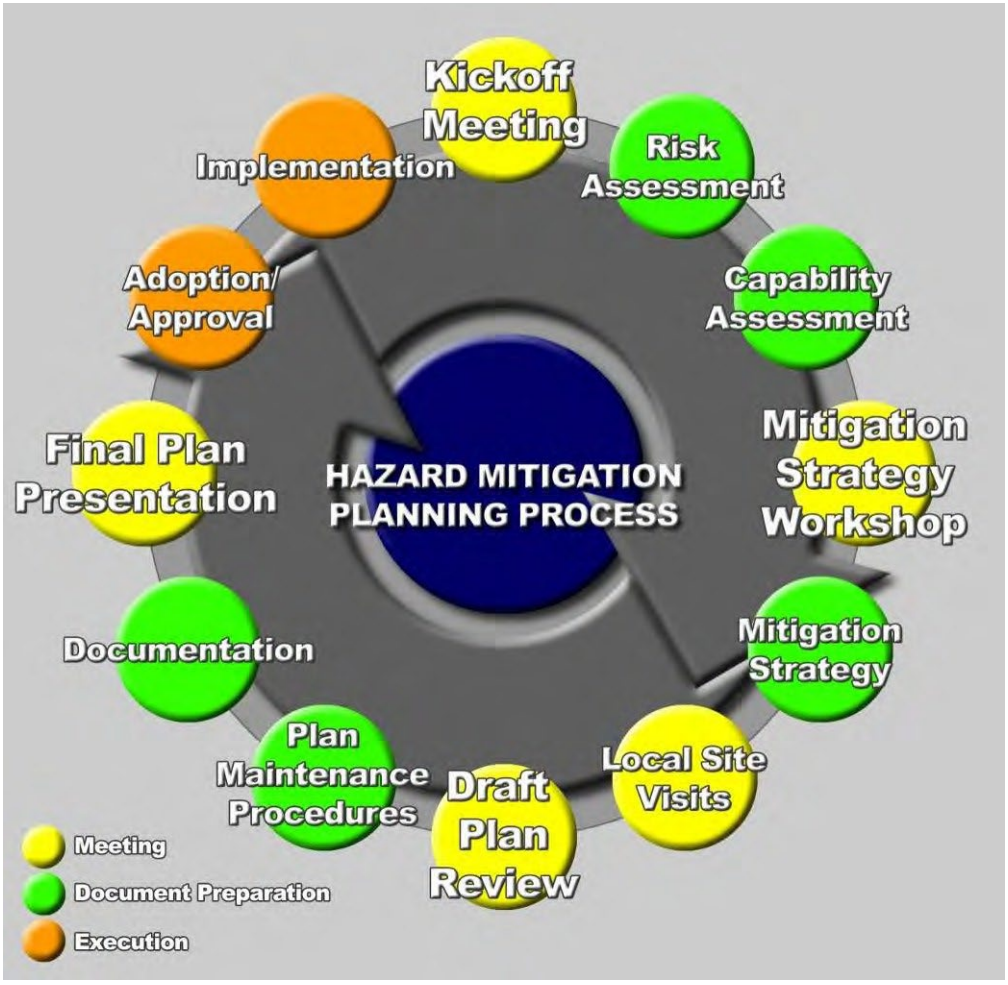
CWPP Process	Hazard Mitigation Plan Integration Reference
Step 1: Convene Decisionmakers	Section 2: Planning Process
Step 2: Involve Federal Agencies	Section 2: Involving Stakeholders
Step 3: Engage Interested Parties	Section 2: Planning Process
Step 4: Establish a Community Base Map	Section 3: Community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

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

The Local Mitigation Plan Review Tool, found in Appendix C, provides a detailed summary of FEMA's current minimum standards of acceptability for compliance with DMA 2000 and notes the location where each requirement is met within this plan. These standards are based upon FEMA's Final Rule as published in the Federal Register in Part 201 of the Code of Federal Regulations (CFR). The planning team used FEMA's Local Mitigation Planning Policy Guide (2022) and Local Mitigation Planning Handbook (2023) for reference as they completed the plan update.

The process used to prepare this plan included twelve major steps that were completed over the course of approximately six months beginning in May 2025. Each of these planning steps (illustrated in **Figure 2.1**) resulted in critical work products and outcomes that collectively make up the Plan. Specific plan sections are further described in Section 1: *Introduction*

FIGURE 2.1: MITIGATION PLANNING PROCESS FOR GUILFORD COUNTY



2.4 THE GUILFORD COUNTY HAZARD MITIGATION PLANNING COMMITTEE

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

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

Table 2.3 lists the members of the Hazard Mitigation Planning Team who were responsible for

participating in the development of the Plan.

TABLE 2.3 MEMBERS OF THE GUILFORD COUNTY HAZARD MITIGATION PLANNING TEAM

ORGANIZATION	NAME	DEPARTMENT/ROLE	ATTENDED 6/24 MTG	ATTENDED 8/26 MTG	ATTENDED 9/17 MTG	ATTENDED 9/24 MTG
GUILFORD COUNTY						
Guilford County	Catherine Hughes	EM Coordinator	X	X	X	X
Guilford County	Ashley Dinkins	Program Supervisor	X	X		
Guilford County	Erris Dunston	Assistant County Manager	X			
Guilford County	Jim Albright	Emergency Services Director	X			
Guilford County	Peter Purcell	CIO	X	X		
Guilford County	James Tardiff	Stormwater Program Administrator	X	X	X	X
Guilford County	Toy Beeninga	Budget & Management Services Director	X			
Guilford County	James Kurfees	CTO	X	X	X	X
Guilford County	Jaime Joyner	Director of HR	X			
Guilford County	Eddi Cabrera Blanco	Communications Manager	X			
Guilford County	Debra Mack	Mental Health Director	X	X		
Guilford County	Michael Townsend	Assistant Fire Marshal	X	X		
Guilford County	Conor Baker	EM Coordinator	X	X	X	
Guilford County	Matthew Crawford	Inspection Director	X			
Guilford County	Justin Wright	Special Operations Division	X			X
Guilford County	Dwight Godwin	Parks Director	X	X		
Guilford County	Linda McElroy	Communications Director	X	X		
Guilford County	Rosanne Wiley	Child Support Services	X			
Guilford County	Jason Hardin	Deputy Planning/Development Director	X	X	X	
Guilford County	Brent Gatlin	Watershed Section Manager	X	X	X	X
Guilford County	Vincent Daugherty	Security Director	X			
Guilford County	Raul Gomez	Disaster Preparedness Coordinator	X			
Guilford County	Robert Carmon	Deputy Fire Marshall	X	X		
Guilford County	Tommy Sluder	Sr EM Director	X	X	X	X
Guilford County	Todd Griffith	Fire Life Safety Coordinator	X	X		
Guilford County	Mitchell Byers	GIS Specialist		X	X	X
Guilford County	Paula Cox	Environmental Health Division Director		X		
Guilford County	Marlena Isley	GIS Manager		X		
Guilford County	Robin Keller	Clerk to Board		X		
Guilford County	Maria Lyons Legrande	Continual Care Specialist		X		

ORGANIZATION	NAME	DEPARTMENT/ROLE	ATTENDED 6/24 MTG	ATTENDED 8/26 MTG	ATTENDED 9/17 MTG	ATTENDED 9/24 MTG
Guilford County	Jeffrey McCartney	Chief Information Security Director		X	X	X
Guilford County	Jorge Ortega	Animal Services Director		X		
Guilford County	Anita Ramachandran	Public Health Director		X		
Guilford County	Donna Riner	Deputy Director of Registry of Deeds		X		
Guilford County	Vince Roberts	Social Services Agency Business Manager		X		
Guilford County	Robert Shelly	Veterans Service Director		X		
Guilford County	Donald Warn	Chief Financial Officer		X		
Guilford County	Irma Zimmerman	Transit Services Manager		X		
Guilford County	Oliver Bass	Planning & Zoning Manager				X
		GIBSONVILLE				
Gibsonville	Brandon Parker	Town Planner	X			
		GREENSBORO				
Greensboro	Christine Moore	Deputy Director Guilford Metro 911	X			
Greensboro	Johnnie Hill	Water Resources/Floodplain Admin	X	X		X
Greensboro	Jason Geary	Engineering Division Manager	X			
Greensboro	Nathanael Moore	GSO Transportation deputy director	X			
Greensboro	Shree Dorestant	Chief Sustainability Officer	X	X		X
Greensboro	Bryan Vickery	EFD Special Operations	X			
Greensboro	Danielle Quick	Sr. Engineering Specialist	X	X		X
Greensboro	Robert Felts	Risk & Safety Administrator		X		
Greensboro	Michael Lewis	Deputy Director of Development Services		X		X
Greensboro	Virginia Spillman	Assistant Director of Water Resources		X		X
		HIGH POINT				
High Point	Michael Foster		X	X		
High Point	Matt Carpenter	Traffic Operations Engineer		X		
High Point	Steven Grose	HPPD Special Projects Coordinator		X		
High Point	Dennis Salgado	Chief Park Ranger		X		
		JAMESTOWN				
Jamestown	Paul Blanchard	Public Services Director				X
		OAK RIDGE				
Oak Ridge	Ashley Royal	Deputy Town Clerk	X	X		X
		PLEASANT GARDEN				
Pleasant Garden	Dean Maddox	Mayor				X
		SEDALIA				

ORGANIZATION	NAME	DEPARTMENT/ROLE	ATTENDED 6/24 MTG	ATTENDED 8/26 MTG	ATTENDED 9/17 MTG	ATTENDED 9/24 MTG
Sedalia	Cam Dungee	Town Administrator				X
SUMMERFIELD						
Summerfield	Justin Snyder	Planning Director	X	X		X
WHITSETT						
Whitsett	Karen Horne	Town Administrator		X		X
OUTSIDE STAKEHOLDERS						
Bennett College	Jermaine Thomas	Executive Director of Campus Operations,		X		
Cone Health	Ben Wooten	Director of Emergency Management	X			
ESP Associates, Inc.	Nathan Slaughter	Project Manager	X	X	X	
ESP Associates, Inc.	John Flores	Hazard Mitigation Planner	X	X		
ESP Associates, Inc.	Fabiha Rahman	GIS Specialist/Planner	X			
ESP Associates, Inc.	Hannah DeLude	Hazard Mitigation Planner		X		X
Guilford Technical Community College	Gene Sapino	Chief Campus Police	X			
Guilford Technical Community College	Michael MacIntosh	Campus Police Lieutenant	X			
Hands on NWNC	Amy Lytle			X		
Julian Fire Department	Cameron Shepard	Fire Chief	X	X		
Kernersville	Scott Alderman	Fire Rescue Chief		X		
NC Agricultural and Technical State University	Dakota Staley	Emergency Management Specialist	X	X		
NC Dept of Public Safety	Carl Baker	Mitigation Plans Manager	X	X		
NC Dept of Public Safety	John Mello	Hazard Mitigation Planner		X		
Piedmont Triad Regional Council	Chloe Davis	Disaster Recovery fellow	X			
Piedmont Triad Regional Council	Jesse Day	Regional Planning Director		X		
Red Cross	Marguerite Davis	Disaster Preparedness Coordinator	X			

ORGANIZATION	NAME	DEPARTMENT/ROLE	ATTENDED 6/24 MTG	ATTENDED 8/26 MTG	ATTENDED 9/17 MTG	ATTENDED 9/24 MTG
University of North Carolina at Greensboro	Michael Burke	EM Coordinator	**X**			

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

- Participate in Hazard Mitigation Planning Team meetings and workshops
- Provide best available data as required for the risk assessment portion of the Plan
- Provide information that will help complete the Capability Assessment section of the plan and provide copies of any mitigation or hazard-related documents for review and incorporation into the Plan
- Support the development of the Mitigation Strategy, including the design and adoption of countywide goal statements
- Help design and propose appropriate mitigation actions for their department/agency for incorporation into the Mitigation Action Plan
- Review and provide timely comments on all study findings and draft plan deliverables
- Support the adoption of the 2025 *Guilford County Hazard Mitigation Plan*

Table 2.4 lists the point of contact for the jurisdiction who elected to designate their 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 This outreach is further described below:

1. Each community was provided access to the project website, which included a feedback loop to submit comments, questions, or suggestions.
2. All participating jurisdictions were included in the county-wide communications, including meeting announcements, milestone updates, and surveys distributed by Guilford County.
3. Following the Hazard Identification and Risk Assessment (HIRA) meeting, all participating jurisdictions received:
    a. The draft Capability Assessment for local review
    b. The existing Mitigation Strategy from the prior plan for verification and updates
4. Jurisdictions were encouraged to review and provide feedback on their local capabilities, completed or ongoing actions, and proposed revisions to ensure accuracy and alignment with current priorities.
5. Comments and input received through email correspondence or the online feedback loop were incorporated into the draft.

TABLE 2.4: MEMBERS DESIGNATING REPRESENTATIVES TO GUILFORD HAZARD MITIGATION PLANNING COMMITTEE

ORGANIZATION	NAME	DEPARTMENT/ROLE
Town of Stokesdale	Robbie Wagoner	Town Administrator/Clerk

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

2.4.1 Multi-Jurisdictional Participation

The Guilford County Multi-Jurisdictional Hazard Mitigation Plan includes Guilford County and its ten incorporated municipalities. To satisfy multi-jurisdictional participation requirements, the county and its participating jurisdictions were required to perform the following tasks:

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

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

2.5 COMMUNITY MEETINGS AND WORKSHOPS

The preparation of the plan involved a series of meetings and workshops designed to facilitate discussion, build consensus, and initiate data collection efforts with local government staff, community officials, and other identified stakeholders. Importantly, these meetings and workshops encouraged ongoing input and feedback from relevant participants throughout the drafting stages of the plan. Below is a summary of the key meetings conducted during the plan update process. Meeting minutes were recorded and are documented in Appendix D.

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

TABLE 2.5: GUILFORD COUNTY HAZARD MITIGATION PLANNING COMMITTEE MEETING SUMMARY

MEETING	MEETING TOPIC	DATE	LOCATION
County Leads – Internal Kickoff	1. Introduction to project team and county leads 2. Review of mitigation, project scope, and tentative project schedule	5/16/25	Virtual Microsoft Teams

MEETING	MEETING TOPIC	DATE	LOCATION
	3. Discussion on stakeholder engagement and citizen contacts		
HMPC Mtg #1 - Project Kick-Off	1. Introduction to DMA requirements and the planning process 2. Review HMPC responsibilities and project schedule	6/24/25	1201 Bonner Drive Jamestown, NC 27282
HMPC Mtg #2 - HIRA Mtg	1. Review Draft Hazard Identification and Risk Assessment (HIRA) 2. Review asset inventory and discuss critical facilities 3. Solicit comments and feedback	8/26/25	601 E Main Street Jamestown, NC 27282
HMPC Mtg #3 – Mitigation Strategy Mtg	1. Review existing mitigation actions 2. Evaluate findings from the Risk Assessment 3. Develop and prioritize new or revised strategies	9/17/25	1002 Meadowood Street Greensboro, NC 27409
HMPC Mtg #4 – Capability & Mitigation Strategy Mtg	1. Review and evaluate existing mitigation strategies 2. Develop new strategies based on the Risk Assessment and gaps identified 3. Review and provide feedback on the Capability Assessment	9/24/25	1002 Meadowood Street Greensboro, NC 27409

2.6 INVOLVING THE PUBLIC

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

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

Public involvement in the development of the Guilford County Multi-Jurisdictional Hazard Mitigation Plan
was sought using several methods:

- Conducting open public meetings online and in-person,
- Developing a project website to share project status and relevant resources,
- Providing online notices,

- Sharing the public survey online and in-person, and
- Making the draft plan available online for public review.

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

TABLE 2.6: GUILFORD COUNTY HAZARD MITIGATION PLAN UPDATE
PUBLIC ENGAGEMENT OPPORTUNITIES AND MEASURES

OUTREACH TYPE	OUTREACH DESCRIPTION	DATE	LOCATION
Public Survey	❖ Shared online via municipal and county websites ❖ Shared in-person at government and community facilities ❖ Respondents could complete anonymously or provide name/email ❖ Input used to inform potential mitigation strategies	-	Online Survey123
Project Website	❖ Provides general overview of mitigation and planning process ❖ Summarizes project-specific timeline and tasks ❖ Links to valuable resources including HMPC meeting minutes and presentations	-	Online ARCGIS Story Maps
Public Notices	❖ Project updates shared on municipal and county websites ❖ Links provided to existing plan and draft plan	-	Online Municipal Websites
Public Meeting #1	❖ Introduction to DMA, CRS, and FMA requirements and planning process ❖ Review of identified hazards and potential mitigation strategies ❖ Review Draft Hazard Mitigation Plan and collect public comment	8/14/25	Virtual Microsoft Teams
Public Meeting #2	❖ Discuss public comment integrated into Final Hazard Mitigation Plan ❖ Review approval and adoption process to ensure timely adoption ❖ Project closeout	8/26/25	901 N Main Street High Point, NC 27262

Furthermore, in addition to the previously mentioned opportunities for public involvement, each participating jurisdiction will hold public meetings before the final plan is officially adopted by local

governing bodies. These meetings will take place at different times once FEMA grants conditional approval of the plan. Adoption resolutions will be included in Appendix A.

2.6.1 Public Survey

The Hazard Mitigation Committee successfully engaged residents in the mitigation planning process through the Public Participation Survey. This survey was specifically designed to gather data and insights from residents of all participating communities.

Copies of the Public Participation Survey were distributed to the Hazard Mitigation Committee, ensuring they were available for residents to complete at local public offices. Additionally, a link to an electronic version of the survey was posted on county and municipal websites. In total, 312 survey responses were received, providing valuable input for the Committee to consider updating the plan. Selected survey results are presented below. Full results can be found in Appendix D.

- Approximately 29 percent of survey respondents had been impacted by a disaster, primarily power outages and flooding.
- Respondents ranked Severe Thunderstorms and High Winds as the highest threat to their neighborhood (39 percent), followed by Flooding (26 percent), and, Tornadoes (6 percent).
- Approximately 40 percent of respondents have taken actions to make their homes more resistant to hazards and 90 percent are interested in making their homes more resistant to hazards.
- 88 percent of respondents do not know what office to contact regarding reducing their risks to hazards.
- Emergency Services and Prevention were ranked as the most important activities for communities to pursue in reducing risks.

2.7 INVOLVING THE STAKEHOLDERS

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

At the outset of the planning process, the project consultant collaborated with the emergency management leaders from the county to initiate stakeholder outreach. At this time, a list was distributed of recommended stakeholders derived from FEMA Publication 386-1, titled *Getting Started: Building Support for Mitigation Planning,* which highlights the diverse range of stakeholders considered for participation in plan development. County emergency management leaders referenced this list while inviting stakeholders from their respective counties to engage in the planning process. Additionally, FEMA's *Local Mitigation Planning Policy Guide* (2023) and *Local Mitigation Planning Handbook* (2023) were reviewed to ensure all elements for participation were addressed.

The participating jurisdictions invited representatives from the health departments, social services departments, and planning departments. In addition to staff representatives of each participating

jurisdiction, the HMPC included a variety of stakeholders, including representatives from North Carolina Emergency Management (NCEM), and others (see subsequent subsections). Input from neighboring communities was also solicited through invitations to the public meetings (see Appendix D).

The Hazard Mitigation Committee actively promoted open and widespread participation in the mitigation planning process. The region also excelled in local outreach efforts by designing and distributing the Public Participation Survey. This initiative allowed local officials, residents, businesses, academics, and other private interests in Guilford County to engage and provide input throughout the local mitigation planning process.

2.8 DOCUMENTATION OF PLAN PROGRESS

This plan update documents the progress made in hazard mitigation planning for the participating jurisdictions in Guilford County. Since the initial hazard mitigation plans were developed in the late 1990s and early 2000s, numerous mitigation actions have been completed and implemented across these jurisdictions. These actions are designed to reduce the overall risk posed by natural hazards to the people and properties in the region. A detailed account of these completed actions can be found in Appendix E.

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

SECTION 3
COMMUNITY PROFILE

This section of the Plan provides a general overview of Guilford County and its participating municipalities. 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

NOTE: Much of the data presented in this section was drawn from the U.S. Census Bureau's 2019–2023 American Community Survey (ACS) 5-Year Estimates. The 5-year dataset was used to ensure consistent and statistically reliable data across all jurisdictions within Guilford County, including smaller municipalities and unincorporated areas not covered by ACS 1-year estimates (65,000 population or less). The 5-year estimates incorporate data collected over a five-year period, providing a larger sample size and greater precision. As such, figures should be interpreted as representing average conditions over that period rather than specific point-in-time values.

3.1 GEOGRAPHY AND THE ENVIRONMENT

Guilford County is situated in north-central North Carolina within the Piedmont region. For the purposes of this plan, Guilford County encompasses the City of Greensboro, City of High Point, Town of Gibsonville, Town of Jamestown, Town of Oak Ridge, Town of Pleasant Garden, Town of Sedalia, Town of Stokesdale, Town of Summerfield, Town of Whitsett, and all unincorporated areas within the county's jurisdiction.

TABLE 3.1: TOTAL LAND AREAS OF PARTICIPATING JURISDICTIONS

Jurisdiction	Land Area	Water Area	Total Area
Guilford County	**645.92 sq. mi.**	**11.71 sq. mi.**	**657.63 sq. mi**
Gibsonville*	3.94 sq. mi.	0.03 sq. mi.	3.96 sq. mi.
Greensboro	131.41 sq. mi.	5.24 sq. mi.	136.65 sq. mi.
High Point*	56.91 sq. mi.	1.52 sq. mi.	58.43 sq. mi.
Jamestown	3.00 sq. mi.	--	3.00 sq. mi.
Oak Ridge	16.44 sq. mi.	0.14 sq. mi.	16.58 sq. mi.
Pleasant Garden	15.04 sq. mi.	0.12 sq. mi.	15.16 sq. mi.
Sedalia	2.00 sq. mi.	0.01 sq. mi.	2.01 sq. mi.
Stokesdale	19.03 sq. mi.	0.15 sq. mi.	19.18 sq. mi.
Summerfield	26.40 sq. mi.	0.29 sq. mi.	26.69 sq. mi.
Whitsett	2.58 sq. mi.	0.03 sq. mi.	2.61 sq. mi.

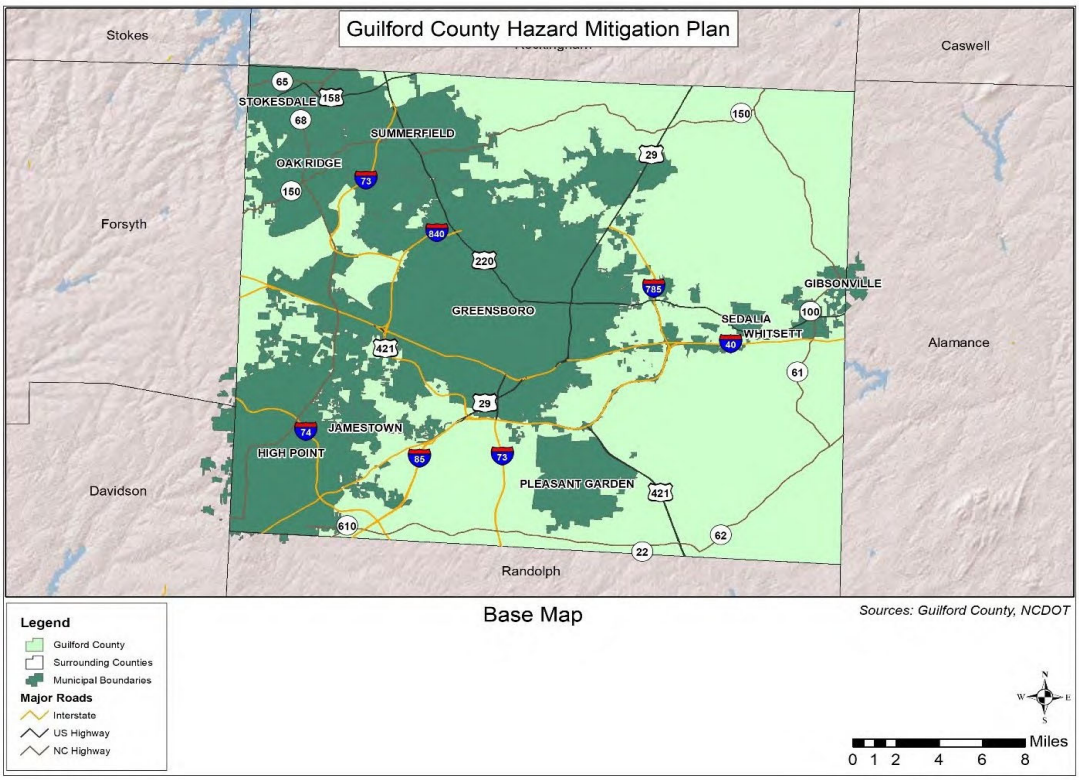
Source: United States Census Bureau (*The total area for Gibsonville and High Point includes areas outside of Guilford County)

The county comprises a total area of over 657.63 square miles. The land area, water area, and total area reported for each participating jurisdiction, entity or municipality is presented in **Table 3.1.**

Guilford County is influenced by several metropolitan statistical areas (MSAs), including the Greensboro – High Point MSA and the Greensboro – High Point Metropolitan – Winston-Salem Combined Statistical Area (CSA). The county is also part of the Piedmont Triad, which is a region in central North Carolina, anchored by the cities of Greensboro, Winston-Salem, and High Point. It is a 12-county area known for its diverse economy and is located along the I-85 corridor between Raleigh and Charlotte. The prevalence of these areas impacts population density and growth, resource allocation and availability, infrastructure and services, and economic characteristics, all of which directly correlate with hazard mitigation planning and community capacity. An orientation map is provided in **Figure 3.1**.

The county is home to multiple colleges, universities, and higher education institutions, contributing to a strong emphasis on academic advancement and workforce development. Greensboro and High Point each host an operational courthouse, making Guilford County one of the few counties in the United States to operate a dual court system. Additionally, the county has a diverse economy with strong representation from the furniture merchandising, retail, and service industries, along with significant manufacturing, logistics, technology, and biotechnology sectors. High Point is internationally recognized as a major center for the furniture industry, hosting the world-renowned High Point Market.

FIGURE 3.1: GUILFORD COUNTY ORIENTATION MAP



Guilford County experiences a moderate climate with four distinct seasons. Spring brings mild temperatures, with highs in the 70s°F and lows in the 40s°F, but weather can shift quickly from sunshine to severe thunderstorms. Summers are hot and humid, with frequent afternoon showers and highs reaching the upper

80s°F in July and August, the wettest months of the year. Fall, from September to mid-November, offers clear skies, warm days, and cool nights, with temperatures similar to spring but cooling steadily by late fall. Winters are generally mild, with highs in the low 50s°F and lows in the upper 20s°F, though occasional snow and ice occur.

3.2 POPULATION AND DEMOGRAPHICS

From 2017 to 2023, the county and most of its municipalities experienced substantial population growth, adding a combined 25,790 residents in that seven-year period. Gibsonville recorded the most rapid expansion, growing by over 35.7 percent. The county's largest cities, Greensboro and High Point, saw steady growth, with Greensboro adding over 13,700 residents and High Point adding roughly 5,400 residents. Other communities experienced slower or shrinking populations. Jamestown's population decreased by 3.9 percent and Whitsett saw a substantial decline from 973 to 592 residents. Population counts from the US Census Bureau for 2000, 2010, 2017, and 2023 for each of the participating communities are presented in **Table 3.2.**

TABLE 3.2: POPULATION COUNTS FOR PARTICIPATING JURISDICTIONS

Jurisdiction	2000 Census Population	2010 Census Population	2017 ACS Population	2020 Census Population	2023 ACS Population	% Change 2017-2023
Guilford County	**421,048**	**488,406**	**517,197**	**541,299**	**542,987**	**5.0%**
Gibsonville*	4,372	6,410	6,845	8,971	9,289	35.7%
Greensboro	223,891	269,666	284,816	299,035	298,564	4.83%
High Point*	85,839	104,371	109,849	114,059	115,263	4.93%
Jamestown	3,088	3,382	3,836	3,668	3,685	-3.9%
Oak Ridge	3,988	6,185	6,728	7,474	7,660	13.9%
Pleasant Garden	4,714	4,489	4,762	4,997	4,989	4.8%
Sedalia	618	623	548	676	680	24.1%
Stokesdale	3,267	5,047	5,331	5,924	5,943	11.5%
Summerfield	7,018	10,232	10,957	10,951	11,031	0.7%
Whitsett	686	590	973	588	592	-39.16

*The population counts of Gibsonville and High Point include population residing in neighboring counties.
Source: United States Census Bureau, 2019-2023 American Community Survey 5-Year Estimates

According to 2019-2023 American Community Survey, the median age in participating communities is 43.5 years, ranging from 56.1 years in Whitsett to 34.1 years in Greensboro. Of the population aged 25 years and over, 93 percent have a high school degree or higher and 38.6 percent have a bachelor's degree or higher. The racial demographics of the participating jurisdictions are presented in **Table 3.3.** Generally, white persons make up much of the population in the region, accounting for over 65 percent of the population. However, this may vary per jurisdiction.

TABLE 3.3: DEMOGRAPHICS OF PARTICIPATING JURISDICTIONS

Jurisdiction	White, Percent (2023)	Black or African American, Percent (2023)	American Indian or Alaska Native, Percent (2023)	Asian, Percent (2023)	Native Hawaiian or Other Pacific Islander, Percent (2023)	Other Race, Percent (2023)	Two or More Races, percent (2023)	Persons of Hispanic Origin, Percent (2023)*
Guilford County	**49.1%**	**34.0%**	**0.4%**	**5.2%**	**0.0%**	**4.0%**	**7.3%**	**9.8%**

Jurisdiction	White, Percent (2023)	Black or African American, Percent (2023)	American Indian or Alaska Native, Percent (2023)	Asian, Percent (2023)	Native Hawaiian or Other Pacific Islander, Percent (2023)	Other Race, Percent (2023)	Two or More Races, percent (2023)	Persons of Hispanic Origin, Percent (2023)*
Gibsonville	74.7%	22.6%	0.0%	0.6%	0.0%	0.7%	1.3%	0.9%
Greensboro	40.4%	42.2%	0.5%	5.0%	0.0%	4.5%	7.5%	10.5%
High Point	46.1%	32.7%	0.4%	8.2%	0.0%	4.4%	8.2%	12.3%
Jamestown	86.5%	9.6%	0.0%	1.4%	0.0%	0.6%	2.0%	8.2%
Oak Ridge	77.3%	3.6%	0.0%	11.4%	0.1%	4.9%	2.5%	5.0%
Pleasant Garden	78.4%	14.1%	0.0%	0.3%	0.0%	1.1%	6.2%	2.3%
Sedalia	17.1%	76.9%	1.9%	0.0%	0.0%	3.1%	1.0%	9.7%
Stokesdale	73.7%	9.4%	0.0%	1.9%	0.0%	0.8%	14.1%	13.4%
Summerfield	93.6%	5.5%	0.0%	6.4%	0.0%	2.7%	6.4%	4.6%
Whitsett	86.7%	6.6%	0.8%	1.5%	0.0%	0.8%	3.5%	4.6%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau, 2019-2023 American Community Survey 5-Year Estimates

3.3 HOUSING, INFRASTRUCTURE, AND LAND USE

3.3.1 Housing

According to 2023 ACS data, there are an estimated 415,774 housing units in Guilford County and its municipalities, the majority of which are single family homes. Housing information for the participating communities is presented in Table 3.4.

TABLE 3.4: HOUSING CHARACTERISTICS OF PARTICIPATING JURISDICTIONS

Jurisdiction	Housing Units (2017)	Housing Units (2023)	Owner-Occupied Units (2023)	Renter-Occupied Units (2023)	Median Home Value (2023)
Guilford County	**225,009**	**235,882**	**60.0%**	**40.0%**	**$234,900**
Gibsonville*	2,684	3,977	83.4%	16.6%	$262,400
Greensboro	129,162	133,565	50.3%	49.7%	$221,300
High Point*	46,550	48,990	58.1%	41.9%	$212,400
Jamestown	1,609	1,600	78.7%	21.3%	$266,600
Oak Ridge	2,378	2,757	92.8%	7.2%	$523,500
Pleasant Garden	1,830	2,244	79.3%	20.7%	$212,700
Sedalia	276	298	99.3%	0.7%	$172,400
Stokesdale	1,952	1,969	94.3%	5.7%	$368,600
Summerfield	3,904	4,090	90.6%	9.4%	$490,100
Whitsett	421	436	82.9%	17.1%	$201,800

*The housing unit counts for Gibsonville and High Point include units located in neighboring counties.
Source: United States Census Bureau, 2019-2023 American Community Survey 5-Year Estimates

Between 2017 and 2023, the housing stock increased by 20,033 units, reflecting continued residential growth to meet rising population demands. On average, 79.1 percent of homes are owner-occupied, and 20.9 percent are renter-occupied. Greensboro and High Point, the county's largest urban centers, have the highest share of rental housing, with Greensboro nearly evenly split between owners and renters and High Point maintaining 58.1

percent owner-occupancy. Suburban and rural towns generally show much higher rates of homeownership, with several exceeding 90 percent.

Median home values vary significantly across the county. Oak Ridge and Summerfield stand out with the highest values, $523,500 and $490,100, respectively. This aligns with their large-lot, low-density development patterns and high homeownership rates. In contrast, Sedalia ($172,400) and Whitsett ($201,800) provide more affordable options yet remain small in overall housing stock. The data indicates strong rental markets in urban centers paired with predominantly owner-occupied, higher-value housing in suburban and rural areas.

3.3.2 Infrastructure

Transportation

Guilford County is served by a robust transportation network of interstates, highways, and transit systems. Interstate 40 runs east–west through the county as the state's longest interstate, while Interstate 73 connects from the south into Greensboro. Interstate 74 follows the former US 311 freeway from the Winston-Salem Northern Beltway southward into High Point and onward. Interstate 85, the state's second longest, runs northeast–southwest, with several segments in concurrency with other routes.

Air travel is anchored by Piedmont Triad International Airport (PTI), served by five major airlines with daily flights. Residents also have access to Charlotte-Douglas International Airport (1,400 daily flights on 15 airlines) and Raleigh-Durham International Airport (400+ daily flights on 10 airlines), providing extensive domestic and international connections.

Public transportation includes local systems in Greensboro and High Point, supplemented by county-operated services for residents in areas without municipal transit. The Piedmont Authority for Regional Transportation (PART) provides regional bus routes linking communities across the Triad.

Utilities

Electric power in Guilford County is provided primarily by Duke Energy, one of the largest utility providers in North Carolina, with certain areas served by EnergyUnited and other local cooperatives. The City of High Point operates its own municipal electric service for most of its residents. Natural gas is available in much of the county through Piedmont Natural Gas, a subsidiary of Duke Energy.

Water and sewer services are delivered by multiple municipal and special district providers, including the Cities of Greensboro, High Point, and Burlington; the Towns of Jamestown and Stokesdale; and the Sedgefield Sanitary District. While Guilford County does not own or operate any public water or sewer systems, it plays a regulatory role by issuing permits for private wells and septic systems.

Community Facilities

There is an extensive networks of public safety, healthcare, and recreational facilities located in Guilford County. Based on the county's vulnerability assessment, there are 73 fire stations, 25 public safety facilities (including police and sheriff's offices), and 167 public and private schools serving the population. Healthcare is anchored by six acute care hospitals providing nearly 1,500 licensed beds. These include Moses H. Cone Memorial Hospital, Wake Forest Baptist High Point Medical Center, Kindred Hospital Greensboro, Cone Health Wesley Long Hospital, and Cone Health MedCenter High Point, with the Cone Health Network operating additional satellite facilities throughout the county. Furthermore, three nationally recognized teaching hospitals are located within an hour drive, expanding access to specialized care.

Commercial amenities are abundant, with three regional shopping malls and over three million square feet of retail space. The county also offers a wide range of parks and recreational opportunities. Major facilities include Bur-Mil Park, Gibson Park, Guilford-Mackintosh Park, Hagan-Stone Park, Northeast Park, Southwest Park, and Triad Park, along with numerous municipal parks in each community. This combination of infrastructure, services, and amenities supports Guilford County's role as a vibrant, well-connected hub within the Piedmont Triad.

3.3.3 Land Use

Guilford County positions itself to accommodate new growth and redevelopment that is efficient and cost-effective; improves the quality of life for residents; enhances economic vitality; is respectful to citizen-based area plans; supports creativity and innovative design; and protects and preserves the natural, historic, and cultural resources and assets of the county.

The county continues to utilize the future land uses depicted on citizen-based area plans, in conjunction with the rezoning guidance matrix, as the basis for land use and policy recommendations. Guilford County is an active partner in the planning and implementation of large-scale multi-jurisdictional land use initiatives such as the Heart of the Triad and transit-oriented development. Local land use and associated regulations are further discussed in Section 7: Capability Assessment.

3.4 EMPLOYMENT AND INDUSTRY

Guilford County's traditional employment base of textiles, apparel, and furniture has diversified greatly in the last fifty years, and now encompasses more than 300 companies producing a wide range of products. An excellent transportation infrastructure, including two interstate highways, Piedmont Triad International Airport, and readily available rail and truck service, has helped solidify the county's position as a major distribution and transportation center in the Southeast. Table 3.5 provides a summary of key economic indicators for the county.

TABLE 3.5: KEY ECONOMIC INDICATORS FOR THE COUNTY

Jurisdiction	Population in Labor Force	Employed (%)	Unemployed (%)	Not in Labor Force (%)	Unemployment Rate (%)
Guilford County	**280,042**	**61%**	**3.0%**	**35.8%**	**4.7%**
Gibsonville*	4,983	65.9%	2.2%	31.9%	3.2%
Greensboro	157,138	62.1%	3.3%	34.3%	5.1%
High Point*	56,994	58.3%	3.5%	38.1%	5.6%
Jamestown	1,992	61.2%	0.2%	38.6%	0.3%
Oak Ridge	3,757	61.9%	2.0%	36.0%	3.2%
Pleasant Garden	2,665	65.3%	1.0%	33.0%	1.6%
Sedalia	398	62.1%	0.8%	37.1%	1.3%
Stokesdale	2,886	62.5%	0.0%	37.5%	0.0%
Summerfield	5,526	62.9%	2.0%	35.1%	3.1%
Whitsett	255	50.4%	2.5%	47.1%	4.7%

*The labor force data for Gibsonville and High Point include counts from neighboring counties.
Source: United States Census Bureau, 2019-2023 American Community Survey 5-Year Estimates

There are approximately 280,042people in the labor force, which breaks down to 61% percent of the total population. This is generally characteristic of all participating communities as well. The percentage of the population currently employed in the region is 61.2 percent, with all communities exceeding an employment

rate of over 50 percent. According to the American Community Survey, the average unemployment rate for all participating communities is 3 percent. **Table 3.6** further breaks down jobs by occupation.

TABLE 3.6: OCCUPATION OF THOSE IN THE LABOR FORCE

Jurisdiction	Management, Business, Science & Arts (%)	Service (%)	Sales & Office (%)	Natural Resources, Construction & Maintenance (%)	Production, Transportation & Material Moving (%)
Guilford County	**39.6%**	**16.2%**	**21.6%**	**6.8%**	**15.8%**
Gibsonville*	39.9%	20.1%	19.1%	9.6%	11.4%
Greensboro	38.3%	17.0%	22.7%	5.7%	16.3%
High Point*	38.6%	15.5%	20.7%	6.8%	18.4%
Jamestown	38.0%	21.6%	27.6%	8.3%	4.4%
Oak Ridge	56.5%	14.4%	13.7%	4.6%	10.8%
Pleasant Garden	49.8%	7.2%	16.0%	12.5%	14.5%
Sedalia	16.5%	22.4%	26.2%	2.8%	32.1%
Stokesdale	61.5%	12.0%	17.5%	2.3%	6.7%
Summerfield	62.1%	11.6%	17.1%	3.4%	5.8%
Whitsett	32.9%	13.6%	28.8%	12.8%	11.9%

In Guilford County, most workers are employed in management, business, science, and arts fields, with shares ranging from 16.5% in Sedalia to over 60% in Stokesdale and Summerfield. Urban areas like Greensboro and High Point have a balanced mix of professional, sales, service, and production jobs, while rural and suburban towns lean more heavily toward professional roles. Service and sales/office occupations remain significant in several communities, and production, transportation, and material moving jobs are concentrated in places like Sedalia and High Point, reflecting the county's diverse economic base.

Many corporate and regional offices are in Guilford County, including Polo/Ralph Lauren, BB&T, Lincoln Financial, Volvo Trucks North America, and ITG Brands. The International Home Furnishings Market in High Point attracts some 150,000 visitors annually, generating millions of dollars in economic benefits to the community. Aggressive economic recruitment efforts by both private and public sectors have yielded many new corporate neighbors.

SECTION 4

Risk Assessment

Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.
Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…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.

44 CFR Subsection D §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. Plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:
A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
(B): An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; and
(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.

4.1 Overview

This section describes the Hazard Identification and Risk Assessment process for the development of this plan. It documents how the County met the following requirements from the 10-step planning process:

— Planning Step 4: Assess the Hazard
— Planning Step 5: Assess the Problem

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. Risk is "the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage." This hazard risk assessment covers all of Guilford County and the incorporated jurisdictions participating in this plan.

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of the potential risk to natural hazards in the county and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:



Data collected through this process has been incorporated into the following sections of this plan:

- **Section 4.2**: **Hazard Identification** identifies the natural and human-caused hazards that threaten the planning area.
- **Section 4.3: Risk Assessment Methodology and Assumptions** describes how the risk and vulnerability assessment was conducted and presented.
- **Section 4.4: Asset Inventory** details the population, buildings, and critical facilities at risk within the planning area.
- **Section 4.5**: **Hazard Profiles, Analysis, and Vulnerability** discusses the threat to the planning area, describes previous occurrences of hazard events and the likelihood of future occurrences, and assesses the planning area's exposure to each hazard profiled; considering assets at risk, critical facilities, and future development trends.
- **Section 4.6: Conclusions on Hazard Risk** summarizes the results of the Priority Risk Index and defines each hazard as a Low, Moderate, or High Risk hazard.

4.2 Hazard Identification

To identify the full range of hazards relevant to the planning area, the HMPC began with a review of the list of hazards identified in the 2023 State Hazard Mitigation Plan and the 2021 Guilford County Multi-Jurisdictional Hazard Mitigation Plan as summarized in Table 4.1. The HMPC used this process to ensure consistency across hazard mitigation planning efforts. All hazards on the below list were evaluated for inclusion in this plan update, and, where appropriate, the hazard list in this plan was updated to be consistent with the State Hazard Mitigation Plan.

TABLE 4.1 – FULL RANGE OF HAZARDS EVALUATED

Hazard	Included in 2023 State HMP?	Included in 2021 Guilford County HMP?
Flooding	Yes	Yes
Hurricanes and Coastal Hazards	Yes	Yes (Hurricanes)
Severe Winter Weather	Yes	Yes
Excessive Heat	Yes	Yes
Earthquakes	Yes	Yes
Wildfire	Yes	Yes
Dam Failure	Yes	No
Levee Failure	No	No
Drought	Yes	Yes
Tornadoes and Thunderstorms	Yes	Yes (evaluated separately)
Landslide	Yes	No
Sinkholes	Yes	No
Infectious Disease	Yes	Yes
Hazardous Substances	Yes	Yes
Radiological Emergency	Yes	Yes
Terrorism	Yes	Yes
Bioterrorism	No	Yes

Hazard	Included in 2023 State HMP?	Included in 2021 Guilford County HMP?
Civil Disturbance	Yes	Yes
Cyber Threat	Yes	Yes
Electromagnetic Pulse	Yes	No
Building/Structure Collapse	No	Yes
Pipeline Failure	No	Yes
Transportation Incident	No	Yes
Energy/Power/Utility Failure	No	Yes
Communications Systems Disruption/Failure	No	Yes
Resource Storage (Water/Fuel)	No	Yes
Food Emergency	Yes	No

The HMPC evaluated the above list of hazards using existing hazard data, past disaster declarations, local knowledge, and information from the 2023 State Plan and the 2021 Guilford County Plan to determine the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage.

One significant resource in this effort was the National Oceanic and Atmospheric Administration's (NOAA) National Center for Environmental Information (NCEI) Storm Events Database, which contains an archive by county of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. The database also provides a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. The database contains records of tornado events since 1950, thunderstorm wind and hail events since 1955, and all other tracked event types since 1996. NCEI receives storm data from the National Weather Service (NWS), which receives their information from a variety of sources, which include but are not limited to county, state and federal emergency management officials, local law enforcement officials, SkyWarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public, among others.

DISCLAIMER

NCEI's Storm Events Database generally only reflects damaging events and is limited to what events are reported to NWS. The database should not be considered an exhaustive list of past weather events. Instead, it is a useful record to understand the consequences of some past events and the relative significance of certain weather events to the planning area. Where no events of a certain type are reported in NCEI, this should not be taken as a definitive indication that no events of that type have occurred. Event types are defined by NWS.

The NCEI database contains 696 records of severe weather events that occurred in Guilford County in the 25-year period from 1999 through 2024. Table 4.2 summarizes these events.

TABLE 4.2 – NCEI SEVERE WEATHER REPORTS FOR GUILFORD COUNTY, 1999 – 2024

Type	# of Events	Property Damage	Crop Damage	Deaths	Injuries
Cold/Wind Chill	0	$0	$0	0	0
Drought	0	$0	$0	0	0
Excessive Heat	0	$0	$0	0	0
Extreme Cold/Wind Chill	0	$0	$0	0	0
Flash Flood	122	$3,247,000	$0	1	0
Flood	4	$15,130,000	$5,000,000	0	0
Frost/Freeze	0	$0	$0	0	0
Hail	146	$1,750	$0	0	0
Heat	1	$0	$0	1	0
Heavy Rain	1	$0	$0	0	0
Heavy Snow	1	$0	$0	0	0
High Wind	3	$1,000	$5,000	0	0
Hurricane	2	$0	$0	0	0
Ice Storm	2	$8,100,000	$0	0	0
Lightning	8	$2,147,400	$0	0	0
Strong Wind	17	$1,221,000	$0	0	0
Thunderstorm Wind	307	$1,593,000	$1,000	0	1
Tornado	7	$80,000,000	$0	1	3
Tropical Storm	3	$4,000,000	$0	0	0
Wildfire	0	$0	$0	0	0
Winter Storm	37	$650,000	$75,000	0	0
Winter Weather	35	$20,000	$0	0	0
Total:	**696**	**$116,111,150**	**$5,081,000**	**3**	**4**

Source: National Center for Environmental Information Events Database, June 2025

Note: Losses reflect totals for all impacted areas for each event.

The HMPC also researched past events that resulted in a federal and/or state emergency or disaster declaration for Guilford County in order to identify significant hazards. Federal and/or state disaster declarations may be granted when the Governor certifies that the combined local, county and state resources are insufficient and that the situation is beyond their recovery capabilities. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state government capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

Records of designated counties for FEMA major disaster declarations start in 1964. Since then, Guilford County has been designated in 14 major disaster declarations, as detailed in Table 4.3. Guilford County has also received 13 emergency declarations.

TABLE 4.3 – FEMA MAJOR DISASTER DECLARATIONS, GUILFORD COUNTY

Disaster #	Dec. Date	Incident Type	Event Title
844	9/25/1989	Hurricane	Hurricane Hugo
827	5/17/1989	Tornado	Tornadoes
1134	9/6/1996	Hurricane	Hurricane Fran
1103	2/23/1996	Snowstorm	Winter Storm
1087	1/13/1996	Snowstorm	Blizzard of 96
1292	9/16/1999	Hurricane	Hurricane Floyd
1312	1/31/2000	Severe Storm	Severe Winter Storm

Disaster #	Dec. Date	Incident Type	Event Title
1457	3/27/2003	Severe Ice Storm	Ice Storm
1448	12/12/2002	Severe Ice Storm	Severe Ice Storm
1553	9/18/2004	Hurricane	Hurricane Ivan
4167	3/31/2014	Severe Ice Storm	Severe Winter Storm
4393	9/14/2018	Hurricane	Hurricane Florence
4364	5/8/2018	Severe Storm	Tornado and Severe Storms
4487	3/25/2020	Biological	COVID-19 Pandemic

Source: FEMA Disaster Declarations Summary, June 27, 2025

Using the above information and additional discussion, the HMPC evaluated each hazard's significance to the planning area in order to decide which hazards to include in this plan update. Some hazard titles have been updated either to focus in on a single hazard or to assess closely related hazards together. Table 4.4 summaries the determination made for each hazard.

TABLE 4.4 – HAZARD EVALUATION RESULTS

Hazard	Included in this plan update?	Explanation for Decision
Flooding	Yes	The 2023 State HMP and 2021 Guilford County plan addressed this hazard. NCEI reports 126 flood-related events between January 1999 and December 2024.
Hurricane & Tropical Storm	Yes	Guilford County is not exposed to coastal hazards; therefore, storm surge, coastal flooding, and coastal erosion will not be assessed. However, past disaster declarations and emergency declarations indicate that hurricane wind and rain are still a significant hazard for the County. The 2023 State HMP and 2021 Guilford County plan addressed this hazard.
Severe Winter Weather	Yes	The 2021 Guilford County plan addressed this hazard. NCEI reports 75 winter weather related storm events since 1999 and the County has received six disaster declarations and two emergency declarations for severe winter weather.
Excessive Heat	Yes	The 2021 Guilford County plan and the 2023 State HMP addressed this hazard. NCEI reports 1 heat event for Guilford County.
Earthquake	Yes	The 2021 Guilford County plan and the 2023 State HMP addressed this hazard. Guilford County could be impacted by the New Madrid fault and the Charleston fault.
Wildfire	Yes	The 2021 Guilford County plan and the 2023 State HMP addressed this hazard. There are critical fireshed and direct exposure areas of Wildland Urban Interface in the planning area.
Dam & Levee Failure	Yes	The 2023 State HMP addressed this hazard while the 2021 Guilford County plan did not. There are 79 high hazard dams located throughout the County.
Drought	Yes	The 2021 Guilford County plan and the 2023 State HMP addressed this hazard. The County has previously received an emergency declaration for drought.

Hazard	Included in this plan update?	Explanation for Decision
Tornadoes & Thunderstorms	Yes	The 2021 Guilford County plan and the 2023 State HMP addressed this hazard. NCEI reports 7 tornado events, 327 wind events, 8 lightning events, and 146 hail events in the past 25 years. They have also caused several disaster declarations. Based on this information, analysis is warranted.
Landslide	No	The 2023 State HMP addressed this hazard while the 2021 Guilford County Plan did not.
Sinkholes	No	The 2023 State HMP addressed this hazard while the 2021 Guilford County Plan did not. No events of note have occurred since the last update of this plan.
Infectious Disease	Yes	The 2021 Guilford County plan and the 2023 State HMP addressed this hazard. Infectious disease has caused one of the disaster declarations in the County. The County feels that infectious diseases pose a substantial risk and opted to assess vulnerability to the extent possible through this effort.
Hazardous Substances	Yes	The 2023 State HMP and 2021 Guilford County plan addressed this hazard. PHMSA reported 33 serious hazardous materials incidents in Guilford County between 1990 to 2024.
Radiological Emergency	Yes	The 2023 State HMP and 2021 Guilford County plan addressed this hazard. The southeastern corner of Guilford County may face risks associated with the Shearon Harris Nuclear Power Plant.
Terrorism	Yes	The 2023 State HMP and 2021 Guilford County plan addressed this hazard. There are several high profiles targets in the area that caused the planning team to determine that the hazard should be evaluated further.
Cyber Threat	Yes	The 2023 State HMP and 2021 Guilford County plan addressed this hazard. Cyber-security threats can occur without regard to specific location, so it was evaluated in this plan.
Electromagnetic Pulse	No	The 2023 State HMP addressed this hazard while the 2021 Guilford County plan did not. The HMPC considers this hazard better addressed by the State and through emergency response planning.
Bioterrorism	Yes	The 2021 Guilford County plan addressed this hazard. There have been no major bioterrorism events in the county, however, these kinds of events are often unpredictable, and Guilford County could be affected.
Building/ Structure Collapse	Yes	The 2021 Guilford County plan addressed this hazard. Building/structure collapse is a hazard that often happens on a very localized level, but the impacts can be severe and could potentially occur anywhere.
Civil Disturbance	Yes	The 2021 Guilford County plan addressed this hazard. Although there have not been any major civil disturbances in the county in many years, there is some possibility that this could impact the county in the future.

Hazard	Included in this plan update?	Explanation for Decision
Communications Systems Disruption/Failure	Yes	The 2021 Guilford County plan addressed this hazard. Communications systems disruptions can happen in any location throughout the United States and throughout the county.
Energy/Power/ Utility Failure	Yes	The 2021 Guilford County plan addressed this hazard. Energy/Power/Utility failures occur frequently in the county, especially during winter storms or high wind events. These will continue to impact the county going forward.
Pipeline Failure	Yes	The 2021 Guilford County plan addressed this hazard. There have been several pipeline failures that have occurred within the county, including two in 1978 leading eastward from Greensboro's tank farm and one caused by digging near Lake Brandt in 1987.
Transportation Incident	Yes	The 2021 Guilford County plan addressed this hazard. Given the number of transportation corridors and hubs located within Guilford County, it is highly likely that more transportation incidents will occur in the future.
Resource Shortage (Water/Fuel)	Yes	The 2021 Guilford County plan addressed this hazard. Resource shortages of both fuel and water have occurred in the county in the past and are likely to occur again in the future.
Food Emergency	No	The 2023 State HMP addresses this hazard, but the 2021 Guilford County plan did not. The HMPC considers this hazard better addressed by the State and through emergency response planning.

The final list of hazards included in this plan are as follows:

Natural Hazards:

- Dam & Levee Failure
- Drought
- Earthquake
- Excessive Heat
- Flooding
- Hurricane & Tropical Storm
- Severe Winter Weather
- Tornadoes & Thunderstorms
- Wildfire

Technological/Manmade Hazards:

- Cyber Threat
- Hazardous Substances
- Radiological Emergency
- Bioterrorism
- Building/Structure Collapse
- Civil Disturbance
- Communications Systems Disruption/Failure

— Energy/Power/Utility Failure
— Infectious Disease
— Pipeline Failure
— Resource Shortage
— Transportation Incident
— Terrorism

4.3 Risk Assessment Methodology and Assumptions

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

Each hazard is profiled in the following format:

HAZARD DESCRIPTION

This section provides a description of the hazard, including discussion of its speed of onset and duration, as well as any secondary effects followed by details specific to the Guilford County planning area.

LOCATION

This section includes information on the hazard's physical or spatial extent, with mapped boundaries where applicable. This section informs the spatial extent assessment category in the Priority Risk Index rating of each hazard.

EXTENT

This section includes information on the hazard extent in terms of the magnitude of impact and describes how the severity of the hazard can be measured. Where available, the most severe event on record is used as a frame of reference. This section informs the impact assessment category in the Priority Risk Index rating of each hazard.

HISTORICAL OCCURRENCES

This section contains information on historical events, including the location and consequences of all past events on record within or near the Guilford County planning area.

PROBABILITY OF FUTURE OCCURRENCE

This section gauges the likelihood of future occurrences based on past events and existing data. The frequency is determined by dividing the number of events observed by the number of years on record and multiplying by 100. This provides the percent chance of the event happening in any given year according to historical occurrence (e.g. 10 winter storm events over a 30-year period equates to a 33 percent chance of experiencing a severe winter storm in any given year). This section informs the probability assessment category in the Priority Risk Index rating of each hazard.

CLIMATE CHANGE

Where applicable, this section discusses how climate change may or may not influence the risk posed by the hazard on the planning area in the future. Resources on climate change projections and potential impacts include the Fourth National Climate Assessment, the Fifth National Climate Assessment, and the North Carolina State Climate Office.

VULNERABILITY ASSESSMENT

This section quantifies, to the extent feasible using best available data, assets at risk to natural hazards and potential loss estimates. People, properties and critical facilities, and environmental assets that are vulnerable to the hazard are identified. Future development is also discussed in this section, including how exposure to the hazard may change in the future or how development may affect hazard risk.

The vulnerability assessments followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002). The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard. Note that time and resource constraints prevented physical visits to assessed critical facilities. Data used to support this assessment included the following:

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

Two distinct risk assessment methodologies were used in the formation of the vulnerability assessment: a quantitative analysis that relies upon best available data and technology and a qualitative analysis that relies on local knowledge and rational decision making.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Where hazard risk cannot be distinctly quantified and modeled, other information can be collected in regard to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources (e.g., an identified wetland or endangered species habitat). Together, this information conveys the vulnerability of that area to that hazard. The quantitative analysis for this plan update involved the use of NCEM's IRISK database, which provides modeled damage estimates for earthquake, flood, wind, and wildfire hazards.

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

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

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

Key methodologies and assumptions for specific hazards analysis are described in their respective profiles.

PRIORITY RISK INDEX

The conclusions drawn from the hazard profiling and vulnerability assessment process can be used to prioritize all potential hazards to the Guilford County planning area. The Priority Risk Index (PRI) was applied for this purpose because it provides a standardized numerical value so that hazards can be compared 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 was assigned a value (1 to 4) and a weighting factor as summarized in Table4.5.

The sum of all five risk assessment categories equals the final PRI value, demonstrated in the equation below (the highest possible PRI value is 4.0).

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

The purpose of the PRI is to categorize and prioritize all potential hazards for the Guilford County planning area as high, moderate, or low risk. The summary hazard classifications generated through the use of the PRI allows for the prioritization of those high and moderate hazard risks for mitigation planning purposes.

The results of the risk assessment and PRI scoring are provided in Section 4.6 Conclusions on Hazard Risk.

TABLE4.5 – PRIORITY RISK INDEX

RISK ASSESSMENT CATEGORY	LEVEL	DEGREE OF RISK CRITERIA	INDEX	WEIGHT
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	**1**	**30%**
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	**2**	
	LIKELY	BETWEEN 10 & 100% ANNUAL PROBABILITY	**3**	
	HIGHLY LIKELY	100% ANNUAL PROBABILTY	**4**	
IMPACT In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & 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 > 1 DAY	**2**	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR > 1 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 > 30 DAYS.	**4**	
SPATIAL EXTENT How large of an area could be impacted by a hazard event? Are impacts localized or regional?	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	**1**	**20%**
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	**2**	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	**3**	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	**4**	
WARNING TIME Is there usually some lead time associated with the hazard event? Have warning measures been implemented?	**MORE THAN 24 HRS**	SELF DEFINED	**1**	**10%**
	12 TO 24 HRS	SELF DEFINED	**2**	
	6 TO 12 HRS	SELF DEFINED	**3**	
	LESS THAN 6 HRS	SELF DEFINED	**4**	
DURATION How long does the hazard event usually last?	**LESS THAN 6 HRS**	SELF DEFINED	**1**	**10%**
	LESS THAN 24 HRS	SELF DEFINED	**2**	
	LESS THAN 1 WEEK	SELF DEFINED	**3**	
	MORE THAN 1 WEEK	SELF DEFINED	**4**	

Asset Inventory

Population

Population data reported in the vulnerability assessment is derived from the 2020 Census and includes a breakdown of population into two subpopulations considered to be a greater risk than the general population, the elderly and children[1]. Table 4.6 details the population counts by jurisdiction used for the vulnerability assessment. Since the last plan update, the total population of the planning area has increased by nearly 14%.

TABLE 4.6 – POPULATION COUNTS BY JURISDICTION, 2020

Jurisdiction	2020 Census Population	Elderly (Age 65 and Over)	Children (Age 5 and Under)
Guilford County (Unincorporated Area)	84,956	20,442	7,162
City Of Greensboro	299,035	39,884	16,134
City Of High Point	114,059	17,209	6,407
Town Of Gibsonville	8,971	1,194	177
Town Of Jamestown	3,668	1,847	301
Town Of Oak Ridge	7,474	993	399
Town Of Pleasant Garden	4,997	1,173	170
Town Of Sedalia	676	94	31
Town Of Stokesdale	5,924	587	271
Town Of Summerfield	10,951	1,519	680
Town Of Whitsett	588	282	150
Total	**541,299**	**85,224**	**31,882**

Source: 2020 Decennial Census

Property

Building counts were also provided by the IRISK database via the RMT and are detailed in

[1] Census population estimates for Guilford County as of 2023 indicate a population increases for most of the jurisdictions in the County. This translates to more people being vulnerable to the hazards that impact the County. Census 2020 population numbers were used to depict population vulnerability and are for planning purposes only.

Table 4.7. These values were generated using locally-provided building footprint and parcel data as well as data generated by NCEM. The methodology for generating the building asset inventory is described in greater detail in Section 4.3. The IRISK building inventory reflects a less than 1% decrease in total building count and in total exposed building value since the development of the 2021 plan. The Planning Area Profile in Section 3 describes recent growth and development and provides context for understanding the degree to which exposure and vulnerability may have changed.

TABLE 4.7 – BUILDING COUNTS AND VALUES BY JURISDICTION

Jurisdiction	Building Count	Building Value
Guilford County (Unincorporated Area)	49,555	$3,862,389,575
City Of Greensboro	81,939	$12,406,325,734
City Of High Point	38,756	$5,746,609,837
Town Of Gibsonville	2,728	$284,010,309
Town Of Jamestown	2,786	$367,496,719
Town Of Oak Ridge	3,228	$285,464,686
Town Of Pleasant Garden	2,820	$215,153,808
Town Of Sedalia	393	$31,561,382
Town Of Stokesdale	2,337	$174,385,731
Town Of Summerfield	4,274	$382,534,991
Town Of Whitsett	573	$37,186,640
Total	**189,389**	**$23,793,119,412**

Source: NCEM IRISK Database

To supplement the asset inventory and provide a clearer picture of the current asset exposure in Guilford County, current parcel data was evaluated to identify recent development since NCEM's IRISK database was last updated. The building footprint layer from IRISK was compared to current parcel data; any parcels with an improved value that did not already have a building in IRISK were appended to the property inventory. This information is used to supplement some spatial risk analyses with current exposure estimates. This updated asset inventory also provides context to understand the degree to which the IRISK exposure and vulnerability numbers differ from current conditions.

Table4.8 provides a summary of estimated property exposure by occupancy type.

TABLE4.8 – CURRENT IMPROVED PARCELS, AS OF JULY 2025

Occupancy Type	Improved Parcel Count	Total Improved Value
Agriculture	622	$150,103,515
Commercial	5,418	$6,836,373,056
Education	752	$1,878,378,395
Government	567	$1,261,635,363
Industrial	3,403	$4,165,028,461
Religious	8	$2,483,253
Residential	198,806	$31,483,313,516
Regional Total	**209,576**	**$45,777,315,559**

Source: County parcel data, retrieved July 2025; IRISK database building footprints

Critical Facilities and Infrastructure

The IRISK database also identifies Critical Infrastructure and Key Resources (CIKR) buildings as well as High Potential Loss Properties. These properties are detailed in Table 4.9 and Table 4.10, respectively.

TABLE 4.9 – CRITICAL INFRASTRUCTURE AND KEY RESOURCES BY TYPE AND JURISDICTION

Jurisdiction	Food and Agriculture	Banking and Finance	Chemical & Hazardous	Commercial	Communications	Critical Manufacturing	EM	Government Facilities	Healthcare	Transportation Systems	Energy	Emergency Services	Water	Total
Unincorporated Guilford County	1,580	4	0	1,195	0	445	0	447	42	366	3	0	0	**4,082**
Greensboro	11	122	4	3,716	4	1,802	0	917	431	1,282	11	0	8	**8,308**
High Point	24	40	1	1,754	1	1,199	0	415	234	450	40	0	0	**4,158**
Gibsonville	9	2	0	66	0	29	0	9	2	17	0	0	0	**134**
Jamestown	0	3	0	95	0	71	0	55	6	42	0	0	1	**273**
Oak Ridge	55	8	0	86	0	25	0	24	4	32	0	0	0	**234**
Pleasant Garden	32	1	0	55	0	44	0	8	5	19	1	0	0	**165**
Sedalia	0	0	0	5	0	0	0	21	1	2	0	0	0	**29**
Stokesdale	62	2	0	70	0	45	0	5	1	27	0	0	0	**212**
Summerfield	30	1	0	109	0	30	0	8	6	24	1	0	0	**209**
Whitsett	2	0	0	24	0	1	0	3	1	1	0	0	0	**32**
Total	**1,805**	**183**	**5**	**7,175**	**5**	**3,691**	**0**	**1,912**	**733**	**2,262**	**56**	**0**	**9**	**17,836**

Source: NCEM Risk Management Tool

TABLE 4.10 – HIGH POTENTIAL LOSS PROPERTIES BY USE AND JURISDICTION

Jurisdiction	Residential	Commercial	Industrial	Government	Agricultural	Religious	Utilities	Total
Unincorporated Guilford County	12	76	34	31	0	18	3	174
Greensboro	110	650	214	126	0	65	16	1,181
High Point	61	241	186	53	0	22	17	580
Gibsonville	3	4	5	0	0	2	0	14
Jamestown	4	11	7	6	0	3	1	32
Oak Ridge	0	8	0	1	0	0	0	9
Pleasant Garden	0	3	1	1	0	2	1	8
Sedalia	0	1	0	1	0	0	0	2
Stokesdale	1	2	0	2	0	0	0	5
Summerfield	0	3	3	0	0	2	1	9
Whitsett	0	2	0	0	0	0	0	2
Total	**191**	**1,001**	**450**	**221**	**0**	**114**	**39**	**2,016**

Source: NCEM Risk Management Tool

To supplement the inventory of CIKR buildings and high potential loss properties from IRISK, the planning committee compiled an inventory of critical facilities and infrastructure using Guilford County GIS data and data from NC OneMap. These assets are considered community lifelines, which are defined by FEMA as the buildings and infrastructure that enable the continuous operation of critical business and government functions and are essential to human health and safety or economic security. Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. These critical facilities are a priority for mitigation planning and were examined against known hazard areas, where possible, in this risk assessment.

Critical facilities are summarized in Table4.11 and shown in Figure 4.1 through Figure 4.11.

TABLE4.11 – CRITICAL FACILITIES

Jurisdiction	FEMA Lifeline Type								Total
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health and Medical	Safety and Security	Transportation	Water Systems	
Unincorporated Guilford County	5	0	4	1	4	28	0	1	**43**
City of Greensboro	7	0	166	15	46	63	1	5	**303**
City of High Point	1	0	32	5	10	17	0	1	**66**
Town of Gibsonville	0	0	1	0	0	2	0	0	**3**
Town of Jamestown	0	0	0	0	0	1	0	0	**1**
Town of Oak Ridge	0	0	0	0	0	2	0	0	**2**
Town of Pleasant Garden	0	0	1	0	0	1	0	0	**2**
Town of Sedalia	0	0	1	0	0	0	0	0	**1**
Town of Stokesdale	0	0	0	0	0	1	0	0	**1**
Town of Summerfield	1	0	3	0	0	3	0	0	**7**
Town of Whitsett	0	0	0	0	0	1	0	0	**1**
Guilford County Total	**14**	**0**	**208**	**21**	**60**	**119**	**1**	**7**	**430**

It should be noted that the data presented in IRSIK/RMT regarding chemical and hazardous facilities, emergency services, and water facilities may not be fully accurate or comprehensive. There are likely more facilities in these categories than those currently listed. This information should be considered approximate.

FIGURE 4.1 – CRITICAL ASSET LOCATIONS, GUILFORD COUNTY

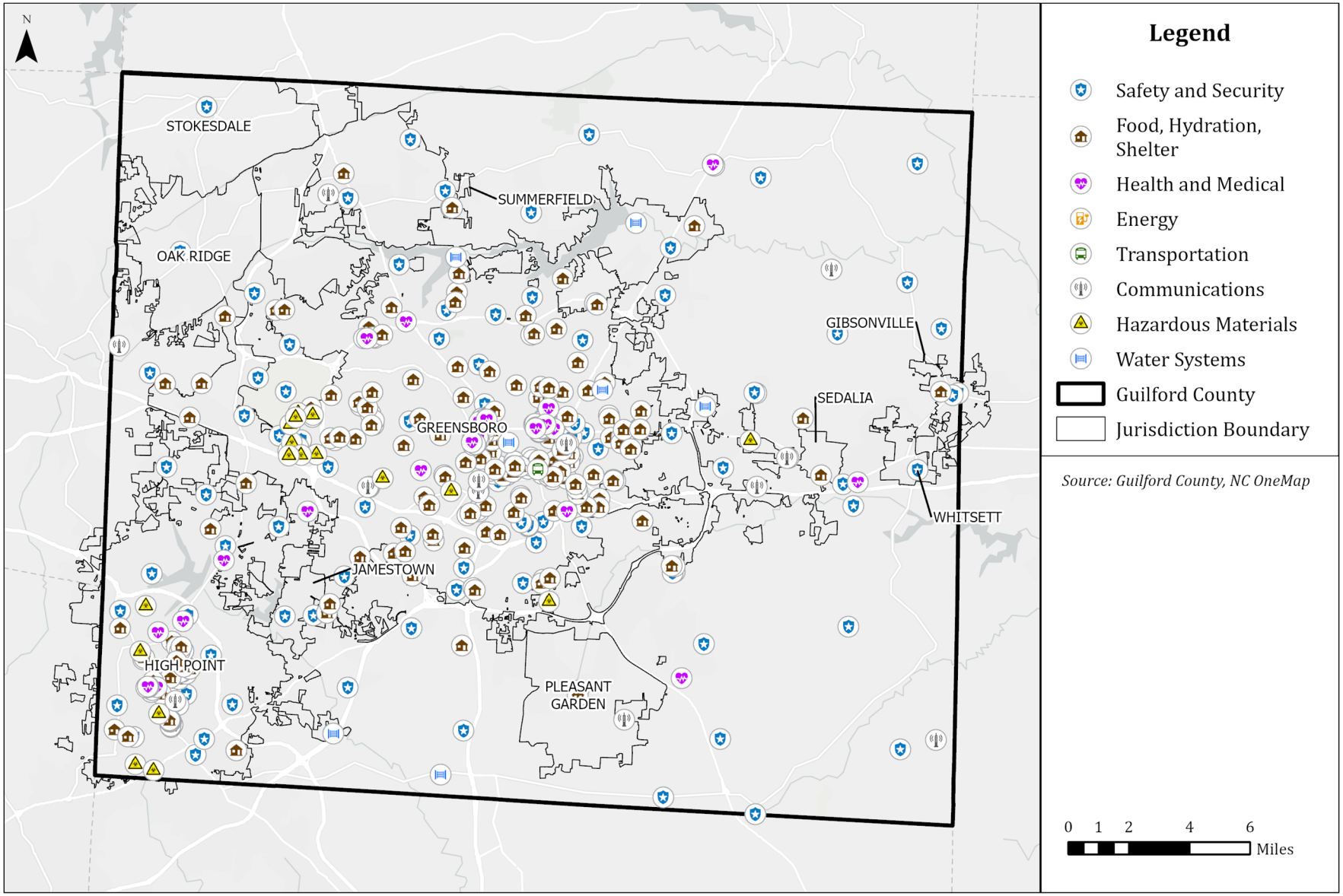


FIGURE 4.2 – CRITICAL ASSET LOCATIONS, CITY OF GREENSBORO

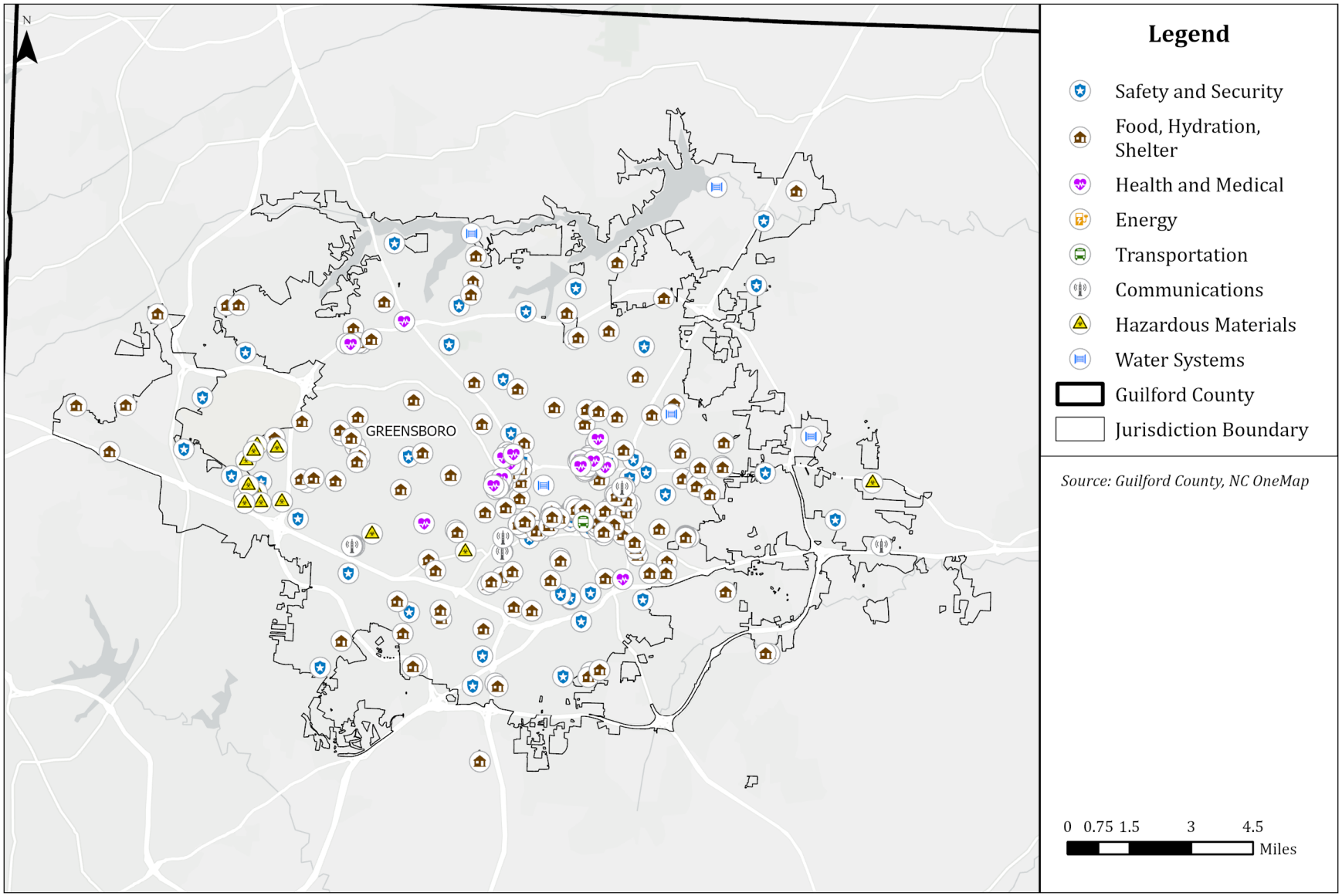


FIGURE4.3 – CRITICAL ASSET LOCATIONS, CITY OF HIGH POINT

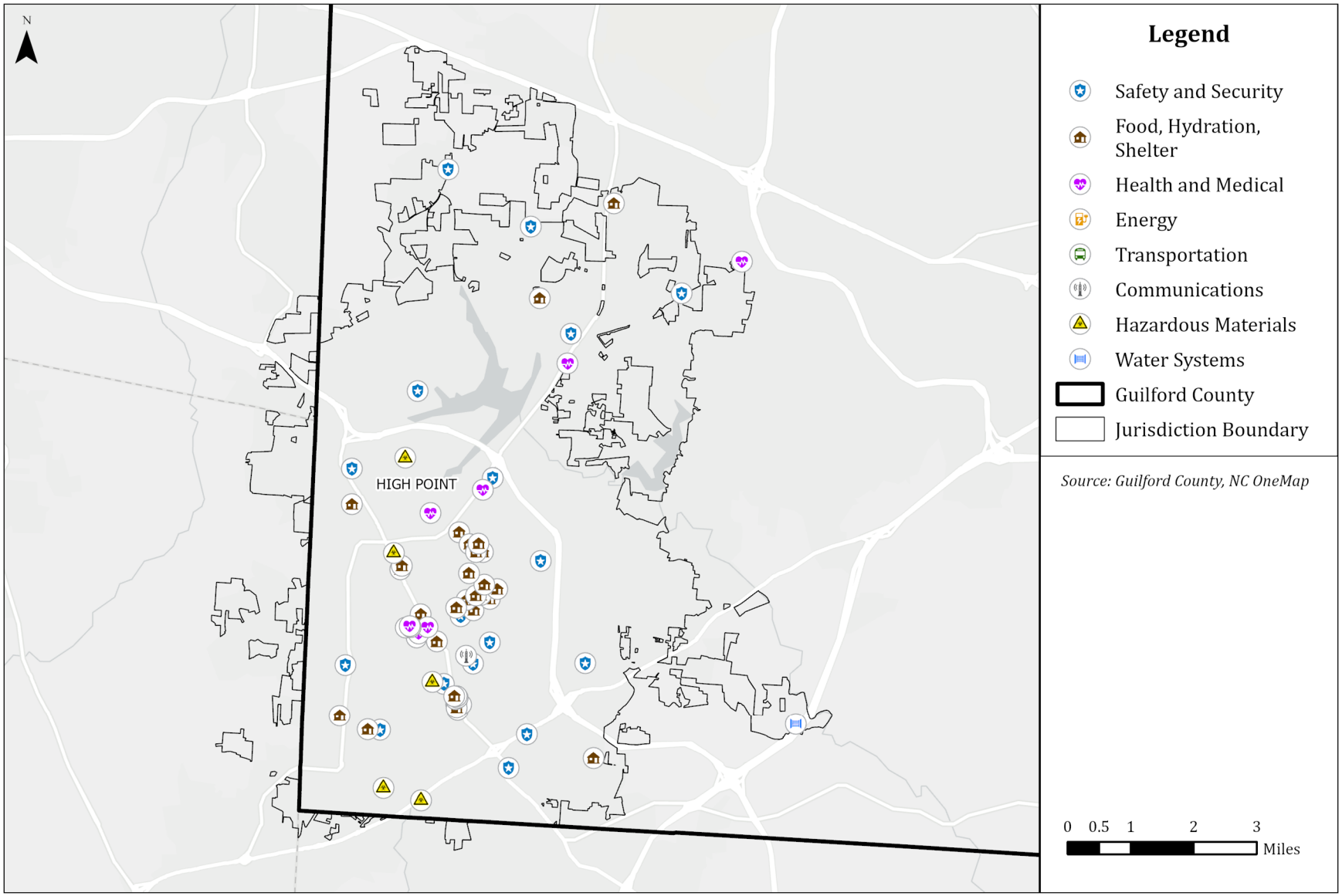


FIGURE4.4 – CRITICAL ASSET LOCATIONS, TOWN OF GIBSONVILLE

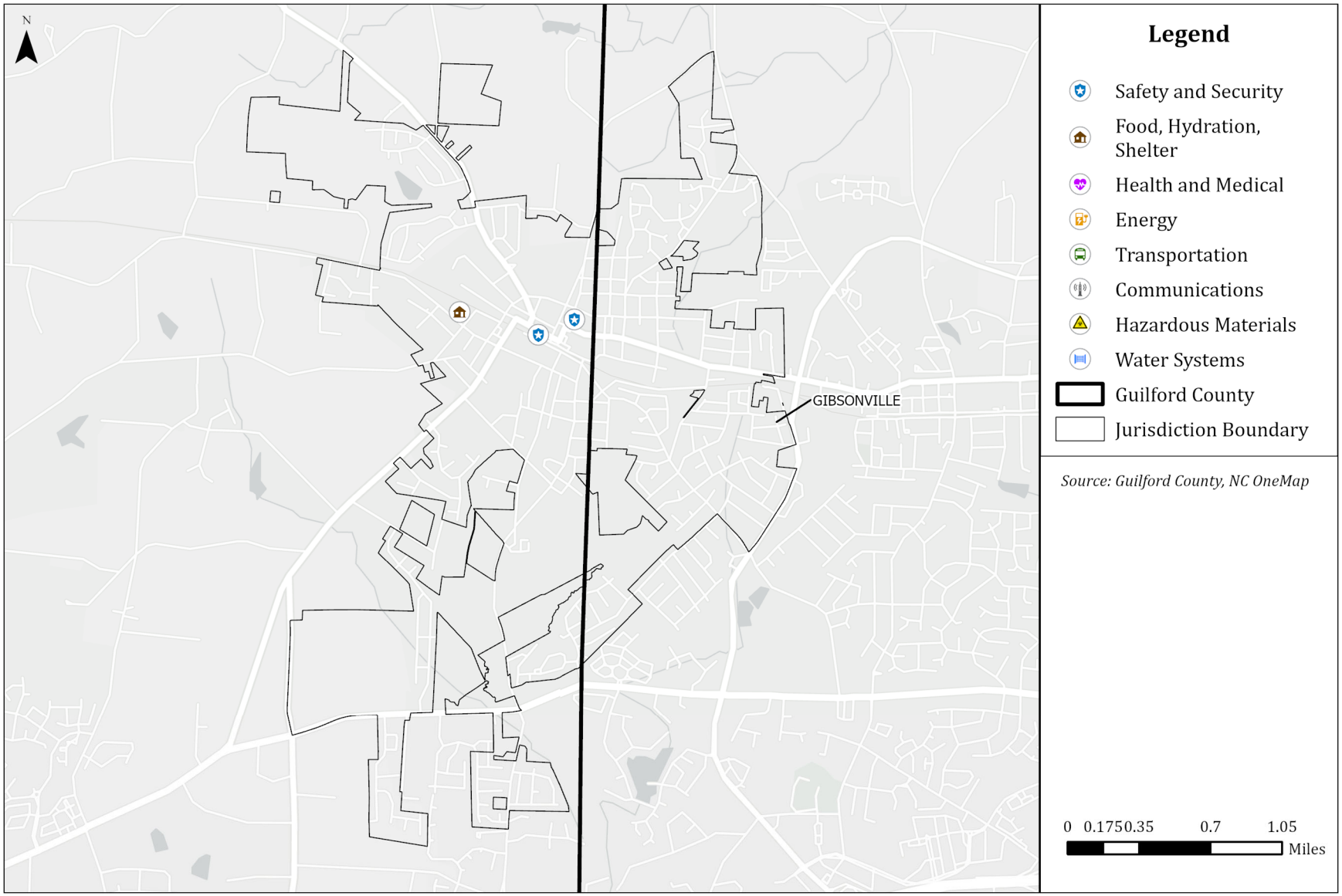


FIGURE 4.5 – CRITICAL ASSET LOCATIONS, TOWN OF JAMESTOWN

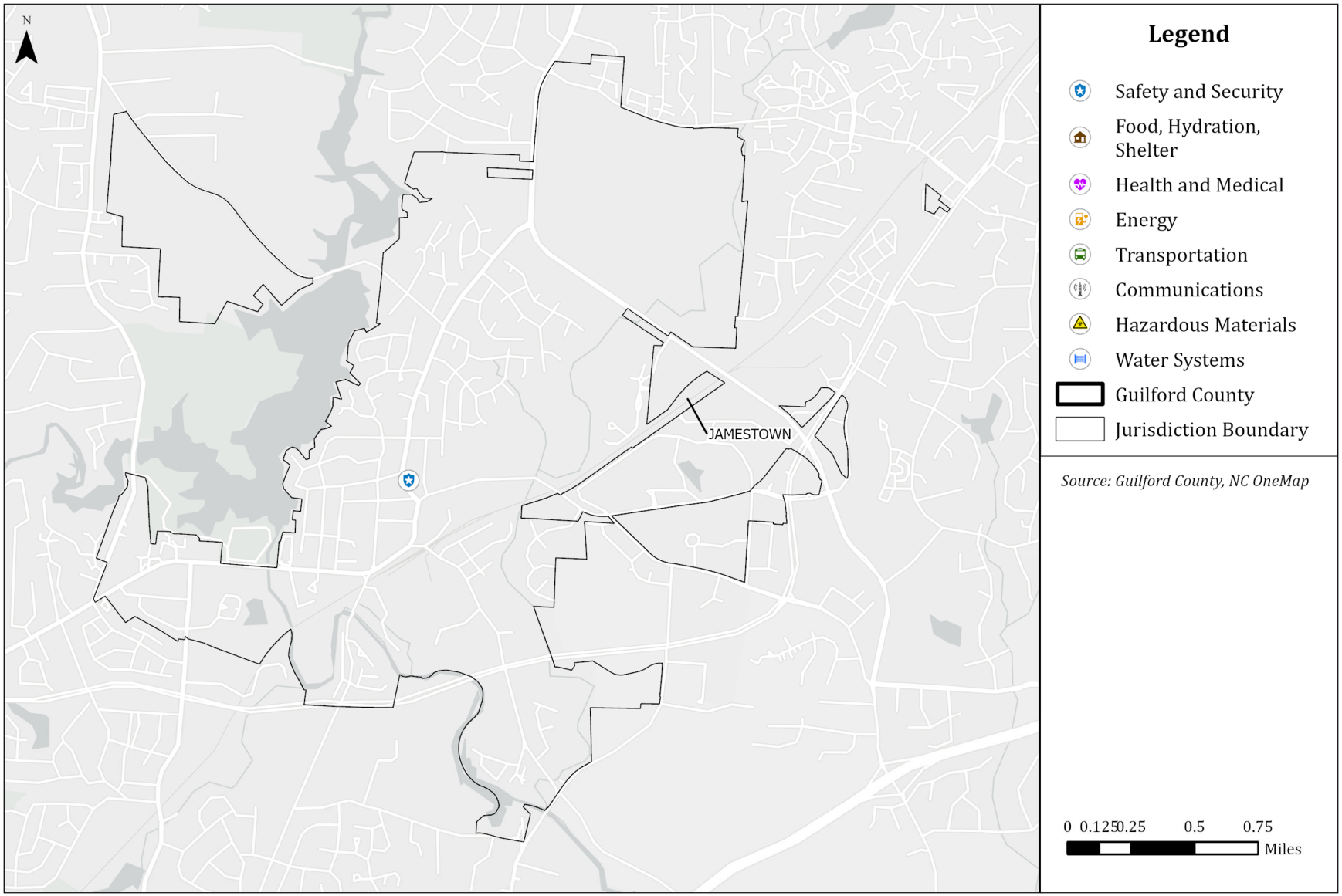


FIGURE4.6 – CRITICAL ASSET LOCATIONS, TOWN OF OAK RIDGE

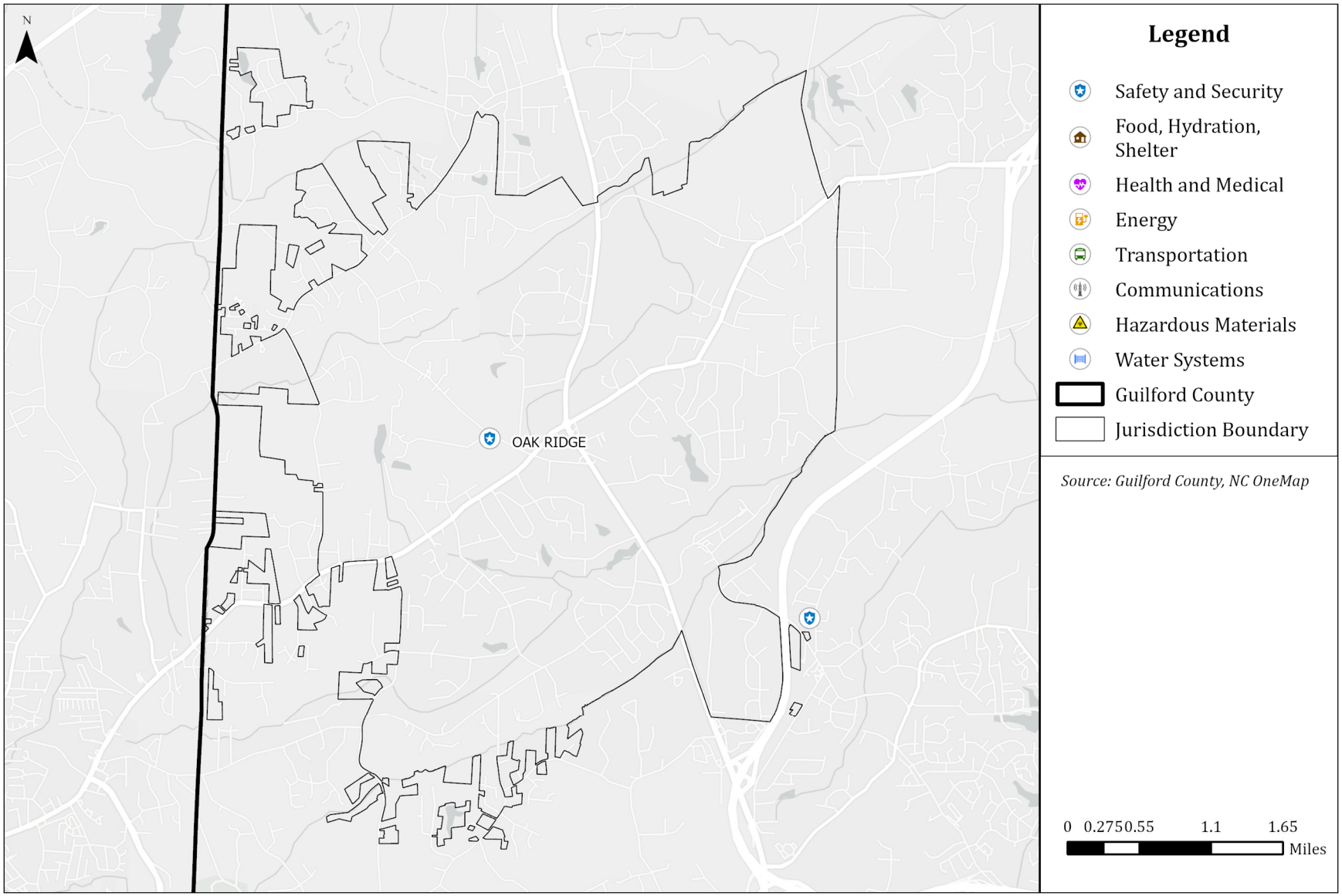


FIGURE 4.7 – CRITICAL ASSET LOCATIONS, TOWN OF PLEASANT GARDEN

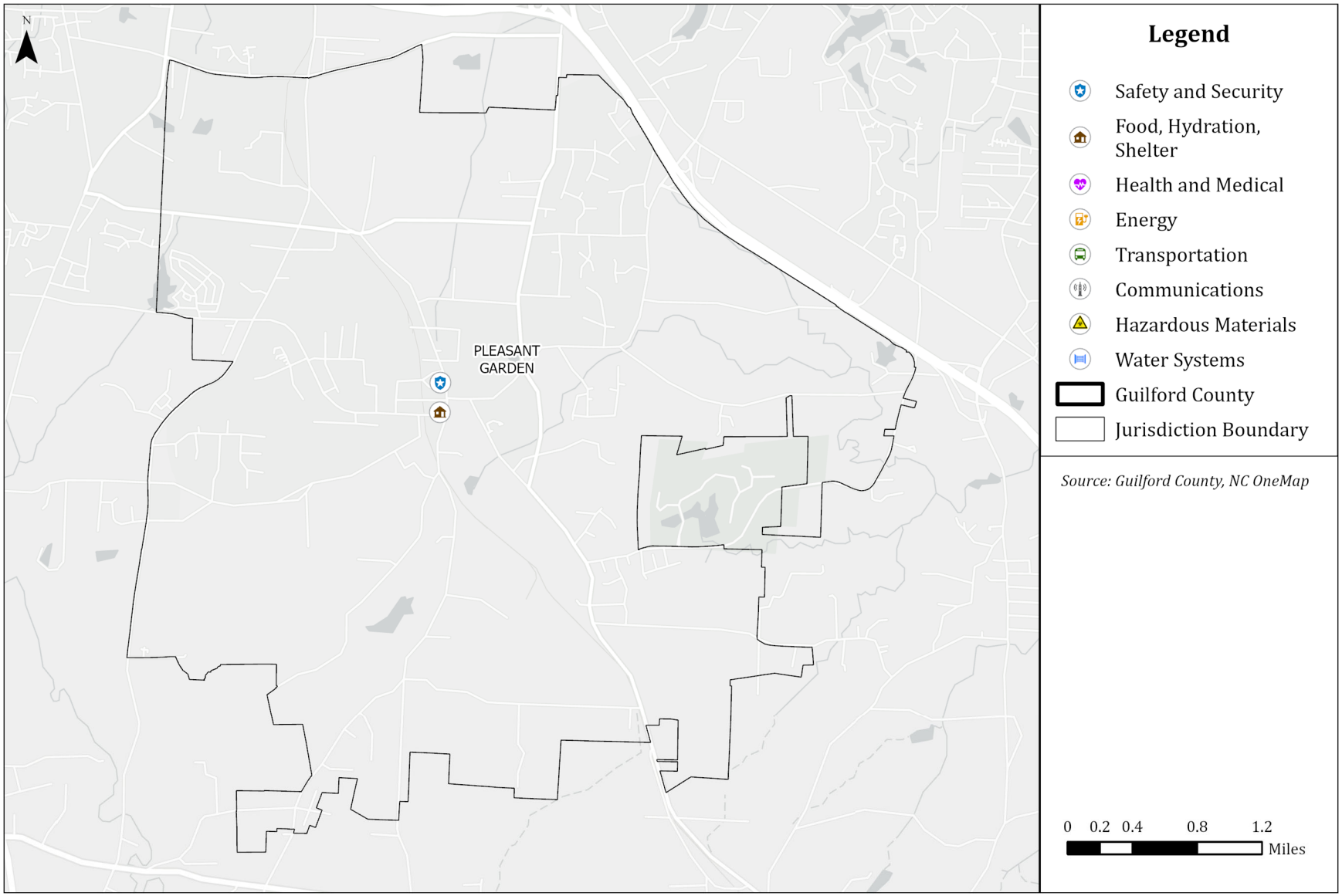


FIGURE4.8 – CRITICAL ASSET LOCATIONS, TOWN OF SEDALIA

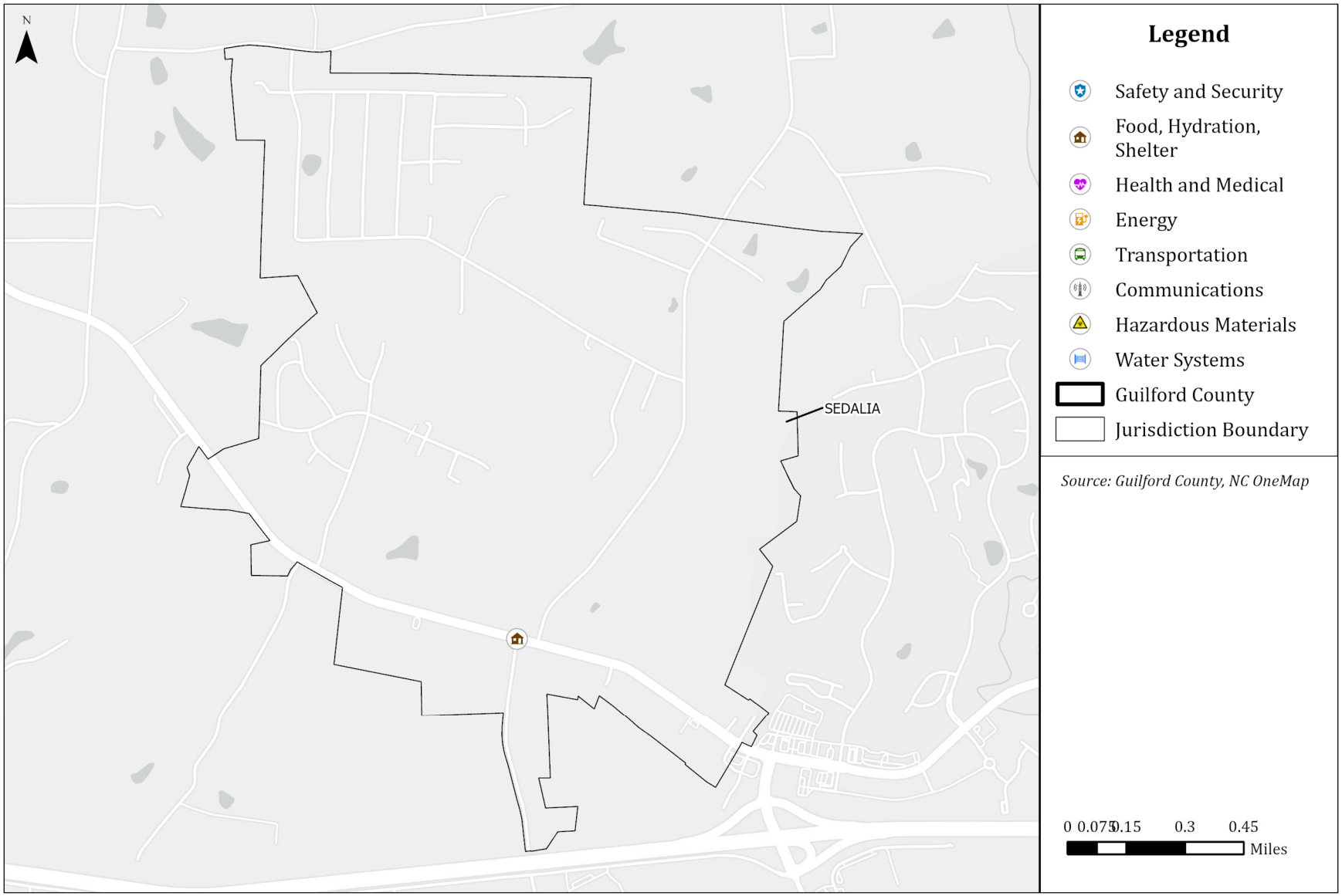


FIGURE4.9 – CRITICAL ASSET LOCATIONS, TOWN OF STOKESDALE

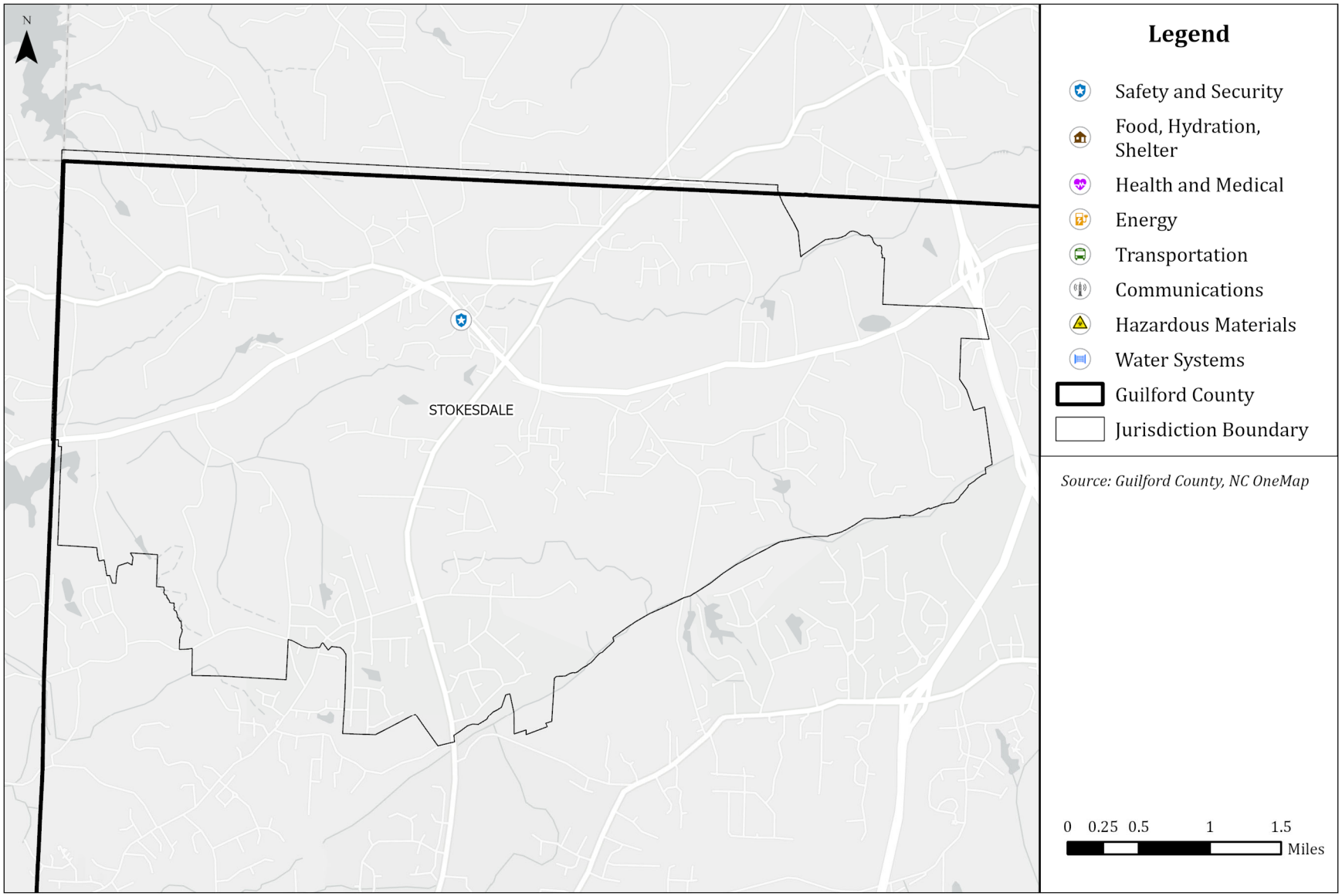


FIGURE 4.10 – CRITICAL ASSET LOCATIONS, TOWN OF SUMMERFIELD

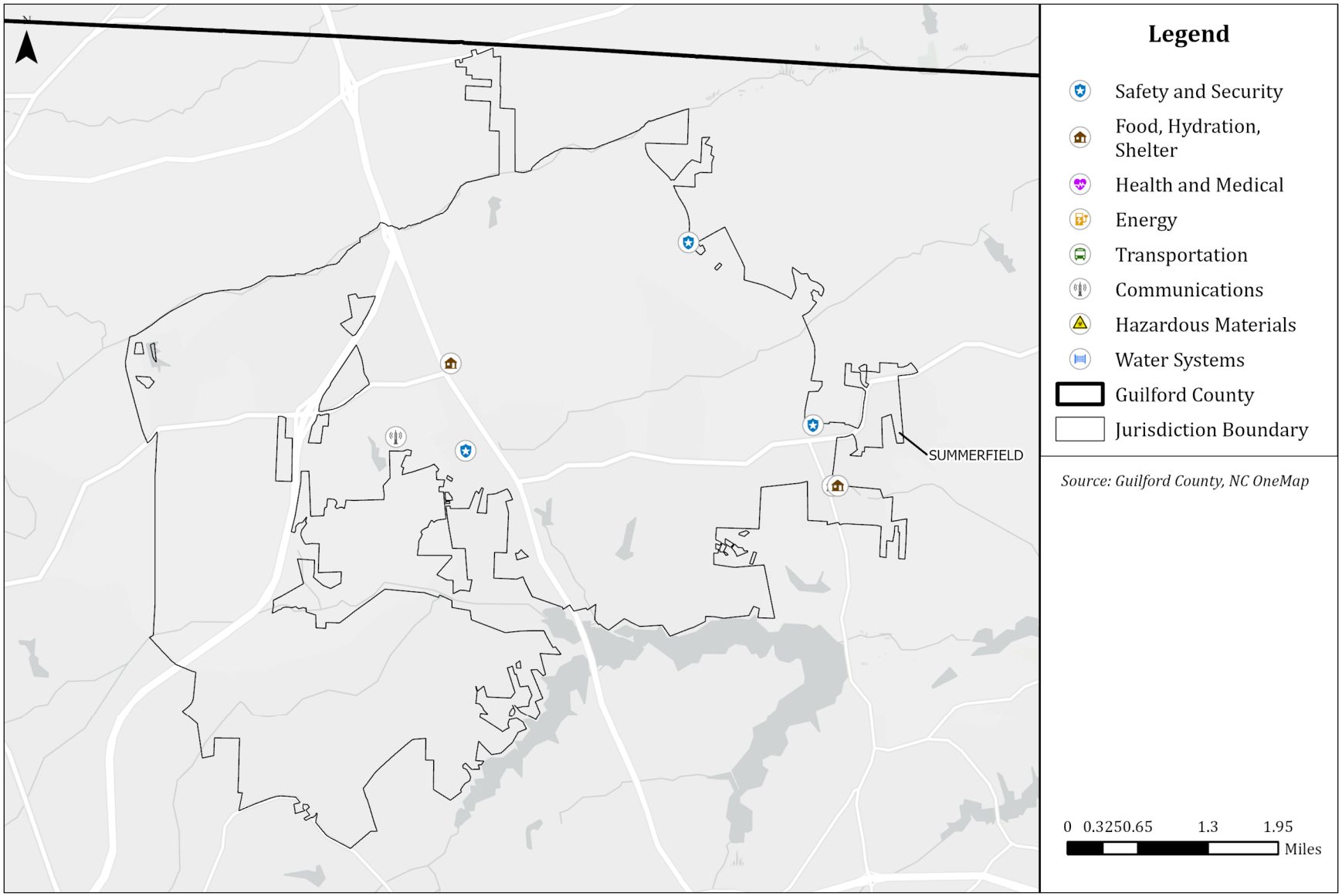
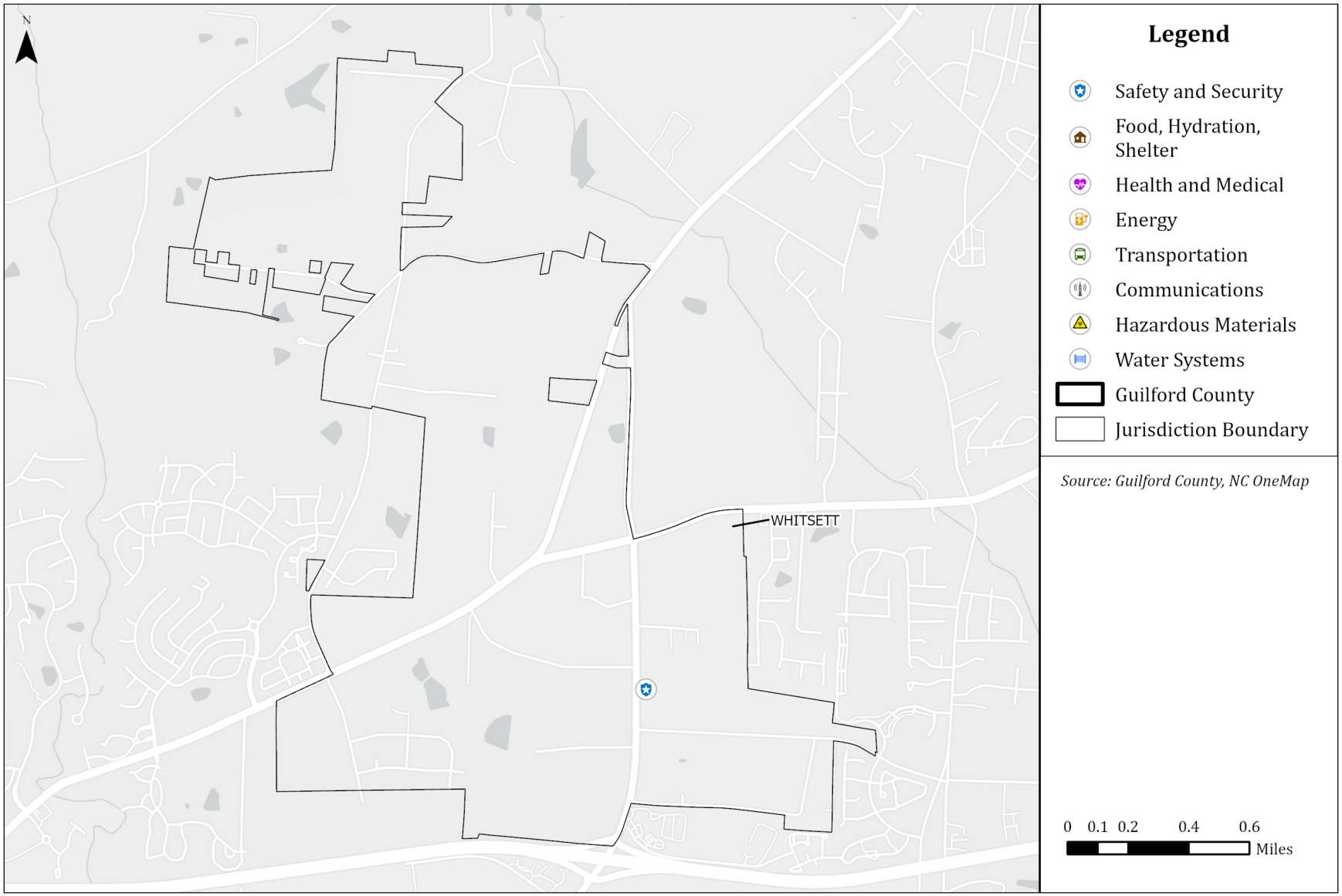


FIGURE 4.11 – CRITICAL ASSET LOCATIONS, TOWN OF WHITSETT



Agriculture

The agricultural industry is also highly vulnerable to natural hazards, which can cause both crop and livestock losses. The exposure of agriculture in the region was measured using the USDA's 2022 Census of Agriculture, which is the most recent data available as of June 2025. Table 4.12 below summarizes the agricultural exposure in the County.

TABLE 4.12 – SUMMARY OF AGRICULTURE EXPOSURE

Number of Farms	Acreage in Farms	Proportion of Total Land Area in Farms	Acreage with Crop Insurance	Estimated Market Value of Land & Buildings
775	94,798	22.9%	19,910 (21%)	$746,917,000

Source: USDA 2022 Census of Agriculture

4.4 Hazard Profiles, Analysis, and Vulnerability

Dam & Levee Failure

HAZARD BACKGROUND

DAM FAILURE

A dam is a barrier constructed across a watercourse that stores, controls, or diverts water. Dams are usually constructed of earth, rock, concrete, or mine tailings. The water impounded behind a dam is referred to as the reservoir and is measured in acre-feet. One acre-foot is the volume of water that covers one acre of land to a depth of one foot. Dams can benefit farmland, provide recreation areas, generate electrical power, and help control erosion and flooding issues. A dam failure is the collapse or breach of a dam that causes downstream flooding. Dam failures may be caused by natural events, manmade events, or a combination. Due to the lack of advance warning, failures resulting from natural events, such as earthquakes or landslides, may be particularly severe. Prolonged rainfall and subsequent flooding is the most common cause of dam failure.

Dam failures usually occur when the spillway capacity is inadequate, and water overtops the dam or when internal erosion in dam foundation occurs (also known as piping). If internal erosion or overtopping causes a full structural breach, a high-velocity, debris-laden wall of water is released and rushes downstream, damaging or destroying anything in its path. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following:

— Prolonged periods of rainfall and flooding;
— Inadequate spillway capacity, resulting in excess overtopping flows;
— Internal erosion caused by embankment or foundation leakage or piping;
— Improper maintenance, including failure to remove trees, repair internal seepage problems, replace lost material from the cross-section of the dam and abutments, or maintain gates, valves, and other operational components;
— Improper design, including the use of improper construction materials and construction practices;
— Negligent operation, including the failure to remove or open gates or valves during high flow periods;

— Failure of upstream dams on the same waterway; or

— High winds, which can cause significant wave action and result in substantial erosion.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. Dam failures are generally catastrophic if the structure is breached or significantly damaged. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major casualties and loss of life could result, as well as water quality and health issues. Potentially catastrophic effects to roads, bridges, and homes are also of major concern. Associated water quality and health concerns could also be issues. Dam failures also have the potential to create a water shortage for nearby communities when the impounded lake is lost, which can affect drinking water supply, power generation, or result in crop losses due to lack of water for irrigation. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

Dam failure can occur with little warning. Intense storms may produce a flood in a few hours or even minutes for upstream locations. Flash floods occur within six hours of the beginning of heavy rainfall, and dam failure may occur within hours of the first signs of breaching. Other failures and breaches can take much longer to occur, from days to weeks, as a result of debris jams or the accumulation of melting snow.

Dam failures are of particular concern because the failure of a large dam has the potential to cause more death and destruction than the failure of any other manmade structure. This is because of the destructive power of the flood wave that would be released by the sudden collapse of a large dam. Dams are innately hazardous structures. Failure or poor operation can result in the release of the reservoir contents—this can include water, mine wastes, or agricultural refuse–causing negative impacts upstream or downstream or at locations far from the dam. Negative impacts of primary concern are loss of human life, property damage, lifeline disruption, and environmental damage.

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

LOCATION

The North Carolina Dam Inventory, maintained by North Carolina Department of Environmental Quality, provides a detailed inventory of dams in the state. As of April 2025, the NC Dam Inventory contains records of 398 dams in Guilford County, of which 309 are rated low hazard, 4 are rated intermediate hazard, and 85 are rated high hazard. Figure4.12 through Figure 4.22 show the location of these dams in Guilford County. Table 4.13 lists all identified dams with high hazard potential in the county. It should be noted that the NC Dam Inventory is not a comprehensive catalog of all dams in the planning area.

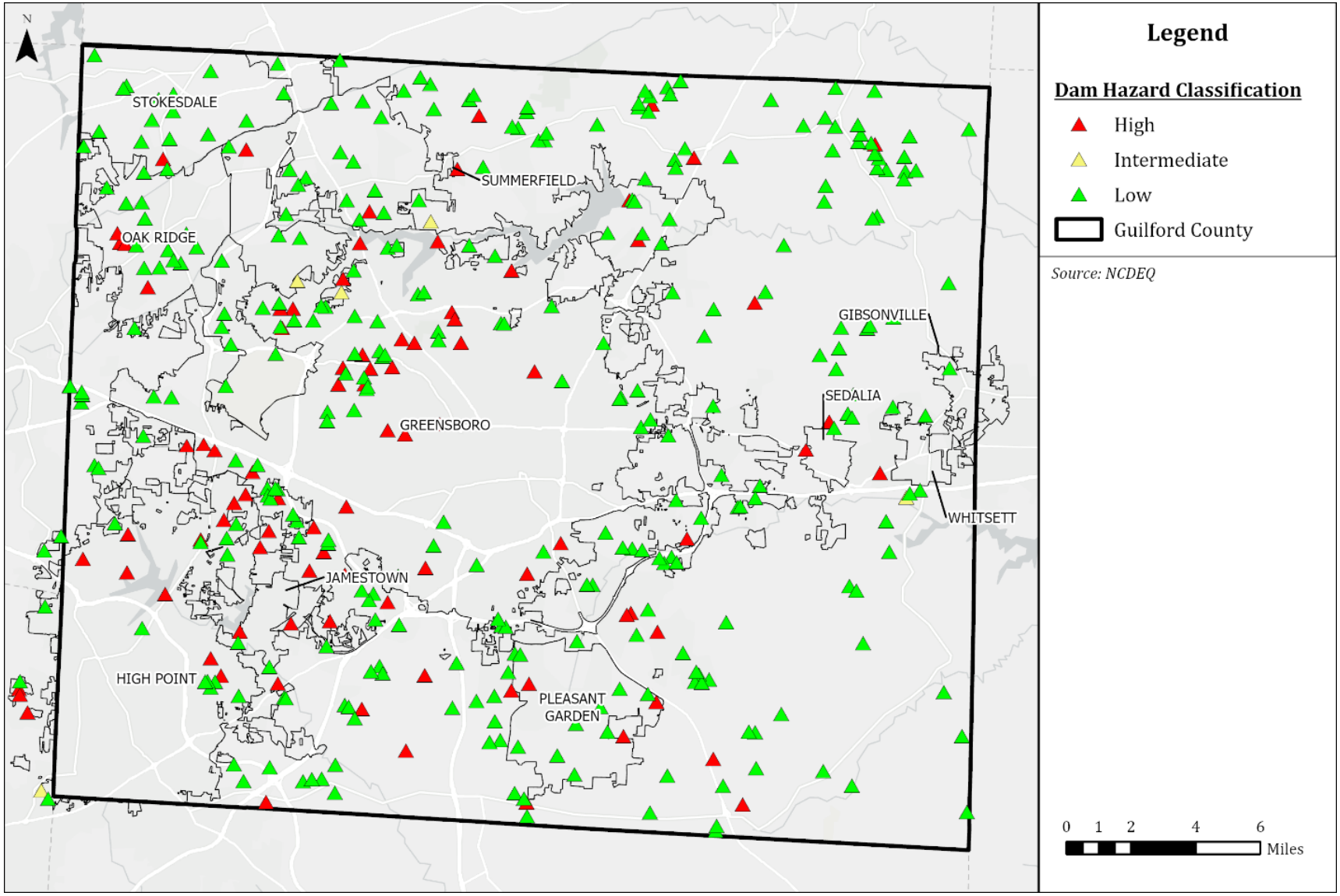
Additionally, while the hazard ratings identified by the NC Dam Inventory may be accurate as of the last date of evaluation, the criteria that dictate hazard ratings are subject to change. Development downstream of a dam may increase exposure of property and lives. Therefore, it is possible that some dams that are rated low or moderate hazard may fit the criteria for high hazard classification as a result of development since the dam was last evaluated. Again, this delay in reclassification may produce an underestimate of overall risk in the planning area.

The HMPC noted that Freemon Lake Dam (GUILF-114; NC00701) is in the process of being reclassified as a high hazard dam.

The spatial extent of dam failure was rated relative to the failure of any single dam within the planning area and is therefore considered negligible.

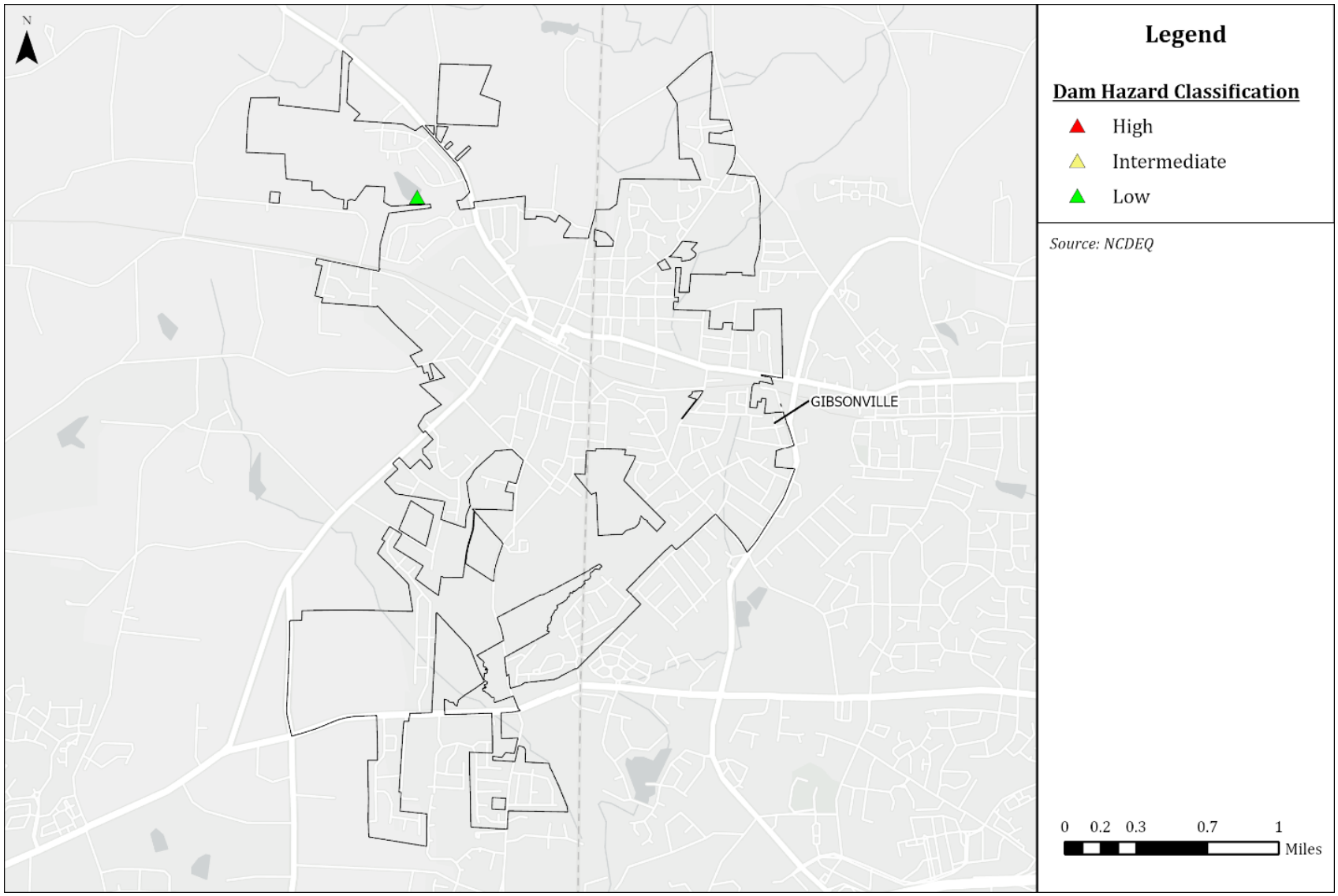
Spatial Extent: 1 – Negligible

FIGURE4.12 – DAM LOCATIONS IN GUILFORD COUNTY



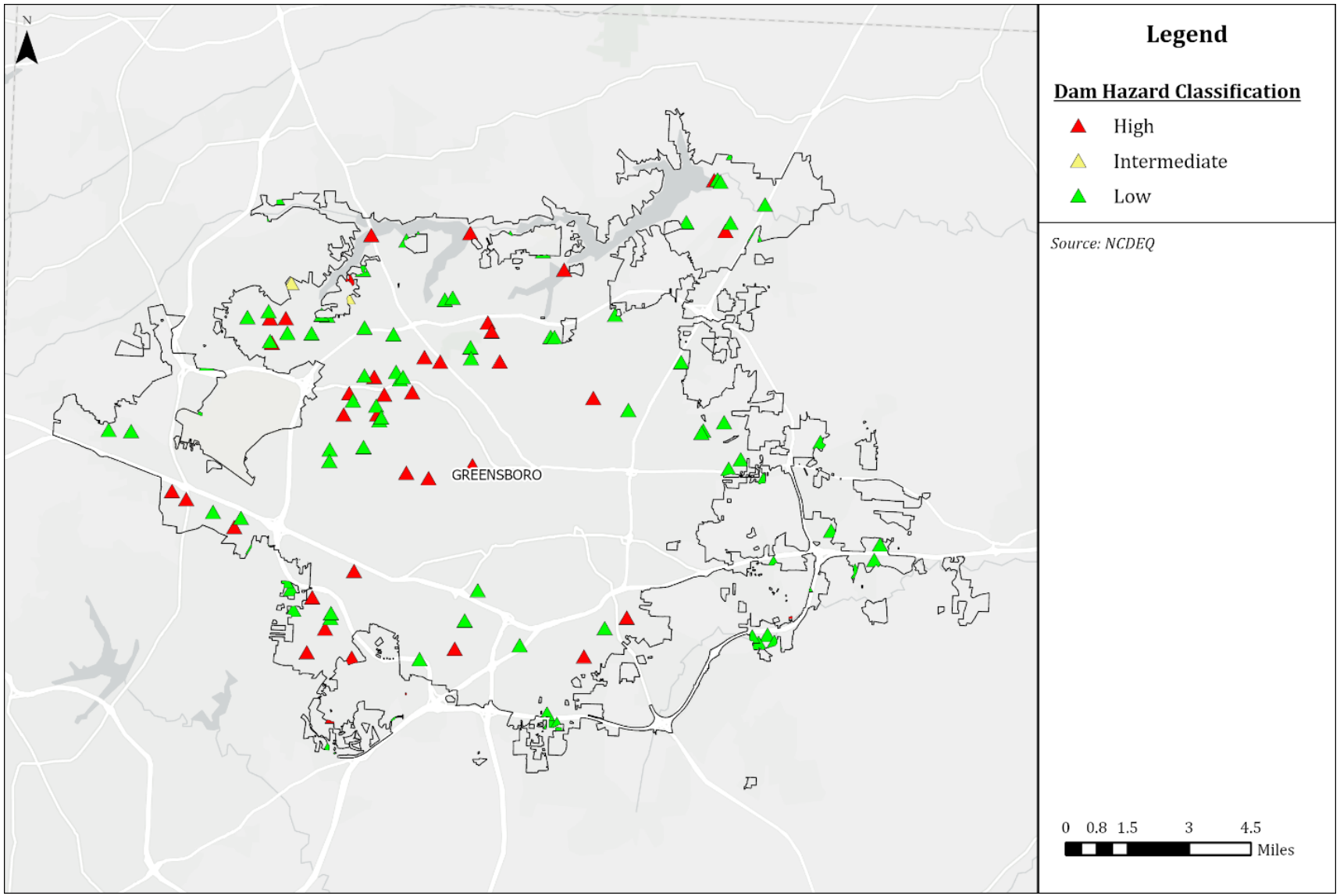
Source: North Carolina Dam Inventory, June 2025

FIGURE4.13 – DAM LOCATIONS IN GIBSONVILLE



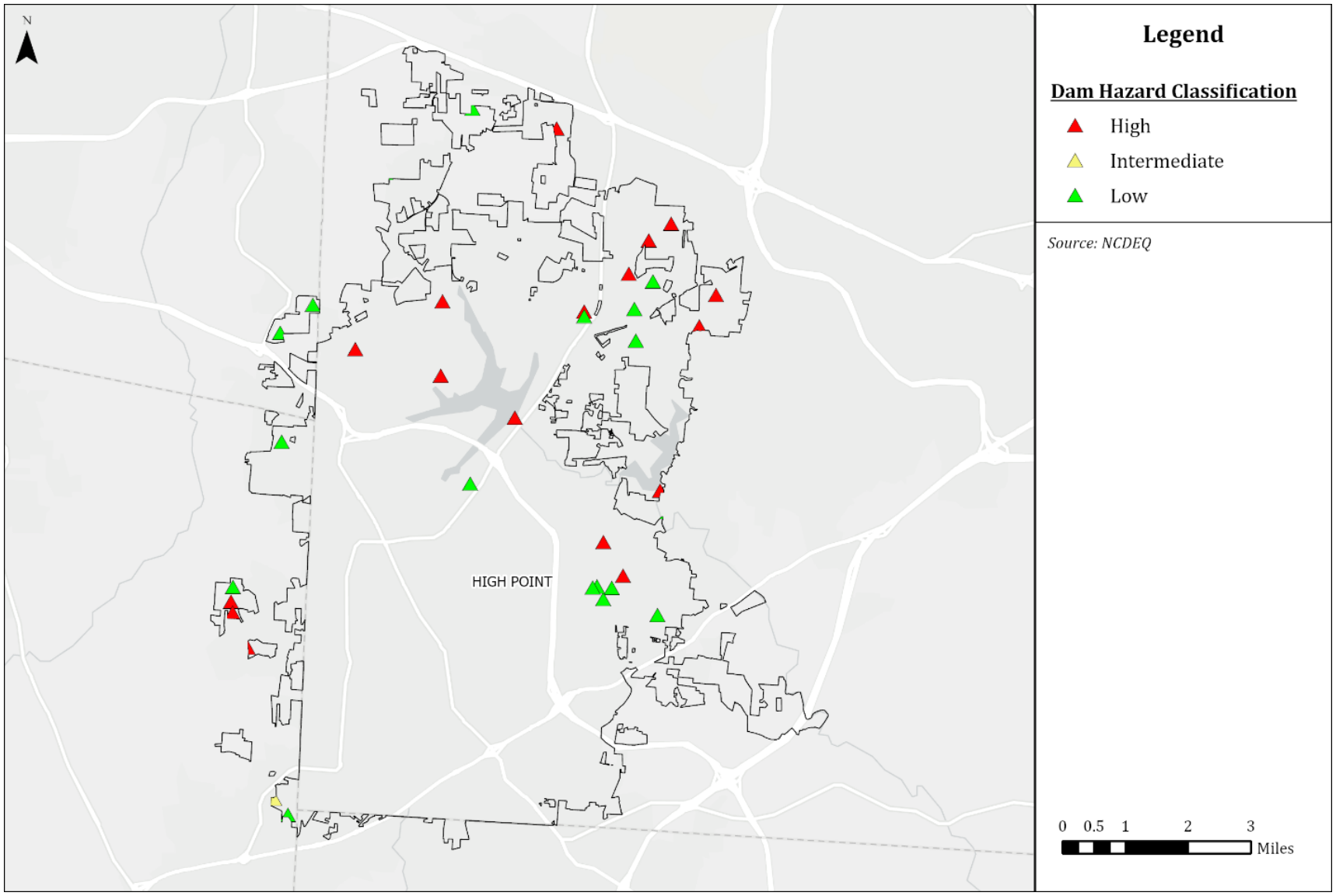
Source: North Carolina Dam Inventory, June 2025

FIGURE 4.14 – DAM LOCATIONS IN GREENSBORO



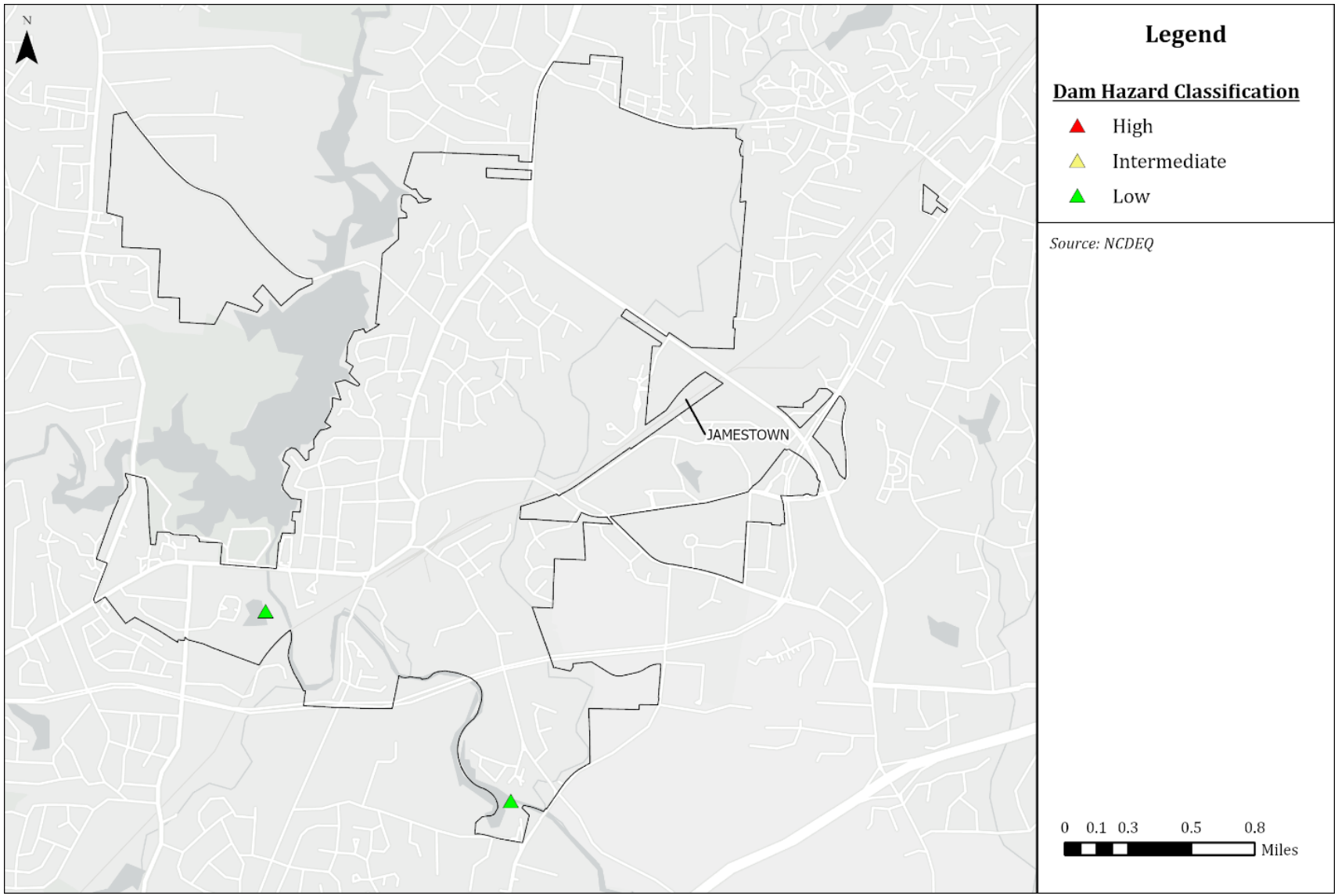
Source: North Carolina Dam Inventory, June 2025

FIGURE 4.15 – DAM LOCATIONS IN HIGH POINT



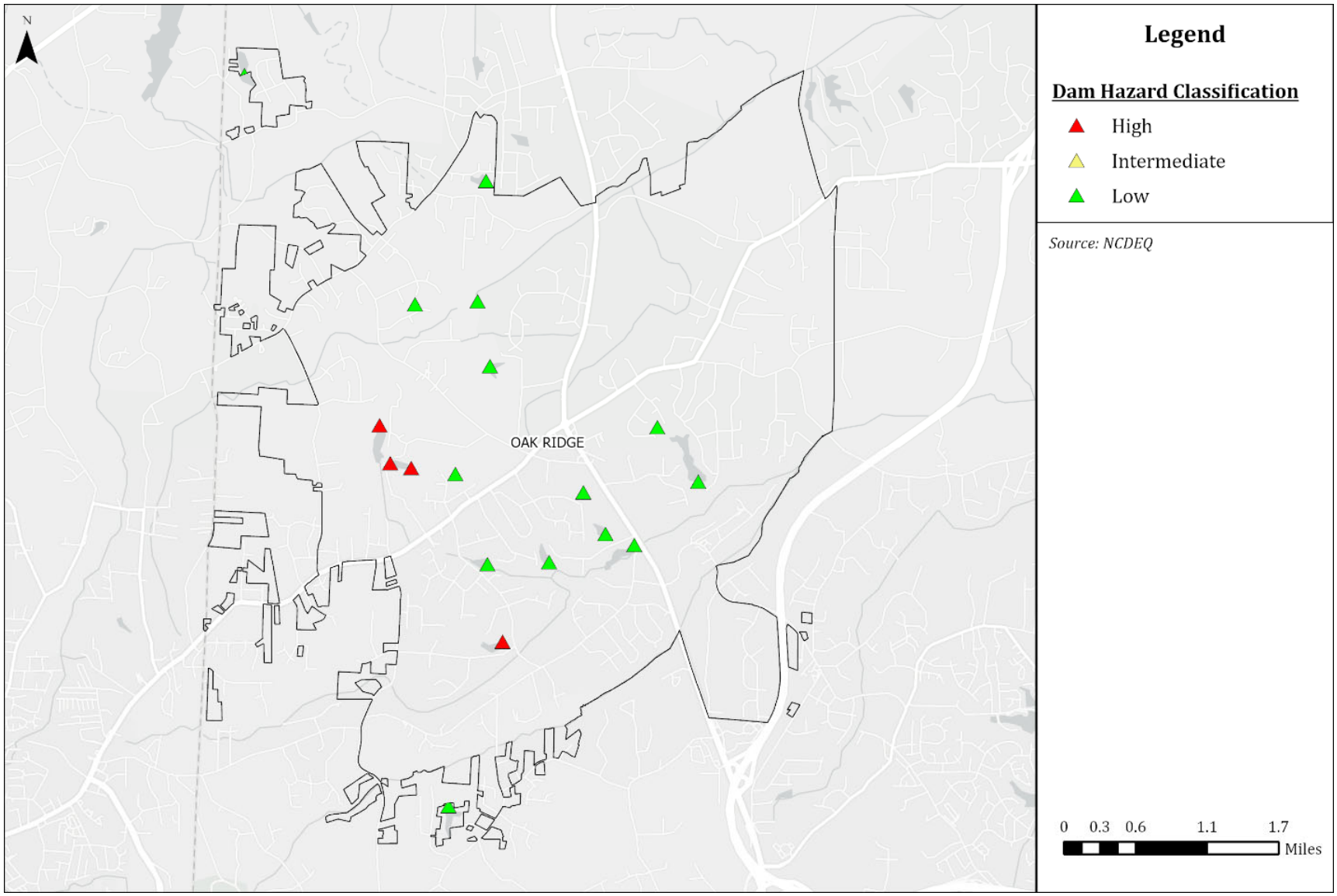
Source: North Carolina Dam Inventory, June 2025

FIGURE4.16 – DAM LOCATIONS IN JAMESTOWN



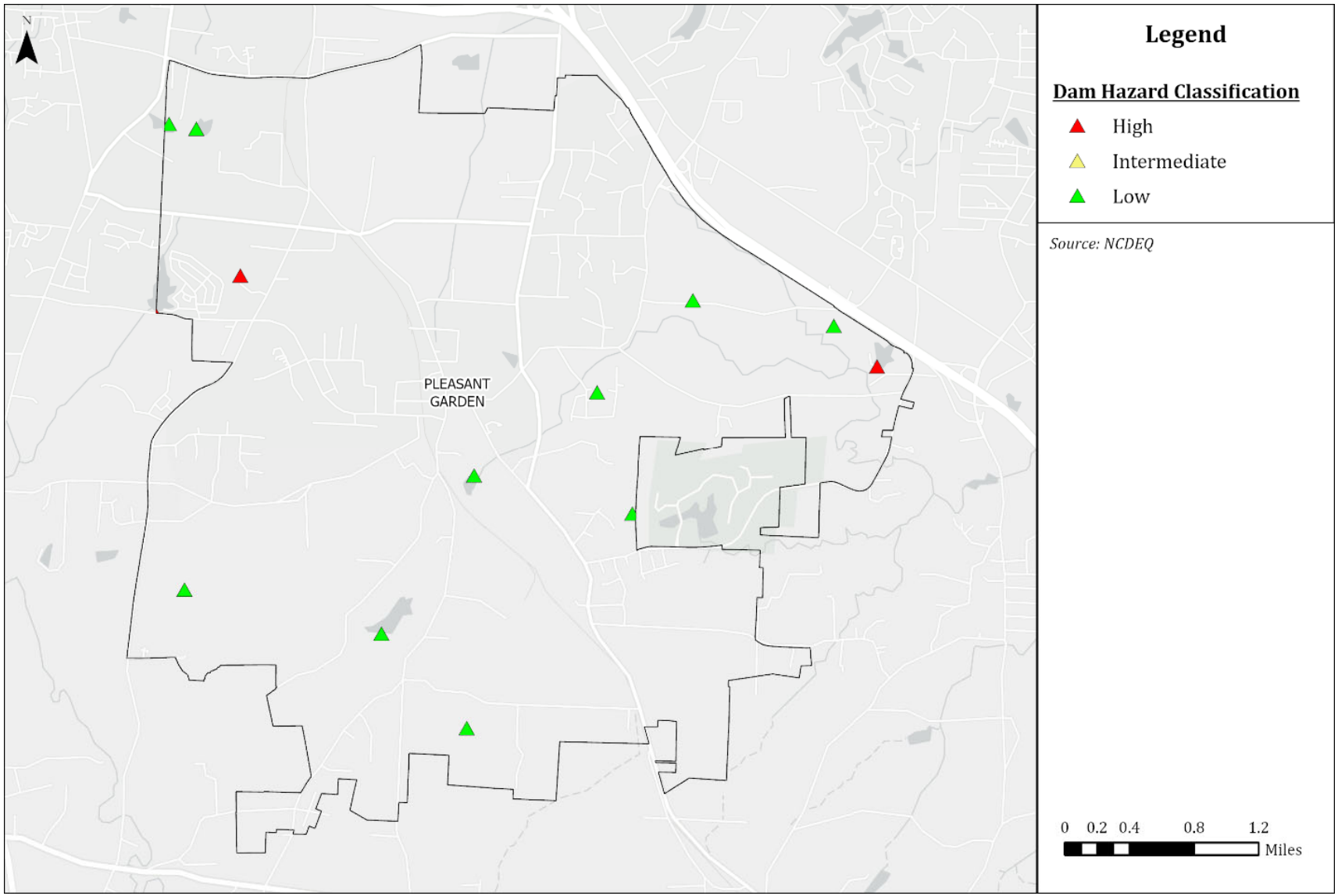
Source: North Carolina Dam Inventory, June 2025

FIGURE 4.17 – DAM LOCATIONS IN OAK RIDGE



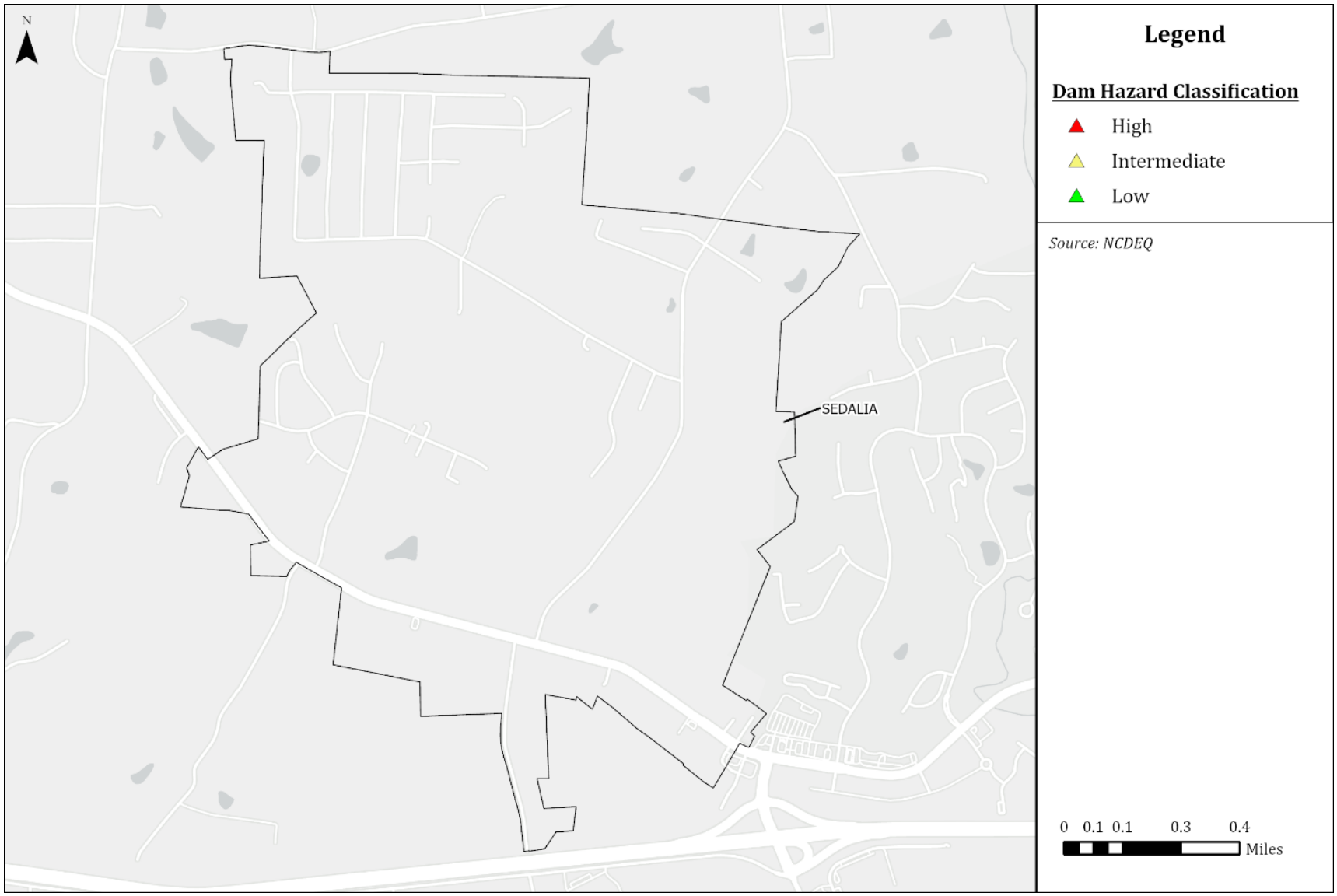
Source: North Carolina Dam Inventory, June 2025

FIGURE 4.18– DAM LOCATIONS IN PLEASANT GARDEN



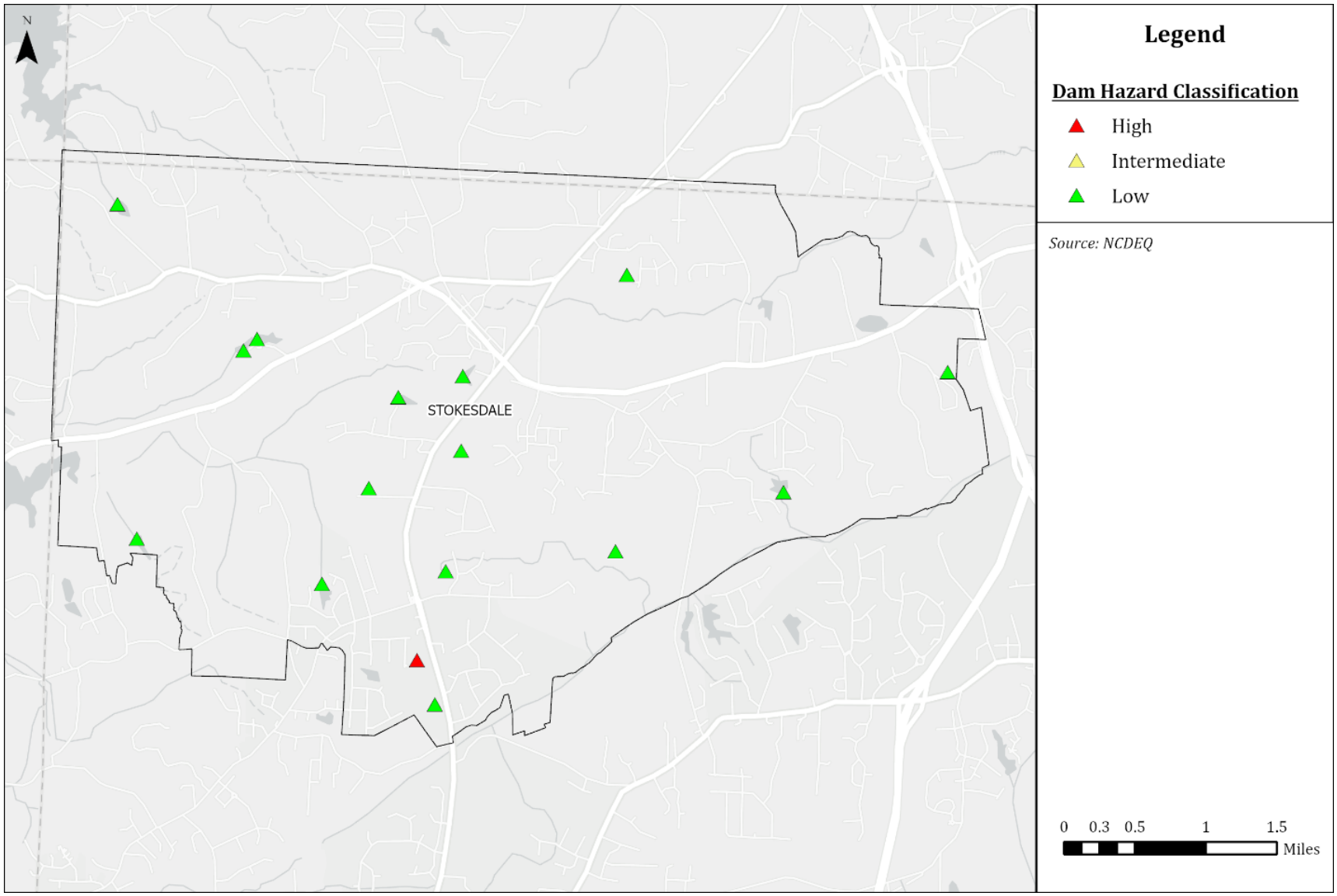
Source: North Carolina Dam Inventory, June 2025

FIGURE 4.19 – DAM LOCATIONS IN SEDALIA



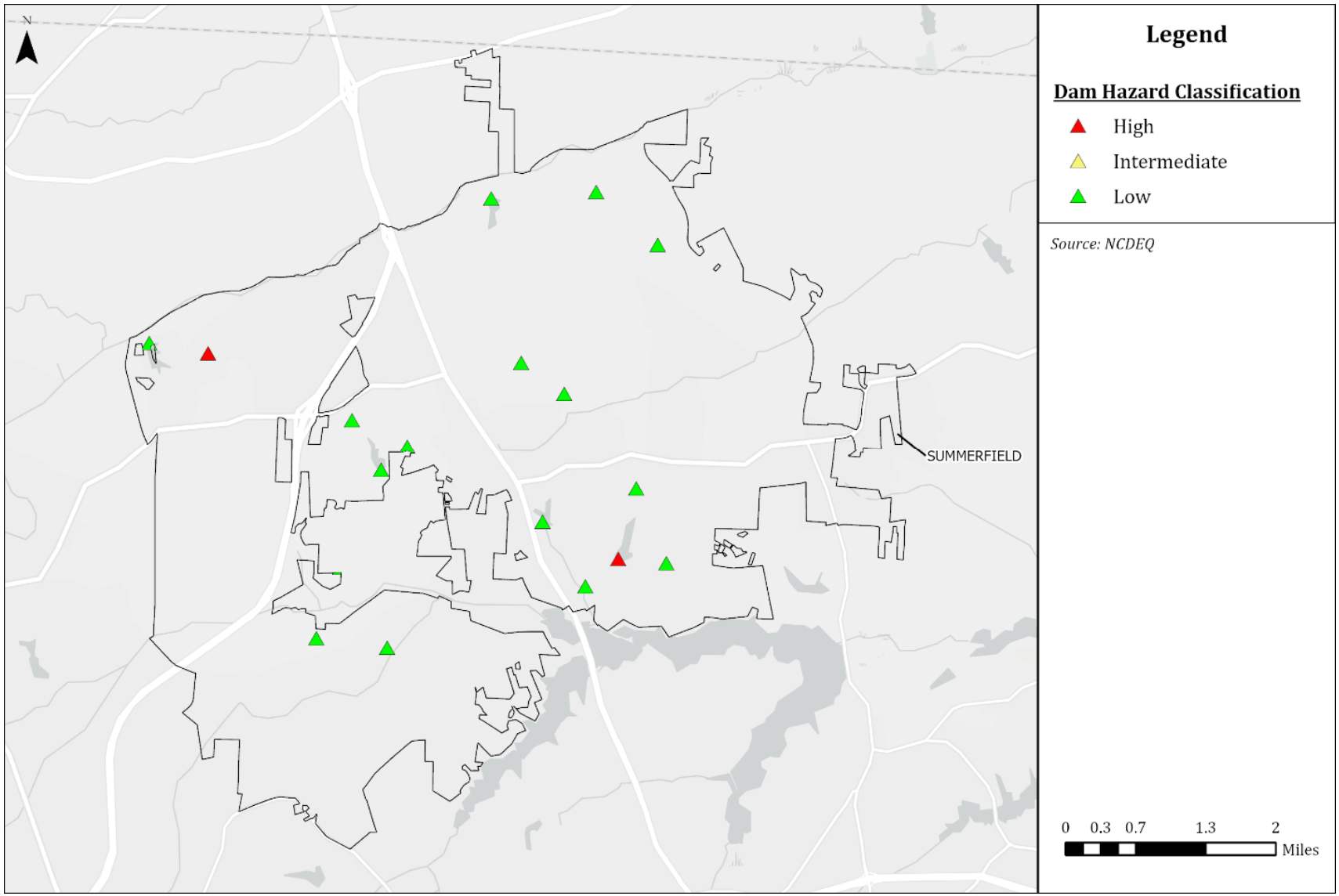
Source: North Carolina Dam Inventory, June 2025

FIGURE 4.20 – DAM LOCATIONS IN STOKESDALE



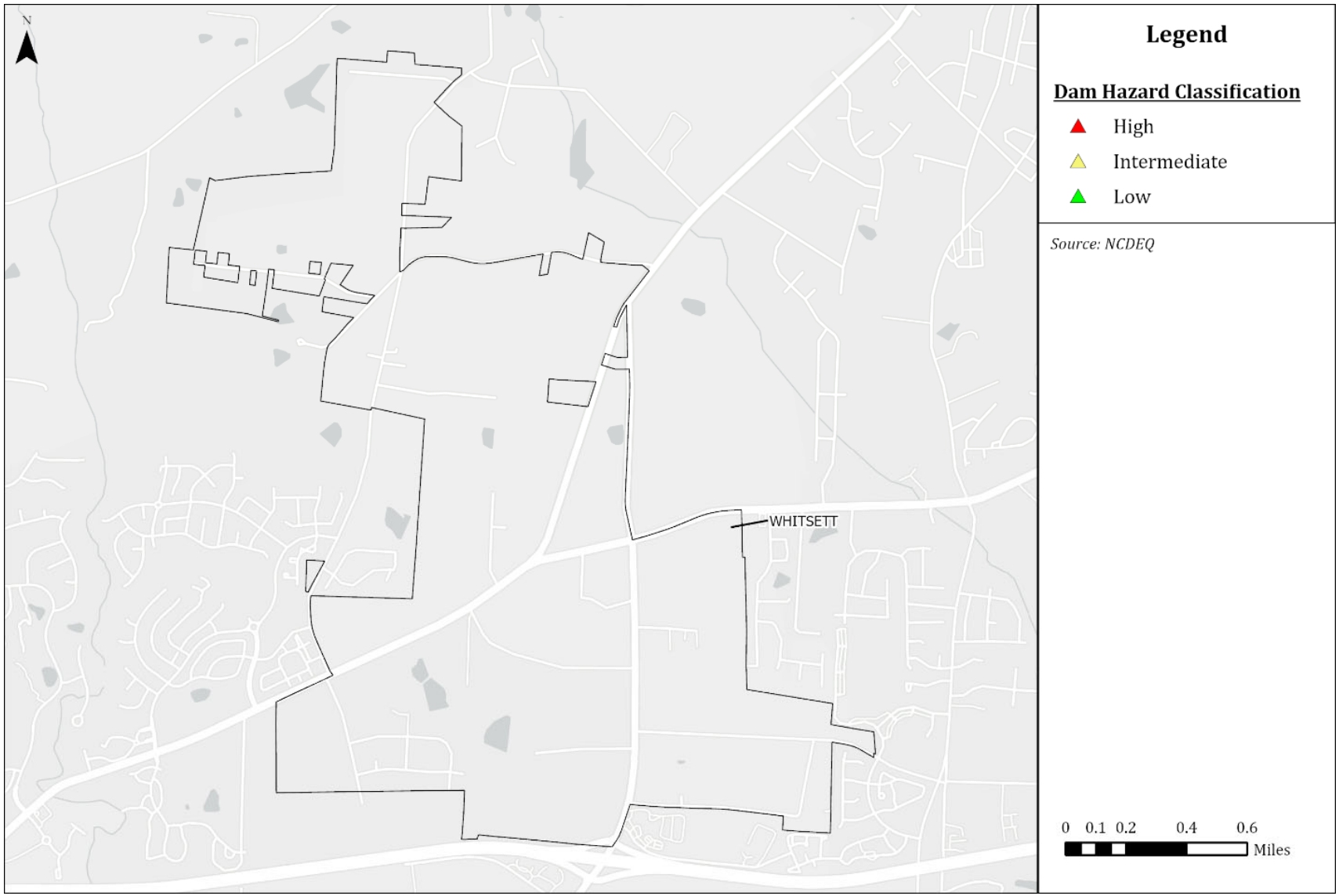
Source: North Carolina Dam Inventory, June 2025

FIGURE 4.21 – DAM LOCATIONS IN SUMMERFIELD



Source: North Carolina Dam Inventory, June 2025

FIGURE 4.22 – DAM LOCATIONS IN WHITSETT



Source: North Carolina Dam Inventory, June 2025

TABLE 4.13 – HIGH HAZARD DAMS IN GUILFORD COUNTY

Dam Name	Location	NID ID	Condition Assessment	Max Capacity (Ac-Ft)	River or Stream Name
AAA Storage Stokesdale Dam	High Point	NC07817	Not Rated	-	
Aaron Sink Farm Pond Dam	Greensboro	NC06268	Not Rated	-	UT to Hickory Creek
Adams Lake Dam	Greensboro	NC00695	Fair	96	Bull Run Creek
AMP Detention Dam	Greensboro	NC05672	Fair	27	UT to E. Fork Deep River
Aydelette Lake Dam	Greensboro	NC00692	Fair	143	Little Alamance Creek
Barker-Frazier Dam	Oak Ridge	NC02752	Fair	45	Haw River
Benjamin Dam	Greensboro	NC00583	Fair	80	N. Buffalo Creek
Bridford Apartments Dam	Greensboro	NC05694	Fair	24	UT to Bull Run
Brighterwood Crossing Dam	High Point	NC06515	Not Rated	-	Rocky Creek
Brooks Lake Dam	Greensboro	NC00598	Fair	346	Benaja Creek
Brookway Dam	Greensboro	NC04892	Fair	6	Horsepen Creek
Buckhorn Lake Dam	Browns Summit	NC00671	Fair	56	Reedy Fork Creek
Buffalo Lake Dam	Greensboro	NC00599	Fair	868	North Buffalo Creek
Cardinal Lake Dam	-	NC05607	Not Rated	19	UT to Brush Creek
Cathedral of His Glory Dam	Greensboro	NC02843	Fair	19	UT to Richland Creek
Cedar Hollow Dam	Greensboro	NC00678	Fair	384	Mears Fork Creek
Church Of God of Prophecy Dam	Jamestown	NC02757	Fair	14	Hiatt Branch
City Lake Dam	High Point	NC00686	Fair	11694	Deep River
Crystal Lake Dam	Greensboro	NC06958	Fair	140	Brush Creek
Davis Lake Dam	High Point	NC05073	Fair	310	UT to E. Fork Deep River
Deep River Pointe Lower Dam	Greensboro	NC02803	Fair	31	E. Fork Deep River
Dogwood Lake Dam	Greensboro	NC00689	Fair	125	Reddicks Creek
Donald Cox Dam	Julian	NC05557	Fair	13	UT to Big Alamance Creek
Fairfield Lake Dam	Greensboro	NC00592	Fair	276	Bull Run Creek
Forest Oaks Lake Dam	Pleasant Garden	NC00676	Poor	222	Beaver Creek

Dam Name	Location	NID ID	Condition Assessment	Max Capacity (Ac-Ft)	River or Stream Name
Foster Sikes Dam	Pleasant Garden	NC02883	Fair	89	Big Alamance Creek
Fresh Water Lake Dam	Greensboro	NC83465		144	
Friendly Lake Dam	Greensboro	NC00593	Poor	58	UT to Horsepen Creek
Furnitureland South Dam	Jamestown	NC02928	Fair	19	UT to Deep River
Gibson Dam	Greensboro	NC02821	Fair	19	UT to Polecat Creek
Green Dam	Reidsville	NC02858	Fair	38	Reedy Fork Creek
Guilford Technical Institute Dam	Jamestown	NC02831	Fair	41	Bull Run Creek
Hagan Stone Park Dam	Greensboro	NC02887	Fair	128	Big Alamance Creek
Heron's Nest Dam	Kernersville	NC00677	Fair	96	Haw River
Hillsdale Lake Dam	Summerfield	NC00612	Fair	200	UT to Lake Brandt
Hillside Lake Dam	Greensboro	NC00585	Fair	80	Brush Creek
Hobbs Lake Dam	Summerfield	NC00684	Fair	69	UT to Haw River
Huffine Dam	Burlington	NC02870	Fair	13	Little Alamance Creek
Hutton Dam	High Point	NC02756	Fair	37	Hiatt Branch
Innkeeper Detention Pond Dam	Greensboro	NC05554	Fair	1	E. Fork Deep River
Jamesford Meadows Dam	Jamestown	NC02802	Fair	29	UT to Long Branch
Jefferson Square Det. Pond Dam	Greensboro	NC05527	Fair	4	UT to Horsepen Creek
Jefferson Standard Country Club Dam	Greensboro	NC00680	Fair	231	Horsepen Creek
Jefferson Village Dam #1	Greensboro	NC07506	Fair	40	Horsepen Creek
John Painter Dam	Gibsonville	NC02902	Fair	56	Rock Creek
Knight Dam	High Point	NC02927	Fair	21	Long Branch
Koger Properties Dam	Greensboro	NC00609	Fair	50	South Buffalo Creek
Lake Brandt Dam	Greensboro	NC00700	Fair	18391	Reedy Fork Creek
Lake Hamilton Dam	Greensboro	NC00594	Fair	110	Buffalo Creek
Lake Herman Dam	Greensboro	NC00600	Fair	120	Reedy Fork Creek
Lake Higgins Dam	Greensboro	NC00698	Fair	5115	Brush Creek
Lake Jeanette Dam	Greensboro	NC00679	Fair	8042	Richland Creek
Lake Townsend Dam	Greensboro	NC00687	Fair	38285	Reedy Fork Creek
Lake Windemere Dam	Greensboro	NC02840	Fair	31	Horsepen Creek

Dam Name	Location	NID ID	Condition Assessment	Max Capacity (Ac-Ft)	River or Stream Name
Lakeview Farm Dam	Greensboro	NC02833	Fair	37	Hickory Creek
Lakota Farm Dam	Greensboro	NC02861	Fair	75	North Buffalo Creek
Linthicum Lake Dam	McLeansville	NC00595	Not Rated	33	Deep River
Lower Colonial Dam	-	NC02788	Fair	64	UT to E. Fork Deep River
Lynco Dam (aka Forbis Lake Dam)	Greensboro	NC02882	Fair	89	UT to Little Alamance Creek
Lynwood Lake Dam	Greensboro	NC00669	Fair	857	Little Alamance Creek
Mallard Lake Dam	Greensboro	NC02842	Fair	27	UT to Richland Creek
Moose Lodge Dam	Greensboro	NC02841	Fair	38	Horsepen Creek
Northline Corporation Dam	High Point	NC02838	Fair	94	North Buffalo Creek
Oak Hollow Lake Dam		NC00704	Fair	24500	W. Fork Deep River
Odom Dam	Greensboro	NC02753	Fair	36	Haw River
Old Deep River Golf Course Dam	High Point	NC02931	Fair	20	E. Fork Deep River
Owens Dam	Oak Ridge	NC01715	Fair	105	Deep River
Piedmont Centre Dam	Greensboro	NC02801	Fair	50	E. Fork Deep River
Piedmont Lake Dam	High Point	NC05182	Fair	95	UT to E. Fork Deep River
Pilot Life Dam	Greensboro	NC01709	Fair	99	Reddicks Creek
Pine Lake Dam	High Point	NC02836	Fair	9	South Buffalo Creek
Price Dam	Greensboro	NC02839	Fair	32	Horsepen Creek
Pringle Dam	Greensboro	NC04757	Poor	20	UT to South Buffalo Creek
Ridgewood Farm Dam	Greensboro	NC02767	Fair	37	Beaver Creek
Roth Dam	Burlington	NC02819	Poor	64	Hickory Creek
Rounda Dam	Oak Ridge	NC00682	Fair	231	South Buffalo Creek
Ski Lake Dam	Greensboro	NC01644	Fair	45	Brush Creek
Smith Dam	Greensboro	NC02755	Satisfactory	12	W. Fork Deep River
Southern Middle School Dam	Greensboro	NC07636	Fair	2	
Sparger Lake Dam	High Point	NC02779	Fair	9	Richland Creek
Stahl Pond Dam	Greensboro	NC07585	Fair	-	
Teague Lake Dam	Greensboro	NC00602	Fair	80	Little Alamance Creek

Dam Name	Location	NID ID	Condition Assessment	Max Capacity (Ac-Ft)	River or Stream Name
Uwharrie Lake Dam	Pleasant Garden	NC00611	Fair	174	Long Branch
Welborn Dam	High Point	NC02807	Poor	34	Muddy Creek
Wood Lake Dam	Julian	NC00604	Fair	90	Polecat Creek

Source: North Carolina Dam Inventory, April 2025

EXTENT

Each state has definitions and methods to determine the hazard potential of a dam. In North Carolina, dams are regulated by the state if they are 25 feet or more in height and impound 50 acre-feet or more. Dams and impoundments smaller than that may fall under state regulation if it is determined that failure of the dam could result in loss of human life or significant damage to property. The height of a dam is from the highest point on the crest of the dam to the lowest point on the downstream toe, and the storage capacity is the volume impounded at the elevation of the highest point on the crest of the dam.

Dam Safety Program engineers determine the "hazard potential" of a dam, meaning the probable damage that would occur if the structure failed, in terms of loss of human life and economic loss or environmental damage. Dams are assigned one of three classes based on the nature of their hazard potential:

— Class A (Low Hazard) includes dams located where failure may damage uninhabited low value non-residential buildings, agricultural land, or low volume roads.

— Class B (Intermediate Hazard) includes dams located where failure may damage highways or secondary railroads, cause interruption of use or service of public utilities, cause minor damage to isolated homes, or cause minor damage to commercial and industrial buildings. Damage to these structures will be considered minor only when they are located in backwater areas not subjected to the direct path of the breach flood wave; and they will experience no more than 1.5 feet of flood rise due to breaching above the lowest ground elevation adjacent to the outside foundation walls or no more than 1.5 feet of flood rise due to breaching above the lowest floor elevation of the structure.

— Class C (High Hazard) includes dams located where failure will likely cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, primary highways, or major railroads

Economic impacts associated with each hazard classification are shown in Table4.14.

TABLE4.14 – DAM HAZARD CLASSIFICATIONS

Hazard Classification	Description	Quantitative Guidelines
Low (Class A)	Interruption of road service, low volume roads	Less than 25 vehicles per day
	Economic damage	Less than $30,000
Intermediate (Class B)	Damage to highways, interruption of service	25 to less than 250 vehicles per day
	Economic damage	$30,000 to less than $200,000
High (Class C)	Loss of human life*	Probable loss of 1 or more human lives

Hazard Classification	Description	Quantitative Guidelines
	Economic damage	More than $200,000
	Damage to highways, interruption of service	250 or more vehicles per day

*Probable loss of human life due to breached roadway or bridge on or below the dam
Source: NCDEQ

Impact: 3 – Critical

HISTORICAL OCCURRENCES

During Tropical Storm Debbie in August 2024, emergency management workers initially reported that the Friendly Lake Dam had experienced a partial failure of the dam according to WXII 12 News; which was later confirmed by NCDEQ.

PROBABILITY OF FUTURE OCCURRENCE

While there is a significant presence of high hazard dams in Guilford County, the probability of failure of a dam is also contingent upon the condition and ongoing maintenance of the dam. A high hazard dam that is well maintained and in good condition may be very unlikely to fail, whereas a dam with maintenance issues or poor overall condition may be at greater risk of failure. Of the 85 high hazard dams identified by the NC Dam Inventory in Guilford County, 5 (6% of the total) were rated in poor condition at the time of their last inspection report. These dams are listed in Table 4.15.

TABLE 4.15 – HIGH HAZARD DAMS IN GUILFORD COUNTY WITH CONDITION ASSESSMENT OF "POOR"

Dam Name	NID ID	Inspection Date	Nearest City & Distance (mi.)	EAP in Place
Forest Oaks Lake Dam	NC00676	08/14/2024	Alamance, 16 mi	Y
Friendly Lake Dam	NC00593	08/12/2024	Greensboro, 1 mi	Y
Pringle Dam	NC04757	02/01/2024	Greensboro, 2 mi	N
Roth Dam	NC02819	08/13/2024	Randleman, 14 mi	N
Welborn Dam	NC02807	01/30/2024	Randleman, 10 mi	N

Source: North Carolina Dam Inventory

There are no records of dam failure in the county, which could suggest that dam failure is unlikely. However, historical events alone do not provide an adequate estimate of potential future occurrence. With heavy rain events becoming more frequent and intense, conditions conducive to dam or levee failure may occur more frequently as well. Dam or levee failure is considered possible in the planning area.

Probability: 2 – Possible

CLIMATE CHANGE

Studies have been conducted to investigate the impact of climate change scenarios on dam safety. The safety of dams for the future climate can be based on an evaluation of changes in design floods and the freeboard available to accommodate an increase in flood levels. The results from the studies indicate that the design floods with the corresponding outflow floods and flood water levels will increase in the future, and this increase will affect the safety of the dams in the future. Studies concluded that the total

hydrological failure probability of a dam will increase in the future climate and that the extent and depth of flood waters will increase by the future dam break scenario. These changes would likely produce similar impacts on levees.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Dam inundation areas were not available for the identified dams; therefore, a quantitative vulnerability assessment could not be completed. Vulnerability discussed below is based on anecdotal evidence and theoretical understanding of potential risks.

PEOPLE

A person's immediate vulnerability to a dam failure is directly associated with the person's distance downstream of the dam as well as proximity to the stream carrying the floodwater from the failure. For dams that have an Emergency Action Plan (EAP), the vulnerability of loss of life for persons in their homes or on their property may be mitigated by following the EAP evacuation procedures; however, the displaced persons may still incur sheltering costs. For persons located on the river (e.g. for recreation) the vulnerability of loss of life is significant.

People are also vulnerable to the loss of the uses of the lake upstream of a dam following failure. Several uses are minor, such as aesthetics or recreational use. However, some lakes serve as drinking water supplies and their loss could disrupt the drinking water supply and present a public health problem.

PROPERTY

Vulnerability of the built environment includes damage to the dam itself and any man-made feature located within the inundation area caused by the dam failure. Downstream of the dam, vulnerability includes potential damage to homes, personal property, commercial buildings and property, and government owned buildings and property; destruction of bridge or culvert crossings; weakening of bridge supports through scour; and damage or destruction of public or private infrastructure that cross the stream such as water and sewer lines, gas lines and power lines. Water dependent structures on the lake upstream of the dam, such as docks/piers, floating structures or water intake structures, may be damaged by the rapid reduction in water level during the failure.

ENVIRONMENT

Aquatic species within the lake will either be displaced or destroyed. The velocity of the flood wave will likely destroy riparian and instream vegetation and destroy wetland function. The flood wave will like cause erosion within and adjacent to the stream. Deposition of eroded deposits may choke instream habitat or disrupt riparian areas. Sediments within the lake bottom and any low oxygen water from within the lake will be dispersed, potentially causing fish kills or releasing heavy metals found in the lake sediment layers.

CONSEQUENCE ANALYSIS

Table 4.16 summarizes the potential negative consequences of dam and levee failure.

TABLE 4.16 – CONSEQUENCE ANALYSIS – DAM & LEVEE FAILURE

Category	Consequences
Public	Localized impact expected to be severe for inundation area and moderate to light for other adversely affected areas.
Responders	Localized impact expected to limit damage to personnel in the inundation area at the time of the incident.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel in the area of the incident may require temporary relocation of some operations. Localized disruption of roads and/or utilities may postpone delivery of some services. Regulatory waivers may be needed locally. Fulfillment of some contracts may be difficult. Impact may reduce deliveries.
Property, Facilities and Infrastructure	Localized impact to facilities and infrastructure in the inundation area of the incident. Some severe damage possible.
Environment	Localized impact expected to be severe for inundation area and moderate to light for other adversely affected areas. Consequences include erosion, water quality degradation, wildlife displacement or destruction, and habitat destruction.
Economic Condition of the Jurisdiction	Local economy and finances adversely affected, possibly for an extended period of time, depending on damage and length of investigation.
Public Confidence in the Jurisdiction's Governance	Localized impact expected to primarily adversely affect only the dam owner and local entities.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes dam failure hazard risk by jurisdiction. Warning time and duration are inherent to the hazard and remain constant across jurisdictions. Spatial extent of any individual dam failure will be negligible relative to the planning area. Jurisdictions with high hazard dams within their boundaries or that are listed as downstream from a high hazard dam were assigned a probability rating of possible and an impact score of critical. Jurisdictions with no high hazard dams were assigned a probability rating of unlikely and an impact rating of limited.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	1	2	1	4	3	1.8	L
Greensboro	2	3	1	4	3	2.4	M
High Point	2	3	1	4	3	2.4	M
Jamestown	2	3	1	4	3	2.4	M
Oak Ridge	2	3	1	4	3	2.4	M
Pleasant Garden	2	3	1	4	3	2.4	M
Sedalia	1	2	1	4	3	1.8	L
Stokesdale	2	3	1	4	3	2.4	M
Summerfield	2	3	1	4	3	2.4	M
Whitsett	1	2	1	4	3	1.8	L
Unincorporated Guilford County	2	3	1	4	3	2.4	M

Drought

HAZARD BACKGROUND

Drought is a deficiency in precipitation over an extended period. It is a normal, recurrent feature of climate that occurs in virtually all climate zones. The duration of a drought varies widely. There are cases when drought develops relatively quickly and lasts a very short period of time, exacerbated by extreme heat and/or wind, and there are other cases when drought spans multiple years, or even decades. Studying the paleoclimate record is often helpful in identifying when long-lasting droughts have occurred. Common types of drought are detailed below in Table 4.17.

TABLE 4.17 – DROUGHT CLASSIFICATIONS

Type	Details
Meteorological Drought	Meteorological Drought is based on the degree of dryness (rainfall deficit) and the length of the dry period.
Agricultural Drought	Agricultural Drought is based on the impacts to agriculture by factors such as rainfall deficits, soil water deficits, reduced ground water, or reservoir levels needed for irrigation.
Hydrological Drought	Hydrological Drought is based on the impact of rainfall deficits on the water supply such as stream flow, reservoir and lake levels, and ground water table decline.
Socioeconomic Drought	Socioeconomic drought is based on the impact of drought conditions (meteorological, agricultural, or hydrological drought) on supply and demand of some economic goods. Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related deficit in water supply.
Ecological Drought	Prolonged and widespread deficit in naturally available water supplies — including changes in natural and managed hydrology — that create multiple stresses across ecosystems

Source: National Drought Mitigation Center

The wide variety of disciplines affected by drought, its diverse geographical and temporal distribution, and the many scales drought operates on make it difficult to develop both a definition to describe drought and an index to measure it. Many quantitative measures of drought have been developed in the United States, depending on the discipline affected, the region being considered, and the particular application. Several indices developed by Wayne Palmer, as well as the Standardized Precipitation Index, are useful for describing the many scales of drought.

The U.S. Drought Monitor provides a summary of drought conditions across the United States and Puerto Rico. Often described as a blend of art and science, the Drought Monitor map is updated weekly by combining a variety of data-based drought indices and indicators and local expert input into a single composite drought indicator.

The **Palmer Drought Severity Index** (PDSI) devised in 1965, was the first drought indicator to assess moisture status comprehensively. It uses temperature and precipitation data to calculate water supply and demand, incorporates soil moisture, and is considered most effective for unirrigated cropland. It primarily reflects long-term drought and has been used extensively to initiate drought relief. It is more complex than the Standardized Precipitation Index (SPI) and the Drought Monitor.

The **Standardized Precipitation Index** (SPI) is a way of measuring drought that is different from the Palmer Drought Severity Index (PDSI). Like the PDSI, this index is negative for drought, and positive for wet conditions. But the SPI is a probability index that considers only precipitation, while Palmer's indices are water balance indices that consider water supply (precipitation), demand (evapotranspiration) and loss (runoff).

In addition to the calculated indices, the North Carolina Drought Management Advisory Council's (DMAC) Technical Drought Advisory Team compiles drought-related information each week including stream flows, groundwater and reservoir levels, wildfire activity, and crop conditions and sends recommendations to the U.S. Drought Monitor for North Carolina's drought conditions.

The State of North Carolina has a Drought Assessment and Response Plan as an Annex to its Emergency Operations Plan. This plan provides the framework to coordinate statewide response to a drought incident.

Warning Time: 1 – More than 24 hours

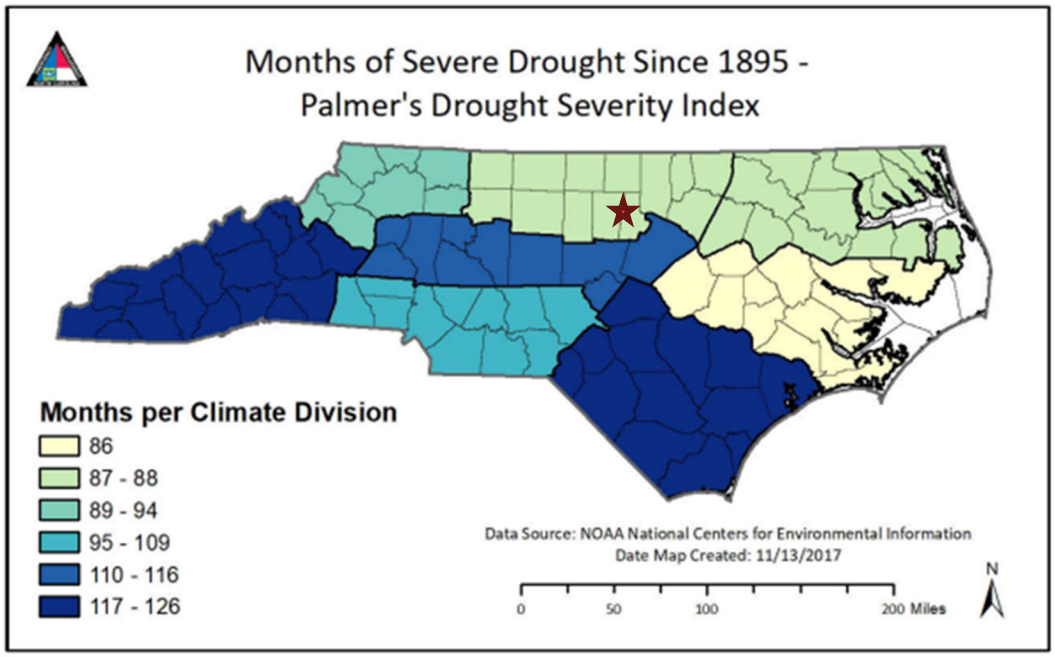
Duration: 4 – More than one week

LOCATION

Typically, the National Weather Service looks at drought and extreme heat as episodes that impact a widespread forecast "zone," and therefore it is not common to pinpoint a specific location within a planning area that is more susceptible to these hazards than others. From this viewpoint, each county is considered uniformly at risk to drought and extreme heat. However, the most significant financial losses are likely to occur in areas that are primarily agricultural. Areas with water-dependent recreational economies are also at higher risk.

Figure 4.23 shows the Palmer Drought Severity Index (PDSI) summary map for North Carolina since 1895. PDSI drought classifications are based on observed drought conditions and range from -0.5 (incipient dry spell) to -4.0 (extreme drought). As can be seen, central North Carolina has historically not seen as many significant long-term droughts as the western and southeastern regions of the state. Specifically, Guilford was in severe drought for 87-88 months during the identified timeframe.

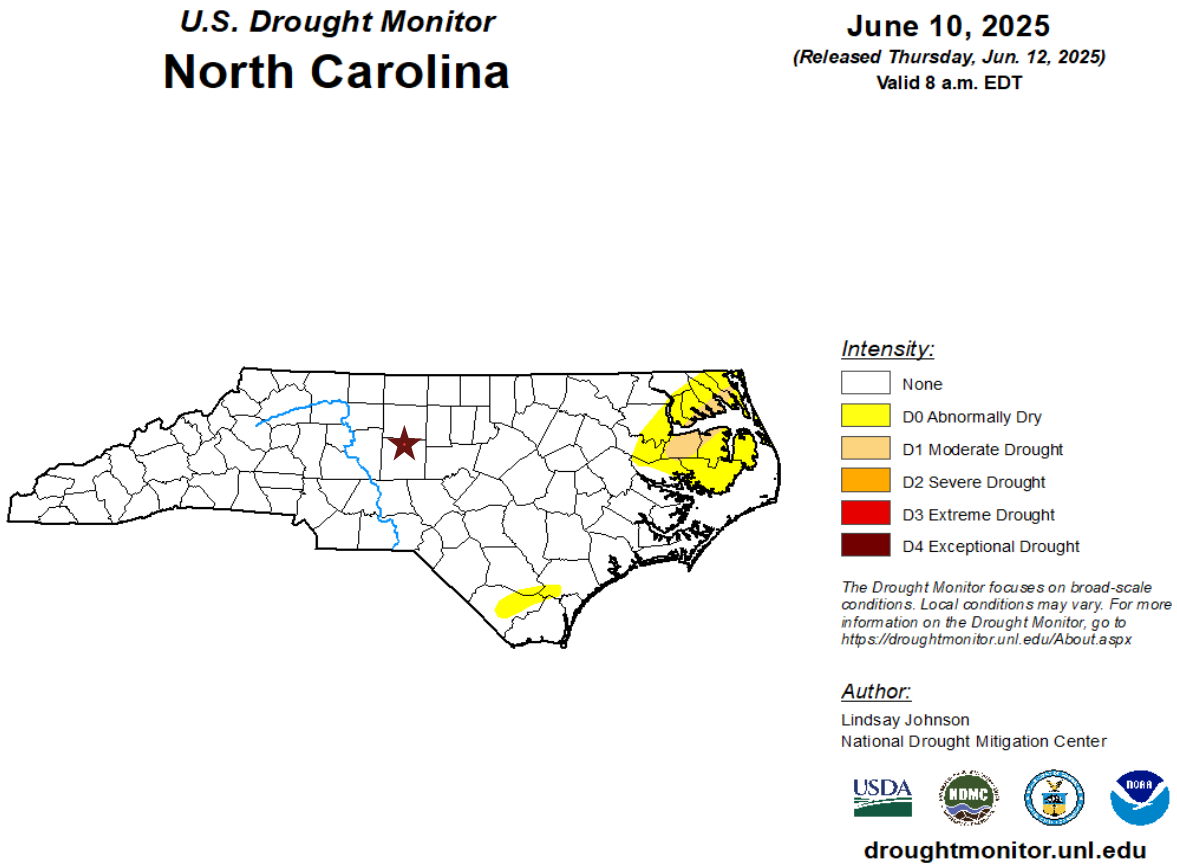
FIGURE 4.23 – PDSI MONTHS OF SEVERE DROUGHT SINCE 1895



Source: State of North Carolina 2023 Hazard Mitigation Plan

Figure 4.24 shows the U.S. Drought Monitor's drought ratings for North Carolina as of June 10 2025; as of that date, Guilford County was not experiencing drought conditions. This map illustrates the regional nature of drought when it occurs.

FIGURE 4.24 – US DROUGHT MONITOR FOR WEEK OF JUNE 10, 2025



Source: U.S. Drought Monitor

Spatial Extent: 4 – Large

EXTENT

Drought extent can be defined in terms of intensity, using the U.S. Drought Monitor scale. The Drought Monitor Scale measures drought episodes with input from the Palmer Drought Severity Index, the Standardized Precipitation Index, the Keetch-Byram Drought Index, soil moisture indicators, and other inputs as well as information on how drought is affecting people. Figure 4.25 details the classifications used by the U.S. Drought Monitor. A category of D2 (severe) or higher on the U.S. Drought Monitor Scale can typically result in crop or pasture losses, water shortages, and the need to institute water restrictions.

Guilford County is susceptible to all of the levels of drought intensity on the U.S. Drought Monitor scale. The most severe periods of drought since 2000 occurred:

- In the spring, summer, and fall of 2002 and reached exceptional drought across 100% of the county;
- In the fall of 2007 and reached exceptional drought across 100% of the county; and
- In the winter and early spring of 2008 and reached extreme drought across 100% and exceptional drought across 88.39% of the County.

Impact: 1 – Minor

FIGURE 4.25 – US DROUGHT MONITOR CLASSIFICATIONS

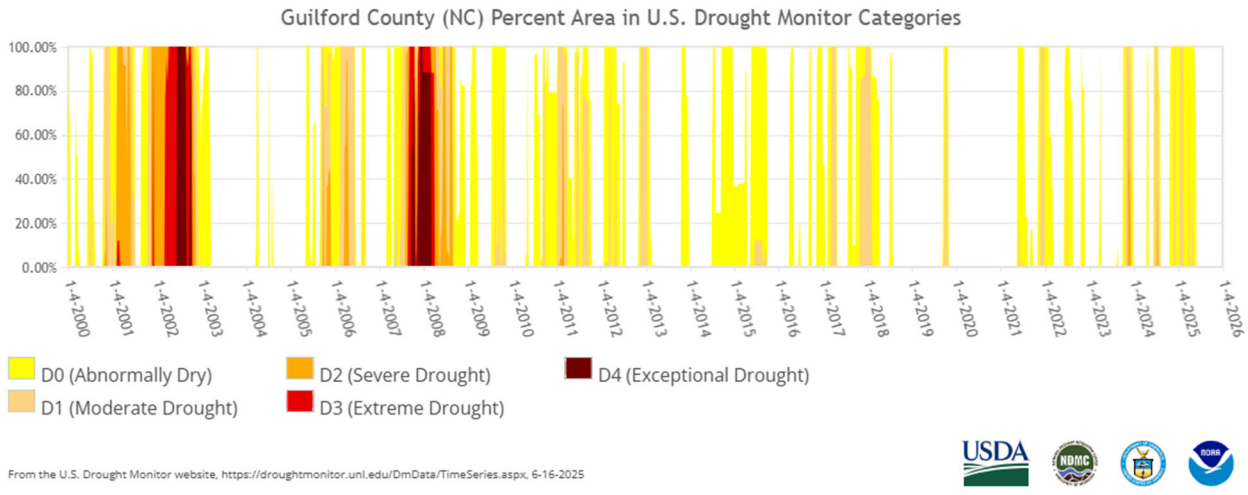
			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Source: US Drought Monitor

HISTORICAL OCCURRENCES

The U.S. Drought Monitor provides historical data on droughts in Guilford County. The following figure shows historical periods where the County was considered in some level of drought condition. The color key shown in Figure 4.25 indicates the intensity of the drought. According to the U.S. Drought Monitor, between January 4, 2000 and June 10, 2025, Guilford County was in some level of drought condition 52.3% of the time, or 701 of 1,328 weeks. Most this time was spent in "abnormally dry" or "moderate" drought conditions; Guilford County recorded 67 weeks in "extreme" drought and 33 weeks in exceptional drought.

FIGURE 4.26 – DROUGHT CONDITIONS IN GUILFORD COUNTY – 2000-2025



Source: US Drought Monitor

The National Drought Mitigation Center's Drought Impact Reporter Dashboard summarizes drought-related media reports starting in 2005. The following narratives were compiled from the Dashboard search results for Guilford County:

— In December 2010, 67 counties, including Guilford, were declared to be natural disaster areas by USDA due to drought and high temperatures during 2010. This declaration permits affected farmers, ranchers, and other agricultural producers to apply for low-interest emergency loans from the Farm Service Agency.
— In November 2017, North Carolina's Drought Management Advisory Council advised that counties in drought, including Guilford, take precautions to limit water use to extend existing water supplies.
— In November 2024, Governor Roy Cooper declared a state of emergency for several counties, including Guilford, in response to the ongoing wildfires in Western North Carolina and continued drought across the state.
— In June 2024, Greensboro area farms were working hard trying to keep crops irrigated amid the hot, dry weather. The crops were more expensive to produce when they need so much irrigation. The corn seemed to be harmed by drought the most.

PROBABILITY OF FUTURE OCCURRENCE

Based on historical occurrences, the probability that the Region will experience some level of drought is likely, with Guilford County in drought 52.3 percent of the time during the period from 2000 through 2025. However, the probability of extreme drought is lower. Overall, drought in the Guilford County can be considered likely.

Probability: 3 – Likely

CLIMATE CHANGE

The Fourth National Climate Assessment (2017) reports that average and extreme temperatures are increasing across the country and average annual precipitation is decreasing in the Southeast. Heavy precipitation events are becoming more frequent, meaning that as more rain falls on fewer days there will likely be an increase in the average number of consecutive dry days. As temperature is projected to continue rising, evaporation rates are expected to increase, resulting in decreased surface soil moisture levels. Together, these factors suggest that drought will increase in intensity and duration in the Southeast.

The Fifth National Climate Assessment (2023) upholds the climate trends reported in the Fourth Assessment and presents additional patterns in the Southeast that exacerbate climate risk and impacts. These patterns include population growth, high proportion of the population with health issues or underlying health conditions, and a large, climate-dependent agricultural sector.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to drought in Guilford County is based on historical occurrences of drought in the planning area and generalized concerns regarding potential drought consequences. Agricultural vulnerability was estimated using data from the USDA Risk Management Agency crop insurance claims, specifically past claims related to drought.

PEOPLE

Drought can affect people's physical and mental health. For those economically dependent on a reliable water supply, drought may cause anxiety or depression about economic losses, reduced incomes, and other employment impacts. Conflicts may arise over water shortages. People may be forced to pay more for water, food, and utilities affected by increased water costs.

Drought may also cause health problems due to poorer water quality from lower water levels. If accompanied by extreme heat, drought can also result in higher incidents of heat stroke and even loss of human life. Young children and older adults are particularly vulnerable to heat stroke. According to the 2023 American Community Survey, children under 5 and adults 65 and over make up 21.2% of Guilford County's population.

PROPERTY

Drought is unlikely to cause damages to the built environment. However, in areas with shrinking and expansive soils, drought may lead to structural damages. Drought may cause severe property loss for the agricultural industry in terms of crop and livestock losses. The USDA's Risk Management Agency (RMA) maintains a database of all paid crop insurance claims. Between 2014-2024, the sum of claims paid for crop damage due to drought in Guilford County was $10,112,661, or an average of $919,333 in losses annually. Table 4.18 summarizes crop losses due to drought reported in the RMA system.

TABLE 4.18 – CROP LOSSES RESULTING FROM DROUGHT IN GUILFORD COUNTY, 2014-2024

Year	Indemnity Amount
2014	$1,379,009
2015	$1,512,442
2016	$1,205,935
2017	$1,350,026
2018	$438,749
2019	$1,834,190
2020	$316,039
2021	$481,146
2022	$922,315
2023	$634,059
2024	$38,751
Total	**$10,112,661**

Source: USDA Risk Management Agency

ENVIRONMENT

Drought can affect local wildlife by shrinking food supplies and damaging habitats. Sometimes this damage is only temporary, and other times it is irreversible. Wildlife may face increased disease rates due to limited access to food and water. Increased stress on endangered species could cause extinction.

Drought conditions can also provide a substantial increase in wildfire risk. As plants and trees die from a lack of precipitation, increased insect infestations, and diseases—all of which are associated with drought—they become fuel for wildfire. Long periods of drought can result in more intense wildfires, which bring additional consequences for the economy, the environment, and society. Drought may also increase likelihood of wind and water erosion of soils.

CONSEQUENCE ANALYSIS

Table 4.19 summarizes the potential negative consequences of drought.

TABLE 4.19 – CONSEQUENCE ANALYSIS - DROUGHT

Category	Consequences
Public	Can cause anxiety or depression about economic losses, conflicts over water shortages, reduced incomes, fewer recreational activities, higher incidents of heat stroke, and fatality.
Responders	Impacts to responders are unlikely. Exceptional drought conditions may impact the amount of water immediately available to respond to wildfires.
Continuity of Operations (including Continued Delivery of Services)	Drought would have minimal impacts on continuity of operations due to the relatively long warning time that would allow for plans to be made to maintain continuity of operations.
Property, Facilities and Infrastructure	Drought has the potential to affect water supply for residential, commercial, institutional, industrial, and government-owned areas. Drought can reduce water supply in wells and reservoirs. Utilities may be forced to increase rates.
Environment	Environmental impacts include strain on local plant and wildlife; increased probability of erosion and wildfire.
Economic Condition of the Jurisdiction	Farmers may face crop losses or increased livestock costs. Businesses that depend on farming may experience secondary impacts. Extreme drought has the potential to impact local businesses in landscaping, recreation and tourism, and public utilities.
Public Confidence in the Jurisdiction's Governance	When drought conditions persist with no relief, local or State governments must often institute water restrictions, which may impact public confidence.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes drought hazard risk by jurisdiction. Drought risk is uniform across the planning area. Probability, warning time, duration, and spatial extent are inherent to the hazard and remain constant across jurisdictions. Most damages that result from drought are to crops and other agriculture-related activities as well as water-dependent recreation industries; therefore, the magnitude of impacts is typically greater in unincorporated areas. In developed areas, the magnitude of drought is less severe, with lawns and local gardens affected and potential impacts on local water supplies during severe, prolonged drought.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	3	1	4	1	4	2.5	M
Greensboro	3	1	4	1	4	2.5	M
High Point	3	1	4	1	4	2.5	M
Jamestown	3	1	4	1	4	2.5	M
Oak Ridge	3	1	4	1	4	2.5	M
Pleasant Garden	3	1	4	1	4	2.5	M
Sedalia	3	1	4	1	4	2.5	M
Stokesdale	3	1	4	1	4	2.5	M
Summerfield	3	1	4	1	4	2.5	M

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Whitsett	3	1	4	1	4	2.5	M
Unincorporated Guilford County	3	2	4	1	4	2.8	M

Earthquake

HAZARD BACKGROUND

An earthquake is a movement or shaking of the ground. 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.

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

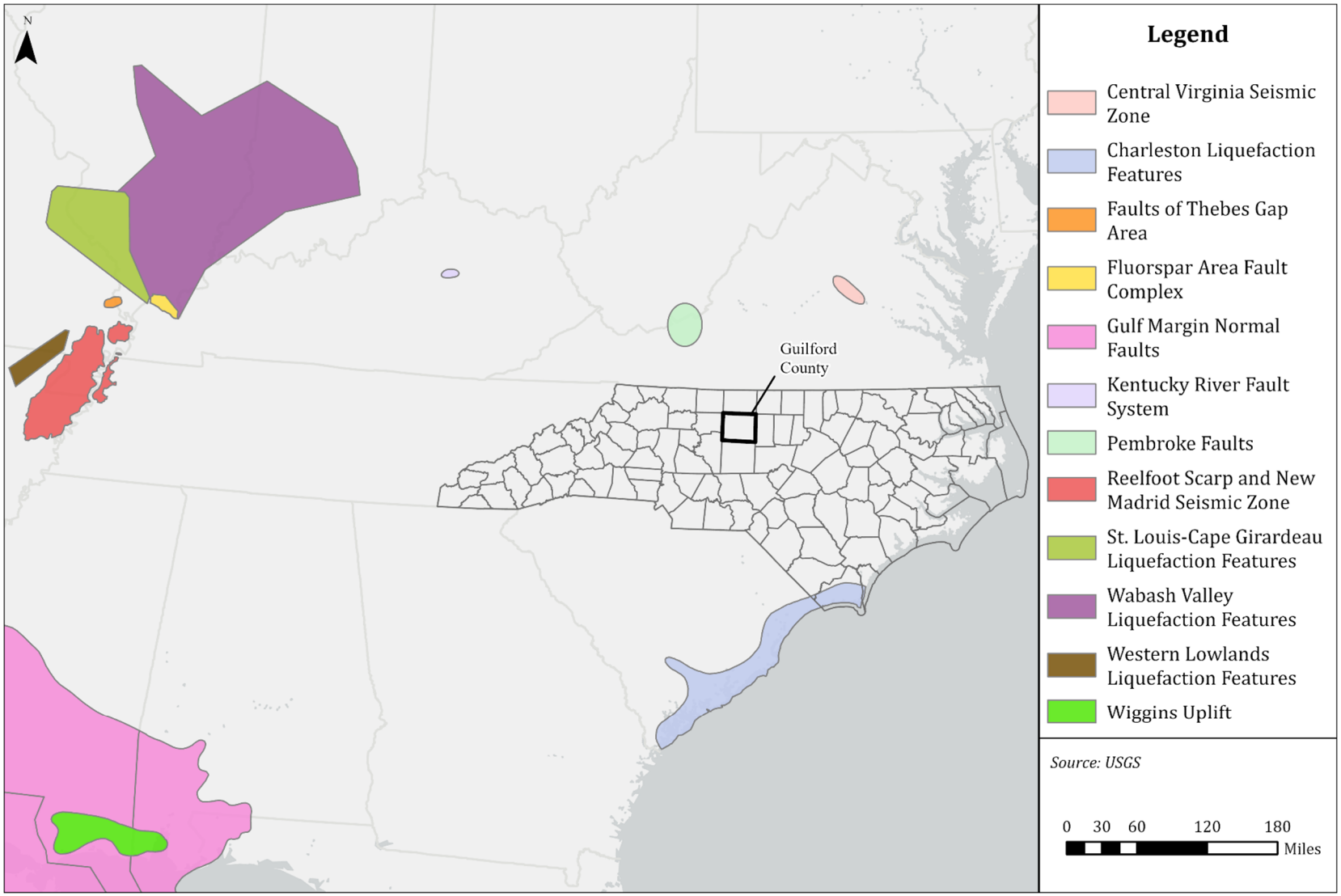
LOCATION

Figure 4.27 reflects the quaternary faults that present an earthquake hazard for the Guilford County planning area based on data from the USGS Earthquake Hazards Program. Quaternary faults have shown evidence of movement within the last 1.6 million years.

All of North Carolina is subject to earthquakes, with the western and southern region most vulnerable to a damaging earthquake. The Charleston Fault in South Carolina and New Madrid Fault in Tennessee affect the state. Both faults have generated earthquakes measuring greater than 8.0 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines in eastern Tennessee, Virginia and throughout North Carolina that could produce less severe shaking.

Spatial Extent: 4 – Large

FIGURE 4.27 – US QUATERNARY FAULTS



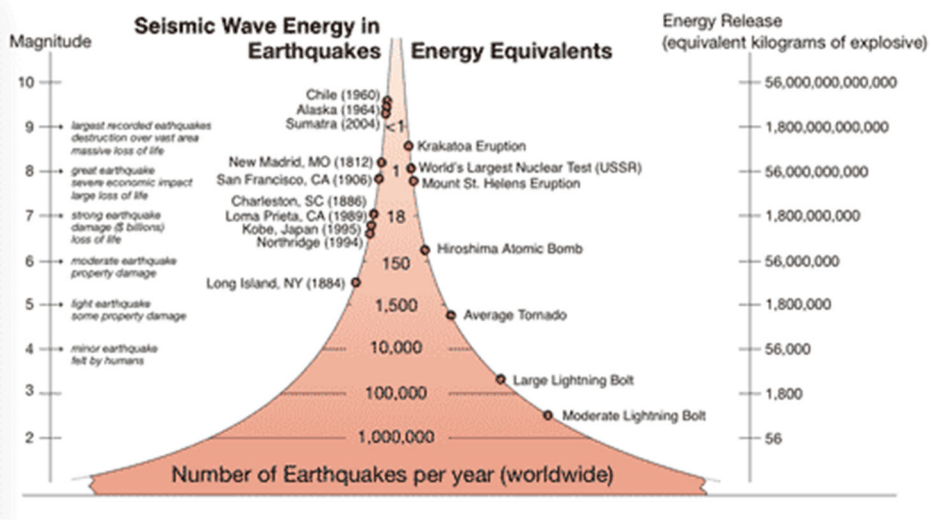
Source: USGS Earthquake Hazards Program

EXTENT

Earthquakes are measured in terms of their magnitude and intensity. The Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude is usually used by the news media when reporting the intensity of earthquakes and is the scale most familiar to the public. However, the USGS now uses moment magnitude, which is an extension of the Richter Scale and is based on physical properties of the earthquake derived from an analysis of all the waveforms recorded from the shaking. Earthquake magnitude is described in Figure 4.28.

A more meaningful measurement is an earthquake's intensity. The intensity scale used by the scientific community in the United States is called the Modified Mercalli Intensity (MMI) scale. The MMI scale is an arbitrary ranking based on observed effects. Table 4.20 shows descriptions for levels of earthquake intensity on the MMI scale compared to the Richter scale. Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

FIGURE 4.28 – EARTHQUAKE MAGNITUDE AND ENERGY RELEASE



Source: USGS Earthquake Hazards Program

TABLE 4.20 –MODIFIED MERCALLI INTENSITY (MMI) SCALE

MMI	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.

MMI	Shaking	Description/Damage
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some will-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Source: USGS Earthquake Hazards Program

The most severe earthquakes to impact the Guilford County area occurred in December of 1875, March 1960, and November of 1969. These earthquakes were estimated to have been felt as a level 4 on the MMI Scale.

Impact: 1 – Minor

HISTORICAL OCCURRENCES

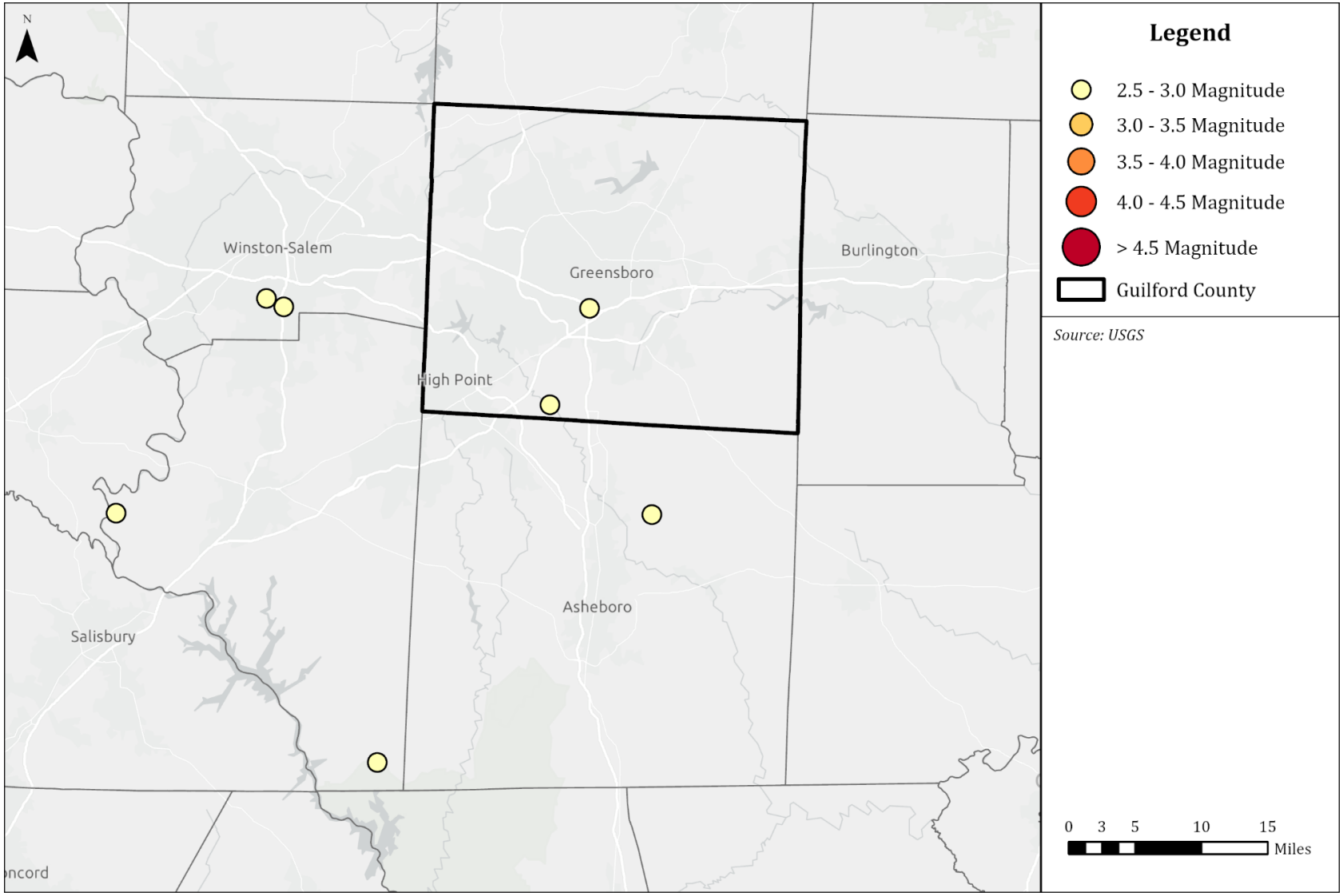
The USGS Earthquake Hazards Program maintains a database of all historical earthquakes of a magnitude 2.5 and greater. Table 4.21 lists historical earthquakes, and Figure 4.29 shows the epicenter of these events.

TABLE 4.21 – HISTORICAL EARTHQUAKE IMPACTS IN GUILFORD COUNTY, 1900-2024

Date of Occurrence	Location	MMI (Intensity)
3/4/1981	Randleman	2.8
10/3/1986	Tyro	2.5
7/12/1993	Greensboro	2.7
10/17/2006	Winston-Salem	2.6
11/3/2006	Winston-Salem	2.5
11/15/2015	Denton	2.58
3/26/2019	Archdale	2.5

Source: USGS Earthquakes Hazard Program

FIGURE 4.29 – HISTORICAL EARTHQUAKES BY MAGNITUDE, 1900-2024



Source: USGS Earthquakes Hazard Program

PROBABILITY OF FUTURE OCCURRENCE

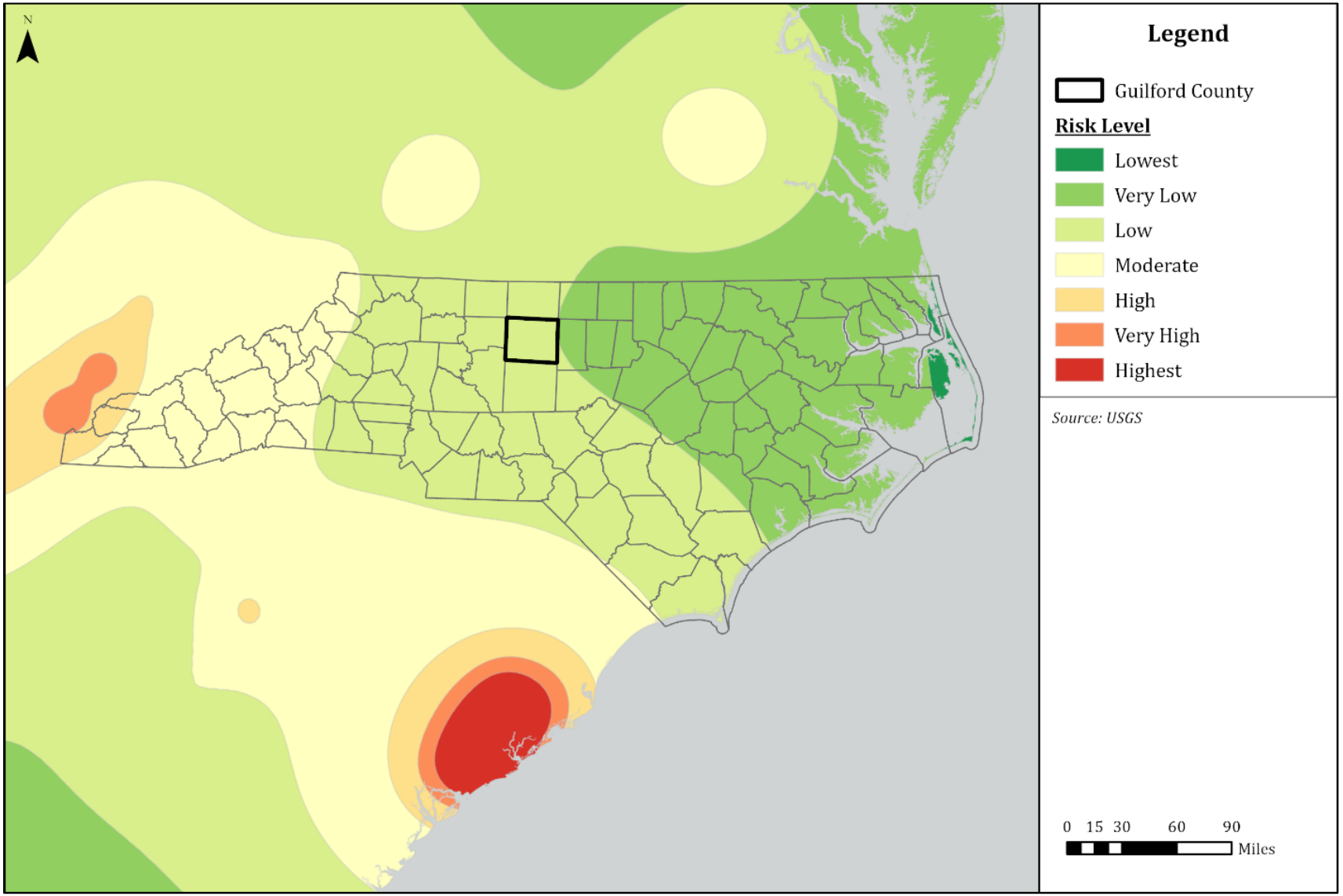
Ground motion is the movement of the earth's surface due to earthquakes or explosions. It is produced by waves generated by a sudden slip on a fault or sudden pressure at the explosive source and travels through the earth and along its surface. Ground motion is amplified when surface waves of unconsolidated materials bounce off of or are refracted by adjacent solid bedrock. The probability of ground motion is depicted in USGS earthquake hazard maps by showing, by contour values, the earthquake ground motions (of a particular frequency) that have a common given probability of being exceeded in 50 years.

Figure 4.30 reflects the seismic hazard for Guilford County based on the national USGS map of peak acceleration with two percent probability of exceedance in 50 years, which USGS simplifies into risk ratings from "very low" to "highest". To produce these estimates, the ground motions being considered at a given location are those from all future possible earthquake magnitudes at all possible distances from that location. The ground motion coming from a particular magnitude and distance is assigned an annual probability equal to the annual probability of occurrence of the causative magnitude and distance. The method assumes a reasonable future catalog of earthquakes, based upon historical earthquake locations and geological information on the recurrence rate of fault ruptures. When all the possible earthquakes and magnitudes have been considered, a ground motion value is determined such that the annual rate of its being exceeded has a certain value. Therefore, for the given probability of exceedance, two percent, the locations shaken more frequently will have larger ground motions.

As shown in the map below, the majority of Guilford County is located within the lighter green zone which represents "low" seismic hazard risk. Based on this data, it can be reasonably assumed that an earthquake event affecting Guilford County is unlikely.

Probability: 1 – Unlikely

FIGURE 4.30 – SEISMIC HAZARD INFORMATION FOR NORTH CAROLINA



Source: USGS Earthquake Hazards Program

CLIMATE CHANGE

Scientists are beginning to believe there may be a connection between climate change and earthquakes. Changing ice caps and sea-level redistribute weight over fault lines, which could potentially have an influence on earthquake occurrences. However, currently no studies quantify the relationship to a high level of detail, so recent earthquakes should not be linked with climate change.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Population and property at risk to earthquakes was estimated using data from the North Carolina Emergency Management (NCEM) IRISK database, which was compiled in NCEM's Risk Management Tool.

PEOPLE

Earthquake events in Guilford County are unlikely to produce more than mild ground shaking; therefore, injury or death is unlikely. Objects falling from shelves generally pose the greatest threat to safety.

Table 4.22 and Table 4.23 detail the population estimated to be at risk from a 250-year earthquake and a 500-year earthquake, respectively, according to the NCEM RMT Database.

TABLE 4.22 – ESTIMATED POPULATION IMPACTED BY 250-YEAR EARTHQUAKE

Jurisdiction	Total Population	Total Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	84,956	83,257	98%	20,442	20,087	98%	7,162	7,038	98%
Greensboro	299,035	299,035	100%	39,884	39,883	100%	16,134	16,134	100%
High Point	114,059	114,059	100%	17,209	17,209	100%	6,407	6,407	100%
Gibsonville	8,971	8,612	96%	1,194	1,152	96%	177	171	97%
Jamestown	3,668	3,668	100%	1,847	1,847	100%	301	301	100%
Oak Ridge	7,474	7,474	100%	993	993	100%	399	399	100%
Pleasant Garden	4,997	4,997	100%	1,173	1,173	100%	170	170	100%
Sedalia	676	676	100%	94	94	100%	31	31	100%
Stokesdale	5,924	5,924	100%	587	587	100%	271	271	100%
Summerfield	10,951	10,951	100%	1,519	1,519	100%	680	680	100%
Whitsett	588	588	100%	282	282	100%	150	150	100%
County Total	**541,299**	**539,241**	**99.6%**	**85,224**	**84,826**	**100%**	**31,882**	**31,752**	**100%**

Source: Census 2020 and NCEM Risk Management Tool

TABLE 4.23 – ESTIMATED POPULATION IMPACTED BY 500-YEAR EARTHQUAKE

Jurisdiction	Total Population	Total Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	84,956	84,956	100%	20,442	20,442	100%	7,162	7,162	100%
Greensboro	299,035	299,035	100%	39,884	39,884	100%	16,134	16,134	100%
High Point	114,059	114,059	100%	17,209	17,209	100%	6,407	6,407	100%
Gibsonville	8,971	8,971	100%	1,194	1,194	100%	177	177	100%
Jamestown	3,668	3,668	100%	1,847	1,847	100%	301	301	100%
Oak Ridge	7,474	7,474	100%	993	993	100%	399	399	100%
Pleasant Garden	4,997	4,997	100%	1,173	1,173	100%	170	170	100%
Sedalia	676	676	100%	94	94	100%	31	31	100%
Stokesdale	5,924	5,924	100%	587	587	100%	271	271	100%
Summerfield	10,951	10,951	100%	1,519	1,519	100%	680	680	100%
Whitsett	588	588	100%	282	282	100%	150	150	100%
County Total	**541,299**	**541,299**	**100%**	**85,224**	**85,224**	**100%**	**31,882**	**31,882**	**100%**

Source: Census 2020 and NCEM Risk Management Tool

PROPERTY

In a severe earthquake event, buildings can be damaged by the shaking itself or by the ground beneath them settling to a different level than it was before the earthquake (subsidence). Buildings can even sink into the ground if soil liquefaction occurs. If a structure (a building, road, etc.) is built across a fault, the ground displacement during an earthquake could seriously damage that structure.

Certain building types are particularly vulnerable to earthquake damage: wood-frame multi-unit buildings, single-family homes, mobile homes, and unreinforced masonry buildings. The most susceptible structures are wood-frame, multi-story, mixed-use buildings that have large openings on the first floor for garages or commercial space and housing on the upper floors. During an earthquake, these types of structures could sway or even collapse.

Earthquakes can also cause damages to infrastructure, resulting in secondary hazards. Damages to dams or levees could cause failures and subsequent flooding. Fires can be started by broken gas lines and power lines. Fires can be a serious problem, especially if the water lines that feed the fire hydrants have been damaged as well.

Table 4.24 and Table 4.25 detail the estimated buildings impacted from varying magnitudes of earthquake events.

TABLE 4.24 – ESTIMATED BUILDINGS IMPACTED BY 250-YEAR EARTHQUAKE EVENT

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	44,680	90%	$185,344	3,277	7%	$320,988	796	2%	$161,087	48,753	98%	$667,418
Greensboro	81,938	73,605	90%	$884,078	6,863	8%	$2,784,115	1,443	2%	$555,605	81,911	100%	$4,223,798
High Point	38,756	34,594	89%	$421,984	3,427	9%	$1,822,543	692	2%	$220,676	38,713	100%	$2,465,203
Gibsonville	2,728	2,502	92%	$9,072	100	4%	$21,340	34	1%	$4,551	2,636	97%	$34,963
Jamestown	2,786	2,511	90%	$20,880	198	7%	$84,527	75	3%	$30,852	2,784	100%	$136,259
Oak Ridge	3,228	2,994	93%	$24,049	181	6%	$15,351	53	2%	$11,530	3,228	100%	$50,930
Pleasant Garden	2,820	2,655	94%	$10,654	142	5%	$20,251	22	1%	$7,034	2,819	100%	$37,939
Sedalia	393	364	93%	$845	6	2%	$218	23	6%	$1,752	393	100%	$2,816
Stokesdale	2,337	2,125	91%	$13,663	196	8%	$49,328	16	1%	$4,031	2,337	100%	$67,022
Summerfield	4,274	4,065	95%	$34,113	183	4%	$13,815	25	1%	$7,939	4,273	100%	$55,868
Whitsett	573	541	94%	$2,238	22	4%	$3,177	10	2%	$609	573	100%	$6,024
Total	**189,387**	**170,636**	**90%**	**$1,606,920**	**14,595**	**8%**	**$5,135,653**	**3,189**	**2%**	**$1,005,666**	**188,420**	**99%**	**$7,748,240**

Source: NCEM Risk Management Tool

TABLE 4.25 – ESTIMATED BUILDINGS IMPACTED BY 500-YEAR EARTHQUAKE EVENT

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	45,470	92%	$2,617,506	3,281	7%	$2,030,714	800	2%	$1,042,958	49,551	100%	$5,691,177
Greensboro	81,938	73,605	90%	$8,847,636	6,867	8%	$17,323,704	1,447	2%	$3,713,210	81,919	100%	$29,884,550
High Point	38,756	34,594	89%	$3,700,018	3,430	9%	$10,907,820	693	2%	$1,366,412	38,717	100%	$15,974,250
Gibsonville	2,728	2,594	95%	$152,057	100	4%	$152,196	34	1%	$29,586	2,728	100%	$333,839
Jamestown	2,786	2,511	90%	$235,395	199	7%	$452,949	75	3%	$206,482	2,785	100%	$894,825
Oak Ridge	3,228	2,994	93%	$224,915	181	6%	$93,843	53	2%	$66,173	3,228	100%	$384,931
Pleasant Garden	2,820	2,655	94%	$153,820	142	5%	$141,862	22	1%	$48,668	2,819	100%	$344,350
Sedalia	393	364	93%	$17,798	6	2%	$1,670	23	6%	$16,133	393	100%	$35,600
Stokesdale	2,337	2,125	91%	$128,400	196	8%	$222,897	16	1%	$22,967	2,337	100%	$374,264
Summerfield	4,274	4,065	95%	$312,751	183	4%	$86,770	25	1%	$44,230	4,273	100%	$443,751
Whitsett	573	541	94%	$34,605	22	4%	$20,565	10	2%	$4,403	573	100%	$59,573
Total	**189,387**	**171,518**	**91%**	**$16,424,901**	**14,607**	**8%**	**$31,434,990**	**3,198**	**2%**	**$6,561,222**	**189,323**	**100%**	**$54,421,110**

Source: NCEM Risk Management Tool

ENVIRONMENT

An earthquake is unlikely to cause substantial impacts to the natural environment in Guilford County. Impacts to the built environment (e.g. ruptured gas line) could damage the surrounding environment. However, this type of damage is unlikely based on historical occurrences.

CONSEQUENCE ANALYSIS

Table 4.26 summarizes the potential negative consequences of earthquake.

TABLE 4.26 – CONSEQUENCE ANALYSIS - EARTHQUAKE

Category	Consequences
Public	Impact expected to be severe for people who are unprotected or unable to take shelter; moderate to light impacts are expected for those who are protected.
Responders	Responders may be required to enter unstable structures or compromised infrastructure. Adverse impacts are expected to be severe for unprotected personnel and moderate to light for protected personnel.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel in the area of the incident may require relocation of operations and lines of succession execution. Disruption of lines of communication and destruction of facilities may extensively postpone delivery of services.
Property, Facilities and Infrastructure	Damage to facilities and infrastructure in the area of the incident may be extensive for facilities, people, infrastructure, and HazMat.
Environment	May cause extensive damage, creating denial or delays in the use of some areas. Remediation may be needed.
Economic Condition of the Jurisdiction	Local economy and finances expected to be adversely affected, possibly for an extended period of time.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery are not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes earthquake hazard risk by jurisdiction. Earthquake risk is uniform across the planning area.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
All Jurisdictions	1	1	4	4	1	1.9	L

Excessive Heat

HAZARD BACKGROUND

Per information provided by Ready.gov, in most of the United States extreme heat is defined as a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. As temperatures rise, our bodies naturally cool down by sweating. In extreme heat, the body must work extra hard to maintain a normal temperature and sweating might not be enough to cool down. When this happens, a person's body temperature rises faster than it can cool itself. Additionally, when the humidity is high, as is common during extreme heat events in North Carolina, evaporative cooling through sweating becomes less effective. Heat-related illnesses occur when the body overheats from exposure to high temperatures and in severe cases can cause damage to the brain and other vital organs[2]. Heat-related illnesses can also arise from moderate to vigorous physical activity in hot situations.

Extreme heat often results in the highest annual number of deaths among all weather-related disasters. On average, the number of extreme heat days has been increasing each year, putting residents at a higher risk of heat-related illnesses. In 2023, more people in the United States died of heat-related illness than any year on record[3]. Per Ready.gov, older adults, children, and people with certain illnesses and chronic conditions are at greater risk from extreme heat; and humidity increases the feeling of heat.

The National Weather Service (NWS) uses the heat index, also known as apparent temperature, to determine when to issue health alerts. The heat index is a measure of how hot it really feels when the relative humidity is considered along with the actual air temperature. In most areas of the country, the NWS generally issues alerts "when the heat index is expected to exceed 105°F -110°F for at least two consecutive days," but they also work with local partners to determine the most appropriate conditions for a specific geography[4,5].

In North Carolina, the Department of Health and Human Services (DHHS) uses regional temperature thresholds to activate its Heat Health Alert System. The regional thresholds recognize that an area's typical climate conditions and relevant local factors, such as the proportion of the population engaged in outdoor work, can impact how heat affects the local population. DHHS sends heat alerts to county health departments and Heat Health Alert System subscribers when the daily maximum heat index is forecasted to meet or exceed the heat index threshold for their region. In Guilford County, the heat index threshold is 100°F, as shown in Figure 4.31.

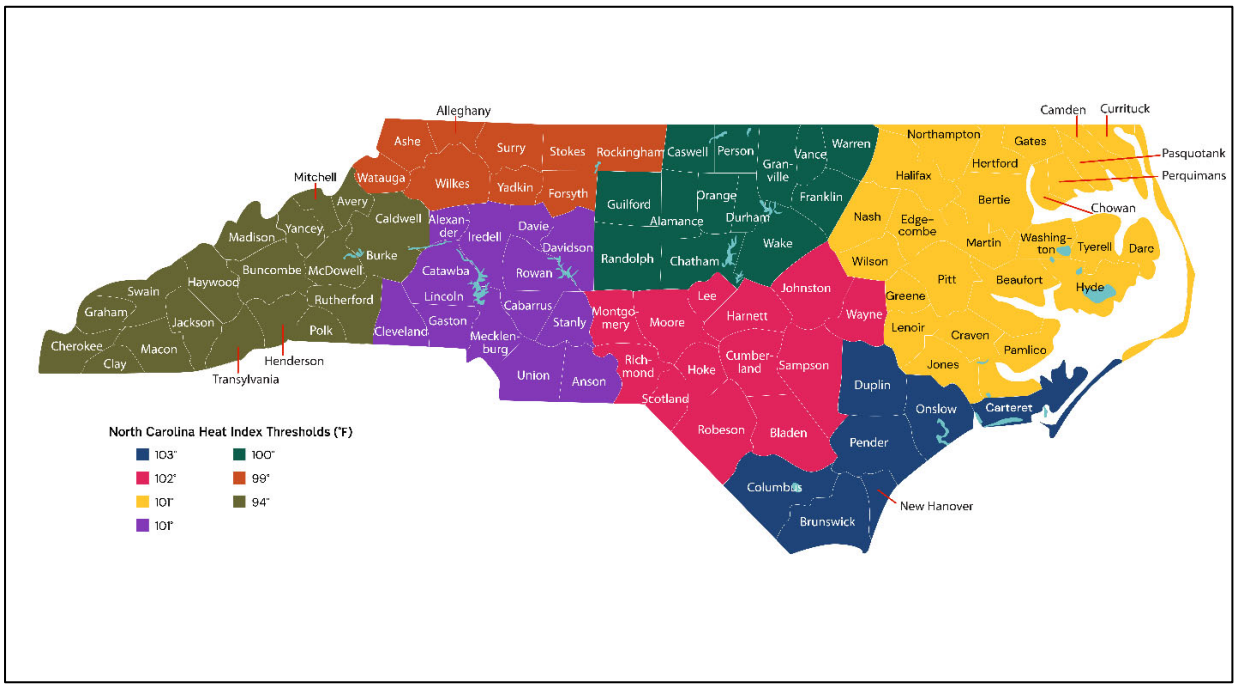
[2] www.cdc.gov/disasters/extremeheat/heat_guide.html.

[3] https://apnews.com/article/record-heat-deadly-climate-change-humidity-south-11de21a526e1cbe7e306c47c2f12438d

[4] https://www.weather.gov/safety/heat-index

[5] https://www.weather.gov/safety/heat-ww

FIGURE 4.31 – NORTH CAROLINA HEAT INDEX THRESHOLDS



Source: https://climate.ncsu.edu/heat_toolkit/thresholds/

The most dangerous place to be during an extreme heat incident is in a permanent home, with little or no air conditioning. Those at greatest risk for heat-related illness include people 65 years of age and older, young children, people with chronic health problems such as heart disease, people who are obese, people who are socially isolated, and people who are on certain medications, such as tranquilizers, antidepressants, sleeping pills, or drugs for Parkinson's disease. However, even young and healthy individuals are susceptible if they participate in strenuous physical activities during hot weather or are not acclimated to hot weather. Table 4.27 lists typical symptoms and health impacts of exposure to extreme heat.

TABLE 4.27 – TYPICAL HEALTH IMPACTS OF EXTREME HEAT

Heat Index (HI)	Disorder
80-90° F (HI)	Fatigue possible with prolonged exposure and/or physical activity
90-105° F (HI)	Heatstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
105-130° F (HI)	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity

Source: National Weather Service Heat Index Program, www.weather.gov/os/heat/index.shtml

The National Weather Service has a system in place to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for issuing excessive heat alerts is when the maximum daytime Heat Index is expected to equal or exceed 105 degrees Fahrenheit (°F) and the nighttime minimum Heat Index is 80°F or above for two or more

consecutive days. A heat advisory is issued when temperatures reach 105 degrees, and a warning is issued at 115 degrees.

Impacts of extreme heat are not only focused on human health, as prolonged heat exposure can have devastating impacts on infrastructure as well. Prolonged high heat exposure increases the risk of pavement deterioration, as well as railroad warping or buckling. High heat also puts a strain on energy systems and consumption, as air conditioners are run at a higher rate and for longer; extreme heat can also reduce transmission capacity over electric systems.

Warning Time: 1 – More than 24 hours

Duration: 3 – Less than one week

LOCATION

The entire planning area is susceptible to high temperatures and incidents of extreme heat.

Spatial Extent: 4 – Large

EXTENT

The extent of extreme heat can be defined by the maximum apparent temperature reached. Apparent temperature is a function of ambient air temperature and relative humidity and is reported as the heat index. The National Weather Service Forecast Office in Raleigh sets the following criteria for heat advisory and excessive heat warning:

- **Heat Advisory** – Heat Index of 105°F to 109°F for 3 hours or more. Can also be issued for lower values 100ºF to 104ºF for heat lasting several consecutive days
- **Excessive Heat Watch** – Potential for heat index values of 110°F or hotter within 24 to 48 hours. Also issued during prolonged heat waves when the heat index is near 110°F
- **Excessive Heat Warning** – Heat Index of 110°F or greater for any duration

Based on data from the State Climate Office of North Carolina, the highest temperature recorded in Guilford County since 1903 was 106°F and occurred in July 1926 and July 1952.

Impact: 3 – Critical

HISTORICAL OCCURRENCES

According to the National Oceanic and Atmospheric Administration (NOAA), 2019 was North Carolina's hottest year on record; that record stretches back 123 years to 1895.

The following heat-related incidents were reported by NCEI for Guilford County; one incident caused a fatality.

July 22, 1998 - Excessive heat plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23 when rain cooled the environment enough to send temperatures into the lower 70s at most locations.

May 27, 2008 - North Carolina A&T State University Senior Chad Wiley collapsed and died after a voluntary football workout on campus Tuesday May 27th. Chad was 22 years old.

Heat index records maintained by the North Carolina Climate Office indicate that the Region regularly experiences heat index temperatures above 100°F. Table 4.28 provide counts of heat index values by threshold recorded from 1999-2024 at the Piedmont Triad International Airport (KGSO), used as an indicator for county overall. Counts are provided as the number of hours in a given year where the heat index reached or exceeded 100°F.

TABLE 4.28 – HISTORICAL HEAT INDEX COUNTS, PIEDMONT TRIAD INTERNATIONAL AIRPORT, 1999-2024

Year	Heat Index Value				Total
	100-104°F	105-109°F	110-114°F	≥115°F	
1999	26	5	0	0	31
2000	9	0	0	0	9
2001	0	0	0	0	0
2002	2	0	0	0	2
2003	0	0	0	0	0
2004	0	0	0	0	0
2005	28	5	0	0	33
2006	16	1	0	0	17
2007	21	0	0	0	21
2008	0	0	0	0	0
2009	0	0	0	0	0
2010	27	3	0	0	30
2011	19	0	0	0	19
2012	22	5	0	0	27
2013	0	0	0	0	0
2014	1	0	0	0	1
2015	0	0	0	0	0
2016	10	0	0	0	10
2017	13	0	0	0	13
2018	5	0	0	0	5
2019	10	0	0	0	10
2020	7	0	0	0	7
2021	0	0	0	0	0
2022	6	0	0	0	6
2023	0	0	0	0	0
2024	15	0	0	0	15
Sum	**237**	**19**	**0**	**0**	**256**
Average	**9**	**1**	**0**	**0**	**10**

Source: North Carolina Climate Office, Heat Index Climatology Tool

PROBABILITY OF FUTURE OCCURRENCE

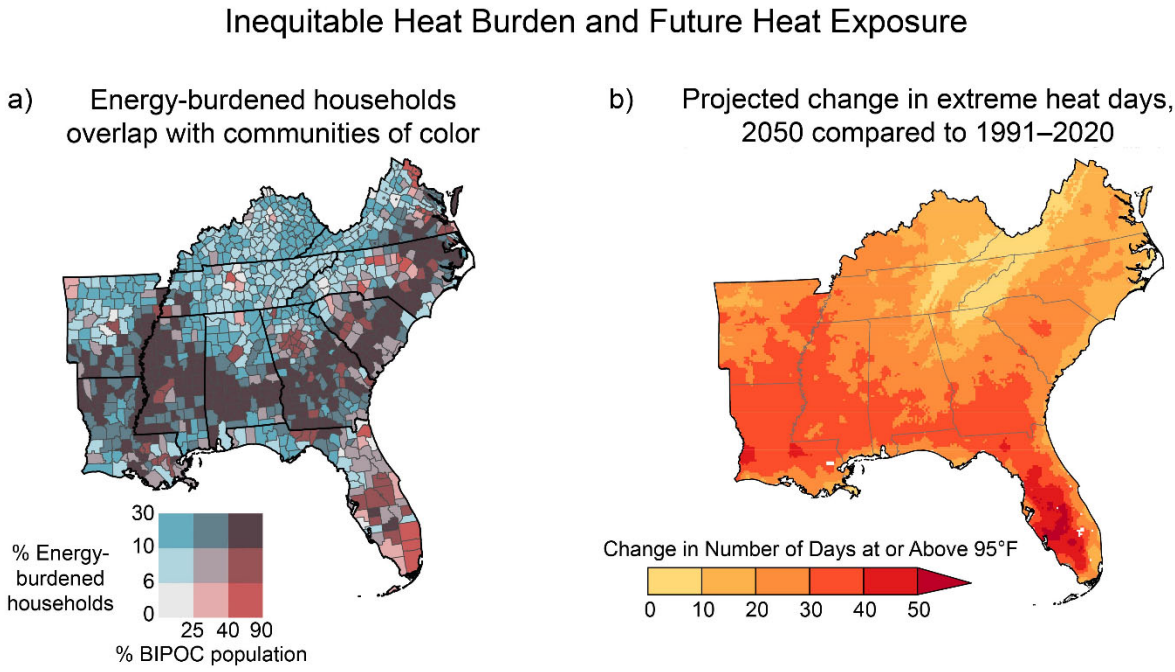
Data was gathered from the North Carolina State Climate Office's Heat Index Climatology Tool using the Piedmont Triad International Airport weather station as an approximation for Guilford County. During the 26-year period from 1999 through 2024, Guilford County experienced 256 hours with high temperatures above 100°F, or an average of 9.8 hours per year.

Probability: 4 – Highly Likely

CLIMATE CHANGE

Research shows that average temperatures will continue to rise in the Southeast United States and globally, directly affecting Guilford County in North Carolina. Per the Fifth National Climate Assessment, "The number of extreme warm days (above 95°F) is expected to continue increasing with every increment of global warming" and that "heatwaves in the Southeast are happening more frequently and are occurring during a longer heat season, with some cities also showing increasing trends in their duration and intensity." Additional heat stresses can be attributed to the urban heat island effect which can increase the temperature of those living in urban environments compared to rural areas. Projected changes in extreme heat days are shown in Figure 4.32.

FIGURE 4.32 – PROJECTED CHANGE IN NUMBER OF DAYS OVER 95°F



Source: USGCRP, 2023: Fifth National Climate Assessment

The Fifth National Climate Assessment also notes that warm nights (minimum temperatures at or above 70°F) in the southeast have increased the most compared to all other continental U.S. regions.

The State Climate Office of North Carolina's County-specific climate projections, which are based on the Fifth National Climate Assessment. This data indicates that extreme heat days in the region could more than quadruple. The historical average from 1983 to 2014 was 6 days annually with maximum temperatures over 95°F. By the 2060s, the projected best-case scenario for these conditions is 26 days annually and the worst-case scenario is 39 days. Days with nighttime temperatures above 70°F are expected to more than double from a historical average of 22 days annually to a projected best-case scenario of 55 days annually or a worst-case of 73 days annually by the 2060s.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to heat was assessed qualitatively and based on historical occurrences. Data from NC Division of Public Health and USDA was used to evaluate impacts to people and agriculture.

PEOPLE

FIGURE 4.33 – ANNUAL COUNTS OF HEAT-RELATED ILLNESS EMERGENCY DEPARTMENT VISITS

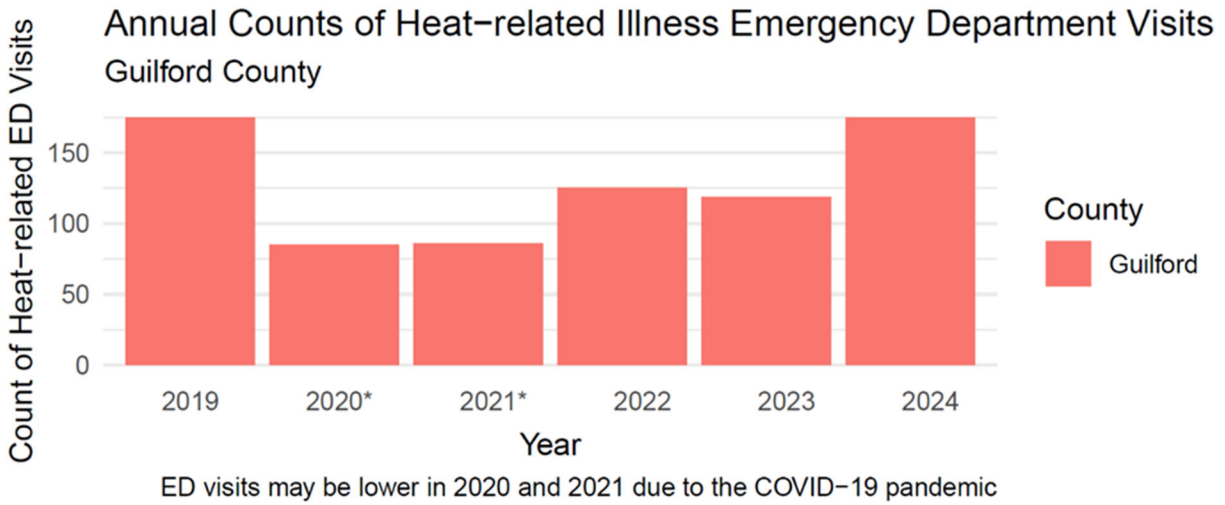


Figure 4.33 shows the annual count of emergency department visits for heat-related illness in Guilford County using public health syndromic surveillance system data from North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). The annual count of emergency department visits for heat-related illness in Guilford County ranged from 85 visits in 2020 to 175 visits in 2019 and 2024.

Extreme heat can cause heat stroke and even loss of human life. The elderly and the very young are most at risk to the effects of heat. People who are isolated, people who work outdoors and/or do strenuous labor, people with chronic health problems such as heart disease or asthma, people who are obese, and people who are on certain medications that interfere with heat regulation and/or fluid balance, including diuretics, some antipsychotic medications, some antidepressants, and some antihypertensive agents, are also more vulnerable to extreme heat.[6]

Extreme heat can cause heat stroke and even loss of human life. The elderly and the very young are most at risk to the effects of heat. People who are isolated are also more vulnerable to extreme heat. Fatalities and injuries recorded across the state of North Carolina also note multiple incidents of persons overexerting themselves in the heat. Guilford County Continuum of Care has designated cooling stations to help residents remain safe and seek relief from the heat.

According to NCEI data, one death was caused by extreme heat in Guilford County in May 2008.

[6] Centers for Disease Control and Prevention. https://www.cdc.gov/heat-health/hcp/clinical-guidance/heat-and-medications-guidance-for-clinicians.html

PROPERTY

Extreme heat is unlikely to cause significant damages to the built environment. However, road surfaces can be damaged as asphalt softens, and concrete sections may buckle under expansion caused by heat. Train rails may also distort or buckle under the stress of head induced expansion. Power transmission lines may sag from expansion and if contact is made with vegetation the line may short out causing power outages. Additional power demand for cooling also increases power line temperature adding to heat impacts.

Extreme heat can also cause significant agricultural losses, though this fact doesn't have as much of an impact on Guilford County due to its more metropolitan nature. Between 2014-2024, the sum of claims paid for crop damage due to heat in the county was $1,546,100 or an average of $140,555 in losses every year. Table 4.29 summarizes the crop losses due to drought in reported in the RMA system.

TABLE 4.29 – CROP LOSSES RESULTING FROM HEAT, 2014-2024

Year	Indemnity Amount
2015	$55,186
2016	$503,537
2017	$195,841
2018	$40,909
2019	$146,275
2020	$10,053
2021	$115,888
2022	$232,749
2023	$166,806
2024	$78,856
Total	**$1,546,100**

Source: USDA Risk Management Agency

ENVIRONMENT

Wild animals are vulnerable to heat disorders similar to humans, including mortality. Vegetation growth will be stunted or plants may be killed if temperatures rise above their tolerance extremes. This could negatively impact agriculture, recreation lands, and native species and their habitats.

CONSEQUENCE ANALYSIS

Table 4.30 summarizes the potential negative consequences of excessive heat.

TABLE 4.30 – CONSEQUENCE ANALYSIS – EXCESSIVE HEAT

Category	Consequences
Public	Extreme heat may cause illness and/or death.
Responders	Consequences may be greater for responders if their work requires exertion and/or wearing heavy protective gear.
Continuity of Operations (including Continued Delivery of Services)	Continuity of operations is not expected to be impacted by extreme heat because warning time for these events is long.
Property, Facilities and Infrastructure	Minor impacts may occur, including possible damages to road surfaces and power lines.

Category	Consequences
Environment	Environmental impacts include strain on local plant and wildlife, including potential for illness or death.
Economic Condition of the Jurisdiction	Farmers may face crop losses or increased livestock costs.
Public Confidence in the Jurisdiction's Governance	Extreme heat is unlikely to impact public confidence.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes extreme heat hazard risk by jurisdiction. Extreme heat risk does not vary significantly by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	4	3	4	1	3	3.3	H

Flooding

HAZARD BACKGROUND

Flooding is defined by the rising and overflowing of water onto normally dry land. As defined by FEMA, a flood is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties. Flooding can result from an overflow of inland waters or an unusual accumulation or runoff of surface waters from any source.

Flooding causes more damage in the United States than any other severe weather-related event, an average of $5 billion a year. According to the National Weather Service, a total of 1,392 flood fatalities occurred in the United States from 2010 to 2023. Of those fatalities, 62 or 4% occurred in the State of North Carolina. Approximately 90 percent of presidentially declared disasters result from flood-related natural hazard events. Taken as a whole, more frequent, localized flooding problems that do not meet federal disaster declaration thresholds ultimately cause the majority of damages across the United States.

SOURCES AND TYPES OF FLOODING

Guilford County can experience riverine and localized flooding. Each of these types of flooding are described below, based on data from the Flood Insurance Study (FIS) report, Flood Insurance Rate Maps (FIRMs), NOAA, and the HMPC.

RIVERINE FLOODING

Guilford County has an Effective FIRM and a Revised Flood Insurance Study (FIS) dated November 17, 2017. The FIS summarizes the principal flood problems in the county as follows:

“Low-lying areas of Guilford County are subjected to periodic flooding from Haw and Deep Rivers and their tributaries included in this study. The most severe flooding on the rivers and large tributaries is usually the result of heavy rains from tropical storms, while flooding on small tributaries results from local thunderstorms. Major flooding problems in Greensboro occur along North and South Buffalo Creeks. Low-lying areas of the City of High Point are subjected to flooding from the Deep River, the East Fork Deep River, Richland Creek, Boulding Branch, and other smaller tributaries included in this FIS. Low-lying areas of Jamestown are subjected to periodic flooding from Deep River and Bull Run. Flooding occurs primarily from thunderstorms and frontal systems; peak stages are reached within a few hours of excess rainfall. Areas having the most severe flood problems lie mostly within the Deep River floodplain. This floodplain varies in width to about 600 feet, but is only sparsely developed at the present time.”

FLASH FLOODING

A flash flood occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, possibly from slow-moving intense thunderstorms and sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil, or impermeable surfaces. Ice jam flooding is a form of flash flooding that occurs when ice breaks up in moving waterways, and then stacks on itself where channels narrow. This creates a natural dam, often causing flooding within minutes of the dam formation.

Flash flooding can happen in Special Flood Hazard Areas (SFHAs) as delineated by the National Flood Insurance Program (NFIP) and can also happen in areas not associated with floodplains. Flash flood hazards caused by surface water runoff are most common in urbanized areas, where greater population density generally equates to more impervious surface (e.g., pavement and buildings) which alters natural drainage patterns and increases the amount of surface water generated.

Flash flooding is a dangerous form of flooding which can reach full peak in only a few minutes. Rapid onset allows little or no time for protective measures. Flash flood waters move at very fast speeds and can move boulders, tear out trees, scour channels, destroy buildings, and obliterate bridges. Flash flooding can result in higher loss of life, both human and animal, than slower developing river and stream flooding.

In certain areas, aging storm sewer systems are not designed to carry the capacity currently needed to handle the increased storm runoff. Typically, the result is water backing into basements, which damages mechanical systems and can create serious public health and safety concerns.

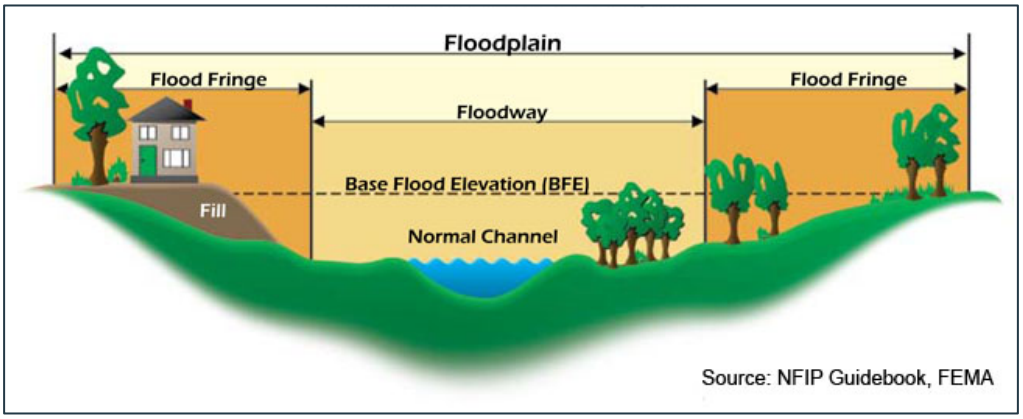
Localized flooding may be caused by the following issues:

- **Inadequate Capacity –** An undersized/under capacity pipe system can cause water to back-up behind a structure which can lead to areas of ponded water and/or overtopping of banks.
- **Clogged Inlets** – Debris covering the asphalt apron and the top of grate at catch basin inlets may contribute to an inadequate flow of stormwater into the system. Debris within the basin itself may also reduce the efficiency of the system by reducing the carrying capacity.
- **Blocked Drainage Outfalls** – Debris blockage or structural damage at drainage outfalls may prevent the system from discharging runoff, which may lead to a back-up of stormwater within the system.
- **Improper Grade** – Poorly graded asphalt around catch basin inlets may prevent stormwater from entering the catch basin as designed. Areas of settled asphalt may create low spots within the roadway that allow for areas of ponded water.

FLOODING AND FLOODPLAINS

In the case of riverine flooding, the area adjacent to a channel is the floodplain, as shown in Figure 4.34. A floodplain is flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood, but which do not experience a strong current. Floodplains are made when floodwaters exceed the capacity of the main channel or escape the channel by eroding its banks. When this occurs, sediments (including rocks and debris) are deposited that gradually build up over time to create the floor of the floodplain. Floodplains generally contain unconsolidated sediments, often extending below the bed of the stream.

FIGURE 4.34 – CHARACTERISTICS OF A FLOODPLAIN



In its common usage, the floodplain most often refers to that area that is inundated by the "100-year flood," which is the flood that has a 1 percent chance in any given year of being equaled or exceeded.

The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

The 100-year flood, which is the minimum standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. Participation in the NFIP requires adoption and enforcement of a local floodplain management ordinance which is intended to prevent unsafe development in the floodplain, thereby reducing future flood damages. Participation in the NFIP allows for the federal government to make flood insurance available within the community as a financial protection against flood losses. Since floods have an annual probability of occurrence, have a known magnitude, depth and velocity for each event, and in most cases, have a map indicating where they will likely occur, they are in many ways often the most predictable and manageable hazard.

Warning Time: 3 – 6 to 12 hours

Duration: 3 – Less than 1 week

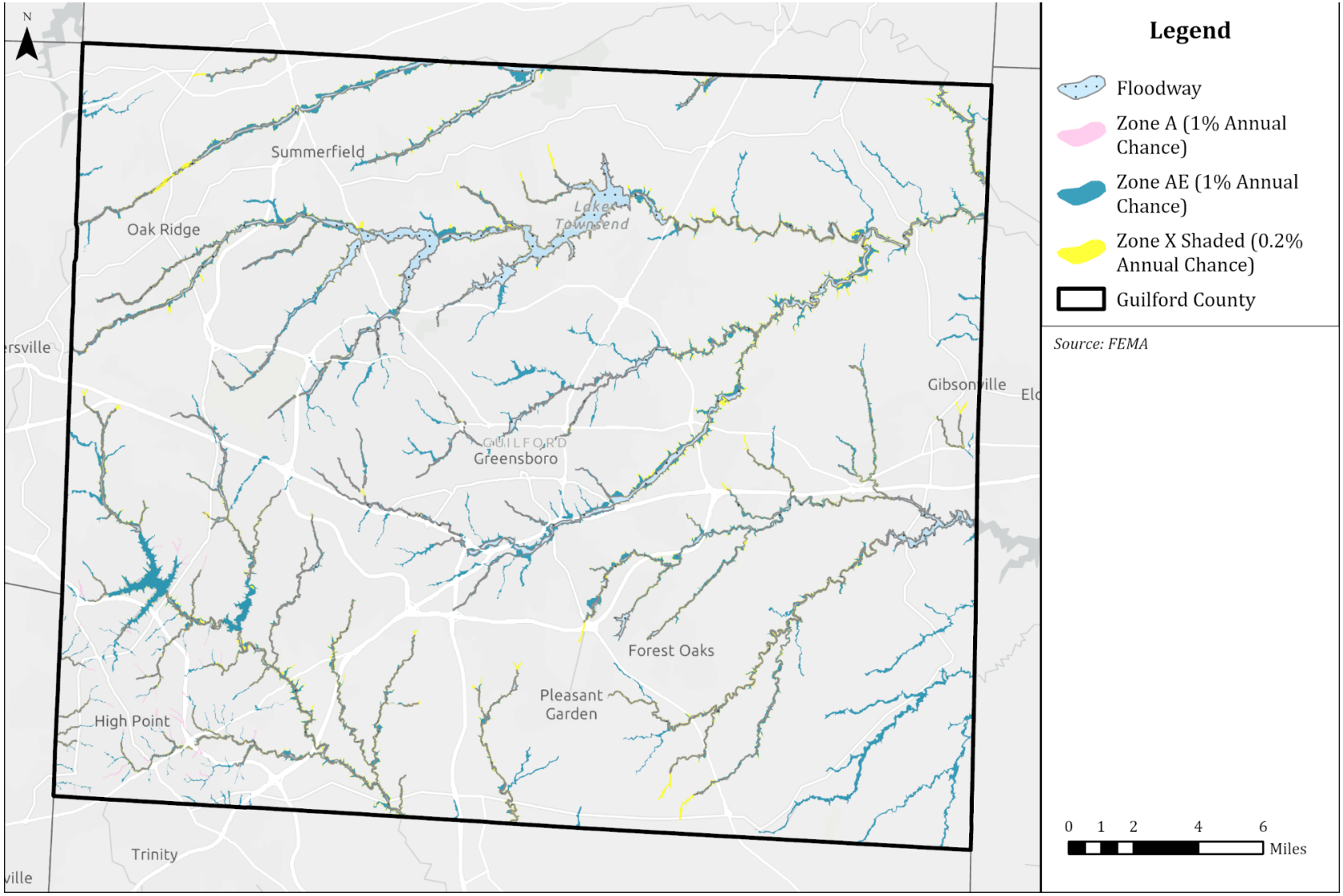
LOCATION

Regulated floodplains are illustrated on inundation maps called Flood Insurance Rate Maps (FIRMs). It is the official map for a community on which FEMA has delineated both the Special Flood Hazard Areas (SFHAs) and the risk premium zones applicable to the community. SFHAs represent the areas subject to inundation by the 100-year flood event. Structures located within the SFHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Flood prone areas were identified within Guilford County using the Effective FIRMs retrieved from NC Flood Risk Information System (FRIS). The current Flood Insurance Study report was revised on November 17, 2017. Figure 4.35 through Figure 4.45 reflect the effective mapped flood insurance zones by jurisdiction in Guilford County.

Flooding can also occur outside the defined SFHA on smaller tributaries that were not studied by FEMA but that nonetheless may be vulnerable to the 1-percent-annual-chance flood. Additionally, localized stormwater flooding can occur anywhere along stormwater system pipes, channels, culverts, and other infrastructure where inadequate capacity, blocked inlets or outfalls, or improper grade prevent sufficient drainage. This type of flooding is more common in the urbanized areas of the county and extends well beyond the limits of the SFHA.

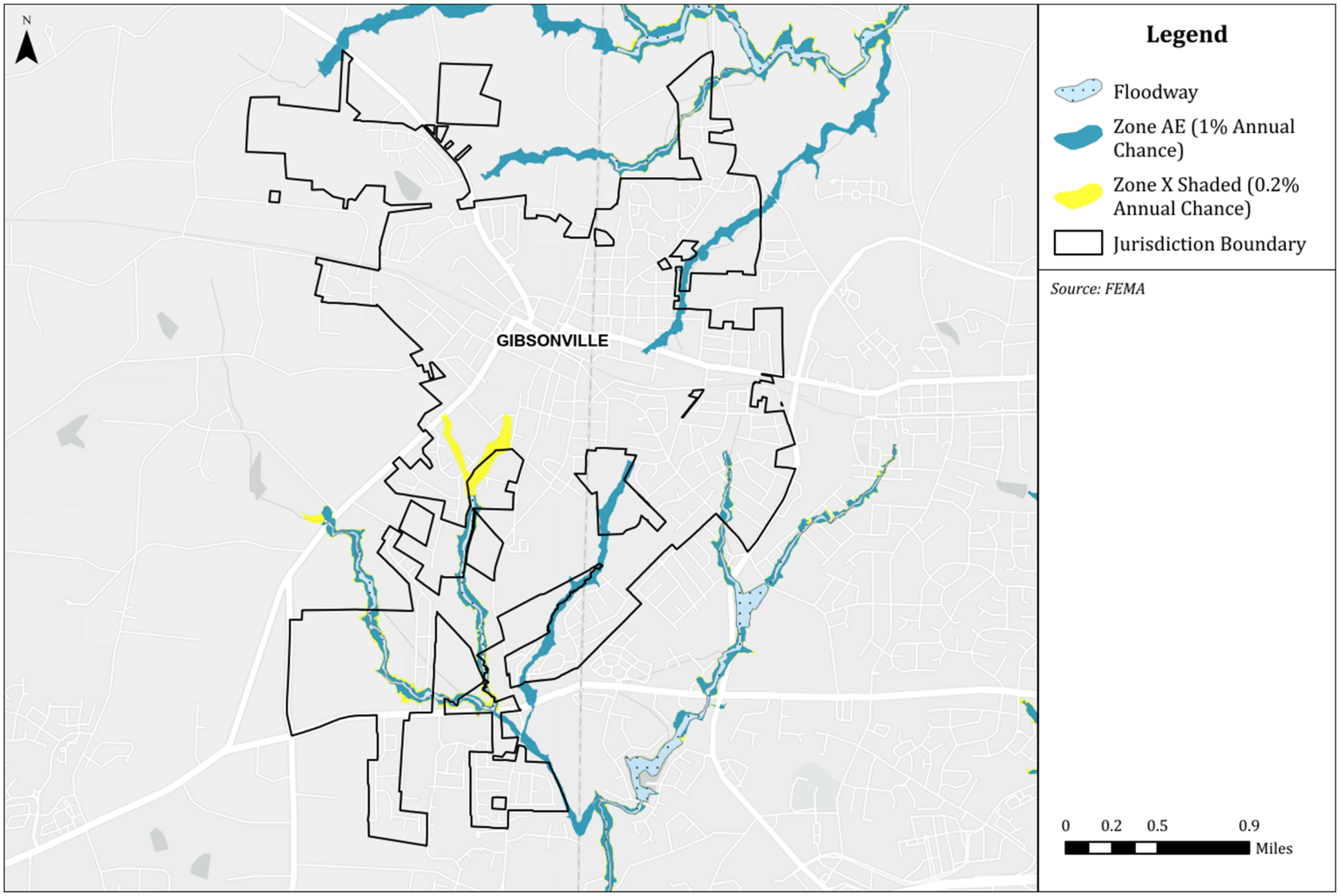
Spatial Extent: 2 – Small

FIGURE 4.35 – FEMA FLOOD HAZARD AREAS IN GUILFORD COUNTY



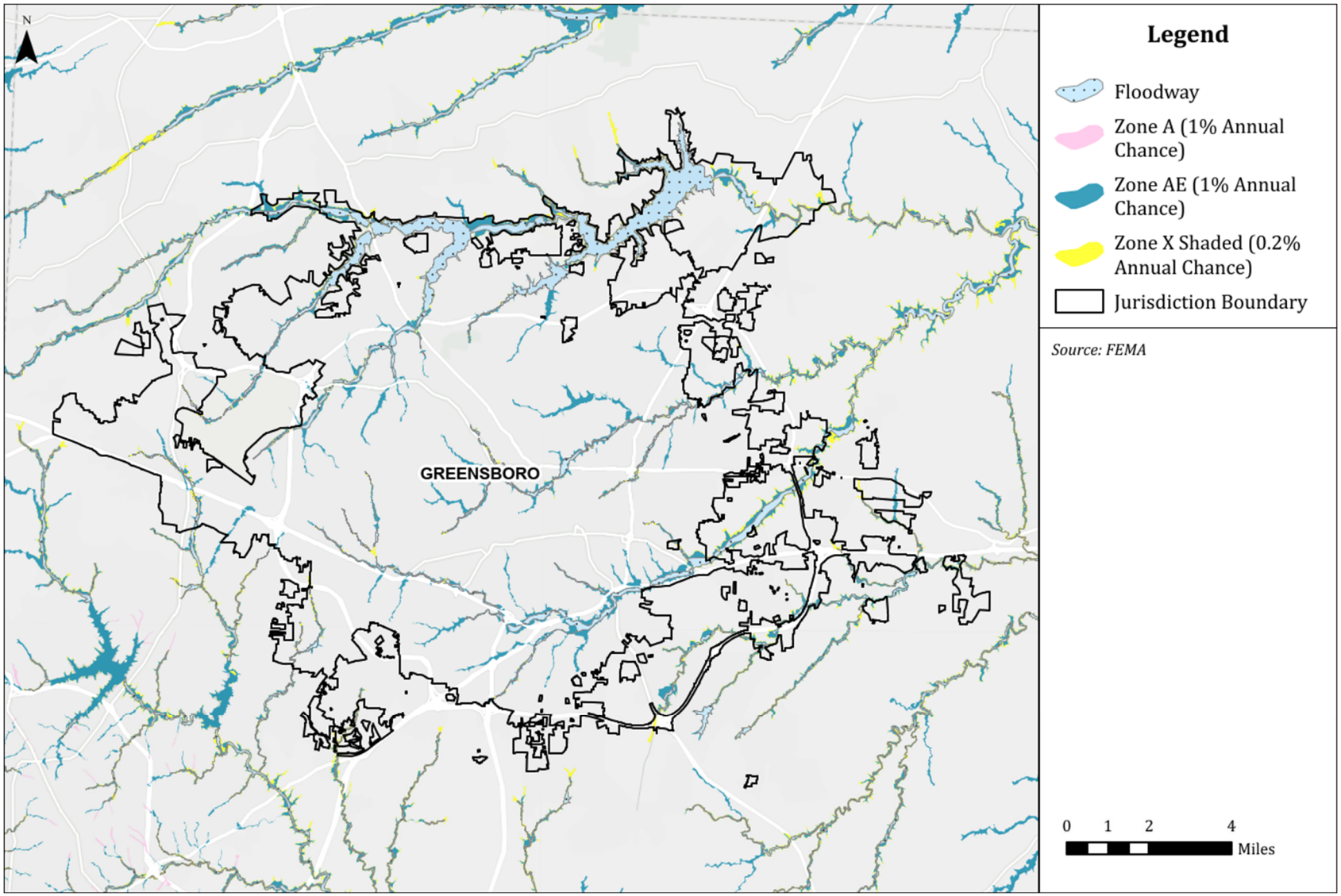
Source: FEMA Effective DFIRM

FIGURE 4.36 – FEMA FLOOD HAZARD AREAS, TOWN OF GIBSONVILLE



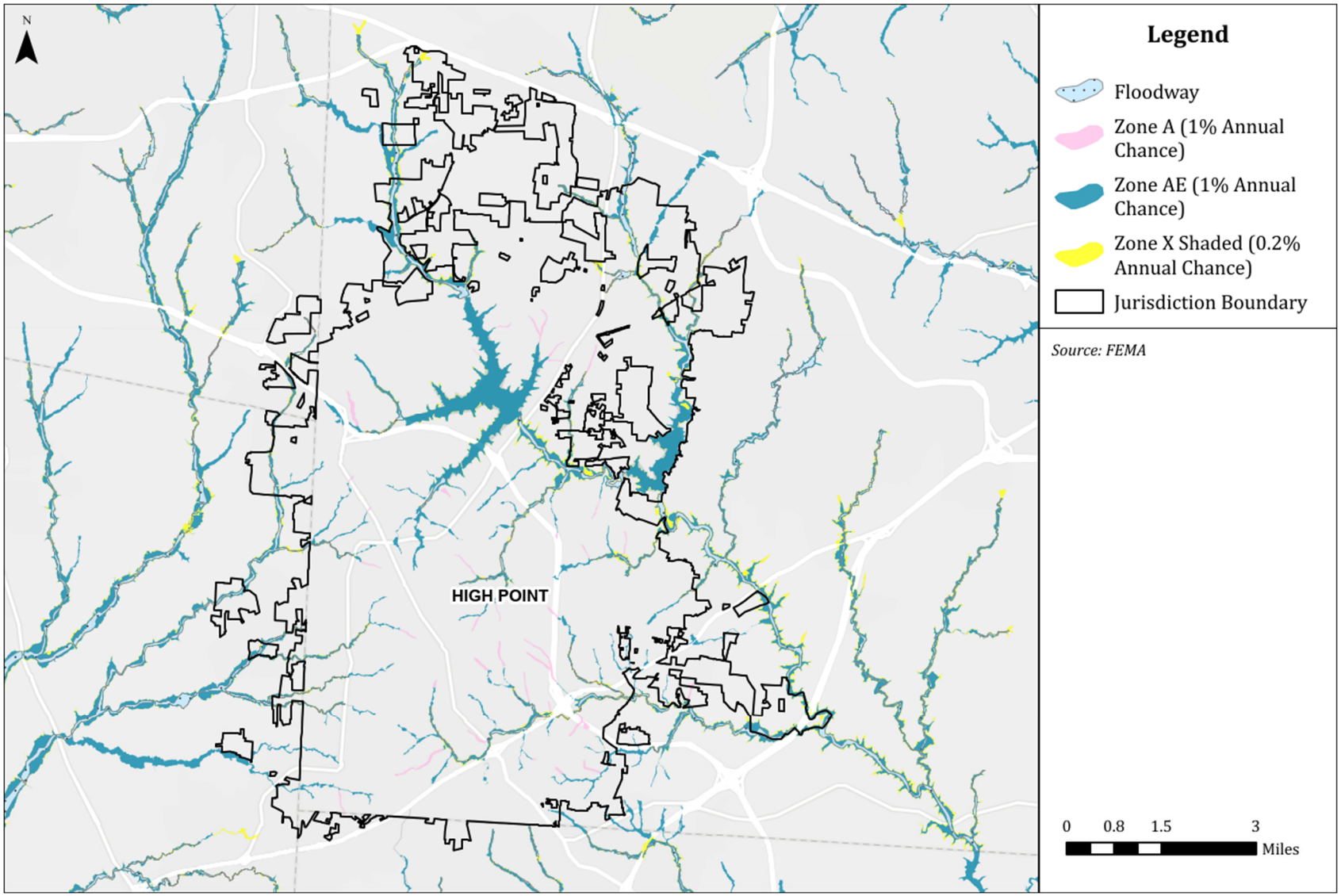
Source: FEMA Effective DFIRM

FIGURE 4.37 – FEMA FLOOD HAZARD AREAS, CITY OF GREENSBORO



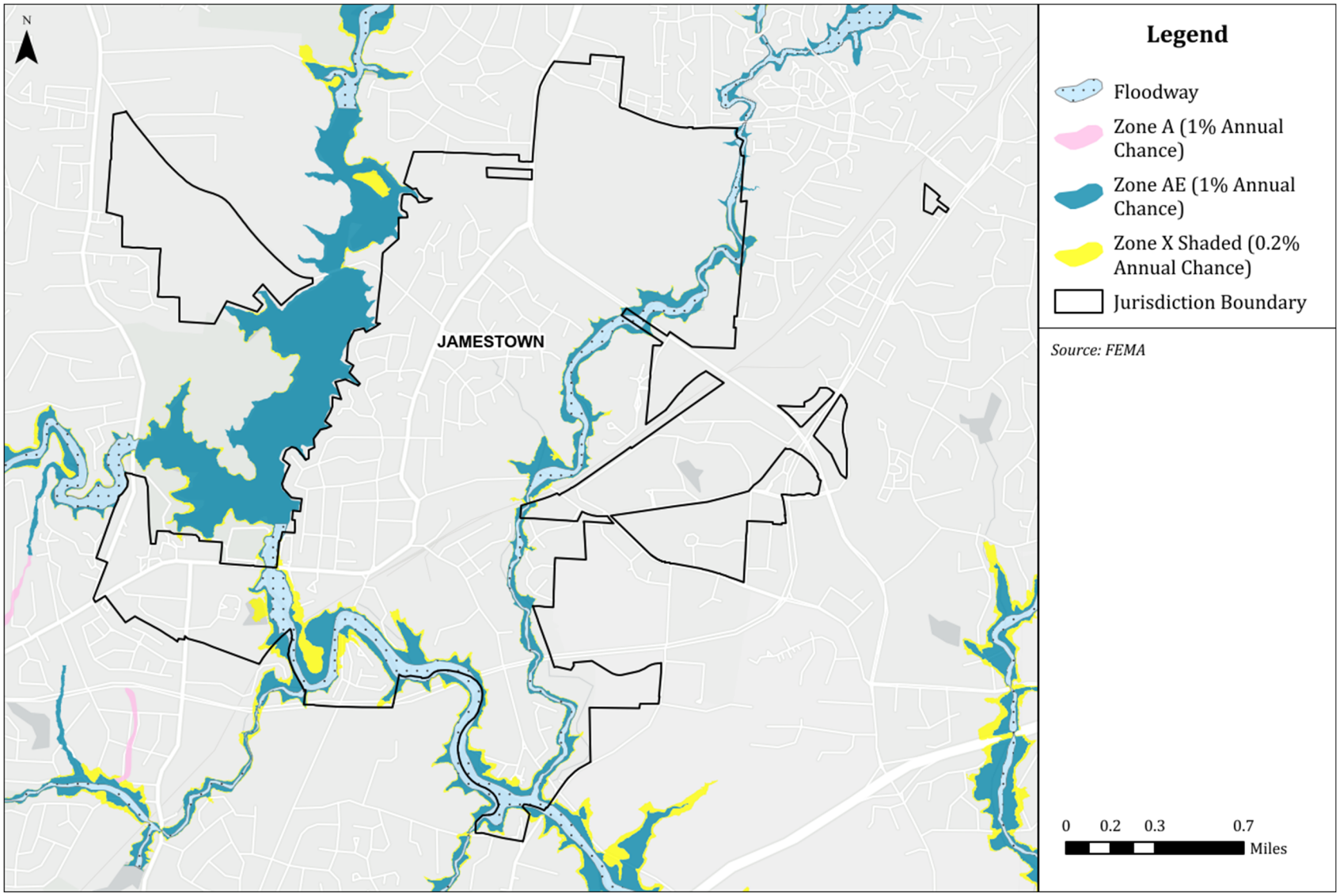
Source: FEMA Effective DFIRM

FIGURE 4.38 – FEMA FLOOD HAZARD AREAS, CITY OF HIGH POINT



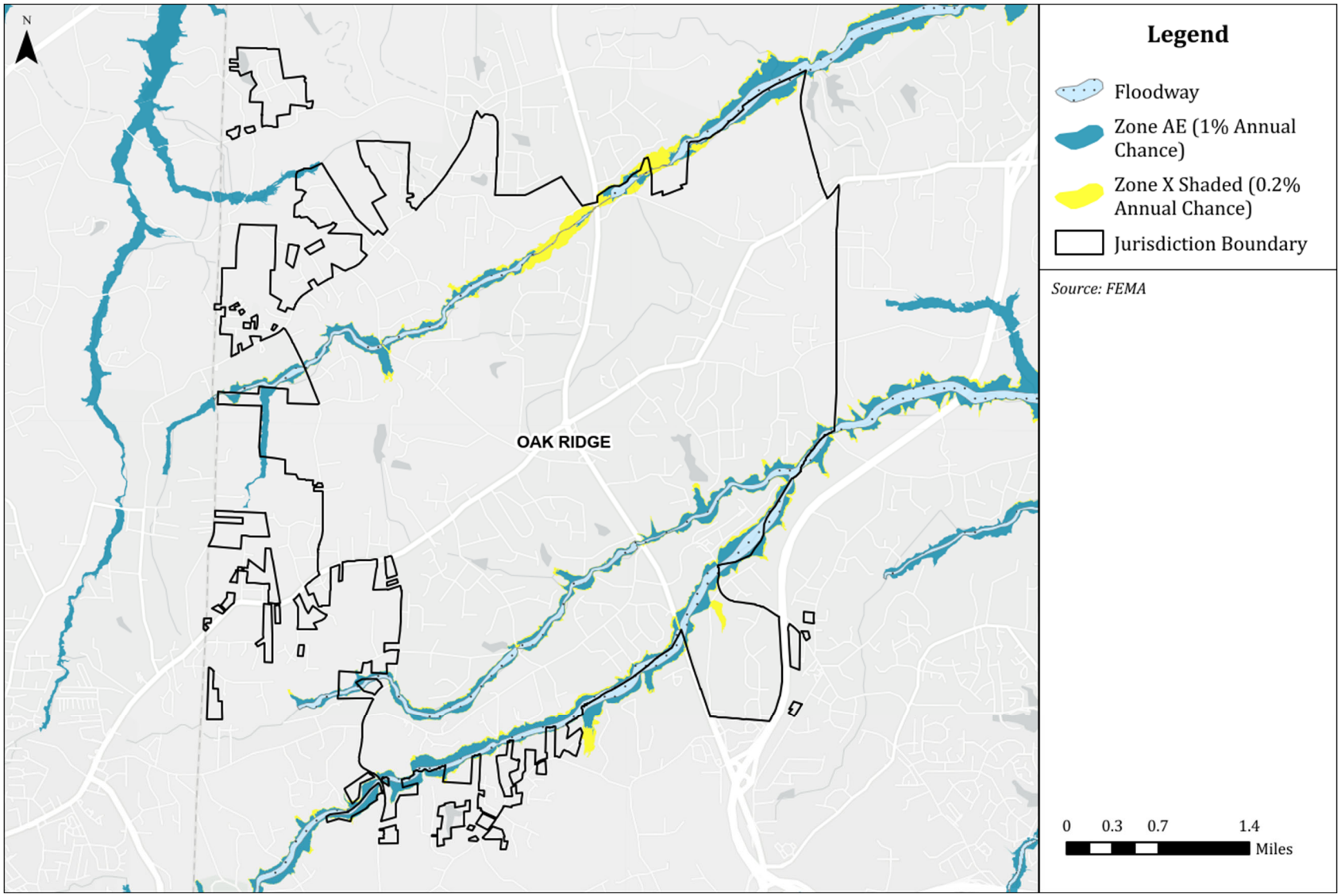
Source: FEMA Effective DFIRM

FIGURE 4.39 – FEMA FLOOD HAZARD AREAS, TOWN OF JAMESTOWN



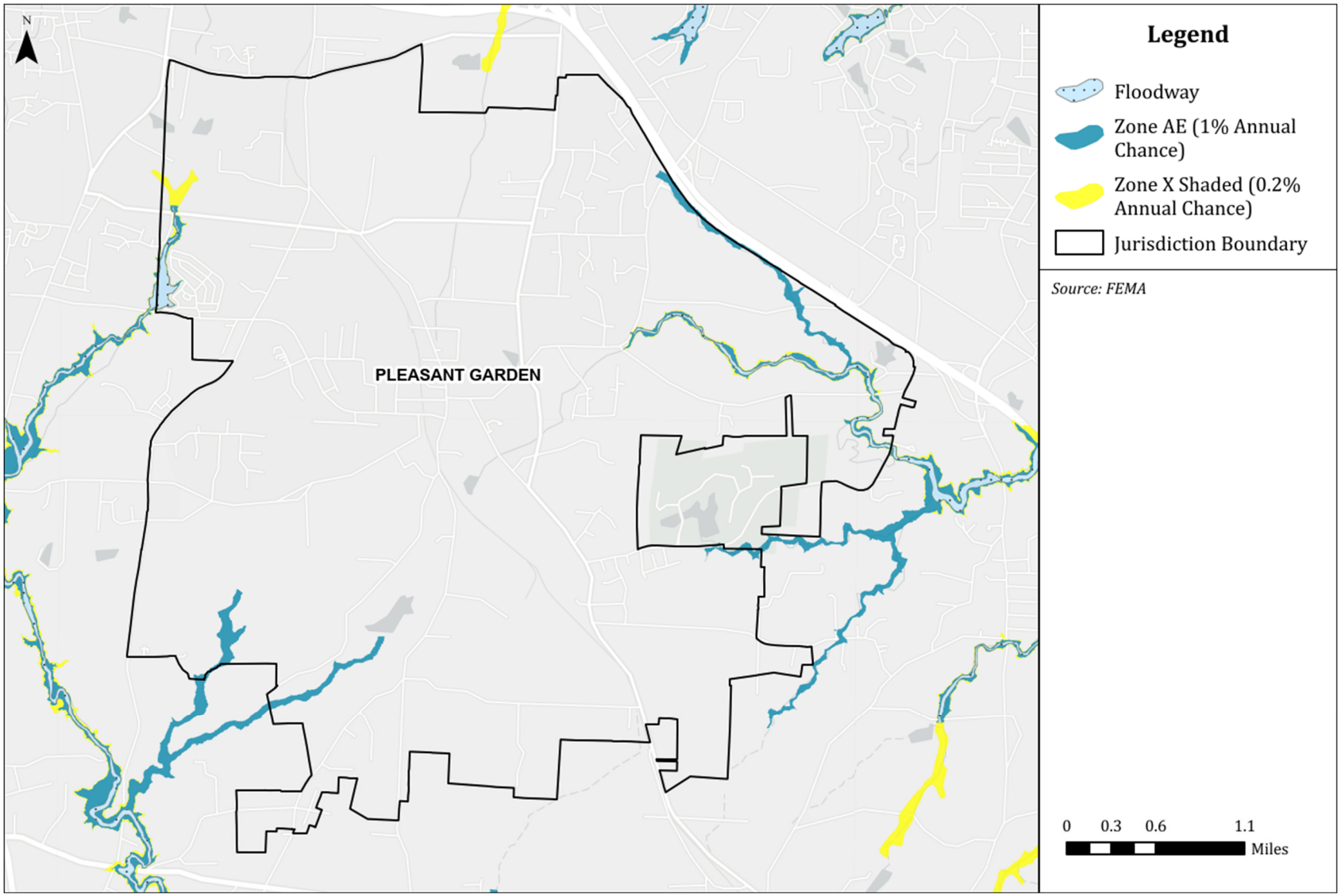
Source: FEMA Effective DFIRM

FIGURE 4.40 – FEMA FLOOD HAZARD AREAS, TOWN OF OAK RIDGE



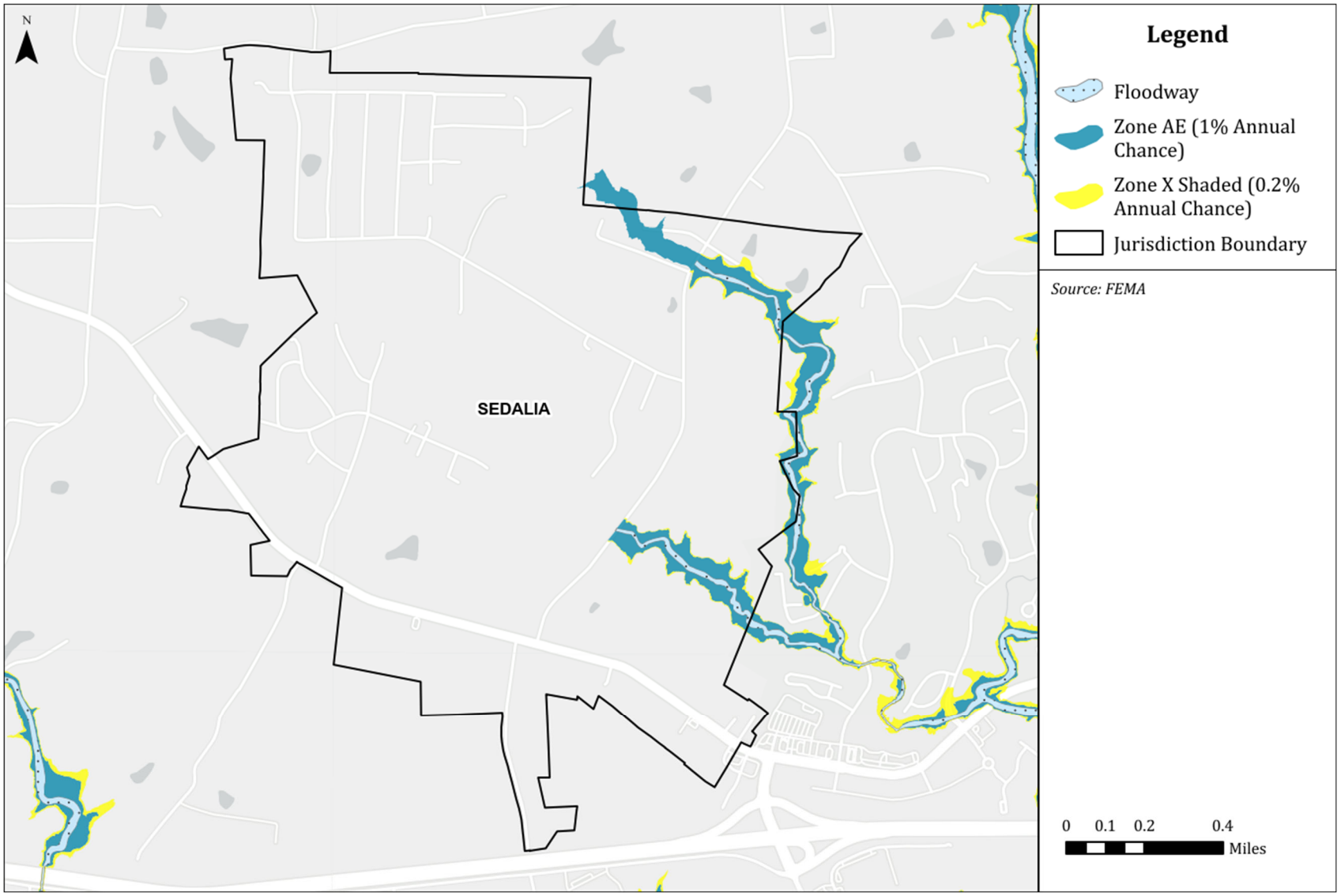
Source: FEMA Effective DFIRM

FIGURE 4.41 – FEMA FLOOD HAZARD AREAS, TOWN OF PLEASANT GARDEN



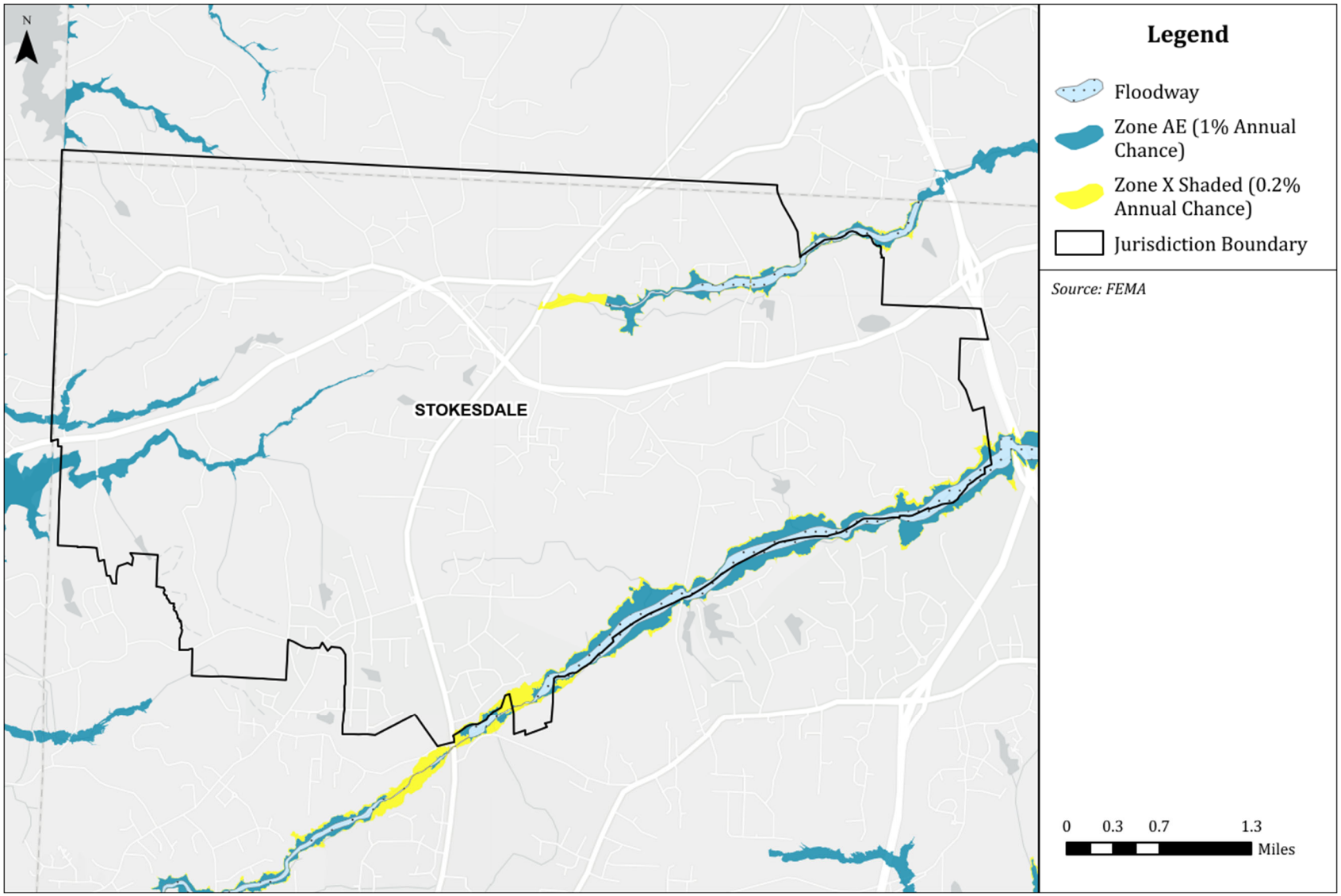
Source: FEMA Effective DFIRM

FIGURE 4.42 – FEMA FLOOD HAZARD AREAS, TOWN OF SEDALIA



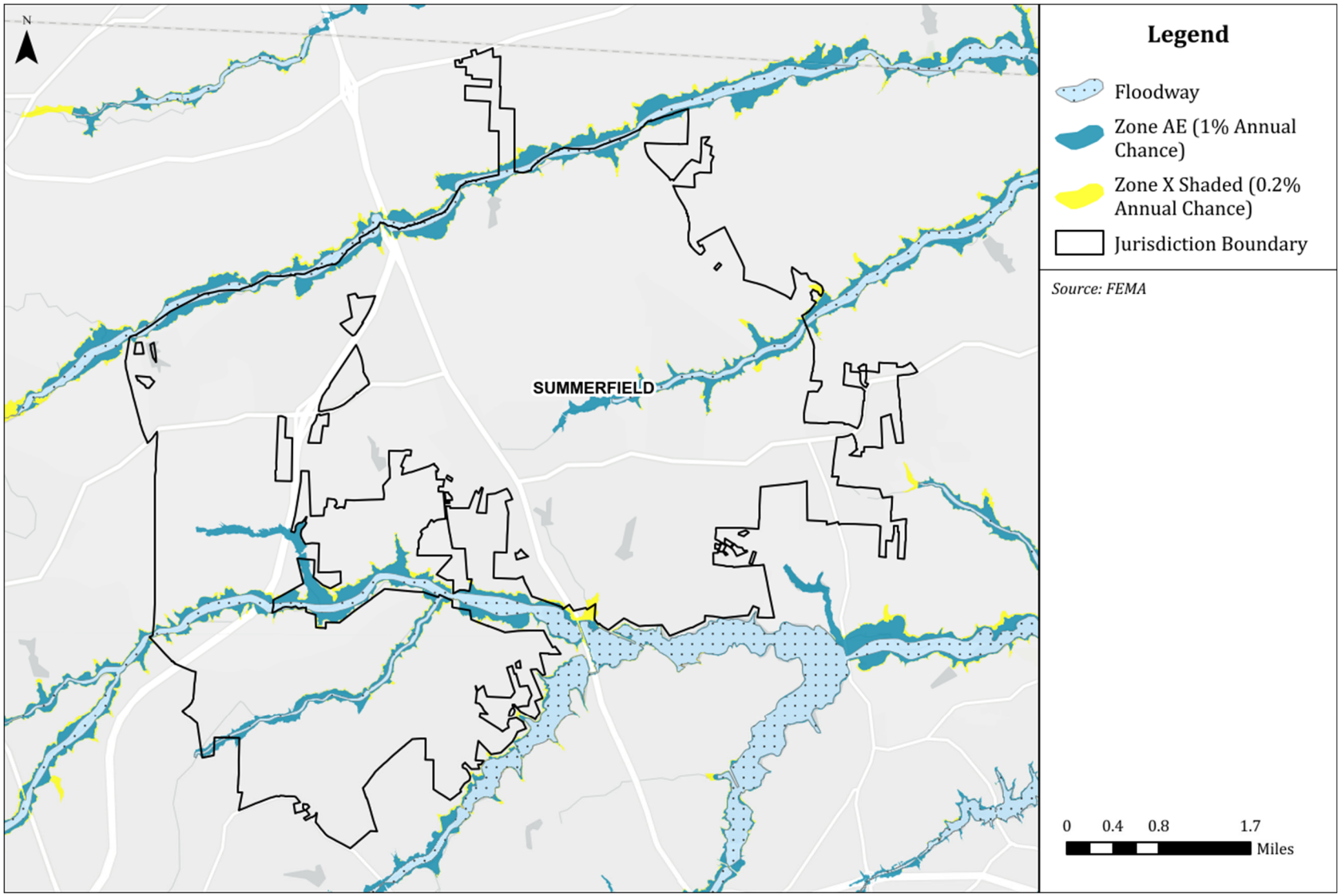
Source: FEMA Effective DFIRM

FIGURE 4.43 – FEMA FLOOD HAZARD AREAS, TOWN OF STOKESDALE



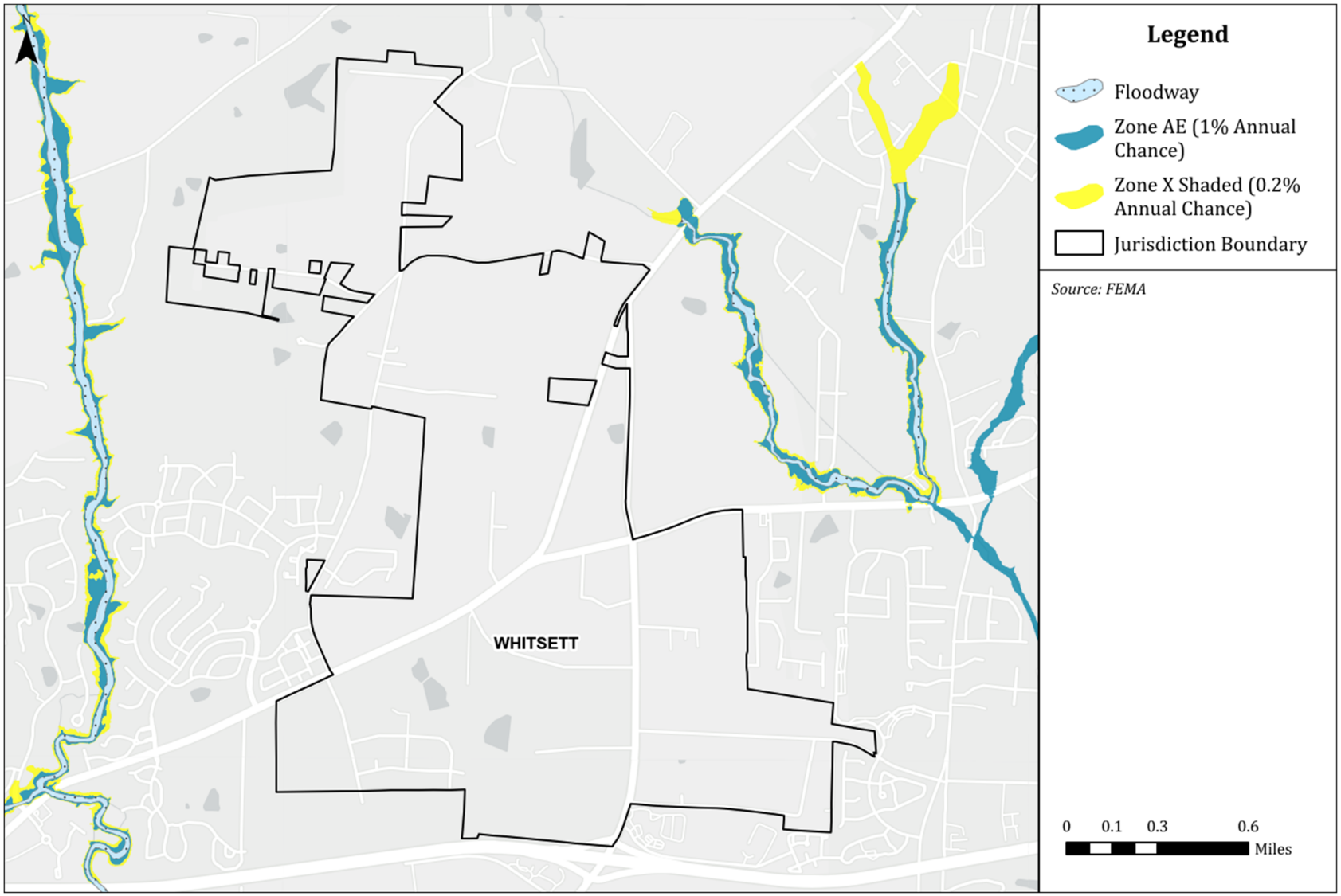
Source: FEMA Effective DFIRM

FIGURE 4.44 – FEMA FLOOD HAZARD AREAS, TOWN OF SUMMERFIELD



Source: FEMA Effective DFIRM

FIGURE 4.45 – FEMA FLOOD HAZARD AREAS, TOWN OF WHITSETT



Source: FEMA Effective DFIRM

EXTENT

Flood extent for riverine flooding can be defined by the amount of land in the floodplain and the potential magnitude of flooding as measured by flood depth and velocity.

The Flood Insurance Study (FIS) defines the probability of flooding as flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 100-year period (recurrence intervals). Or considered another way, properties within a 100-year flood zone have a one percent probability of being equaled or exceeded during any given year. Mortgage lenders require that owners of properties with federally backed mortgages located within SFHAs purchase and maintain flood insurance policies on their properties. Consequently, newer and recently purchased properties in the community are typically insured against flooding.

Table 4.31 summarizes the flood insurance zones identified by the Digital FIRM (DFIRM).

TABLE 4.31 – MAPPED FLOOD INSURANCE ZONES WITHIN GUILFORD COUNTY

Zone	Description
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
AE	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.
0.2% Annual Chance (shaded Zone X)	Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. (Zone X (shaded) is used on new and revised maps in place of Zone B.)

Over six percent of the county falls within the SFHA. Greensboro, Jamestown, and High Point all have more than 8 percent of their area in the SFHA. Table 4.32 below summarizes acreage of the county's total area by flood zone on the effective DFIRM.

TABLE 4.32 – FLOOD ZONE ACREAGE BY JURISDICTION IN GUILFORD COUNTY

Flood Zone	Acreage	Percent of Total (%)
Gibsonville		
Zone AE	92.7	3.2
Zone X (500-year)	28.1	1.0
Zone X Unshaded	2,755.4	95.8
Total	**2,876.2**	**100.0**
Greensboro		
Zone AE	8,547.3	9.5
Zone X (500-year)	433.3	0.5
Zone X Unshaded	80,725.2	90.0
Total	**89,705.8**	**100.0**
High Point		
Zone A	212.3	0.6

Flood Zone	Acreage	Percent of Total (%)
Zone AE	3,017.5	8.0
Zone X (500-year)	306.4	0.8
Zone X Unshaded	34,192.8	90.6
Total	**37,729.0**	**100.0**
Jamestown		
Zone AE	222.0	9.1
Zone X (500-year)	41.8	1.7
Zone X Unshaded	2,178.0	89.2
Total	**2,441.9**	**100.0**
Oak Ridge		
Zone AE	670.5	6.1
Zone X (500-year)	149.5	1.4
Zone X Unshaded	10,101.0	92.5
Total	**10,921.0**	**100.0**
Pleasant Garden		
Zone AE	171.9	1.8
Zone X (500-year)	29.3	0.3
Zone X Unshaded	9,577.2	97.9
Total	**9,778.4**	**100.0**
Sedalia		
Zone AE	38.6	3.0
Zone X (500-year)	4.5	0.3
Zone X Unshaded	1,243.5	96.7
Total	**1,286.5**	**100.0**
Stokesdale		
Zone AE	452.1	3.6
Zone X (500-year)	80.0	0.6
Zone X Unshaded	12,007.9	95.8
Total	**12,539.9**	**100.0**
Summerfield		
Zone AE	844.7	5.2
Zone X (500-year)	93.3	0.6
Zone X Unshaded	15,155.3	94.2
Total	**16,093.3**	**100.0**
Whitsett		
Zone X Unshaded	1,664.2	100.0
Total	**1,664.2**	**100.0**
Guilford County Unincorporated		
Zone A	3.0	0.0
Zone AE	12,174.8	5.1

Flood Zone	Acreage	Percent of Total (%)
Zone X (500-year)	2,159.5	0.9
Zone X Unshaded	224,960.4	94.0
Total	**239,297.7**	**100.0**
Guilford County		
Zone A	215.3	0.1
Zone AE	26,232.2	6.2
Zone X (500-year)	3,325.7	0.8
Zone X Unshaded	394,560.9	93.0
Total	**424,334.0**	**100.0**

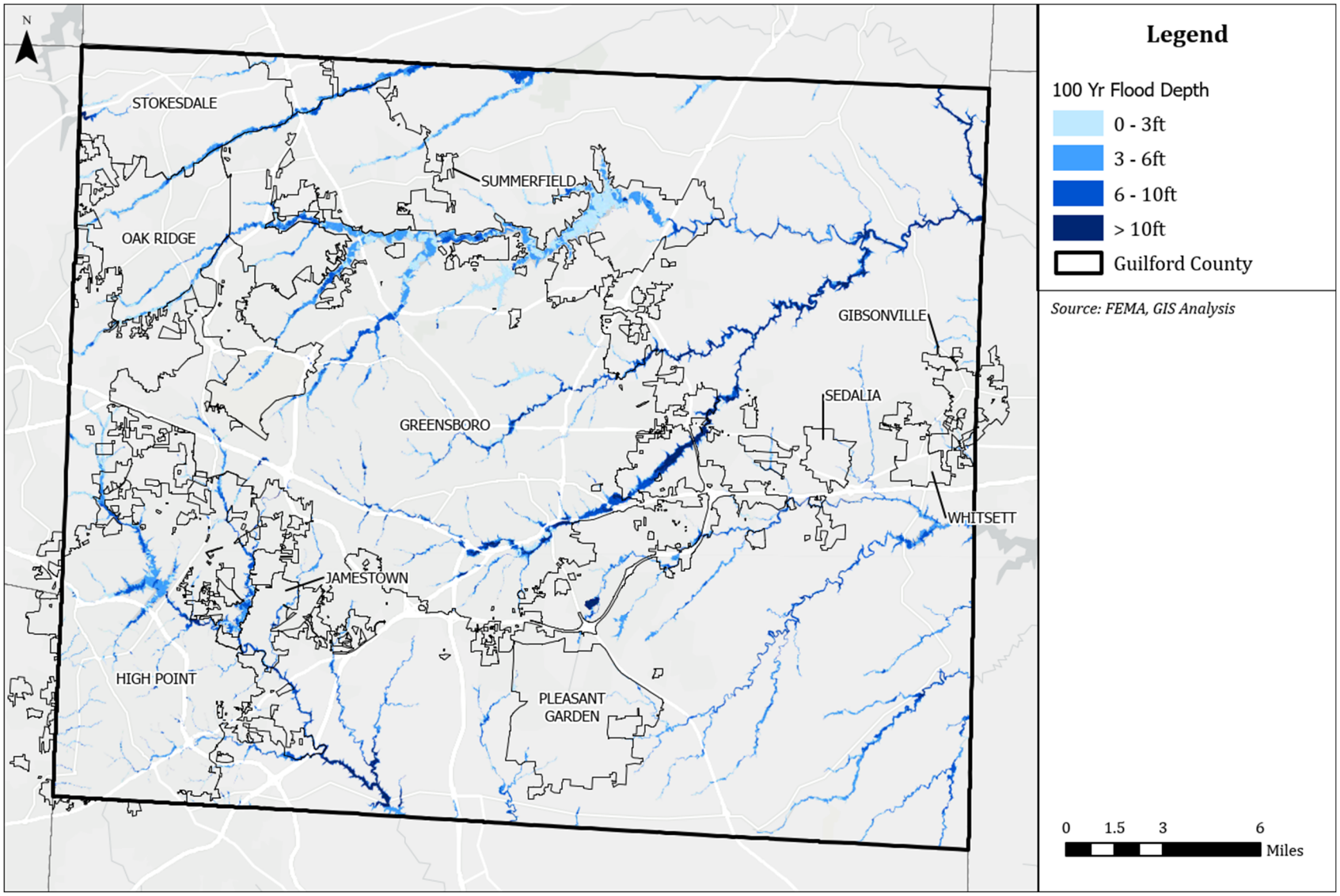
Source: FEMA Effective DFIRM; Guilford County Open Data

Property damages correlate to the depth of flooding that impacts a property. Data is not available to measure flood depth beyond the SFHA, but it is important to note that damaging floods can and do occur outside the SFHA.

Figure 4.46 through Figure 4.56 show the depth of flooding predicted to result from a 1% annual chance flood within Guilford County and participating jurisdictions.

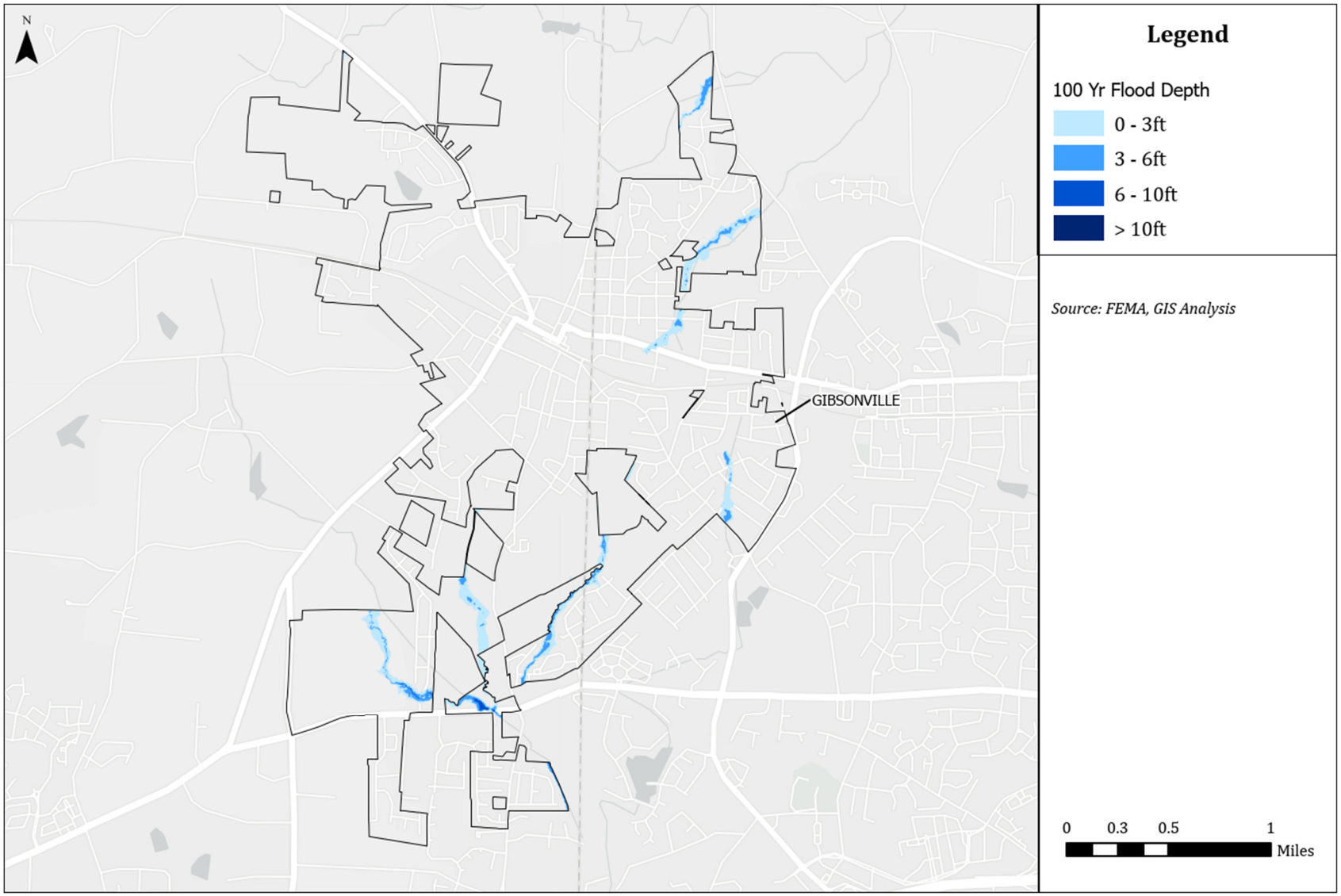
Impact: 3 – Critical

FIGURE 4.46 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, GUILFORD COUNTY



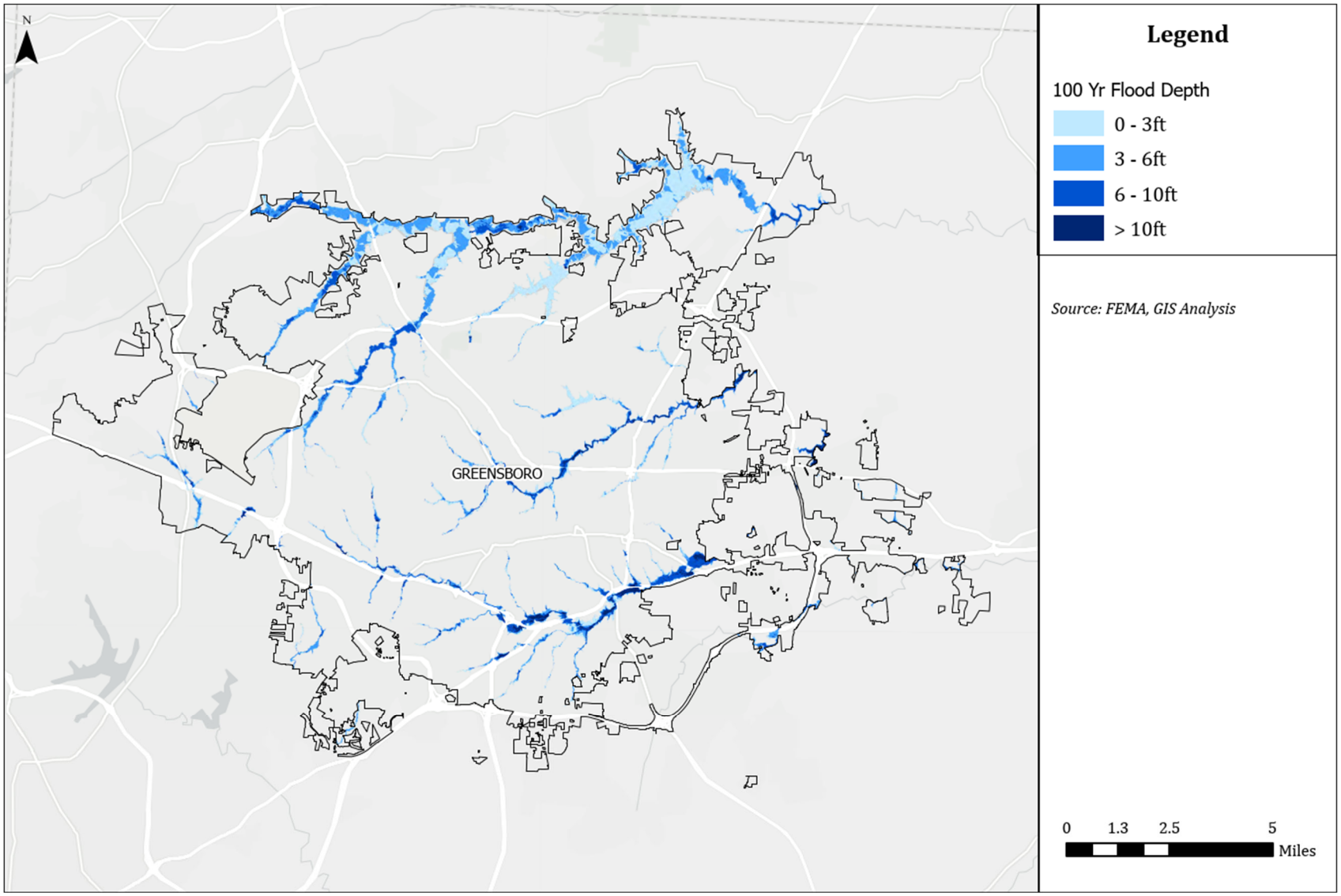
Source: FEMA Effective DFIRM

FIGURE 4.47 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF GIBSONVILLE



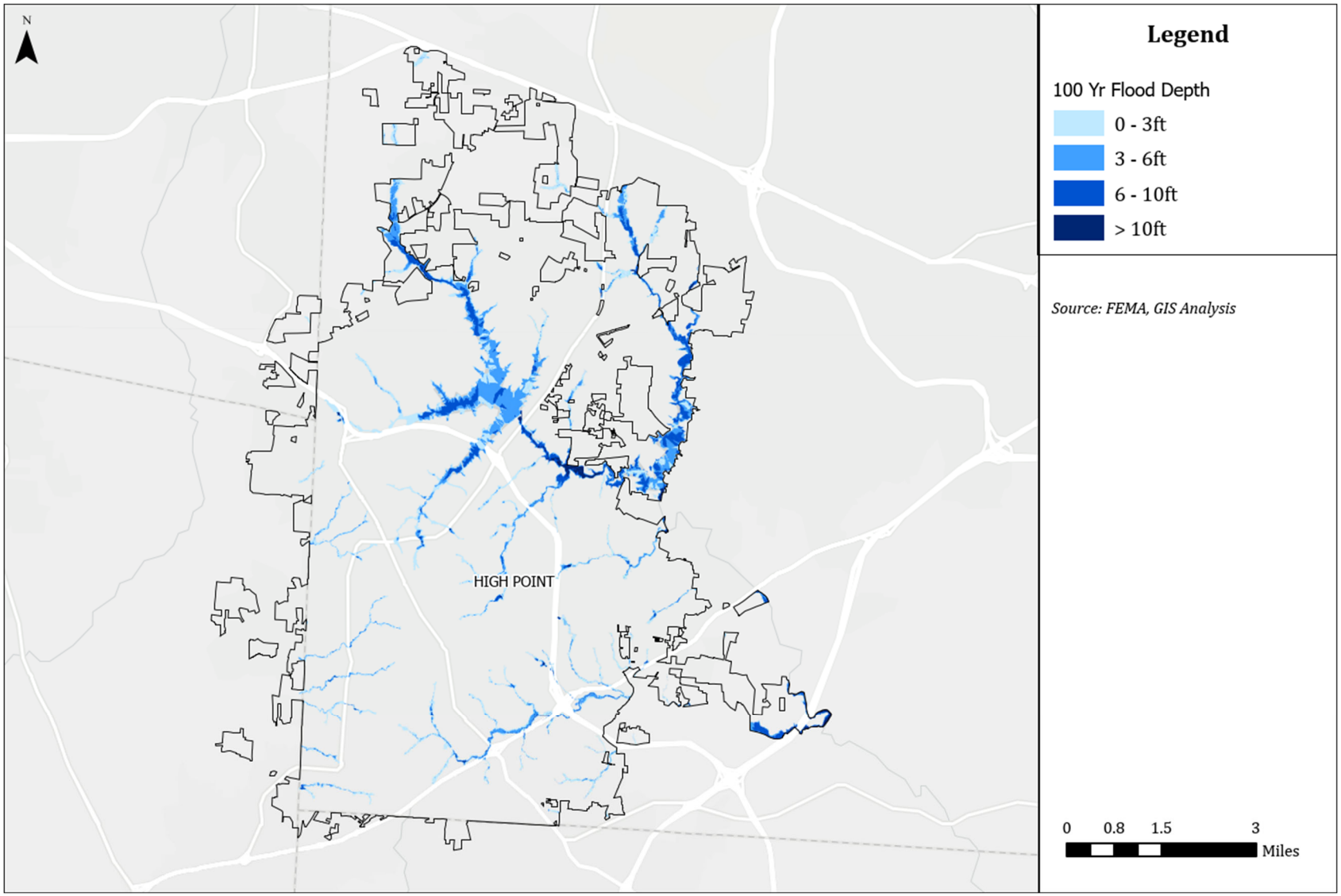
Source: FEMA Effective DFIRM

FIGURE 4.48 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, CITY OF GREENSBORO



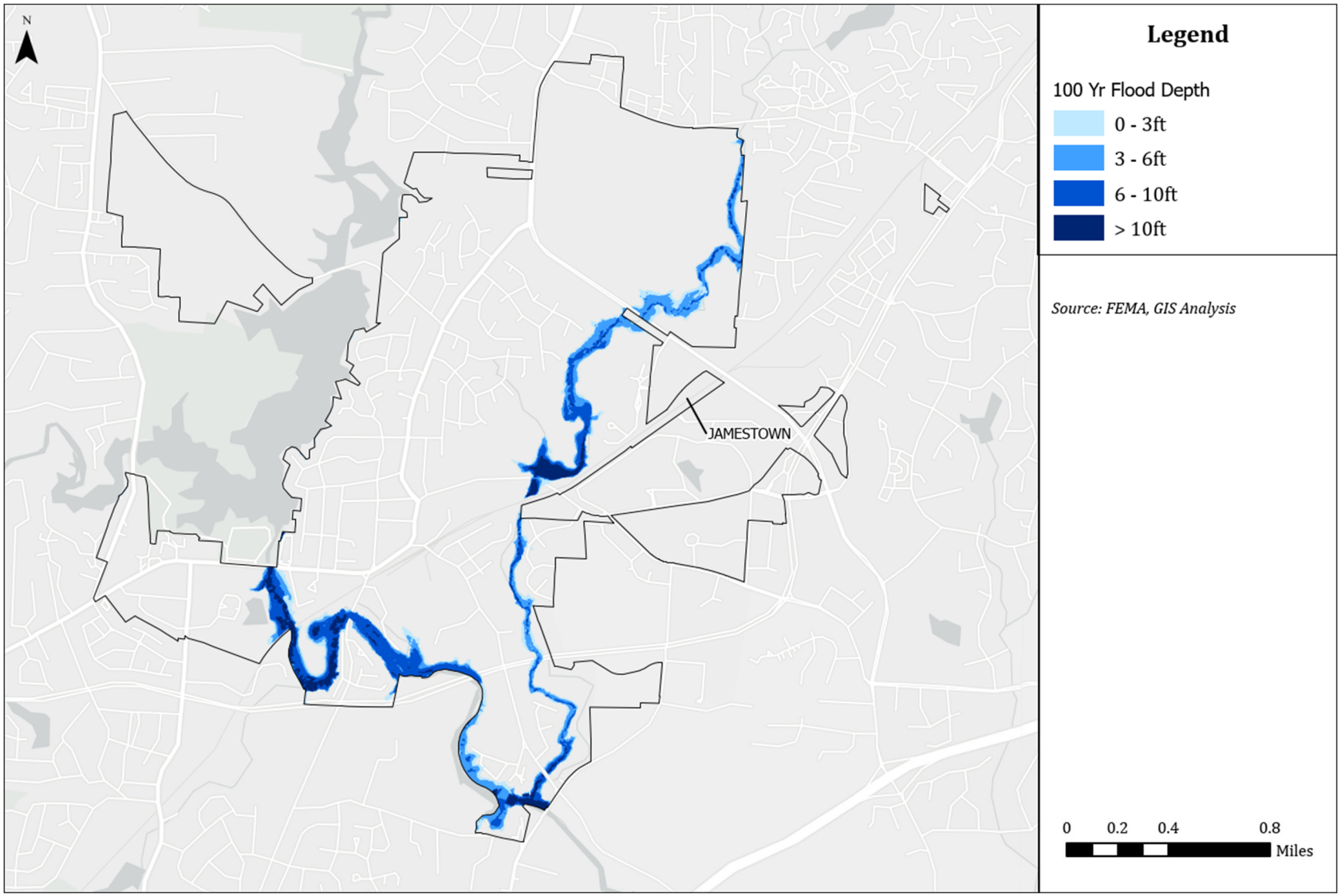
Source: FEMA Effective DFIRM

FIGURE 4.49 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, CITY OF HIGH POINT



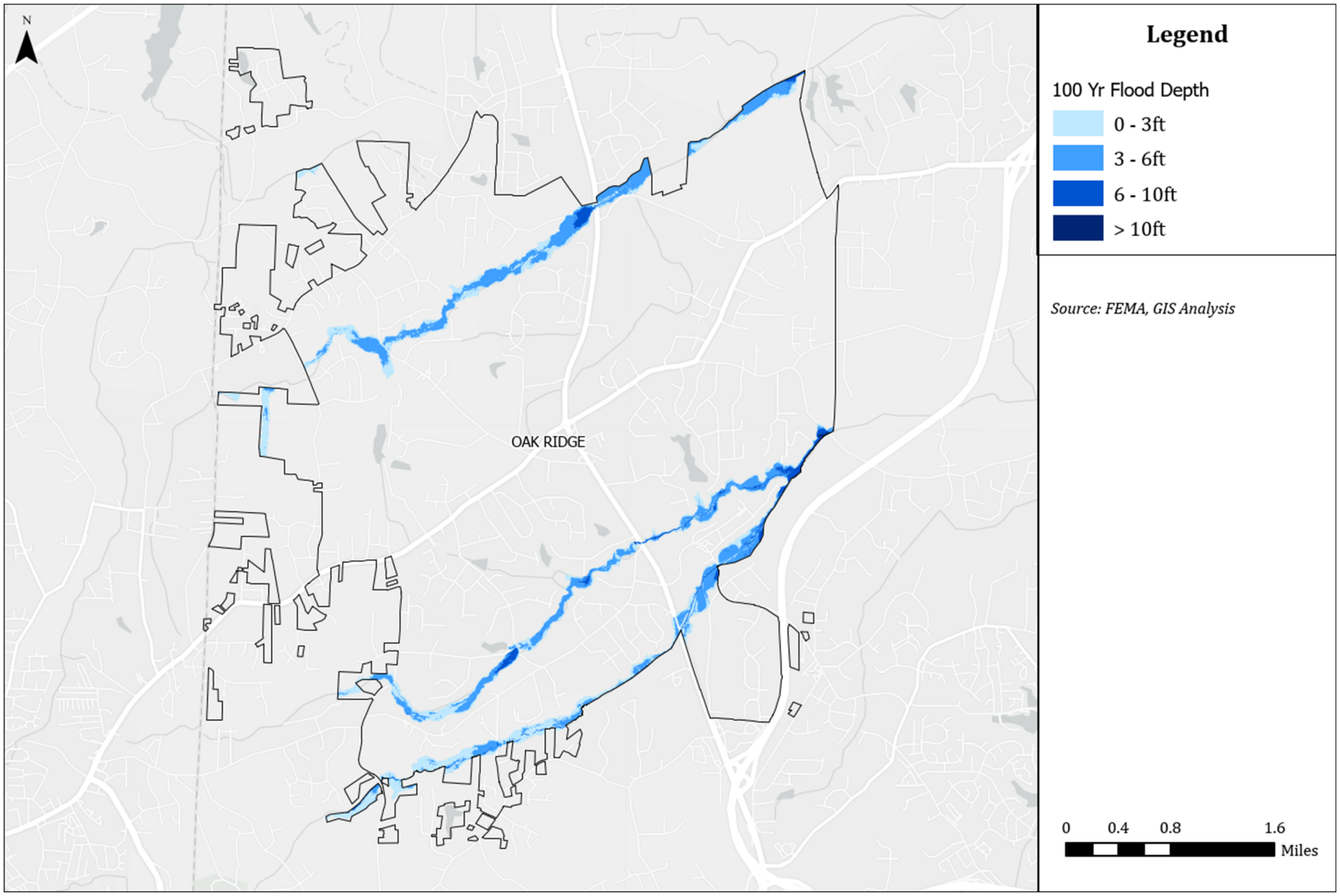
Source: FEMA Effective DFIRM

FIGURE 4.50 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF JAMESTOWN



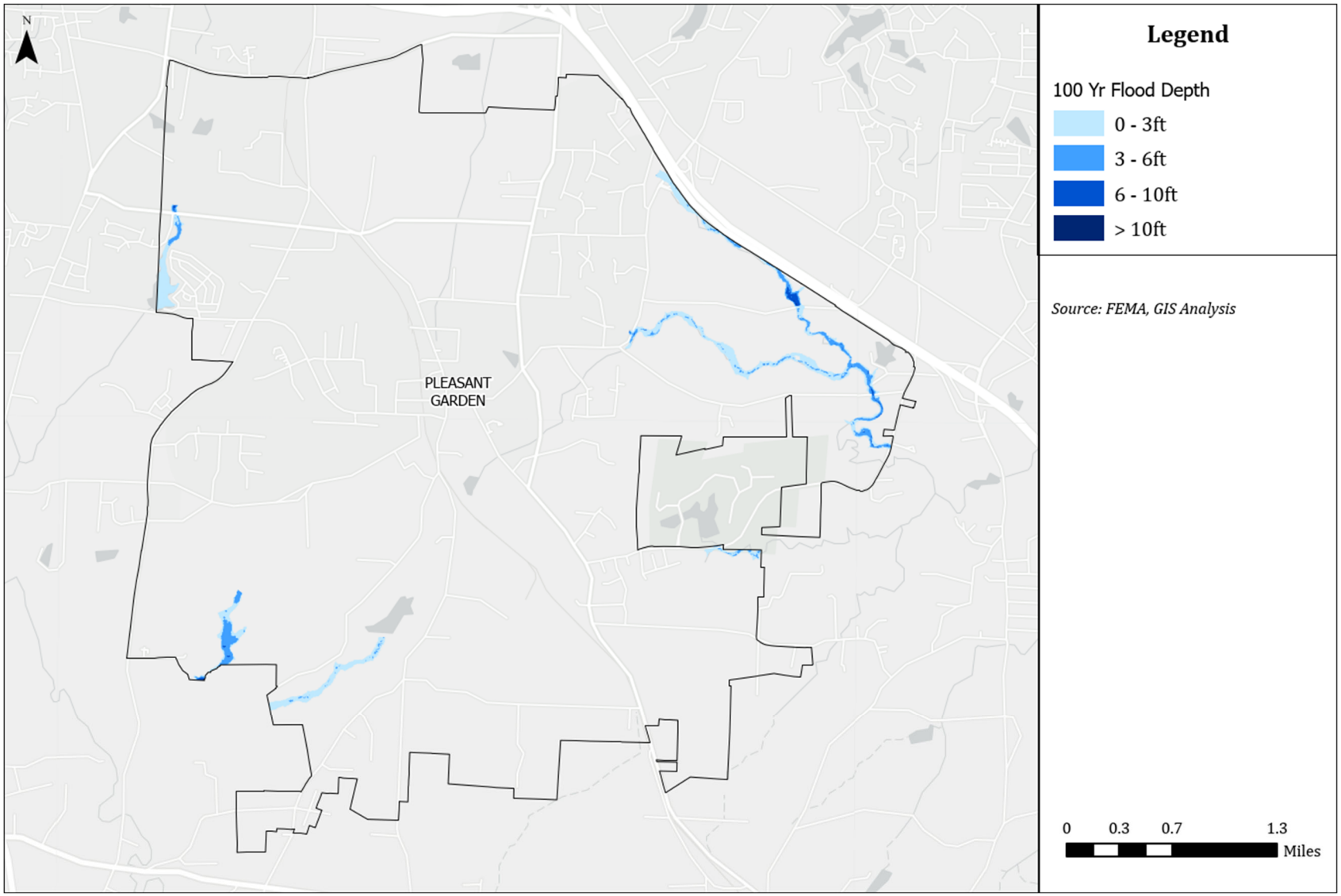
Source: FEMA Effective DFIRM

FIGURE 4.51 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF OAK RIDGE



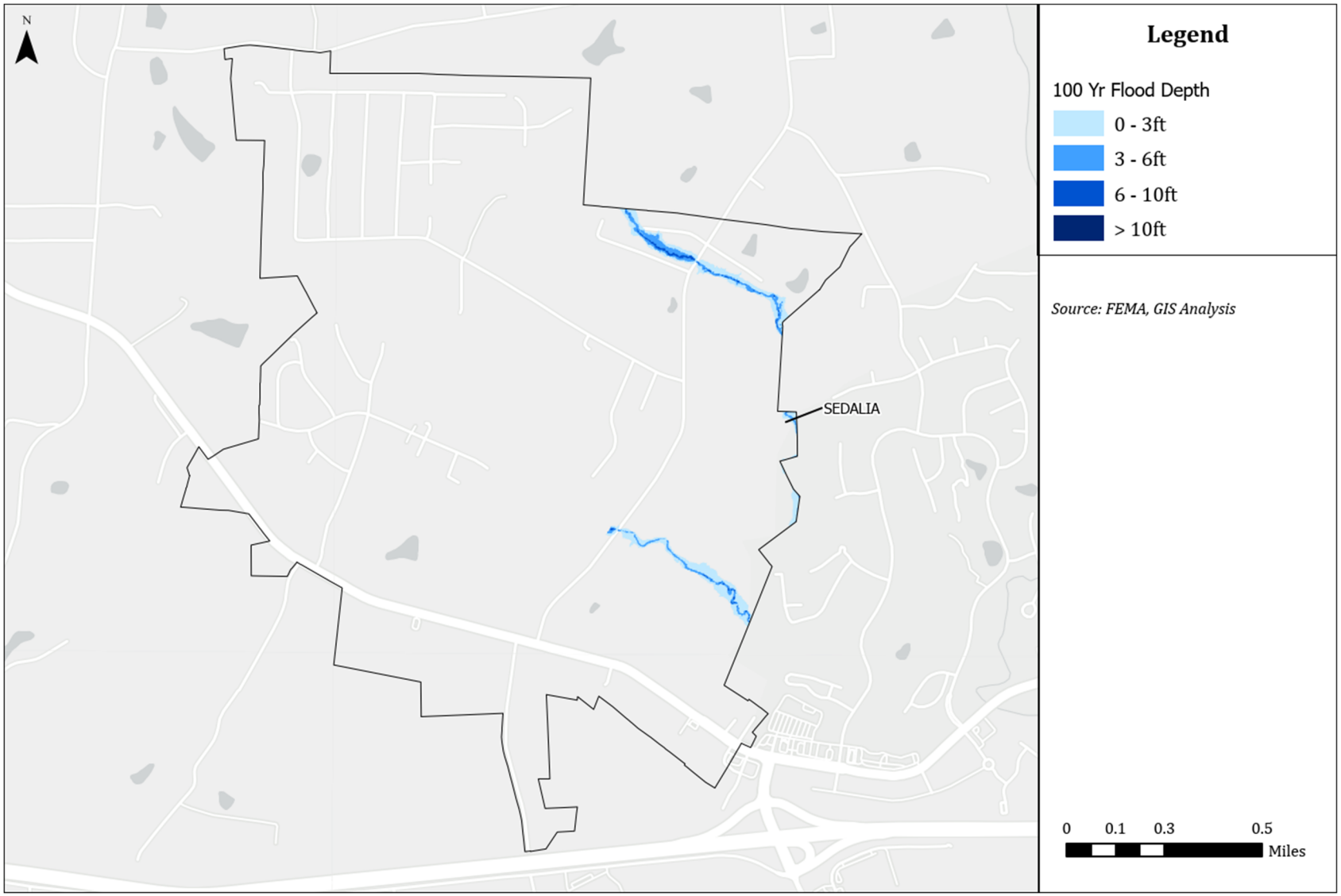
Source: FEMA Effective DFIRM

FIGURE 4.52 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF PLEASANT GARDEN



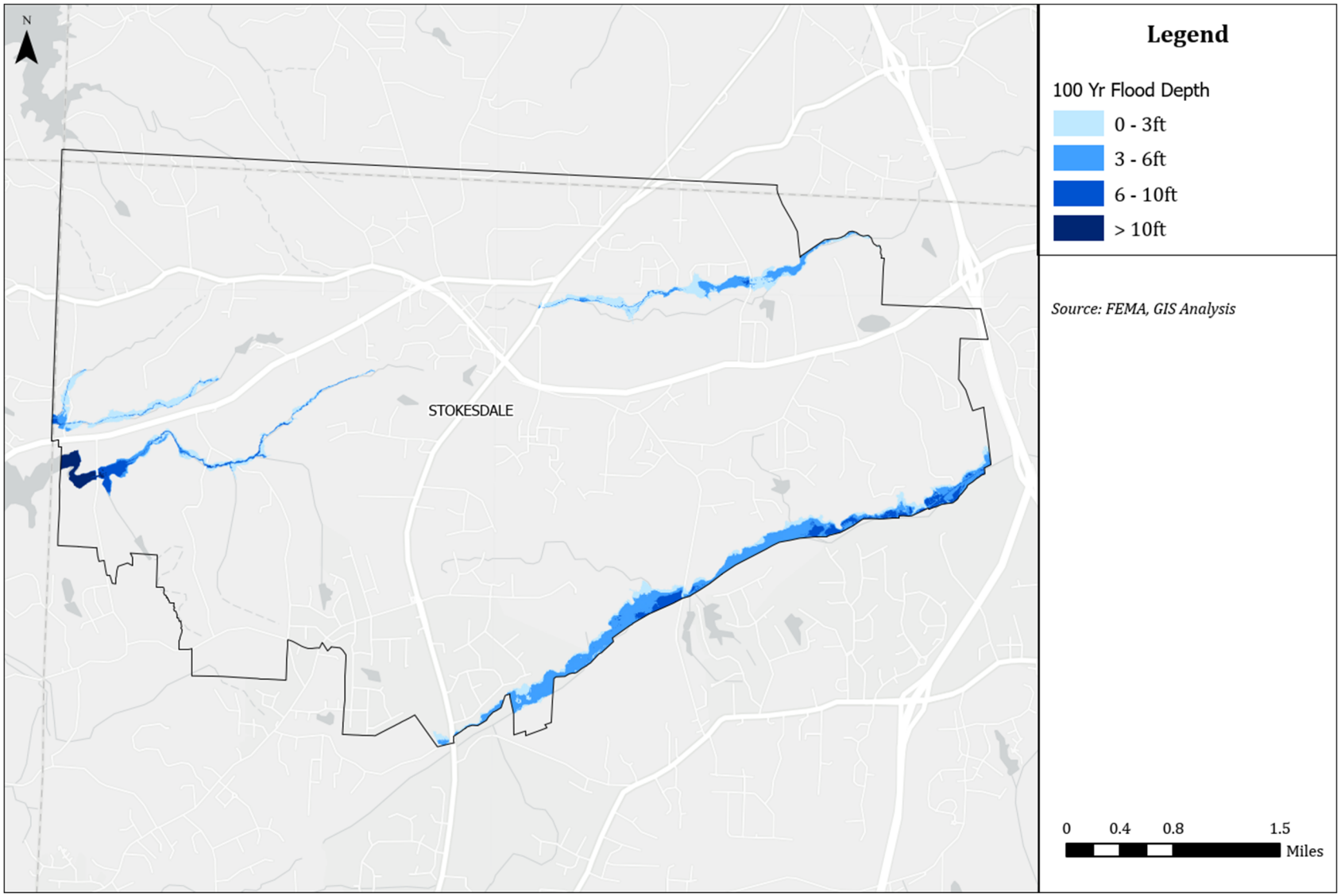
Source: FEMA Effective DFIRM

FIGURE 4.53 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF SEDALIA



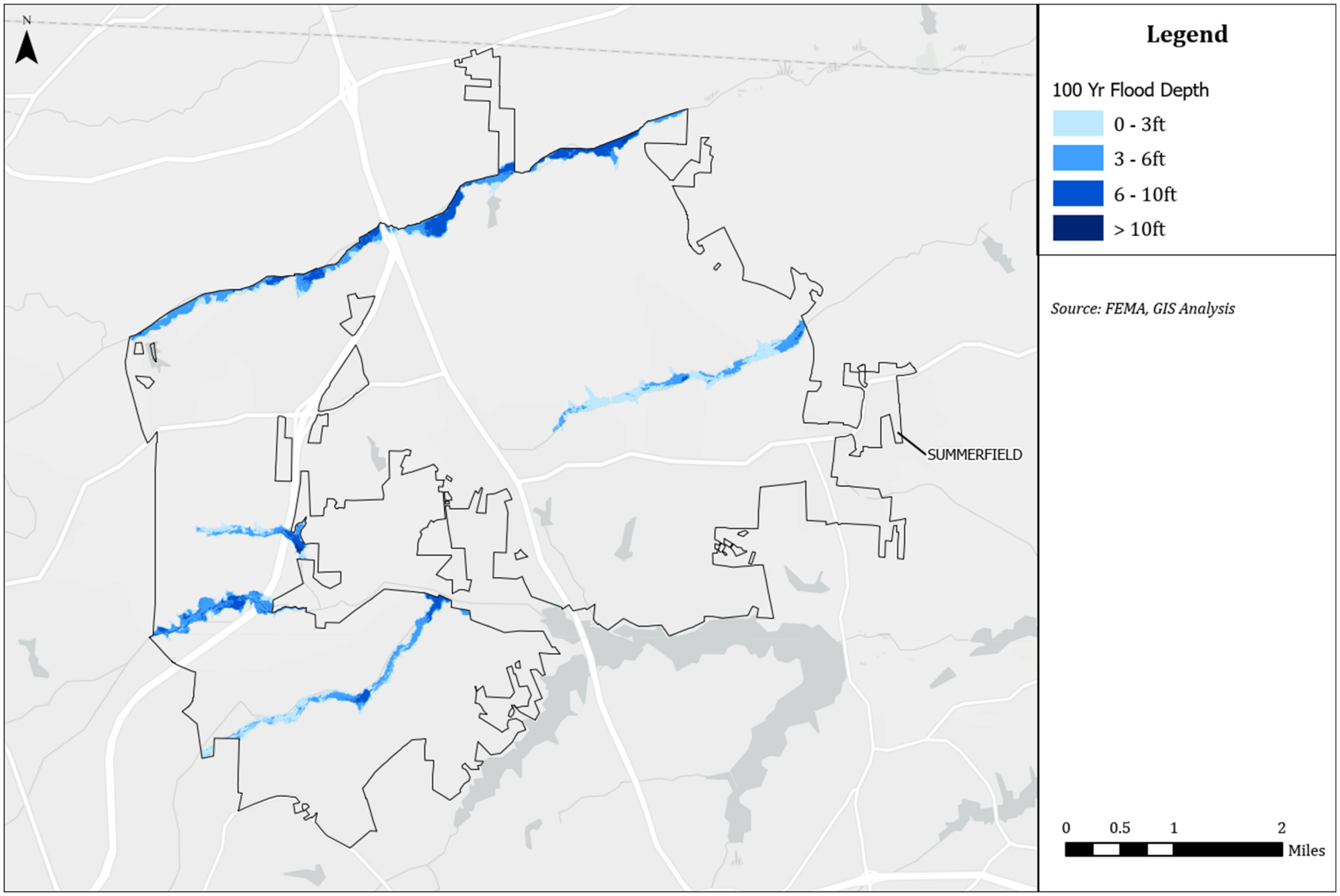
Source: FEMA Effective DFIRM

FIGURE 4.54 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF STOKESDALE



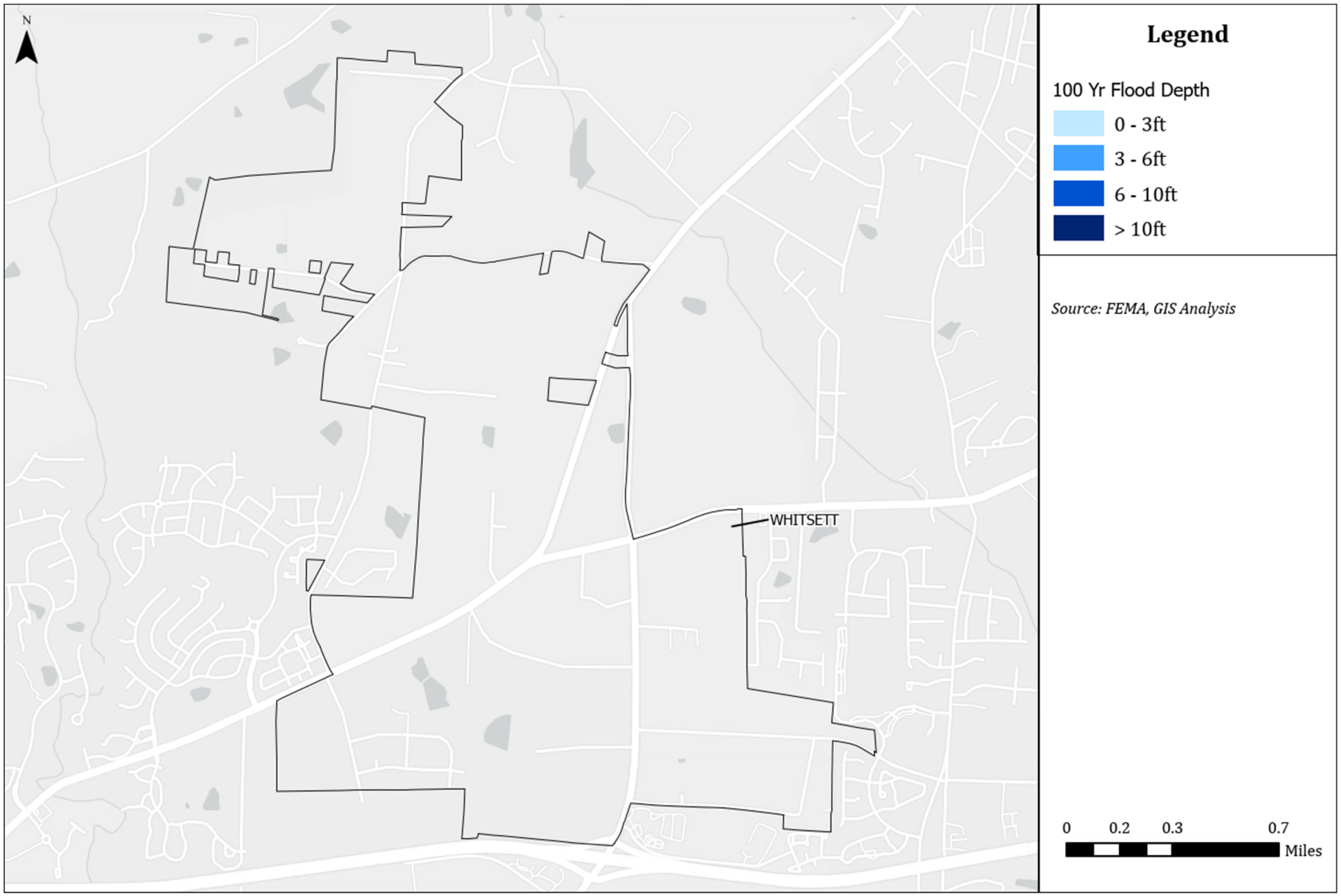
Source: FEMA Effective DFIRM

FIGURE 4.55 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF SUMMERFIELD



Source: FEMA Effective DFIRM

FIGURE 4.56 – FLOOD DEPTH, 100-YEAR FLOODPLAIN, TOWN OF WHITSETT



Source: FEMA Effective DFIRM

HISTORICAL OCCURRENCES

Flood and flash flood statistics for the Guilford County region were pulled from the NCEI. Table 4.33 details the 126 historical occurrences of flooding events identified from 1999 through 2024 by the NCEI Storm Events database. It should be noted that only those historical occurrences listed in the NCEI database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

TABLE 4.33 – NCEI RECORDS OF FLASH FLOODING, 1999-2024

Location	Date	Type	Deaths	Injuries	Property Damage	Crop Damage
Guilford (Zone)	3/20/2003	Flood	0	0	0	0
Guilford (Zone)	4/10/2003	Flood	0	0	0	0
(GSO)GREENSBORO RGNL	8/27/2008	Flash Flood	0	0	$30,000	0
(GSO)GREENSBORO RGNL	6/12/2019	Flash Flood	0	0	0	0
(GSO)GREENSBORO RGNL	8/13/2020	Flash Flood	0	0	0	0
(GSO)GREENSBORO RGNL	9/12/2023	Flash Flood	0	0	0	0
(GSO)GREENSBORO RGNL	8/9/2024	Flash Flood	0	0	$10,000	0
BATTLE GROUND	6/22/2012	Flash Flood	0	0	0	0
BATTLE GROUND	8/5/2016	Flash Flood	0	0	0	0
BATTLE GROUND	8/9/2024	Flash Flood	0	0	$10,000	0
BESSEMER	6/11/2011	Flash Flood	0	0	0	0
BESSEMER	6/11/2011	Flash Flood	0	0	0	0
BESSEMER	7/8/2011	Flash Flood	0	0	0	0
BESSEMER	9/6/2011	Flash Flood	0	0	0	0
BESSEMER	6/8/2019	Flash Flood	0	0	0	0
BESSEMER	9/12/2023	Flash Flood	0	0	0	0
BROADVIEW	6/25/2013	Flash Flood	0	0	0	0
BROADVIEW	7/21/2013	Flash Flood	0	0	$20,000	0
BROADVIEW	9/1/2018	Flash Flood	0	0	0	0
CLIMAX	8/4/2003	Flash Flood	0	0	0	0
DEEP RIVER	9/30/2010	Flash Flood	0	0	0	0
DEEP RIVER	8/2/2018	Flash Flood	0	0	$50,000	0
DEEP RIVER	5/21/2020	Flash Flood	0	0	0	0
DEEP RIVER	7/16/2022	Flash Flood	0	0	0	0
FOUR MILE	9/30/2010	Flash Flood	0	0	0	0
FOUR MILE	11/12/2020	Flash Flood	0	0	0	0
GREENSBORO	6/19/2000	Flash Flood	0	0	0	0
GREENSBORO	8/27/2000	Flash Flood	0	0	0	0
GREENSBORO	8/28/2000	Flash Flood	0	0	0	0
GREENSBORO	9/1/2000	Flash Flood	0	0	0	0
GREENSBORO	7/4/2001	Flash Flood	0	0	0	0
GREENSBORO	8/17/2003	Flash Flood	0	0	$12,000	0
GREENSBORO	8/31/2003	Flash Flood	0	0	0	0
GREENSBORO	9/23/2003	Flash Flood	0	0	0	0
GREENSBORO	7/17/2004	Flash Flood	0	0	0	0
GREENSBORO	9/8/2004	Flash Flood	0	0	0	0

Location	Date	Type	Deaths	Injuries	Property Damage	Crop Damage
GREENSBORO	9/27/2004	Flash Flood	0	0	0	0
GREENSBORO	12/10/2004	Flash Flood	0	0	0	0
GREENSBORO	6/14/2006	Flash Flood	0	0	0	0
GREENSBORO	8/30/2006	Flash Flood	0	0	0	0
GREENSBORO	4/15/2007	Flash Flood	0	0	0	0
GREENSBORO	6/27/2007	Flash Flood	0	0	0	0
GREENSBORO	6/27/2007	Flash Flood	0	0	0	0
GREENSBORO	6/27/2007	Flash Flood	0	0	0	0
GREENSBORO	6/3/2009	Flash Flood	1	0	$2,000,000	0
GREENSBORO	11/12/2009	Flash Flood	0	0	0	0
GREENSBORO	1/25/2010	Flash Flood	0	0	0	0
GREENSBORO	7/13/2010	Flash Flood	0	0	0	0
GREENSBORO	8/11/2010	Flash Flood	0	0	0	0
GREENSBORO	5/21/2016	Flash Flood	0	0	0	0
GREENSBORO	6/8/2019	Flash Flood	0	0	0	0
GREENSBORO	7/31/2019	Flash Flood	0	0	0	0
GREENSBORO	8/19/2019	Flash Flood	0	0	$10,000	0
GREENSBORO	8/24/2023	Flash Flood	0	0	0	0
GREENSBORO	9/12/2023	Flash Flood	0	0	0	0
GREENSBORO	1/9/2024	Flash Flood	0	0	0	0
GREENSBORO	1/9/2024	Flash Flood	0	0	$100,000	0
GREENSBORO	1/9/2024	Flash Flood	0	0	$10,000	0
GREENSBORO MAY ARPT	8/27/2008	Flash Flood	0	0	$150,000	0
GREENSBORO MAY ARPT	6/28/2011	Flash Flood	0	0	0	0
GUILFORD	6/23/2006	Flash Flood	0	0	0	0
GUILFORD	7/10/2013	Flash Flood	0	0	$50,000	0
GUILFORD	7/16/2016	Flash Flood	0	0	0	0
GUILFORD	8/27/2016	Flash Flood	0	0	0	0
GUILFORD	8/1/2019	Flash Flood	0	0	$10,000	0
GUILFORD	8/9/2024	Flash Flood	0	0	$10,000	0
GUILFORD	8/9/2024	Flash Flood	0	0	$10,000	0
GUILFORD	8/9/2024	Flash Flood	0	0	$10,000	0
GUILFORD	8/9/2024	Flash Flood	0	0	$10,000	0
GUILFORD	8/10/2024	Flash Flood	0	0	$100,000	0
GUILQUARRY	10/8/2016	Flash Flood	0	0	0	0
GUILQUARRY	8/2/2018	Flash Flood	0	0	$10,000	0
GUILQUARRY	9/17/2018	Flash Flood	0	0	0	0
GUILQUARRY	10/11/2018	Flash Flood	0	0	$500,000	0
HAMILTON LAKES	11/11/2009	Flash Flood	0	0	0	0
HAMILTON LAKES	6/16/2010	Flash Flood	0	0	0	0
HAMILTON LAKES	6/28/2011	Flash Flood	0	0	0	0
HAMILTON LAKES	7/9/2012	Flash Flood	0	0	$100,000	0
HAMILTON LAKES	6/10/2013	Flash Flood	0	0	0	0
HAMILTON LAKES	8/6/2015	Flash Flood	0	0	0	0
HAMILTON LAKES	12/30/2015	Flash Flood	0	0	0	0

Location	Date	Type	Deaths	Injuries	Property Damage	Crop Damage
HAMILTON LAKES	6/7/2019	Flash Flood	0	0	0	0
HAMILTON LAKES	8/14/2021	Flash Flood	0	0	0	0
HAMILTON LAKES	9/12/2023	Flash Flood	0	0	0	0
HIGH PT	9/18/2002	Flash Flood	0	0	0	0
HIGH PT	6/23/2006	Flash Flood	0	0	0	0
HIGH PT	6/23/2006	Flash Flood	0	0	0	0
HIGH PT	6/27/2006	Flash Flood	0	0	0	0
HIGH PT	8/30/2006	Flash Flood	0	0	0	0
HIGH PT	9/30/2010	Flash Flood	0	0	0	0
HIGH PT	9/29/2015	Flood	0	0	$500,000	0
HIGH PT	5/23/2018	Flash Flood	0	0	0	0
HIGH PT MIDWAY ARPT	9/17/2018	Flood	0	0	$14,630,000	$5,000,000
HILLSDALE	11/12/2020	Flash Flood	0	0	0	0
JAMESTOWN	9/30/2010	Flash Flood	0	0	0	0
JAMESTOWN	8/24/2023	Flash Flood	0	0	$15,000	0
MELBORNE HGTS	6/7/2019	Flash Flood	0	0	0	0
OAK RIDGE	9/14/2000	Flash Flood	0	0	0	0
OAK RIDGE	8/6/2020	Flash Flood	0	0	0	0
OAK RIDGE ARPT	8/17/2013	Flash Flood	0	0	0	0
OSCEOLA	11/12/2020	Flash Flood	0	0	0	0
OSCEOLA	8/8/2024	Flash Flood	0	0	$5,000	0
PINECROFT	9/3/2012	Flash Flood	0	0	0	0
PINECROFT	6/7/2019	Flash Flood	0	0	0	0
PINECROFT	7/7/2019	Flash Flood	0	0	$10,000	0
PINECROFT	7/23/2020	Flash Flood	0	0	0	0
PLEASANT GARDEN	9/3/2012	Flash Flood	0	0	0	0
PLEASANT GARDEN	6/27/2015	Flash Flood	0	0	0	0
POMONA	8/13/2020	Flash Flood	0	0	0	0
POMONA	9/12/2023	Flash Flood	0	0	0	0
POMONA	9/12/2023	Flash Flood	0	0	0	0
RANKIN	1/25/2010	Flash Flood	0	0	0	0
RANKIN	8/22/2012	Flash Flood	0	0	0	0
SEDGEFIELD	6/19/2017	Flash Flood	0	0	$5,000	0
SUMMERFIELD	7/13/2003	Flash Flood	0	0	0	0
SUMMERFIELD	7/30/2007	Flash Flood	0	0	0	0
SUMMERFIELD	7/30/2007	Flash Flood	0	0	0	0
SUMMERFIELD	7/30/2007	Flash Flood	0	0	0	0
SUMMERFIELD	1/25/2010	Flash Flood	0	0	0	0
SUMMERFIELD	11/12/2018	Flash Flood	0	0	0	0
TERRA COTTA	6/22/2008	Flash Flood	0	0	0	0
TERRA COTTA	7/27/2010	Flash Flood	0	0	0	0
TERRA COTTA	9/23/2011	Flash Flood	0	0	0	0
TERRA COTTA	8/19/2012	Flash Flood	0	0	0	0
TERRA COTTA	7/20/2024	Flash Flood	0	0	0	0
WEST PORTION	2/22/2003	Flash Flood	0	0	0	0

Location	Date	Type	Deaths	Injuries	Property Damage	Crop Damage
	Total	**126**	**1**	**0**	**$18,377,000**	**$5,000,000**

Source: NCEI

The NCEI records 126 total flash flood and flood incidents occurring in Guilford County between 1999 and 2024. The incidents resulted in one recorded fatality, over $18 million in property damages and $5 million in recorded crop damage.

Table 4.34 provides a summary of this historical information by participating jurisdiction. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

TABLE 4.34 – SUMMARY OF HISTORICAL FLOOD OCCURRENCES BY PARTICIPATING JURISDICTION, 1999-2024

Jurisdiction	Event Count	Deaths	Injuries	Property Damage	Crop Damage
Gibsonville	0	0	0	$0	$0
Greensboro	39	1	0	$2,322,000	$0
High Point	9	0	0	$15,130,000	$5,000,000
Jamestown	2	0	0	$15,000	$0
Oak Ridge	3	0	0	$0	$0
Pleasant Garden	2	0	0	$0	$0
Sedalia	0	0	0	$0	$0
Stokesdale	0	0	0	$0	$0
Summerfield	6	0	0	$0	$0
Whitsett	0	0	0	$0	$0
Guilford County (unincorporated)	65	0	0	$910,000	$0
Total	**126**	**1**	**0**	**$18,377,000**	**$5,000,000**

Source: NCEI

The following historical flood events reported in the NCEI database and other sources illustrate the potential for flooding throughout the county:

July 2004 – Interstate 40 at exit 68, portions of Tarrance Road, Industrial Village Road, and Tower Road were all closed due to flooding. An estimated 67 cars were abandoned along Interstate 40, with water door-handle high on some cars, and roof-high on others. Several people were trapped in vehicles stuck in flood waters along West Friendly Avenue near Chimney Rock Road. South Buffalo Creek at Four Seasons Mall was reported out of its banks, the Ashley Creek Apartments had to be evacuated, and an emergency shelter had to be opened at the Glenwood Recreation Center. Flooding also necessitated evacuations at Maplewood Apartments on Maplewood Lane.

June 2009 – Numerous streets were closed in downtown Greensboro with as many as 50 to 100 water rescues performed, mainly from stalled out vehicles. Multiple buildings were flooded, with at least 10 to 15 on the UNC-Greenbsoro Campus alone. In addition, as many as two dozen businesses and government buildings were also flooded. One fatality occurred when a woman lost control of a moped

and went into a creek. A police officer rescued the woman, only to have her jump back into the creek in an attempt to recover her moped.

July 2013 – Flood waters from North Buffalo Creek closed several roads in the area. Latham Park was also closed due to high flood waters from nearby North Buffalo Creek . Flooding was reported near the intersection of North Church Street and East Cone Blvd. There was a water rescue on Green Valley road near Westover Terrace. A car flooded and stuck under Benjamin Parkway at Green Valley. Bryan Blvd was closed at Holden Road with reports of several feet of water on the road.

September 2018 – Torrential rainfall of 6 to 8 inches caused widespread flooding across the county, which caused moderate flooding along North Buffalo and South Buffalo Creeks, as well as other creeks and streams throughout the county. Flooding damaged approximately 119 structures throughout the county, destroying 7 and resulting in over $14.63 million in property damage. Numerous roads were closed due to flooding. Numerous homes and businesses were flooded as well. While final losses on crops are not yet tallied, estimates around $5 million or more are possible.

November 2020 – Moisture from Tropical Storm Eta was drawn northward into the Mid Atlantic during the day of Wednesday November 11th. Meanwhile, a slow moving cold front approached the area and made its way through central North Carolina during the day Thursday, resulting in widespread showers and isolated thunderstorms. Rainfall totals were generally in the 4 to 6 inches range, although some spots near Rocky Mount saw close to 10 inches of rain by the time the event drew to a close. This resulted in numerous flooded road, including one death resulting from the flash flooding. One thunderstorm also caused some localized storm damage in Sampson County.

August 2021 – Scattered to numerous showers and thunderstorms developed along a pre-frontal trough in a very hot and unstable environment over the North Carolina Piedmont. Weak steering flow combined with the unstable environment resulted in both slow moving showers and thunderstorms and strong downdrafts, with new thunderstorms developing along the subsequent outflow boundaries. The storms produced damaging winds and isolated large hail and flash flooding.

August 2024 – As the remnants of tropical cyclone Debby lifted into Pennsylvania, a cold front remained draped across western North Carolina. Anomalous moisture remained across the area, along with antecedent conditions being wet for early August. A scattered line of storms developed across the northwest Piedmont and produced flash flooding in Guilford County. Several reports of flooding occurred in the town of Greensboro.

PROBABILITY OF FUTURE OCCURRENCE

By definition, SFHAs are those areas that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. Properties located in the SFHA have a 26 percent chance of flooding over the life of a 30-year mortgage. The Shaded X Zone indicates areas that are estimated to be inundated by the flood event having a 0.2-percent chance of being equaled or exceeded in any given year. The SFHA and the Shaded X zone indicate areas of high and moderate risk according to FEMA guidelines; however, this does not mean that flood risk is limited to these areas. There is also potential for other magnitudes of flood events to impact these and other areas in the region.

While exposure to flood hazards vary across jurisdictions, all jurisdictions have at least some area of land in FEMA flood hazard areas. Additionally, much of the planning area is subject to urban stormwater flooding and smaller flash flood events. While potentially less severe than the 1%-annual-chance flood, these events can still cause significant damage. Taken as a whole, the probability of flooding is considered likely (greater than 10% probability) for all jurisdictions.

Probability: 3 – Likely

CLIMATE CHANGE

Per the Fifth National Climate Assessment, frequency and intensity of heavy precipitation events is expected to increase across the country. Additionally, increased levels of rainfall, temperatures, and land cover change can exacerbate flood risks and are expected to occur throughout the southeast. Therefore, with more rainfall falling in more intense incidents, the region may experience more frequent flash flooding. Increased flooding may also result from more intense tropical cyclone; researchers have noted the occurrence of more intense storms bringing greater rainfall totals, a trend that is expected to continue as ocean and air temperatures rise.

Per the 2023 North Carolina Hazard Mitigation Plan, changing climate and weather patterns, environmental conditions, and urban and rural development may affect the frequency and intensity of flooding. Historical data and climate projections provided by the State Climate Office of North Carolina on the North Carolina Resilience Exchange website indicate that days with extreme precipitation (2 inches or more of precipitation) are expected to increase in Guilford County. Guilford County averages 9 days per decade of extreme precipitation and this number is likely to increase to 12 days per decade by the 2060s. This increased likelihood of extreme precipitation events due to climate change will result in greater risks of flash flooding and impacts from stormwater runoff.

Various land use and land surface changes can also result in changes to the floodplain and flood prone areas. For example, an increase in impervious surface can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are often created by human activity. However, changes in precipitation frequency and intensity can also result in changes to flood magnitudes and probabilities. For example, what we currently define as the 1-percent-annual-chance flood may occur more frequently in the future.

VULNERABILITY ASSESSMENT

The following section provides an assessment of vulnerability to flooding by jurisdiction and flood return period.

METHODOLOGIES AND ASSUMPTIONS

Population and property at risk to flooding was estimated using data from the North Carolina Emergency Management (NCEM) IRISK database, which was compiled in NCEM's Risk Management Tool.

As a subset of the building vulnerability analysis, exposure of pre-FIRM structures was also estimated. Table 4.35 below provides the NFIP entry date for each participating jurisdiction, which was used to determine which buildings were constructed pre-FIRM. Pre-FIRM structures were built prior to the adoption of flood protection building standards and are therefore assumed to be at greater risk to the flood hazard.

TABLE 4.35 – NFIP ENTRY DATES

Jurisdiction	NFIP Entry Date
Gibsonville	05/15/80
Greensboro	04/16/71
High Point	11/01/79
Jamestown	03/04/80

Jurisdiction	NFIP Entry Date
Oak Ridge	08/13/02
Pleasant Garden	03/17/09
Sedalia	10/09/08
Stokesdale	005/05/97
Summerfield	08/12/02
Whitsett	11/07/08
Guilford County (Unincorporated Area)	06/04/80

Source: Federal Emergency Management Agency Community Status Book Report: Communities Participating in the National Flood Program, June 2025

Pre-FIRM structures are those built before a community's NFIP entry date, while those built after the entry date are post-FIRM. If the NFIP entry date for a given community is between January and June, buildings constructed the same year as the entry date are considered to be post-FIRM (e.g., if the NFIP entry date is 02/01/1991, buildings constructed in 1990 and before are pre-FIRM. Buildings constructed from 1991 to the present are post-FIRM.). If the NFIP entry date is between July and December, then the following year applies for the year built cut-off (e.g., if the NFIP entry date is 12/18/2007, buildings constructed in the year 2007 and before are pre-FIRM, 2008 and newer are post-FIRM).

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

PEOPLE

Flood events pose many threats to public health and safety. While such problems are often not reported, three general types of health hazards accompany floods: physical hazards from the water itself, environmental hazards in the aftermath of the flood, and long-term psychological hazards. These common health and safety hazards are detailed below:

- **Contaminated water**: Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where farm animals are kept or where their wastes are stored can contribute polluted waters to the receiving streams. Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines, or wastewater treatment plants may be flooded or over loaded. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as E.coli and other disease causing agents. Private sewer and septic systems may also introduce pollutants into floodwaters. Private wells may become contaminated through infiltration of polluted water. Given the many potential sources of contamination, direct or indirect contact with floodwaters poses a significant health risk for contraction of infectious disease.
- **Debris**: During a flood, debris carried by floodwaters can cause physical injury from impact. During the recovery process, people may often need to clear debris out of their properties but may encounter dangers such as sharp materials or rusty nails that pose a risk of tetanus.
- **Unsafe food**: If floodwaters come into contact with food items, that food may no longer be safe for consumption due to the potential contaminants in the floodwaters. Foods stored in cardboard, plastic bags, jars, bottles, and paper packaging may all be subject to contamination. Even if foods don't come into direct contact with floodwaters, the introduction of mold and mildew from flooding

may cause foods to spoil faster. Additionally, power outages may cause refrigerated and frozen foods to spoil.

- **Mosquitos and animals**: After most of the water has receded, stagnant pools can become breeding grounds for mosquitoes, which may carry infectious diseases such as West Nile virus or St. Louis encephalitis. Wild animals such as snakes or rodents may carried by floodwaters or lose their habitat and seek shelter in buildings. Snakes may also be swimming in floodwaters seeking higher ground. People may be at risk for bites or disease if they come in contact with these animals or animal carcasses.
- **Mold and mildew**: Areas of a building that were exposed to excessive moisture can breed mold and mildew. Molds can start to grow in only 24 to 48 hours and will continue to grow without steps to dry out and disinfect the affected surface. Some molds are allergens, while others can produce harmful mycotoxins. Exposure to mold can cause respiratory problems; nasal and sinus congestion; eye, nose, and throat irritation; aches and pains; and effects on the nervous system. Infants, children, immunocompromised individuals, elderly adults, pregnant women, and individuals with respiratory conditions are all at higher risk.
- **Reentering a flooded building**: Health hazards may occur when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If the public water systems lose pressure, public water supplies may be contaminated, and a boil order may be issued to protect people and animals from contaminated water.
- **Mental stress**: Long-term psychological impacts can result after having been through a flood and seeing one's home damaged and personal belongings destroyed. The cost and labor needed to repair a flood-damaged home can also put a severe strain on people, especially individuals who were unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

Floods can also result in injuries and fatalities. Individuals face particularly high risk when driving through flooded streets, or from being washed away by floodwaters on foot. NCEI reports one fatality in Guilford County caused by flood events.

Tables 4.36 through 4.40 detail the estimated population at risk from various flood events, according to data from the NCEM IRISK database. Note that development and population growth have occurred since the analysis for the IRISK dataset was performed. Therefore, actual population at risk is likely higher.

TABLE 4.36 – POPULATION IMPACTED BY THE 10 YEAR FLOOD EVENT

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	84,956	128	0%	20,442	21	0%	7,162	7	0%
Greensboro	299,035	720	0%	39,884	104	0%	16,134	42	0%
High Point	114,059	315	0%	17,209	52	0%	6,407	19	0%
Gibsonville	8,971	21	0%	1,194	6	1%	177	1	1%

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Jamestown	3,668	7	0%	1,847	1	0%	301	0	0%
Oak Ridge	7,474	3	0%	993	0	0%	399	0	0%
Pleasant Garden	4,997	0	0%	1,173	0	0%	170	0	0%
Sedalia	676	0	0%	94	0	0%	31	0	0%
Stokesdale	5,924	5	0%	587	1	0%	271	0	0%
Summerfield	10,951	0	0%	1,519	0	0%	680	0	0%
Whitsett	588	0	0%	282	0	0%	150	0	0%
Total	**541,299**	**1,199**	**0%**	**85,224**	**185**	**0%**	**31,882**	**69**	**0%**

Source: Census 2020 and NCEM Risk Management Tool

TABLE 4.37 – POPULATION IMPACTED BY THE 25 YEAR FLOOD EVENT

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	84,956	195	0%	20,442	31	0%	7,162	11	0%
Greensboro	299,035	1,106	0%	39,884	159	0%	16,134	64	0%
High Point	114,059	466	0%	17,209	76	0%	6,407	28	0%
Gibsonville	8,971	22	0%	1,194	6	1%	177	1	1%
Jamestown	3,668	7	0%	1,847	1	0%	301	0	0%
Oak Ridge	7,474	3	0%	993	0	0%	399	0	0%
Pleasant Garden	4,997	0	0%	1,173	0	0%	170	0	0%
Sedalia	676	0	0%	94	0	0%	31	0	0%
Stokesdale	5,924	8	0%	587	1	0%	271	0	0%
Summerfield	10,951	0	0%	1,519	0	0%	680	0	0%
Whitsett	588	0	0%	282	0	0%	150	0	0%
Total	**541,299**	**1,807**	**0%**	**85,224**	**274**	**0%**	**31,882**	**104**	**0%**

Source: Census 2020 and NCEM Risk Management Tool

TABLE 4.38 – POPULATION IMPACTED BY THE 50 YEAR FLOOD EVENT

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	84,956	256	0%	20,442	41	0%	7,162	14	0%
Greensboro	299,035	1,387	1%	39,884	200	1%	16,134	81	1%

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
High Point	114,059	566	1%	17,209	93	1%	6,407	34	1%
Gibsonville	8,971	26	1%	1,194	7	1%	177	1	1%
Jamestown	3,668	7	0%	1,847	1	0%	301	0	0%
Oak Ridge	7,474	3	0%	993	0	0%	399	0	0%
Pleasant Garden	4,997	2	0%	1,173	0	0%	170	0	0%
Sedalia	676	2	0%	94	0	0%	31	0	0%
Stokesdale	5,924	8	0%	587	1	0%	271	0	0%
Summerfield	10,951	0	0%	1,519	0	0%	680	0	0%
Whitsett	588	0	0%	282	0	0%	150	0	0%
Total	**541,299**	**2,257**	**0%**	**85,224**	**343**	**0%**	**31,882**	**130**	**0%**

Source: Census 2020 and NCEM Risk Management Tool

TABLE 4.39 – POPULATION IMPACTED BY THE 100 YEAR FLOOD EVENT

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	84,956	345	0%	20,442	56	0%	7,162	20	0%
Greensboro	299,035	1,781	1%	39,884	256	1%	16,134	104	1%
High Point	114,059	627	1%	17,209	103	1%	6,407	38	1%
Gibsonville	8,971	26	1%	1,194	7	1%	177	1	1%
Jamestown	3,668	10	0%	1,847	2	0%	301	0	0%
Oak Ridge	7,474	3	0%	993	0	0%	399	0	0%
Pleasant Garden	4,997	2	0%	1,173	0	0%	170	0	0%
Sedalia	676	2	0%	94	0	0%	31	0	0%
Stokesdale	5,924	8	0%	587	1	0%	271	0	0%
Summerfield	10,951	0	0%	1,519	0	0%	680	0	0%
Whitsett	588	0	0%	282	0	0%	150	0	0%
Total	**541,299**	**2,804**	**1%**	**85,224**	**425**	**0%**	**31,882**	**163**	**1%**

Source: Census 2020 and NCEM Risk Management Tool

TABLE 4.40 – POPULATION IMPACTED BY THE 500 YEAR FLOOD EVENT

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	84,956	563	0%	20,442	91	0%	7,162	32	0%
Greensboro	299,035	2,452	1%	39,884	353	1%	16,134	143	1%
High Point	114,059	781	1%	17,209	128	1%	6,407	48	1%
Gibsonville	8,971	38	1%	1,194	10	1%	177	2	1%
Jamestown	3,668	20	0%	1,847	4	0%	301	1	0%
Oak Ridge	7,474	6	0%	993	1	0%	399	0	0%
Pleasant Garden	4,997	4	0%	1,173	1	0%	170	0	0%
Sedalia	676	2	0%	94	0	0%	31	0	0%
Stokesdale	5,924	10	0%	587	1	0%	271	1	0%
Summerfield	10,951	0	0%	1,519	0	0%	680	0	0%
Whitsett	588	0	0%	282	0	0%	150	0	0%
Total	**541,299**	**3,876**	**1%**	**85,224**	**589**	**1%**	**31,882**	**227**	**1%**

Source: Census 2020 and NCEM Risk Management Tool

PROPERTY

Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed by flood waters. The increased number of flood days will likely cause additional flood-related property damage, although it is unclear exactly what this will look like. Homes, businesses, and vehicles will be susceptible to increased water damage.

Properties within the SFHA are estimated to have a one percent probability of being exposed to flooding equaling or exceeding the base flood during any given year. Mortgage lenders require that owners of properties with federally backed mortgages located within SFHAs purchase and maintain flood insurance policies on their properties. Consequently, newer and recently purchased properties in the community are typically insured against flooding. Regardless of insurance status, pre-FIRM properties, those built before the community's first FIRM, may be more vulnerable to flood damage because they were built prior to the enforcement of flood damage prevention regulations. These properties may be a priority for mitigation.

Table 4.43 through Table 4.47 detail the property at risk and loss estimates from various flood events, according to data from the NCEM IRISK database. The damage estimates for the 1% annual chance flood event total $34,870,154, which equates to a loss ratio of less than 1 percent. The loss ratio is the damage estimate divided by the total potential exposure (i.e., total value of all buildings in the planning area), displayed as a percentage of value at risk. FEMA considers loss ratios greater than 10% to be significant and an indicator a community may have more difficulties recovering from an event.

Actual property at risk is likely higher due to the amount of development that has occurred since the original analysis for the IRISK dataset was performed. To estimate current exposure to the 1% annual chance flood, additional spatial analysis of current parcel data was completed, comparing the locations

of improved parcels—those with existing structures or development—to the SFHA. Table 4.41 provides a summary of estimated property exposure to the 1% annual chance flood in Guilford County. Note that this analysis reflects the exposure of improved parcels, but structures on these parcels may be located outside of the floodplain.

TABLE 4.41 – IMPROVED PARCEL EXPOSURE TO FLOODING BY JURISDICTION

Jurisdiction	Improved Parcel Count	Total Improved Value
Guilford County	3,074	$371,480,434
Gibsonville	124	$27,709,577
Greensboro	3,003	$3,288,444,163
High Point	2,192	$1,271,593,541
Jamestown	126	$18,028,800
Oak Ridge	164	$51,625,500
Pleasant Garden	75	$7,481,700
Sedalia	38	$3,560,600
Stokesdale	76	$25,398,100
Summerfield	177	$18,196,600
Total	9,049	$5,083,519,015

Source: Guilford County GIS, FEMA

Critical facility exposure to the 1% annual chance flood was also evaluated. Based on a comparison of critical facility locations to the FEMA flood hazard areas, only five critical facilities are exposed to the 1% annual chance flood and one facility is exposed to the 0.2% annual chance flood, as detailed in Table 4.42. All other identified critical facilities are located in the unshaded Zone X, which reflects low flood risk.

TABLE 4.42 – CRITICAL FACILITIES EXPOSED TO FLOODING

Jurisdiction	FEMA Lifeline	Facility	FEMA Flood Zone
Greensboro	Food, Hydration, Shelter	Barber Park/George Simkins Sports Center	AE
Greensboro	Water Systems	Greensboro Wastewater Treatment Plant-N. Buffalo Plant	AE

Jurisdiction	FEMA Lifeline	Facility	FEMA Flood Zone
Greensboro	Safety & Security	Guilford County Sheriff's Office - Special Operations Office	AE
Greensboro	Safety & Security	Greensboro Fire Station 1	AE
High Point	Water Systems	Piedmont Triad Regional Water Authority Wilmington Bldg Ste 217	X Shaded

TABLE 4.43 – BUILDINGS IMPACTED BY THE 10-YEAR FLOOD EVENT

Jurisdiction	All Buildings	Number of Pre-FIRM Buildings at Risk		Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	36	0%	46	0%	$270,750	8	0%	$405,442	0	0%	$0	54	0%	$676,193
Greensboro	81,938	136	0%	192	0%	$7,077,329	33	0%	$1,180,338	1	0%	$126	226	0%	$8,257,793
High Point	38,756	79	0%	104	0%	$951,345	10	0%	$493,118	1	0%	$17,795	115	0%	$1,462,257
Gibsonville	2,728	4	0%	12	0%	$26,550	0	0%	$0	0	0%	$0	12	0%	$26,550
Jamestown	2,786	2	0%	2	0%	$1,532	0	0%	$0	0	0%	$0	2	0%	$1,532
Oak Ridge	3,228	0	0%	1	0%	$1,660	0	0%	$0	0	0%	$0	1	0%	$1,660
Pleasant Garden	2,820	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Sedalia	393	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Stokesdale	2,337	2	0%	2	0%	$11,604	0	0%	$0	0	0%	$0	2	0%	$11,604
Summerfield	4,274	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Whitsett	573	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Total	**189,387**	**259**	**0%**	**359**	**0%**	**$8,340,770**	**51**	**0%**	**$2,078,898**	**2**	**0%**	**$17,921**	**412**	**0%**	**$10,437,589**

Source: NCEM Risk Management Tool

TABLE 4.44 – BUILDINGS IMPACTED BY THE 25-YEAR FLOOD EVENT

Jurisdiction	All Buildings	Number of Pre-FIRM Buildings at Risk		Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	52	0%	70	0%	$354,406	13	0%	$600,661	0	0%	$0	83	0%	$955,067
Greensboro	81,938	202	0%	295	0%	$9,154,682	57	0%	$2,590,746	3	0%	$8,748	355	0%	$11,754,177
High Point	38,756	113	0%	154	0%	$1,504,648	12	0%	$705,211	1	0%	$26,971	167	0%	$2,236,830
Gibsonville	2,728	4	0%	13	0%	$36,752	0	0%	$0	0	0%	$0	13	0%	$36,752
Jamestown	2,786	2	0%	2	0%	$1,940	0	0%	$0	0	0%	$0	2	0%	$1,940
Oak Ridge	3,228	0	0%	1	0%	$2,142	0	0%	$0	0	0%	$0	1	0%	$2,142
Pleasant Garden	2,820	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Sedalia	393	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Stokesdale	2,337	3	0%	3	0%	$16,892	0	0%	$0	0	0%	$0	3	0%	$16,892
Summerfield	4,274	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Whitsett	573	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Total	**189,387**	**376**	**0%**	**538**	**0%**	**$11,071,462**	**82**	**0%**	**$3,896,618**	**4**	**0%**	**$35,719**	**624**	**0%**	**$15,003,800**

Source: NCEM Risk Management Tool

TABLE4.45 – BUILDINGS IMPACTED BY THE 50-YEAR FLOOD EVENT

Jurisdiction	All Buildings	Number of Pre-FIRM Buildings at Risk		Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	60	0%	92	0%	$455,986	16	0%	$772,616	1	0%	$1,939	109	0%	$1,230,541
Greensboro	81,938	248	0%	370	0%	$11,051,961	77	0%	$3,772,530	5	0%	$61,892	452	1%	$14,886,384
High Point	38,756	137	0%	187	0%	$1,718,892	14	0%	$797,554	1	0%	$32,116	202	1%	$2,548,563
Gibsonville	2,728	5	0%	15	1%	$41,079	0	0%	$0	0	0%	$0	15	1%	$41,079
Jamestown	2,786	2	0%	2	0%	$1,940	0	0%	$0	0	0%	$0	2	0%	$1,940
Oak Ridge	3,228	0	0%	1	0%	$2,492	0	0%	$0	0	0%	$0	1	0%	$2,492
Pleasant Garden	2,820	1	0%	1	0%	$1,335	0	0%	$0	0	0%	$0	1	0%	$1,335
Sedalia	393	1	0%	1	0%	$1,064	0	0%	$0	0	0%	$0	1	0%	$1,064
Stokesdale	2,337	3	0%	3	0%	$20,012	0	0%	$0	0	0%	$0	3	0%	$20,012
Summerfield	4,274	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Whitsett	573	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Total	**189,387**	**457**	**0%**	**672**	**0%**	**$13,294,761**	**107**	**0%**	**$5,342,700**	**7**	**0%**	**$95,947**	**786**	**0%**	**$18,733,410**

Source: NCEM Risk Management Tool

TABLE 4.46 – BUILDINGS IMPACTED BY THE 100-YEAR FLOOD EVENT

Jurisdiction	All Buildings	Number of Pre-FIRM Buildings at Risk		Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	72	0%	124	0%	$621,013	19	0%	$975,980	1	0%	$6,247	144	0%	$1,603,240
Greensboro	81,938	314	0%	473	1%	$23,358,113	100	0%	$6,607,947	8	0%	$190,255	581	1%	$30,156,315
High Point	38,756	152	0%	207	1%	$1,923,033	17	0%	$1,052,554	1	0%	$37,090	225	1%	$3,012,677
Gibsonville	2,728	5	0%	15	1%	$47,375	0	0%	$0	0	0%	$0	15	1%	$47,375
Jamestown	2,786	4	0%	3	0%	$5,699	1	0%	$5,008	0	0%	$0	4	0%	$10,707
Oak Ridge	3,228	0	0%	1	0%	$2,842	0	0%	$0	0	0%	$0	1	0%	$2,842
Pleasant Garden	2,820	1	0%	1	0%	$1,335	0	0%	$0	0	0%	$0	1	0%	$1,335
Sedalia	393	1	0%	1	0%	$1,064	0	0%	$0	0	0%	$0	1	0%	$1,064
Stokesdale	2,337	3	0%	3	0%	$34,599	0	0%	$0	0	0%	$0	3	0%	$34,599
Summerfield	4,274	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Whitsett	573	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Total	**189,387**	**552**	**0%**	**828**	**0%**	**$25,995,073**	**137**	**0%**	**$8,641,489**	**10**	**0%**	**$233,592**	**975**	**1%**	**$34,870,154**

Source: NCEM Risk Management Tool

TABLE 4.47 – BUILDINGS IMPACTED BY THE 500-YEAR FLOOD EVENT

Jurisdiction	All Buildings	Number of Pre-FIRM Buildings at Risk		Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	111	0%	202	0%	$1,560,171	26	0%	$1,799,101	2	0%	$12,160	230	0%	$3,371,432
Greensboro	81,938	432	1%	649	1%	$38,336,519	148	0%	$17,219,315	12	0%	$777,842	809	1%	$56,333,676
High Point	38,756	189	0%	258	1%	$4,385,868	21	0%	$1,347,616	1	0%	$55,871	280	1%	$5,789,355
Gibsonville	2,728	8	0%	22	1%	$61,795	0	0%	$0	0	0%	$0	22	1%	$61,795
Jamestown	2,786	8	0%	6	0%	$18,120	2	0%	$146,130	1	0%	$23,150	9	0%	$187,400
Oak Ridge	3,228	1	0%	2	0%	$5,898	0	0%	$0	0	0%	$0	2	0%	$5,898
Pleasant Garden	2,820	2	0%	2	0%	$2,030	0	0%	$0	0	0%	$0	2	0%	$2,030
Sedalia	393	1	0%	1	0%	$1,064	0	0%	$0	0	0%	$0	1	0%	$1,064
Stokesdale	2,337	5	0%	4	0%	$71,359	1	0%	$2,126	0	0%	$0	5	0%	$73,484
Summerfield	4,274	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Whitsett	573	0	0%	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Total	**189,387**	**757**	**0%**	**1,146**	**1%**	**$44,442,824**	**198**	**0%**	**$20,514,288**	**16**	**0%**	**$869,023**	**1,360**	**1%**	**$65,826,134**

Source: NCEM Risk Management Tool

REPETITIVE LOSS ANALYSIS

A repetitive loss property is a property for which two or more flood insurance claims of more than $1,000 have been paid by the NFIP within any 10-year period since 1978. A severe repetitive loss property is classified as such if it has four or more separate claim payments of more than $5,000 each (including building and contents payments) or two or more separate claim payments (building only) where the total of the payments exceeds the current value of the property. Repetitive loss properties and severe repetitive loss properties are a priority for mitigation because they have a known flood risk and are a drain on the NFIP.

According to February 2024 NFIP records, there are a total of 61 repetitive loss properties within Guilford County, of which 18 percent are insured. There are 13 properties on the list classified as severe repetitive loss properties, which are all located within the City of Greensboro. Additionally, the majority of repetitive loss properties (90%) are residential. Table 4.48 summarizes repetitive loss properties by jurisdiction as identified by FEMA through the NFIP.

TABLE 4.48 – REPETITIVE LOSS PROPERTIES BY JURISDICTION

Jurisdiction	Total Number of Properties	Residential Properties	Total Number of Insured Properties	Total Number of Losses	Severe Repetitive Loss Properties
Unincorporated Guilford County	3	3	1	6	-
Greensboro	50	44	15	216	13
High Point	8	8	2	22	-
Total	**61**	**55**	**18**	**244**	**13**

Source: FEMA/ISO

Note: Communities in the planning area are not listed here if they do not have any repetitive loss properties.

ENVIRONMENT

During a flood event, chemicals and other hazardous substances may end up contaminating local water bodies. Flooding kills animals and in general disrupts the ecosystem. Snakes and insects may also make their way to the flooded areas.

Floods can also cause significant erosion, which can alter streambanks and deposit sediment, changing the flow of streams and rivers and potentially reducing the drainage capacity of those waterbodies.

CONSEQUENCE ANALYSIS

Table 4.49 summarizes the potential detrimental consequences of flooding.

TABLE 4.49 – CONSEQUENCE ANALYSIS - FLOODING

Category	Consequences
Public	Localized impact expected to be severe for incident areas and moderate to light for other adversely affected areas.
Responders	First responders are at risk when attempting to rescue people. They are subject to the same health hazards as the public. Flood waters may prevent access to areas in need of response or the flood may prevent access to the critical facilities themselves which may prolong response time.

Category	Consequences
Continuity of Operations (including Continued Delivery of Services)	Floods can severely disrupt normal operations, especially when there is a loss of power. Damage to facilities in the affected area may require temporary relocation of some operations. Localized disruption of roads, facilities, and/or utilities caused by incident may postpone delivery of some services.
Property, Facilities and Infrastructure	Buildings and infrastructure, including transportation and utility infrastructure, may be damaged or destroyed. Impacts are expected to be localized to the area of the incident. Severe damage is possible.
Environment	Chemicals and other hazardous substances may contaminate local water bodies. Wildlife and livestock deaths possible. The localized impact is expected to be severe for incident areas and moderate to light for other areas affected by the flood or associate hazardous materials spills.
Economic Condition of the Jurisdiction	Local economy and finances will be adversely affected, possibly for an extended period. Roads, bridges, farms, houses and automobiles can be destroyed. The local government must deploy emergency response personnel and equipment to help the affected area. It may take years for the affected communities to be re-built and business to return to normal.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery are not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes flood hazard risk by jurisdiction. Communities without historical flood events in the last 20 years were assigned a probability rating of 2; those with between 1 and 20 flood events were assigned a probability rating of 3, and those with more than 20 past occurrences in the past 20 years were assigned a probability rating of 4. All communities that have between 1 and 10% of their land area within the SFHA were assigned a spatial extent of 2; those with less than 1% land area in the SFHA were given a spatial extent rating of 1. All other factors do not vary by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	2	3	2	3	3	2.5	M
Greensboro	4	3	2	3	3	3.1	H
High Point	3	3	2	3	3	2.8	M
Jamestown	3	3	2	3	3	2.8	M
Oak Ridge	3	3	2	3	3	2.8	M
Pleasant Garden	3	3	2	3	3	2.8	M
Sedalia	2	3	2	3	3	2.5	M
Stokesdale	2	3	2	3	3	2.5	M
Summerfield	3	3	2	3	3	2.8	M
Whitsett	2	3	1	3	3	2.3	M
Unincorporated Guilford County	4	3	2	3	3	3.1	H

Hurricane and Tropical Storm

HAZARD 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.

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.

Warning Time: 1 – More than 24 hours

Duration: 2 – Less than 24 hours

LOCATION

Hurricanes and tropical storms can occur anywhere within the Guilford County planning area. While coastal areas are most vulnerable to hurricanes, their wind and rain impacts can be felt hundreds of miles inland.

Spatial Extent: 4 – Large

EXTENT

Hurricane intensity is classified by the Saffir-Simpson Scale, shown in Table 4.50, which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

TABLE 4.50 – SAFFIR-SIMPSON SCALE

Category	Maximum Sustained Wind Speed (MPH)	Types of Damage
1	74–95	Very dangerous winds will produce some damage; Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96–110	Extremely dangerous winds will cause extensive damage; Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111–129	Devastating damage will occur; Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130–156	Catastrophic damage will occur; Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 +	Catastrophic damage will occur; A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds and barometric pressure, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as “major” hurricanes and, while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. Table 4.51 describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes and inland flooding associated with heavy rainfall that usually accompanies these storms.

TABLE 4.51 – 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.	

Source: National Hurricane Center; Federal Emergency Management Agency

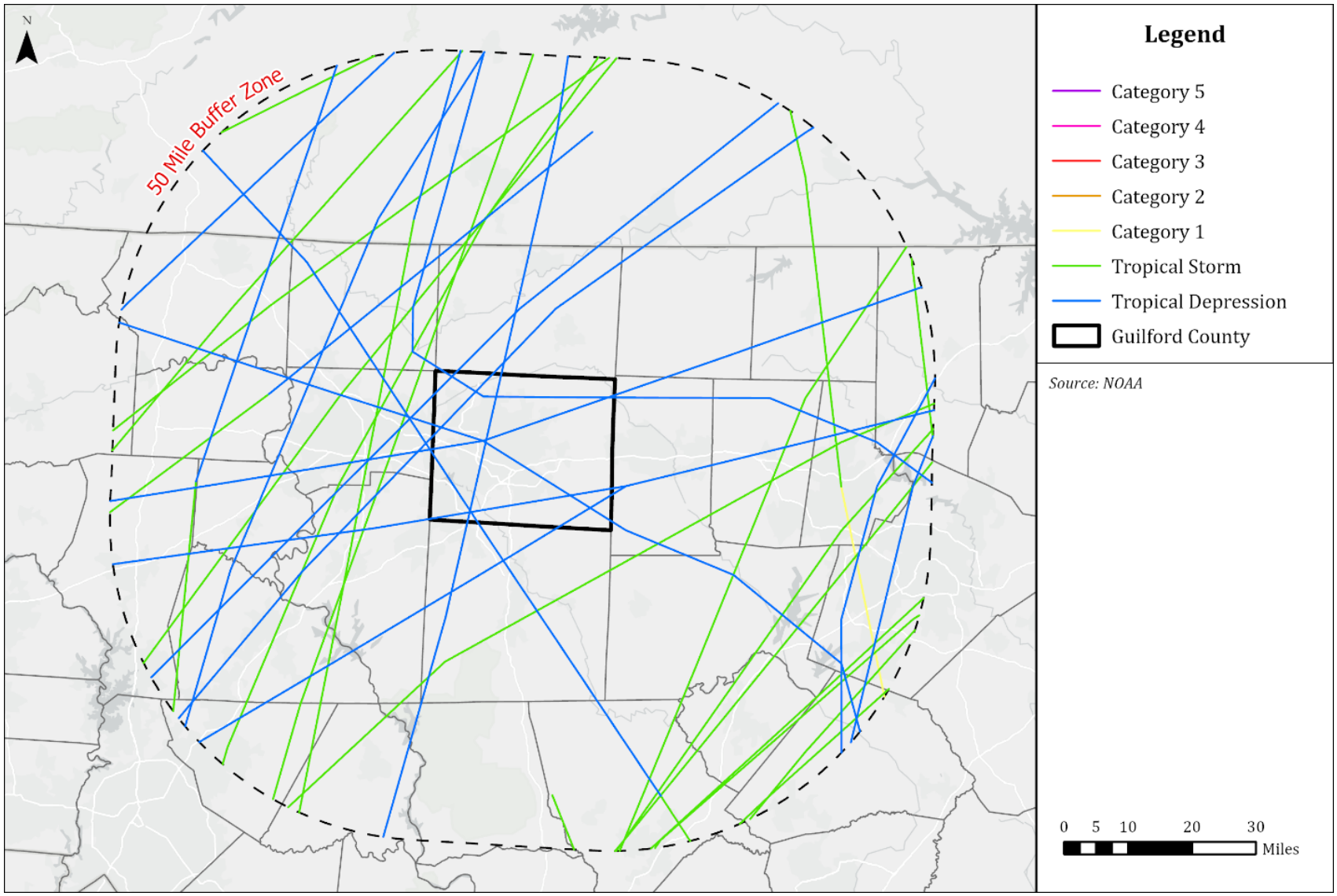
Tropical cyclones weaken relatively quickly after making landfall; therefore, Guilford County will not typically experience major hurricane force winds, though these occurrences are possible. Based on past occurrences, Guilford County is unlikely to experience a Category 4 or Category 5 storm, but a Category 3 storm is possible and could cause limited damages.

Impact: 2 – Limited

HISTORICAL OCCURRENCES

According to the Office of Coastal Management's Tropical Cyclone Storm Segments data, which is a subset of the International Best Track Archive for Climate Stewardship (IBTrACS) dataset, 140 hurricanes and tropical storms passed within 50 miles of Guilford County from 1900-2024. These storms tracks are shown in Figure 4.57. The date, storm name, storm category, and maximum wind speed of each event are detailed in Table 4.52.

FIGURE 4.57 – HURRICANE AND TROPICAL STORM TRACKS WITHIN 50 MILES OF GUILFORD COUNTY, 1900-2024



Source: NOAA Office of Coastal Management

TABLE 4.52 – HURRICANE AND TROPICAL STORM TRACKS WITHIN 50 MILES OF GUILFORD COUNTY, 1900-2024

Date	Storm Name	Max Storm Category*	Max Sustained Wind (knots)
6/17/1902	Tropical Storm	Unnamed	38
10/12/1902	Tropical Storm	Unnamed	35
9/24/1907	Tropical Storm	Unnamed	35
9/1/1911	Tropical Depression	Unnamed	25
8/4/1915	Tropical Storm	Unnamed	38
9/24/1920	Tropical Storm	Unnamed	35
9/24/1920	Tropical Depression	Unnamed	33
10/4/1927	Tropical Storm	Unnamed	35
10/4/1927	Tropical Depression	Unnamed	33
8/12/1928	Tropical Depression	Unnamed	30
10/3/1929	Tropical Storm	Unnamed	50
9/7/1935	Tropical Storm	Unnamed	48
10/21/1944	Tropical Storm	Unnamed	48
9/19/1945	Tropical Storm	Unnamed	48
8/29/1949	Tropical Storm	Unnamed	50
8/30/1949	Tropical Storm	Unnamed	50
9/1/1952	Tropical Storm	Able	43
8/18/1955	Tropical Storm	Diane	53
9/1/1964	Tropical Depression	Cleo	28
6/10/1968	Tropical Depression	Abby	25
6/11/1968	Tropical Depression	Abby	25
5/27/1970	Tropical Storm	Alma	40
9/17/1976	Tropical Depression	Unnamed	28
9/6/1979	Tropical Storm	David	45
7/26/1985	Tropical Storm	Bob	45
8/19/1985	Tropical Depression	Danny	25
8/30/1988	Tropical Depression	Chris	23
9/7/1996	Category 1	Fran	65
9/7/1996	Tropical Storm	Fran	53
9/6/1999	Tropical Depression	Dennis	33
9/20/2000	Tropical Depression	Gordon	20
9/29/2004	Tropical Depression	Jeanne	23
7/8/2005	Tropical Depression	Cindy	20
10/12/2018	Tropical Storm	Michael	48
10/30/2020	Tropical Storm	Zeta	45
7/9/2021	Tropical Storm	Elsa	45
10/2/2022	Tropical Storm	Ian	40
8/10/2024	Tropical Depression	Debby	25

*Reports the most intense category that occurred within 50 miles of Guilford County, not for the storm event overall.
Source: Office of Coastal Management, 2025. https://marinecadastre.gov/data/

The National Centers for Environmental Information reported four events associated with a hurricane or tropical storm in Guilford County since 1996. Additionally, Federal records indicate that five disaster declarations were made in 1989 (Hurricane Hugo), 1996 (Hurricane Fran), 1999 (Hurricane Floyd), 2004 (Hurricane Ivan), 2018 (Hurricane Florence) for the county.

Flooding is often the greatest hazard of concern with hurricane and tropical storm events in Guilford County. Most events do not carry winds that are above that of the thunderstorms and straight-line winds received by the county. Some anecdotal information is available for the major storms that have impacted that area as found below:

September 22-24, 1989 – Hurricane Hugo was one of the largest storms on record in the Atlantic Basin that produced high winds and dumped heavy rains over much of North Carolina and South Carolina. Hugo reached a peak level of Category 5 on the Saffir-Simpson scale and made landfall near Isle of Palms in South Carolina as a Category 4, eventually passing over Charlotte and much of the surrounding area as a Category 1 storm. Although the storm caused its greatest damage in South Carolina, over 1,000 structures were destroyed or severely damaged in North Carolina, causing over $1 billion dollars in damages. Wind gusts reached over 40 mph and numerous trees were downed throughout much of south and western North Carolina.

September 5-6, 1996 – After being hit just a few weeks earlier by Hurricane Bertha, North Carolina was impacted by the one of the most devastating storms to ever make landfall along the Atlantic Coast. Fran dropped more than 10 inches of rain in many areas and had sustained winds of around 115 miles per hour as it hit the coast and began its path along the I-40 corridor central North Carolina. In the end, over 3 billion dollars in damages were reported in the state. Damages to infrastructure and agriculture added to the overall toll and more than 1.7 million people in the state were left without power.

September 16, 1999 – Hurricane Floyd, combined with the weather conditions before and immediately after this hurricane, resulted in the most severe flooding and devastation in North Carolina history. In North Carolina, the storm resulted in 35 fatalities, over $3 billion in damages, 7,000 destroyed homes, 56,000 damaged homes, 1,500 people rescued from flooded areas, and more than 500,000 customers without electricity. Additionally, the flooding caused an estimated $813 million in agricultural losses affecting 32,000 farmers. There was also significant loss of livestock including 2,860,827 poultry, 28,000 swine, and 619 cattle.

September 16-17, 2004 – Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed and landslides were common across the mountain region. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains resulting in numerous downed trees. More than $13.8 million of federal aid was dispersed across North Carolina following Ivan.

September 12-15, 2018 – Hurricane Florence produced extensive wind damage along the North Carolina coast from Cape Lookout, across Carteret, Onslow, Pender and New Hanover counties. Thousands of downed trees caused widespread power outages to nearly all of eastern North Carolina. The historic legacy of Hurricane Florence will be record breaking storm surge of 9 to 13 feet and devastating rainfall of 20 to 30 inches, which produced catastrophic and life-threatening flooding. The hardest hit areas included New Bern, Newport, Belhaven, Oriental, North Topsail Beach and Jacksonville, along with Downeast Carteret County, or basically south of a line from Kinston to Cedar Island. A storm total rainfall of 34.00 inches was reported in Swansboro, while the NWS office in Newport recorded 25.20 inches. Wind gusts of 106 mph were reported at Cape Lookout with 105 mph at Fort Macon.

October 11, 2018 – Tropical Storm Michael moved through North Carolina on Thursday, October 11th. Michael brought heavy rain and strong damaging winds to central North Carolina. While heavy rainfall of 3 to 6 inches produced minor flash flooding across the area, it was high wind gusts of 40 to 60 mph that caused the biggest problems, knocking down score of trees, leading to blocked roadways and thousands without power. Tropical storm wind gusts caused significant damage to homes and other structures across the county. A total of 321 homes were damaged from fallen trees, with seven destroyed, 88 being classified as having major damage, 121 seeing minor damage. At the peak of the storm, the total peak outages were around 130,000 customers.

October 29, 2020 – Hurricane Zeta made landfall along the Louisiana coast during the afternoon of October 28th and quickly lift off to the north and northeast, moving across the southern Appalachians and southern Mid-Atlantic region on October 29th while transitioning to a extra-tropical cyclone. This resulted in numerous reports of wind damage across the area, especially across the northern Piedmont of central North Carolina. Frequent wind gusts of 40 to 55 mph resulted in scattered to numerous trees and power lines down across Guilford County, including some on homes. Numerous customers lost power in Guilford County as a result of the tropical storm force winds.

September 30, 2022 – Hurricane Ian made landfall along the South Carolina coast near Georgetown during the early afternoon hours of September 30, 2022. Widespread wind gusts over tropical storm force and heavy rainfall occurred across much of central North Carolina through the afternoon and evening hours. There were numerous reports of wind damage and power outages as a result of the storm. Frequent wind gusts of 40 to 60 mph resulted in scattered to numerous trees and power lines down across Guilford County, including some on homes. Numerous customers lost power in Guilford County as a result of the tropical storm force wind gusts.

PROBABILITY OF FUTURE OCCURRENCE

Probability: 3 – Likely

Per NCEI records and FEMA disaster declarations, in the 36-year period from 1989 through 2024, eight tropical storms impacted Guilford County area which equates to a 22% annual probability of hurricane winds impacting the county. It should be noted that secondary impacts of hurricanes and tropical storms (i.e. flooding or flash flooding) may be recorded by the NCEI as separate events. Nonetheless, the probability of a hurricane or tropical storm impacting Guilford County is likely.

CLIMATE CHANGE

NOAA reports that extremes will likely cause more frequent, stronger storms in the future due to rising surface temperatures. That is to say, NOAA models predict that while there may be less frequent low-category storm events (Tropical Storms, Category 1 Hurricanes), there will be more high-category storm events (Category 5 and 5 Hurricanes) in the future. This means that there may be fewer hurricanes overall in any given year, but when hurricanes do form, it is more likely that they will become larger storms that can create massive damage.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Property at risk to hurricanes was estimated using data from the North Carolina Emergency Management (NCEM) IRISK database, which was compiled in NCEM's Risk Management Tool. The vulnerability data displayed below is for wind-related damages. Hurricanes may also cause substantial damages from heavy rains and subsequent flooding, which is addressed in Section 4.5.5 Flood.

PEOPLE

The very young, the elderly and the handicapped are especially vulnerable to harm from hurricanes. For those who are unable to evacuate for medical reasons, there should be provision to take care of special-needs patients and those in hospitals and nursing homes. Many of these patients are either oxygen-dependent, insulin-dependent, or in need of intensive medical care. There is a need to provide ongoing treatment for these vulnerable citizens, either on the coast or by air evacuation to upland hospitals. The stress from disasters such as a hurricane can result in immediate and long-term physical and emotional health problems among victims.

PROPERTY

Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Hurricanes can produce winds exceeding 157 mph as well as tornadoes and microbursts. Additionally, hurricanes often bring intense rainfall that can result in flash flooding. Floods and flying debris from winds are often the deadly and most destructive results of hurricanes. Agriculture damages are also common impacts, though the USDA RMA reports no agricultural damages in Guilford County due to hurricane.

The damage estimates for the 100-year hurricane wind event total $61,920,172, which equates to a loss ratio of less than 1 percent. These damage estimates account for only wind impacts and actual damages would likely be higher due to flooding. Therefore, the county would likely experience a higher overall loss ratio from the 100-year hurricane event and face difficulty recovering from such an event. Table 4.53 through Table 4.57 detail the estimated building damages from varying magnitudes of hurricane events.

TABLE 4.53 – ESTIMATED BUILDINGS IMPACTED BY 25-YEAR HURRICANE WIND EVENT

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,583	95	$159,807	100	4	$11,308	34	1	$2,890	2,717	100	$174,004
Greensboro	81,938	72,551	89	$6,456,696	6,867	8	$1,651,639	1,447	2	$371,402	80,865	99	$8,479,737
High Point	38,756	33,632	87	$2,407,740	3,430	9	$648,774	693	2	$102,412	37,755	97	$3,158,927
Jamestown	2,786	2,496	90	$223,278	199	7	$26,209	75	3	$16,960	2,770	99	$266,446
Oak Ridge	3,228	2,984	92	$271,888	181	6	$13,543	53	2	$9,258	3,218	100	$294,689
Pleasant Garden	2,820	2,598	92	$161,929	142	5	$5,899	22	1	$4,165	2,762	98	$171,994
Sedalia	393	357	91	$20,338	6	2	$2,350	23	6	$800	386	98	$23,487
Stokesdale	2,337	2,024	87	$114,398	196	8	$17,211	16	1	$2,734	2,236	96	$134,342
Summerfield	4,274	4,021	94	$319,886	183	4	$10,082	25	1	$4,969	4,229	99	$334,937
Whitsett	573	538	94	$33,392	22	4	$3,336	10	2	$267	570	99	$36,995
Guilford County (unincorporated area)	49,554	44,419	90	$2,897,336	3,281	7	$185,956	800	2	$128,043	48,500	98	$3,211,336
Total	**189,387**	**168,203**	**89**	**$13,066,688**	**14,607**	**8**	**$2,576,307**	**3,198**	**2**	**$643,900**	**186,008**	**98**	**$16,286,894**

Source: NCEM Risk Management Tool

TABLE 4.54 – ESTIMATED BUILDINGS IMPACTED BY 50-YEAR HURRICANE WIND EVENT

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,583	95	$159,807	100	4	$11,308	34	1	$2,890	2,717	100	$174,004
Greensboro	81,938	72,551	89	$6,456,696	6,867	8	$1,651,639	1,447	2	$371,402	80,865	99	$8,479,737
High Point	38,756	33,632	87	$2,407,732	3,430	9	$648,710	693	2	$102,467	37,755	97	$3,158,909
Jamestown	2,786	2,496	90	$223,278	199	7	$26,209	75	3	$16,960	2,770	99	$266,446
Oak Ridge	3,228	2,984	92	$271,888	181	6	$13,543	53	2	$9,258	3,218	100	$294,689
Pleasant Garden	2,820	2,598	92	$161,929	142	5	$5,899	22	1	$4,165	2,762	98	$171,994
Sedalia	393	357	91	$20,338	6	2	$2,350	23	6	$800	386	98	$23,487
Stokesdale	2,337	2,024	87	$114,398	196	8	$17,211	16	1	$2,734	2,236	96	$134,342
Summerfield	4,274	4,021	94	$319,886	183	4	$10,082	25	1	$4,969	4,229	99	$334,937
Whitsett	573	538	94	$33,392	22	4	$3,336	10	2	$267	570	99	$36,995
Guilford County (unincorporated area)	49,554	44,419	90	$2,897,336	3,281	7	$185,956	800	2	$128,043	48,500	98	$3,211,336
Total	**189,387**	**168,203**	**89**	**$13,066,680**	**14,607**	**8**	**$2,576,243**	**3,198**	**2**	**$643,955**	**186,008**	**98**	**$16,286,876**

Source: NCEM Risk Management Tool

TABLE 4.55 – ESTIMATED BUILDINGS IMPACTED BY 100-YEAR HURRICANE WIND EVENT

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$621,200	100	4	$26,605	34	1	$7,413	2,728	100	$655,218
Greensboro	81,938	73,605	90	$24,796,123	6,867	8	$5,928,942	1,447	2	$1,237,056	81,919	100	$31,962,121
High Point	38,756	34,594	89	$9,473,890	3,430	9	$2,192,620	693	2	$353,339	38,717	100	$12,019,848
Jamestown	2,786	2,511	90	$867,673	199	7	$94,781	75	3	$82,501	2,785	100	$1,044,955
Oak Ridge	3,228	2,994	93	$1,073,958	181	6	$43,191	53	2	$27,470	3,228	100	$1,144,619
Pleasant Garden	2,820	2,655	94	$599,328	142	5	$21,671	22	1	$17,484	2,819	100	$638,483
Sedalia	393	364	93	$87,715	6	2	$11,739	23	6	$6,358	393	100	$105,811
Stokesdale	2,337	2,125	91	$483,331	196	8	$50,338	16	1	$7,769	2,337	100	$541,437
Summerfield	4,274	4,065	95	$1,279,060	183	4	$30,779	25	1	$13,828	4,273	100	$1,323,667
Whitsett	573	541	94	$135,287	22	4	$10,259	10	2	$677	573	100	$146,223
Guilford County (unincorporated area)	49,554	45,470	92	$11,197,068	3,281	7	$674,110	800	2	$466,612	49,551	100	$12,337,790
Total	**189,387**	**171,518**	**91**	**$50,614,633**	**14,607**	**8**	**$9,085,035**	**3,198**	**2**	**$2,220,507**	**189,323**	**100**	**$61,920,172**

Source: NCEM Risk Management Tool

TABLE 4.56 – ESTIMATED BUILDINGS IMPACTED BY 300-YEAR HURRICANE WIND EVENT

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$3,529,078	100	4	$333,778	34	1	$115,610	2,728	100	$3,978,466
Greensboro	81,938	73,605	90	$156,094,113	6,867	8	$64,310,049	1,447	2	$13,515,173	81,919	100	$233,919,335
High Point	38,756	34,594	89	$58,698,049	3,430	9	$25,859,985	693	2	$4,137,066	38,717	100	$88,695,100
Jamestown	2,786	2,511	90	$4,819,745	199	7	$1,125,454	75	3	$1,154,897	2,785	100	$7,100,096
Oak Ridge	3,228	2,994	93	$6,270,180	181	6	$359,409	53	2	$296,072	3,228	100	$6,925,661
Pleasant Garden	2,820	2,655	94	$3,158,865	142	5	$281,136	22	1	$202,869	2,819	100	$3,642,870
Sedalia	393	364	93	$391,971	6	2	$62,473	23	6	$117,104	393	100	$571,548
Stokesdale	2,337	2,125	91	$2,661,524	196	8	$722,453	16	1	$97,372	2,337	100	$3,481,349
Summerfield	4,274	4,065	95	$7,685,107	183	4	$297,803	25	1	$120,532	4,273	100	$8,103,443
Whitsett	573	541	94	$693,258	22	4	$59,813	10	2	$9,530	573	100	$762,601
Guilford County (unincorporated area)	49,554	45,470	92	$59,931,471	3,281	7	$7,254,596	800	2	$5,286,800	49,551	100	$72,472,867
Total	**189,387**	**171,518**	**91**	**$303,933,361**	**14,607**	**8**	**$100,666,949**	**3,198**	**2**	**$25,053,025**	**189,323**	**100**	**$429,653,336**

Source: NCEM Risk Management Tool

TABLE 4.57 – ESTIMATED BUILDINGS IMPACTED BY 700-YEAR HURRICANE WIND EVENT

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$9,570,446	100	4	$1,255,969	34	1	$488,081	2,728	100	$11,314,496
Greensboro	81,938	73,605	90	$433,551,091	6,867	8	$191,023,632	1,447	2	$41,896,537	81,919	100	$666,471,260
High Point	38,756	34,594	89	$167,102,842	3,430	9	$81,995,495	693	2	$13,015,718	38,717	100	$262,114,055
Jamestown	2,786	2,511	90	$13,235,237	199	7	$3,548,938	75	3	$3,300,020	2,785	100	$20,084,195
Oak Ridge	3,228	2,994	93	$17,754,231	181	6	$1,056,654	53	2	$1,016,097	3,228	100	$19,826,982
Pleasant Garden	2,820	2,655	94	$8,174,101	142	5	$795,858	22	1	$595,546	2,819	100	$9,565,505
Sedalia	393	364	93	$794,364	6	2	$89,604	23	6	$360,408	393	100	$1,244,376
Stokesdale	2,337	2,125	91	$6,986,050	196	8	$3,128,599	16	1	$432,082	2,337	100	$10,546,731
Summerfield	4,274	4,065	95	$22,535,928	183	4	$1,022,501	25	1	$421,429	4,273	100	$23,979,857
Whitsett	573	541	94	$1,799,120	22	4	$148,944	10	2	$35,467	573	100	$1,983,530
Guilford County (unincorporated area)	49,554	45,470	92	$156,882,474	3,281	7	$21,867,119	800	2	$16,037,181	49,551	100	$194,786,774
Total	**189,387**	**171,518**	**91**	**$838,385,884**	**14,607**	**8**	**$305,933,313**	**3,198**	**2**	**$77,598,566**	**189,323**	**100**	**$1,221,917,761**

Source: NCEM Risk Management Tool

ENVIRONMENT

Hurricane winds can cause massive damage to the natural environment, uprooting trees and other debris within the storm's path. Animals can either be killed directly by the storm or impacted indirectly through changes in habitat and food availability caused by high winds and intense rainfall. Endangered species can be dramatically impacted. Forests can be completely defoliated by strong winds.

CONSEQUENCE ANALYSIS

Table 4.58 summarizes the potential negative consequences of hurricanes and tropical storms.

TABLE 4.58 – CONSEQUENCE ANALYSIS – HURRICANE AND TROPICAL STORM

Category	Consequences
Public	Impacts include injury or death, loss of property, outbreak of diseases, mental trauma and loss of livelihoods. Power outages and flooding are likely to displace people from their homes. Water can become polluted such that if consumed, diseases and infection can be easily spread. Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed, resulting in cascading impacts on the public.
Responders	Localized impact expected to limit damage to personnel in the inundation area at the time of the incident. Potential impacts to response capabilities due to storm impacts
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel from flooding or wind may require temporary relocation of some operations. Operations may be interrupted by power outages. Disruption of roads and/or utilities may postpone delivery of some services. Regulatory waivers may be needed locally. Fulfillment of some contracts may be difficult. Impact may reduce deliveries.
Property, Facilities and Infrastructure	Structural damage to buildings may occur; loss of glass windows and doors by high winds and debris; loss of roof coverings, partial wall collapses, and other damages requiring significant repairs are possible in a major (category 3 to 5) hurricane.
Environment	Hurricanes can devastate wooded ecosystems and remove all the foliation from forest canopies, and they can change habitats so drastically that the indigenous animal populations suffer as a result. Specific foods can be taken away as high winds will often strip fruits, seeds and berries from bushes and trees. Secondary impacts may occur; for example, high winds and debris may result in damage to an above-ground fuel tank, resulting in a significant chemical spill.
Economic Condition of the Jurisdiction	Local economy and finances adversely affected, possibly for an extended period of time, depending on damages. Intangible impacts also likely, including business interruption and additional living expenses.
Public Confidence in the Jurisdiction's Governance	Likely to impact public confidence due to possibility of major event requiring substantial response and long-term recovery effort.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes hurricane and tropical storm hazard risk by jurisdiction. Most aspects of hurricane risk do not vary substantially by jurisdiction; however, impacts may be greater in more highly developed areas with greater amounts of impervious surface and higher exposure in terms of both property and population density. Additionally, mobile home units are more vulnerable to wind damage. While mobile home units do not comprise a significant proportion of any jurisdictions housing mix, Guilford County has over 3,000 mobile home units in their jurisdiction and therefore may face more severe impacts from wind.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	3	2	4	1	2	2.6	M
Greensboro	3	2	4	1	2	2.6	M
High Point	3	2	4	1	2	2.6	M
Jamestown	3	2	4	1	2	2.6	M
Oak Ridge	3	2	4	1	2	2.6	M
Pleasant Garden	3	2	4	1	2	2.6	M
Sedalia	3	2	4	1	2	2.6	M
Stokesdale	3	2	4	1	2	2.6	M
Summerfield	3	2	4	1	2	2.6	M
Whitsett	3	2	4	1	2	2.6	M
Unincorporated Guilford County	3	3	4	1	2	2.9	M

Severe Winter Weather

HAZARD 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 of more inches in 12 hours or less. A blizzard is the most severe form of winter storm. It combines low temperatures, heavy snow, and winds of 35 miles per hour or more, which reduces visibility to a quarter mile or less for at least 3 hours. Winter storms are often accompanied by sleet, freezing rain, or an ice storm. Such freeze events are particularly hazardous as they create treacherous surfaces.

Ice storms, which are much more common in Guilford County than snow 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, etc. – have the potential to cause significant hazard to a community. Even small accumulations can down power lines and trees limbs and create hazardous driving conditions. Furthermore, communication and power may be disrupted for days.

Advancements in meteorology and forecasting usually allow for mostly accurate forecasting a few days in advance of an impending storm. Most storms have a duration of a few hours; however, impacts can last a few days after the initial incident until cleanup is completed.

Warning Time: 1 – More than 24 hours

Duration: 3 – Less than one week

LOCATION

Severe winter storms are usually a countywide or regional hazard, impacting the entire county at the same time. Some ice storms 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 risk of a severe winter storm occurring is uniform across the county. Guilford County is accustomed severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm.

Spatial Extent: 4 – Large

EXTENT

The National Oceanic and Atmospheric Administration (NOAA) uses the Regional Snowfall Index (RSI) to assess the societal impact of winter storms in the six easternmost regions in the United States. The index makes use of population and regional differences to assess the impact of snowfall. For example, areas which receive very little snowfall on average may be more adversely affected than other regions, resulting in a higher severity. The Region may experience any level on the RSI scale.

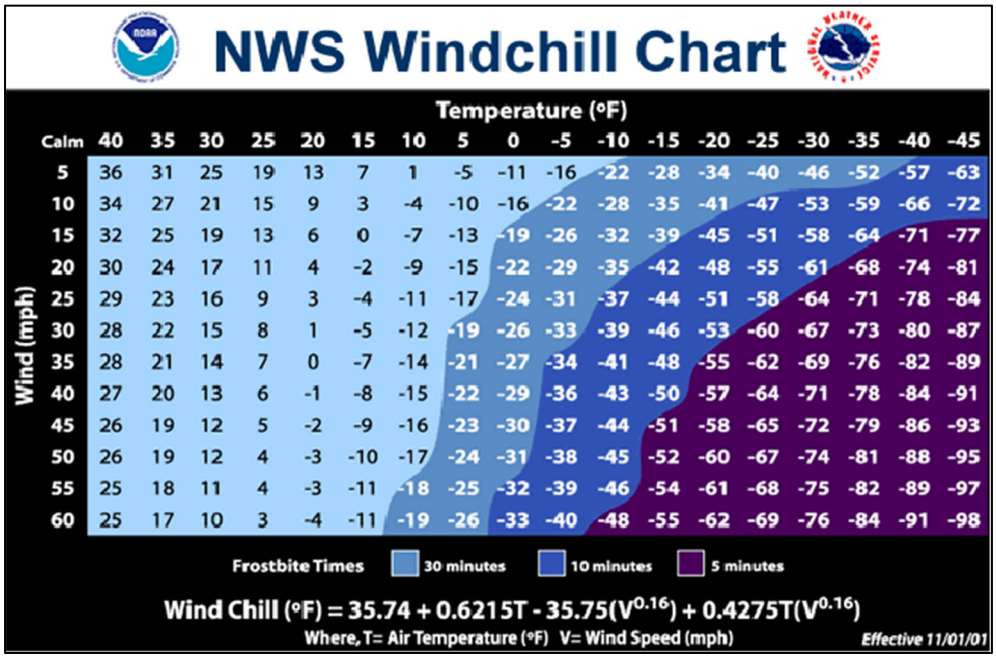
TABLE 4.59 – REGIONAL SNOWFALL INDEX (RSI) VALUES

Category	RSI Value	Description
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18+	Extreme

Source: NOAA

Severe winter storms often involve a mix of hazardous weather conditions. The magnitude of an event can be defined based on the severity of each of the involved factors, including precipitation type, precipitation accumulation amounts, temperature, and wind. The NWS Wind Chill Temperature Index, shown in Figure 4.58, provides a formula for calculating the dangers of winter winds and freezing temperatures.

FIGURE 4.58 – NWS WIND CHILL TEMPERATURE INDEX



Source: http://www.nws.noaa.gov/om/winter/windchill.shtml

The greatest one-day snowfall amount recorded in the Guilford County planning area was 20 inches, recorded on March 3, 1927. The greatest one-day snowfall to occur in the last 25 years was on December 9, 2018 when a major winter storm dropped 12 inches on the City of Greensboro.

Impact: 2 – Limited

HISTORICAL OCCURRENCES

To get a full picture of the range of impacts of a severe winter storm, data for the following weather types as defined by the National Weather Service (NWS) Raleigh Forecast Office and tracked by NCEI were collected:

- **Blizzard** – A winter storm which produces the following conditions for 3 consecutive hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile.
- **Cold/Wind Chill** – Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory conditions of 0°F to -14°F with wind speeds 10 mph (9 kt) or greater.
- **Extreme Cold/Wind Chill** – A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria, defined as wind chill -15°F or lower with wind speeds 10 mph (9 kt) or greater.
- **Frost/Freeze** – A surface air temperature of 32°F or lower, or the formation of ice crystals on the ground or other surfaces, for a period of time long enough to cause human or economic impact, during the locally defined growing season.
- **Heavy Snow** – Snow accumulation meeting or exceeding 12 and/or 24 hour warning criteria of 3 and 4 inches, respectively.
- **Ice Storm** – Ice accretion meeting or exceeding locally/regionally defined warning criteria of ¼ inch or greater resulting in significant, widespread power outages, tree damage and dangerous travel. Issued only in those rare instances where just heavy freezing rain is expected and there will be no "mixed bag" precipitation meaning no snow, sleet or rain.
- **Sleet** – Sleet accumulations meeting or exceeding locally/regionally defined warning criteria of ½ inch or more.
- **Winter Storm** – A winter weather event that has more than one significant hazard and meets or exceeds locally/regionally defined 12 and/or 24 hour warning criteria for at least one of the precipitation elements. Defined by NWS Raleigh Forecast Office as snow accumulations 3 inches or greater in 12 hours (4 inches or more in 24 hours); Freezing rain accumulations ¼ inch (6 mm) or greater; Sleet accumulations ½ inch (13 mm) or more. Issued when there is at least a 60% forecast confidence of any one of the three criteria being met.
- **Winter Weather** – A winter precipitation event that causes a death, injury, or a significant impact to commerce or transportation, but does not meet locally/regionally defined warning criteria.

Summarized impacts from data collected for the years 1999 through 2024 are included in Table 4.60. Cumulatively, severe winter storms caused $8.7 million in property damage and $75,000 in crop damage. In this timeframe, the County experienced no injuries or fatalities from the impacts of severe winter storm, though these types of impacts are possible in future events. No blizzard, cold/wind chill, extreme cold/wind chill, frost/freeze, and sleet events were recorded.

TABLE 4.60 – TOTAL SEVERE WINTER WEATHER EVENTS IN GUILFORD COUNTY, 1999-2024

Event Type	Number of Recorded Incidents	Total Fatalities	Total Injuries	Total Property Damage	Total Crop Damage
Heavy Snow	1	0	0	$0	$0

Event Type	Number of Recorded Incidents	Total Fatalities	Total Injuries	Total Property Damage	Total Crop Damage
Ice Storm	2	0	0	$8,000,000	$0
Winter Storm	37	0	0	$650,000	$75,000
Winter Weather	35	0	0	$20,000	$0
Total	**75**	**0**	**0**	**$8,770,000**	**$75,000**

Source: NCEI

Specific events with recorded property damage or crop damage in Guilford County are detailed in Table 4.61.

TABLE 4.61 – EVENTS WITH RECORDED SEVERE WINTER WEATHER IMPACTS IN GUILFORD COUNTY, 1999-2024

Date	Event Type	Fatalities	Injuries	Property Damage	Crop Damage
12/7/2007	Winter Weather	0	0	$20,000	$0
2/5/2010	Winter Storm	0	0	$50,000	$0
3/6/2014	Ice Storm	0	0	$8,100,000	$0
2/25/2015	Winter Storm	0	0	$500,000	$0
1/12/2019	Winter Storm	0	0	$0	$75,000
2/12/2021	Winter Storm	0	0	$100,000	$0
Total		**0**	**0**	**$8,770,000**	**$75,000**

Source: NCEI

(Note: The data presented in the table is based on NCEI records, which may be incomplete. While the table indicates no recorded fatalities or injuries from severe winter weather events, including the December 2007 storm, the narrative below references a fatality associated with that storm. This discrepancy highlights limitations in the available data)

Several storm impacts from NCEI are summarized below:

December 7, 2007 – Light freezing rain fell across Central North Carolina. The event resulted in several automobile accidents from black ice on numerous bridges. Someone was killed in a multi vehicle accident on Highway 421 just south of Greensboro. The accident was the result of black ice which formed on an overpass.

February 5, 2010 – A low pressure system moving along the North Carolina coast combined with cold air to produce a period of freezing rain and snow over Central North Carolina. Up to three inches of snow fell across portions of the county along with up to a quarter inch of freezing rain. A total of over fifty thousand people were without power in North Carolina. North Carolina Highway Patrol responded to over 725 calls involving vehicle accidents. Numerous trees fell due to the weight of the freezing rain.

March 6, 2014 – A storm off the Carolina coast brought a wintry mix of snow, sleet, and freezing rain to the northern-northwestern Piedmont counties. One quarter to one half of an inch of ice from freezing rain resulted in widespread downed trees and powerlines. Additionally, snowfall of 4 to 7 inches fell across northern portions of the county. Mainly sleet mixed with freezing rain produced significant icing of a quarter to half inch. At the peak of the storm, over 400,000 customers were without power. A natural disaster was declared in 7 |counties across the Raleigh CWA that were impacted by this storm.

February 25, 2015 – As a low-pressure system tracked along the southeast coast, wintry precipitation spread into Central North Carolina. A winter storm warning was issued for the majority of the area.

Much of the warning area received 2-4 inches of snow and sleet, with the northern third tier of counties receiving 7-9 inches. Guilford County received 5 to 8 inches. In addition, some locations received a thin glaze of ice on top of the snow. Precipitation amounts decreased towards the south, with the southern tier of counties only received a trace of snow and sleet. The heavy, wet snow caused extensive power outages in many of the hardest hit counties, with some power outages extending beyond 24 hours.

January 12, 2019 – Moisture overspread the area from the southwest as a southern low pressure system came up through the Southeast Coast. |The moist warm air moving atop a strong wedge of shallow cold air near the surface along the eastern slopes of the southern Appalachians produced predominately freezing rain and significant icing across the northwest and northern portions of the NC Piedmont beginning Saturday night(January 12) before ending Sunday morning (January 13). The heaviest ice accrual was reported along and north of the Interstate 85 corridor, where a quarter to one-third of an inch of ice toppled numerous trees and leaving thousands without power.

February 12, 2021 – An area of low pressure tracked along a stalled frontal zone to the south of Central North Carolina. Widespread precipitation occurred with a cold air damming airmass developing. This allowed for temperatures to cool falling below freezing across the northern Piedmont and northern Coastal Plain. Freezing rain occurred in this area resulting in ice accrual. One quarter to one-half of an inch of ice from freezing rain downed numerous trees across the county, causing numerous power outages.

Guilford County received two emergency management declaration and five presidential disaster declarations since 1953 for incidents related to severe winter storms. As a state, North Carolina received eight disaster declarations related to severe winter storms during this timeframe.

TABLE 4.62 – EMERGENCY & DISASTER DECLARATIONS IN GUILFORD COUNTY DUE TO SEVERE WINTER WEATHER

Number	Date	Disaster Type	Incident Start	Incident End
EM 3033	3/2/1977	Drought and Freezing	3/2/1977	3/2/1977
EM 3110	3/17/1993	Severe Snowfall and Winter Storm	3/13/1993	3/17/1993
DR 1087	1/13/1996	Blizzard	1/6/1996	1/13/1996
DR 1103	2/23/1996	Snowstorm	2/2/1996	2/9/1996
DR 1448	12/12/2002	Severe Ice Storm	12/4/2002	12/6/2002
DR 1457	3/27/2003	Ice Storm	2/27/2003	2/28/2003
DR 4167	3/31/2014	Severe Winter Storm	3/6/2014	3/7/2014

Source: FEMA, June 19, 2025

PROBABILITY OF FUTURE OCCURRENCE

Winter storm events will remain a regular occurrence in Guilford County due to its location in the western half of the state. According to historical information, Guilford County generally experiences several winter storm events each year. NCEI records 75 severe winter storm related events during the 25-year period from 1999 through 2024, which equates to an average of 3 events per year, or more than 100 percent likelihood of an occurrence in any given year.

Probability: 4 – Highly Likely

CLIMATE CHANGE

Per the 2023 North Carolina Hazard Mitigation Plan, there is uncertainty associated with climate change impacts on future severe winter storms. Global temperature rise could cause shorter and warmer winters in many areas; however, the potential for dangerously low temperatures may increase due to continuing trends of temperature extremes. Warmer winters, however, mean that precipitation that would normally fall as snow may begin to fall as rain or freezing rain instead.

VULNERABILITY ASSESSMENT

PEOPLE

Winter storms are considered deceptive killers because most deaths are indirectly related to the storm event. The leading cause of death during winter storms is from automobile or other transportation accidents due to poor visibility and/or slippery roads. Additionally, exhaustion and heart attacks caused by overexertion may result from winter storms.

Power outages during very cold winter storm conditions can also create potentially dangerous situations. Elderly people account for the largest percentage of hypothermia victims. In addition, if the power is out for an extended period, residents are forced to find alternative means to heat their homes. The danger arises from carbon monoxide released from improperly ventilated heating sources such as space or kerosene heaters, furnaces, and blocked chimneys. House fires also occur more frequently in the winter due to lack of proper safety precautions when using an alternative heating source. Those without shelter are also especially vulnerable to the impacts of winter weather.

Another indirect impact of winter weather on the public is its potential to impact public and private school schedules through closings and delays. Poor driving conditions, lack of power and heat, and mechanical problems with school buses and equipment due to cold weather conditions are potential concerns. School closures and delays can lead to logistical problems for teachers and school administrators, especially in the event of end-of-term exams and standardized testing schedules. It can also result in logistical problems for making up school days.

There is a high potential of business and office closures, modified business and office hours, and cancellation or postponement of other planned events. In general, absenteeism is higher during winter weather events as many employers rightly encourage employees to stay home and avoid potential injury in unsafe driving conditions.

PROPERTY

According to reported data of storm impacts recorded by the NCEI, between 1999 and 2024 Guilford County experienced $8.77 million in property damage related to the impacts of severe winter storm, and $75,000 in crop damage.

One of the primary impacts of winter weather in North Carolina is the disruption of utilities. Utilities that are at risk of being affected include telephone, internet, cable, and water. Newspaper reports typically cite trees falling on electrical wires or stress caused by ice accumulation as main causes for power outages. Damage to this infrastructure is one of the major consequences of a winter weather event and can lead to life-threatening situations if the public is unable to utilize central heating systems to keep warm during the concurrent cold weather that often accompanies winter weather.

Winter weather also has the potential to create hazardous driving conditions leading to accidents on roadways. The North Carolina Climate Office reports that 70 percent of winter-weather–related injuries are a result of accidents on the road.33 The North Carolina Highway Patrol call volume can double

during a winter storm compared to a typical 24-hour period. This creates significant problems for emergency workers. Accidents can cause highways to become "large parking lots" as well as cause motorists to strand their vehicles, making it difficult for emergency workers to reach those who need assistance. In general, major and local roadways become severely impacted when temperatures drop, making pre- treatment solutions ineffective. Transportation impacts can be minimized during early- and late-season events when paved surfaces are able to warm sufficiently to prevent winter precipitation accumulation. Winter weather can also cause delays and cancellations of flights at airports in the state due to slick conditions on runways. There is also the potential of a loss of power that can close the airport.

ENVIRONMENT

Winter weather events may include ice or snow accumulation on trees which can cause large limbs, or even whole trees, to snap and potentially fall on buildings, cars, or power lines. This potential for winter debris creates a dangerous environment to be outside in; significant injury or fatality may occur if a large limb snaps while a local resident is out driving or walking underneath it.

Snow on the roads can pick up contaminants from chemicals and oil products in traffic as well as the salt mixture that is used to de-ice the roads. These contaminants can be carried to nearby waterways, which, contaminates water sources and is absorbed by groundwater.

CONSEQUENCE ANALYSIS

Table 4.63 summarizes the potential negative consequences of severe winter weather.

TABLE 4.63 – CONSEQUENCE ANALYSIS – SEVERE WINTER WEATHER

Category	Consequences
Public	Localized impact expected to be severe for affected areas and moderate to light for other less affected areas. The leading cause of death during winter storms is from automobile or other transportation accidents due to poor visibility and/or slippery roads. Additionally, exhaustion and heart attacks caused by overexertion may result from winter storms.
Responders	Responders in winter storm and freeze events face a variety of hazards themselves including slick or icy roads that could cause harm to responders if they are attempting to quickly respond to an emergency as is often the case. Winter storms can also make it difficult to access more rural areas if roads are snowed over and vehicles cannot pass through.
Continuity of Operations (including Continued Delivery of Services)	Localized disruption of roads and/or utilities caused by incident may postpone delivery of some services.
Property, Facilities and Infrastructure	Localized impact to facilities and infrastructure in the areas of the incident. Power lines and roads most adversely affected.
Environment	Environmental damage to trees, bushes, etc.
Economic Condition of the Jurisdiction	Poor road conditions and loss of power can cause business and office closures, modified business and office hours, and cancellation or postponement of planned events. Local economy and finances may be adversely affected, depending on damage.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes severe winter storm hazard risk by jurisdiction. Severe winter weather risk does not vary substantially by jurisdiction because these events are typically regional in nature.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All jurisdictions	*4*	*2*	*4*	*1*	*3*	*3.0*	*H*

Tornadoes & Thunderstorms

HAZARD BACKGROUND

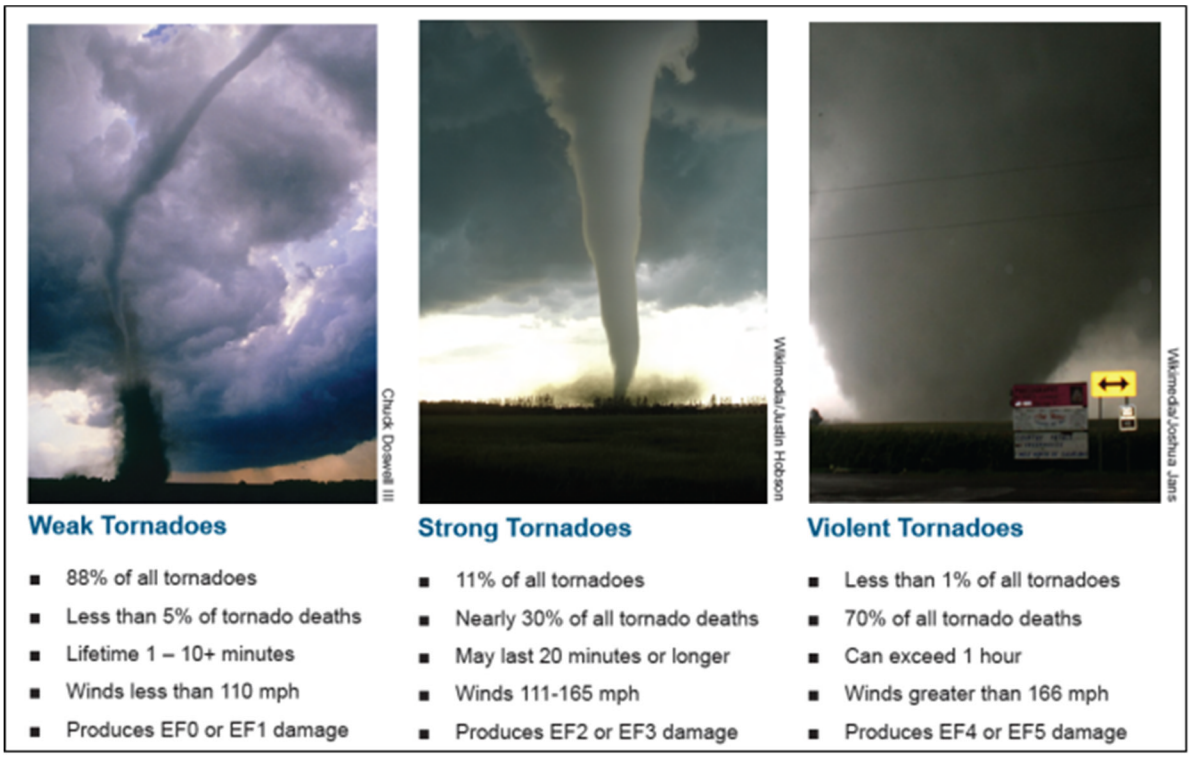
TORNADOES

According to the Glossary of Meteorology (AMS 2000), a tornado is "a violently rotating column of air, pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud." Tornadoes can appear from any direction. Most move from southwest to northeast, or west to east. Some tornadoes have changed direction or even backtracked.

Tornadoes are commonly produced by land falling tropical cyclones. Those making landfall along the Gulf coast traditionally produce more tornadoes than those making landfall along the Atlantic coast. Tornadoes that form within hurricanes are more common in the right front quadrant with respect to the forward direction but can occur in other areas as well. According to the NHC, about 10% of the tropical cyclone-related fatalities are caused by tornadoes. Tornadoes are more likely to be spawned within 24 hours of landfall and are usually within 30 miles of the tropical cyclone's center.

Tornadoes have the potential to produce winds in excess of 200 mph (EF5 on the Enhanced Fujita Scale) and can be very expansive – some in the Great Plains have exceeded two miles in width. Tornadoes associated with tropical cyclones, however, tend to be of lower intensity (EF0 to EF2) and much smaller in size than ones that form in the Great Plains. Figure 4.59 provides a description and breakdown of tornadoes by severity. Violent tornadoes, as described below, are unlikely in Guilford County.

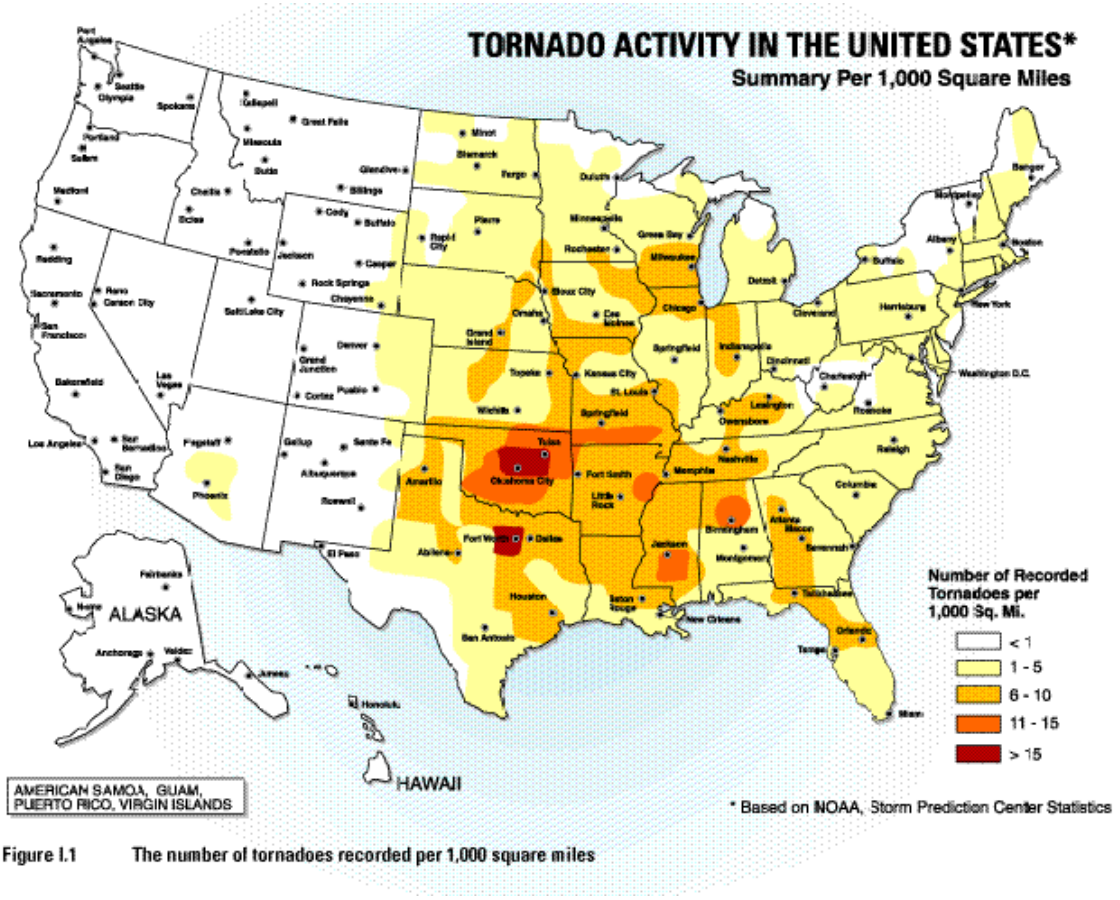
FIGURE 4.59 – TORNADO BY SEVERITY



Source: NOAA National Weather Service

Figure 4.60 shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles. North Carolina has averaged 1 to 5 tornadoes per 1,000 square miles.

FIGURE 4.60 – TORNADO ACTIVITY IN THE U.S.



Source: American Society of Civil Engineers

Warning Time: 4 – Less than 6 hours

Duration: 1 – Less than 6 hours

THUNDERSTORM WINDS

Thunderstorms result from the rapid upward movement of warm, moist air. They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at earth's surface and causes strong winds associated with thunderstorms.

There are four ways in which thunderstorms can organize: single cell, multi-cell cluster, multi-cell lines (squall lines), and supercells. Even though supercell thunderstorms are most frequently associated with severe weather phenomena, thunderstorms most frequently organize into clusters or lines. Warm, humid conditions are favorable for the development of thunderstorms. The average single cell thunderstorm is approximately 15 miles in diameter and lasts less than 30 minutes at a single location.

However, thunderstorms, especially when organized into clusters or lines, can travel intact for distances exceeding 600 miles.

Thunderstorms are responsible for the development and formation of many severe weather phenomena, posing great hazards to the population and landscape. Damage that results from thunderstorms is mainly inflicted by downburst winds, large hailstones, and flash flooding caused by heavy precipitation. Stronger thunderstorms are capable of producing tornadoes and waterspouts. While conditions for thunderstorm conditions may be anticipated within a few hours, severe conditions are difficult to predict. Regardless of severity, storms generally pass within a few hours.

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

LIGHTNING

Lightning is a sudden electrical discharge released from the atmosphere that follows a course from cloud to ground, cloud to cloud, or cloud to surrounding air, with light illuminating its path. Lightning's unpredictable nature causes it to be one of the most feared weather elements.

All thunderstorms produce lightning, which often strikes outside of the area where it is raining and is known to fall more than 10 miles away from the rainfall area. When lightning strikes, electricity shoots through the air and causes vibrations creating the sound of thunder. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. According to the National Weather Service, lightning kills an average of 20 people nationwide each year. Lightning strikes can also start building fires and wildland fires, and damage electrical systems and equipment.

The watch/warning time for a given storm is usually a few hours. There is no warning time for any given lightning strike. Lightning strikes are instantaneous. Storms that cause lightning usually pass within a few hours.

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

HAIL

According to the National Oceanic and Atmospheric Administration (NOAA), hail is precipitation that is formed when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere causing them to freeze. The raindrops form into small frozen droplets and then continue to grow as they come into contact with super-cooled water which will freeze on contact with the frozen rain droplet. This frozen rain droplet can continue to grow and form hail. As long as the updraft forces can support or suspend the weight of the hailstone, hail can continue to grow.

At the time when the updraft can no longer support the hailstone, it will fall down to the earth. For example, a ¼" diameter or pea sized hail requires updrafts of 24 mph, while a 2 ¾" diameter or baseball sized hail requires an updraft of 81 mph. The largest hailstone recorded in the United States was found in Vivian, South Dakota on July 23, 2010; it measured eight inches in diameter, almost the size of a soccer ball. While soccer-ball-sized hail is the exception, even small pea sized hail can do damage.

Hailstorms in North Carolina cause damage to property, crops, and the environment, and kill and injure livestock. In the United States, hail causes more than $1 billion in damage to property and crops each year. Much of the damage inflicted by hail is to crops. Even relatively small hail can shred plants to ribbons in a matter of minutes. Vehicles, roofs of buildings and homes, and landscaping are the other

things most commonly damaged by hail. Hail has been known to cause injury to humans; occasionally, these injuries can be fatal.

The onset of thunderstorms with hail is generally rapid. However, advancements in meteorological forecasting allow for some warning. Storms usually pass in a few hours.

Warning Time: 4 – Less than six hours

Duration: 1 – Less than six hours

LOCATION

TORNADOES

Tornadoes and thunderstorms can occur anywhere in the region and do not have a defined vulnerability zone. Tornadoes typically impact a small area, but damage may be extensive. Tornado locations are completely random, meaning risk to tornado isn't increased in one area of the county versus another. Tornadoes can be spawned by tropical cyclones; however, these tornadoes typically occur up to 2 days before and as many as 3 days after landfall of the tropical cyclone.

Spatial Extent: 2 – Small

THUNDERSTORM WINDS

Thunderstorm wind, lightning, and hail events do not have a defined vulnerability zone. The scope of wind, lightning and hail is generally defined to the footprint of its associated thunderstorm. Given the general size and movement of thunderstorm events, thunderstorm winds from one event may impact a large portion of the planning area. The entirety of Guilford County shares equal risk to the threat of severe weather.

Spatial Extent: 3 – Moderate

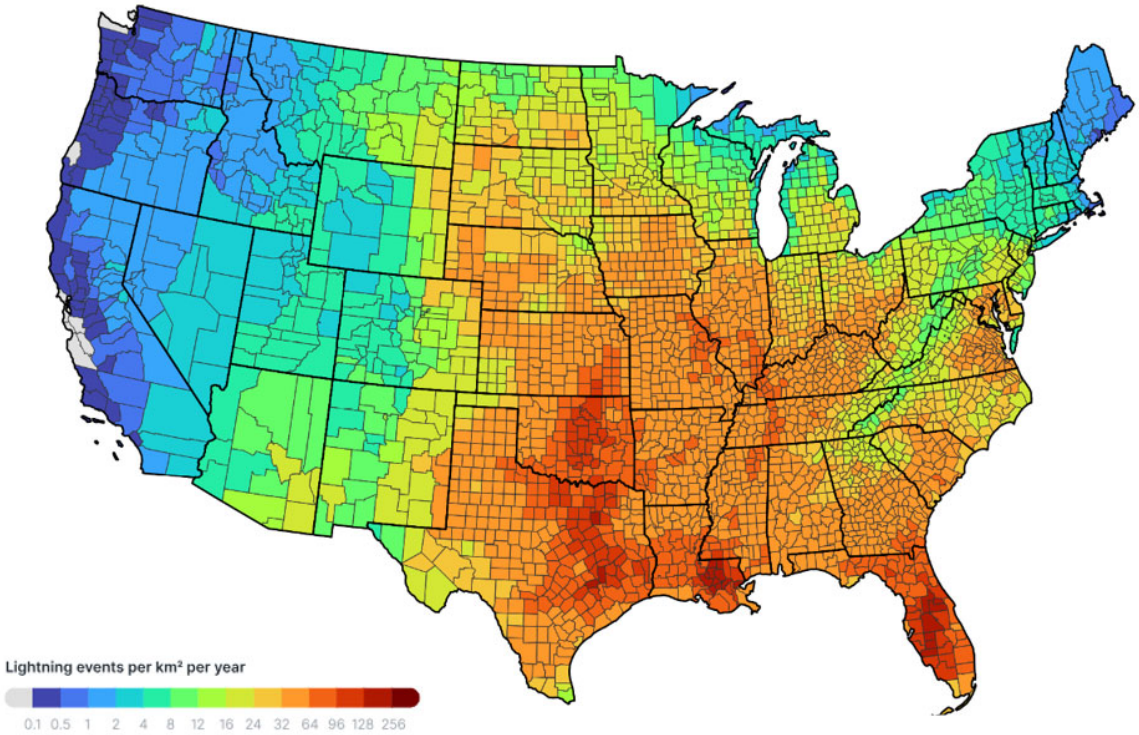
LIGHTNING AND HAIL

The scope of lightning and hail is generally defined to the footprint of its associated thunderstorm. However, large-scale hail tends to occur in a more localized area within the storm, and lightning strikes and associated damages are highly localized and occur randomly. It should be noted that while lightning is most often affiliated with severe thunderstorms, it may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall. The entirety of Guilford County is uniformly exposed to each of these hazards.

According to the Vaisala flash density map, shown in Figure 4.61, Guilford County experiences 24 to 32 lightning flashes per square km per year. The entire planning area is uniformly exposed to the threat of lightning.

Spatial Extent: 1 – Negligible

FIGURE 4.61 – TOTAL LIGHTNING DENSITY BY COUNTY (2016-2022)



EXTENT

TORNADOES

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita (EF) scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis, better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 4.64 shows the wind speeds associated with the enhanced Fujita scale ratings and the damage that could result at different levels of intensity.

TABLE 4.64 – ENHANCED FUJITA SCALE

EF Number	3 Second Gust (mph)	Damage
0	65-85	**Light damage.** Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
1	96-110	**Moderate damage.** Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.

EF Number	3 Second Gust (mph)	Damage
2	111-135	**Considerable damage.** Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
3	136-165	**Severe damage.** Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
4	166-200	**Devastating damage.** Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
5	Over 200	**Incredible damage.** Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m; high-rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NWS Storm Prediction Center

Historically, the highest rated tornado to pass through Guilford County was rated EF3 and occurred in March 2010, causing $10 million in damage.

Impact: 3 – Critical

THUNDERSTORM WINDS

The magnitude of a thunderstorm event can be defined by the storm's maximum wind speed and its impacts. NCEI divides wind events into several types including High Wind, Strong Wind, Thunderstorm Wind, Tornado and Hurricane. For this severe weather risk assessment, High Wind, Strong Wind and Thunderstorm Wind data was collected. Hurricane Wind and Tornadoes are addressed as individual hazards. The following definitions come from the NCEI Storm Data Preparation document.

- **High Wind** – Sustained non-convective winds of 40mph or greater lasting for one hour or longer or winds (sustained or gusts) of 58 mph for any duration on a widespread or localized basis.
- **Strong Wind** – Non-convective winds gusting less than 58 mph, or sustained winds less than 40 mph, resulting in a fatality, injury, or damage.
- **Thunderstorm Wind** – Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 58 mph, or winds of any speed (non-severe thunderstorm winds below 58 mph) producing a fatality, injury or damage.

The Beaufort Wind Force Scale shown in Table 4.65 is an empirical measure that relates wind speed to observed conditions at sea or on land. In the United States, winds of force 6 to 7 are designated as "strong;" 8 to 9 "gale force;" 10 to 11 "usually results in a storm warning or tropical storm warning; and force 12 results in a hurricane warning.

TABLE 4.65 – BEAUFORT WIND FORCE SCALE

Rating	(MPH)	Name	Appearance of Wind Effects	
			On Water	On Land
0	<1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	13-18	Moderate Breeze	Small waves 1-4 ft, becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	19-24	Fresh Breeze	Moderate waves 4-8 ft taking longer to form, many whitecaps, some spray	Small trees in leaf begin to sway
6	25-31	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	32-38	Near Gale	Sea heaps up, waves 13-19 ft, white foam streaks of breakers	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Moderately high (18-25 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	47-54	Strong Gale	High waves (23-32 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Very high waves (29-41 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, “considerable structural damage”
11	64-72	Violent Storm	Exceptionally high (37-52 ft) waves, foam patches cover sea, visibility more reduced	Very rarely experienced; widespread damage
12	73+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	Devastation

— Source: NOAA Storm Prediction Center

The strongest recorded thunderstorm wind event in the county occurred on July 15, 1976 with a measured gust of 97 mph, though the NCEI recorded no location or impact data.

Impact: 2 – Limited

LIGHTNING

Lightning is measured by the Lightning Activity Level (LAL) scale, created by the National Weather Service to define lightning activity into a specific categorical scale. The LAL is a common parameter that is part of fire weather forecasts nationwide.

TABLE 4.66 – LIGHTNING ACTIVITY LEVEL SCALE

Lightning Activity Level Scale	
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground lightning strikes in a five-minute period
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a five-minute period
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a five-minute period
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a five-minute period
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag warning

Source: National Weather Service

With the right conditions in place, the entire county is susceptible to each lightning activity level as defined by the LAL. Most lightning strikes cause limited damage to specific structures in a limited area, and cause very few injuries or fatalities, and minimal disruption on quality of life.

Impact: 1 – Minor

HAIL

The NWS classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4.67 indicates the hailstone measurements utilized by the NWS.

TABLE 4.67 – HAILSTONE MEASUREMENT COMPARISON CHART

Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf ball
2.0 inch	Hen egg
2.5 inch	Tennis ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

The Tornado and Storm Research Organization (TORRO) has further described hail sizes by their typical damage impacts. Table 4.68 describes typical intensity and damage impacts of the various sizes of hail.

TABLE 4.68 – TORNADO AND STORM RESEARCH ORGANIZATION HAILSTORM INTENSITY SCALE

Intensity Category	Diameter (mm)	Diameter (inches)	Size Description	Typical Damage Impacts
Hard Hail	5-9	0.2-0.4	Pea	No damage
Potentially Damaging	10-15	0.4-0.6	Mothball	Slight general damage to plants, crops
Significant	16-20	0.6-0.8	Marble, grape	Significant damage to fruit, crops, vegetation
Severe	21-30	0.8-1.2	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
Severe	31-40	1.2-1.6	Pigeon's egg > squash ball	Widespread glass damage, vehicle bodywork damage
Destructive	41-50	1.6-2.0	Golf ball > Pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
Destructive	51-60	2.0-2.4	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
Destructive	61-75	2.4-3.0	Tennis ball > cricket ball	Severe roof damage, risk of serious injuries
Destructive	76-90	3.0-3.5	Large orange > softball	Severe damage to aircraft bodywork
Super Hailstorms	91-100	3.6-3.9	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
Super Hailstorms	>100	4.0+	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: Tornado and Storm Research Organization (TORRO), Department of Geography, Oxford Brookes University
Notes: In addition to hail diameter, factors including number and density of hailstones, hail fall speed and surface wind speeds affect severity.

The average hailstone size recorded between 1999 and 2024 in Guilford County was approximately 1" in diameter; the largest hailstone recorded was 2.5", recorded on both August 8, 2000. Despite the large hail size, this storm resulted in no deaths, injuries, or property and crop damages per NCEI.

Impact: 1 – Minor

HISTORICAL OCCURRENCES

TORNADOES

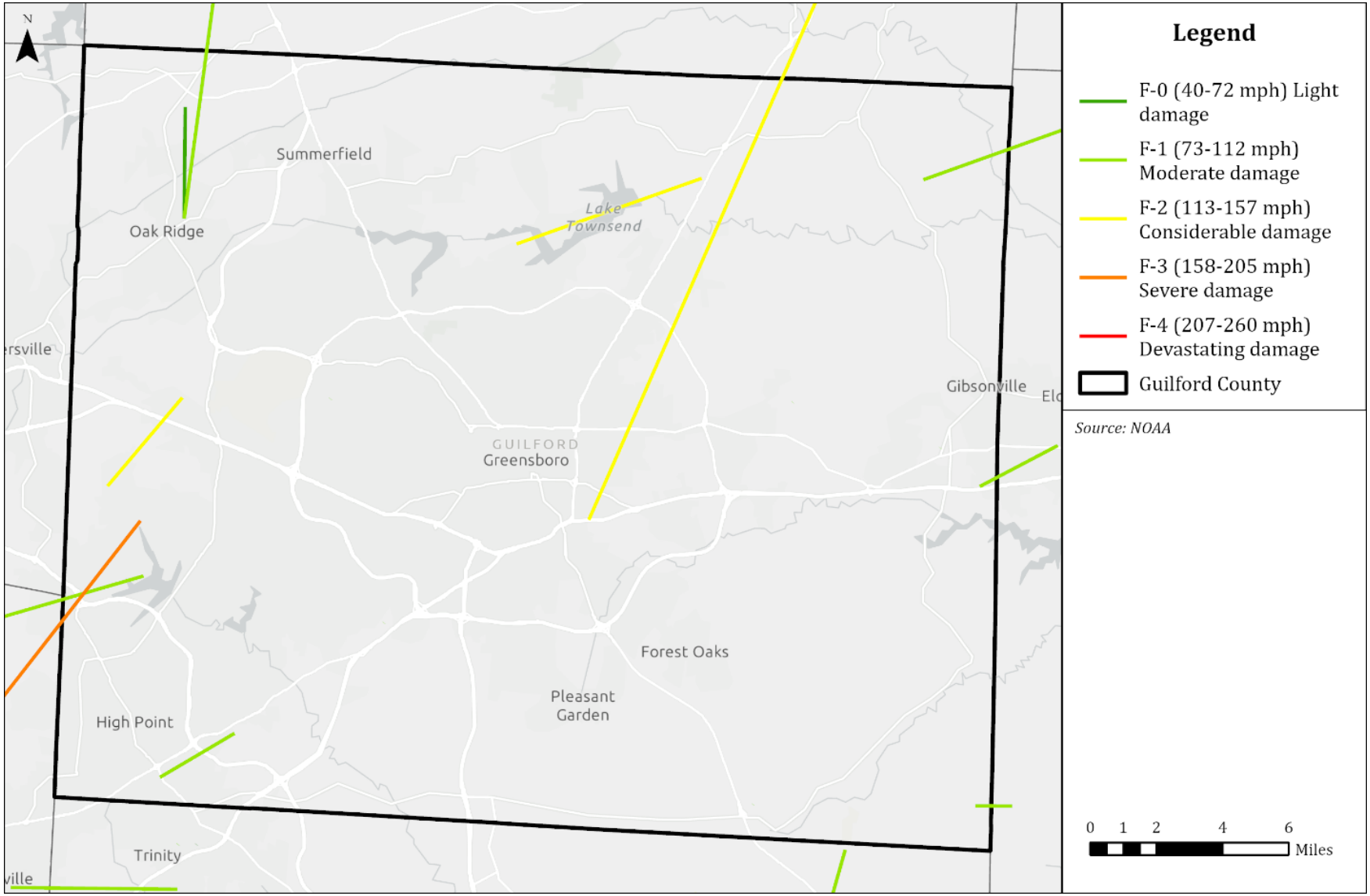
NCEI storm reports were reviewed from 1999 through 2024 to assess whether recent trends varied from the longer historical record. According to NCEI, Guilford County experienced 7 tornado incidents between 1999 and 2024, causing 1 fatality, 3 injuries, over $80 million in property damage and no crop damage. Table 4.69 shows historical tornadoes in Guilford County during this time period. Figure 4.62 reflects the tracks of past tornadoes that passed through the Region from 1950 through 2024 according to data from the NOAA/NWS Storm Prediction Center.

TABLE 4.69 – RECORDED TORNADOES IN GUILFORD COUNTY, 1999-2024

Location	Date	Time	Magnitude	Deaths	Injuries	Property Damage
Stokesdale	9/17/2004	1009	F1	0	0	-
Oak Ridge	7/7/2005	1620	F0	0	0	-
Deep River	5/8/2008	2229	EF2	1	3	$4,000,000
High Pt	3/28/2010	1830	EF3	0	0	$10,000,000
Greensboro	4/15/2018	1607	EF2	0	0	$65,000,000
Sherwood Vlg	3/18/2021	1601	EF1	0	0	$500,000
Whitsett	3/18/2021	1638	EF1	0	0	$500,000
Total				**1**	**3**	**$80,000,000**

Source: NCEI

FIGURE 4.62 – TORNADO PATHS IN GUILFORD COUNTY, 1999-2024



Source: NOAA/NWS Storm Prediction Center

Specific incidents with some level of impact include:

May 8, 2008 – The tornado, originally an EF-0, initially touched down just north of Squire Davis Park near the intersection of Sandy Ridge Road and Johnson Street. From there the tornado tracked northeast and intensified to EF-1 intensity as it approached the Farmers Market and Interstate 40. The tornado overturned several cars and tractor trailers as it crossed Interstate 40. A roof was blown off of an office building just north of the interstate as the tornado continued to intensify. As the tornado moved further northeast into an industrial complex, it further strengthened to EF-2 with winds estimated around 130 mph based on damage to warehouses. Numerous warehouses along Little Santee Road, Capital Drive, and West Market Street sustained significant damage. Numerous vehicles and tractor trailers were also overturned in the industrial complex. At its widest point, the tornado was just over 200 yards wide. The tornado quickly lifted off of the ground after crossing West Market Street near the post office. The tornado was on the ground for about four miles. One fatality occurred along West Market Street next to the Lamination Service Building located at 8717 West Market Street. The fatality occurred as a 51-year-old man slept in the rig of his tractor trailer. Three other injuries were reported, two of which occurred in automobiles and another in the I.H. Caffey Warehouse Distribution Center.

March 28, 2010 – The tornado initially touched down as an EF1 with winds around 100 mph near Old Plank Road in southwest Guilford County. It was in this area where the Apple Tree Academy sustained significant damage and two vehicles including a small bus were rolled 50 yards across the street. From this point the tornado continued northeast across Highway 311. The next area to experience damage was just north of Highway 311 and south of Old Mill Road along Langdale, Imperial and Impala Drives. Tornado damage in this area continued to indicate EF1 winds with numerous trees down along with a number of homes with roof and siding damage. The tornado intensified to an EF2 as it crossed Old Mill Road towards Johnson Street. The EF2 tornado severely damaged numerous homes along Brandon Drive. In one instance, an entire bedroom was blown off a single-story home. Three individuals who were taking shelter in a bedroom closet were carried 50 feet and were buried under the debris. One individual experienced several broken bones but overall injuries were not serious. The remainder of the house was shifted off the foundation approximately 8 inches. EF2 tornado damage continued north of Old Mill Road to Skeet Club Road along either side of Johnson Road with winds around 130 mph for most of its duration but briefly reached EF3 intensity with winds of 138 mph near Hampton Park Drive at 1278 Silverstone Court where the upper level of a two-story home was blown off. 50 to 60 homes along Hampton Park Drive, Scarlet Drive, Ruskin Drive and Johnson Road were severely damaged. The tornado crossed Johnson Road as an EF2 crossing Elmwood Avenue, Oakforest Drive and Maplewood Avenue. Nearly every home in this highly urbanized area experienced minor to moderate damage. The upper floor of a two-story home on Elmwood Avenue was blown off. The tornado weakened to an EF1 as it crossed Maplewood Avenue and Wellingham Lane, where numerous homes experienced roof and siding damage. The tornado finally lifted off the ground north of Kendale Road. In total 603 single family homes were damaged with 21 homes being completely destroyed. Thirty-one multifamily homes were damaged with 16 reported destroyed. Finally, 11 businesses sustained damage, with 3 businesses destroyed.

April 15, 2018- A strong upper low moved from Iowa across the Lower Great Lakes region, with a deep trough taking on a negative tilt while swinging into North Carolina. An associated strong cold front approached western North Carolina that afternoon and pushed east and east-northeast across central North Carolina on the night of the 15th. A strengthening and backing flow at all levels led to a surge of moisture into NC. Moderate instability, strong deep layer shear, and high low-level storm-relative helicity were also present. The result was a quasi-linear convective system with embedded mesovortices, which produced widespread severe weather, including a tornado in Greensboro, as it

moved through North Carolina. The tornado initially touched down on the north side of I-40 near where Willow Road crosses I-40. Damage at this point consisted of snapped trees and was consistent with 90 mph wind speeds, or EF-1 on the Enhanced Fujita Scale. The tornado remained on the ground as it traveled north toward Peeler Elementary School. Numerous homes in this area were damaged along with substantial tree damage. The tornado wind speeds at this location were estimated to be approximately 100 mph. The tornado continued traveling north and reached a peak intensity and maximum path width in the Hampton Community and near Hampton Elementary School. At this school a large portion of the roof was blown off and three adjacent portable classroom buildings (manufactured buildings) were completely destroyed and leveled. The damage to the main school building was consistent with wind speeds around 110 mph (DI 15/DOD 6), while the damage to the adjacent portable units was consistent with wind speeds of 135 mph (DI 4/DOD 12), which is a high-end EF2 on the Enhanced Fujita Scale. It s worth noting that the neighborhoods adjacent to this school experienced a wide and substantial path of devastation which included snapped and uprooted trees, snapped power poles, homes that were pushed off of their foundation, numerous homes that lost most or all of their roof cover, and several homes with exterior walls blown out. The survey found the width of the tornado, and particularly the width of the EF1 and EF2 wind speeds, contributed to a particularly wide path of destruction. The tornado then continued north-northeast and mostly remained on the ground all the way to the Guilford/Rockingham County line. Along the way, the damage consisted mostly of snapped and uprooted trees, and roof and siding damage to several additional homes. The tornado appeared to produce minor tree damage (with wind speeds 80 mph or less) just before crossing into Rockingham County. Finally, the aforementioned path length (16 miles) consists of just the Guilford County path. The tornado continued into Rockingham County, and remained on the ground for an additional 17.6 miles.

March 18, 2021 – A tornadic storm entered far southwestern Guilford County just after 5 PM, with tornadic damage mostly in the form of downed trees with numerous homes and businesses sustaining damage. The tornado was on the ground for less than 10 minutes before lifting. Maximum wind gusts were expected to be around 95 miles per hour.

THUNDERSTORM WINDS

Between 1999 and 2024, the NCEI recorded 307 separate incidents of thunderstorm winds, occurring on 173 separate days. These events caused $1.59 million in recorded property damage and one injury. The recorded gusts averaged 58 mph, with the highest gusts recorded at 81.7 mph at the Piedmont Triad International airport during a storm on May 25, 2000. Wind gusts with property damage recorded averaged around $15,617 in damage per event. All 102 incidents with recorded damages are detailed Table 4.70.

TABLE 4.70 – THUNDERSTORM WINDS WITH PROPERTY DAMAGES IN GUILFORD COUNTY, 1999-2024

Location	Date	Time	Wind Speed (mph)	Fatalities	Injuries	Property Damage
High Pt	7/13/2009	2345	57.6	0	0	$15,000
Pomona	6/14/2010	1620	57.6	0	0	$1,000
Pleasant Garden	6/23/2010	1400	57.6	0	0	$5,000
Summerfield	6/24/2010	1930	57.6	0	0	$10,000
Deep River	7/16/2010	1635	57.6	0	0	$5,000

Location	Date	Time	Wind Speed (mph)	Fatalities	Injuries	Property Damage
High Pt	4/5/2011	138	57.6	0	0	$250,000
Terra Cotta	6/1/2012	1410	57.6	0	0	$15,000
Deep River	1/30/2013	2100	57.6	0	0	$500
Groomtown	4/19/2013	1517	57.6	0	0	$500
Guilquarry	6/13/2013	1507	57.6	0	1	$200,000
Sedgefield	6/28/2013	1545	57.6	0	0	$2,000
Oak Ridge	8/10/2013	1345	57.6	0	0	$1,000
Oak Ridge	8/10/2013	1350	57.6	0	0	$1,000
Vandalia	9/1/2013	1550	57.6	0	0	$1,000
Hamilton Lakes	2/21/2014	940	57.6	0	0	$3,000
(Gso)Greensboro Rgnl	3/12/2014	1626	61.0	0	0	$5,000
Hamilton Lakes	6/10/2014	2248	57.6	0	0	$1,000
Deep River	6/30/2015	1640	59.9	0	0	$25,000
High Pt	8/5/2015	2035	57.6	0	0	$4,000
Guilford	5/2/2016	1605	57.6	0	0	$5,000
Guilford	5/2/2016	1615	57.6	0	0	$25,000
High Pt	5/3/2016	1450	57.6	0	0	$5,000
Greensboro May Arpt	5/12/2016	1808	57.6	0	0	$1,000
Summerfield	5/21/2016	1525	57.6	0	0	$2,000
Osceola	6/24/2016	1944	57.6	0	0	$500
Guilquarry	7/27/2016	1741	57.6	0	0	$5,000
Four Mile	8/27/2016	1625	57.6	0	0	$2,500
Battle Ground	5/5/2017	215	57.6	0	0	$10,000
Monticello	5/5/2017	220	57.6	0	0	$10,000
Browns Summit	5/5/2017	225	57.6	0	0	$100,000
Hillsdale	5/5/2017	241	57.6	0	0	$10,000
Osceola	5/31/2017	1835	57.6	0	0	$2,000
Guilquarry	6/13/2017	1520	57.6	0	0	$10,000
Guilford	6/13/2017	1548	57.6	0	0	$3,000
Battle Ground	6/14/2017	1945	57.6	0	0	$5,000
Allen Jay	6/18/2017	2315	57.6	0	0	$500
Mc Leansville	7/13/2017	1640	57.6	0	0	$5,000
Hill Top	7/23/2017	1630	57.6	0	0	$5,000
Gibsonville	6/20/2018	2055	57.6	0	0	$50,000
Sedalia	7/6/2018	1419	57.6	0	0	$2,500
Monticello	7/22/2018	1936	57.6	0	0	$2,500
Broadview	9/1/2018	1551	57.6	0	0	$1,500
High Pt	4/12/2019	1405	57.6	0	0	$2,000
Bessemer	4/12/2019	1516	57.6	0	0	$3,000
Oak Ridge	4/15/2019	20	57.6	0	0	$4,000
Four Mile	5/31/2019	1610	57.6	0	0	$10,000
Terra Cotta	5/31/2019	1700	57.6	0	0	$3,000

Location	Date	Time	Wind Speed (mph)	Fatalities	Injuries	Property Damage
Summerfield	6/20/2019	1314	57.6	0	0	$2,500
Guilford	6/20/2019	1321	57.6	0	0	$1,500
Broadview	6/20/2019	1330	57.6	0	0	$10,000
Broadview	6/20/2019	1338	57.6	0	0	$10,000
Koontzville	8/1/2019	1630	57.6	0	0	$15,000
Hamilton Lakes	8/19/2019	1645	57.6	0	0	$3,000
Mc Leansville	8/21/2019	1721	57.6	0	0	$10,000
Summerfield	8/22/2019	1530	57.6	0	0	$35,000
Greensboro	10/31/2019	1720	57.6	0	0	$20,000
Battle Ground	10/31/2019	1727	57.6	0	0	$25,000
Groomtown	10/31/2019	1730	57.6	0	0	$10,000
Hillsdale	1/11/2020	2306	57.6	0	0	$10,000
Pomona	1/11/2020	2318	57.6	0	0	$5,000
(Gso)Greensboro Rgnl	2/6/2020	1145	57.6	0	0	$200,000
Guilford	4/13/2020	435	57.6	0	0	$5,000
Vandalia	4/13/2020	455	57.6	0	0	$10,000
Greensboro May Arpt	4/13/2020	500	57.6	0	0	$10,000
High Pt	7/5/2020	1845	57.6	0	0	$10,000
Bessemer	7/23/2020	1433	57.6	0	0	$2,500
Greensboro	7/23/2020	1447	57.6	0	0	$2,500
Greensboro	7/23/2020	1454	57.6	0	0	$2,500
Colfax	8/6/2020	1810	57.6	0	0	$2,500
Greensboro May Arpt	9/29/2020	1604	57.6	0	0	$10,000
Pleasant Garden	5/29/2021	1416	57.6	0	0	$5,000
Pleasant Garden	5/29/2021	1423	57.6	0	0	$5,000
Hamilton Lakes	7/17/2021	1555	57.6	0	0	$5,000
Guilford	12/11/2021	1715	57.6	0	0	$20,000
Greensboro	6/16/2022	1455	57.6	0	0	$10,000
Mc Leansville	6/16/2022	1501	57.6	0	0	$50,000
Deep River	6/17/2022	1600	57.6	0	0	$5,000
Pleasant Garden	7/6/2022	1614	57.6	0	0	$5,000
Hillsdale	7/21/2022	1215	57.6	0	0	$5,000
Pinecroft	7/23/2022	2246	57.6	0	0	$5,000
Pleasant Garden	8/10/2022	1733	57.6	0	0	$25,000
Browns Summit	1/12/2023	1855	57.6	0	0	$5,000
Hamilton Lakes	4/22/2023	807	57.6	0	0	$5,000
Greensboro Arpt	5/16/2023	2000	57.6	0	0	$20,000
Greensboro	5/16/2023	2014	57.6	0	0	$5,000
Oak Ridge Arpt	6/3/2023	1812	57.6	0	0	$5,000
Mc Leansville	6/19/2023	1307	57.6	0	0	$5,000
Oak Ridge Arpt	7/9/2023	1023	57.6	0	0	$10,000
Hamilton Lakes	7/9/2023	1039	57.6	0	0	$10,000

Location	Date	Time	Wind Speed (mph)	Fatalities	Injuries	Property Damage
Gbsnvll Mc Lean Arpt	7/9/2023	1104	57.6	0	0	$5,000
Climax	8/6/2023	1632	57.6	0	0	$5,000
Mc Leansville	8/7/2023	1725	57.6	0	0	$25,000
Pinecroft	8/15/2023	1418	57.6	0	0	$15,000
Pleasant Garden	8/15/2023	1423	57.6	0	0	$10,000
Sherwood Vlg	8/15/2023	1423	57.6	0	0	$25,000
Pleasant Garden	8/15/2023	1425	57.6	0	0	$25,000
Broadview	9/12/2023	1708	57.6	0	0	$5,000
High Pt	1/9/2024	1545	57.6	0	0	$5,000
Gibsonville	1/9/2024	1615	57.6	0	0	$1,000
Battle Ground	4/11/2024	2012	57.6	0	0	$5,000
Sedalia	8/2/2024	1722	57.6	0	0	$10,000
Hamilton Lakes	9/27/2024	830	57.6	0	0	$10,000
				0	**1**	**$1,593,000**

Source: NCEI

In addition to recorded thunderstorm wind events, NCEI reports 3 high wind and strong wind events during this same period that caused $1,000 in property damage.

LIGHTNING

According to NCEI data, there were 8 lightning strikes reported between 1999 and 2024 causing $2,147,400 in property damage. No crop damage was recorded by these strikes. NCEI has had no new reports of lightning strikes since 2010 in the planning area. It should be noted that lightning events recorded by the NCEI are only those that are reported; it is certain that additional lightning incidents have occurred in Guilford County. Table 4.71 details NCEI-recorded lightning strikes from 1999 through 2024.

TABLE 4.71 – RECORDED LIGHTNING STRIKES IN GUILFORD COUNTY, 1999-2024

Location	Date	Time	Fatalities	Injuries	Property Damage
Greensboro	3/26/2002	1710	0	0	$220,000
Sedgefield	5/1/2002	0	0	0	$300,000
Oak ridge	6/26/2002	1600	0	0	$5,000
High Pt	7/1/2002	1945	0	0	$7,000
Hamilton Lakes	6/12/2010	2346	0	0	$1,500,000
Greensboro RGNL	6/16/2010	1430	0	0	$100,000
Deep River	8/11/2010	2145	0	0	$15,000
Bessemer	8/11/2010	2200	0	0	$400
Total			**0**	**0**	**$2,147,400**

Source: NCEI

The following are a selection of narrative descriptions recorded in NCEI for lightning events that occurred in Guilford County:

June 26, 2002 – At least four house fires were started by lightning strikes in the Oak Ridge area.

June 12, 2010 – Lightning struck a large fuel tank at the Colonial Pipeline gasoline tank farm resulting in a large fire destroying the tank and resulting in the closure of Interstate 40 for four hours. The tank contained 840,000 gallons of gasoline at the time of the fire.

June 16, 2010 - Lightning struck the runway at the Piedmont Triad International Airport creating a hole two feet wide and 18 inches deep in the runway.

HAIL

NCEI records 146 separate hail incidents across 76 days between 1999 and 2024 in Guilford County. The largest diameter hail recorded in the County during this period was 2.5 inches; the average hail size in all storms was approximately one inch in diameter. No injuries or fatalities were recorded by NCEI for these incidents. Two incidents resulted in $1,750 in property damage. It should be noted that as insured loss, hail damage numbers are not reliably reported and are usually orders of magnitude higher than available reports.

The following are a selection of narrative descriptions recorded in NCEI for hail incidents that occurred in Guilford County:

May 20, 2008 – Numerous thunderstorms developed across central North Carolina when a cold front and associated shortwave trough moved through central North Carolina during strong daytime heating. The severe storms produced widespread reports of large hail with only scattered thunderstorm wind damage.

September 28, 2016 – A slow moving cold front moving into the area coupled with deep upper low settling southward into the Tennessee Valley region set the stage for multiple rounds of convection during the afternoon into the evening. Some of these storms produced large hail and flash flooding.

August 15, 2023 – A trough and associated cold front interacted with a very hot and humid air mass to result in widespread showers and storms across much of central North Carolina in the afternoon and early evening. With adequate wind shear, some of the storms were severe, and they consolidated into a line as they pushed east. There were numerous reports of wind damage across the Piedmont and northern and central Coastal Plain, along with several reports of large hail.

PROBABILITY OF FUTURE OCCURRENCE

Based on historical occurrences recorded by NCEI for the 26-year period from 1999 through 2024, Guilford County averages 7 days with thunderstorm wind events per year. Over this same period, 8 lightning events were reported as having caused death, injury, or property damage, which equates to a 30% annual probability.

Over the 26-year period from 1999 through 2024, Guilford County experienced 146 reported hail incidents; this averages to 6 reported incidents per year somewhere in the planning area. Over this same period, 7 tornado incidents were reported, which equates to 27% annual probability.

Based on these historical occurrences, there is a 100% chance that the County will experience severe weather each year. The probability of a damaging impacts is highly likely.

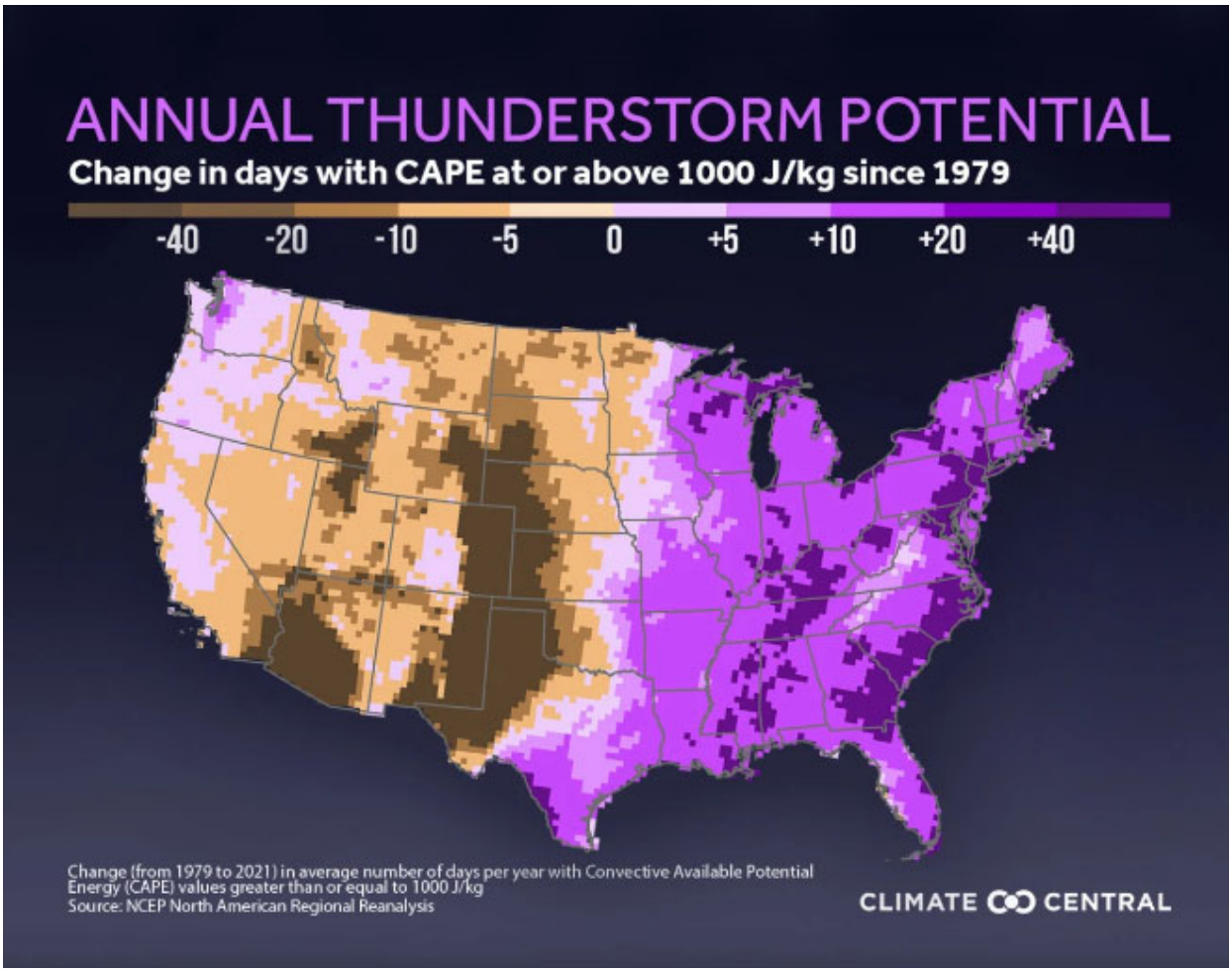
Probability: 4 – Highly Likely

CLIMATE CHANGE

According to the National Aeronautics and Space Administration (NASA), thunderstorm events in the future are likely to become more frequent in the southeast as a result of weather extremes. Thunderstorm potential is measured by an index that NASA created called the Convective Available

Potential Energy (CAPE) index. This measures how warm and moist the air is, which is a major contributing factor in thunderstorm/tornado formation. Between 1979 and 2021, Guilford County experienced 10-20 more days on average with CAPE at or above 1000 J/kg, which is considered a high cape value. Figure 4.63 below shows the change in days with high potential for thunderstorms nationwide.

FIGURE 4.63 – CHANGE IN DAYS WITH HIGH THUNDERSTORM POTENTIAL FROM 1979 TO 2021



Source: NCEP North American Regional Reanalysis, Climate Central 2022

NASA projects that by the period of 2072-2099, the CAPE in the southeastern United States will increase dramatically. Parts of North Carolina are in an area that will likely experience the greatest increase in CAPE in the United States, and the entire state is likely to experience at least some increase.

For a thunderstorm to become a supercell event, meaning that it produces more severe weather like large hail, damaging winds, and tornadoes, it relies on not only warm moist air, but also wind at different levels moving in different directions at different speed (wind shear). As the planet warms, wind shear, unlike warm, moist air, is expected to decrease. Therefore, it is difficult to predict if more supercell thunderstorm events and the tornadoes they can bring with them are more likely to occur.

Additionally, while supercell events are associated with tornadoes, only about 20% of supercell thunderstorms produce tornadoes. To complicate things further, no one fully understands how

tornadoes are formed. Therefore, there is no identified conclusion on how climate change will impact tornadoes.

The relationship between hail and climate change is also unclear, however, a 2022 study shows that climate change could increase severe and/or significant spring hailstorms within the Central U.S. (Fan, et.al, 2022). Lightning has a more direct correlation with increasing temperatures as it occurs more frequently when the temperature is hotter than when it is colder. Romps, et. al postulate that lightning will increase by 12% for every degree of rise global average air temperature.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Population and property at risk to wind events was estimated using data from the North Carolina Emergency Management (NCEM) IRISK database, which was compiled in NCEM's Risk Management Tool.

PEOPLE

People and populations exposed to the elements are most vulnerable to severe weather. A common hazard associated with wind events is falling trees and branches. Risk of being struck by lightning is greater in open areas, at higher elevations, and on the water. Lightning can also cause cascading hazards, including power loss. Loss of power could critically impact those relying on energy to service, including those that need powered medical devices. Additionally, the ignition of fires is always a concern with lightning strikes.

The availability of sheltered locations such as basements, buildings constructed using hail-resistant materials and methods, and public storm shelters, all reduce the exposure of the population. Individuals who work outdoors may face increased risk. Residents living in mobile homes are also more vulnerable to hail events due to the lack of shelter locations and the vulnerability of the housing unit to damages.

According to the 2023 American Community Survey (ACS), 6,044 occupied housing units (2.8%) in Guilford County are classified as "mobile homes or other types of housing." Based on an estimated average of 2.41 persons per household from the 2023 ACS, there are approximately 14,566 people in the County living in mobile home. Individuals who work outdoors may also face increased risk; data on outdoor workers is limited.

Between 1999 and 2024, the NCEI record no fatalities or injuries attributed to lightning in Guilford County. NCEI records one injury attributed to thunderstorm wind events in Guilford County. There are no injuries or fatalities attributed to hail. NCEI records one fatality and three injuries attributed to tornadoes during this same time period.

PROPERTY

Property damage caused by lightning usually occurs in one of two ways – either by direct damages through fires ignited by lightning, or by secondary impacts due to power loss. NCEI records lightning impacts over 26 years (1999-2024), with $2,147,000 in property damage recorded. The majority of this damage is attributable to a June 2010 lightning event that struck a large fuel tank at the Colonial Pipeline. The average impact from lightning per incident in Guilford County is $268,425. However, if the June 2010 incident is excluded, the average impact per incident is $92,485.

General damages to property from hail are direct, including destroyed windows, dented cars, and building, roof and siding damage in areas exposed to hail. Hail can also cause enough damage to cars to

cause them to be totaled. The level of damage is commensurate with both a material's ability to withstand hail impacts, and the size of the hailstones that are falling. Construction practices and building codes can help maximize the resistance of the structures to damage. Large amounts of hail may need to be physically cleared from roadways and sidewalks, depending on accumulation. Hail can cause other cascading impacts, including power loss. During a 26-year span between 1999 and 2024 in Guilford County, NCEI reported $1,750 in property damages due to hail.

According to PolicyGenius, North Carolina had one of the highest number of hail loss claims (25,026) in the U.S. in 2019. It should be noted that property damage due to hail is usually insured loss, with damages covered under most major comprehensive insurance plans. Because of this, hail losses are notoriously underreported by the NCEI. It is difficult to find an accurate repository of hail damages in Guilford, thus the NCEI is still used to form a baseline.

When strong enough, wind events can cause significant direct damage to buildings and infrastructure. NCEI reports $1,594,000 in property losses due to wind events over 26 years (1999-2024). The average impact from wind per incident in Guilford County is $15,180. NCEM's IRISK database estimates damages from increasing magnitudes of wind events, detailed in Table 4.72 through Table 4.75. Note that these tables sum the total estimated damage should every exposed property in each jurisdiction be impacted by an event of the given magnitude. Therefore, these tables are not an approximation of the total damages that would occur from an event of each magnitude because a thunderstorm wind event would not uniformly impact the entire Region. These tables should only be used to understand potential damages relative to storms of varying degrees of severity.

General damages to property are both direct (what the tornado physically destroys) and indirect (additional costs, damages, and losses attributed to secondary hazards spawned by the tornado or due to the damages caused by the tornado). Depending on its size and path, a tornado is capable of damaging and eventually destroying almost anything. During a 26-year span between 1999 and 2024, tornadoes caused $80 million in damage in Guilford County, averaging $11.4 million. The majority of damage is attributable to one March 2018 tornado, which resulted in $65 million in property damage. Construction practices and building codes can help maximize the resistance of the structures to damage. Estimated building damages for different tornado magnitudes are detailed in Table 4.77 through Table 4.80.

TABLE 4.72 – ESTIMATED BUILDINGS IMPACTED BY 50-YEAR THUNDERSTORM WINDS

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$1,021,579	100	4	$47,738	34	1	$14,038	2,728	100	$1,083,355
Greensboro	81,938	73,605	90	$41,033,867	6,867	8	$11,355,682	1,447	2	$2,342,599	81,919	100	$54,732,147
High Point	38,756	34,594	89	$15,741,827	3,430	9	$4,192,338	693	2	$678,669	38,717	100	$20,612,835
Jamestown	2,786	2,511	90	$1,411,903	199	7	$185,529	75	3	$174,655	2,785	100	$1,772,087
Oak Ridge	3,228	2,994	93	$1,751,120	181	6	$75,292	53	2	$48,995	3,228	100	$1,875,406
Pleasant Garden	2,820	2,655	94	$971,721	142	5	$43,780	22	1	$34,379	2,819	100	$1,049,880
Sedalia	393	364	93	$143,312	6	2	$21,222	23	6	$15,364	393	100	$179,898
Stokesdale	2,337	2,125	91	$802,846	196	8	$94,946	16	1	$13,789	2,337	100	$911,580
Summerfield	4,274	4,065	95	$2,098,243	183	4	$54,152	25	1	$23,437	4,273	100	$2,175,831
Whitsett	573	541	94	$218,268	22	4	$16,918	10	2	$1,244	573	100	$236,429
Guilford County (unincorporated)	49,554	45,470	92	$18,221,547	3,281	7	$1,285,778	800	2	$906,769	49,551	100	$20,414,093
Total	**189,387**	**171,518**	**91**	**$83,416,233**	**14,607**	**8**	**$17,373,375**	**3,198**	**2**	**$4,253,938**	**189,323**	**100**	**$105,043,541**

Source: NCEM Risk Management Tool

TABLE 4.73 – ESTIMATED BUILDINGS IMPACTED BY 100-YEAR THUNDERSTORM WINDS

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$1,564,103	100	4	$88,312	34	1	$27,104	2,728	100	$1,679,519
Greensboro	81,938	73,605	90	$64,320,342	6,867	8	$21,050,482	1,447	2	$4,314,192	81,919	100	$89,685,016
High Point	38,756	34,594	89	$24,538,805	3,430	9	$7,871,809	693	2	$1,274,442	38,717	100	$33,685,056
Jamestown	2,786	2,511	90	$2,142,393	199	7	$349,953	75	3	$346,417	2,785	100	$2,838,763
Oak Ridge	3,228	2,994	93	$2,668,166	181	6	$128,125	53	2	$87,707	3,228	100	$2,883,999
Pleasant Garden	2,820	2,655	94	$1,465,842	142	5	$86,163	22	1	$64,773	2,819	100	$1,616,778
Sedalia	393	364	93	$210,874	6	2	$33,762	23	6	$32,549	393	100	$277,185
Stokesdale	2,337	2,125	91	$1,226,253	196	8	$178,946	16	1	$24,765	2,337	100	$1,429,964
Summerfield	4,274	4,065	95	$3,212,467	183	4	$94,879	25	1	$39,596	4,273	100	$3,346,943
Whitsett	573	541	94	$326,693	22	4	$26,574	10	2	$2,436	573	100	$355,703
Guilford County (unincorporated)	49,554	45,470	92	$27,538,968	3,281	7	$2,350,437	800	2	$1,691,974	49,551	100	$31,581,378
Total	**189,387**	**171,518**	**91**	**$129,214,906**	**14,607**	**8**	**$32,259,442**	**3,198**	**2**	**$7,905,955**	**189,323**	**100**	**$169,380,304**

Source: NCEM Risk Management Tool

TABLE 4.74 – ESTIMATED BUILDINGS IMPACTED BY 300-YEAR THUNDERSTORM WINDS

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$2,329,449	100	4	$175,697	34	1	$57,229	2,728	100	$2,562,375
Greensboro	81,938	73,605	90	$99,339,736	6,867	8	$37,600,061	1,447	2	$7,774,406	81,919	100	$144,714,204
High Point	38,756	34,594	89	$37,599,554	3,430	9	$14,569,574	693	2	$2,347,865	38,717	100	$54,516,993
Jamestown	2,786	2,511	90	$3,183,109	199	7	$640,000	75	3	$653,019	2,785	100	$4,476,128
Oak Ridge	3,228	2,994	93	$4,025,348	181	6	$216,738	53	2	$163,609	3,228	100	$4,405,695
Pleasant Garden	2,820	2,655	94	$2,139,208	142	5	$160,383	22	1	$116,355	2,819	100	$2,415,946
Sedalia	393	364	93	$290,718	6	2	$47,648	23	6	$64,740	393	100	$403,106
Stokesdale	2,337	2,125	91	$1,799,384	196	8	$362,421	16	1	$49,087	2,337	100	$2,210,892
Summerfield	4,274	4,065	95	$4,879,556	183	4	$168,236	25	1	$68,961	4,273	100	$5,116,753
Whitsett	573	541	94	$472,204	22	4	$40,259	10	2	$4,889	573	100	$517,352
Guilford County (unincorporated)	49,554	45,470	92	$41,041,618	3,281	7	$4,258,730	800	2	$3,103,871	49,551	100	$48,404,219
Total	**189,387**	**171,518**	**91**	**$197,099,884**	**14,607**	**8**	**$58,239,747**	**3,198**	**2**	**$14,404,031**	**189,323**	**100**	**$269,743,663**

Source: NCEM Risk Management Tool

TABLE 4.75 – ESTIMATED BUILDINGS IMPACTED BY 700-YEAR THUNDERSTORM WINDS

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,728	95	$5,808,879	100	4	$686,990	34	1	$255,810	2,728	100	$6,751,679
Greensboro	81,938	81,938	90	$156,094,113	6,867	8	$64,310,049	1,447	2	$13,515,173	81,919	100	$233,919,335
High Point	38,756	38,756	89	$58,698,053	3,430	9	$25,859,985	693	2	$4,137,066	38,717	100	$88,695,103
Jamestown	2,786	2,786	90	$4,819,745	199	7	$1,125,454	75	3	$1,154,897	2,785	100	$7,100,096
Oak Ridge	3,228	3,228	93	$6,270,180	181	6	$359,409	53	2	$296,072	3,228	100	$6,925,661
Pleasant Garden	2,820	2,820	94	$3,236,810	142	5	$282,085	22	1	$202,869	2,819	100	$3,721,764
Sedalia	393	393	93	$443,690	6	2	$63,713	23	6	$160,769	393	100	$668,173
Stokesdale	2,337	2,337	91	$2,661,524	196	8	$722,453	16	1	$97,372	2,337	100	$3,481,349
Summerfield	4,274	4,274	95	$7,685,107	183	4	$297,803	25	1	$120,532	4,273	100	$8,103,443
Whitsett	573	573	94	$1,106,812	22	4	$96,037	10	2	$19,501	573	100	$1,222,349
Guilford County (unincorporated)	49,554	45,470	92	$67,282,511	3,281	7	$8,647,967	800	2	$5,649,624	49,551	100	$81,580,102
Total	**189,387**	**171,518**	**91**	**$314,107,424**	**14,607**	**8**	**$102,451,945**	**3,198**	**2**	**$25,609,685**	**189,323**	**100**	**$442,169,054**

Source: NCEM Risk Management Tool

TABLE 4.76 – ESTIMATED BUILDINGS IMPACTED BY EF0 TORNADO

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$17,889,090	100	4	$5,020,822	34	1	$810,465	2,728	100	$23,720,376
Greensboro	81,938	73,605	90	$719,838,846	6,867	8	$556,505,809	1,447	2	$84,379,765	81,919	100	$1,360,724,420
High Point	38,756	34,594	89	$311,961,461	3,430	9	$278,405,909	693	2	$27,767,520	38,717	100	$618,134,890
Jamestown	2,786	2,511	90	$27,193,835	199	7	$12,194,771	75	3	$5,699,624	2,785	100	$45,088,231
Oak Ridge	3,228	2,994	93	$28,429,348	181	6	$2,939,196	53	2	$1,943,702	3,228	100	$33,312,246
Pleasant Garden	2,820	2,655	94	$19,509,104	142	5	$4,334,156	22	1	$1,104,545	2,819	100	$24,947,806
Sedalia	393	364	93	$2,445,818	6	2	$78,561	23	6	$519,967	393	100	$3,044,346
Stokesdale	2,337	2,125	91	$15,814,474	196	8	$6,263,194	16	1	$626,540	2,337	100	$22,704,207
Summerfield	4,274	4,065	95	$39,654,326	183	4	$2,897,965	25	1	$848,405	4,273	100	$43,400,696
Whitsett	573	541	94	$3,728,779	22	4	$660,262	10	2	$79,736	573	100	$4,468,777
Guilford County (unincorporated)	49,554	45,470	92	$337,613,365	3,281	7	$70,460,703	800	2	$26,815,979	49,551	100	$434,890,048
Total	**189,387**	**171,518**	**91**	**$1,524,078,446**	**14,607**	**8**	**$939,761,348**	**3,198**	**2**	**$150,596,248**	**189,323**	**100**	**$2,614,436,043**

Source: NCEM Risk Management Tool

TABLE 4.77 – ESTIMATED BUILDINGS IMPACTED BY EF1 TORNADO

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$130,446,277	100	4	$35,527,169	34	1	$4,608,700	2,728	100	$170,582,146
Greensboro	81,938	73,605	90	$5,109,977,666	6,867	8	$3,695,017,625	1,447	2	$528,432,973	81,919	100	$9,333,428,264
High Point	38,756	34,594	89	$2,252,224,862	3,430	9	$1,868,099,492	693	2	$161,188,586	38,717	100	$4,281,512,941
Jamestown	2,786	2,511	90	$199,181,146	199	7	$79,139,259	75	3	$32,117,886	2,785	100	$310,438,292
Oak Ridge	3,228	2,994	93	$209,378,661	181	6	$17,774,124	53	2	$9,815,601	3,228	100	$236,968,385
Pleasant Garden	2,820	2,655	94	$142,800,409	142	5	$29,984,721	22	1	$6,643,928	2,819	100	$179,429,058
Sedalia	393	364	93	$17,854,688	6	2	$531,599	23	6	$2,894,516	393	100	$21,280,804
Stokesdale	2,337	2,125	91	$115,340,397	196	8	$40,795,523	16	1	$3,358,429	2,337	100	$159,494,348
Summerfield	4,274	4,065	95	$292,044,250	183	4	$18,532,993	25	1	$5,115,186	4,273	100	$315,692,430
Whitsett	573	541	94	$27,063,220	22	4	$5,419,540	10	2	$641,924	573	100	$33,124,684
Guilford County (unincorporated)	49,554	45,470	92	$2,465,065,842	3,281	7	$471,874,275	800	2	$148,059,670	49,551	100	$3,084,999,787
Total	**189,387**	**171,518**	**91**	**$10,961,377,418**	**14,607**	**8**	**$6,262,696,320**	**3,198**	**2**	**$902,877,399**	**189,323**	**100**	**$18,126,951,139**

Source: NCEM Risk Management Tool

TABLE 4.78 – ESTIMATED BUILDINGS IMPACTED BY EF2 TORNADO

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$251,899,139	100	4	$80,982,614	34	1	$14,693,800	2,728	100	$347,575,554
Greensboro	81,938	73,605	90	$10,499,116,978	6,867	8	$8,450,891,795	1,447	2	$1,756,014,455	81,919	100	$20,706,023,228
High Point	38,756	34,594	89	$4,472,385,268	3,430	9	$4,330,615,135	693	2	$518,732,492	38,717	100	$9,321,732,896
Jamestown	2,786	2,511	90	$384,532,309	199	7	$182,827,767	75	3	$101,971,351	2,785	100	$669,331,427
Oak Ridge	3,228	2,994	93	$395,122,818	181	6	$41,539,712	53	2	$29,481,911	3,228	100	$466,144,441
Pleasant Garden	2,820	2,655	94	$265,496,321	142	5	$68,491,361	22	1	$21,714,477	2,819	100	$355,702,159
Sedalia	393	364	93	$33,337,678	6	2	$1,408,675	23	6	$9,137,267	393	100	$43,883,620
Stokesdale	2,337	2,125	91	$214,306,829	196	8	$89,597,554	16	1	$10,408,113	2,337	100	$314,312,495
Summerfield	4,274	4,065	95	$551,361,281	183	4	$42,404,681	25	1	$16,734,636	4,273	100	$610,500,598
Whitsett	573	541	94	$51,883,751	22	4	$11,223,328	10	2	$2,322,845	573	100	$65,429,923
Guilford County (unincorporated)	49,554	45,470	92	$4,588,967,464	3,281	7	$1,046,516,731	800	2	$465,564,907	49,551	100	$6,101,049,103
Total	**189,387**	**171,518**	**91**	**$21,708,409,836**	**14,607**	**8**	**$14,346,499,353**	**3,198**	**2**	**$2,946,776,254**	**189,323**	**100**	**$39,001,685,444**

Source: NCEM Risk Management Tool

TABLE 4.79 – ESTIMATED BUILDINGS IMPACTED BY EF3 TORNADO

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$308,237,389	100	4	$90,742,391	34	1	$22,928,363	2,728	100	$421,908,143
Greensboro	81,938	73,605	90	$14,316,899,604	6,867	8	$10,492,805,404	1,447	2	$2,758,192,937	81,919	100	$27,567,897,945
High Point	38,756	34,594	89	$5,737,225,973	3,430	9	$5,162,162,106	693	2	$810,659,650	38,717	100	$11,710,047,729
Jamestown	2,786	2,511	90	$466,096,947	199	7	$220,748,735	75	3	$159,008,161	2,785	100	$845,853,843
Oak Ridge	3,228	2,994	93	$461,851,472	181	6	$54,614,045	53	2	$45,543,459	3,228	100	$562,008,976
Pleasant Garden	2,820	2,655	94	$309,373,888	142	5	$79,748,666	22	1	$34,018,567	2,819	100	$423,141,121
Sedalia	393	364	93	$39,266,343	6	2	$1,967,375	23	6	$14,234,716	393	100	$55,468,435
Stokesdale	2,337	2,125	91	$251,569,544	196	8	$114,660,771	16	1	$16,164,871	2,337	100	$382,395,186
Summerfield	4,274	4,065	95	$644,811,847	183	4	$52,448,152	25	1	$26,221,102	4,273	100	$723,481,100
Whitsett	573	541	94	$63,633,515	22	4	$12,874,386	10	2	$3,694,743	573	100	$80,202,643
Guilford County (unincorporated)	49,554	45,470	92	$5,384,989,728	3,281	7	$1,272,556,705	800	2	$724,824,194	49,551	100	$7,382,370,627
Total	**189,387**	**171,518**	**91**	**$27,983,956,250**	**14,607**	**8**	**$17,555,328,736**	**3,198**	**2**	**$4,615,490,763**	**189,323**	**100**	**$50,154,775,748**

Source: NCEM Risk Management Tool

TABLE 4.80 – ESTIMATED BUILDINGS IMPACTED BY EF4 TORNADO

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Gibsonville	2,728	2,594	95	$311,577,051	100	4	$91,519,671	34	1	$24,560,079	2,728	100	$427,656,802
Greensboro	81,938	73,605	90	$14,798,605,578	6,867	8	$10,774,154,329	1,447	2	$2,920,869,436	81,919	100	$28,493,629,343
High Point	38,756	34,594	89	$5,857,424,305	3,430	9	$5,276,495,618	693	2	$866,076,694	38,717	100	$11,999,996,617
Jamestown	2,786	2,511	90	$470,016,932	199	7	$227,205,208	75	3	$170,526,693	2,785	100	$867,748,833
Oak Ridge	3,228	2,994	93	$462,038,097	181	6	$57,077,662	53	2	$49,640,148	3,228	100	$568,755,907
Pleasant Garden	2,820	2,655	94	$309,567,229	142	5	$80,902,444	22	1	$36,188,554	2,819	100	$426,658,227
Sedalia	393	364	93	$39,390,881	6	2	$2,034,530	23	6	$15,290,801	393	100	$56,716,212
Stokesdale	2,337	2,125	91	$252,229,874	196	8	$117,957,404	16	1	$17,456,587	2,337	100	$387,643,865
Summerfield	4,274	4,065	95	$645,142,708	183	4	$54,374,670	25	1	$27,886,101	4,273	100	$727,403,480
Whitsett	573	541	94	$64,390,316	22	4	$13,097,827	10	2	$3,827,331	573	100	$81,315,474
Guilford County (unincorporated)	49,554	45,470	92	$5,397,899,116	3,281	7	$1,304,950,007	800	2	$779,469,635	49,551	100	$7,482,318,757
Total	**189,387**	**171,518**	**91**	**$28,608,282,087**	**14,607**	**8**	**$17,999,769,370**	**3,198**	**2**	**$4,911,792,059**	**189,323**	**100**	**$51,519,843,517**

Source: NCEM Risk Management Tool

ENVIRONMENT

The main environmental impact from wind is damage to trees or crops. Wind events can also bring down power lines, which could cause a fire and result in even greater environmental impacts. Tornadoes can cause massive damage to the natural environment, uprooting trees and other debris within the tornado's path. This is part of a natural process, however, and the environment will return to its original state in time. Lightning may also result in the ignition of wildfires. Hail can cause extensive damage to the natural environment, pelting animals, trees and vegetation with hailstones. Melting hail can also increase both river and flash flood risk.

CONSEQUENCE ANALYSIS

Table 4.81 summarizes the potential negative consequences of severe weather.

TABLE 4.81 – CONSEQUENCE ANALYSIS – TORNADOES AND THUNDERSTORM

Category	Consequences
Public	Injuries and fatalities are possible. Individuals who cannot take shelter are most vulnerable as well as those in unsecured buildings like mobile homes. Injury may also result from debris or damaged buildings.
Responders	Responders may be hindered by storm impacts; damages may block access to affected areas or make it dangerous to enter affected buildings or areas.
Continuity of Operations (including Continued Delivery of Services)	Potential impacts to continuity of operations may result if personnel are harmed or if critical systems or resources are damaged. Delays in providing services may result.
Property, Facilities and Infrastructure	Possibility of structure fire ignition; potential for disruptions in power and communications infrastructure; destruction and/or damage to any exposed property, especially windows, cars and siding; mobile homes see increased risk. The weakest tornadoes, EF0, can cause minor roof damage, while strong tornadoes can destroy frame buildings and even badly damage steel reinforced concrete structures. Buildings are vulnerable to direct impact from tornado winds and wind-borne debris.
Environment	Potential fire ignition from lightning; hail damage to wildlife and foliage; Downed trees and damages to vegetation are likely during tornadoes. Debris may be thrown great distances and end up in natural areas, with potential impacts on habitats. If hazardous materials facilities are impacted, chemical releases may occur and would require remediation.
Economic Condition of the Jurisdiction	Lightning damage contingent on target; can severely impact/destroy critical infrastructure and other economic drivers. Economic impacts are contingent on tornado's path, but a tornado can severely impact/destroy critical infrastructure and other economic drivers, halt economic activity, or cause direct losses to businesses.
Public Confidence in the Jurisdiction's Governance	Public confidence is not generally affected by thunderstorm events, however public confidence in the jurisdiction's governance may be influenced by severe tornado events if response and recovery are not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following tables summarize tornadoes and thunderstorm risk by jurisdiction. Most aspects of tornadoes and thunderstorm risk do not vary substantially by jurisdiction; however, wind and hail impacts may be greater in more highly developed areas with higher exposure in terms of both property and population density. Additionally, mobile home units are more vulnerable to wind damage. While mobile home units do not comprise a significant proportion of any jurisdictions housing mix, the unincorporated area of Guilford County has 3,000 mobile home units and therefore may face more severe impacts from wind. Where priority ratings vary between thunderstorm wind, lightning, and hail for impact and spatial extent, these scores represent an average rating with greater weight given to thunderstorm wind because it occurs much more frequently.

TORNADOES

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
All Jurisdictions	3	3	2	4	1	2.7	M

THUNDERSTORM WIND

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	4	1	3	4	1	2.6	M
Greensboro	4	1	3	4	1	2.6	M
High Point	4	1	3	4	1	2.6	M
Jamestown	4	1	3	4	1	2.6	M
Oak Ridge	4	1	3	4	1	2.6	M
Pleasant Garden	4	1	3	4	1	2.6	M
Sedalia	4	1	3	4	1	2.6	M
Stokesdale	4	1	3	4	1	2.6	M
Summerfield	4	1	3	4	1	2.6	M
Whitsett	4	1	3	4	1	2.6	M
Unincorporated Guilford County	4	2	3	4	1	2.9	M

LIGHTNING

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
All Jurisdictions	3	1	1	4	1	1.9	M

HAIL

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
All Jurisdictions	4	1	1	4	1	2.2	M

Wildfire

HAZARD BACKGROUND

A wildfire is an uncontained fire that spreads through the environment. Wildfires have the ability to consume large areas, including infrastructure, property, and resources. When massive fires, or conflagrations, develop near populated areas, evacuations possibly ensue. Not only do the flames impact the environment, but the massive volumes of smoke spread by certain atmospheric conditions also impact the health of nearby populations. There are three general types of fire spread that are recognized.

- **Ground fires** – burn organic matter in the soil beneath surface litter and are sustained by glowing combustion.
- **Surface fires** – spread with a flaming front and burn leaf litter, fallen branches and other fuels located at ground level.
- **Crown fires** – burn through the top layer of foliage on a tree, known as the canopy or crown fires. Crown fires, the most intense type of fire and often the most difficult to contain, need strong winds, steep slopes and a heavy fuel load to continue burning.
- Fuels to wildfires are subject to a variety of ignition sources, both natural and human caused. Generally, wildfires are started by humans, either through arson or carelessness. Fire intensity is controlled by both short-term weather conditions and longer-term vegetation conditions. During intense fires, understory vegetation, such as leaves, small branches, and other organic materials that accumulate on the ground, can become additional fuel for the fire. The most explosive conditions occur when dry, gusty winds blow across dry vegetation. Historically, fire starts have been contained quickly with minimal loss to property and structures.
- Weather plays a major role in the birth, growth and death of a wildfire. Weather conditions favorable to wildfire include drought, which increases flammability of surface fuels, and winds, which aid a wildfire ‘s progress. The combination of wind, temperature, and humidity affects how fast wildland fires can spread. Rapid response can contain wildfires and limit their threat to property. In support of forecasting for fire weather, the National Weather Service Fire Weather Program emerged. This service is provided to federal and state land management agencies for the prevention, suppression, and management of forest and rangeland fires.

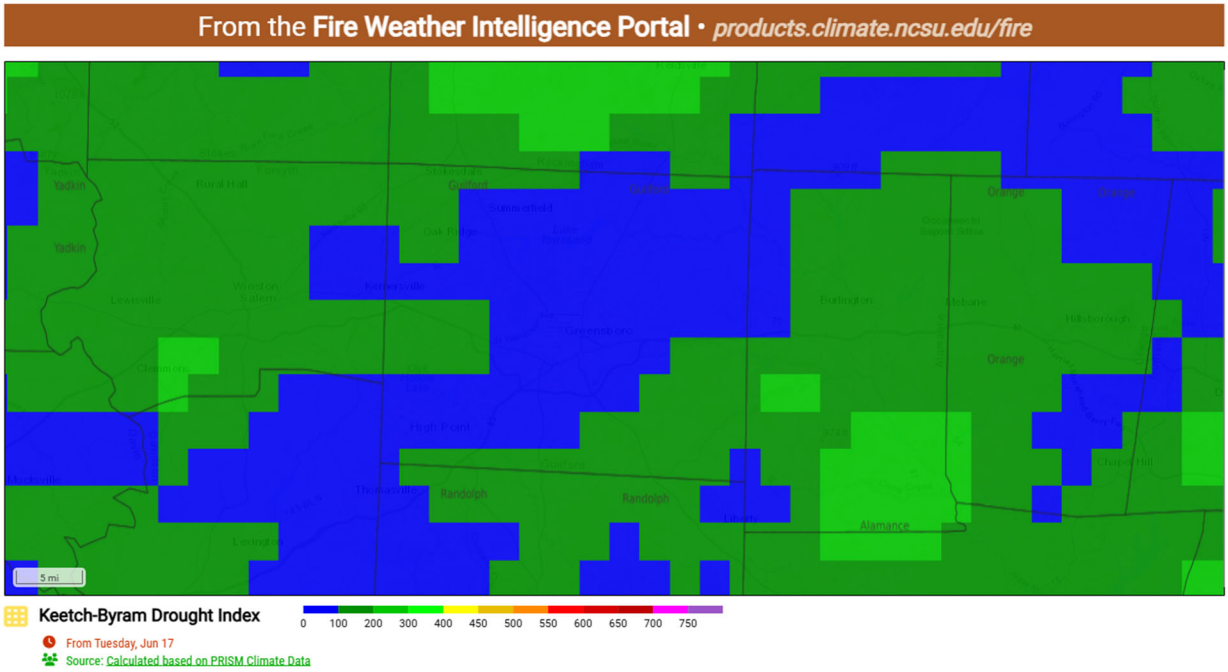
Guilford County experiences a variety of wildfire conditions found in the Keetch-Byram Drought Index, which is described in Table 4.82. The Keetch-Byram Drought Index (KBDI) for June 19, 2025 is shown in Figure 4.64 The KBDI for Guilford County at this time was below 200.

TABLE 4.82 – KEETCH-BYRAM INDEX FIRE DANGER RATING SYSTEM

KBDI	Description
0-200	Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in sports and patches.
200-400	Fires more readily burn and will carry across an area with no gaps. Heavier fuels will still not readily ignite and burn. Also, expect smoldering and the resulting smoke to carry into and possibly through the night.
400-600	Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.

KBDI	Description
600-800	Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn through the night and heavier fuels will actively burn and contribute to fire intensity.

FIGURE 4.64 – KEETCH-BYRAM DROUGHT INDEX, JUNE 2025



Source: North Carolina State Climate Office

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

LOCATION

The location of wildfire risk can be defined by the acreage of Functional Wildland Urban Interface (WUI). The Functional WUI is described as the classification of the land near buildings into zones that describe the wildfire risk mitigation activities appropriate for each zone. Buildings used in producing the Functional WUI are defined as greater than 40 square meters. There are five Functional WUI categories recognized. There are five Functional WUI categories recognized.

- **Direct Exposure:** Burnable land cover within 75 m of a building. Buildings in this zone are exposed to ignition from convective and radiative heat from a wildfire, embers, and adjacent burning structures/outbuildings.
- **Indirect Exposure:** Nonburnable land cover within 75 m of a building and less than 1530 m from a 500-ha contiguous block of wildland fuel. Buildings in this zone are exposed to ignition from embers and/or adjacent burning structures
- **Critical Fireshed:** The burnable land cover from which a wildfire can reach a significant number of buildings within a single burning period.

— **Little-to-no Exposure:** Non-burnable land cover within 75 m of a building and more than 1530 m from a 500-ha contiguous block of wildland fuel. Buildings in this zone are relatively safe from ember ignition and building-to-building spread.

— **Sources of Ember Load to Buildings:** Burnable land cover more than 75 m from a building that produces embers capable of reaching nearby buildings. Ember production is a function of fire type and intensity; ember travel is a function of wind speed and direction. Ember modeling is based on fire modeling based on gridded historical climatology.

The Southern Wildfire Risk Assessment (SWRA) estimates that 26 percent of the Guilford County's population lives within the critical fireshed and 27 percent live in direct exposure to the Functional WUI. The expansion of residential development from urban centers out into rural landscapes increases the potential for wildland fire threat to public safety and the potential for damage to forest resources and dependent industries. Population growth within the WUI substantially increases the risk of wildfire.

— Spatial Extent: 3 – Moderate

Table 4.83 and Table 4.84 detail the extent of the Functional WUI by jurisdiction in Guilford County, and Figure 4.65 maps the functional WUI in Guilford County.

TABLE 4.83 – FUNCTIONAL WILDLAND URBAN INTERFACE, GUILFORD COUNTY

	Functional Wildland Urban Interface (WUI) Category	Acres	Percent
	Direct Exposure	115,991	27%
	Indirect Exposure	79,037	19%
	Critical Fireshed	109,115	26%
	Sources of Ember Load to Buildings	99,695	23%
	Little to No Exposure	13,311	3%
	Water	7,208	2%
	Total	**424,356**	**100%**

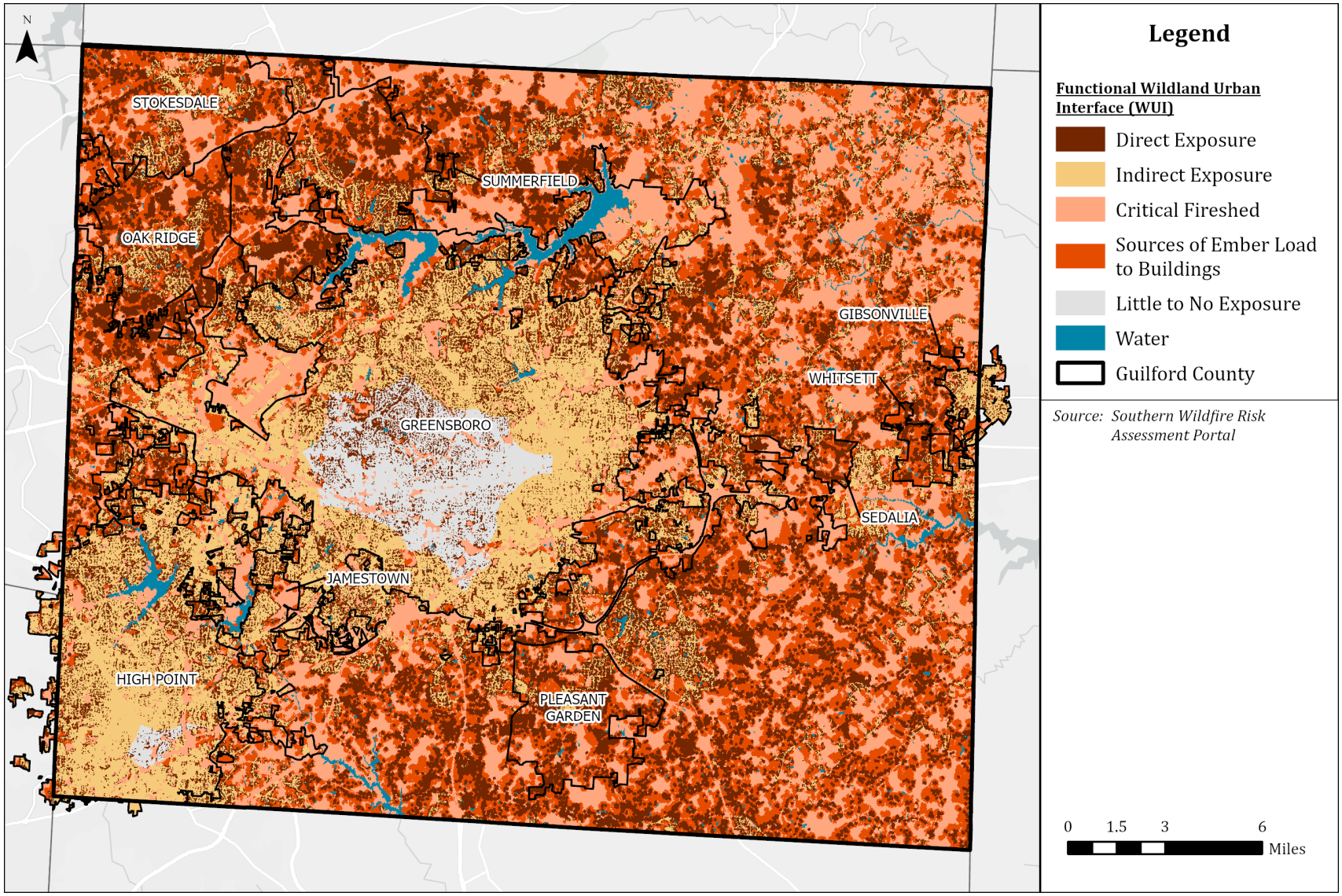
Source: Southern Wildfire Risk Assessment

TABLE 4.84 – FUNCTIONAL WILDLAND URBAN INTERFACE BY JURISDICTION

Jurisdiction	Direct Exposure	Indirect Exposure	Critical Fireshed	Sources of Ember Load to Buildings	Little to No Exposure	Water
Gibsonville	28%	41%	11%	19%	0%	0%
Greensboro	19%	37%	19%	8%	14%	3%
High Point	20%	53%	15%	8%	2%	3%
Jamestown	21%	36%	30%	12%	0%	1%
Oak Ridge	46%	9%	14%	29%	0%	1%
Pleasant Garden	40%	5%	23%	31%	0%	1%
Sedalia	48%	6%	14%	32%	0%	0%
Stokesdale	32%	10%	24%	34%	0%	1%
Summerfield	45%	8%	18%	28%	0%	1%
Whitsett	45%	6%	7%	41%	0%	1%
Unincorporated Guilford County	29%	8%	32%	30%	0%	1%

Source: Southern Wildfire Risk Assessment

FIGURE 4.65 – FUNCTIONAL WILDLAND URBAN INTERFACE, GUILFORD COUNTY



Source: Southern Wildfire Risk Assessment

EXTENT

Wildfire extent can be defined by the fire's intensity and measured by the Characteristic Fire Intensity Scale, which identifies areas where significant fuel hazards which could produce dangerous fires exist. Fire Intensity ratings identify where significant fuel hazards and dangerous fire behavior potential exist based on fuels, topography, and a weighted average of four percentile weather categories. The Fire Intensity Scale consists of five classes, as defined by Southern Wildfire Risk Assessment. 5,557 (1%) acres of Guilford County may experience up to a Class 4 Fire Intensity, which poses significant harm or damage to life and property. 15 percent of the county may experience Class 3 Fire Intensity, which has potential for harm to life and property but is easier to suppress with dozer and plows. The remainder of the county is either non-burnable (36%) or would face a Class 1 or Class 2 Fire Intensity, which are easily suppressed.

Impact: 1 – Minor

Table 4.86 and Table 4.87 show the potential fire intensity within the Functional WUI across Guilford County. Detailed maps of fire intensity by jurisdiction are provided in each community's annex.

TABLE 4.85 – FIRE INTENSITY SCALE

Class	Description
1, Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
2, Low	Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
3, Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
4, High	Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
5, Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

5,557 (1%) acres of Guilford County may experience up to a Class 4 Fire Intensity, which poses significant harm or damage to life and property. 15 percent of the county may experience Class 3 Fire Intensity, which has potential for harm to life and property but is easier to suppress with dozer and plows. The remainder of the county is either non-burnable (36%) or would face a Class 1 or Class 2 Fire Intensity, which are easily suppressed.

Impact: 1 – Minor

TABLE 4.86 – CHARACTERISTIC FIRE INTENSITY, GUILFORD COUNTY

	Characteristic Fire Intensity Scale Category	Acres	Percent
	Non-burnable	152,479	36%
	1 Lowest Intensity	42,417	10%
	1.5	118,036	28%
	2 Low	30,589	7%
	2.5	4,497	1%
	3 Moderate	65,306	15%
	3.5	5,451	1%
	4 High	5,557	1%
	4.5	26	0%
	5 Highest Intensity	0	0%
	> 5	0	0%
	Total	**424,356**	**100%**

Source: Southern Wildfire Risk Assessment

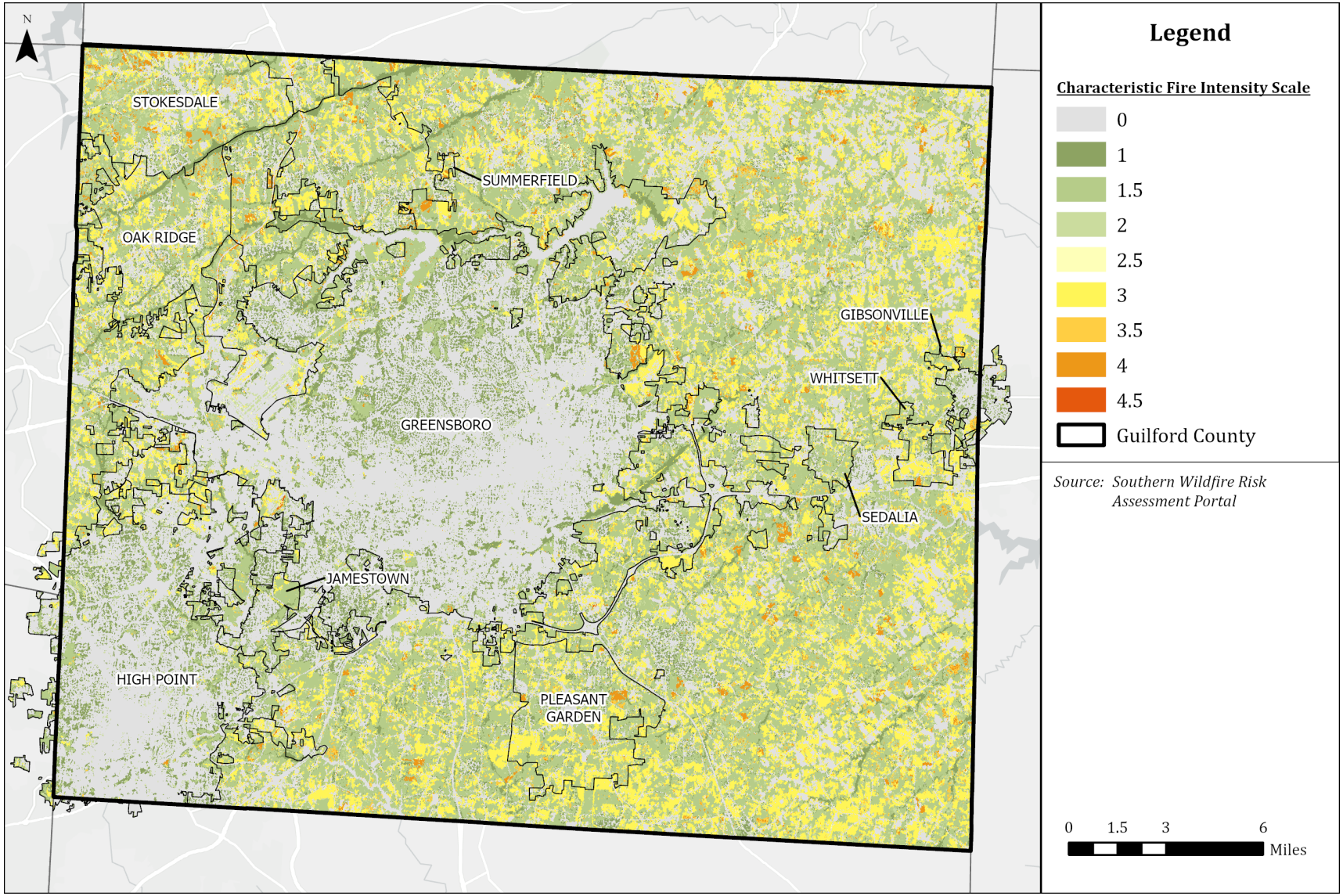
TABLE 4.87 – CHARACTERISTIC FIRE INTENSITY BY JURISDICTION

Jurisdiction	Non-Burnable	1 (Lowest Intensity)	1.5	2 (Low)	2.5	3 (Moderate)	3.5	4 (High)	4.5
Gibsonville	46%	15%	15%	12%	0%	8%	2%	1%	0%
Greensboro	62%	15%	12%	5%	1%	4%	0%	0%	0%
High Point	64%	15%	11%	6%	1%	4%	0%	0%	0%
Jamestown	44%	16%	28%	7%	0%	4%	1%	0%	0%
Oak Ridge	23%	11%	32%	10%	3%	19%	1%	2%	0%
Pleasant Garden	18%	7%	39%	7%	0%	25%	2%	1%	0%
Sedalia	18%	9%	48%	12%	1%	10%	1%	1%	0%
Stokesdale	22%	7%	33%	11%	2%	18%	2%	4%	0%
Summerfield	21%	13%	35%	9%	3%	15%	1%	3%	0%
Whitsett	20%	7%	29%	9%	0%	31%	2%	2%	0%
Unincorporated Guilford County	25%	7%	35%	8%	1%	21%	2%	2%	0%

Source: Southern Wildfire Risk Assessment

Note: No communities reported having a fire intensity rating over 4.

FIGURE 4.66 – CHARACTERISTIC FIRE INTENSITY, GUILFORD COUNTY



Source: Southern Wildfire Risk Assessment

HISTORICAL OCCURRENCES

The North Carolina Forest Service (NCFS) began keeping records of fire occurrence on private and state-owned lands in 1928. Since this time, there has been an average of approximately 4,000 fires burning more than 104,000 acres annually. Recently, within the last 10 years, the State has averaged closer to 4,300 fires per year and 14,000 acres burned annually.

Table 4.88 lists past occurrences of wildfire in Guilford County since 1999 as provided by the North Carolina Forest Service in June 2025. This data only accounts for occurrences within unincorporated Guilford County, which fall under the NCFS jurisdiction, as well as larger events in incorporated areas where local fire departments requested NCFS support for fire suppression. Actual number of fires and acreage burned are higher than what can be reported here.

TABLE 4.88 – RECORDS FOR WILDFIRE IN GUILFORD COUNTY, 1999-2024

Year	Number of Fires	Acreage Burned	Homes/Structures Protected	Value of Protected Homes/Structures
1999	9	14.6	n/a	n/a
2000	12	10.2	n/a	n/a
2001	31	61.4	n/a	n/a
2002	21	31.5	n/a	n/a
2003	8	4.6	n/a	n/a
2004	23	49.2	n/a	n/a
2005	10	43.8	n/a	n/a
2006	34	38.5	n/a	n/a
2007	53	112	n/a	n/a
2008	15	72.4	n/a	n/a
2009	10	13.4	n/a	n/a
2010	27	17.6	n/a	n/a
2011	61	40.9	n/a	n/a
2012	41	36.5	n/a	n/a
2013	52	42.4	n/a	n/a
2014	139	53.8	n/a	n/a
2015	89	58.3	37	$2,875,500
2016	61	33.6	155	$16,415,300
2017	88	74.3	258	$25,144,519
2018	53	23.6	261	$34,718,000
2019	56	23.3	149	$10,994,000
2020	31	62	63	$6,097,500
2021	89	65	167	$16,002,300
2022	62	47.6	198	$27,415,500
2023	57	45.6	123	$27,835,300
2024	60	39.6	196	$28,038,300
Total	**1,192**	**42.9**	**1,607**	**$195,536,219**

Source: NC Forest Service

Note: Homes/structure values and homes/structures protected were not recorded until 2015 in Guilford County

On average, Guilford County experiences 45 fires and 42.9 acres burned annually from fires that require the North Carolina Forest Service to respond. Actual number of fires and acreage burned is likely higher because smaller fires within jurisdictional boundaries are managed by local fire departments.

PROBABILITY OF FUTURE OCCURRENCE

The Southern Wildfire Risk Assessment provides a Burn Probability analysis which predicts the probability of an area burning based on landscape conditions, weather, historical ignition patterns, and historical fire prevention and suppression efforts. Burn Probability data is generated by simulating fires under different weather, fire intensity, and other conditions. Values in the Burn Probability (BP) data layer indicate, for each pixel, the number of times that cell was burned by a modeled fire, divided by the total number of annual weather scenarios simulated. The simulations are calibrated to historical fire size distributions. Guilford County has a low burn probability as do each of its respective jurisdictions. The Burn Probability for Guilford County and participating jurisdictions is presented in Table 4.89 and Table 4.90 and illustrated in Figure 4.67.

Probability: 2 – Possible

TABLE 4.89 – BURN PROBABILITY, GUILFORD COUNTY

	Burn Probability Category	Acres	Percent
	0	22,564	5%
	>0 - 0.0001000	93,716	22%
	0.0001000 - 0.0002154	191,133	45%
	0.0002154 - 0.0004642	116,420	27%
	0.0004642 - 0.0010000	523	0%
	0.0010000 - 0.0021544	0	0%
	0.0021544 - 0.0046416	0	0%
	0.0046416 - 0.0100000	0	0%
	0.0100000 - 0.0215443	0	0%
	0.0215443 - 0.0464159	0	0%
	0.0464159 - 0.1000000	0	0%
	>0.10000000	0	0%
	Total	**424,356**	**100%**

Source: Southern Wildfire Risk Assessment

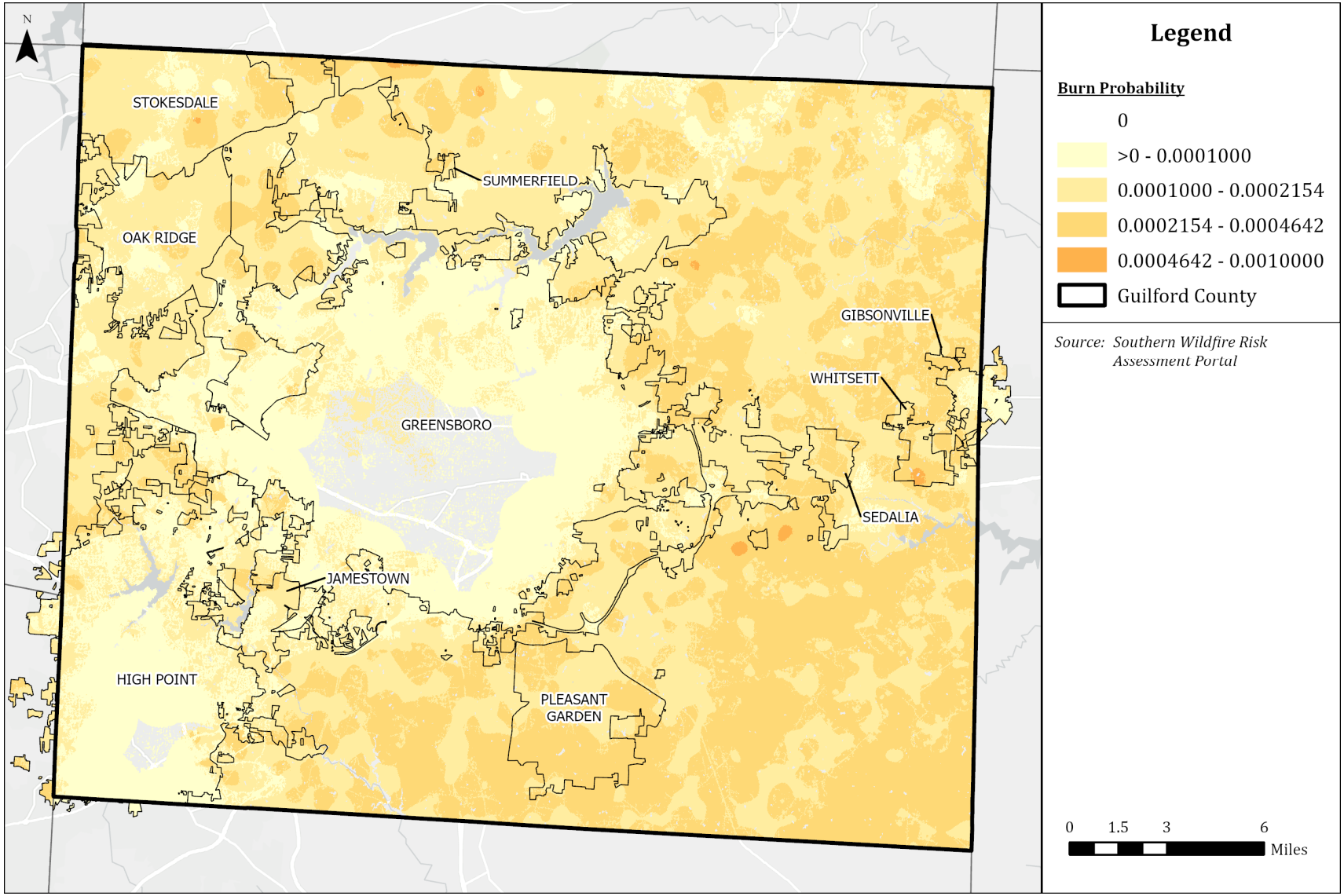
TABLE 4.90 – BURN PROBABILITY BY JURISDICTION

Jurisdiction	0	>0 - 0.0001000	0.0001000 - 0.0002154	0.0002154 - 0.0004642	0.0004642 - 0.0010000
Gibsonville	0%	32%	45%	23%	0%
Greensboro	19%	51%	26%	4%	0%
High Point	5%	60%	29%	5%	0%
Jamestown	1%	39%	53%	7%	0%
Oak Ridge	1%	19%	75%	6%	0%
Pleasant Garden	1%	0%	37%	62%	0%
Sedalia	0%	0%	50%	50%	0%
Stokesdale	1%	13%	68%	18%	0%
Summerfield	1%	14%	68%	18%	0%
Whitsett	1%	0%	43%	50%	6%
Unincorporated Guilford County	1%	8%	51%	40%	0%

Source: Southern Wildfire Risk Assessment

Note: No communities were reported to have a burn probability rating over 0.0010000 (moderate).

FIGURE 4.67 – BURN PROBABILITY, GUILFORD COUNTY



Source: Southern Wildfire Risk Assessment

CLIMATE CHANGE

The North Carolina Climate Science Report predicts that conditions conducive to wildfire occurrence will likely increase in the future due to future increases in annual and seasonal average temperatures and associated increases in drying rates. Additionally, future droughts are very likely to be warmer, increasing the drying rate of fuels and leading to higher wildfire likelihood. However, changes in other climate elements that affect wildfire likelihood are uncertain.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Population and property at risk to wildfire was estimated using data from the North Carolina Emergency Management (NCEM) IRISK database, which was compiled in NCEM's Risk Management Tool.

Within IRISK, wildfire hazard areas were determined using the Wildland Fire Susceptibility Index (WFSI). The following parameters were applied:

- Areas with a WFSI value of 0.01 – 0.05 were considered to be at moderate risk.
- Areas with a WFSI value greater than 0.05 were considered to be at high risk.
- Areas with a WFSI value less than 0.01 were considered to not be at risk.

The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the state have this value determined consistently, it allows for comparison and ordination of areas of the state as to the likelihood of an acre burning.

PEOPLE

Wildfire poses significant risks to human life and health, causing fatalities, injuries, and long-term health complications such as respiratory issues due to smoke inhalation. To mitigate these dangers, it is crucial to implement comprehensive procedures for rapid warning and evacuation. Developing reliable early warning systems that utilize satellite monitoring, drones, and weather forecasts can help alert communities to emerging threats. Local authorities should communicate through various channels, including SMS alerts, social media and community radio, to ensure that messages everyone effectively. Table 4.91 details the population estimated to be at risk to wildfire according to the NCEM IRISK database.

TABLE 4.91 – ESTIMATED POPULATION IMPACTED BY WILDFIRE

Jurisdiction	Total Population	Total Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	126,765	457	0%	20,442	74	0%	7,162	26	0%
Greensboro	277,272	64	0%	39,884	9	0%	16,134	4	0%
High Point	105,221	33	0%	17,209	5	0%	6,407	2	0%
Gibsonville	4,488	396	9%	1,194	105	9%	177	16	9%
Jamestown	8,546	0	0%	1,847	0	0%	301	0	0%
Oak Ridge	8,318	19	0%	993	2	0%	399	1	0%
Pleasant Garden	5,294	0	0%	1,173	0	0%	170	0	0%
Sedalia	645	0	0%	94	0	0%	31	0	0%
Stokesdale	5,318	23	0%	587	2	0%	271	1	0%
Summerfield	11,050	0	0%	1,519	0	0%	680	0	0%
Whitsett	2,641	0	0%	282	0	0%	150	0	0%
Total	**555,558**	**992**	**0%**	**85,224**	**197**	**0%**	**31,882**	**50**	**0%**

Source: NCEM Risk Management Tool

PROPERTY

Wildfire can cause direct property losses, including damage to buildings, vehicles, landscaped areas, agricultural lands, and livestock. Construction practices and building codes can increase fire resistance and fire safety of structures. Techniques for reducing vulnerability to wildfire include using street design to ensure accessibility to fire trucks, incorporating fire resistant materials in building construction, and using landscaping practices to reduce flammability and the ability for fire to spread.

The sectors facing the greatest risk to wildfire in Guilford County are food and agriculture, commercial facilities, government facilities, critical manufacturing, and transportation systems.

Critical facility exposure to wildfire was also evaluated. Based on a comparison of critical facility locations to Functional WUI areas, approximately 10.7 percent of all critical facilities found within Guilford County face direct exposure to wildfires, while 57 percent are located in areas with secondary exposure.

Table 4.93 details the buildings at risk to wildfire in Guilford County, and Table 4.94 shows buildings exposed to wildfire by sector.

Improved parcels located within the Functional WUI are at a higher risk of experiencing damage to property by wildfire. To assess this risk, additional analysis of current parcel data was used comparing the locations of improved parcels—those with existing structures or development—to the boundaries of the direct exposure areas of the Functional WUI. Table 4.92 provides a summary of estimated property exposure to wildfire in Guilford County.

TABLE 4.92 – IMPROVED PARCEL EXPOSURE TO WILDFIRE BY JURISDICTION

Jurisdiction	Improved Parcel Count	Total Improved Value
Guilford County	1,265	$134,712,135
Gibsonville	47	$10,801,988
Greensboro	843	$286,936,500
High Point	797	$177,016,940
Jamestown	57	$5,340,900
Oak Ridge	113	$38,170,900
Pleasant Garden	33	$2,998,400
Sedalia	20	$1,874,000
Stokesdale	37	$12,731,200
Summerfield	83	$8,248,700
Total	3,295	$678,831,663

Source: Guilford County GIS, Southern Wildfire Risk Assessment

TABLE 4.93 – ESTIMATED BUILDINGS IMPACTED BY WILDFIRE

Jurisdiction	All Buildings	Residential Buildings at Risk			Commercial Buildings at Risk			Public Buildings at Risk			Total Buildings at Risk		
	Num	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages	Num	% of Total	Estimated Damages
Unincorporated Guilford County	49,554	164	0%	$24,033,969	41	0%	$45,308,498	3	0%	$30,418,911	208	0%	$99,761,378
Greensboro	81,938	17	0%	$6,207,623	1	0%	$174,480	0	0%	$0	18	0%	$6,382,103
High Point	2,728	11	0%	$1,328,115	0	0%	$0	0	0%	$0	11	0%	$1,328,115
Gibsonville	2,786	229	8%	$30,124,579	2	0%	$343,103	0	0%	$0	231	8%	$30,467,683
Jamestown	3,228	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Oak Ridge	2,820	7	0%	$789,033	2	0%	$333,926	0	0%	$0	9	0%	$1,122,959
Pleasant Garden	393	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Sedalia	2,337	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Stokesdale	4,274	9	0%	$1,312,272	5	0%	$1,139,887	0	0%	$0	14	1%	$2,452,159
Summerfield	573	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Whitsett	189,387	0	0%	$0	0	0%	$0	0	0%	$0	0	0%	$0
Total	**2,728**	**437**	**0%**	**$63,795,591**	**51**	**0%**	**$47,299,894**	**3**	**0%**	**$30,418,911**	**491**	**0%**	**$141,514,397**

Source: NCEM Risk Management Tool

Sector	Number of Buildings at Risk	Estimated Damages
Banking and Finance	0	$0
Commercial Facilities	7	$1,593,823
Critical Manufacturing	2	$313,349
Energy	0	$0
Food and Agriculture	41	$1,658,061
Government Facilities	3	$30,418,911
Healthcare and Public Health	0	$0
Transportation Systems	1	$43,734,661
All Sectors	**54**	**$77,718,805**

TABLE 4.94 – ESTIMATED BUILDINGS IMPACTED BY WILDFIRE BY SECTOR

Source: NCEM Risk Management Tool

ENVIRONMENT

Wildfires have the potential to destroy forest and forage resources and damage natural habitats. Wildfire can also damage agricultural crops on private land. Wildfire is part of a natural process, however, and the environment will return to its original state in time.

CONSEQUENCE ANALYSIS

Table 4.95 summarizes the potential detrimental consequences of wildfire.

TABLE 4.95 – CONSEQUENCE ANALYSIS - WILDFIRE

Category	Consequences
Public	In addition to the potential for fatalities, wildfire and the resulting diminished air quality pose health risks. Exposure to wildfire smoke can cause serious health problems within a community, including asthma attacks and pneumonia, and can worsen chronic heart and lung diseases. Vulnerable populations include children, the elderly, people with respiratory problems or with heart disease. Even healthy citizens may experience minor symptoms, such as sore throats and itchy eyes.
Responders	Public and firefighter safety is the first priority in all wildland fire management activities. Wildfires are a real threat to the health and safety of the emergency services. Most fire-fighters in rural areas are 'retained'. This means that they are part-time and can be called away from their normal work to attend to fires.
Continuity of Operations (including Continued Delivery of Services)	Wildfire events can result in a loss of power which may impact operations. Downed trees, power lines and damaged road conditions may prevent access to critical facilities and/or emergency equipment.

Category	Consequences
Property, Facilities and Infrastructure	Wildfires frequently damage community infrastructure, including roadways, communication networks and facilities, power lines, and water distribution systems. Restoring basic services is critical and a top priority. Efforts to restore roadways include the costs of maintenance and damage assessment teams, field data collection, and replacement or repair costs. Direct impacts to municipal water supply may occur through contamination of ash and debris during the fire, destruction of aboveground distribution lines, and soil erosion or debris deposits into waterways after the fire. Utilities and communications repairs are also necessary for equipment damaged by a fire. This includes power lines, transformers, cell phone towers, and phone lines.
Environment	Wildfires cause damage to the natural environment, killing vegetation and animals. The risk of floods and debris flows increases after wildfires due to the exposure of bare ground and the loss of vegetation. In addition, the secondary effects of wildfires, including erosion, landslides, introduction of invasive species, and changes in water quality, are often more disastrous than the fire itself.
Economic Condition of the Jurisdiction	Wildfires can have significant short-term and long-term effects on the local economy. Wildfires, and extreme fire danger, may reduce recreation and tourism in and near the fires. If aesthetics are impaired, local property values can decline. Extensive fire damage to trees can significantly alter the timber supply, both through a short-term surplus from timber salvage and a longer-term decline while the trees regrow. Water supplies can be degraded by post-fire erosion and stream sedimentation. Wildfires can also have positive effects on local economies. Positive effects come from economic activity generated in the community during fire suppression and post-fire rebuilding. These may include forestry support work, such as building fire lines and performing other defenses, or providing firefighting teams with food, ice, and amenities such as temporary shelters and washing machines.
Public Confidence in the Jurisdiction's Governance	Wildfire events may cause issues with public confidence because they have very visible impacts on the community. Public confidence in the jurisdiction's governance may be influenced by: • The jurisdiction's actions taken pre-disaster to mitigate and prepare for impacts, including the amount of public education provided • The jurisdiction's efforts to provide warning to residents • The jurisdiction's actions taken to respond to the event • The jurisdiction's actions taken to recover from the impacts and return impacted communities to the same or better state before the wildfire occurred

HAZARD SUMMARY BY JURISDICTION

The following table summarizes wildfire hazard risk by jurisdiction. Wildfire warning time and duration do not vary by jurisdiction. Spatial extent ratings were based on the proportion of area within the WUI. Impact ratings were based on fire intensity data from SWRA; there are no clusters of significant fire

intensity risk in any jurisdictions. Probability ratings were determined based on burn probability data from SWRA, which is generally low across all jurisdictions.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	3	1	3	4	3	2.5	M
Greensboro	2	1	3	4	3	2.2	M
High Point	2	1	3	4	3	2.2	M
Jamestown	2	1	3	4	3	2.2	M
Oak Ridge	2	1	3	4	3	2.2	M
Pleasant Garden	3	1	3	4	3	2.5	M
Sedalia	3	1	3	4	3	2.5	M
Stokesdale	3	1	3	4	3	2.5	M
Summerfield	3	1	3	4	3	2.5	M
Whitsett	3	1	3	4	3	2.5	M
Unincorporated Guilford County	3	1	3	4	3	2.5	M

Cyber Threat

HAZARD BACKGROUND

The State of North Carolina Hazard Mitigation Plan defines cyber-attacks as "deliberate attacks on information technology systems in an attempt to gain illegal access to a computer, or purposely cause damage." Cyber-attacks use malicious code to alter computer operations or data. The vulnerability of computer systems to attacks is a growing concern as people and institutions become more dependent upon networked technologies. The Federal Bureau of Investigation (FBI) reports that "cyber intrusions are becoming more commonplace, more dangerous, and more sophisticated," with implications for private- and public-sector networks.

There are many types of cyber-attacks. Among the most common is a direct denial of service, or DDoS attack. This is when a server or website will be queried or pinged rapidly with information requests, overloading the system and causing it to crash.

Malware, or malicious software, can cause numerous problems once on a computer or network, from taking control of users' machines to discreetly sending out confidential information. Ransomware is a specific type of malware that blocks access to digital files and demands a payment to release them. Hospitals, school districts, state and local governments, law enforcement agencies, businesses, and even individuals can be targeted by ransomware.

Cyber spying or espionage is the act of illicitly obtaining intellectual property, government secrets, or other confidential digital information, and often is associated with attacks carried out by professional agents working on behalf of a foreign government or corporation. According to cybersecurity firm Symantec, in 2016 "…the world of cyber espionage experienced a notable shift towards more overt activity, designed to destabilize and disrupt targeted organizations and countries."

Major data breaches - when hackers gain access to large amounts of personal, sensitive, or confidential information - have become increasingly common. The Symantec report says more than seven billion identities have been exposed in data breaches over the last eight years. In addition to networked systems, data breaches can occur due to the mishandling of external drives, as has been the case with losses of some state employee data.

Cybercrime can refer to any of the above incidents when motivated primarily by financial gain or other criminal intent.

The most severe type of attack is cyber terrorism, which aims to disrupt or damage systems in order to cause fear, injury, and loss to advance a political agenda.

The North Carolina State Bureau of Investigation's Computer Crime Unit helps law enforcement across North Carolina solve sophisticated crimes involving digital evidence.

Warning Time: 4 – Less than six hours

Duration: 4 – More than one week

LOCATION

Cyber disruption events can occur and/or impact virtually any location where computing devices are used. Incidents may involve a single location or multiple geographic areas. A disruption can have far-reaching effects beyond the location of the targeted system; disruptions that occur far outside the state can still impact people, businesses, and institutions within Guilford County.

Spatial Extent: 2 – Small

EXTENT

The extent or magnitude/severity of a cyber disruption event is variable depending on the nature of the event. A disruption affecting a small, isolated system could impact only a few functions/processes. Disruptions of large, integrated systems could impact many functions/processes, as well as many individuals that rely on those systems.

There is no universally accepted scale to quantify the severity of cyber-attacks. The strength of a DDoS attack is sometimes explained in terms of a data transmission rate. One of the largest DDoS disruptions ever, which brought down some of the internet's most popular sites on October 21, 2016, peaked at 1.2 terabytes per second.

Data breaches are often described in terms of the number of records or identities exposed.

Impact: 3 – Critical

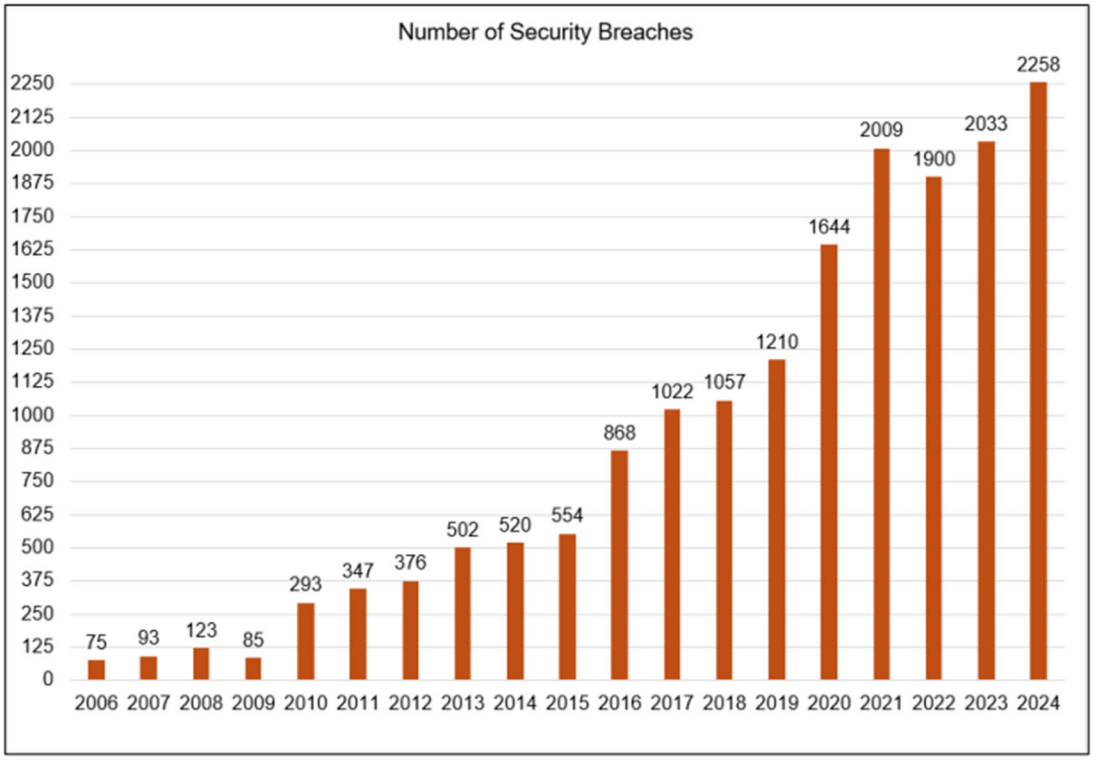
HISTORICAL OCCURRENCES

Guilford Technical Community College (GTCC), located in Jamestown, North Carolina, experienced a ransomware attack in September of 2020. Once the attack was discovered, GTCC launched a forensic investigation and confirmed that the cybercriminals had gained access to the college's network and had access to personal information of students, employees, and faculty members. Additionally, GTCC fell victim to another system wide cyber attack in October of 2022 that resulted in students experiencing Wi-Fi outages for over a week and eventually led to sensitive and personal information data being stolen from their network.

According to local news reports, additional cyber attacks have impacted grocery stores, car dealerships, libraries, and local governments within Guilford County. In June 2025, the City of Thomasville, which is a neighboring community to High Point, was hit by a cyberattack that disrupted their system and left city residents concerned and exposed to their personal information being accessed.

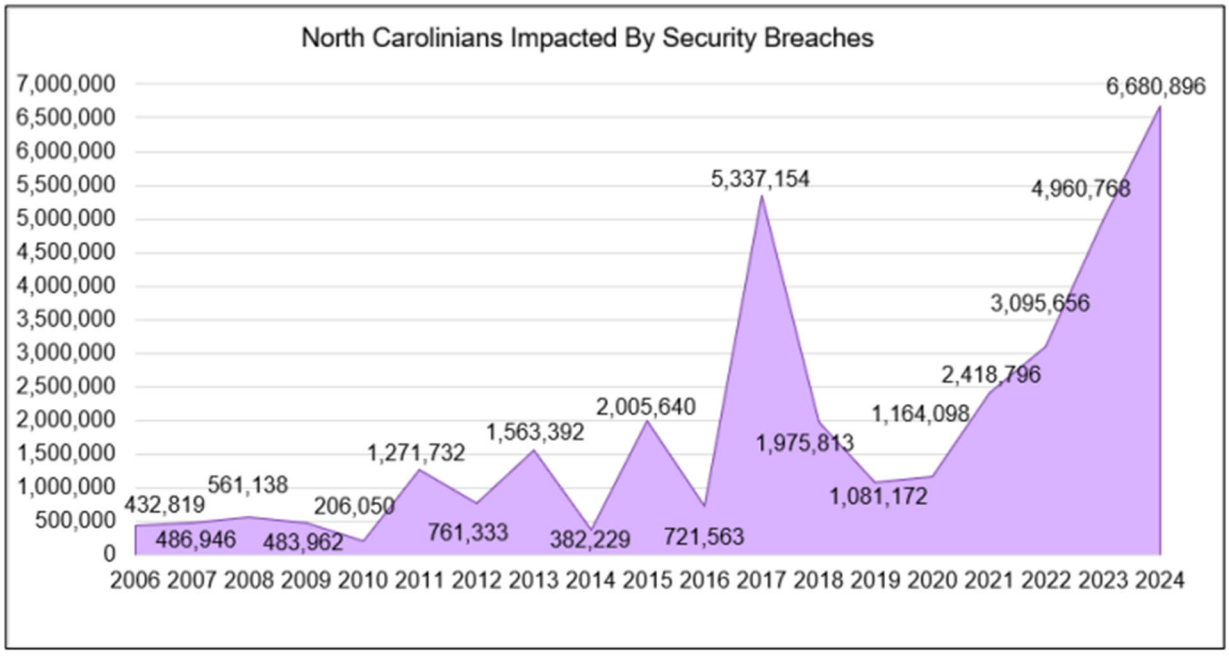
In North Carolina, businesses and organizations that experience data breaches are required to report the breach and the information that was compromised to the NC Department of Justice (DOJ). In 2024, the DOJ received 2,258 data breach notices from organizations according to their annual Data Breach Report. These breaches impacted more than 6.6 million North Carolinians – the highest number of people impacted in a single year. Additionally, in 2024, hacking-related breaches were at a record high with 1,755 breaches reported for the year. The report noted that ransomware attacks have increased nearly 50 percent and contributed to more than half of all data breaches reported in 2024.

FIGURE 4.68 – NUMBER OF SECURITY BREACHES IN NORTH CAROLINA



Source: North Carolina Department of Justice

FIGURE 4.69 – NORTH CAROLINIANS IMPACTED BY SECURITY BREACHES



Source: North Carolina Department of Justice

PROBABILITY OF FUTURE OCCURRENCE

Cyber-attacks occur daily, but most have negligible impacts at the county level. The possibility of a larger disruption affecting the county exists at all times, but it is difficult to quantify the exact probability due to such highly variable factors as the type of attack and intent of the attacker. Minor attacks against business and government systems have become commonplace occurrences, but are usually stopped with minimal impact. Similarly data breaches impacting the information of Guilford County residents are almost certain to happen in coming years. Major attacks or breaches specifically targeting systems in the county are less likely, but cannot be ruled out.

Probability: 3 – Likely

CLIMATE CHANGE

Climate change is not expected to affect incidence of cyber-attacks.

VULNERABILITY ASSESSMENT

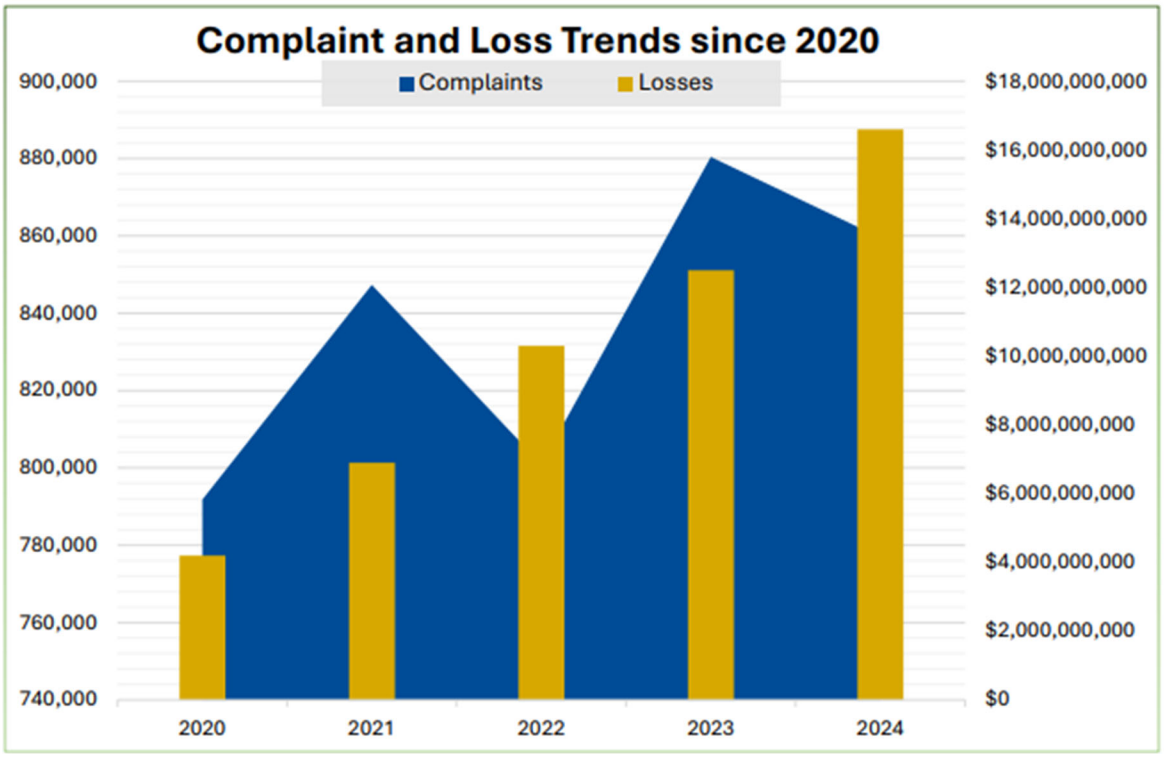
METHODOLOGIES AND ASSUMPTIONS

Vulnerability to cyber-attacks was assessed based on past occurrences nationally and internationally as well as publicly available information on these vulnerabilities.

PEOPLE

Cyber-attacks can have a significant cumulative economic impact. According to the Internet Crime Complaint Center run by the Federal Bureau of Investigation, the U.S. experienced a loss of $50.5 billion between the years 2020 to 2024. Economic losses associated with cybercrime increased every year during this five-year period as shown in Figure 4.70.

FIGURE 4.70 – 2020-2024 COMPLAINTS AND LOSSES DUE TO CYBERCRIME IN THE U.S.



Source: Internet Crime Complaint Center 2024 Annual Report

Businesses continue to use evolving technologies to improve operations, and increasingly, personal and financial information is stored and transferred online. Phishing scams have reached an all-time high in 2022, up 60 percent from 2020 with over 1 million attacks in the first quarter of 2022 alone.

Consumers continued usage of online services, such as banking and shopping, increase vulnerability to personal and financial information theft or manipulation. Between 2016 and 2021, Americans lost more than $9 billion to lost or stolen financial information.

In recent years, cyber criminals have begun to target hospitals, which create a significant health and safety concern. For example, in 2024, a ransomware attack targeted Ascension, the third largest health system in the U.S. that provides care to over 6 million people each year. This ransomware attack took down Ascension's computer system, and nurses were left scrambling to find paper backups of medical history and prescribed medications. This attack undoubtedly slowed down the hospital system and forced Ascension facilities to redirect patients to other providers. The Ascension computer system was down for 37 days, and the hospital spent $130 million in response to the attack.

It should be noted that direct injuries or fatalities from cyber-attacks would generally only be possible from a major cyber terrorist attack against critical infrastructure.

PROPERTY

Short of a major cyber terrorist attack against critical infrastructure, property damage from cyber-attacks is typically limited to computer systems. However, infrastructure attacks using social engineering temporarily disabled the Colonial Pipeline, risking access to oil products across the East Coast.

ENVIRONMENT

The vast majority of cyber incidents have little to no environmental impact. A major cyber terrorism attack could potentially impact the environment by triggering a release of a hazardous materials, or by causing an accident involving hazardous materials by disrupting traffic-control devices.

CONSEQUENCE ANALYSIS

Table 4.96 summarizes the potential consequences of a cyber-attack.

TABLE 4.96 – CONSEQUENCE ANALYSIS – CYBER SECURITY

Category	Consequences
Public	Cyber-attacks can impact personal data and accounts. Injuries or fatalities could potentially result from a cyber attack against critical infrastructure.
Responders	Cyber-attacks can impact personal data and accounts. Injuries or fatalities could potentially result from a major cyber attack against critical infrastructure.
Continuity of Operations (including Continued Delivery of Services)	Agencies that rely on electronic backup of critical files are vulnerable. The delivery of services can be impacted since governments rely, to a great extent, upon electronic delivery of services.
Property, Facilities and Infrastructure	Rare. Most attacks affect only data and computer systems. Sabotage of utilities and infrastructure from a cyber attack could potentially result in system failures that damage property on a scale equal with natural disasters. A cyber attack may render facilities and infrastructure unusable.
Environment	Rare. A major attack could theoretically result in a hazardous materials release.
Economic Condition of the Jurisdiction	Could greatly affect the economy. In an electronic-based commerce society, any disruption to daily activities can have disastrous impacts to the economy. It is difficult to measure the true extent of the impact.
Public Confidence in the Jurisdiction's Governance	The government's inability to protect critical systems or confidential personal data could impact public confidence. An attack could raise questions regarding the security of using electronic systems for government services.

HAZARD SUMMARY BY JURISDICTION

The table below summarizes cyber threat risk by jurisdiction. Risk does not vary across the planning area.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All jurisdictions	*3*	*3*	*2*	*4*	*4*	*3*	*H*

Hazardous Substances

HAZARD BACKGROUND

Generally, a hazardous material is a substance or combination of substances which, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either cause or significantly contribute to an increase in mortality or serious illness. Hazardous materials may also pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous material incidents can occur while a hazardous substance is stored at a fixed facility, or while the substance is being transported along a road corridor or railroad line or via an enclosed pipeline or other linear infrastructure.

The U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) all have responsibilities relating to the transportation, storage, and use of hazardous materials and waste. The Right to Know Network (RTK NET), maintained by the EPA's National Response Center (NRC), is a primary source of information on the use and storage of hazardous materials, as well as data regarding spills and releases.

Hazardous materials are typically divided into the following classes:

— Explosives
— Compressed gases: flammable, non-flammable compressed, poisonous
— Flammable or combustible liquids
— Flammable solids: spontaneously combustible, dangerous when wet
— Oxidizers and organic peroxides
— Toxic materials: poisonous material, infectious agents
— Radioactive material
— Corrosive material: destruction of human skin, corrodes steel

It is common to see hazardous materials releases as escalating incidents resulting from other hazards such as floods, wildfires, and earthquakes that may cause containment systems to fail or affect transportation infrastructure. The release of hazardous materials can greatly complicate or even eclipse the response to the natural hazards disaster that caused the spill.

FIXED HAZARDOUS MATERIALS INCIDENT

A fixed hazardous materials incident is the accidental release of chemical substances or mixtures during production or handling at a fixed facility. While these incidents can sometimes involve large quantities of materials, their locations can be more easily predicted and monitored.

TRANSPORTATION HAZARDOUS MATERIALS INCIDENT

A transportation hazardous materials incident is the accidental release of chemical substances or mixtures during transport. Transportation hazardous materials incidents can occur during highway or air transport. Highway accidents involving hazardous materials pose a great potential for public exposures. Both nearby populations and motorists can be impacted and become exposed by accidents and releases. If airplanes carrying hazardous cargo crash or otherwise leak contaminated cargo, populations and the environment in the impacted area can become exposed.

PIPELINE INCIDENT

A pipeline transportation incident occurs when a break in a pipeline creates the potential for an explosion or leak of a dangerous substance (oil, gas, etc.) possibly requiring evacuation. An underground pipeline incident can be caused by environmental disruption, accidental damage, or sabotage. Incidents can range from a small, slow leak to a large rupture where an explosion is possible. Inspection and maintenance of the pipeline system along with marked gas line locations and an early warning and response procedure can lessen the risk to those near the pipelines.

Warning Time Score: 4 – Less than six hours

Duration Score: 2 – Less than 24 hours

LOCATION

The Toxic Release Inventory (TRI) Program run by the U.S. Environmental Protection Agency (EPA) maintains a database of industrial facilities across the country and the type and quantity of toxic chemicals they release. The program also tracks pollution prevention activities and which facilities are reducing toxic releases. The Toxic Release Inventory reports 52 sites with hazardous materials in the county. TRI sites are listed in Table 4.97 and are shown in Figure 4.71.

Spatial Extent: 2 – Small

TABLE 4.97 – TOXIC RELEASE INVENTORY SITES, GUILFORD COUNTY

Facility Name	Jurisdiction	Industry Sector	Chemicals Present
ASSOCIATED ASPHALT GREENSBORO LLC	Greensboro	Petroleum Bulk Terminals	Polycyclic aromatic compounds, Lead, Benzo[g,h,i]perylene
THE PROCTER & GAMBLE MANUFACTURING CO	Greensboro	Chemicals	Nitric acid, Nitrate Compounds
MARSH FURNITURE CO	High Point	Furniture	Xylene, n-Butyl alcohol, Methanol
SHERWIN-WILLIAMS CO	Greensboro-1025 Howard St	Chemicals	n-Hexane, Cyclohexane, Methyl isobutyl ketone, n-Butyl alcohol, Cobalt compounds, Toluene, Certain glycol ethers, Xylene, 1,2,4-Trimethylbenzene, Ethylbenzene, Copper Compounds, Zinc Compounds, Manganese Compounds
O'NEAL MANUFACTURING SERVICES	Greensboro	Fabricated Metals	Manganese, Copper, Nickel, Chromium
ADAMS AN OLDCASTLE CO-GREENSBORO	Greensboro	Nonmetallic Mineral Product	Mercury, Lead

Facility Name	Jurisdiction	Industry Sector	Chemicals Present
UNIVAR SOLUTIONS USA INC	Jamestown	Chemical Wholesalers	Toluene, n-Hexane, 1,2,4-Trimethylbenzene, n-Butyl alcohol, Certain glycol ethers, Methanol, Methyl isobutyl ketone
PPG INDUSTRIES GREENSBORO POWDER	Greensboro	Chemicals	Copper Compounds, Triglycidyl isocyanurate, Zinc Compounds
HIGHLINE WARREN LLC.-GREENSBORO	Greensboro	Chemicals	Ethylene glycol, Methanol
RUSSELL STANDARD GREENSBORO	Greensboro	Petroleum	Lead, Styrene, Benzo[g,h,i]perylene, Polycyclic aromatic compounds
SHERWIN-WILLIAMS CO	Greensboro – 113 Stage Coach Trail	Chemicals	Methyl isobutyl ketone, 1,2,4-trimethylbenzene, n-Butyl alcohol, Ethylbenzene, Certain glycol ethers, Xylene, Toluene, Zinc Compounds, Methanol
CAMCO MANUFACTURING INC	Greensboro	Plastics and Rubber	Copper
CONCEPT PLASTICS INC.	High Point	Plastics and Rubber	Styrene
ENGINEERED CONTROLS INTERNATIONAL LLC	Whitsett	Fabricated Metals	Manganese, Lead, Copper, Nickel
FUTURE FOAM INC	High Point	Plastics and Rubber	Toluene diisocyanate, Diethanolamine
HSM-HIGH POINT (PLANT 1)	High Point	Plastics and Rubber	Diisocyanates
DFA DAIRY BRANDS FLUID LLC DBA PET DAIRY	High Point	Food	Nitrate Compounds, Nitric acid
THOMAS BUILT BUSES INC	High Point	Transportation Equipment	Nickel, Ethylene glycol, Lead, Manganese
AKZONOBEL COATINGS INC	High Point	Chemicals	Toluene, Xylene, n-Butyl alcohol, Certain glycol ethers, Methanol, Ethylbenzene

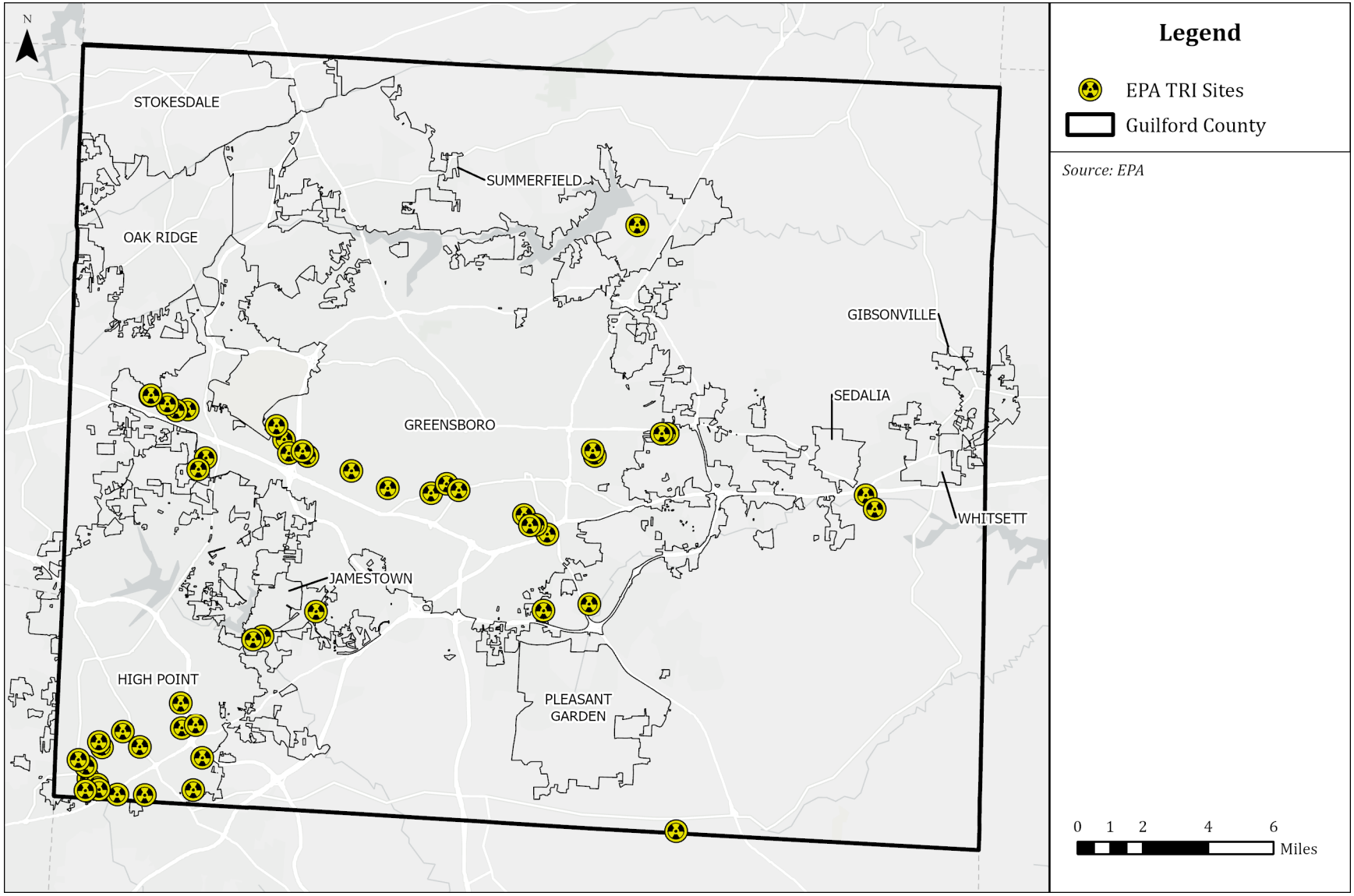
Facility Name	Jurisdiction	Industry Sector	Chemicals Present
AXALTA COATING SYSTEMS USA LLC - HIGH POINT	High Point	Chemicals	Zinc Compounds, Phthalic anhydride, 1,2,4-Trimethylbenzene, Methanol, Manganese Compounds Nonylphenol Ethoxylates, Toluene, Ethylbenzene, Certain glycol ethers, Xylene, Cobalt compounds, n-Butyl alcohol, Methyl isobutyl ketone
CASCADE DIE CASTING/ATLANTIC	High Point	Primary Metals	Copper, Lead
ENNIS-FLINT INC - HIGH POINT FACILITY	High Point	Chemicals	Methyl methacrylate, Butyl acrylate
AURORIUM LLC - GREENSBORO	Greensboro	Chemicals	n-Butyl alcohol, Ethylene glycol, Methanol, Diisocyanates
CHEMOL CO INC	Greensboro	Chemicals	n-Butyl alcohol, Nickel Compounds, Ethylene glycol, Certain glycol ethers
EVONIK SUPERABSORBER LLC	Greensboro	Chemicals	Maleic anhydride, Acrylamide, Acrylic acid
SOLENIS LLC	Greensboro	Chemicals	Acrylic Acid, Acrylamide
KAO SPECIALTIES AMERICAS LLC	High Point	Chemicals	4,4'-Isopropylidenediphenol, Allyl alcohol, Propylene oxide, Ethylene glycol, Styrene, Methanol, Ammonia, Ethylene oxide
ITG BRANDS	Greensboro	Tobacco	Nicotine and Salts, Ammonia
CENTRAL CAROLINA CONCRETE LLC-PLANT 1	Greensboro	Nonmetallic Mineral Product	Lead and Lead Compounds
PIEDMONT PLATING CORP	Greensboro	Fabricated Metals	Zinc Compounds
CLASSIC DYESTUFFS INC	High Point	Chemical Wholesalers	Chromium and Chromium Compounds
PREPAC - MANUFACTURING - BLDG 1	Whitsett	Furniture	Diisocyanates
PIEDMONT CHEMICAL INDUSTRIES I LLC	High Point	Chemicals	Diethyl sulfate, Dicyclopentadiene, Methanol, Phthalic anhydride,

Facility Name	Jurisdiction	Industry Sector	Chemicals Present
			Dimethyl sulfate, 1,3-Phenylenediamine, Maleic anhydride
ADAMS AN OLDCASTLE CO-COLFAX	Colfax	Nonmetallic Mineral Product	Lead
TEKNOR APEX - NORTH CAROLINA	Jamestown	Chemicals	Antimony Compounds, Chromium Compounds, Barium Compounds
RESCO PRODUCTS INC GREENSBORO OPERATIONS	Greensboro	Nonmetallic Mineral Product	Chromium Compounds
CENTRAL CAROLINA CONCRETE LLC PLANT 2	Greensboro	Nonmetallic Mineral Product	Lead and Lead Compounds
OLYMPIC PRODUCTS LLC	Greensboro	Plastics and Rubber	Diethanolamine, Toluene diisocyanate
AMERICAN METAL TREATING INC.	High Point	Fabricated Metals	Methanol, Ammonia
INNOSPEC ACTIVE CHEMICALS	High Point	Chemicals	o-Xylene, Acrylic acid, Epichlorohydrin, Hydrochloric acid, Toluene, Phthalic anhydride, Methanol
HALLSTAR (FORMERLY LANXESS CORP)	Greensboro	Chemicals	Methanol, Phthalic anhydride, n-Butyl alcohol, o-Xylene
ALBERDINGK BOLEY INC	Greensboro	Chemicals	Hydrazine, N-Methyl-2-pyrrolidone, Acrylic acid, Methyl methacrylate, Styrene, Diisocyanates, Butyl acrylate, Triethylamine
PROCTER & GAMBLE MANUFACTURING CO	Browns Summit	Chemicals	Zinc Compounds, Benzene
THOMAS BUILT BUSES INC	High Point	Transportation Equipment	Methyl Methacrylate, Ethylene glycol, Xylene (mixed isomers), Lead, Antimony, Nickel, Chromium, Manganese
TE CONNECTIVITY - PEGG ROAD	Greensboro	Transportation Equipment	Manganese, Nickel and Nickel Compounds, Copper

Facility Name	Jurisdiction	Industry Sector	Chemicals Present
V & E COMPONENTS INC	High Point	Plastics and Rubber	Styrene
GILBARCO INC	Greensboro	Machinery	Manganese, Copper, Chromium, Nickel, Lead
QORVO US INC.	Greensboro	Computers and Electronic Products	N-Methyl-2-pyrrolidone, Xylene
ECOLAB INC KAY CHEMICAL CO	Greensboro	Chemicals	Nitrilotriacetic acid trisodium salt, Ammonia, Aluminum oxide
BOX-BOARD PRODUCTS	Greensboro	Paper	Certain glycol ethers
W&W-AFCO STEEL LLC	Colfax	Fabricated Metals	Manganese
INDUSTRIAL WOOD PRODUCTS	Climax	Wood Products	Lead
Region Total: 52			

Source: US EPA Toxic Release Inventory

FIGURE 4.71 – MAJOR HAZARDOUS MATERIALS FACILITIES IN GUILFORD COUNTY



Source: EPA Toxic Release Inventory

HISTORICAL OCCURRENCES

Multiple hazardous materials incidents take place in Guilford County every year. The USDOT's PHMSA maintains a database of reported hazardous materials incidents since 1989. According to PHSMA records, there were 2,877 recorded releases in Guilford County from 1990 to 2024. These releases are listed in Table 4.98. Of these events, 33 (1.1%) were flagged as serious incidents, shown in Table 4.99. Of the total incidents to occur in Guilford County, these events caused an estimated $3,891,155 in damages with over 96 percent of all incidents occurring on highways and roads.

TABLE 4.98 – ANNUAL REPORTED HAZARDOUS MATERIALS INCIDENTS, 1990-2024, GUILFORD COUNTY

Year	Total Incidents
1990	13
1991	23
1992	21
1993	21
1994	47
1995	173
1996	73
1997	41
1998	90
1999	151
2000	82
2001	80
2002	50
2003	40
2004	41
2005	74
2006	94
2007	76
2008	57
2009	66
2010	65
2011	51
2012	78
2013	54
2014	56
2015	52
2016	122
2017	87
2018	126
2019	144
2020	134
2021	183
2022	142
2023	110
2024	160

Year	Total Incidents
Total	2,877
Avg/Year	82.2

Source: PHMSA Incident Reports, Office of Hazardous Materials Safety, Incident Reports Database Search

TABLE 4.99 – HAZARDOUS MATERIALS INCIDENTS CLASSIFIED AS SERIOUS 1990-2024, GUILFORD COUNTY

Report Number	Date Of Incident	Hazardous Class	Mode Of Transportation	Causes of Failure	Total Damages
I-1990080042	7/26/1990	3	Highway	Improper Preparation for Transportation; Overfilled	$390
I-1991090582	9/8/1991	3	Highway	Overfilled	$129
I-1991110412	9/26/1991	3	Highway	-	$35
I-1992090751	8/20/1992	2	Highway	Overfilled	-
I-1993090117	8/24/1993	2	Highway	Vehicular Crash or Accident Damage; Impact with Sharp or Protruding Object (e.g., nails)	$75,000
I-1995071369	7/5/1995	2.2	Highway	Freezing; Freezing	-
I-1997100017	9/4/1997	3	Highway	Rollover Accident; Vehicular Crash or Accident Damage; Water Damage	$262,850
I-1997100623	9/5/1997	3	Highway	Impact with Sharp or Protruding Object (e.g., nails)	-
I-1999101169	9/30/1999	3	Highway	Rollover Accident; Vehicular Crash or Accident Damage	$110,000
I-2000040521	3/30/2000	8	Rail	Defective Component or Device	$4,890
I-2001060345	11/13/2000	3	Highway	Overfilled	$137,000
I-2001050986	3/19/2001	3	Highway	Rollover Accident; Vehicular Crash or Accident Damage	$158,300
I-2003050215	8/28/2002	3	Highway	-	$188,000
I-2002120039	11/12/2002	3	Highway	Rollover Accident; Vehicular Crash or Accident Damage	$194,500

Report Number	Date Of Incident	Hazardous Class	Mode Of Transportation	Causes of Failure	Total Damages
I-2003090170	1/30/2003	3	Highway	Loose Closure, Component, or Device	$7,889
I-2003100511	9/25/2003	8	Highway	-	-
I-2003120134	10/2/2003	8	Highway	-	$11,824
E-2009020080	12/23/2008	3	Highway	Abrasion	-
E-2009110327	10/27/2009	8	Highway	Rollover Accident	$152,000
I-2011010135	11/10/2010	3	Highway	Dropped	-
I-2011010037	12/10/2010	3	Highway	Overfilled	-
I-2012040248	11/29/2011	3	Highway	Rollover Accident	$247,345
I-2012040248	11/29/2011	3	Highway	Rollover Accident	$247,345
E-2013030384	3/27/2013	3	Highway	Vehicular Crash or Accident Damage	$170,300
I-2014120003	11/14/2014	3	Highway	Dropped	$2,450
I-2015040484	12/5/2014	3	Highway	Dropped	$59,806
I-2016100044	9/7/2016	8	Highway	Vehicular Crash or Accident Damage	$73,512
I-2016100044	9/7/2016	8	Highway	Vehicular Crash or Accident Damage	$73,512
E-2019010304	12/13/2018	3	Highway	Rollover Accident	$153,000
E-2019050725	4/8/2019	8	Highway	-	-
I-2019070105	4/30/2019	2	Highway	Forklift Accident	$4,500

Report Number	Date Of Incident	Hazardous Class	Mode Of Transportation	Causes of Failure	Total Damages
E-2019070319	5/9/2019	8	Highway	Improper Preparation for Transportation	-
E-2019080049	7/26/2019	3	Rail	Derailment	$250,000

Source: PHMSA Incident Reports, Office of Hazardous Materials Safety, Incident Reports Database Search

The most common materials spilled in the planning area are Class 3 (Flammable Combustible Liquids) and Class 8 (Corrosive). Figure 4.72 describes all nine hazard classes.

FIGURE 4.72 – HAZARDOUS MATERIALS CLASSES



Source: U.S. Department of Transportation

EXTENT

The magnitude of a hazardous materials incident can be defined by the material type, the amount released, and the location of the release. The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA), which records hazardous material incidents across the country, defines a "serious incident" as a hazardous materials incident that involves:

- a fatality or major injury caused by the release of a hazardous material,
- the evacuation of 25 or more persons as a result of release of a hazardous material or exposure to fire,
- a release or exposure to fire which results in the closure of a major transportation artery,
- the alteration of an aircraft flight plan or operation,
- the release of radioactive materials from Type B packaging,

— the release of over 11.9 galls or 88.2 pounds of a severe marine pollutant, or
— the release of a bulk quantity (over 199 gallons or 882 pounds) of a hazardous material.

The release or spill of hazardous materials can also require different emergency responses depending on the amount, type, and location of the spill incident. Potential losses can vary greatly for hazardous material incidents. For even a small incident, there are cleanup and disposal costs. In a larger scale incident, cleanup can be extensive and protracted. There can be deaths or injuries requiring doctor's visits and hospitalization, disabling chronic injuries, soil and water contamination can occur, necessitating costly remediation. Evacuations can disrupt home and business activities. Large-scale incidents can easily reach $1 million or more in direct damages, with clean-ups that can last for years.

Impact: 3 – Critical

PROBABILITY OF FUTURE OCCURRENCE

Based on historical occurrences, there have been 2,877 hazardous materials release in the 35-year period from 1990 through 2024. While the number of incidents varies from year to year, the overall trend shows no increase or decrease in the number. Thus, the planning area can expect approximately 82 hazardous materials incident a year, or roughly 6.8 per month. The majority of these incidents will be in or near Greensboro.

However, the number of serious incidents is significantly lower: only 33 in 35 years or an average of 0.9 serious incidents per year. This means that based on historical data, there is a 94 percent annual chance of the planning area experiencing a damaging hazardous materials incident.

Probability: 3 – Likely

CLIMATE CHANGE

Climate change is not expected to impact hazardous materials incidents.

VULNERABILITY ASSESSMENT

The impacts of a hazardous materials incident vary based on the type and quantity of material released, as well as the location, time of day, and weather conditions.

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to hazardous materials incidents was assessed based on past occurrences in the region and nationally and the known behavior of these materials.

PEOPLE

Hazardous materials incidents can cause injuries, hospitalizations, and even death to people nearby. People living near hazardous facilities and along transportation routes may be at a higher risk of exposure, particularly those living or working downstream and downwind from such facilities. For example, a toxic spill or a release of an airborne chemical near a populated area can lead to significant evacuations and have a high potential for loss of life. Individuals working with or transporting hazardous materials are also at heightened risk.

In addition to the immediate health impacts of releases, a handful of studies have found long term health impacts such as increased incidence of certain cancers and birth defects among people living near certain chemical facilities. However there has not been sufficient research done on the subject to allow detailed analysis.

The primary economic impact of hazardous material incidents results from lost business, delayed deliveries, property damage, and potential contamination. Large and publicized hazardous material-related events can deter tourists and could potentially discourage residents and businesses. Economic effects from major transportation corridor closures can be significant.

PROPERTY

The property impacts of a fixed hazardous facility, such as a chemical processing facility is typically localized to the property where the incident occurs. The impact of a small spill (i.e. liquid spill) may also be limited to the extent of the spill and remediated if needed. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to property.

Impacts of hazardous material incidents on critical facilities are most often limited to the area or facility where they occurred, such as at a transit station, airport, fire station, hospital, or railroad. However, they can cause long-term traffic delays and road closures resulting in major delays in the movement of goods and services. These impacts can spread beyond the planning area to affect neighboring counties, or vice-versa. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to critical facilities.

To provide an estimate of current property exposure to hazardous materials in Guilford County, parcel data was evaluated to identify improved parcels and areas of development that are located within the buffer zone of both major roads and railroads. Due to closer proximity to major transportation corridors, buildings found within the buffer zones are at an increased risk of exposure to hazardous materials releases. Table 4.100 and Table 4.101 show the number of improved parcels and their value by jurisdiction within a half mile and 1-mile buffer to major roads and railways. Figure 4.73 and Figure 4.74 illustrate the locations of these buffers within Guilford County.

TABLE 4.100 – IMPROVED PARCEL EXPOSURE TO ROAD BUFFER ZONES BY JURISDICTION

Jurisdiction	Road Buffer Zone	Number of Improved Parcels	Sum of Improved Value	Number of Buildings
Guilford County	0.5 Mile	18,425	2,412,712,093	16,805
	1 Mile	12,829	1,585,049,327	11,006
Gibsonville	0.5 Mile	1,108	139,371,200	517
	1 Mile	1,496	194,592,446	918
Greensboro	0.5 Mile	31,951	9,627,213,598	23,670
	1 Mile	26,145	5,973,436,140	22,259
High Point	0.5 Mile	9,262	2,396,472,674	8,980
	1 Mile	12,456	2,698,683,441	11,102
Jamestown	0.5 Mile	564	113,121,700	394

Jurisdiction	Road Buffer Zone	Number of Improved Parcels	Sum of Improved Value	Number of Buildings
	1 Mile	466	53,939,400	387
Oak Ridge	0.5 Mile	873	301,713,600	810
	1 Mile	786	262,525,500	631
Pleasant Garden	0.5 Mile	268	26,275,100	254
	1 Mile	425	40,593,700	371
Sedalia	0.5 Mile	78	7,308,600	39
	1 Mile	78	7,361,900	79
Stokesdale	0.5 Mile	1,884	466,599,600	1,406
	1 Mile	773	216,329,783	475
Summerfield	0.5 Mile	2,037	209,415,600	1,540
	1 Mile	1,431	185,223,900	1,091
Whitsett	0.5 Mile	321	30,847,100	347
	1 Mile	75	7,027,500	103

Source: Guilford County GIS

TABLE 4.101 – IMPROVED PARCEL EXPOSURE TO RAIL BUFFER ZONES BY JURISDICTION

Jurisdiction	Rail Buffer Zone	Number of Improved Parcels	Sum of Improved Value	Number of Buildings
Guilford County	0.5 Mile	3,496	565,310,806	3,789
	1 Mile	3,640	466,611,702	3,725
Gibsonville	0.5 Mile	1,519	183,447,762	1,190
	1 Mile	1,395	351,995,353	833
Greensboro	0.5 Mile	22,745	8,189,947,534	21,145
	1 Mile	20,598	4,778,445,000	18,004
High Point	0.5 Mile	7,140	2,134,027,603	7,958
	1 Mile	6,156	1,377,472,011	6,502
Jamestown	0.5 Mile	918	154,064,200	734
	1 Mile	656	64,484,100	600
Oak Ridge	1 Mile	1	196,600	1
Pleasant Garden	0.5 Mile	846	79,855,400	834
	1 Mile	620	60,962,800	794
Whitsett	1 Mile	24	2,248,800	13

Source: Guilford County GIS

FIGURE 4.73 – ROAD HAZMAT BUFFERS, GUILFORD COUNTY

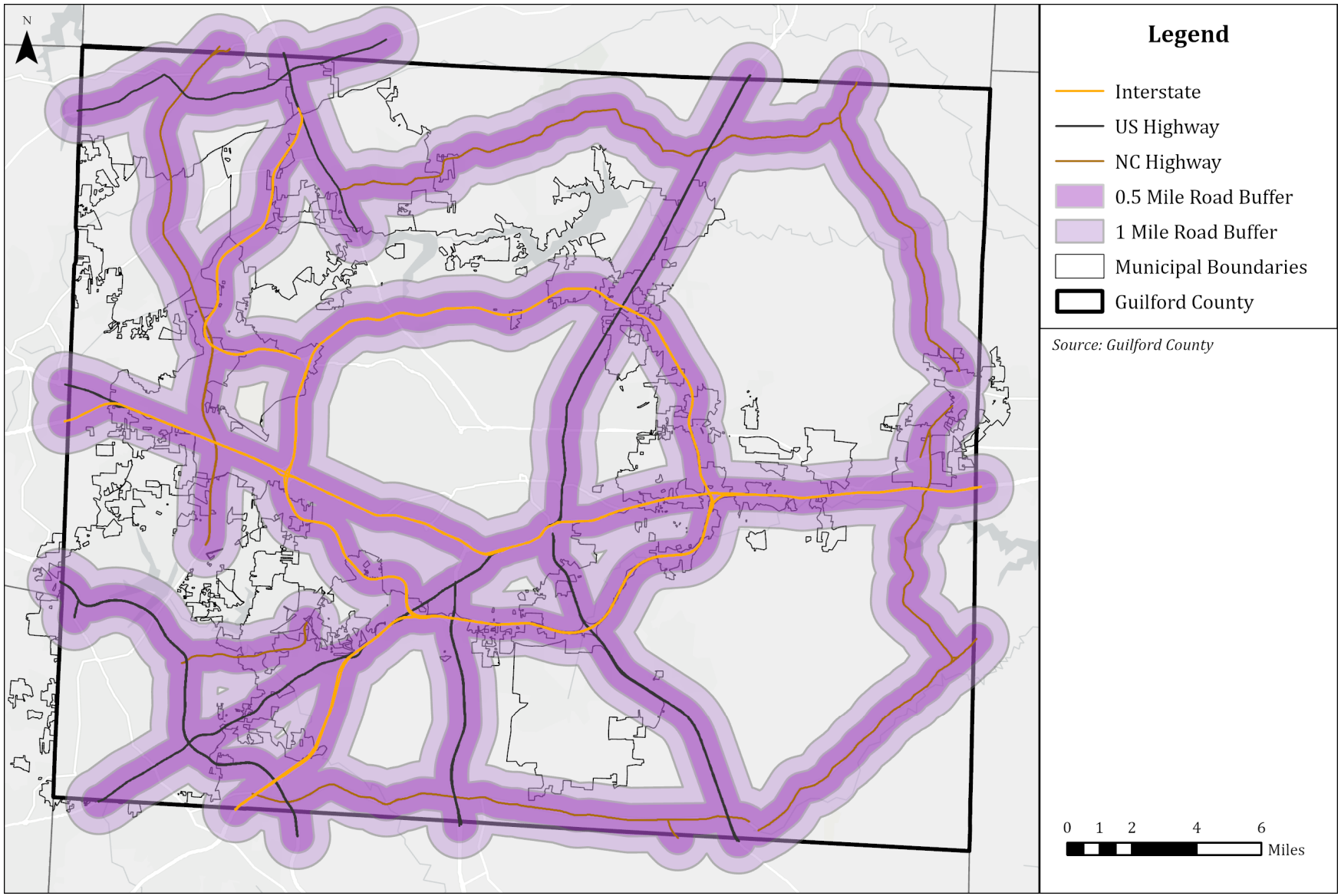
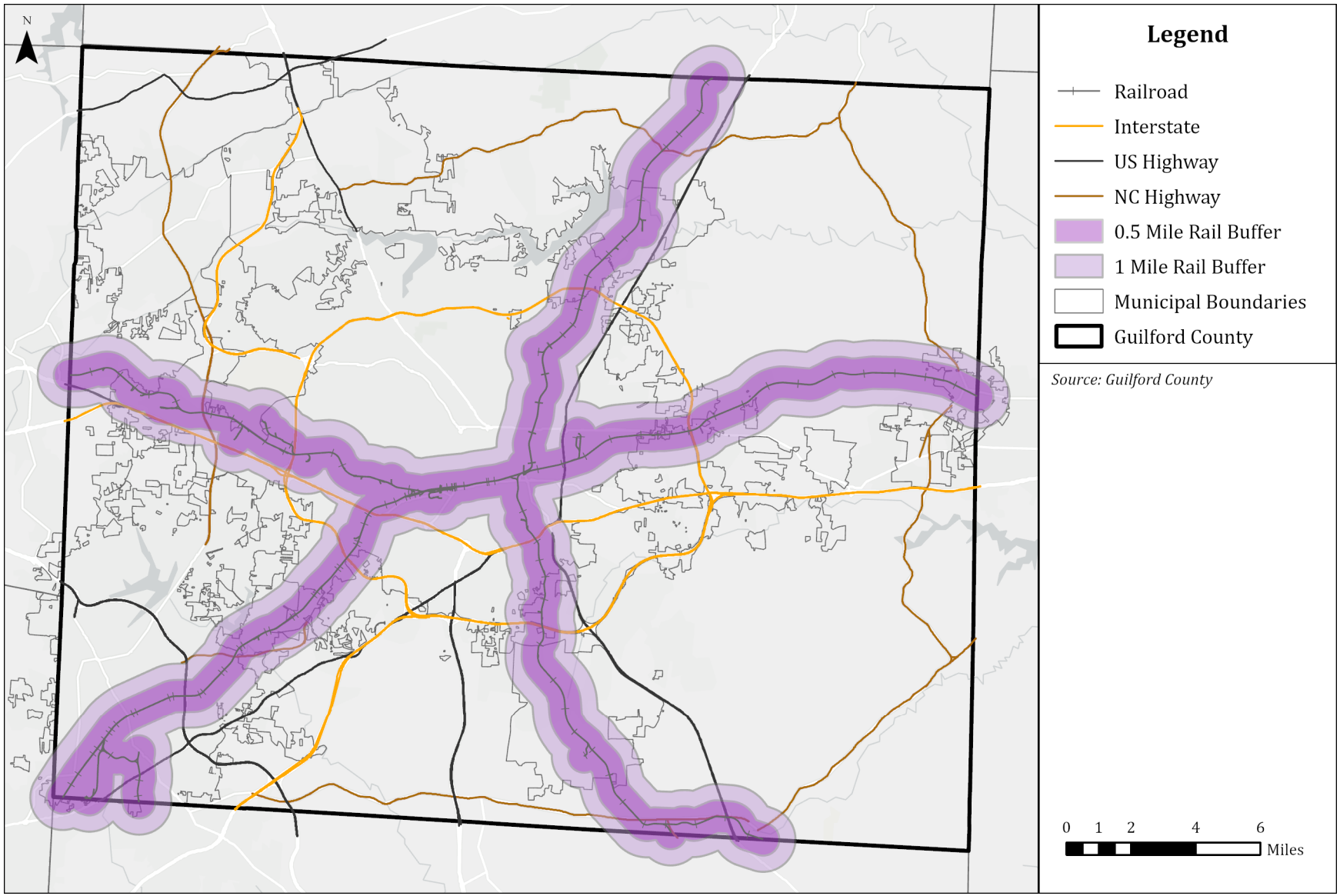


FIGURE 4.74 – RAIL HAZMAT BUFFERS, GUILFORD COUNTY



ENVIRONMENT

Hazardous material incidents may affect a small area at a regulated facility or cover a large area outside such a facility. Widespread effects occur when hazardous materials contaminate the groundwater and eventually the municipal water supply, or they migrate to a major waterway or aquifer.

CONSEQUENCE ANALYSIS

Table 4.102 summarizes the potential detrimental consequences of hazardous materials incident.

TABLE 4.102 – CONSEQUENCE ANALYSIS – HAZARDOUS MATERIALS INCIDENT

Category	Consequences
Public	Contact with hazardous materials could cause serious illness or death. Those living and working closest to hazardous materials sites face the greatest risk of exposure. Exposure may also occur through contamination of food or water supplies.
Responders	Responders face similar risks as the general public but a heightened potential for exposure to hazardous materials.
Continuity of Operations (including Continued Delivery of Services)	A hazardous materials incident may cause temporary road closures or other localized impacts but is unlikely to affect continuity of operations.
Property, Facilities and Infrastructure	Some hazardous materials are flammable, explosive, and/or corrosive, which could result in structural damages to property. Impacts would be highly localized.
Environment	Consequences depend on the type of material released. Possible ecological impacts include loss of wildlife, loss of habitat, and degradation of air and/or water quality.
Economic Condition of the Jurisdiction	Clean up, remediation, and/or litigation costs may apply. Long-term economic damage is unlikely.
Public Confidence in the Jurisdiction's Governance	A hazardous materials incident may affect public confidence if the environmental or health impacts are enduring.

HAZARD SUMMARY BY JURISDICTION

The table below summarizes hazardous materials incident risk by jurisdiction. Probability was determined based on past incidents. All other factors do not vary by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	2	3	2	4	2	2.5	M
Greensboro	3	3	2	4	2	2.8	M
High Point	3	3	2	4	2	2.8	M
Jamestown	2	3	2	4	2	2.5	M
Oak Ridge	2	3	2	4	2	2.5	M
Pleasant Garden	2	3	2	4	2	2.5	M
Sedalia	2	3	2	4	2	2.5	M
Stokesdale	2	3	2	4	2	2.5	M
Summerfield	2	3	2	4	2	2.5	M

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Whitsett	3	3	2	4	2	2.8	M
Unincorporated Guilford County	3	3	2	4	2	2.8	M

Radiological Emergency

HAZARD BACKGROUND

A radiological incident is an occurrence resulting in the release of radiological material at a fixed facility (such as power plants, hospitals, laboratories, etc.) or in transit.

Radiological incidents related to transportation are described as incidents resulting in a release of radioactive material during transportation. Transportation of radioactive materials through North Carolina over the interstate highway system is considered a radiological hazard. The transportation of radioactive material by any means of transport is licensed and regulated by the federal government. As a rule, there are two categories of radioactive materials that are shipped over the interstate highways:

— Low level waste consists of primarily of materials that have been contaminated by low level radioactive substances but pose no serious threat except through long-term exposure. These materials are shipped in sealed drums within placarded trailers. The danger to the public is no more than a wide array of other hazardous materials.

— High level waste, usually in the form of spent fuel from nuclear power plants, is transported in specially constructed casks that are built to withstand a direct hit from a locomotive.

Radiological emergencies at nuclear power plants are divided into classifications. Table 4.103 shows these classifications, as well as descriptions of each.

TABLE 4.103 – RADIOLOGICAL EMERGENCY CLASSIFICATIONS

Emergency Classification	Description
Notification of Unusual Event (NOUE)	Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.
Alert	Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the Environmental Protection Agency (EPA) Protective Action Guides (PAGs)
Site Area Emergency (SAE)	Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.
General Emergency	Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

Warning Time: 4 – Less than six hours

Duration: 4 – More than one week

LOCATION

The southeastern portion of Guilford County is at risk to impacts from a nuclear incident at the Shearon Harris Nuclear Power Plant, located on Harris Lake. Areas in this part of the county are susceptible because they are within 50 miles of the nuclear power plant. Duke Energy operates Shearon Harris Nuclear Power Plant, which has the capacity to produce 2,948 megawatts of power.

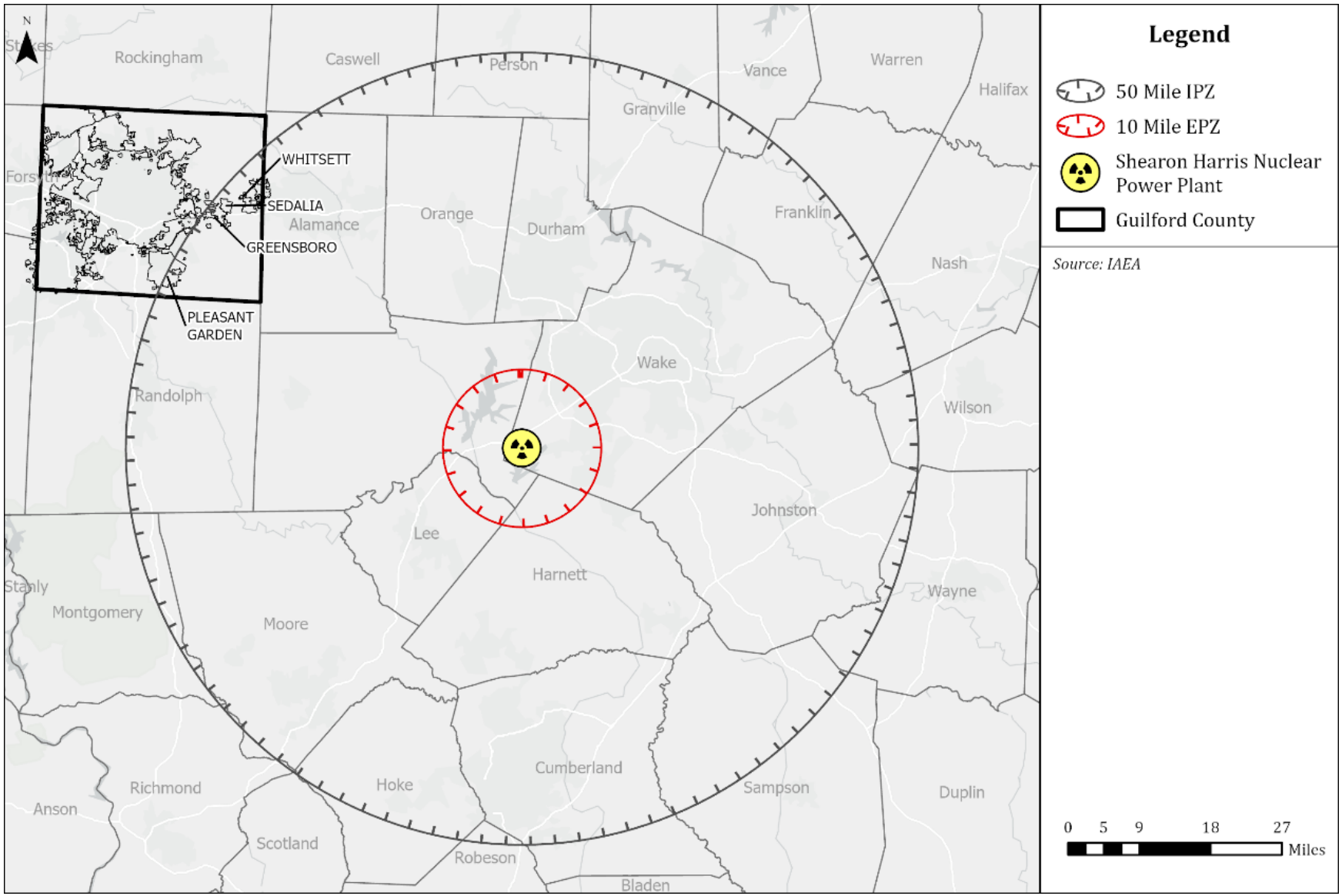
The Nuclear Regulatory Commission defines two emergency planning zones around nuclear plants:

- **Emergency Planning Zone (EPZ)** – The EPZ is a 10-mile radius around nuclear facilities. It is also known as the Plume Exposure Pathway. Areas located within this zone are considered to be at highest risk of exposure to radioactive materials. Within this zone, the primary concern is exposure to and inhalation of radioactive contamination. Predetermined action plans within the EPZ are designed to avoid or reduce dose from such exposure. Residents within this zone would be expected to evacuate in the event of an emergency. Other actions such as sheltering, evacuation, and the use of potassium-iodide must be taken to avoid or reduce exposure in the event of a nuclear incident.
- **Ingestion Pathway Zone (IPZ)** – The IPZ is delineated by a 50-mile radius around nuclear facilities as defined by the federal government. Also known as the Ingestion Exposure Pathway, the IPZ has been designated to mitigate contamination in the human food change resulting from a radiological accident at a nuclear power facility. Contamination to fresh produce, water supplies, and other food produce may occur when radionuclides are deposited on surfaces.

Figure 4.75 shows the location of the Shearon Harris Nuclear Power Plant and the EPZ and IPZ areas around each plant. Guilford County is on the edge of the 50-mile IPZ buffer. Whitsett and Sedalia fall completely within the IPZ, while a portion of Greensboro, Pleasant Garden, and Guilford County fall within the IPZ. None of the county is located within the 10-mile radius of the power plant.

Spatial Extent: 3 – Moderate

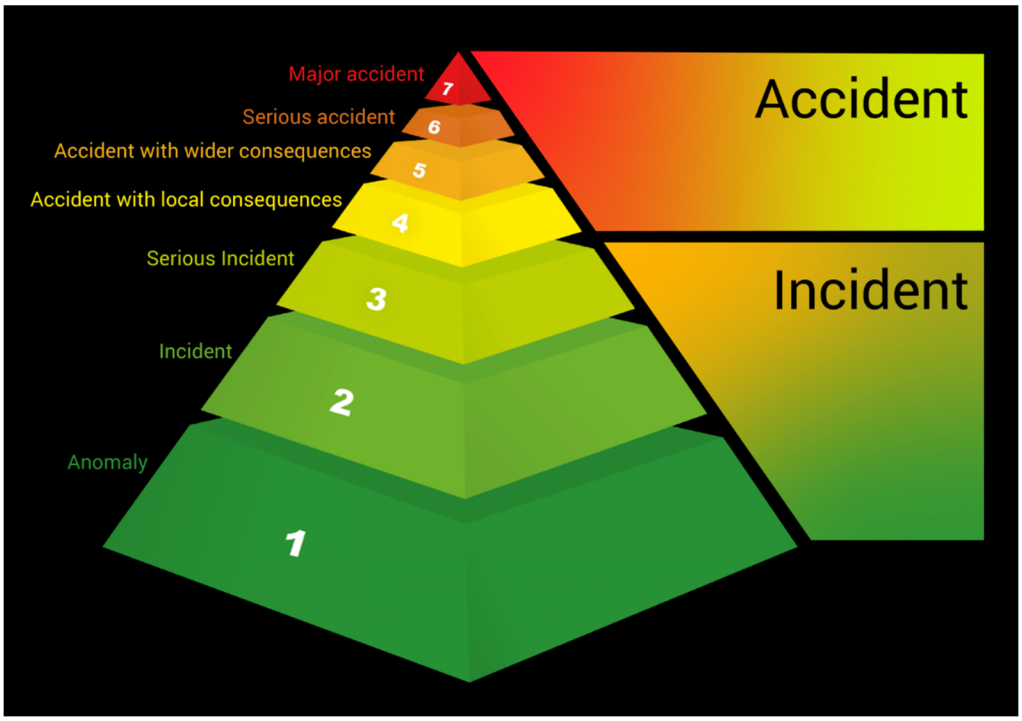
FIGURE 4.75 – SHEARON HARRIS NUCLEAR POWER PLANT



EXTENT

The International Atomic Energy Association (IAEA) developed the International Nuclear and Radiological Event Scale to quantify the magnitude of radiological events. This scale is logarithmic, meaning each increasing level represents a 10-fold increase in severity compared to the previous level.

FIGURE 4.76 – INTERNATIONAL NUCLEAR AND RADIOLOGICAL EVENT SCALE



Source: International Atomic Energy Association

Because Guilford County is not located within the EPZ, the impact of a nuclear event is not as immediate or direct. The primary concern is potential contamination of human foods, livestock feeds, and water supplies.

Impact: 2 - Limited

HISTORICAL OCCURRENCES

As reported in the 2023 State Hazard Mitigation Plan, there have been no major release events in North Carolina nuclear facilities; there was one situation in 2008 where the nuclear material was being monitored for criticality that occurred within the fuel rod fabrication facility.

PROBABILITY OF FUTURE OCCURRENCE

Radiological hazards are highly unpredictable. Nuclear reactors present the possibility of catastrophic damages, yet the industry is highly regulated and historical precedence suggests an incident is unlikely.

Probability: 1 – Unlikely

CLIMATE CHANGE

Climate change is not projected to have any impact on a potential radiological incident.

VULNERABILITY ASSESSMENT

PEOPLE

People located within the 50-mile IPZ are at risk of exposure through ingestion of contaminated food and water, but generally do not require evacuation. Low levels of radiation are not considered harmful, but a high exposure to radiation can cause serious illness or death.

PROPERTY

A radiological incident could cause severe damage to the power station itself but would not cause direct property damage outside the station. However, property values could drop substantially if a radiological incident resulted in contamination of nearby areas.

ENVIRONMENT

A radiological incident could result in the spread of radioactive material into the environment, which could contaminate water and food sources and harm animal and plant life.

CONSEQUENCE ANALYSIS

Table 4.104 summarizes the potential detrimental consequences of radiological incident.

TABLE 4.104 – CONSEQUENCE ANALYSIS – RADIOLOGICAL EMERGENCY

Category	Consequences
Public	High levels of radiation could cause serious illness or death. Those living and working closest to the nuclear station would face the greatest risk.
Responders	Responders face potential for heightened exposure to radiation, which could cause severe chronic illness and death.
Continuity of Operations (including Continued Delivery of Services)	An incident at the nuclear station could interrupt power generation and cause power shortages. Regular operations would likely be affected by the response effort an event would require.
Property, Facilities and Infrastructure	The plant itself could be damaged by a radiological incident. Nearby property and facilities could be affected by contamination.
Environment	Water supplies, food crops, and livestock within 50 miles of the nuclear station could be contaminated by radioactive material in the event of a major incident.
Economic Condition of the Jurisdiction	The local economy could be affected by a radiological incident. Property values and economic activity could decline as a result.
Public Confidence in the Jurisdiction's Governance	A radiological incident would likely cause severe loss of public confidence given that the hazard is human-caused and highly regulated. Public confidence can also be affected by false alarms.

HAZARD SUMMARY BY JURISDICTION

The table below summarizes radiological emergency risk by jurisdiction. Impact is rated higher for those jurisdictions within the IPZ. Spatial extent is dependent on the jurisdiction's location relative to the IPZ.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	1	1	1	4	4	1.6	L
Greensboro	1	2	2	4	4	2.1	M
High Point	1	1	1	4	4	1.6	L
Jamestown	1	1	1	4	4	1.6	L
Oak Ridge	1	1	1	4	4	1.6	L
Pleasant Garden	1	2	3	4	4	2.3	M
Sedalia	1	2	4	4	4	2.5	M
Stokesdale	1	1	1	4	4	1.6	L
Summerfield	1	1	1	4	4	1.6	L
Whitsett	1	2	4	4	4	2.5	M
Unincorporated Guilford County	1	2	3	4	4	2.3	M

Bioterrorism

HAZARD BACKGROUND

While there are many biological agents to be concerned with as they exist in nature, there are some that can also be used as a weapon. It is very difficult to spread many of these diseases to large populations of people. There have been few instances of bioterrorism to this point. While it is likely that another bioterrorism event will be attempted, it is unlikely that a large population will be exposed or that it will affect Guilford County and its citizens. However, consideration and planning must still address the possibility, no matter how slight.

Examples of agents identified by the Centers for Disease Control and Prevention (CDC) that have been or have the potential to be used in bioterrorism form include anthrax, botulism, brucellosis, plague, smallpox, tularemia, and viral hemorrhagic fevers, among others.

Anthrax, a serious disease caused by Bacillus anthracis, a bacterium that forms spores, was used as a biological weapon in the United States in 2001 when it was deliberately spread through the postal system. Botulism, a muscle-paralyzing disease caused by a toxin made by a bacterium called Clostridium botulinum, could potentially be released into food sources, causing foodborne illnesses. Brucellosis is a rare infectious disease caused by the bacteria Brucella; used a biological weapon, the bacteria could also be introduced into a food source for human consumption.

Plague, a disease caused by Yersinia pestis, a bacterium found in rodents and their fleas in many areas around the world, could be used in an aerosol attack through its pneumonic form. Because of the delay in exposure and becoming sick, those infected with the disease could travel around the globe transmitting the disease to others before knowing they were sick. This could have dire consequences in controlling the outbreak of the disease in large populations.

Smallpox is a serious, contagious infectious disease caused by the variola virus; no treatment exists and the only prevention is vaccination. According to the CDC, the disease is now eradicated after a successful worldwide vaccination program; however, there is still concern that the variola virus could still be used as an agent of bioterrorism through the development of the disease in a laboratory setting.

Tularemia is a highly infectious disease caused by the bacterium Francisella tularensis, which is found in animals. Used as a biological weapon, the bacteria would likely be made airborne for exposure by inhalation. Because the bacterium is widely found in nature, the disease could be grown in large quantity in a laboratory; however, an effective aerosol weapon has yet to be manufactured to release it in a bioterrorism event.

Viral hemorrhagic fevers (VHFs) refer to illnesses caused by specific viruses that cause severe multisystem syndromes. Many of these have been considered for bioterrorism. The Marburg and Ebola viruses are well-known examples of VHFs.

Warning Time: 4 – Less than 6 hours

Duration: 4 – More than 1 week

LOCATION

Due to the nature of a bioterrorism event, it would be difficult to predict a precise location where this type of event would occur. Moreover, a large-scale event may have impacts that spread throughout the county. Therefore, all areas in Guilford County are considered equally susceptible to bioterrorism.

Spatial Extent: 4 - Large

EXTENT

At scale, diseases caused by a bioterrorist attack can lead to high infection rates in the population potentially leading to potential mass fatalities. Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines. The most serious incident of bioterrorism in the United States occurred in 2001 following the September 11th attacks. Anthrax began appearing in the U.S. mail, killing five people and sickening 17.

Impact: 3 – Critical

HISTORICAL OCCURENCES

No major incidents have ever been recorded as affecting those within the bounds of Guilford County.

PROBABILITY OF FUTURE OCCURENCE

No incidents have been recorded in Guilford County. Future occurrences are considered unlikely.

Probability: 1 – Unlikely

CLIMATE CHANGE

Climate change can intensify the spread of infectious disease by changing behavior, lifespans, and regions of diseases and their carriers. There is potential for bioterrorists to exploit these changes.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to bioterrorism was assessed based on past occurrences nationally and internationally as well as publicly available information on these vulnerabilities, as well as attacks occurring in the region.

PEOPLE

The general public can be exposed to emerging diseases through different means based on the particular threat and its potential transmission routes. Vaccinations, when available, are the best means of preventing transmission and infection. Public Health information messages will be disseminated via the media in order to provide preventive measures to limit or avoid exposure.

A bioterrorism event may or may not elicit a large-scale response from government and nongovernmental organizations, dependent on the scope of the attack. For major incidents, public notification and information will be important to prevent further exposure and ensure the public that efforts are underway to handle the situation. Communicating with the media will not only assist in this dispersal of information, but also ensure that appropriate information is getting out. These efforts can help bring about positive outcomes and positive public perception.

PROPERTY

For the most part, property itself would not be impacted by bioterrorism. However, as concerns about contamination increase, property may be quarantined or destroyed as a precaution against spreading illness. Furthermore, staffing shortages could affect the function of critical facilities.

ENVIRONMENT

The environmental impact is dependent on whether the particular biological substance being transmitted can impact/infect animal or plant life, or if it can be distributed through the water supply. Also, the delivery method of the agent's release could cause physical harm to the environment as well.

CONSEQUENCE ANALYSIS

Table 4.105 summarizes the potential negative consequences of bioterrorism.

TABLE 4.105 – CONSEQUENCE ANALYSIS

Category	Consequences
Public	Adverse impact expected to be severe for unprotected personnel and moderate to light for protected personnel.
Responders	During a disease outbreak, responders can expect an increase in workload and should practice a higher level of precaution toward exposure than they would normally. Plans exist for first response and health care to address the needs of such situations. Communication between these agencies regarding plans and procedures maximize the efficiency and effectiveness of the combined efforts.
Continuity of Operations (including Continued Delivery of Services)	Continuity of operations may be impacted if those in governmental or other key roles are impacted by the bioterrorism event and cannot perform their normal duties. Although plans are in place to ensure continuity of operations, a large-scale event or one that has significant impacts on operational-level staff could affect continuity of operations.
Property, Facilities and Infrastructure	Access to facilities and infrastructure in the area of the incident may be denied until decontamination completed.
Environment	Incident may cause denial or delays in the use of some areas. Remediation needed.
Economic Condition of the Jurisdiction	Local economy and finances adversely affected, possibly for an extended period of time.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes bioterrorism risk by jurisdiction. Bioterrorism risk does not vary significantly by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	1	3	4	4	4	2.8	M

Building/Structure Collapse

HAZARD BACKGROUND

A building or structure collapse, also called a structural failure, can be defined as any significant compromise of a standing, built enclosure, including its roof, walls, floors (in multi-story structures), or other large areas. Any material used to build structures has a strength limit that once passed can lead to a structural failure.

Building/structure collapse can occur due to issues with structural design, construction defects, and/or long-term deterioration, such as the collapse of the Champlain Towers South condominium in Surfside, Florida. However, the most common causes of structural collapse are external in nature, including explosions (both accidental and purposeful) and vehicles striking the structure and destroying key supports. This section primarily focuses on non-deliberate building collapse.

Warning Time: 4 – Less than 6 hours

Duration: 1 – Less than 6 hours

LOCATION

A building or structure collapse is an uncommon occurrence anywhere, especially as structural engineering has continued to progress throughout time. Most of the structure collapses that occur are at construction sites but occasionally an existing building can collapse due to long-term structural issues or outside forces, such as a vehicle striking the building.

Spatial Extent: 1 – Negligible

EXTENT

The impacts of building collapse are typically isolated to the building and its immediate surroundings. A building or structure collapse could lead to injuries or deaths of people inside or close to the building at the time of collapse.

Impact: 3 – Critical

HISTORICAL OCCURENCES

Guilford County has not experienced a notable building collapse. Therefore, historical occurrences were drawn broadly from across the U.S.

HARBORO CAY CONDOMINIUM COLLAPSE, MARCH 1981

A condominium building, which was under construction, collapsed in Cocoa, Beach, Florida, killing 11 construction workers. Errors in construction and design, including thin load-bearing walls, caused the structure to collapse. Additionally, construction failed to follow local building laws and codes.

HYATT REGENCY WALKWAY COLLAPSE, JULY 1981

On July 17, 1981, the Hyatt Regency Kansas City Hotel in Kansas City, Missouri, hosted a tea dance for 1,600 people. Two walkways collapsed under the weight of the dancers killing 114 people and injuring at least 216. The collapse was attributed to errors in structural design.

L'AMBIANCE PLAZA COLLAPSE, APRIL 1987

The partially erect frame of the L'Ambiance Plaza in Bridgeport, CT, collapsed during construction killing 28 construction workers and injuring 22. Building and construction design, including the use of lift-slab construction, were cited as potential causes of the building's collapse.

BERKELEY BALCONY COLLAPSE, JUNE 2015

A Berkley, CA apartment balcony collapsed killing five college students and injuring six as the collapse caused them to fall from the 5th floor of the apartment building. The collapse was attributed to rotted wooden beams, weakened by moisture and improper sealing during construction.

NEW ORLEANS HARD ROCK HOTEL, OCTOBER 2019

Construction crews were working on building a new 350-room Hard Rock Hotel, in New Orleans, LA, when the building collapsed killing three workers and injuring 30 people. The collapse was attributed to inadequate structural design.

CHAMPLAIN SOUTH TOWER CONDO, JUNE 2021

On June 24, 2021, part of the 12-story Champlain Towers South condo building in Surfside, Florida, collapsed, killing 98 people and seriously injuring 11. A combination of factors compromised Champlain Towers' integrity including design flaws, construction defects, and long-term deterioration exacerbated by the building's coastal location.

PROBABILITY OF FUTURE OCCURRENCE

No incidents have been recorded in Guilford County. Future occurrences are considered unlikely.

Probability: 1 – Unlikely

CLIMATE CHANGE

Climate Change can intensify natural hazards, which could impact a building's structural integrity. Refer to the climate change section found under each natural hazard for more information.

Vulnerability Assessment

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to building/structure collapse was assessed based on past occurrences nationally as well as publicly available information on these vulnerabilities.

PEOPLE

The collapse of an occupied building is a highly dangerous situation to occupants and passersby. Falling debris and debris that is carried out by the pressure of the collapse can injure those outside the building.

Those persons who are inside the structure are most likely to be injured. Generally, these occupants will have more severe injuries, which can include death. Following a collapse anyone inside the structure is likely to be trapped and could suffer further injury while awaiting rescue and removal from the structure.

During and after a building collapse, the public will be influenced by the perceived effectiveness of the response to the collapse. This perception could be impacted by eyewitness accounts, victims, and in particular the reporting of the event by the media. Expectations may or may not be met, affecting public

confidence in the ability of government and other involved entities to make decisions and act in emergency situations.

PROPERTY

In cases of structure collapse, homes may become uninhabitable or require significant repair and displace residents. Building collapses in business settings could lead to disruptions to normal operations or closures and work stoppages. Structural issues at hazardous materials sites could not only bring about the operational issues noted in business settings but could also cause hazardous material releases or spills.

ENVIRONMENT

The environmental impact of a building collapse would most likely be minimal. Run off from the collapsed building could contaminate nearby wildlife and/or water supplies if it is not controlled.

CONSEQUENCE ANALYSIS

Table 4.106 summarizes the potential negative consequences of building collapse.

TABLE 4.106 – CONSEQUENCE ANALYSIS

Category	Consequences
Public	Adverse impact expected to be severe for people inside or near the building.
Responders	First responders will be impacted by a building collapse, as they are required to respond to such incidents. The possibility exists for secondary collapses to occur during rescue operations. If such secondary instances occur, rescuers could be injured and the condition of those trapped may worsen. Highly-trained teams such as Urban Search and Rescue teams exist for these situations and should be activated early and utilized fully to minimize the impact. Until these teams arrive, rescuers must be cognizant of the dangers associated with secondary collapses and proceed with caution.
Continuity of Operations (including Continued Delivery of Services)	Generally, continuity of operations can be relatively easily maintained during a structure collapse in Guilford County. Since the effects will be very localized and are not likely to directly impact availability of personnel, there is a low risk of impact on continuity of operations.
Property, Facilities and Infrastructure	There can be impacts if the building that collapses is directly tied to the functioning or management of power or other utilities. If the building collapses on equipment or structures that are part of the distribution network, it could also have significant impact on the delivery of services.
Environment	Incident would result in minimal environmental impact.
Economic Condition of the Jurisdiction	Economic impact is dependent on which structures collapse and the extent of the damage. If the collapse occurs in a business district and forces other businesses to be closed for cleanup or inspected for possible damage, this could have impact on the local economy.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes building collapse risk by jurisdiction. Building collapse risk does not vary significantly by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	1	3	1	4	1	1.9	L

Civil Disturbance

HAZARD BACKGROUND

Civil disorder is a term that generally refers to groups of people purposely choosing not to observe a law, regulation, or rule, usually in order to bring attention to a cause, concern, or agenda. Civil disorder can take the form of small gatherings or large groups blocking or impeding access to a building or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full-scale riot in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. In the 1990s abortion clinics, for example, were targets for these disruptive-type activities.

Throughout this country's history, incidents that disrupted the public peace have figured prominently. The constitutional guarantees allow for ample expression of protest and dissent, and in many cases collide with the preamble's requirement of the government "to ensure domestic tranquility." Typical examples of such conflicting ideology include the protest movements for civil rights in the late 1960s and the Vietnam War protest demonstrations in the early 1970s. The balance between an individual's and group's legitimate expression of dissent and the right of the populace to live in domestic tranquility requires the diligent efforts of everyone to avoid such confrontations in the future.

In modern society, laws have evolved that govern the interaction of its members to peacefully resolve conflict. In the United States, a crowd itself is constitutionally protected under "the right of the people to peacefully assemble." However, assemblies that are not peaceable are not protected, and this is generally the dividing line between crowds and mobs. The laws that deal with disruptive conduct are generally grouped into offenses that disturb the public peace. They range from misdemeanors, such as blocking sidewalks or challenging another to fight, to felonies, such as looting and rioting.

It is important to note that civil unrest is not synonymous with peaceful assembly or peaceful protest; Americans are guaranteed a right to assemble peacefully under the First Amendment to the Constitution.

TYPES OF CROWDS

A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four general categories:

Casual Crowd — A casual crowd is merely a group of people who happen to be in the same place at the same time. Examples of this type include shoppers and sightseers. The likelihood of violent conduct is all but nonexistent.

Cohesive Crowd — A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshiping, dancing, or watching a sporting event. Although they may have intense internal discipline (e.g., rooting for a team), they require substantial provocation to arouse to action.

Expressive Crowd — An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest something.

Aggressive Crowd — An aggressive crowd is made up of individuals who have assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They tend to be impulsive and highly

emotional and require only minimal stimulation to arouse them to violence. Examples of this type of crowd include demonstrations and strikers.

TYPES OF MOBS

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, tumultuous, violent, and lawless. Like crowds, mobs have different levels of commitment and can be classified into four categories:

Aggressive Mob—An aggressive mob is one that attacks, riots, and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.

Escape Mob—An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs have lost their capacity to reason and are generally impossible to control. They are characterized by unreasonable terror.

Acquisitive Mob—An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property. Examples of acquisitive mobs would include the looting in South Central Los Angeles in 1992, or food riots in other countries.

Expressive Mob—An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations. Examples of this type of mob include the June 1994 riots in Canada following the Stanley Cup professional hockey championship, European soccer riots, and those occurring after other sporting events in many countries, including the United States.

Although members of mobs have differing levels of commitment, as a group they are far more committed than members of a crowd. As such, a "mob mentality" sets in, which creates a cohesiveness and sense of purpose that is lacking in crowds. Thus, any strategy that causes individual members to contemplate their personal actions will tend to be more effective than treating an entire mob as a single entity.

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

LOCATION

Civil disturbance can arise from several causes for a variety of reasons. Circumstances may be spontaneous or may result from escalating tensions. A civil disturbance event can erupt anywhere, but the most likely locations are those areas with large population groupings or gatherings. Sites that are attractive for political or other rallies should be considered as probable locations for the epicenter of civil disorder events; arenas and stadiums are another type of venue where civil disorder can occur. Civil disturbance can also occur in proximity to locations where a "trigger event" occurred.

Spatial Extent: 2 – Small

EXTENT

The ultimate extent of any civil disorder incident will depend on the magnitude of that event and its location. The more widespread an incident is, the greater the likelihood of excessive injury, loss of life

and property damage; additional factors, such as the ability of law enforcement to contain the event, are also critical in minimizing damages.

Impact: 2 – Limited

HISTORICAL OCCURENCES

In Guilford County, there have not been any major civil disturbances in recent years. While there are occasional marches and protests that take place in its bounds, they have not had significant threat of violence associated with them. The following are civil disturbance events in recent history:

- A disturbance near North Carolina Agricultural and Technical State University in Greensboro led to the shooting death of a college student on May 22, 1969. African American student protestors clashed with city police and members of the National Guard for three days (May 21-23), leading to several civilian and nine officer injuries in addition to the fatality. Dozens of students were arrested for disturbing the peace on public school property.
- On November 3, 1979, an event since named the Greensboro Massacre saw members of the Ku Klux Klan and American Nazis clash with members of the Communist Party marching for African-American industrial workers. The event climaxed with Klansmen opening gunfire on marchers, five of whom died.
- On May 30, 2020 demonstrators gathered in downtown Greensboro to protest police violence against African-Americans, in particular the death of George Floyd. The protest was largely peaceful; however, after dusk, unknown individuals smashed a window at the International Civil Rights Museum and set fire to a portion of the Guilford County Courthouse. However, the individuals who committed these acts were not affiliated with the demonstration and appeared to be outsiders seeking to cause trouble.

PROBABILITY OF FUTURE OCCURRENCE

In their article on “Understanding Riots” published in the Cato Journal (Vol. 14, No 1), David D. Haddock and Daniel D. Polsby note that a large crowd itself is not an incipient riot merely because it assembles a great many people. Haddock and Polsby explain that “starting signals” must occur for civil disorder to erupt; these starting signals include certain kinds of high profile events. In fact, incidents can become signals simply because they have been signals in the past. In Detroit, for example, Devils Night (the night before Halloween) has in recent years become a springboard for multiple, independent, and almost simultaneous acts of arson. With any conventional triggering event, such as news of an assassination or unpopular jury verdict, crowds form spontaneously in various places as word of the incident spreads, without any one person having to recruit them. But since not every crowd threatens to evolve into a riot, the authors reason that a significant number of people must expect and desire that the crowd will become riotous. In addition, “someone has to serve as a catalyst—a sort of entrepreneur to get things going.” A typical action is the breaking of a window (a signal that can be heard by many who do not necessarily see it). Someone will throw the first stone, so to speak, when he calculates the risk of being apprehended has diminished to an acceptable level. This diminished risk is generally based on two variables—the size of the crowd relative to the police force and the probability that others will follow if someone leads. The authors conclude that once someone has taken a risk to get things started, the rioting will begin and spread until civil authorities muster enough force to make rioters believe they face a realistic prospect of arrest.

Nationwide, riots are apt to be a recurrent, if unpredictable, feature of social life. Without question, the planning area will continue to experience future episodes of marches, protests, demonstrations, and gatherings in various cities and communities that could lead to some type of disruptive civil disorder.

However, based on the State's general history of civil disturbance and the various human factors noted above, the probability that such incidents will develop into full-scale, widespread riots is considered low.

Should the planning area experience future incidents of disruptive civil disorder or rioting, the severity of a given event could range from low to high, depending on many factors. A spirited demonstration that gets out of hand may result in several arrests, minor damage to property (police vehicles with broken windows, etc.), some injuries, and manpower/overtime costs for police, fire, and other response services. To a greater extent, the threat of urban or intercity riots has the potential for millions of dollars in property damage, possible loss of life, and serious injuries, and extensive arrests. Sustaining police at the scene for extended periods and possibly mobilizing state highway patrol and National Guard units, can add to the extensive manpower costs. Still, such riots tend to be confined to a single site or general area of a community rather than multiple locations or several areas of the State at the same time. Once a riot has occurred, police in other cities are generally on standby for possible riotous conditions and are better able to alleviate potential disturbances before they develop into full-scale riots.

Despite some history of civil disturbance in Guilford County, there have been few recent events that caused major violence, injury, or fatalities, so the probability of future occurrences is possible.

Probability: 2 – Possible

CLIMATE CHANGE

Any changes in climate would not have a direct impact on civil disturbance. However, the implications of future climate change could present a cause for civil disturbance. Climate change impact forecasts include increasingly extreme weather patterns that exacerbate issues of drought, flooding, severe weather, and other weather hazards globally that could affect whole ecosystems and access to critical resources (water, food, energy). As society adjusts and confronts these changes, incidents of civil disturbance could be a secondary result related to societal unrest associated with other climate-related hazard impacts.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to civil disturbance was assessed based on past occurrences as well as publicly available information on these vulnerabilities, as well as attacks occurring in the region.

PEOPLE

Injuries and fatalities can occur during civil unrest.

PROPERTY

Should a large gathering of people turn violent, damage to property and infrastructure can result, as well as looting of property.

ENVIRONMENT

Impacts are unlikely as natural resources and the environment are not generally targeted and collateral impacts are not typical, unless other hazards are caused by violent acts.

CONSEQUENCE ANALYSIS

Table 4.107 summarizes the potential negative consequences of civil disturbance.

TABLE 4.107 – CONSEQUENCE ANALYSIS

Category	Consequences
Public	Localized impact expected to be severe for unprotected personnel and moderate to light for protected personnel.
Responders	Localized impact expected to be severe for unprotected personnel and moderate to light for protected personnel.
Continuity of Operations (including Continued Delivery of Services)	Damage to facilities/personnel in the area of the incident may require temporary relocation of operations; localized disruption of lines of communication and destruction of facilities may postpone delivery of some services.
Property, Facilities and Infrastructure	Localized impact to facilities and infrastructure in the area of the incident. Some severe damage possible.
Environment	Unlikely to result in environmental harm.
Economic Condition of the Jurisdiction	Local economy and finances adversely affected, possibly for an extended period, depending on damage.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes civil disturbance risk by jurisdiction. Civil disturbance risk does not vary significantly by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	2	2	2	4	3	2.3	M

Communications Systems Disruption/Failure

HAZARD BACKGROUND

The widespread failure or disruption of communications systems is uncommon. In most cases, there are backup systems in place to keep communication lines flowing. Extreme situations or the presence of several significant hazards would be necessary for an incident that would affect multiple communications systems. Communications infrastructure is designed to withstand high winds and other weather elements; however, failure is always a possibility and must be planned for regardless of the unlikelihood. In Guilford County, one issue that can cause or exacerbate a communications system disruption is that numerous facilities in the county are constructed in a way that radio coverage is greatly diminished within the building. This kind of disruption can occur without a precipitating event and result in similar impacts to communication among response personnel.

Disruptions are more likely to occur than actual failures. Overloaded systems due to other hazards or disaster circumstances may cause temporary connectivity issues, especially in cell phone networks. The public, government, and business operations have become more reliant on cell phones for communicating. During large-scale events or emergencies when cell phone traffic is high, it can cause overload situations and disruptions could result.

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

LOCATION

Since a communications disruption/failure would generally have impacts throughout the county's entire network, the location for this hazard is considered countywide.

Spatial Extent: 4 – Large

EXTENT

A communications system disruption could result in community-wide confusion and chaos. Such a disruption could temporarily paralyze emergency response, transportation, and economic activity. The impact of a communications event is largely dependent on its duration. Deaths, injuries or property damage attributable to a communications system disruption/failure are highly unlikely.

Impact: 1 - Minor

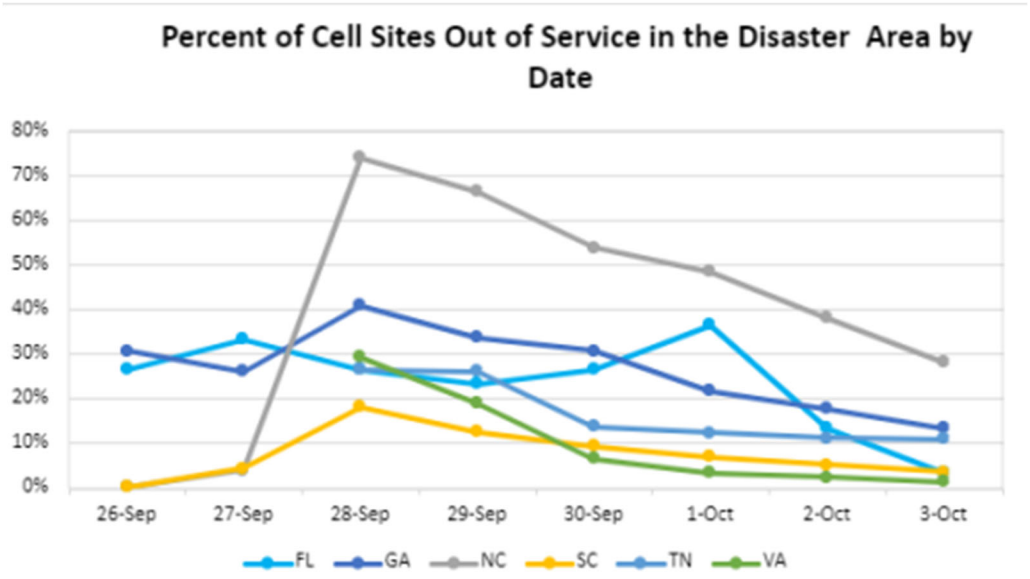
HISTORICAL OCCURENCES

In Wilmington, North Carolina, Hurricane Floyd caused a temporary outage of the county's 800 megahertz (MHz) radio system. Guilford County had a similar instance in the spring of 2011 when the 800 MHz radio system entered into failsoft mode. This significantly impacted radio transmissions as multiple sets of talk groups were consolidated into single channels, a result of the system losing "trunking" capability. Occasional impediments in radio transmissions can be expected in these situations. Many digital talk groups in Greensboro had disruptions, especially those associated with law enforcement. Decision makers may ultimately decide to switch operational communications over to a backup system until the primary system's issues are corrected.

In late September 2024, Hurricane Helene caused widespread outages of public communications systems in Western North Carolina. The Federal Communications Commission reported that up to 80% of cell sites were out of service within North Carolina's disaster area on September 28, 2024. By October

3, 2024, that percentage had declined to 30% as shown in Figure 4.77. This communication failure meant that residents, businesses, and first responders were unable to communicate vital information during a disaster event.

FIGURE 4.77 – CELL SITES OUT OF SERVICES FOLLOWING HURRICANE HELENE



Source: Federal Communications Commission

It should be noted that Guilford County has not experienced a significant communication failure or disruption.

PROBABILITY OF FUTURE OCCURENCE

Since there have been some previous occurrences of communication disruption/failure and communications are becoming more and more integrated into daily life, the probability is considered to be likely.

Probability: 3 – Likely

CLIMATE CHANGE

Climate change can intensify natural hazards, which could impact communications infrastructure. Refer to the climate change section found under each natural hazard for more information.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to communications systems disruption/failure was assessed based on past occurrences in North Carolina as well as publicly available information on these vulnerabilities, as well as attacks occurring in the region.

PEOPLE

The public has become increasingly reliant on cell phone communications, with many households deciding to forgo landline services completely in exchange for cell phones. In large-scale emergencies,

many calls will be made to dispatch centers, loved ones, etc. that may cause overloading of the cell phone networks. These disruptions can cause issues that range from slight nuisances for the end user to preventing an emergency from being reported. Extended disruptions or complete outages can significantly impact communications and in extreme cases, put people in danger during emergencies as responders will be delayed or may not receive notification at all.

PROPERTY

Most of the built environment (e.g. homes, buildings, roadways) would not be directly impacted in any way by this type of event. However, if power or communications systems are damaged or temporarily shut down, some aspects of the built environment may be impacted such as traffic lights, street lights, and cell phone towers that may rely on communications equipment to function properly. At many key facilities, there are backup systems in place and many facilities utilize radios that allow for continued communication within the facility. There may be more significant impacts when trying to communicate outside of the facility.

Airports and other transportation facilities can be particularly impacted by communications issues, especially if the communication failure is internal. Such communications failures could impact travel locally, regionally, and potentially at a national level, especially if the failures are widespread. External communications failures may delay the reporting of general conditions or promote compounding incidents and in turn delay the dispatch of appropriate personnel.

ENVIRONMENT

There will likely be relatively minimal impacts on the environment from a communications system failure. These types of events do not directly impact plants or animals and typically do not have any effect on water systems or other natural areas. There may be indirect impacts if, for example, communications systems are damaged at facilities that house hazardous materials which, in turn, results in releases into the environment. However, the likelihood of this occurring is relatively low.

CONSEQUENCE ANALYSIS

Table 4.108 summarizes the potential negative consequences of communications disruption/failure.

TABLE 4.108 – CONSEQUENCE ANALYSIS

Category	Consequences
Public	Communication disruption expected to limit the public's ability to communicate with one another and emergency services.
Responders	Communication is vital to efficient and effective service, and disruptions or breakdowns could impact the service provided,
Continuity of Operations (including Continued Delivery of Services)	Communications failure could create disorder in continuity,
Property, Facilities and Infrastructure	May impact traffic lights, streetlights, and cell phone towers. Airports and transportation infrastructure are particularly vulnerable.
Environment	Unlikely to result in environmental harm.
Economic Condition of the Jurisdiction	Significant economic impact is unlikely unless communication systems are down for extended periods of time.

Category	Consequences
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes community system failure/disruption risk by jurisdiction. Communication system failure/disruption risk does not vary significantly by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	3	1	4	4	3	2.7	M

Energy/Power/Utility Failure

HAZARD BACKGROUND

A failure in the power distribution network can happen for varying reasons. Some possible examples include the physical failure of power lines due to hazards as discussed in the Critical Utilities sections throughout this document, as well as problems within the network itself including faults at a power station, shorts or overloading in a circuit(s), or physical damages at a substation.

There are three different types of power outages - transient faults, brownouts, and blackouts. A transient fault is a brief outage caused by a fault in a power line. The issue is corrected when the power flow clears the faulty part of the circuit, and power is returned. A brownout occurs when voltage falls to an inadequate level. A blackout occurs when there is a complete loss in the power supply. Blackouts are generally longer lasting outages than the previous two examples and may involve significant repairs. These outages can range from minutes to weeks or more depending on the significance of the failure in the network.

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

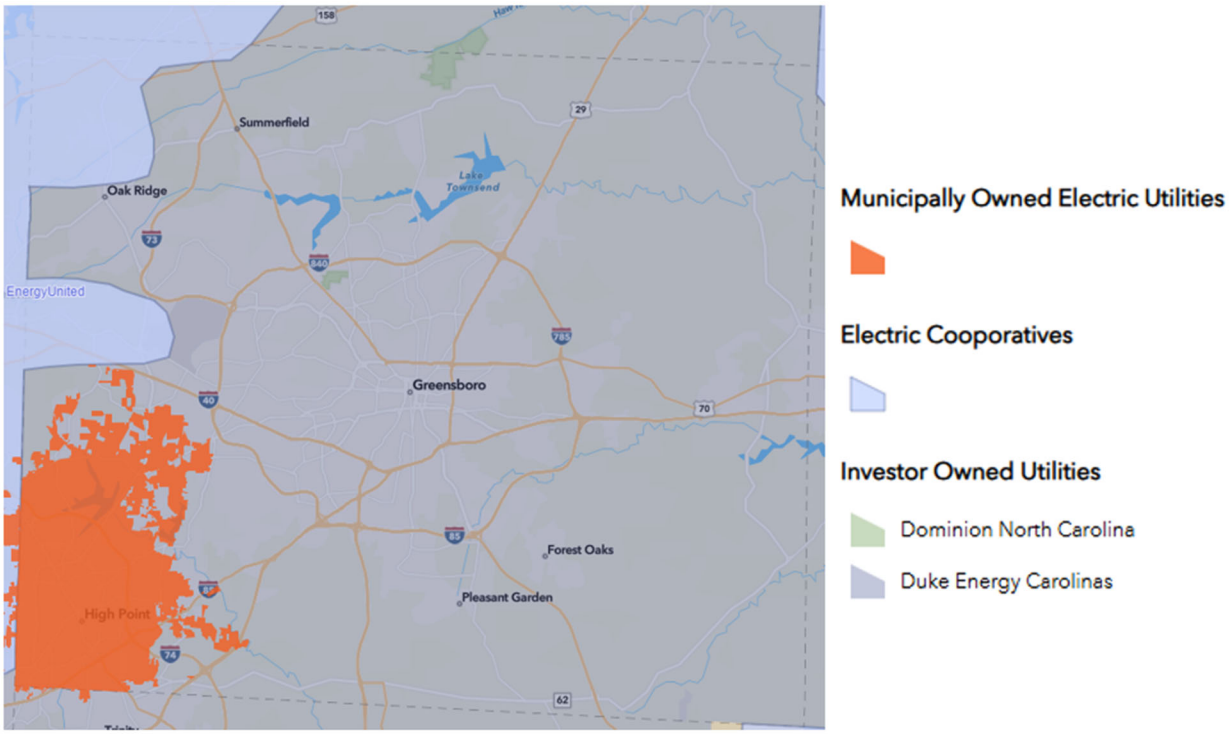
LOCATION

Due to the unpredictable nature of where exactly a power or utility outage will occur, the entire county is equally susceptible to this hazard. However, it should be noted that in more urbanized areas, the effects of an outage at a single location or facility would likely impact larger numbers of people.

Figure 4.78 below shows the location of electric utilities in Guilford County. Electric power in Guilford County is primarily provided by Duke Energy; however, the Town of High Point provides its own electric power. Additionally, the energy cooperative, Energy United, provides energy to the northwest area of Guilford County.

Spatial Extent: 4 – Large

FIGURE 4.78 – ELECTRIC PROVIDERS IN GUILFORD COUNTY



EXTENT

In many cases, utility interruptions are small, isolated events that are within the capabilities of the local utility to address. Due to long-range planning, regulation, and diligence of the utility operators, major interruptions resulting in a high degree of severity are few and far between. In some instances, utility outages and interruptions can impact a larger area and be for a prolonged period. Utility outages can also often be a cascading impact of a primary hazard such as flooding, severe thunderstorm, severe winter weather, and cyber disruptions.

Impact: 1 - Minor

HISTORICAL OCCURENCES

Most of the lengthy power outages that have occurred in Guilford County have been due to winter storms with ice accumulation, as the area occasionally experiences this type of weather during the winter months. This accumulation can make travel dangerous and also cause branches, trees, and power lines to break or fall, causing power disruptions or outages in the affected area. Power outages can vary depending on the amount of precipitation, its location, and its form.

Guilford County experienced record power outages during an ice storm on December 4, 2002. Almost a million people in central North Carolina lost power due to ½ an inch to an inch of ice accumulation causing power line failures and downed trees. Some areas lost power for a week or more in this event. Power outages do not occur only during weather-related events.

On February 25, 2010, an ice accumulation event occurred, as ¼ of an inch of icing followed a 3- inch snowfall. The weight of the icepack and snow during this storm caused the downing of trees and power lines, resulting in over 12,000 homes without power. More recently, in 2014 a major ice storm impacted the county and many areas of the state knocking down power lines and causing power outages for

several days in some cases. In 2018, Hurricanes Florence and Michael caused widespread outages in the county as hundreds of thousands lost power in these storms.

In October 2018, Guilford County experience a widespread power outage due to Tropical Storm Michael. More than 145,000 power outages were reported in the Greensboro area following the impact of the storm. In September 2024, thousands in Guilford County lost power as a result of Hurricane Helene.

In 2003, the Northeast Blackout showed how vulnerable large networks are to widespread outage. An estimated 55 million people were without power after a critical failure in the system, as many power plants in Ontario, Canada and the Northeast went offline. A single cause could not be attributed to this incident, but several issues led to a cascading failure. Overload protection was unable to keep a small problem in the system from affecting other parts of the system, which led to the power outage affecting a larger area.

PROBABILITY OF FUTURE OCCURRENCE

Based on the high number of outages that have occurred in past years, the probability of a power or utility failure is considered likely.

Probability: 3 - Likely

CLIMATE CHANGE

Deteriorating infrastructure is a current nationwide problem that is likely to be exacerbated by changing future conditions. Higher future temperatures, for example, would increase the demand for cooling homes, businesses, and public buildings, placing greater stress on power systems.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to utility failure was assessed based on past occurrences in North Carolina as well as publicly available information on these vulnerabilities.

PEOPLE

Some issues that need to be considered during a power outage include transportation tie-ups and accidents, medical emergencies, and communications disruptions. The transportation problems would likely be related to traffic lights and signals not working or from decreased visibility during the night. Medical emergencies could stem from homes not having power to operate heating and air conditioning systems, particularly during conditions of extreme temperatures. Also, medical equipment that relies on power could shut off, no longer providing a patient with treatment he or she requires. Communications issues could prevent the public from being able to call emergency services. Business disruptions could also impact services that the public wants or needs. Lastly, well pumps would not function without power unless on backup generator power.

PROPERTY

Many residential structures do not have backup generators in place. If power fails, the residents of these homes may not be able to refrigerate their food, regulate medical equipment properly (such as oxygen), etc. until power is restored. Power outages can also sometimes lead to sparks that may rarely ignite fires or damage other components of the electric grid, causing extensive damage. Other utility failures may also cause damage when they go down, such as sewer systems. Shut downs or damage to these systems can result in hazardous environments that expose the built environment to waste products.

In terms of transportation infrastructure, airports may have to ground flights and suspend operations as a result of a power outage until power can be restored. Extended outages may cause more significant impacts on flight patterns. Signals at railroad crossings may not work appropriately and in more severe cases, networks may be stopped until power is restored to prevent incidents.

ENVIRONMENT

The impacts to the environment from a utility outage will likely be minimal. Most utility outages do not affect environmental features, despite having a major effect on humans and the built environment. It is possible that some outages may cause spillover effects from cascading events such as fires or sewer backups, but these would likely have a relatively minor impact.

CONSEQUENCE ANALYSIS

Table 4.109 summarizes the potential negative consequences of energy/power/utility failure.

TABLE 4.109 – CONSEQUENCE ANALYSIS

Category	Consequences
Public	Energy/power/utility failure could cause widespread power outages, cutting off the public's access to heating/cooling, refrigeration, communication technology, etc. People that rely on medical equipment, the elderly, children, and low-income are the most vulnerable.
Responders	A utility failure can lead transportation, medical equipment, extreme weather temperatures, and communications issues in the event of a power outage or other utility loss. Any of these issues could impact the call volume for emergency responders.
Continuity of Operations (including Continued Delivery of Services)	The impact on continuity of operations depends on the availability of emergency generators.
Property, Facilities and Infrastructure	May impact transportation, communications, and water/wastewater infrastructure dependent on availability of emergency generators.
Environment	Unlikely to result in environmental harm.
Economic Condition of the Jurisdiction	Significant economic impact is unlikely unless utilities are down for extended periods of time.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes energy/power/utility failure risk by jurisdiction. Energy/power/utility failure does not vary significantly by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	3	1	4	4	3	2.7	M

Infectious Disease

Public health emergencies can take many forms—disease epidemics, large-scale incidents of food or water contamination, or extended periods without adequate water and sewer services. There can also be harmful exposure to chemical, radiological, or biological agents, and largescale infestations of disease-carrying insects or rodents. The first part of this section focuses on emerging public health concerns and potential pandemics, while the second part addresses natural and human-caused air and water pollution.

Public health emergencies can occur as primary events by themselves, or they may be secondary to another disaster or emergency, such as tornado, flood, or hazardous material incident. For more information on those particular incidents, see Sections 4.5.8 (Tornado and Thunderstorms), 0 (Flooding), and 4.5.11 (Hazardous Substances). The common characteristic of most public health emergencies is that they adversely impact, or have the potential to adversely impact, a large number of people. Public health emergencies can be worldwide or localized in scope and magnitude.

The primary communicable, or infectious, disease addressed within this plan is influenza:

Influenza - Whether natural or manmade, health officials say the threat of a dangerous new strain of influenza (flu) virus in pandemic proportions is a very real possibility in the years ahead. Unlike most illnesses, the flu is especially dangerous because it is spread through the air. A classic definition of influenza is a respiratory infection with fever. Each year, flu infects humans and spreads around the globe. There are three types of influenza virus: Types A, B, and C. Type A is the most common, most severe, and the primary cause of flu epidemics. Type B cases occur sporadically and sometimes as regional or widespread epidemics. Type C cases are quite rare and hence sporadic, but localized outbreaks have occurred. Seasonal influenza usually is treatable, and the mortality rate remains low. Each year, scientists estimate which particular strain of flu is likely to spread, and they create a vaccine to combat it. A flu pandemic occurs when the virus suddenly changes or mutates and undergoes an —antigenic shift, permitting it to attach to a person's respiratory system and leave the body's immune system defenseless against the invader.

Additional diseases of public health concern include tuberculosis, Smallpox, St. Louis Encephalitis, Meningitis, Lyme disease, West Nile, Coronavirus, SARS, Zika, and Ebola. These communicable diseases are introduced within this plan, but full vulnerability analyses are not included at this time.

Tuberculosis - Tuberculosis, or TB, is the leading cause of infectious disease worldwide. It is caused by a bacteria called Mycobacterium tuberculosis that most often affects the lungs. TB is an airborne disease spread by coughing or sneezing from one person to another. The World Health Organization (WHO) estimates that one-third of the world's population, approximately two billion people, has latent TB, which means people have been infected by TB bacteria but are not yet ill with the disease and cannot transmit the disease. In 2022, an estimated 10.6 million people fell ill with TB and 1.3 million died from the disease (including 167,000 people with HIV). Over 80% of TB deaths occur in low- and middle-income countries.

Smallpox - Smallpox is a contagious, sometimes fatal, infectious disease. There is no specific treatment for smallpox disease, and the only prevention is vaccination. Smallpox is caused by the variola virus that emerged in human populations thousands of years ago. It is generally spread by face- to-face contact or by direct contact with infected bodily fluids or contaminated objects (such as bedding or clothing). A person with smallpox is sometimes contagious with onset of fever, but the person becomes most contagious with the onset of rash. The rash typically develops into sores that spread over all parts of the body. The infected person remains contagious until the last smallpox scab is gone. Smallpox outbreaks

have occurred periodically for thousands of years, but the disease is now largely eradicated after a worldwide vaccination program was implemented. After the disease was eliminated, routine vaccination among the general public was stopped. The last case of smallpox in the United States was in 1949.

St. Louis Encephalitis - In the United States, the leading type of epidemic flaviviral Encephalitis is St. Louis encephalitis, which is transmitted by mosquitoes that become infected by feeding on birds infected with the virus. There is no evidence to suggest that the virus can be spread from person to person.

Meningitis - Meningitis is an infection of fluid that surrounds a person's spinal cord and brain. High fever, headache, and stiff neck are common symptoms of meningitis, which can develop between several hours to one to two days after exposure. Meningitis can be caused by either a viral or bacterial infection; however, a correct diagnosis is critically important, because treatments for the two varieties differ. Meningitis is transmitted through direct contact with respiratory secretions from an infected carrier. Primary risk groups include infants and young children, household contact with patients, and refugees. In the United States, periodic outbreaks continue to occur, particularly among adolescents and young adults. About 2,600 people in the United States get the disease each year. Generally, 10 to 14 percent of cases are fatal, and 11 to 19 percent of those who recover suffer from permanent hearing loss, mental retardation, loss of limbs, or other serious effects. Two vaccines are available in the United States.

Lyme Disease - Lyme disease was named after the town of Lyme, Connecticut, where an unusually large frequency of arthritis-like symptoms was observed in children in 1977. It was later found that the problem was caused by bacteria transmitted to humans by infected deer ticks, causing an average of more than 16,000 reported infections in the United States each year (however, the disease is greatly under-reported). Lyme disease bacteria are not transmitted from person to person. Following a tick bite, 80 percent of patients develop a red —bullseye rash accompanied by tiredness, fever, headache, stiff neck, muscle aches, and joint pain. If untreated, some patients may develop arthritis, neurological abnormalities, and cardiac problems, weeks to months later. Lyme disease is rarely fatal. During early stages of the disease, oral antibiotic treatment is generally effective, while intravenous treatment may be required in more severe cases.

West Nile Virus - West Nile virus is a flavivirus spread by infected mosquitoes and is commonly found in Africa, West Asia, and the Middle East. It was first documented in the United States in 1999. Although it is not known where the U.S. virus originated, it most closely resembles strains found in the Middle East. It is closely related to St. Louis encephalitis and can infect humans, birds, mosquitoes, horses, and other mammals. West Nile is one of the most common mosquito-borne diseases in the United States.

Most people who become infected with West Nile virus will have either no symptoms or only mild effects. However, on rare occasions, the infection can result in severe and sometimes fatal illness. There is no evidence to suggest that the virus can be spread from person to person.

An abundance of dead birds in an area may indicate that West Nile virus is circulating between the birds and mosquitoes in that area. Although birds are particularly susceptible to the virus, most infected birds survive. The continued expansion of West Nile virus in the United States indicates that it is permanently established in the Western Hemisphere.

Coronaviruses - Coronaviruses are a large family of viruses found in both animals and humans and are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS), and Novel Coronavirus (COVID- 19). Coronaviruses can cause respiratory infections and can lead to serious illnesses, like pneumonia, and can be deadly. Typical coronavirus symptoms include fever, cough, headache, runny

nose, and sore throat. MERS was first reported in 2012 in Saudi Arabia and spread to more than 25 countries. It produced symptoms that often progressed to pneumonia and 30-40 percent of cases were fatal. SARS emerged in 2002 and spread to more than two dozen countries. It caused acute respiratory distress and had a mortality rate of about 10 percent.

The most significant recent coronavirus, COVID-19, first emerged in Wuhan, China in 2019 and rapidly spread across the world. According to CDC data, as of February 2022, there had been over 78.5 million cases of COVID-19 reported in the United States. COVID-19 spreads when an infected person breathes out droplets and very small particles that contain the virus. These droplets and particles can be breathed in by other people or land on their eyes, noses, or mouth. Symptoms include fever, cough, shortness of breath, fatigue, loss of taste and smell, and more. Symptoms range from mild to severe illness and typically appear between 2-14 days after exposure to the virus.

Severe Acute Respiratory Syndrome - Severe acute respiratory syndrome (SARS) is a respiratory illness that has recently been reported in Asia, North America, and Europe. Although the cause of SARS is currently unknown, scientists have detected in SARS patients a previously unrecognized coronavirus that appears to be a likely source of the illness. In general, humans infected with SARS exhibit fevers greater than 100.4 F, headaches, an overall feeling of discomfort, and body aches. Some people also experience mild respiratory symptoms. After two to seven days, SARS patients may develop a dry cough and have trouble breathing. The primary way that SARS appears to spread is by close person-to-person contact; particularly by an infected person coughing or sneezing contaminated droplets onto another person, with a transfer of those droplets to the victim's eyes, nose, or mouth.

Zika Virus - Discovered in the Zika forest of Uganda in 1947, the Zika virus is a member of the flavivirus family. It is transmitted to humans through the bite of an infected Aedes species mosquito (Ae. aegypti and Ae. albopictus). Zika virus can also be transmitted from an infected pregnant woman to her baby during pregnancy and can result in serious birth defects, including microcephaly. Less commonly, the virus can be spread through intercourse or blood transfusion. However, most people infected with the Zika virus do not become sick.

Ebola - Previously known as Ebola hemorrhagic fever, is a rare and deadly disease caused by infection with one of the Ebola virus species. It was first discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo. Since then, outbreaks have appeared sporadically in Africa.

Warning Time: 1 – More than 24 hours

Duration: 4 – More than one week

LOCATION

Infectious disease outbreaks can occur anywhere in the planning area, especially where there are groups of people in close quarters.

Spatial Extent: 4 – Large

EXTENT

When on an epidemic scale, diseases can lead to high infection rates in the population causing isolation, quarantine, and potential mass fatalities. An especially severe influenza pandemic or other major disease outbreak could lead to high levels of illness, death, social disruption, and economic loss. Impacts could range from school and business closings to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines.

Impact: 3 – Critical

Table 4.110 describes the World Health Organization's six main phases to a pandemic flu as part of their planning guidance.

TABLE 4.110 – WORLD HEALTH ORGANIZATION'S PANDEMIC FLU PHASES

Phase	Description
1	No animal influenza virus circulating among animals have been reported to cause infection in humans.
2	An animal influenza virus circulating in domesticated or wild animals is known to have caused infection in humans and is therefore considered a specific potential pandemic threat.
3	An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level breakouts.
4	Human-to-human transmission of an animal or human-animal influenza reassortant virus able to sustain community-level breakouts has been verified.
5	The same identified virus has caused sustained community-level outbreaks in two or more countries in one WHO region.
6	In addition to the criteria defined in Phase 5, the same virus has caused sustained community-level outbreaks in at least one other country in another WHO region.
Post-Peak Period	Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.
Post-Pandemic Period	Levels of influenza activity have returned to levels seen for seasonal influenza in most countries with adequate surveillance.

Source: World Health Organization

HISTORICAL OCCURRENCES

PUBLIC HEALTH EMERGENCIES – INFLUENZA PANDEMICS

Since the early 1900s, four lethal pandemics have swept the globe: Spanish Flu of 1918-1919; Asian Flu of 1957-1958; Hong Kong Flu of 1968-1969; and Swine Flu of 2009-2010. The Spanish Flu was the most severe pandemic in recent history. The number of deaths was estimated to be 50-100 million worldwide and 675,000 in the United States. Its primary victims were mostly young, healthy adults. The 1957 Asian Flu pandemic killed about 70,000 people in the United States, mostly the elderly and chronically ill. The 1968 Hong Kong Flu pandemic killed 34,000 Americans. The 2009 Swine Flu caused 12,469 deaths in the United States. These historic pandemics are further defined in the following paragraphs along with several "pandemic scares".

SPANISH FLU (H1N1 VIRUS) OF 1918-1919

In 1918, when World War I was in its fourth year, another threat began that rivaled the war itself as the greatest killer in human history. The Spanish Flu swept the world in three waves during a two-year period, beginning in March 1918 with a relatively mild assault.

The first reported case occurred at Camp Funston (Fort Riley), Kansas, where 60,000 soldiers trained to be deployed overseas. Within four months, the virus traversed the globe, as American soldiers brought the virus to Europe. The first wave sickened thousands of people and caused many deaths (46 died at Camp Funston), but it was considered mild compared to what was to come. The second and deadliest

wave struck in the autumn of 1918 and killed millions. At Camp Funston alone, there were 14,000 cases and 861 deaths reported during the first three weeks of October 1918.

Outbreaks caused by a new variant exploded almost simultaneously in many locations including France, Sierra Leone, Boston, and New York City, where more than 20,000 people died that fall. The flu gained its name from Spain, which was one of the hardest hit countries. From there, the flu went through the Middle East and around the world, eventually returning to the United States along with the troops.

Of the 57,000 Americans who died in World War I, 43,000 died as a result of the Spanish Flu. At one point, more than 10 percent of the American workforce was bedridden. By a conservative estimate, a fifth of the human race suffered the fever and aches of influenza between 1918 and 1919 and 20 million people died. At the height of the flu outbreak during the winter of 1918-1919, at least 20% of North Carolinians were infected by the disease. Ultimately, 10,000 citizens of the state succumbed to this disease.

ASIAN FLU (H2N2 VIRUS) OF 1957-1958

This influenza pandemic was first identified in February 1957 in the Far East. Unlike the Spanish Flu, the 1957 virus was quickly identified, and vaccine production began in May 1957. A number of small outbreaks occurred in the United States during the summer of 1957, with infection rates highest among school children, young adults, and pregnant women; however, the elderly had the highest rates of death. A second wave of infections occurred early the following year, which is typical of many pandemics.

HONG KONG FLU (H3N2 VIRUS) OF 1968-1969

This influenza pandemic was first detected in early 1968 in Hong Kong. The first cases in the United States were detected in September 1968, although widespread illness did not occur until December. This became the mildest pandemic of the twentieth century, with those over the age of 65 the most likely to die. People infected earlier by the Asian Flu virus may have developed some immunity against the Hong Kong Flu virus. Also, this pandemic peaked during school holidays in December, limiting student-related infections.

PANDEMIC FLU THREATS: SWINE FLU OF 1976, RUSSIAN FLU OF 1977, AND AVIAN FLU OF 1997 AND 1999

Three notable flu scares occurred in the twentieth century. In 1976, a swine-type influenza virus appeared in a U.S. military barracks (Fort Dix, New Jersey). Scientists determined it was an antigenically drifted variant of the feared 1918 virus. Fortunately, a pandemic never materialized, although the news media made a significant argument about the need for a Swine Flu vaccine.

In May 1977, influenza viruses in northern China spread rapidly and caused epidemic disease in children and young adults. By January 1978, the virus, subsequently known as the Russian Flu, had spread around the world, including the United States. A vaccine was developed for the virus for the 1978–1979 flu season. Because illness occurred primarily in children, this was not considered a true pandemic.

In March 1997, scores of chickens in Hong Kong's rural New Territories began to die—6,800 on three farms alone. The Avian Flu virus was especially virulent, and made an unusual jump from chickens to humans. At least 18 people were infected, and six died in the outbreak. Chinese authorities acted quickly to exterminate over one million chickens and successfully prevented further spread of the disease. In 1999, a new avian flu virus appeared. The new virus caused illness in two children in Hong Kong. Neither of these avian flu viruses started pandemics.

SWINE FLU (H1N1 VIRUS) OF 2009–2010

This influenza pandemic emerged from Mexico in 2009. The first U.S. case of H1N1, or Swine Flu, was diagnosed on April 15, 2009. The U.S. government declared H1N1 a public health emergency on April 26. By June, approximately 18,000 cases of H1N1 had been reported in the United States. A total of 74 countries were affected by the pandemic.

The CDC estimates that 43 million to 89 million people were infected with H1N1 between April 2009 and April 2010. There were an estimated 8,870 to 18,300 H1N1 related deaths. On August 10, 2010, the World Health Organization (WHO) declared an end to the global H1N1 flu pandemic.

CORONAVIRUS DISEASE (COVID-19), 2019-2024

COVID-19 was caused by severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2). First identified in Wuhan, China in December 2019, the virus quickly spread throughout China and then globally. In the United States, COVID-19 was first identified in late January in Washington State and rapidly spread throughout the Country, with large epicenters on both the east and west coasts. On March 13, 2020 the U.S. enters a nationwide emergency and by March 15, 2020 U.S. states begin to shut down to prevent the spread of COVID-19. Almost a year later the U.S. has administered over 100 million vaccinations. In June 2021 the first major variant, the Delta variant, becomes dominant in the U.S. which kicks off a third wave of infections during the summer of 2021. By December 20, 2021, Omicron, the second and most dominant variant in the U.S., had been detected in most U.S. states and territories. The Omicron variant spread more easily than the original virus that caused COVID-19 and the Delta variant.

According to the Johns Hopkins Coronavirus Resource Center, from the start of the pandemic to March 2023, there were over 103 million confirmed cases of COVID-19 in the U.S. resulting in over 1.1 million deaths. In North Carolina, there were over 3.4 million confirmed cases and 28,432 deaths due to COVID-19. Johns Hopkins stopped collecting data as of March 10, 2023. The COVID-19 virus has transitioned to endemic but maintains dual seasonality, with cases peaking twice a year.

PUBLIC HEALTH EMERGENCIES – OTHER EPIDEMICS AND DISEASE OUTBREAKS

ST. LOUIS ENCEPHALITIS, 1964-2005

Between 1964 and 2005, there were 4,651 confirmed cases of St. Louis encephalitis in the United States. It should be noted, however, that less than 1 percent of St. Louis encephalitis infections are clinically apparent, so the vast majority of infections remain undiagnosed. Illnesses range from mild headaches and fever to convulsions, coma, and paralysis. The last major outbreak of St. Louis encephalitis occurred in the Midwest from 1974 to 1977, when over 2,500 cases were reported in 35 states. The most recent outbreak of St. Louis encephalitis was in 1999 in New Orleans, Louisiana, with 20 reported cases. The disease is generally milder in children than in adults, with the elderly at highest risk for severe illness and death. Approximately 3 to 30 percent of cases are fatal; no vaccine against St. Louis encephalitis exists. In 2014, two U.S. cases were reported and were the first human cases since 2002.

MENINGITIS, 1996-1997, 2005

During 1996 and 1997, 213,658 cases of meningitis were reported, with 21,830 deaths, in Africa. According to the North Carolina Division of Public Health, an average of 20 reported cases of Meningitis occurred annually between 2005-2013 following the initial outbreak. In 2023, the CDC confirmed 438 cases of meningitis across the U.S. which is the largest number of cases reported since 2013.

LYME DISEASE, 2015

In the United States, Lyme disease is mostly found in the northeastern, mid-Atlantic, and upper north-central regions, and in several counties in northwestern California. In 2019, 93-percent of confirmed

Lyme Disease cases were reported from 14 states: Connecticut, Delaware, Maine, Maryland, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, and Wisconsin. Lyme disease is the most commonly reported vector-borne illness in the United States. According to the CDC, recent estimates based on insurance records suggest that approximately 476,000 Americans are diagnosed and treated with Lyme disease each year. This disease does not occur nationwide and is concentrated heavily in the northeast and upper Midwest. Between 2018 to 2022 the average incidence rate of Lyme disease in North Carolina was 2.82 confirmed and probable cases per 100,000 residents, which is significantly lower than the national average. In 2023, Guilford County had five confirmed cases of Lyme disease according to data collected from the CDC.

SEVERE ACUTE RESPIRATORY SYNDROME, 2003

During November 2002-July 2003, a total of 8,098 probable SARS cases were reported to the World Health Organization (WHO) from 29 countries. In the United States, only 8 cases had laboratory evidence of infection. Since July 2003, when SARS transmission was declared contained, active global surveillance for SARS disease has detected no person-to-person transmission. CDC has therefore archived the case report summaries for the 2003 outbreak. Across North Carolina, there was one confirmed SARS case – a man in Orange County tested positive in June 2003.

ZIKA VIRUS, 2015

In May 2015, the Pan American Health Organization issued an alert noting the first confirmed case of a Zika virus infection in Brazil. Since that time, Brazil and other Central and South America countries and territories, as well as the Caribbean, Puerto Rico, and the U.S. Virgin Islands have experienced ongoing Zika virus transmission. In August 2016, the Centers for Disease Control and Prevention (CDC) issued guidance for people living in or traveling to a 1-square-mile area Miami, Florida, identified by the Florida Department of Health as having mosquito-borne spread of Zika. In October 2016, the transmission area was expanded to include a 4.5-square-mile area of Miami Beach and a 1-squre mile area of Miami-Dade County. In addition, all of Miami-Dade County was identified as a cautionary area with an unspecified level of risk. As of the end of 2018, the CDC reported 74 cases of Zika across the United States. As of November 2024, there are no current local transmission of Zika virus in the continental U.S. or territories. The last cases of local Zika transmission by mosquitos in the continental U.S. were in Florida and Texas in 2016-17 and no reported cases from U.S. territories since 2019.

EBOLA, 2014-2016

Most recently, in March 2014, West Africa experienced the largest outbreak of Ebola in history. Widespread transmission was found in Liberia, Sierra Leone, and Guinea with the number of cases totaling 28,616 and the number of deaths totaling 11,310. In the United States, four cases of Ebola were confirmed in 2014 including a medical aid worker returning to New York from Guinea, two healthcare workers at Texas Presbyterian Hospital who provided care for a diagnosed patient, and the diagnosed patient who traveled to Dallas, Texas from Liberia. All three healthcare workers recovered. The diagnosed patient passed away in October 2014. In March 2016, the WHO terminated the public health emergency for the Ebola outbreak in West Africa.

PROBABILITY OF FUTURE OCCURRENCE

It is impossible to predict when the next pandemic, epidemic, or disease outbreak will occur or its impact. The CDC continually monitors and assesses pandemic threats and prepares for an influenza pandemic. Novel influenza A viruses with pandemic potential include Asian lineage avian influenza A (H5N1) and (H7N9) viruses. These viruses have all been evaluated using the Influenza Risk Assessment Tool (IRAT) to assess their potential pandemic risk. Because the CDC cannot predict how severe a future

pandemic will be, advance planning is needed at the national, state and local level; this planning is done through public health partnerships at the national, state and local level.

Today, a much larger percentage of the world's population is clustered in cities, making them ideal breeding grounds for epidemics. Additionally, the explosive growth in air travel means the virus could literally be spread around the globe within hours. Under such conditions, there may be very little warning time. Most experts believe we will have just one to six months between the time that a dangerous new influenza strain is identified and the time that outbreaks begin to occur in the United States. Outbreaks are expected to occur simultaneously throughout much of the nation, preventing shifts in human and material resources that normally occur with other natural disasters. These and many other aspects make influenza pandemic unlike any other public health emergency or community disaster.

Probability: 2 – Possible

CLIMATE CHANGE

According to the U.S. Global Change Research Program, the influences of climate change on public health is significant and varied. The influences range from the clear threats of temperature extremes and severe storms to less obvious connections related to insects. Climate and weather can also affect water and food quality in particular areas, with implications for public health.

Hot days can be unhealthy—even dangerous. High air temperatures can cause heat stroke and dehydration, and affect people's cardiovascular and nervous systems. Southeastern cities are vulnerable to heat waves as urban areas are typically warmer than their rural surroundings. Heat stress is expected to increase as climate change brings hotter summer temperatures and more humidity. Certain people are especially vulnerable, including children, the elderly, the sick, and the poor.

Higher temperatures and wetter conditions tend to increase mosquito and tick activity, leading to an increased risk of zoonotic diseases. Mosquitos are known to carry diseases such as West Nile virus (WNV), La Crosse/California encephalitis, Jamestown Canyon virus, St. Louis encephalitis, and Eastern equine encephalitis. The two major concerns associated with warmer and wetter conditions are that the mosquito species already found in North Carolina and the diseases that they carry will become more prevalent, and that new species carrying unfamiliar diseases will start to appear for the first time.

Warmer winters with fewer hard freezes in areas that already see WNV-carrying mosquitos are likely to observe both a higher incidence of WNV and a longer WNV season, ultimately leading to an increase in human cases. Non-native mosquito species may move into North Carolina if the climate becomes more suitable for them, bringing with them diseases such as Jamestown Canyon virus, Chikungunya, and Dengue Fever.

Ticks are also well-known disease vectors in North Carolina, carrying pathogens such as Lyme disease, anaplasmosis, Ehrlichiosis, Powassan virus, and Babesiosis. Warmer, wetter weather can lead to an increase in algal blooms and declining beach health. An increase in flood events may also be associated with an increased incidence of mold problems in homes and businesses, as well as contamination of wells and surface waters due to sewer overflows and private septic system failures.

If these predictions come true, communities must contend with the human health impacts related to the increased prevalence of infectious diseases, heat waves, and changes in air and water quality. Public health officials will need to focus on spreading information and enacting pest and disease reduction. Floodprone communities will need to focus on continuously improving flood controls and mitigation

strategies, including restricting building and chemical storage in floodplains, upgrading well and septic requirements, and providing water testing kits to residents.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to infectious disease was assessed based on past occurrences nationally and internationally as well as publicly available information on these vulnerabilities, as well as attacks occurring in the region.

PEOPLE

Disease spread and mortality is affected by a variety of factors, including virulence, ease of spread, aggressiveness of the virus and its symptoms, resistance to known antibiotics and environmental factors. While every pathogen is different, diseases normally have the highest mortality rate among the very young, the elderly or those with compromised immune systems. As an example, the unusually deadly 1918 H1N1 influenza pandemic had a mortality rate of 20%. If an influenza pandemic does occur, it is likely that many age groups would be seriously affected. The greatest risks of hospitalization and death—as seen during the last two pandemics in 1957 and 1968 as well as during annual outbreaks of influenza—will be to infants, the elderly, and those with underlying health conditions. However, in the 1918 pandemic, most deaths occurred in young adults. Few people, if any, would have immunity to a new virus.

Approximately twenty percent of people exposed to West Nile Virus through a mosquito bite develop symptoms related to the virus; it is not transmissible from one person to another. Preventive steps can be taken to reduce exposure to mosquitos carrying the virus; these include insect repellent, covering exposed skin with clothing and avoiding the outdoors during twilight periods of dawn and dusk, or in the evening when the mosquitos are most active.

PROPERTY

For the most part, property itself would not be impacted by a human disease epidemic or pandemic. However, as concerns about contamination increase, property may be quarantined or destroyed as a precaution against spreading illness. Furthermore, staffing shortages could affect the function of critical facilities.

ENVIRONMENT

A widespread pandemic would not have an impact on the natural environment unless the disease was transmissible between humans and animals. However, affected areas could result in denial or delays in the use of some areas, and may require remediation.

CONSEQUENCE ANALYSIS

Table 4.111 summarizes the potential consequences of infectious disease.

TABLE 4.111 – CONSEQUENCE ANALYSIS – INFECTIOUS DISEASE

Category	Consequences
Public	Adverse impact expected to be severe for unprotected personnel and moderate to light for protected personnel.
Responders	Adverse impact expected to be severe for unprotected personnel and uncertain for trained and protected personnel, depending on the nature of the incident.
Continuity of Operations (including Continued Delivery of Services)	Danger to personnel in the area of the incident may require relocation of operations and lines of succession execution. Disruption of lines of communication and destruction of facilities may extensively postpone delivery of services.
Property, Facilities and Infrastructure	Access to facilities and infrastructure in the area of the incident may be denied until decontamination completed.
Environment	Incident may cause denial or delays in the use of some areas. Remediation needed.
Economic Condition of the Jurisdiction	Local economy and finances adversely affected, possibly for an extended period of time.
Public Confidence in the Jurisdiction's Governance	Ability to respond and recover may be questioned and challenged if planning, response, and recovery not timely and effective.

HAZARD SUMMARY BY JURISDICTION

The following table summarizes infectious disease hazard risk by jurisdiction. Infectious disease risk is uniform across the planning area; there is no variation in risk by jurisdiction.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	Score	Priority
All Jurisdictions	2	3	4	1	4	2.8	M

Pipeline Failure

HAZARD BACKGROUND

Pipelines in the United States are used to transport and distribute a number of products from their extraction point to sites where those materials are utilized throughout the country. Pipelines are most commonly used to transport energy sources such as natural gas and petroleum products but are also often used in the transportation of other hazardous liquids. Transportation of these products via pipeline is abundant in the United States due to the cost-effectiveness of the process which allows quick movement with relatively minimal cost.

Generally, pipelines are safe and effective, transporting materials where they are needed without incident. However, many pipelines in the United States were installed over 60 years ago and were made with materials such as cast and wrought iron or bare steel which degrade over time. This presents a definitive danger to people and property as a leak or spill of hazardous products from a degraded pipeline could prove disastrous, causing costly damage to property and injury or death.

As a result, there has been a recent movement to replace many of these older pipelines with newer materials such as plastics that can reduce the risk of a pipeline failure and a hazard incident. In 2011, the Pipeline Safety, Regulatory Certainty, and Job Creation Act was passed and called for the US Department of Transportation to conduct a state by state survey of pipelines and accelerate repairs of aging infrastructure.

Warning Time: 4 – Less than six hours

Duration: 3 – Less than one week

LOCATION AND SPATIAL EXTENT

Pipelines exist throughout the state of North Carolina and in Guilford County. Based on data from the National Pipeline Mapping System (NPMS), it is estimated that Guilford County contains approximately 119 miles of natural gas pipelines and 203 miles of pipelines carrying Non-HVL (Highly Volatile Liquid) products. For more specific description of the location of pipelines in Guilford County, see Figure 4.79.

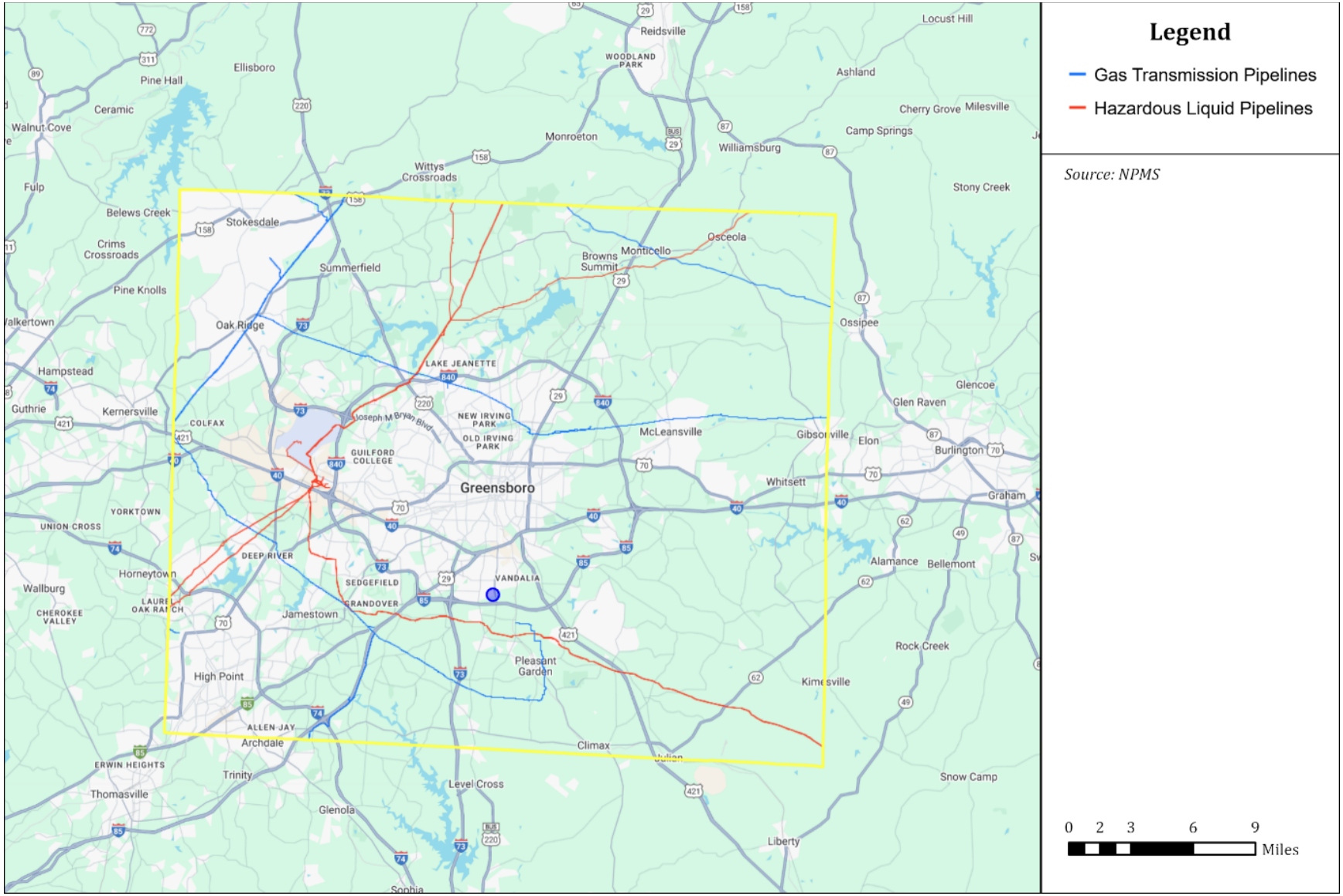
Spatial Extent: 2 – Small

EXTENT

The magnitude of a pipeline failure incident will vary in every case depending on the amount spilled or released, type of chemical, location of release, time of day, and weather conditions. Close coordination between the North Carolina Department of Environmental Quality (DEQ), the EPA, and the PHMSA, the local jurisdiction, and the spiller (responsible party) will be required to minimize the potential impacts to public health and the environment.

Impact: 2 – Limited

FIGURE 4.79 – PIPELINES IN GUILFORD COUNTY



HISTORICAL OCCURENCES

There have been some reported incidents of pipeline disruptions/failures within Guilford County, dating back to the 1970s. In 1978 there were two spills that occurred on a line connected to the Greensboro tank farm. As a result of these spills, 14,700 gallons and 8,400 gallons of gas were spilled, respectively. In 1987, a 17,000-gallon spill occurred near Lake Brandt on the Plantation Pipeline that was caused by digging in the area. As a result, there was leakage into the nearby neighborhood of Guilford Green, although fortunately the fuel did not reach the lake itself.

Table 4.112 details pipeline accidents/incidents in Guilford County reported to the PHMSA since 2002. No injuries or fatalities were reported, and the vast majority of these incidents occurred at each company's fuel tank sites. Additionally, please note that while barrels of gasoline, fuel oil, kerosene, etc., often the majority of each release was recovered.

TABLE 4.112 – PIPELINE ACCIDENTS JANUARY 2002 – APRIL 2025

Year	Pipeline Name	Release Type	Barrels Released	Cause
2002	Colonial Pipeline Co	Gasoline	0.24	Incorrect operation
2002	Colonial Pipeline Co	Fuel oil	2	Corrosion
2002	Colonial Pipeline Co	Gasoline	4	Incorrect operation
2003	Colonial Pipeline Co	Kerosene	20	Material failure or pipe or weld
2003	Colonial Pipeline Co	Diesel fuel	2,133	Diesel fuel
2004	Colonial Pipeline Co	Fuel oil	16	Natural force damage
2004	Plantation Pipeline Co	Reformulated gasoline	182	All other causes
2013	Colonial Pipeline Co	Refined and/or petroleum product	131.30	Incorrect operation
2013	Colonial Pipeline Co	Refined and/or petroleum product	6.7	Equipment failure
2013	Colonial Pipeline Co	Refined and/or petroleum product	28.4	Corrosion
2014	Colonial Pipeline Co	Refined and/or petroleum product	2.4	Corrosion
2014	Colonial Pipeline Co	Refined and/or petroleum product	0.6	Equipment failure
2015	Colonial Pipeline Co	Refined and/or petroleum product	0.45	Equipment failure
2015	Colonial Pipeline Co	Refined and/or petroleum product	8.9	Equipment failure
2015	Colonial Pipeline Co	Refined and/or petroleum product	3.69	Equipment failure
2016	Colonial Pipeline Co	Refined and/or petroleum product	9.3	Equipment failure
2019	Colonial Pipeline Co	Refined and/or petroleum product	0.2	Incorrect operation
2022	Colonial Pipeline Co	Refined and/or petroleum product	2.5	Incorrect operation

Year	Pipeline Name	Release Type	Barrels Released	Cause
2023	Colonial Pipeline Co	Refined and/or petroleum product	1.24	Equipment failure
2023	Colonial Pipeline Co	Refined and/or petroleum product	71.43	Material failure or pipe or weld
2023	Colonial Pipeline Co	Refined and/or petroleum product	1.24	Equipment failure
2023	Products (SE) Pipeline Corporation	Refined and/or petroleum product	5.36	Corrosion
2024	Colonial Pipeline Co	Refined and/or petroleum product	0.4	Equipment failure
2024	Colonial Pipeline Co	Refined and/or petroleum product	15.48	Equipment failure
2025	Colonial Pipeline Co	Refined and/or petroleum product	16.67	All other causes
Total			**2,585.4**	

Source: National Pipeline Mapping Service

Additionally, local new sources indicate that a damaged natural gas pipeline led to a gas leak on Fox Hunt Way in Greensboro in October 2024. The line ignited and damaged one building.

PROBABILITY OF FUTURE OCCURRENCE

While pipeline disruptions have occurred in recent years, a complete pipeline failure, resulting in significant damage, fatalities, or injuries has not. Therefore, pipeline failure is considered possible.

Probability: 2 – Possible

CLIMATE CHANGE

Extreme weather events occurring with greater frequency and intensity due to climate change may cause greater cumulative damage to pipelines. And therefore, pipelines may need more frequent evaluation and maintenance.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to pipeline failure was assessed based on past occurrences in North Carolina as well as publicly available information on these vulnerabilities.

PEOPLE

The main concerns for the public with natural gas/pipeline incidents include fire ignition, explosions, and service loss. Any part of the distribution network that contains product may experience some form of failure as discussed above. The release of natural gas has the potential to spark fires or cause explosions due to the material's characteristics. This is especially hazardous in residential or other populated areas.

PROPERTY

The primary concerns with residential buildings during a pipeline failure include gas inhalation, fires, explosions, and loss of heating. Natural gas leaks could lead to asphyxia in some cases. The natural gas

that is used in home heating has the compound mercaptan, which has a distinctly strong odor that can detect a leak before the environment becomes hazardous to health. The fire and explosion risks are present due to the presence of methane in natural gas, which is highly flammable and can be explosive in certain conditions. Gasoline is also flammable but is not an explosive risk. Lastly, some homes may lose their primary heat source when natural gas service is disrupted.

Some businesses in Guilford County have natural gas heating systems or rely on natural gas for some of their food preparation processes. A pipeline failure would interrupt these processes, thus having a negative impact on business. If a facility or business containing hazardous materials is located near a natural gas release, the potential exists for interactions between the hazardous materials stored on the site and the natural gas. Also, any fires or explosions caused by a release of fuels or natural gas could cause containment failures for the hazardous materials on the site(s). The I-40 Fuel Farm is a key facility in the distribution of these materials and could potentially be the site of an incident in the future as it has experienced incidents in the past.

If there is a pipeline break near an interstate or other component of the transportation infrastructure, responders may have to shut traffic down until the release is contained. Lanes of travel may be blocked by vehicles that run out of fuel during shortages.

ENVIRONMENT

Pipeline failure may affect a small area and could negatively impact local wildlife. Widespread effects occur when hazardous materials released during a pipeline failure contaminate the groundwater and eventually the municipal water supply, or they migrate to a major waterway or aquifer.

CONSEQUENCE ANALYSIS

Table 4.113 summarizes the potential negative consequences of a pipeline failure.

TABLE 4.113 – CONSEQUENCE ANALYSIS

Category	Consequences
Public	Pipeline failure could lead to fire or explosions, potentially harming people nearby. Additionally, hazardous substances released during pipeline failure could endanger those nearby.
Responders	Responders face similar risks as the general public.
Continuity of Operations (including Continued Delivery of Services)	Pipeline failure may cause temporary road closures or other localized impacts but is unlikely to affect continuity of operations.
Property, Facilities and Infrastructure	Materials carried by pipelines could be flammable, explosive, and/or corrosive, which could result in structural damages to property. Impacts would be highly localized.
Environment	Consequences depend on the type and amount of material released. Possible ecological impacts include loss of wildlife, loss of habitat, and degradation of air and/or water quality.
Economic Condition of the Jurisdiction	Clean up, remediation, and/or litigation costs may apply. Long-term economic damage is unlikely.
Public Confidence in the Jurisdiction's Governance	Pipeline failure may affect public confidence if the environmental or health impacts are enduring.

HAZARD SUMMARY BY JURISDICTION

The table below summarizes pipeline failure risk by jurisdiction. Probability, spatial extent, and impact are dependent on a jurisdiction's location relative to pipelines.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	2	2	2	4	3	2.3	M
Greensboro	2	2	2	4	3	2.3	M
High Point	2	2	2	4	3	2.3	M
Jamestown	2	2	2	4	3	2.3	M
Oak Ridge	2	2	2	4	3	2.3	M
Pleasant Garden	1	1	1	4	3	1.5	L
Sedalia	1	1	1	4	3	1.5	L
Stokesdale	2	2	2	4	3	2.3	M
Summerfield	2	2	2	4	3	2.3	M
Whitsett	1	1	1	4	3	1.5	L
Unincorporated Guilford County	2	2	2	4	3	2.3	M

Resource Shortage (Water/Fuel)

HAZARD BACKGROUND

Society relies on many resources to conduct routine activities. Without the most critical resources in ample supply, the public's way of life can be severely hampered. Water, electricity, and fuel are among the most critical resources and occasionally may be subject to supply issues. Electrical disruptions and outages were addressed in the Energy/Power/Utility Failure section. This section will address water and fuel shortages.

Warning Time: 1 – More than 24 hrs

Duration: 4 – More than 1 week

LOCATION AND SPATIAL EXTENT

Since a water or fuel shortage would impact the entire county when it occurs, the location of this hazard is countywide.

Spatial Extent: 4 – Large

EXTENT

A water shortage is most likely to result in temporary water restrictions, such as limitations on outdoor watering. In extreme cases, a water shortage could impact residents' ability to hydrate, shower, etc.; however, this is highly unlikely in the U.S. In Greensboro, a water shortage in 2002 led to emergency conservation measures.

Fuel shortages, which often impact multiple states, can affect residents' ability to travel and can result in rationing at gas stations. However, fuel shortage does not primarily impact life safety unless the flow of goods and services between communities is severely affected.

Impact: 2 – Limited

HISTORICAL OCCURENCES

In July of 2002, there was a major water shortage throughout North Carolina. This shortage was exacerbated by exceptional drought conditions over an extended period of time. Most of the years between 1998 and 2002 were marked as under some level of drought. The shortage led to a significant water emergency for Guilford County, in particular in the City of Greensboro. At its worst point, the city had only a 67 day water supply and emergency conservation measures were put in place.

In September of 2008, the impacts of Hurricanes Gustav and Ike caused shortages of fuel in Guilford County and many other parts of the Southeast. Oil refineries in the Gulf of Mexico and the pipelines that deliver the product to various distribution points experienced significant disruptions or damages. Three years prior in August of 2005, Hurricane Katrina caused major shortages of fuel after it damaged or shut down many of the refineries and pipelines in the same region. In both shortages, there were long lines of vehicles at gas stations as the public attempted to fill up gas tanks before the supply ran out. Some stations were completely out of diesel and regular unleaded gasoline.

The fuel situation in the area was also critical during the OPEC fuel crisis in 1973 and 1974. Some gas stations in Greensboro implemented limits on refueling, including one station recorded as asking customers to purchase a maximum of 10 gallons. This illustrates how the geopolitical climate with

respect to oil in the Middle East and other major oil reserves can have a significant impact on the price and supply of fuel.

PROBABILITY OF FUTURE OCCURRENCE

Guilford County relies on the Cape Fear Watershed and depends on surface water stored in reservoirs for its water supply, which makes the city more vulnerable than others to periods of drought. In the Southeast, drought is expected to intensify and increase in duration due to climate change. However, the likelihood of drought impacting water supply beyond basic conservation restrictions is low, and therefore a significant water shortage is unlikely.

Due to international influence on fuel availability and past occurrences, a fuel shortage is possible.

Probability: 2 – Possible

CLIMATE CHANGE

Climate change is expected to intensify drought conditions in the Southeast, which could impact water supply. Additionally, extreme weather events occurring with greater frequency and intensity due to climate change could impact infrastructure used in the transportation of fuel.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to resource shortage was assessed based on past occurrences nationally as well as publicly available information on these vulnerabilities.

PEOPLE

During events such as drought that cause water shortages or emergencies, the public is given limitations on using water for non-essential purposes such as watering lawns or washing vehicles. Water shortages beyond this are possible but less likely. Greater restrictions could be implemented and enforced in extreme water emergencies. Due to these impacts to the public, first response agencies may require additional resources to deal with heightened public safety or medical emergency concerns.

Fuel shortages are not as critical to life safety but could impact decisions made about travel and other life activities. When fuel supply issues become apparent, the public often resorts to panic buying, and lines become long at gas stations. Before the shortage even takes place, gas stations may be overtaxed, as fuel is dispensed faster than it can be replenished. In extreme shortages, limitations could be placed on consumers and in some cases businesses, governments, and other groups. Rationing at gas stations may be implemented and non-essential business or governmental activities may be put on hold or eliminated completely.

Water and other resource shortages can have an influence on the public and its outlook on how the government and any related nongovernmental organizations respond to the shortage. If rationing and restrictions are put in place, it will impact the public and its confidence in the entities responsible for dealing with these limitations. Collaboration with the media could have some influence on what is reported and could reduce negative perception.

PROPERTY

In the midst of a water shortage, the prime concerns for residential areas would deal with hydration, preparation of food, and personal hygiene. In a fuel shortage, generators that run on fuel may not be

operational. In both water and fuel shortage scenarios, there may be limitations put on property maintenance. Water intensive processes may be disrupted during water shortages for commercial and industrial operations.

ENVIRONMENT

In the case of a severe water shortage, vegetation and crops, livestock, and aquatic wildlife may experience some impact. Livestock may not be provided adequate water and could experience illness or death. Typical or alternative sources of water may be tapped for more water, affecting ecosystems as water levels drop. There would be little expected impact to the environment during a fuel shortage.

CONSEQUENCE ANALYSIS

Table 4.114 summarizes the potential negative consequences of a resource shortage.

TABLE 4.114 – CONSEQUENCE ANALYSIS

Category	Consequences
Public	Water shortage could require people to restrict their outdoor water use and in extreme cases could impact drinking and bathing. Fuel shortage would most likely impact the public's ability to travel via increase the increase cost of fuel and limited availability.
Responders	Water shortages are more likely to present life safety issues than fuel shortages. In the event of an extreme water shortage, more health-related emergencies such as dehydration can be expected. Water shortages may also hamper firefighting. Additionally, in extreme cases, lack of water could impact medical procedures.
Continuity of Operations (including Continued Delivery of Services)	Communities typically have plans in place to ensure the continuity of operations during a resource shortage. However, a long-term shortage could impact operations.
Property, Facilities and Infrastructure	Property is unlikely to be damaged by a resource shortage. However, during a resource shortage property maintenance may be impacted.
Environment	A severe water shortage could impact vegetation, crops, livestock and aquatic life.
Economic Condition of the Jurisdiction	Significant economic damage is unlikely unless a resource shortage is long-term.
Public Confidence in the Jurisdiction's Governance	A resource shortage may affect public confidence if impacts are enduring.

HAZARD SUMMARY BY JURISDICTION

The table below summarizes cyber threat risk by jurisdiction. Risk does not vary across the planning area.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	2	2	4	1	4	2.5	M

Transportation Incident

HAZARD BACKGROUND

While transportation crashes occur daily, large-scale incidents that have major impacts on commerce or mass transit are uncommon. This section focuses on large-scale incidents, which include incidents involving airplanes on and off airport properties in Guilford County and incidents involving trains or major highways because when these incidents do occur, they can have significant impacts on the community. The area has experienced several incidents in the past, but occurrence is relatively infrequent and significant impacts are rare. The most common impacts involve how the incident will impact daily life, such as travel and commerce.

In Guilford County, the most prominent site for air travel is Piedmont Triad International Airport (PTIA) located in Greensboro. There are smaller airports within the county, such as Southeast Greensboro Airport, which have much smaller operations that are of very low significance to national air travel. Incidents have and will occur both on and off of airport properties.

Guilford County is also a major thoroughfare for rail commerce and travel. A major rail line passes through the downtown areas of both Greensboro and High Point. Norfolk Southern and Amtrak are the two major carriers of cargo and passengers.

There are also several major highways and interstate highways that run through Guilford County including Interstate-40, Interstate-73, Interstate-74, Interstate-85, and Interstate-840.

Transportation incidents occur quickly with little to no warning.

Warning Time: 4 – Less than six hours

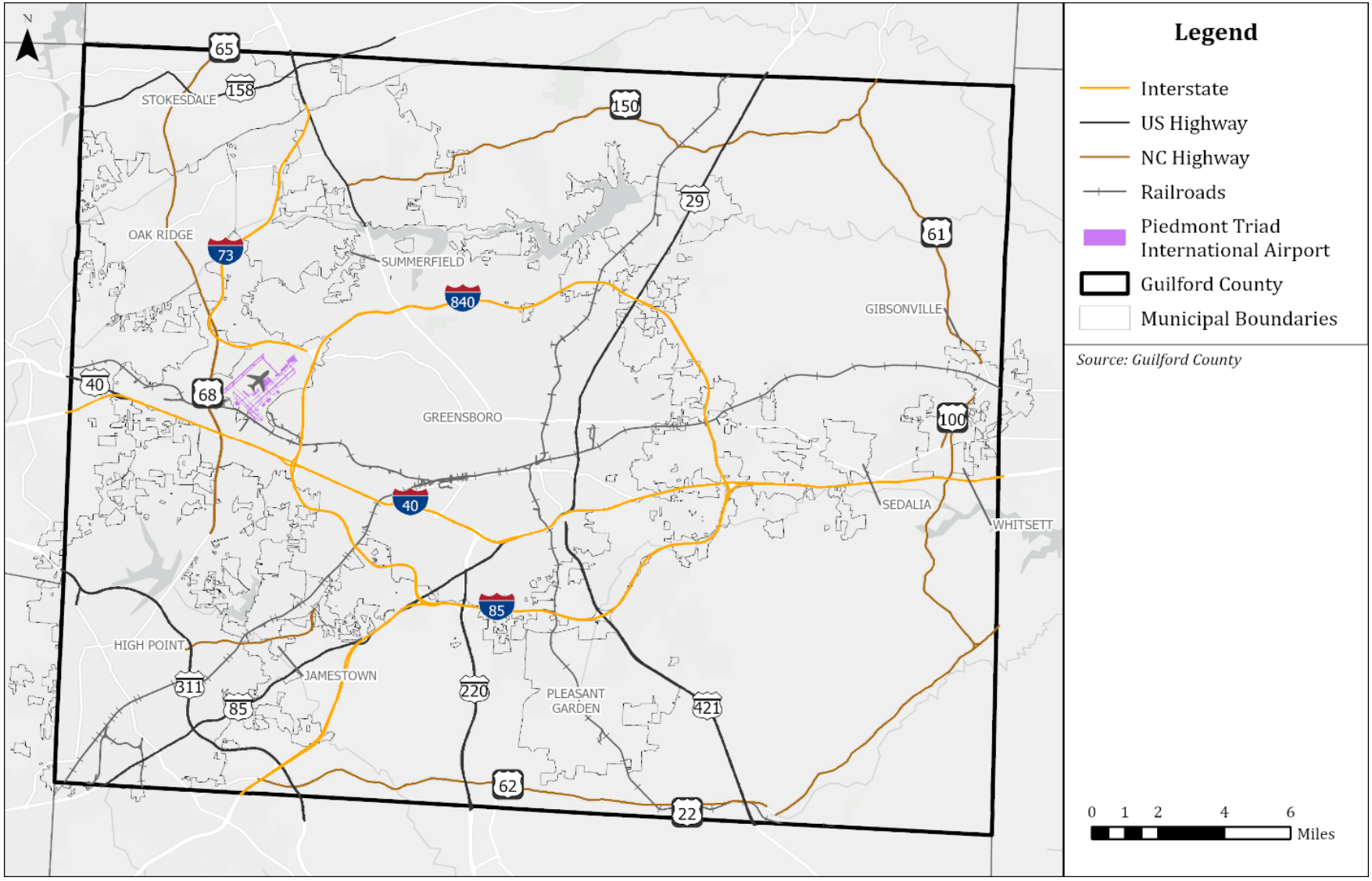
Duration: 1 – Less than 6 hours

LOCATION

Transportation incidents are most likely to occur along major transportation corridors such as highways, interstates, or railways. However, transportation incidents can occur throughout the county, especially given the number of planes that take flight in and out of regional and local airports. All major transportation corridors located in the planning area are shown in Figure 4.80 below.

Spatial Extent: 1 – Negligible

FIGURE 4.80 – MAJOR TRANSPORTATION CORRIDORS, GUILFORD COUNTY



Source: Guilford County GIS

EXTENT

The impacts of a transportation incident are often isolated to the where the incident occurred and the immediate surroundings. The severity of the incident varies on contributing factors such as weather, road conditions, vehicle malfunction, and human error. Transportation incidents could lead to injuries or deaths of people involved in the incident. Additionally, some incidents may lead to the release of hazardous materials and property damage.

Impact: 3 – Critical

HISTORICAL OCCURENCES

According to the NC Department of Transportation County Crash Profiles, Guilford County averaged 13,948 reportable car crashes annually between the years of 2019 to 2023. During the same time period, the County averaged 72 fatalities and 7,774 nonfatal injuries annually due to transportation incidents occurring on the road. According to these numbers, this means that Guilford County experiences a crash every 30 minutes and a nonfatal injury every hour. The average annual cost of crashes occurring in Guilford County is over 1.9 billion dollars.

There have been numerous incidents in Guilford County involving airplanes. Some of these incidents have occurred at PTIA while others were outside of any airport's boundaries. The following incidents are just a sample of some of the incidents that have occurred within the county. Much of this information is from response records in the Guilford Metro 9-1-1 system archive.

- In 1989, the left main gear in the landing gear system of a 737 airplane was not functioning correctly. The plane made an emergency landing at PTIA with 107 occupants. There were no injuries or deaths.
- In August of 2000, a DC-9 airplane made an emergency landing at PTIA due to smoke in the cockpit. Of the 63 crew and passengers, no one was injured during the landing or the fire that resulted, which damaged the plane substantially.
- In November of 2002, a small plane struck trees while in flight and crashed near Route 421 near Southeast Greensboro Airport. The pilot was the only occupant and the only injury/fatality in the incident.
- In January of 2004, a plane went off of the runway during its takeoff attempt. There were no significant injuries or deaths.
- In October of 2011, a small private plane crashed into a home in a subdivision in Colfax. There was no one inside the home at the time, but the occupants of the airplane did not survive.
- On February 11, 2015, there was a plane crash at 150 Air Harbor Road. This was a single engine aircraft and there was one fatality.
- In December 2018, a fuel tanker crashed resulting in a fire that damaged the Interstate 73 Overpass and requiring the highway to be closed for repairs.
- In April 2023, there was a small plane crash on 421 in Julian that resulted in a fatality.
- In August 2024, a small plane began experiencing engine trouble and was forced to land on I-840 before reaching PTIA. After landing, a car traveling on the interstate swerved and hit the right wing of the plane. Minor injuries occurred.

There have also been several incidents within Guilford County that involved trains.

- In December 2005, 11 train cars derailed in Greensboro. No one was injured.
- In May of 2010, six train cars derailed in downtown Greensboro. No one was injured.

— In 1979, another train struck a gasoline tanker in Greensboro.
— In October 1987, a 57-car train struck a gasoline tanker in Greensboro.
— On November 28th, 2024, an unoccupied Greensboro Police Department car was struck by an Amtrak train traveling from Charlotte to Raleigh. There were no reported injuries to the passengers or crew members.
— On September 4th, 2024, a JGL telescoping boom lift was traveling across the train tracks and was struck by an Amtrack passenger train traveling northbound near Hilltop Road in Greensboro. The lift operator was killed in the accident.

PROBABILITY OF FUTURE OCCURRENCE

Of the recent transportation incidents that have occurred in Guilford County, none have resulted in widespread damage and/or several casualties, and therefore, a major transportation incident, while possible, is an infrequent event.

Probability: 2 – Possible

CLIMATE CHANGE

Climate change may affect transportation incidents as changes in precipitation, extreme weather, and heat pose significant risks to the overall performance of transportation infrastructure. Heavy rains and increased local flooding can weaken roadway materials or cause traffic congestion. Rising temperatures can damage airport runways, rail tracks, and cause cracks in roads. Overall, increased damages to transportation infrastructure may lead to a higher number of accidents.

VULNERABILITY ASSESSMENT

METHODOLOGIES AND ASSUMPTIONS

Vulnerability to transportation incidents was assessed based on past occurrences in the region and nationally and the known behavior of these incidents.

PEOPLE

Transportation incidents can cause injuries, hospitalizations, and even death to people actively traveling or people nearby. People living along transportation routes or who work in public transportation are at heightened risk.

The primary economic impact of hazardous material incidents results from property damage and delayed services. Large and publicized transportation incident events can deter tourists and could potentially discourage residents and businesses. Economic effects from major transportation corridor closures can be significant.

PROPERTY

A transportation incident having an impact on any given residence is highly unlikely. If it were to occur, there could be structural damage to the residence and the potential for fire and severe localized damage to the particular structure impacted. If the incident involves hazardous materials release the impact on homes could be more widespread.

Similarly, impacts to any given critical facility are unlikely. However, a transportation incident could increase the volume of patients at a hospital and strain the ability of responders. Facilities may be

located in close proximity to rail lines or roadways, and a major incident near one of those facilities could have an impact on the community overall.

Transportation infrastructure will be directly affected by incidents. Short term or potentially long-term closures are possible depending on the magnitude of the incident. For example, while Piedmont Triad International Airport is not one of the major national travel hubs, any disruptions to its operations will have some impact on air travel and commerce.

ENVIRONMENT

The impacts of a transportation incident vary on the types of materials contained. Most transportation vehicles use some type of fuel that may be spilled during an incident and these fuels are hazardous to plant and wildlife populations and may also be harmful if spilled into a water source. Other contained chemicals and materials that are being transported by freight vehicles can be hazardous to these populations as well, depending on the characteristics of the substance(s). These impacts are described above in the Hazardous Substances section.

CONSEQUENCE ANALYSIS

Category	Consequences
Public	In the event of a transportation incident, there is a strong possibility of injury or death. A car accident or train derailment could impact the normal operations of the transportation system, as other cars or trains attempting to pass through the area of the incident may be stopped or redirected.
Responders	Responders face similar risks as the general public but a heightened potential for exposure to hazardous materials (fuel), fires, and explosions that may occur in the event of a transportation incident.
Continuity of Operations (including Continued Delivery of Services)	Since these types of events occur on a relatively regular basis and their impact is generally localized, there would probably be little disruption to continuity of operations from a transportation incident. However, if it is a major incident, staff resources may be strained and there could be some effect on continuing normal operations.
Property, Facilities and Infrastructure	Structural damage to residence or critical facilities is unlikely, but if it occurred could cause fires and the release of fuel and other hazardous materials. Impacts would be highly localized.
Environment	Consequences depend on the type of material released. Possible ecological impacts include loss of wildlife, loss of habitat, and degradation of air and/or water quality if fuel or other harmful materials are released in an incident.
Economic Condition of the Jurisdiction	The economic impact of a transportation incident would be relatively minor. Plane crashes may discourage some from traveling while a train derailment may have a temporary impact on commerce. However, operations are expected to return to normal in a short period of time following the incident.
Public Confidence in the Jurisdiction's Governance	A transportation incident may affect public confidence if the transportation infrastructure damages are enduring.

HAZARD SUMMARY BY JURISDICTION

The table below summarizes transportation incident risk by jurisdiction. Jurisdictions with proximity to major transportation infrastructure exhibit a greater probability of a major transportation incident occurring.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
Gibsonville	2	3	1	4	1	2.2	M
Greensboro	3	3	1	4	1	2.3	M
High Point	2	3	1	4	1	2.2	M
Jamestown	2	3	1	4	1	2.2	M
Oak Ridge	2	3	1	4	1	2.2	M
Pleasant Garden	2	3	1	4	1	2.2	M
Sedalia	2	3	1	4	1	2.2	M
Stokesdale	2	3	1	4	1	2.2	M
Summerfield	2	3	1	4	1	2.2	M
Whitsett	2	3	1	4	1	2.2	M
Unincorporated Guilford County	2	3	1	4	1	2.2	M

Terrorism

HAZARD BACKGROUND

There is no universal globally agreed-upon definition of terrorism. In a broad sense, terrorism is the use of violence and threats to intimidate or coerce, especially against civilians, in the pursuit of political aims.

For this analysis, this hazard encompasses the following sub-hazards: enemy attack, biological terrorism, agro-terrorism, chemical terrorism, conventional terrorism, and radiological terrorism. These hazards can occur anywhere and demonstrate unlawful force, violence, and/or threat against persons or property causing intentional harm for purposes of intimidation, coercion or ransom in violation of the criminal laws of the United States. These actions may cause massive destruction and/or extensive casualties. The threat of terrorism, both international and domestic, is ever present, and an attack can occur when least expected.

Enemy attack is an incident that could cause massive destruction and extensive casualties throughout the world. Some areas could experience direct weapons' effects: blast and heat; others could experience indirect weapons' effect. International political and military activities of other nations are closely monitored by the federal government and the State of North Carolina would be notified of any escalating military threats.

Use of conventional weapons and explosives against persons or property in violation of the criminal laws of the United States for purposes of intimidations, coercion, or ransom is conventional terrorism. Hazard effects are instantaneous; additional secondary devices may be used, lengthening the time duration of the hazard until the attack site is determined to be clear. The extent of damage is determined by the type and quantity of explosive. Effects are generally static other than cascading consequences and incremental structural failures. Conventional terrorism can also include tactical assault or sniping from remote locations.

Biological terrorism is the use of biological agents against persons or property. Liquid or solid contaminants can be dispersed using sprayers/aerosol generators or by point of line sources such as munitions, covert deposits and moving sprayers. Biological agents vary in the amount of time they pose a threat. They can be a threat for hours to years depending upon the agent and the conditions in which it exists.

Chemical terrorism involves the use or threat of chemical agents against persons or property. The effects of chemical contaminants are similar to biological agents.

Radiological terrorism is the use of radiological materials against persons or property. Radioactive contaminants can be dispersed using sprayers/aerosol generators, or by point of line sources such as munitions, covert deposits and moving sprayers or by the detonation of a nuclear device underground, at the surface, in the air or at high altitude.

During 2024, the Southern Poverty Law Center (SPLC) reported tracking 44 active hate and antigovernment groups in North Carolina. The SPLC defines a hate group as any group with "beliefs or practices that attack or malign an entire class of people – particularly when the characteristics being maligned are immutable." It is important to note that inclusion on the SPLC list is not meant to imply that a group advocates or engages in violence or other criminal activity.

Warning Time: 4 – Less than 6 hours

Duration: 2 – Less than 24 hours

Generally, no warning is given for acts of terrorism. Duration is dependent on the parameters of the incident; while the incidents themselves are usually relatively short, residual impacts on the community can be long-lasting. This score takes into account a prolonged scenario with continuous impacts.

LOCATION

A terror threat could occur at any location in the county, but are more likely to target highly populated areas, critical infrastructure, or symbolic locations.

Spatial Extent: 2 – Small

EXTENT

The extent of a terrorist incident is tied to many factors, including the attack vector, location, time of day, and other circumstances; for this reason, it is difficult to assess a single definition or conclusion of the extent of "terrorism." As a general rule, terrorism incidents are targeted to where they can do the most damage and have the maximum impact possible, though this impact is tempered by the weapon used in the attack itself.

Impact: 3 – Critical

HISTORICAL OCCURRENCES

There are no records of any acts of terrorism in Guilford County; however, given the unpredictability of these events, past incidents are not necessarily an indicator of future risk. The ability to respond to a terrorist incident is provided by county and community emergency operations plans.

PROBABILITY OF FUTURE OCCURRENCE

While difficult to estimate when a deliberate act like terrorism may occur, it can be inferred that the probability of a terrorism attack in any one area in the county is very low at any given time. When identified, credible threats may increase the probability of an incident; these threats are generally tracked by law enforcement.

Probability: 1 – Unlikely

VULNERABILITY ASSESSMENT

PEOPLE

People can suffer death or illness as a result of a terrorist attack. Symptoms of illness from a biological or chemical attack may go undetected for days or even weeks. Local healthcare workers may observe a pattern of unusual illness or early warning monitoring systems may detect airborne pathogens. People will face increased risk if a biological or chemical agent is released indoors, as this may result in exposure to a higher concentration of pathogens, whereas agents that are released outdoors would disperse in the direction of the wind. Physical harm from a weapons attack or explosive device is not dependent on location, but risk is greater in areas where higher numbers of people may gather. People could also be affected by an attack on food and water supply. In addition to impacts on physical health, any terrorist attack could cause significant stress and anxiety.

PROPERTY

The potential for damage to property is highly dependent on the type of attack. Buildings and infrastructure may be damaged by an explosive device or by contamination from a biological or chemical attack. Impacts are generally highly localized to the target of the attack.

ENVIRONMENT

Environmental impacts are also dependent on the type of attack. Impacts could be negligible or could require major clean-up and remediation.

CONSEQUENCE ANALYSIS

Table 4.115 summarizes the potential detrimental consequences of a mass shooter threat.

TABLE 4.115 – CONSEQUENCE ANALYSIS – TERRORISM / MASS SHOOTER

Category	Consequences
Public	Illness, injury, or fatality are possible; these impacts would be highly localized to the attack. Widespread stress and psychological suffering may occur. Human impacts may be long-term based on attack vector.
Responders	Injuries; fatalities are possible. Responders face increased risks during an effort to stop an attack or rescue others while an attack is underway. Potential impacts to response capabilities may result from an attack.
Continuity of Operations (including Continued Delivery of Services)	Potential impacts to continuity of operations due to attack impacts; delays in providing services; impacts tied to attack vector
Property, Facilities and Infrastructure	Impacted roads; downed power lines and power loss; utility disruption. Several key critical sites could be targeted in an attack, causing cascading impacts to daily life in the region
Environment	Water and food supply could be contaminated by a biological or chemical attack. Remediation could be required.
Economic Condition of the Jurisdiction	The local economy could be disrupted, depending on the location and scale of an attack.
Public Confidence in the Jurisdiction's Governance	Illness, injury, or fatality are possible; these impacts would be highly localized to the attack. Widespread stress and psychological suffering may occur. Human impacts may be long-term based on attack vector.

HAZARD SUMMARY BY JURISDICTION

The table below summarizes terrorism risk by jurisdiction. Risk does not vary across the planning area.

Jurisdiction	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score	Priority
All Jurisdictions	2	3	2	4	2	2.5	M

4.5 Conclusions on Hazard Risk

PRIORITY RISK INDEX

As discussed in Section 4.3 Risk Assessment Methodology and Assumptions, the Priority Risk Index (PRI) was used to rate each hazard on a set of standardized criteria and determine an overall score for each hazard. The quantitative PRI result were then presented to the Hazard Mitigation Planning Committee for qualitative input. The conclusions drawn from this process are summarized below by classifying hazards into three categories—high, moderate, or low risk—based on the assigned risk value[7]. For some hazards, PRI ratings vary by jurisdiction. In these cases, the overall PRI rating reflects the highest risk that applies to the region. General assumptions for high, moderate, and low risk hazards are described below, and hazard risk ratings are summarized in Table 4.116:

- **High Risk** – Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread.
- **Moderate Risk** – Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **Low Risk** – Minimal potential impact. The occurrence and potential cost of damage to life and property is negligible or nonexistent. This is not a priority hazard for mitigation projects.

TABLE 4.116 – SUMMARY OF HAZARD RISK CLASSIFICATION

High Risk (≥ 3.0)	Excessive Heat Flooding Severe Winter Weather Cyber Threat
Moderate Risk (2.0 – 2.9)	Dam & Levee Failure Drought Hurricane & Tropical Storm Tornadoes/Thunderstorm Wind/Hail Wildfire Infectious Disease Cyber Threat Hazardous Substances Radiological Emergency Bioterrorism Civil Disturbance Communications Systems Disruption/Failure Energy/Power/Utility Failure Pipeline Failure Resource Shortage Transportation Incident Terrorism
Low Risk (< 2.0)	Earthquake Lightning Building/Structure Collapse

[7] Qualitative input received from the HMPC resulted in Cyber Threat being moved to the High Risk ranking category.

Table 4.117 summarizes the degree of risk assigned to each identified hazard using the PRI method. Where PRI ratings varied by jurisdiction, the range is shown. Additionally, where a hazard encompasses several sub-hazards, the PRI rating for each sub-hazard is provided.

TABLE 4.117 – SUMMARY OF PRI RESULTS

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Bioterrorism	Unlikely	Critical	Large	Less than 6 hours	More than 1 week	2.8
Building/Structure Collapse	Unlikely	Critical	Negligible	Less than 6 hours	Less than 6 hours	1.9
Civil Disturbance	Possible	Limited	Small	Less than 6 hours	Less than 1 week	2.3
Communications Systems Disruption/Failure	Likely	Minor	Large	Less than 6 hours	Less than 1 week	2.7
Cyber Threat	Likely	Critical	Small	Less than 6 hours	More than 1 week	3
Dam & Levee Failure[1]	Unlikely-Possible	Limited-Critical	Negligible	Less than 6 hrs	Less than 1 week	1.8-2.4
Drought[1]	Likely	Minor-Limited	Large	More than 24 hours	More than 1 week	2.5-2.8
Earthquake	Unlikely	Minor	Large	Less than 6 hours	Less than 6 hours	1.9
Energy/Power/Utility Failure	Likely	Minor	Large	Less than 6 hours	Less than 1 week	2.7

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Excessive Heat	Highly Likely	Critical	Large	More than 24 hours	Less than 1 week	3.3
Flooding[1]	Possible-Highly Likely	Critical	Negligible-Small	6 to 12 hours	Less than 1 week	2.5-3.1
Hail[2]	Highly Likely	Minor	Negligible	Less than 6 hours	Less than 6 hours	2.2
Hazardous Substances[1]	Possible-Likely	Critical	Small	Less than 6 hours	Less than 24 hours	2.5-2.8
Hurricane & Tropical Storm[1]	Likely	Limited-Critical	Large	More than 24 hours	Less than 24 hours	2.6-2.9
Infectious Disease	Possible	Critical	Large	More than 24 hours	More than 1 week	2.8
Lightning[2]	Likely	Minor	Negligible	Less than 6 hours	Less than 6 hours	1.9
Pipeline Failure[1]	Unlikely-Possible	Minor-Limited	Negligible-Small	Less than 6 hours	Less than 1 week	1.5-2.3
Radiological Emergency[1]	Unlikely	Minor-Limited	Negligible-Large	Less than 6 hrs	More than 1 week	1.6-2.5
Resource Shortage	Possible	Limited	Large	More than 24 hours	More than 1 week	2.5
Severe Winter Weather	Highly Likely	Limited	Large	More than 24 hours	Less than 1 week	3

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Terrorism	Possible	Critical	Small	Less than 6 hours	Less than 24 hours	2.5
Thunderstorm Winds[1,2]	Highly Likely	Limited-Critical	Moderate	Less than 6 hours	Less than 6 hours	2.6-2.9
Tornadoes[2]	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	2.7
Transportation Incident	Likely	Critical	Negligible	Less than 6 hours	Less than 24 hours	2.6
Wildfire[1]	Possible-Likely	Minor	Moderate	Less than 6 hours	Less than 1 week	2.2-2.5

[1]Note: PRI ratings for this hazard vary by jurisdiction. The range of ratings are shown here.
[2]Note: This is a sub-hazard of the Tornadoes & Thunderstorms hazard. The overall hazard rating is an average of these sub-hazards.

SECTION 5
CAPABILITY ASSESSMENT

This section of the plan discusses the capability of the communities in Guilford County to implement hazard mitigation activities. It consists of the following four subsections:

- 5.1 What is a Capability Assessment?
- 5.2 Conducting the Capability Assessment
- 5.3 Capability Assessment Findings
- 5.4 Conclusions on Local Capability

5.1 WHAT IS A CAPABILITY ASSESSMENT?

The purpose of the capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects[1]. As with any planning process, it is important to try to establish feasible goals, objectives, and/or actions based on an understanding of the organization's capacity (agencies and/or departments) to implement the proposed strategies. The capability assessment helps determine practical mitigation actions that are likely to be implemented over time, given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate.

A capability assessment has two primary components: 1) an inventory of a local jurisdiction's relevant plans, ordinances, or programs already in place and 2) an analysis of its capacity to implement mitigation measures. Careful examination of local capabilities helps identify existing gaps, shortfalls, or weaknesses with ongoing government activities that potentially hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A capability assessment acknowledges the existing mitigation measures (completed or underway) at the local government level, which should be leveraged and enhanced through future mitigation efforts.

The capability assessment completed for Guilford County serves as a critical planning step and an integral part of the foundation for designing an effective hazard mitigation strategy. Coupled with the risk assessment, the capability assessment helps identify and target meaningful mitigation actions for incorporation in the Mitigation Strategy portion of the Hazard Mitigation Plan. This helps establish the goals and objectives for the region to pursue under this Plan and ensures that such goals and objectives are feasible under given local conditions.

[1]While the Final Rule for implementing the Disaster Mitigation Act of 2000 does not require a local capability assessment to be completed for local hazard mitigation plans, it is a critical step in developing a mitigation strategy that meets the needs of the region while taking into account their own unique abilities. The Rule does state that a community's mitigation strategy should be "based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools" (44 CFR, Part 201.6(c)(3)).

5.2 CONDUCTING THE CAPABILITY ASSESSMENT

To facilitate the inventory and analysis of local government capabilities within Guilford County, a detailed capability assessment was completed for each of the participating jurisdictions based on the information found in existing hazard mitigation plans and local government websites. The assessment compiled information on various "capability indicators" including relevant planning regulatory practices (plans, programs, and ordinances), fiscal resources, administrative and technical capacity, and current political climate. These capability indicators provide insight into existing conditions that support and/or hinder the region's ability to implement hazard mitigation actions.

The standardized indicators used to assess capability promote an extensive inventory of existing local plans, ordinances, programs, and resources that are in place or underway in addition to their overall effect on hazard loss reduction. Additionally, this information can help identify gaps, weaknesses, or conflicts that counties and local jurisdictions can be addressed through newly proposed mitigation actions as part of the hazard mitigation strategy.

The information collected for the capability assessment was incorporated into a database for further analysis. A general scoring methodology was then applied to quantify each jurisdiction's overall capability. According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation. Using this scoring methodology, a total score[2] and overall capability rating of high, moderate, or limited was determined according to the total number of points received. These classifications are designated to provide a general assessment of local government capability. The results of this capability assessment help inform and develop an effective and practical mitigation strategy.

5.3 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this plan to provide insight into the relevant capacity of the participating jurisdictions in Guilford County to implement hazard mitigation activities. All information is based upon the review of the existing hazard mitigation plan and local government websites and input provided by local government officials during meetings of the Guilford County Hazard Mitigation Planning Team.

5.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the successful enforcement and implementation of plans, ordinances, and programs that are intended to guide and manage growth, development, and redevelopment in a responsible manner while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning; the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built; as well as protecting environmental, historic, and cultural resources in the community. These planning initiatives generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision-making process.

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

This assessment is designed to provide a general overview of the key planning and regulatory tools and programs in place or underway for the participating jurisdictions in Guilford County and highlight the potential effect on loss reduction. This information helps identify opportunities to address existing gaps, weaknesses, or conflicts with other initiatives in addition to integrating the implementation of this plan with existing planning mechanisms where appropriate.

Table 5.1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the jurisdictions in Guilford County. 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. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Guilford County Hazard Mitigation Plan.

TABLE 5.1: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning / Regulatory Tool	GUILFORD COUNTY	Gibsonville	Greensboro	High Point	Jamestown	Oak Ridge	Pleasant Garden	Sedalia	Stokesdale	Summerfield	Whitsett
Hazard Mitigation Plan	✓	†	†	†	†	†	†	†	†	†	†
Comprehensive Land Use Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Floodplain Management Plan											
Open Space Management Plan (Parks & Rec/Greenway Plan)	✓		✓	✓	✓	✓	✓	✓	✓	✓	
Stormwater Management Plan/Ordinance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Natural Resource Protection Plan	✓			✓						✓	
Flood Response Plan											
Emergency Operations Plan	✓	†	†	✓	†	†	†	†	†	†	†
Continuity of Operations Plan	✓	✓	✓	✓		✓	✓	✓		✓	✓
Evacuation Plan											
Disaster Recovery Plan	✓	†	†	†	†	†	†	†	†	†	†
Capital Improvements Plan	✓	✓	✓	✓	✓	✓	✓		✓	✓	

Planning / Regulatory Tool	GUILFORD COUNTY	Gibsonville	Greensboro	High Point	Jamestown	Oak Ridge	Pleasant Garden	Sedalia	Stokesdale	Summerfield	Whitsett
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 county's planning and regulatory capability follows.

5.3.2 Emergency Management

Hazard mitigation is widely recognized as one of the five mission areas of emergency management. The other four phases include prevention, protection, response, and recovery. In reality, each phase is interconnected with hazard mitigation as **Figure 5.1** suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before disaster strikes, such as the elevation of flood prone structures or the continuous enforcement of policies that prevent and regulate development that is vulnerable to hazards due to its location, design, or other characteristics. Mitigation opportunities will also be presented during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane, and certainly during the long-term recovery and redevelopment process following a hazard event.

FIGURE 5.1: THE FIVE MISSION AREAS OF EMERGENCY MANAGEMENT



Source: FEMA

Planning for each mission area 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 participating jurisdictions' 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.

- Guilford County has previously adopted a hazard mitigation plan. Each participating municipality was included in the 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.

- Guilford County has developed a recovery framework plan that serves as the county's disaster recovery plan. This recovery framework pertains to all participating municipalities and each community acts as an integral part of the framework.

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

- Guilford County maintains an emergency operations plan through the County Emergency Management Department. All 10 participating municipalities have adopted the county plan.

- The City of High Point has also adopted a municipal-level emergency operations plan.

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.

- Guilford County has adopted a continuity of operations planning program that allows all county departments to develop a department specific continuity of operations plan. As part of this program, Guilford County has also developed and adopted a continuity of government plan.
- Various departments within the Cities of Greensboro and High Point have developed department specific continuity of operations plans.
- Several of the municipalities within Guilford County have developed or are in the process of developing a continuity of government and/or continuity of operations plan for their jurisdiction.

Flood Response Plan: A flood response plan establishes procedures for responding to a flood emergency including coordinating and facilitating resources to minimize the impacts of flood.

- The county does not currently have a flood response plan in place.

5.3.3 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they are not designed as such. 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 Guilford County.

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.

- Guilford County has adopted a county comprehensive plan.
- Each of the 10 participating municipalities has adopted a municipal 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.

- Guilford County, Gibsonville, Greensboro, High Point, Jamestown, Oak Ridge, Pleasant Garden, Stokesdale, and Summerfield have capital improvement plans in place.

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.

- The City of Greensboro has a Preservation Plan that is a sub-section of the city's Comprehensive Plan.
- None of the remaining participating municipalities have adopted a historic preservation plan.

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

- Guilford County and all 10 participating municipalities have adopted zoning ordinances.
- The county and all of the participating municipalities, except the Town of Whitsett, include zoning regulations as part of their local unified development ordinances. Whitsett has adopted a standalone 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.

- Guilford County and all 10 participating municipalities have adopted subdivision ordinances.
- The county and all of the participating municipalities, except the Town of Whitsett, include subdivision regulations as part of their local unified development ordinances. Whitsett has adopted a standalone 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.

- North Carolina has a state compulsory building code, which applies throughout the state; however, jurisdictions may adopt codes if approved as providing adequate minimum standards. The county and all 10 participating municipalities have adopted a building code.
- Guilford County provides building inspection services for all unincorporated areas of the county and through contractual agreements for the Towns of Jamestown, Oak Ridge, Pleasant Garden, Sedalia, Stokesdale, Summerfield, and Whitsett.

- Gibsonville, Greensboro, and High Point are responsible for enforcement of the building codes within their planning jurisdictions.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program developed by the Insurance Services Office, Inc. (ISO).[3] In North Carolina, the North Carolina Department of Insurance assesses the building codes in effect in a particular community and how the community enforces its building codes *with special emphasis on mitigation of losses from natural hazards*. The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The concept is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses and, as a result, should have lower insurance rates.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education as well as the number of inspections performed per day. This type of information combined with local building codes is used to determine a grade for that jurisdiction. The grades range from 1 to 10 with a BCEGS grade of 1 representing exemplary commitment to building code enforcement and a grade of 10 indicating less than minimum recognized protection.

Specific BCEGS rating for the participating jurisdictions can be obtained by contacting the department for building inspections within that jurisdiction.

5.3.4 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. Accordingly, advanced tools have been developed and are readily available to help reduce the impacts associated with flooding. These tools are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the *National Flood Insurance Program* (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step to implement and sustain an effective hazard mitigation program. It is therefore used as part of this assessment as a key indicator for measuring local capability.

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

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

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

Table 5.2 provides NFIP policy and claim information for each participating jurisdiction in Guilford County.

TABLE 5.2: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Map Panel Effective Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Guilford County†	06/04/80	11/17/17	98	$28,918,000	61	$786,091
Gibsonville	05/15/80	11/17/17	7	$2,190,000	5	$73,676
Greensboro	04/16/71	03/16/09	561	$167,037,000	439	$5,789,820
High Point	11/01/79	06/16/09	237	$61,074,000	86	$287,251
Jamestown	03/04/80	03/16/09	13	$4,314,000	3	$51,619
Oak Ridge	08/13/02	03/16/09	6	$1,909,000	1	$17,950
Pleasant Garden	03/17/09	03/16/09	3	$1,004,000	2	$0
Sedalia	10/09/08	03/16/09	2	$400,000	0	$0
Stokesdale	05/05/97	03/16/09	4	$1,319,000	0	$0
Summerfield	08/12/02	03/16/09	13	$3,682,000	0	$0
Whitsett	11/07/08	NSFHA	0	$0	2	$25,576

†Includes unincorporated areas of county only
Source: NFIP Community Status information as of 11/12/2025; NFIP claims and policy information as of 8/31/2025

All jurisdictions listed above that are participants in the NFIP will continue to comply with all required provisions of the program and will work to adequately comply in the future utilizing several strategies. For example, the jurisdictions will coordinate with NCEM and FEMA to develop maps and regulations related to special flood hazard areas within their jurisdictional boundaries and, through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property.

Community Rating System: An additional indicator of floodplain management capability is the active participation of local jurisdictions in the Community Rating System (CRS). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP by adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class rating. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in **Table 3.3**. As class rating improves (the lower the number the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

TABLE 5.3: 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

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

- Guilford County (Class 7) and the City of Greensboro (Class 7) are the only two jurisdictions that currently participate in the CRS. Participation in the CRS program should be considered as a mitigation action by the other participating municipalities. The program would be most beneficial to the City of High Point, which has 274 NFIP policies.

Flood Damage Prevention Ordinance: A flood damage prevention ordinance establishes minimum building standards in the floodplain with the intent to minimize public and private losses due to flood conditions.

- All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. The county and all 10 participating municipalities participate in the NFIP and they all have adopted flood damage prevention regulations.

Floodplain Management Plan: A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts.

- Neither the county nor any of the participating municipalities have adopted floodplain management plans.

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.

- Guilford County participated in the development of the Piedmont Triad Regional Open Space Strategy which identifies a wide variety of key conservation opportunities across the region as well as a strategy meant to serve as the foundation for future conservation planning efforts within the county.
- Greensboro, High Point, Jamestown, Oak Ridge, Pleasant Garden, Stokesdale, and Summerfield have adopted parks, recreation, greenways, and/or open space plans.

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.

- Guilford County, the City of Greensboro, and the City of High Point are the only jurisdictions that have adopted a stormwater management plan.
- Guilford County and all 10 of the participating municipalities have adopted a stormwater management ordinance.

Substantial Damage Estimate Procedures: Properties in communities that participate in the NFIP that are determined to be "substantially damaged" following a flood event must be brought into compliance with the local flood damage prevention ordinance. Determination of substantial damage is a coordinated effort between emergency management, police and fire departments and permitting departments such as planning and building inspections departments. Substantial damage estimating procedures for participating jurisdictions are detailed below. The SDE procedures are summarized in **Table 5.4.**

TABLE 5.4: SUBSTANTIAL DAMAGE ESTIMATE (SDE) PROCEDURES

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
GUILFORD COUNTY	The County maintains a county-wide Flood Damage Prevention Ordinance and participates in CRS (Class 7).	Determination of substantial damage is a coordinated effort between Guilford County Emergency Management, Police and Fire Departments, Permitting Departments and all jurisdictions within the County that participate in the NFIP.	Following a flood event, County Emergency Management staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by County staff and compliance with building codes and flood prevention ordinance required.

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
Greensboro	The City maintains a city-wide Flood Damage Prevention Ordinance and participates in CRS (Class 7).	The City Water Resources Director is designated as the Floodplain Administrator.	Determination of substantial damage is a coordinated effort between relevant City staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments. Following a flood event, City staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by City staff and compliance with building codes and flood prevention ordinance required.
High Point	The City maintains a city-wide Flood Damage Prevention Ordinance.	Determination of substantial damage is a coordinated effort between relevant City staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments.	Following a flood event, City staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: d. Estimation of market value or obtaining appraisal e. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure f. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by City staff and compliance with building codes and flood prevention ordinance required.

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
Gibsonville	The Town maintains a town-wide Flood Damage Prevention Ordinance.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments.	Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.
Jamestown	The Town maintains a town-wide Flood Damage Prevention Ordinance.	The Town Planning Director is designated as the Floodplain Administrator.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments. Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
Oak Ridge	The Town maintains a town-wide Flood Damage Prevention Ordinance.	Town Council appoints an enforcement officer to administer and enforce the provisions of the Flood Damage Prevention Ordinance.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments. Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.
Pleasant Garden	The Town participates in the NFIP.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments.	Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
Sedalia	The Town participates in the NFIP.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments.	Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.
Stokesdale	The Town maintains a town-wide Flood Damage Prevention Ordinance.	The governing body appoints an enforcement officer to administer and enforce the provisions of the Flood Damage Prevention Ordinance.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments. Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.

Jurisdiction	Local Floodplain Management Regulations	Designated Officials for SD/SI Determinations	Process Used to Make SD/SI Determinations	Communication Procedures for SD/SI Requirements
Summerfield	The Town maintains a town-wide Flood Damage Prevention Ordinance.	The Town Enforcement Officer is designated as the Floodplain Administrator.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments. Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.
Whitsett	The Town participates in the NFIP.	Determination of substantial damage is a coordinated effort between relevant Town staff and Guilford County Emergency Management, Police and Fire Departments, Permitting Departments.	Following a flood event, Town staff (along with other County, municipal and mutual aid staff as needed) conduct damage assessments and collect data on damaged structures. Substantial damages/improvements determined by Floodplain Administrator with Building Official coordination using the following process: a. Estimation of market value or obtaining appraisal b. Cost comparison to improve, to repair a damaged building to pre-damaged condition, or combined, vs. market value of building/structure c. Determination of whether work constitutes substantial improvement/repair of damage This process involves comparing the damage assessment information with permit applications.	If work constitutes substantial improvement or repair of substantial damage, applicants are notified by Town staff and compliance with building codes and flood prevention ordinance required.

5.3.5 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and

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

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using Geographic Information Systems (GIS) to analyze and assess community hazard vulnerability. The Capability Assessment Survey was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Table 5.5 provides a summary of the capability assessment results for Guilford County 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. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE 5.5: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	GUILFORD COUNTY	Gibsonville	Greensboro	High Point	Jamestown	Oak Ridge	Pleasant Garden	Sedalia	Stokesdale	Summerfield	Whitsett
Planners with knowledge of land development / land management practices	✓	✓	✓	✓	✓	✓	†	†	†	✓	†
Engineers or professionals trained in construction practices related to buildings and/or infrastructure	✓	✓	✓	✓	†	†	†	†	†	†	†
Planners or engineers with an understanding of natural and/or human-caused hazards	✓	✓	✓							✓	
Emergency Manager	✓	†	†	✓	†	†	†	†	†	†	†
Floodplain Manager	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Land Surveyors	✓		✓	✓							
Scientists familiar with the hazards of the community	✓	†	†	†	†	†	†	†	†	†	†
Staff with education or expertise to assess the community's vulnerability to hazards	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Personnel skilled in GIS and/or Hazus	✓		✓	✓	✓	✓				✓	
Resource development staff or grant writers	✓		✓			✓				✓	

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

5.3.6 Fiscal Capability

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of outside grant funding awards or locally-based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project, such as the acquisition of flood-prone homes, which can require a substantial commitment from local, state, and federal funding sources.

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

Table 5.6 provides a summary of the results for Guilford County 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 5.6: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	GUILFORD COUNTY	Gibsonville	Greensboro	High Point	Jamestown	Oak Ridge	Pleasant Garden	Sedalia	Stokesdale	Summerfield	Whitsett
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: PDM, FMA, HMGP, PA, SBA, other Federal, state, and non-governmental funding sources, etc.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

5.3.7 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority or may conflict with or be seen as an impediment to other goals of the community, such as growth and economic development. Therefore, the local political climate must be considered in designing mitigation strategies as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

The Capability Assessment Survey was used to capture information on political capability of Guilford County. The previous hazard mitigation plan was reviewed for general examples of local political capability, such as guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (i.e., building codes, floodplain management, etc.).

- The previous local hazard mitigation plan identified existing ordinances that address natural hazards or are related to hazard mitigation such as flood damage prevention, watershed protection, soil erosion and sediment control, stormwater management, zoning, and subdivision.
- Most Guilford County residents are quite knowledgeable about the potential hazards that their community faces, and in recent years, they have become more familiar with the practices and principles of mitigation. A number flood prone structures have been acquired and demolished or elevated out of harm's way. It is strongly believed that such tangible and visual changes within the community have created a greater sense of awareness among local residents and that hazard mitigation is a concept that citizens are beginning to readily accept and support. Because of this fact, coupled with Guilford County's history with natural disasters, it is expected that the current and future political climates are favorable for supporting and advancing future hazard mitigation strategies.

5.4 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 Guilford County to implement hazard mitigation actions.

The overall capability to implement hazard mitigation actions varies among the participating jurisdictions. For planning and regulatory capability, the majority of the jurisdictions are in the moderate range. There is also some variation in the administrative and technical capability among the jurisdictions with larger jurisdictions generally having greater staff and technical resources. All of jurisdictions are in the limited range for fiscal capability.

Table 5.7 shows the results of the capability assessment using the designed scoring methodology. The capability score is based on the information found in the existing hazard mitigation plan and readily available on the jurisdictions' government websites. This information was then reviewed by

all jurisdictions. According to the assessment scoring, the average capability score was 39.5.

TABLE 5.7: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
GUILFORD COUNTY	53	**High**
Gibsonville	37	**Moderate**
Greensboro	50	**High**
High Point	45	**High**
Jamestown	35	**Moderate**
Oak Ridge	38	**Moderate**
Pleasant Garden	35	**Moderate**
Sedalia	34	**Moderate**
Stokesdale	33	**Moderate**
Summerfield	42	**High**
Whitsett	32	**Moderate**

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

5.4.1 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 Hazard Mitigation Planning Team considered not only each jurisdiction's level of hazard risk, but also their existing capability to minimize or eliminate that risk.

SECTION 6
MITIGATION STRATEGY

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

- 6.1 Introduction
- 6.2 Mitigation Goals
- 6.3 Identification and Analysis of Mitigation Techniques
- 6.4 Piedmont Together Adaptation Strategies
- 6.5 Selection of Mitigation Techniques for Guilford County
- 6.6 Plan Update Requirement

6.1 INTRODUCTION

The intent of the Mitigation Strategy is to provide Guilford County with the goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of mitigation techniques available to meet those goals and reduce the impact of identified hazards. It is designed to be comprehensive, strategic, and functional in nature:

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

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

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

The third and last step in designing the Mitigation Strategy is the selection and prioritization of specific mitigation actions for Guilford County and its municipalities (provided separately in Section 9: *Mitigation Action Plan*). The county and each participating jurisdiction has its own Mitigation Action Plan (MAP) that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process.

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

In preparing each Mitigation Action Plan for Guilford County, 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.

6.1.1 Mitigation Action Prioritization

Prioritization of the proposed mitigation actions was based on the following six factors:

- Effect on overall risk to life and property
- Ease of implementation
- Political and community support
- A general economic cost/benefit review[1]
- Funding availability
- Continued compliance with the NFIP

The point of contact for each jurisdiction helped coordinate the prioritization process by reviewing each

[1] A general economic cost/benefit review was considered by the Hazard Mitigation Planning Team through the process of selecting and prioritizing mitigation actions as recommended by FEMA guidance. Mitigation actions with "high" priority were determined to be the most cost effective and most compatible with the participating jurisdictions' unique needs. Actions with a "moderate" priority were determined to be cost-effective and compatible with jurisdictional needs, but may be more challenging to complete administratively or fiscally than "high" priority actions. Actions with a "low" priority were determined to be important community needs, but the community likely identified several potential challenges in terms of implementation (e.g. lack of funding, technical obstacles). A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.

action and working with the lead agency/department responsible to determine a priority for each action using the six factors listed above.

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

6.2 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.

One of the primary goals of all local governments is generally to promote the public health, safety, and welfare of its citizens. In keeping with this standard, Guilford County and the participating municipalities have developed four goal statements for local hazard mitigation planning in the county. In developing these goals, the previous hazard mitigation plan was reviewed to determine if the goals remained applicable. The existing goals were presented, reviewed, voted on, and accepted by the Hazard Mitigation Planning Team (all of the goals remain unchanged). Each goal, purposefully broad in nature, serves to establish parameters that were used in developing mitigation actions. The Guilford County Mitigation Goals are presented in **Table 8.1**. Consistent implementation of actions over time will ensure that community goals are achieved.

TABLE 6.1: GUILFORD COUNTY MITIGATION GOALS

	Goal
Goal #1	Increase the internal capabilities of Guilford County and its municipalities to mitigate the effects of natural, biological, technical, and man-made hazards
Goal #2	Enhance existing or implement new County, City, and Town policies that will reduce the potential damaging effects of hazards without hindering other community goals.
Goal #3	Protect the most vulnerable populations, public buildings, and critical facilities in Guilford County, and its municipalities, through the implementation of cost-effective and technically-feasible mitigation projects.
Goal #4	Protect public health, safety, and welfare by increasing the public awareness of existing hazards and by enhancing both individual and public responsibility in mitigating risks due to those hazards throughout Guilford County and its municipalities.

6.3 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 Guilford County, 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 Guilford County Hazard Mitigation Planning Team meetings. In general, all activities considered by the Hazard Mitigation Planning Team can be classified

under one of the following six broad categories of mitigation techniques: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, and Public Awareness and Education. These are discussed in detail below.

6.3.1 Prevention

Preventive 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 preventive 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

6.3.2 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

6.3.3 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

6.3.4 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

6.3.5 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

6.3.6 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

6.4 PIEDMONT TOGETHER CLIMATE ADAPTATION STRATEGIES

The *Piedmont Together Climate Adaptation Report* identifies strategies that will be necessary to ensure the health of the Piedmont Triad's people, economy, and ecosystems as the region grows to 2 million people and North Carolina ascends to a greater role nationally with its greater constituency. Although the strategies listed below in **Table 8.2** are not official actions included in the Hazard Mitigation Plan (Section 9: *Mitigation Action Plan*), they are potential strategies that can be considered by Guilford County and its municipalities to help to reduce the impacts and risks of climate change.

TABLE 6.2: RESILIENCE STRATEGIES FROM PIEDMONT TOGETHER CLIMATE ADAPTATION REPORT

Piedmont Together Resilient Climate Adaptation Strategy		
Goal	**Objective**	**Example Strategy**
Decrease the Piedmont Triad's Vulnerability to Climate Change	Decrease the Piedmont Triad's Vulnerability to Extreme Heat	Update county hazard mitigation plans to include extreme heat response strategies
	Decrease the Piedmont Triad's Vulnerability to Frozen Precipitation and Extreme Low Temperatures	Focus household weatherization programs on vulnerable populations
	Protect the Piedmont Triad's Water Supply and Quality	Develop source water protection plans for all drinking water sources
	Protect the Piedmont Triad's Air Quality	Promote and support the enhancement of the available alternative transportation infrastructure to reduce vehicle miles traveled
	Preserve Piedmont Triad Plants, Trees and Natural Landscapes	Enhance urban forest canopies so that all Triad municipalities have a 40% canopy cover
	Decrease the Piedmont Triad's Vulnerability to Wildfires	Partner with the county EMS and the NC Division of Parks and Recreation staffs to improve public awareness of wildfire risks
	Reduce the Vulnerability of Piedmont Triad Residents to Health Risks	Work with hospitals to monitor and respond to extreme heat conditions
	A Climate-Educated Piedmont Triad Public	Share Piedmont Together work with vested parties and develop a public engagement campaign
	Plan for Future Challenges	Adopt a regional green infrastructure plan to anticipate needs an mitigate their impacts to the public and ecology

Reduce Energy Consumption	Retrofit Commercial and Industrial Buildings	Develop weatherization program that targets those most vulnerable to extreme weather events
	Increase the Use of Energy-Efficient Appliances	Collaborate with retail partners to build upon existing appliance buy-back programs
	Promote Energy Reduction Through Water Conservation	Develop leak detection programs for water utility in the region
	Streamline Resources	Work with public and private sector partners to make structural and programmatic retrofits simpler and easier to implement
	Promote Clean and Renewable Energy Sources	Diversify the sources of energy generation used by power plants
	Improve Transportation Options	Promote transit-oriented development patterns
	Reduce Waste and Industrial Pollution	Switch to newer, less-toxic refrigerants

Additionally, many organizations in the Piedmont Triad, such as the Dan River Basin Association (DRBA), North Carolina Interagency Leadership Team, US Centers for Disease Control (CDC), and the National Oceanic and Atmospheric Administration (NOAA), have begun implementing climate adaptation strategies. Additional details on these strategies can be found in the *Piedmont Together Climate Adaptation Report*.

6.5 SELECTION OF MITIGATION TECHNIQUES FOR GUILFORD COUNTY

In order to determine the most appropriate mitigation techniques for the communities in Guilford County, the Hazard Mitigation Planning Team 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).

6.6 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the Mitigation Actions identified in the previous plans were evaluated to determine their 2020 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 2020 planning process.

SECTION 7
MITIGATION ACTION PLAN

This section includes the listing of the mitigation actions proposed by the participating jurisdictions in Guilford County. It consists of the following two subsections:

- 7.1 Overview
- 7.2 Mitigation Action Plans

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44 CFR Requirement
44 CFR Part 201.6(c)(3)(iii): The mitigation strategy shall include an action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction.

7.1 OVERVIEW

As described in the previous section, the Mitigation Action Plan, or MAP, provides a functional plan of action for each jurisdiction. It is designed to achieve the mitigation goals established in Section 8: *Mitigation Strategy* and will be maintained on a regular basis according to the plan maintenance procedures established in Section 10: *Plan Maintenance*.

Each proposed mitigation action has been identified as an effective measure (policy or project) to reduce hazard risk for Guilford County. Each action is listed in the MAP in conjunction with background information such as hazard(s) addressed and relative priority. Other information provided in the MAP includes potential funding sources to implement the action, should funding be required (not all proposed actions are contingent upon funding). Most importantly, implementation mechanisms are provided for each action, including the designation of a lead agency or department responsible for carrying the action out as well as a timeframe for its completion. These implementation mechanisms ensure that the Guilford County Multi-Jurisdictional 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 in Section 8.

The Mitigation Action Plan is organized by mitigation strategy category (Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, or Public Education and Awareness). The following are the key elements described in the Mitigation Action Plan:

- Hazard(s) Addressed—Hazard which the action addresses.

- Relative Priority—High, moderate, or low priority as assigned by the jurisdiction.
- Lead Agency/Department—Department responsible for undertaking the action.
- Potential Funding Sources—Local, State, or Federal sources of funds are noted here, where applicable.
- Implementation Schedule—Date by which the action should be completed. More information is provided when possible.
- Implementation Status (2026)—Indication of completion, progress, deferment, or no change since the previous plan. If the action is new, that will be noted here.

7.2 MITIGATION ACTION PLANS

The mitigation actions proposed by each of the participating jurisdictions are listed in 11 individual MAPs on the following pages. **Table 9.1** shows the location of each jurisdiction's MAP within this section as well as the number of mitigation actions proposed by each jurisdiction.

TABLE 7.1: INDIVIDUAL MAP LOCATIONS

Location	Page	Number of Mitigation Actions
Guilford County	**7:3**	**26**
Gibsonville	7:11	21
Greensboro	7:17	20
High Point	7:23	21
Jamestown	7:31	19
Oak Ridge	7:39	19
Pleasant Garden	7:45	20
Sedalia	7:51	19
Stokesdale	7:56	19
Summerfield	7:62	24
Whitsett	7:68	19

Guilford County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All hazards	High	Guilford County Information Technology	NC DEM	2031	The county continues to maintain appropriate layers and has installed cloud-based, data access paths. These pathways are currently being expanded, so this action will remain in place.
P-2	Regularly calculate and document the amount of flood prone property that is preserved as open space for additional credit points under the Community Rating System (CRS).	Flooding	High	Guilford County Planning & Development Dept-Watershed Section(NFIP/CRS)	Local	2031	The Guilford County Planning & Development Department in coordination with the GIS Dept continues to calculate and document the amount of flood prone property that is preserved as open space for additional CRS points.
P-3	Identify the county's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All hazards	Moderate	Guilford County Emergency Management	NC DEM; others as available	2031	The county frequently attempts to update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county attempts to identify potential mitigation actions to reduce risk to these facilities. The county will continue to carry out the update process going forward.
P-4	Identify and evaluate funding streams to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities, infrastructure damaged by natural hazards, and other mitigation projects.	All hazards	Moderate	Guilford County Emergency Services	Local	2031	The county works across departments to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-5	Invest in cyber security equipment and training to mitigate future cyber incidents.	Cyber-Threat	High	Guilford County Information Technology	Local	2031	Guilford County continues to advance and mature it's Cyber Security and compliance program. Regulation 33, Information Technology Acceptable Use Policy was approved by the board on November 21st, 2024 effective January 1st, 2025. In 2024, the county adopted a new Endpoint Security Solution that unified EDR, MDR and XDR capabilities under one platform ensuring continuous endpoint monitoring and rapid incident response through automation and artificial intelligence. The county made significant progress toward its goal of 100% employee enrollment in MFA. Currently, 98% of all Guilford County users are actively using a MFA to protect their credentials. For 2025, the county is continuing to invest in implementing processes and technologies designed to identify and block advanced cyber-attacks, proactively identify and address vulnerabilities and establish Identity and Access Management program.
P-6	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-7	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to acquire and preserve parcel land subject to repetitive flooding from willing and voluntary property owners. The county will also consider other residential mitigation projects such as elevation and mitigation reconstruction	Flooding	High	Guilford County Planning & Development Dept-Watershed Section(NFIP/CRS)	FEMA; NC DEM	2031	The County continues to update its Repetitive Loss (RL) properties list (list is private and not shared with 3rd parties per ISAA between FEMA and Guilford County) and includes the RL properties and nearby properties (the RL area) on mailings with information on federal flood assistance and flood protection measures. The County assisted property owners with applications for (2) Hazard Mitigation Grant Program (HMGP) grants that were for property acquisition & demolition of (2) parcels under the Hurricane Florence HMGP. These properties have been acquired and the houses demolished. Awaiting final grant closeout

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PP-2	Research and implement, if feasible, zoning regulations for critical facilities (schools and/or other vulnerable population facilities) located near hazardous materials and pipeline locations.	Hazardous Substances	High	Guilford County Planning and Development, Information Technology, and Emergency Management	Local	2031	The Comprehensive Plan was adopted by the Board of County Commissioners in September 2025 and includes the protection of sensitive areas and planning for an increase in flooding. It also sets forth goals, policies, and programs intended to guide the present and future physical, social, and economic development of the unincorporated area of Guilford County. The future land use map uses text and maps to designate the future use or reuse of land and is intended to guide coordinated, efficient, and orderly development based on an analysis of present and future needs.
PP-3	Research and implement, if feasible, residential sprinkler code in Guilford County	Wildfire	Moderate	Guilford County Fire Marshal's Office	Local	2031	No real changes with this. It is still a priority within several associations in the state. The North Carolina Fire Marshal's office and NC Sprinkler Coalition are working on ways to address this item moving forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PP-4	Research and create a Historic Preservation Plan.	All hazards	Moderate	Guilford County Planning and Development	Local	2031	The County currently is working on its Guiding Guilford Comprehensive Plan (tentatively schedule for adoption by the Board of Commissioners in 2025) that sets forth goals, policies, and programs intended to guide the present and future physical, social, and economic development of the unincorporated area of Guilford County. Additionally, the proposed future land use map uses text and maps to designate the future use or reuse of land and is intended to guide coordinated, efficient, and orderly development based on an analysis of present and future needs.
PP-6	Research grant funding opportunities for alternate power sources for critical facilities.	All Hazards	Moderate	Guilford County Emergency Management	Various	2031	Little progress has been made on this action since the last plan update as grant opportunities have not been available. The county will continue to research opportunities to implement this action.
Structural Projects							
SP-1	Research safe room grant opportunities to construct safe rooms in schools and vulnerable population locations.	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management	Various	2031	Little progress has been made on this action since the last plan update as grant opportunities have not been available. The county will continue to research opportunities to implement this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
SP-2	Research and implement, if feasible, a local building code that requires new and modified commercial buildings to install communication repeaters/amplifiers within the structure to augment public safety radio systems.	Communications Systems Disruption/Failure	Moderate	Guilford County Emergency Management	Local	2031	Final acceptance testing was completed in September 2025. Also, we have 2 new systems approved and operational in 2 new schools. On a county wide level, we have created unified policies related to these systems and are working very closely with METRO and the Radio Shop on an ongoing basis. We have made some code changes at the state level and are getting ready to take another look at some more potential updates in the near future.
Emergency Services							
ES-1	Develop a Flood Response Plan to address the specific response to flooding events within the county.	Flooding	High	Guilford County Emergency Management	Local	2031	Little progress has been made on this action. The county will continue to research opportunities to implement this action.
ES-2	Offer additional training to law enforcement officers regarding civil disturbances and provide necessary equipment to officers.	Civil Disturbance	High	Guilford County Sheriff's Office	Local	2031	The Sheriff's Office Civil Disorder Unit is in operational status and it continues to train monthly.
ES-3	Develop targeted warning messages for the inundation zones of all high hazard dams.	Dam Failure	High	Guilford County Emergency Management	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Public Education and Awareness							
PEA-1	Promote the availability of flood insurance to County and City property owners.	Flooding	High	Guilford County Planning & Development Dept-Watershed Section(NFIP/CRS)	Local	2031	The County makes efforts to promote the availability of flood insurance to property owners, especially those located in the floodplain or other flood prone areas. The County provides insurance info in annual letters to property owners in areas of Repetitive Loss, and to property owners, real estate agents and consultants when inquiries are requested on properties in or near floodplains.
PEA-2	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County Planning & Development Dept-Watershed Section(NFIP/CRS)	Local	2031	Guilford County continues to send annual letters to the Repetitive Loss area properties with information regarding federal flood assistance programs and flood protection measures.
PEA-3	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management	Local	2031	Guilford County Emergency Management participated in a variety of public education activities in 2023, including preparedness presentations, awareness events, and social media campaigns.
PEA-4	Maintain communications with school safety personnel as appropriate. Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management	Local	2031	Guilford County works with stakeholders in the school system to keep them informed of best practices in the industry and to coordinate and educate on critical matters related to disaster preparedness. Further coordination will take place going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-6	Maintain StormReady Community certifications through the National Weather Service as long as the program is available.	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management	Local	2031	Per NWS Raleigh, this program is on hold and Guilford County maintains its certification.
PEA-7	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Guilford County Planning Department	Local	2031	New Action for the 2026 update
PEA-8	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management	Local	2031	New Action for the 2026 update
PEA-9	Research and develop multilanguage translations for GEANI messages.	All Hazards	High	Guilford County Emergency Management	Local	2031	New Action for the 2026 update
PEA-10	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management	Local	2031	New Action for the 2026 update

Town of Gibsonville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Gibsonville Town Planner	State and Federal funding as available	2031	No new updates on status but this is still a high priority for the town. Action to remain in plan.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Gibsonville Town Planner	State and Federal funding as available; Town planning expertise	2031	Starting 5 year Update with Guilford County.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Gibsonville Town Planner	Town planning expertise	2031	As of 2024, the town has worked with the county on a system to identify and document hazards that occur. The town will aim to improve its identification of mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Promote the availability of flood insurance to City property owners.	Flooding	Moderate	Gibsonville Town Planner	Local When Available	2031	The town has made efforts through regular contact with homeowners to encourage the purchase flood insurance and will continue to promote flood insurance for properties in floodplain.
P-5	Prevent encroachments, including fill, new construction, substantial improvements, and other developments within areas designated as floodways or non-encroachment areas	Flooding	Low	Gibsonville Town Planner	Local	2031	Completed during plan review and on site inspections.
P-6	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Gibsonville Town Planner	NC DEM	2031	The town continues to work with the county to maintain appropriate layers and has assisted as the county has installed cloud-based, data access paths.
P-7	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Gibsonville Town Planner	NC DEM; others as available	2031	Risk Assessment completed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-8	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Gibsonville Town Planner	Local	2031	The county works across departments and with the town to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.
P-9	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Gibsonville Town Planner	Local	2031	New Action for the 2026 update
P-10	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Gibsonville Town Planner	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to evaluate and update facilities and infrastructure that may be deemed “High Risk” facilities for various threats.	All Hazards	Moderate	Town of Gibsonville All Departments	Local	2031	Ongoing evaluation. The Town will seek funding to implement mitigation projects for vulnerable facilities and infrastructure.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PP-2	Continue to acquire and preserve parcel land subject to repetitive flooding from willing and voluntary property owners. The county will also consider other residential mitigation projects such as elevation and mitigation reconstruction	Flooding	High	Guilford County Planning and Development Department; Gibsonville Town Planner	FEMA; NC DEM	2031	The county will continue to work with the town to update the Repetitive Loss Properties and include them on the mailings regarding federal flood assistance and flood protection measures. The county has also applied for HMGP grants to acquire parcels and is looking forward to implementing those projects in the future. The county will work with the town to coordinate on potential future projects.
PP-3	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Gibsonville Town Planner	State and Federal funding as available; HMGP	2031	Backup power generator installed for Town Hall in 2023
Public Education and Awareness							
PEA-1	Stormwater Smart Information	Flooding	Moderate	Gibsonville Town Planner	PTRCOG	2031	Gibsonville remains a member of the Stormwater Smart Program and has provided stormwater handouts.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All hazards	High	Guilford County Emergency Management, Gibsonville Town Planner	Local	2031	The county has developed a program aimed at all hazards education and Guilford County Emergency Management has performed presentations multiple times for various community groups. The town will work with the county to disseminate this information and encourage public attendance at these presentations. This action is still relevant and will remain in place.
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Gibsonville Town Planner	Local	2031	The county and town coordinate to make efforts to promote the availability of flood insurance to property owners, especially those located in the floodplain or other flood prone areas. The county and town will continue these efforts going forward.
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Gibsonville Town Planner	Local	2031	Guilford County has relatively few repetitive loss properties and has carried this out for all of these properties where required. The county will continue to work with the town to carry out this action going forward for repetitive loss properties.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; Gibsonville Town Planner	Local	2031	Guilford County and the town will work with stakeholders in the school system to keep them informed of best practices in the industry and to coordinate and educate on critical matters related to disaster preparedness. Further coordination will take place going forward.
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management; Guilford County Planning Department; Gibsonville Town Planner	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Gibsonville Town Planner	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Gibsonville Town Planner	Local	2031	New Action for the 2026 update

City of Greensboro Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	City of Greensboro Planning Department, Information Technology Department, GIS Department	NC DEM	2031	Annual evaluation of opportunities for data validation and collection. City Staff working to acquire new planometric data. No significant updates.
P-2	Regularly calculate and document the amount of structures located in the special flood hazard area and flood prone parcels preserved as open space for the Community Rating System (CRS).	Flooding	High	City of Greensboro Water Resources Department	N/A	2031	Reviewed annually for CRS program . No significant updates.
P-3	Identify the city's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	City of Greensboro Emergency Management Coordinator	NC DEM; others as available	2031	Continuation of report evaluation and implementation of recommendations.
P-4	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services	Local	2031	City staff are researching additional grant opportunities as the HMGP grants are closed out and finalized.
P-5	Revise the Flood Damage Prevention Ordinance on as needed basis	Flooding	High	City of Greensboro	Local	2031	Staff continues to evaluate and adapt necessary ordinance updates in compliance with NCDEQ and FEMA relations for flood damage prevention.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-6	Invest in cyber security equipment and training to mitigate future cyber incidents. This includes deploying Malware prevention technology to detect zero-day and advanced persistent threats and gain visibility into advanced threat activity. Additionally, IT Security offers and conducts security awareness and training to all of the departments (onsite and online), sends monthly security bulletins (advisories) and sometimes alerts via email as needed, as well as a quarterly Cyber Security newsletter to the organization. The City now has Cyber Liability Insurance for the organization in the case of a breach that provides an end-to-end risk management solution to stay ahead of the curve of cyber risk and offers additional services that provide loss prevention tools to educate (training portal IT Security can use) and potentially prevent a breach.	Cyber-Threat	High	Greensboro Information Services	Local	2031	The City of Greensboro continues to mature the cyber security and compliance program by implementing processes and technologies to quickly identify and block advanced intrusions and cyber-attacks and ensure compliance to laws, regulations and standards. Detected and blocked a significant number of attacks on the IT system and implemented a system to detect and block new forms of cyber-attacks and increased security measures. Achieved ISO/IEC 27001 recertification and continued to monitor and test the IT systems for threats.
P-7	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Greensboro Fire Department; Greensboro Office of Sustainability	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-8	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Greensboro Fire Department; Greensboro Office of Sustainability; Greensboro Information Services	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners. The city will also consider other residential mitigation projects such as elevation and mitigation reconstruction.	Flooding	High	City of Greensboro Water Resources	FEMA; NC DEM	2031	HMGP funding for two property acquisitions in final stages, properties are being preserved as open space and FMA grant opportunities for RL structures are underway.
PP-3	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	City of Greensboro Emergency Management Coordinator	State and Federal funding as available; HMGP	2031	City of Greensboro is working with facilities and city departments to identify areas of improving continuity of operations during emergencies. Power supply to facilities for both critical functions and emergency operations

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Emergency Services							
ES-1	Inventory and evaluate the City's emergency response activities. Identify the resources needed to accomplish specific response activities. Reviews shall include the needs of personnel, equipment, and required resources for emergency deployment.	All Hazards	Moderate	City of Greensboro Fire, GDOT and Police Departments	Local	2031	City of Greensboro updates major emergency plans. The focus in 2024 was Critical Communications.
ES-2	Offer additional training to law enforcement officers regarding civil disturbances and provide necessary equipment to officers.	Civil Disturbance	High	Greensboro Police Department	Local	2031	GPD provides initial Civil Disturbance training in the recruit academy. GPD continues to train and exercise in response to Civil Disturbances and rosters 150 personnel to Mobile Field Force team that performs quarterly training.
Public Education and Awareness							
PEA-1	Advertise and promote the availability of flood insurance to property owners that are located in flood hazard areas. Continue to review FEMA-identified repetitive loss properties for potential mitigation through the federal Flood Mitigation Assistance (FMA) program or other flood protection measures.	Flooding	High	City of Greensboro	Local when available	2031	Annual mailings to all properties within the SFHA, relators, lenders, and insurance agencies and flood brochures available at municipal facilities and libraries.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-2	As new Repetitive Loss Properties are identified within the City of Greensboro, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	City of Greensboro Water Resources Department	Local	2031	Annual mailings to all repetitive loss properties and brochures available at municipal facilities and libraries.
PEA-3	Continue to collect education materials to create and distribute pamphlets to educate the public on family preparedness as well as mitigation measures that are available to property owners. Maintain space for education materials at the following public locations; the City Library and designated City Facilities.	Flooding	High	City of Greensboro	Local	2031	Mailings to all properties within the SFHA, brochures available at municipal facilities and libraries.
PEA-4	Continue to provide technical assistance for property owners located in flood hazard areas.	Flooding	High	City of Greensboro Water Resources Department	Local	2031	Technical assistance is provided for property owners located in flood hazard areas and is advertised to local relators and insurance agents through annual mailings and in the newsletter to citizens.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; City of Greensboro Emergency Management Coordinator	Local	2031	Greensboro is working closely with GCEM and GC School system and continue improving plans.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Greensboro Water Resources; Greensboro Fire; Greensboro Planning and Development	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	City of Greensboro	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	City of Greensboro	Local	2031	New Action for the 2026 update

City of High Point Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to identify areas in the city subject to repetitive flooding and institute mitigation measures as funds allow.	Flooding	High	City of High Point Public Services Department	Local	2031	Ongoing process. The Town will seek funding for mitigation projects as needed.
P-2	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	High Point IS; City of High Point Public Services	NC DEM	2031	The city continues to work with the county to maintain appropriate layers and has assisted as the county has installed cloud-based, data access paths. These pathways are currently being expanded, so this action will remain in place.
P-3	Identify the city's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; City of High Point Public Services	NC DEM; others as available	2031	The county works with the city to frequently update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county and city attempt to identify potential mitigation actions to reduce risk to these facilities. The county and city will continue to carry out the update process going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; City of High Point Public Services	Local	2031	The county works across departments and with the city to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.
P-5	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	City of High Point	Local	2031	New Action for the 2026 update
P-6	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	High Point Fire; High Point IS	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to update City of High Point facilities and infrastructure to identify "High Risk" facilities for various threats. As budgetary resources allow, redefine the criteria and evaluate the aid of establishment of protective measures that may be required to mitigate and respond to incidents within the high risk facilities.	All Hazards	Moderate	All City of High Point Departments	Local	2031	The city has worked to identify facilities that may be at high risk to various threats and will continue to evaluate and mitigate, where possible, facilities and infrastructure that are in high risk areas.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PP-2	Each city department should have an established system to identify potential hazards within their supervised departments. This system should provide for mitigation strategies of known hazards in the department's planning and budget processes as needed. The list of hazard mitigation needs should be periodically revised and updated.	All Hazards	Moderate	All City of High Point Departments	Local	2031	The city has acted at the departmental level to identify potential hazards, but this action will require consistent supervision.
PP-3	Continue to acquire and preserve parcel land subject to repetitive flooding from willing and voluntary property owners. The county will also consider other residential mitigation projects such as elevation and mitigation reconstruction	Flooding	High	Guilford County Planning and Development Department; City of High Point Public Services	FEMA; NC DEM	2031	The county will continue to work with the city to update the Repetitive Loss Properties and include them on the mailings regarding federal flood assistance and flood protection measures. The county has also applied for HMGP grants to acquire parcels and is looking forward to implementing those projects in the future. The county will work with the city to coordinate on potential future projects.
PP-4	Pursue grant funding as possible to allow for the purchase and installation of generators at critical facilities lacking same	All Hazards	High	Federal, State	Led by OEM, departments with such facilities assisting	2031	An HGMP grant for a generator at an emergency shelter has been completed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Structural Projects							
SP-1	Continue utility pole inspection program	Energy/Power/ Utility Failure	Medium	Local	Electric Utilities	2031	The program is in place and the city continues to identify areas for improvement.
Emergency Services							
ES-1	Inventory and evaluate the City's emergency response activities. Identify the resources needed to accomplish specific response activities. Reviews shall include the needs of personnel, equipment, and required resources for emergency deployment.	All Hazards	Moderate	City of High Point Fire and Police Departments	Local	2031	On going process of updating plans and procedures. This action will remain in the plan
ES-2	Continue to receive intelligence on law enforcement/security matters and monitor developments/best practices for management of same	All Hazards	High	Local	Police Department	2031	The city is continuing to communicate with agencies at all levels of government concerning intelligence matters. The city will continue efforts in maintaining lines of coordination and ensure we are up to date on best practices.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Public Education and Awareness							
PEA-1	Advertise and promote the availability of flood insurance to property owners that are located in flood hazard areas. Continue to review FEMA-identified repetitive loss properties for potential mitigation through the federal Flood Mitigation Assistance (FMA) program or other flood protection measures.	Flooding	High	City of High Point Public Services Department	FEMA	2031	The city has made efforts through regular contact with homeowners to encourage the purchase flood insurance and will continue to promote flood insurance for properties in floodplain. Additionally, the City's public outreach project consists of flood informational inserts with water bills. Topics covered include a Flood Risk Map, Flood Safety, Property Protection Measures. We also run three educational programs on our local television channel. The City's public library maintains flood protection materials provided by FEMA.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-2	Continue to collect education materials as budgeting will allow for pamphlets to educate the public on family preparedness as well as mitigation measures that are available to property owners. These pamphlets shall be posted on the High Point Emergency Management Website and will remain on display for the public at the following locations: the City Library, Public Services, and the Fire Department/City's Office of Emergency Management as budget and conditions allow.	All Hazards	High	City of High Point Fire Department/ Emergency Management	Local	2031	We are exploring options to best build-out this program. This is in addition to previous and continuing ongoing efforts and programs from past years, many of which will be continued going forward.
PEA-3	Update the educational pamphlet on the ICC (Increased Cost of Compliance) and how it associates with the policy holders within the City of High Point. This informational pamphlet should be distributed to the city property owners that receive substantial damage during a flood type event.	Flooding	High	City of High Point Fire Department and Public Services	Local	2031	The city has made great efforts to educate the public on flood-related issues through various pamphlets and documents, including the ICC pamphlet. Most of these educational documents will need to be updated regularly, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; City of High Point Emergency Management and Public Services	Local	2031	Guilford County has relatively few repetitive loss properties and has carried this out for all these properties where required. The county will continue to work with the city to carry out this action going forward for repetitive loss properties.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; City of High Point Emergency Management and Public Services	Local	2031	Guilford County and he city will work with stakeholders in the school system to keep them informed of best practices in the industry and to coordinate and educate on critical matters related to disaster preparedness. Further coordination will take place going forward.
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	High Point Engineering Services; High Point Fire Department	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	City of High Point	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	City of High Point	Local	2031	New Action for the 2026 update

Town of Jamestown Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Town of Jamestown Town Clerk	State and Federal funding as available	2031	As of 2024, the town is a participant in the NFIP and will continue to work towards meeting all requirements of the NFIP going forward and will work to make improvements to its participation as described.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Town of Jamestown Town Clerk	State and Federal funding as available; Town planning expertise	2031	The town has been an active participant in the 2024 update of the hazard mitigation plan and will take an active role in future updates. The town will also work to implement the identified improvements to the plan in the interim between update cycles.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Town of Jamestown Town Clerk	Town planning expertise	2031	As of 2024, the town has worked with the county on a system to identify and document hazards that occur. The town will aim to improve its identification of mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Town of Jamestown Town Clerk	NC DEM	2031	The town continues to work with the county to maintain appropriate layers and has assisted as the county has installed cloud-based, data access paths. These pathways are currently being expanded, so this action will remain in place. The town continues to update its GIS data to be more up to date and user-friendly.
P-5	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Town of Jamestown Town Clerk	NC DEM; others as available	2031	The county works with the town to frequently update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county and town attempt to identify potential mitigation actions to reduce risk to these facilities. The county and town will continue to carry out the update process going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-6	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Town of Jamestown Town Clerk	Local	2031	The county works across departments and with the town to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action. The Town of Jamestown hired a Grant Administrator in 2023 that is pursuing grants for various facilities and infrastructure projects.
P-7	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Town of Jamestown	Local	2031	New Action for the 2026 update
P-8	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Town of Jamestown	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Property Protection							
PP-1	Continue to identify potential mitigation projects (e.g. acquisition, elevation, reconstruction, etc) and continue to require floodplain dedication.	Flooding	Moderate	Town of Jamestown Town Clerk	Local	2031	The town has not implemented any major mitigation projects in recent years, but will continue to work with the county to identify potential mitigation projects that may help reduce flood risk.
PP-2	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Town of Jamestown Town Clerk	State and Federal funding as available; HMGP	2031	The town completed the backup power installation at Town Hall, which should provide power to all critical parts of the building during a prolonged power outage. All mobile town generators and facilities were updated to have compatible generator connections. An existing generator was taken out of service and retrofitted, so the town has two back up mobile generators capable of providing power to Town Hall or any lift station.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Structural Projects							
SP-1	Support county as it researches safe room grant opportunities to construct safe rooms in schools and vulnerable population locations.	Tornadoes and Thunderstorms	Moderate	Town of Jamestown Town Clerk	Various	2031	Little progress has been made on this action since the last plan update as grant opportunities have not been available. The town will continue to work with the county to research opportunities to implement this action.
Public Education and Awareness							
PEA-1	Work with Guilford County to promote education and awareness through Town website and Facebook	All Hazards	High	Town of Jamestown Town Clerk	Local	2031	The town has worked to increase public awareness of hazards and potential mitigation measures. The town will continue to promote public education efforts in the future using multiple methods such as posting weather updates, emergency declarations, etc. on website and Facebook.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management, Town of Jamestown Town Clerk	Local	2031	The county has developed a program aimed at all hazards education and Guilford County Emergency Management has performed presentations multiple times for various community groups. The town will work with the county to disseminate this information and encourage public attendance at these presentations. This action is still relevant and will remain in place.
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Town of Jamestown Town Clerk	Local	2031	The county and town coordinate to make efforts to promote the availability of flood insurance to property owners, especially those located in the floodplain or other flood prone areas. The county and town will continue these efforts going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Town of Jamestown Town Clerk	Local	2031	Guilford County has relatively few repetitive loss properties and has carried this out for all of these properties where required. The county will continue to work with the town to carry out this action going forward for repetitive loss properties.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; Town of Jamestown Town Clerk	Local	2031	Guilford County and the town will work with stakeholders in the school system to keep them informed of best practices in the industry and to coordinate and educate on critical matters related to disaster preparedness. Further coordination will take place going forward.
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Jamestown Public Services	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Town of Jamestown	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Town of Jamestown	Local	2031	New Action for the 2026 update

Town of Oak Ridge Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Town of Oak Ridge Town Clerk	State and Federal funding as available	2031	As of 2024, the town is a participant in the NFIP and will continue to work towards meeting all requirements of the NFIP going forward and will work to make improvements to its participation as described.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Town of Oak Ridge Town Clerk	State and Federal funding as available; Town planning expertise	2031	The town has been an active participant in the 2024 update of the hazard mitigation plan and will take an active role in future updates. The town will also work to implement the identified improvements to the plan in the interim between update cycles.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Town of Oak Ridge Town Clerk	Local	2031	As of 2024, the town has worked with the county on a system to identify and document hazards that occur. The town will aim to improve its identification of mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Town of Oak Ridge Town Clerk	NC DEM	2031	The town continues to work with the county to maintain appropriate layers and has assisted as the county has installed cloud-based, data access paths. These pathways are currently being expanded, so this action will remain in place.
P-5	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Town of Oak Ridge Town Clerk	NC DEM; others as available	2031	The county works with the town to frequently update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county and town attempt to identify potential mitigation actions to reduce risk to these facilities. The county and town will continue to carry out the update process going forward.
P-6	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Town of Oak Ridge Town Clerk	Local	2031	The county works across departments and with the town to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-7	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Town of Oak Ridge Town Clerk	Local	2031	New Action for the 2026 update
P-8	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Town of Oak Ridge Town Clerk	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to identify potential mitigation projects (e.g. acquisition, elevation, reconstruction, etc) and continue to require floodplain dedication.	Flooding	Moderate	Town of Oak Ridge Town Clerk	Local	2031	The town has not implemented any major mitigation projects in recent years, but will continue to work with the county to identify potential mitigation projects that may help reduce flood risk.
PP-2	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Town of Oak Ridge Town Clerk	State and Federal funding as available; HMGP	2031	The Town will continue to work with the County to implement this action as needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Structural Projects							
SP-1	Support county as it researches safe room grant opportunities to construct safe rooms in schools and vulnerable population locations.	Tornadoes and Thunderstorms	Moderate	Town of Oak Ridge Town Clerk	Various	2031	Little progress has been made on this action since the last plan update as grant opportunities have not been available. The town will continue to work with the county to research opportunities to implement this action.
Public Education and Awareness							
PEA-1	Work with Guilford County to promote education and awareness through Town website and Facebook	All Hazards	High	Town of Oak Ridge Town Clerk	Local	2031	The town continues to post weather updates and other emergency information on our website, on Facebook and on Nextdoor.com.
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management, Town of Oak Ridge Town Clerk	Local	2031	The town helps to prepare for hazards by posting information about them on its website and on social media.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Town of Oak Ridge Town Clerk	Local	2031	The county and town coordinate to make efforts to promote the availability of flood insurance to property owners, especially those located in the floodplain or other flood prone areas. The county and town will continue these efforts going forward.
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Town of Oak Ridge Town Clerk	Local	2031	Guilford County has relatively few repetitive loss properties and has carried this out for all of these properties where required. The county will continue to work with the town to carry out this action going forward for repetitive loss properties. No repetitive loss properties are known to exist in Oak Ridge.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; Town of Oak Ridge Town Clerk	Local	2031	The town has partnered with Oak Ridge Elementary School to provide shelter locations at town hall and at the town parks for students should they ever need to vacate the school campus.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Guilford County Planning Department; Town of Oak Ridge Town Clerk	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Town of Oak Ridge Town Clerk	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Town of Oak Ridge Town Clerk	Local	2031	New Action for the 2026 update

Town of Pleasant Garden Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Town of Pleasant Garden Town Clerk	State and Federal funding as available	2031	The Town is a participant in the NFIP and will continue to work towards meeting all requirements of the NFIP and will work to make improvements to its participation as described.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Town of Pleasant Garden Town Clerk	State and Federal funding as available; Town planning expertise	2031	The Town will continue to take an active role in on going and future updates. The Town will work to implement the identified improvements to the plan in the interim between the update cycles.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Town of Pleasant Garden Town Clerk	Town planning expertise	2031	The Town has worked with county to identify and document hazards that occur. The Town will aim to improve its identification of mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Town of Pleasant Garden Town Clerk	NC DEM	2031	The town continues to work with the county to maintain appropriate layers and has assisted as the county has installed cloud-based, data access paths. These pathways are currently being expanded, so this action will remain in place.
P-5	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Town of Pleasant Garden Town Clerk	NC DEM; others as available	2031	The county works with the town to frequently update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county and town attempt to identify potential mitigation actions to reduce risk to these facilities. The county and town will continue to carry out the update process going forward.
P-6	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Town of Pleasant Garden Town Clerk	Local	2031	The county works across departments and with the town to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-7	Continue to research and implement ways to improve water access for firefighting purposes.	Wildfire	High	Town of Pleasant Garden	Local	2027	New Action for the 2026 update
P-8	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Town of Pleasant Garden	Local	2031	New Action for the 2026 update
P-9	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Town of Pleasant Garden	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to identify potential mitigation projects (e.g. acquisition, elevation, reconstruction, etc) and continue to require floodplain dedication.	Flooding	Moderate	Town of Pleasant Garden Town Clerk	Local	2031	The town has not implemented any major mitigation projects in recent years, but will continue to work with the county to identify potential mitigation projects that may help reduce flood risk.
PP-2	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Town of Pleasant Garden Town Clerk	State and Federal funding as available; HMGP	2031	No opportunities determined at this point.
PP-3	Continue to research and implement ways to correct stormwater management issues.	Flooding	High	Town of Pleasant Garden	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Public Education and Awareness							
PEA-1	Provide information, prevention tips, safety ideas, etc. in the town newsletter and on the town website for hazards pertinent to town residents	All Hazards	Moderate	Town of Pleasant Garden Town Clerk	Town	2031	Throughout the years, the Town continues to share pertinent information within the Town's newsletter and website. This is a critical part of outreach, so this action will remain in place.
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management, Town of Pleasant Garden Town Clerk	Local	2031	The county has developed a program aimed at all hazards education and Guilford County Emergency Management has performed presentations multiple times for various community groups. The town will work with the county to disseminate this information and encourage public attendance at these presentations. This action is still relevant and will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Town of Pleasant Garden Town Clerk	Local	2031	The county and town coordinate to make efforts to promote the availability of flood insurance to property owners, especially those located in the floodplain or other flood prone areas. The county and town will continue these efforts going forward.
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Town of Pleasant Garden Town Clerk	Local	2031	Guilford County has relatively few repetitive loss properties and has carried this out for all of these properties where required. The county will continue to work with the town to carry out this action going forward for repetitive loss properties.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; Town of Pleasant Garden Town Clerk	Local	2031	Guilford County and the town will work with stakeholders in the school system to keep them informed of best practices in the industry and to coordinate and educate on critical matters related to disaster preparedness. Further coordination will take place going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Town of Pleasant Garden	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Town of Pleasant Garden	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Town of Pleasant Garden	Local	2031	New Action for the 2026 update

Town of Sedalia Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Town of Sedalia Town Clerk	State and Federal funding as available	2031	As of 2024, the town is a participant in the NFIP and will continue to work towards meeting all requirements of the NFIP going forward and will work to make improvements to its participation as described. No new action taken.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Town of Sedalia Town Clerk	State and Federal funding as available; Town planning expertise	2031	The town has been an active participant in the 2024 update of the hazard mitigation plan and will take an active role in future updates. The town will also work to implement the identified improvements to the plan in the interim between update cycles.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Town of Sedalia Town Clerk	Local	2031	As of 2024, the town has worked with the county on a system to identify and document hazards that occur. The town will aim to improve its identification of mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Town of Sedalia Town Clerk	NC DEM	2031	Continued to utilize GIS tool to help maintain hazard risks and risk assessments
P-5	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Town of Sedalia Town Clerk	NC DEM; others as available	2031	The county works with the town to frequently update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county and town attempt to identify potential mitigation actions to reduce risk to these facilities. The county and town will continue to carry out the update process going forward.
P-6	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Town of Sedalia Town Clerk	Local	2031	The county works across departments and with the town to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.
P-7	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Town of Sedalia Town Clerk	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-8	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Town of Sedalia Town Clerk	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to identify potential mitigation projects (e.g. acquisition, elevation, reconstruction, etc) and continue to require floodplain dedication.	Flooding	Moderate	Town of Sedalia Town Clerk	Local	2031	The Town continues to maintain vigilance in identifying mitigation projects as reconstruction needs increase over time due to erosion.
PP-2	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Town of Sedalia Town Clerk	State and Federal funding as available; HMGP	2031	The Town is planning to add this as an item line in the upcoming budget.
Structural Projects							
SP-1	Support county as it researches safe room grant opportunities to construct safe rooms in schools and vulnerable population locations.	Tornadoes and Thunderstorms	Moderate	Town of Sedalia Town Clerk	Various	2031	The Town is working with a company to help identify grant opportunities. We will continue to actively seek out grants to assist with and support the County in this endeavor.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Public Education and Awareness							
PEA-1	Provide information, prevention tips, safety ideas, etc. in the town newsletter and on the town website for hazards pertinent to town residents	All Hazards	Moderate	Town of Sedalia Town Clerk	Town	2031	The Town continues to provide access to the latest version of the Multi-jurisdictional Hazard Mitigation Plan Update on the Town's website for all citizens review.
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management, Town of Sedalia Town Clerk	Local	2031	Staff continues to participate in hazard education programs within the county and state
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Town of Sedalia Town Clerk	Local	2031	The Town continues to educate residents by providing flood insurance information to those at risk as well as maintaining the most up to date information in the Sedalia Flood Ordinance
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Town of Sedalia Town Clerk	Local	2031	The Town continues to notify property owners within the Sedalia jurisdiction of emerging flood programs and resources.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes	Moderate	Guilford County Emergency Management; Town of Sedalia Town Clerk	Local	2031	The Town is working on developing a collaborative resource that will be a proactive source of education and preparation in the event of a flood.
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Guilford County Planning Department; Town of Sedalia Town Clerk	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Town of Sedalia Town Clerk	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Town of Sedalia Town Clerk	Local	2031	New Action for the 2026 update

Town of Stokesdale Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Town of Stokesdale Town Clerk	State and Federal funding as available	2031	As of 2024, the town is a participant in the NFIP and will continue to work towards meeting all requirements of the NFIP going forward and will work to make improvements to its participation as described.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Town of Stokesdale Town Clerk	State and Federal funding as available; Town planning expertise	2031	The town has been an active participant in the 2024 update of the hazard mitigation plan and will take an active role in future updates. The town will also work to implement the identified improvements to the plan in the interim between update cycles.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Town of Stokesdale Town Clerk	Town planning expertise	2031	As of 2024, the town has worked with the county on a system to identify and document hazards that occur. The town will aim to improve its identification of mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Town of Stokesdale Town Clerk	NC DEM	2031	The town continues to work with the county to maintain appropriate layers and has assisted as the county has installed cloud-based, data access paths. These pathways are currently being expanded, so this action will remain in place.
P-5	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Town of Stokesdale Town Clerk	NC DEM; others as available	2031	The county works with the town to frequently update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county and town attempt to identify potential mitigation actions to reduce risk to these facilities. The county and town will continue to carry out the update process going forward.
P-6	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Town of Stokesdale Town Clerk	Local	2031	The county works across departments and with the town to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-7	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Town of Stokesdale Town Clerk	Local	2031	New Action for the 2026 update
P-8	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Town of Stokesdale Town Clerk	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to identify potential mitigation projects (e.g. acquisition, elevation, reconstruction, etc) and continue to require floodplain dedication.	Flooding	Moderate	Town of Stokesdale Town Clerk	Local	2031	The town has not implemented any major mitigation projects in recent years, but will continue to work with the county to identify potential mitigation projects that may help reduce flood risk.
PP-2	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Town of Stokesdale Town Clerk	State and Federal funding as available; HMGP	2031	The Town will continue to work with the County to implement this action as needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Structural Projects							
SP-1	Support county as it researches safe room grant opportunities to construct safe rooms in schools and vulnerable population locations.	Tornadoes and Thunderstorms	Moderate	Town of Stokesdale Town Clerk	Various	2031	The Town will continue to work with the County to implement this action as needed.
Public Education and Awareness							
PEA-1	Provide information, prevention tips, safety ideas, etc. in the town newsletter and on the town website for hazards pertinent to town residents	All Hazards	Moderate	Town of Stokesdale Town Clerk	Town	2031	Throughout the last several years, the town continued to share pertinent information within the town newsletter and website. This is a critical part of outreach, so this action will remain in place.
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management, Town of Stokesdale Town Clerk	Local	2031	The county has developed a program aimed at all hazards education and Guilford County Emergency Management has performed presentations multiple times for various community groups. The town will work with the county to disseminate this information and encourage public attendance at these presentations. This action is still relevant and will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Town of Stokesdale Town Clerk	Local	2031	The county and town coordinate to make efforts to promote the availability of flood insurance to property owners, especially those located in the floodplain or other flood prone areas. The county and town will continue these efforts going forward.
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Town of Stokesdale Town Clerk	Local	2031	Guilford County has relatively few repetitive loss properties and has carried this out for all of these properties where required. The county will continue to work with the town to carry out this action going forward for repetitive loss properties.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; Town of Stokesdale Town Clerk	Local	2031	Guilford County and the town will work with stakeholders in the school system to keep them informed of best practices in the industry and to coordinate and educate on critical matters related to disaster preparedness. Further coordination will take place going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Guilford County Planning Department; Town of Stokesdale Town Clerk	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Town of Stokesdale Town Clerk	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Town of Stokesdale Town Clerk	Local	2031	New Action for the 2026 update

Town of Summerfield Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Summerfield Planning Department	State and Federal funding as available	2031	As of 2025, the town is a participant in the NFIP and will continue to work towards meeting all requirements of the NFIP going forward and will work to make improvements to its participation as described.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Summerfield Planning Department	State and Federal funding as available; Town planning expertise	2026	Working on UDO and Comp Plan updates. Updates are expected to be completed by 2026.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Town of Summerfield Town Planner	Town planning expertise	2026	Working on UDO and Comp Plan updates. Working on UDO and Comp Plan updates. Expected to be completed by 2026.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Require the installation of underground utilities to minimize outages during winter storms, tornadoes, hurricanes and other wind related storms - residential	Severe Winter Weather/ Tornadoes and Thunderstorms Hurricanes and Coastal Hazards	Moderate	Summerfield Planning Department	Developer installed	Ongoing	May become challenging as state statutes continue to whittle away authority to do this for existing development. Is usually done for new development.
P-5	Explore the installation of underground utilities to minimize outages during winter storms, tornadoes, hurricanes and other wind related storms – all other uses	Severe Winter Weather/ Tornadoes and Thunderstorms Hurricanes and Coastal Hazards	Moderate	Summerfield Planning Department	Joint Town/Developer/Utility Effort	Ongoing	May become challenging as state statutes continue to whittle away authority to do this for existing development. Is usually done for new development.
P-6	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Summerfield Planning Department	NC DEM	2026	Working with Guilford County on possible interlocal agreement to take over GIS services. . Expected to occur in 2026. The County currently provides addressing services for the Town for E-911 purposes.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-7	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Summerfield Planning Department	NC DEM; others as available	Ongoing	Will continue to investigate using Comp Plan update, UDO updates, and other means.
P-8	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Summerfield Planning Department	Local	Ongoing	Dependent upon support from local leaders.
P-9	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Town of Summerfield	Local	2031	New Action for the 2026 update
P-10	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Town of Summerfield	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Property Protection							
PP-1	Continue to identify potential mitigation projects (e.g. acquisition, elevation, reconstruction, etc) and continue to require floodplain dedication.	Flooding	Moderate	Summerfield Planning Department	Local	Ongoing	We use our floodplain development ordinance, as well as education, to address these issues. Our UDO and Comp Plan updates will also address this.
PP-2	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Summerfield Planning Department	State and Federal funding as available; HMGP	Ongoing	Some Town facilities have backup power systems, but Town Hall will eventually need a generator installed. This will be dependent on grant availability and local funding priorities.
Natural Resource Protection							
NRP-1	Modify land regulation to reduce the amount of impervious surfaces and limit uses which may impact surface and groundwater quality	Flooding	High	Summerfield Planning Department	Watershed programs and State Water quality	2026	UDO update is underway. Scheduled to be completed in early 2026.
Structural Projects							
SP-1	Support county as it researches safe room grant opportunities to construct safe rooms in schools and vulnerable population locations.	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management	Various	Ongoing	We can support the County in trying to identify resources, but this is typically handled through the Board of Education, as opposed to the Town level.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Emergency Services							
ES-1	Explore joint ventures with commercial development to acquire water storage capacity for emergency services	Resource Shortage Water	Moderate	Summerfield Planning Department/ consulting engineers	Private/public	2026	Project design is nearing completion. Construction of tower scheduled to begin in early 2026.
ES-2	Identify opportunities to develop new water supply and storage resources used in fire suppression by emergency services.	Resources Shortage - Water	Moderate	Summerfield Planning Department/ consulting engineers	Balance from recent regional water study	2026	Project design is nearing completion. Construction of tower scheduled to begin in early 2026.
Public Education and Awareness							
PEA-1	Develop web pages to add to Community Website for information distribution regarding hazard education, risk awareness, and mitigation techniques.	All Hazards	High	Summerfield Planning Department	Local	Ongoing	summerfieldnc.gov website contains links to pertinent information and plans.
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management, Summerfield Planning Department	Local	Ongoing	We educate through PTRC and Guilford County.
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Summerfield Planning Department	Local	Ongoing	We work with landowners and local realtors to identify flood hazards and to give information on NFIP.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Summerfield Planning Department	Local	Ongoing	We work with landowners and local realtors to identify flood hazards and to give information on NFIP.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; Summerfield Planning Department	Local	Ongoing	Board of Education has its own list of these areas. We can provide assistance as required.
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Summerfield Planning Department	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Town of Summerfield	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Town of Summerfield	Local	2031	New Action for the 2026 update

Town of Whitsett Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Prevention							
P-1	Continue to participate in the NFIP and improve floodplain management within the community. As part of this action the community will evaluate implementing: • Requirements to reduce new construction in SFHAs • Programs to improve information provided to citizens whose homes are located in the floodplain	Flooding	High	Town of Whitsett Town Clerk	State and Federal funding as available	2031	As of 2024, the town is a participant in the NFIP and will continue to work towards meeting all requirements of the NFIP going forward and will work to make improvements to its participation as described.
P-2	Work with the County and State to complete hazard mitigation plan updates. As part of this action, the community will: • Annually evaluate its list of critical facilities for additions or changes • Identify new opportunities for actions that may be included in future plan updates	All Hazards	High	Town of Whitsett Town Clerk	State and Federal funding as available; Town planning expertise	2031	The town has been an active participant in the 2024 update of the hazard mitigation plan and will take an active role in future updates. The town will also work to implement the identified improvements to the plan in the interim between update cycles.
P-3	Continue to identify and document hazard occurrences and potential mitigation projects.	All Hazards	High	Town of Whitsett Town Clerk	Town planning expertise	2031	As of 2024, the town has worked with the county on a system to identify and document hazards that occur. The town will aim to improve its identification of mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-4	Maintain Geographic Information System (GIS) to maintain current cadastral (building/parcel) data for purposes of conducting more detailed hazard risk assessments and for tracking permitting and land use patterns.	All Hazards	High	Guilford County Information Technology; Town of Whitsett Town Clerk	NC DEM	2031	Will periodically access and review GIS to help maintaining hazard risk assessments
P-5	Identify the town's most at-risk vital/critical facilities, and evaluate the potential mitigation techniques for protecting each facility to the maximum extent possible.	All Hazards	Moderate	Guilford County Emergency Management Coordinator; Town of Whitsett Town Clerk	NC DEM; others as available	2031	The county works with the town to frequently update its list of vital/critical facilities, including through the update of this plan. Through these processes, the county and town attempt to identify potential mitigation actions to reduce risk to these facilities. The county and town will continue to carry out the update process going forward.
P-6	Monitor grant opportunities for funding to establish a local reserve fund for repairing and/or incorporating hazard mitigation measures for public facilities and infrastructure damaged by natural hazards.	All Hazards	Moderate	Guilford County Emergency Services; Town of Whitsett Town Clerk	Local	2031	The county works across departments and with the town to evaluate funding streams for various projects and will continue to work on establishing mechanisms to carry out this action.
P-7	Continue to work with stakeholders to implement the extreme temperature action plan and long-term heat resilience strategies.	Excessive Heat	High	Guilford County Emergency Management; Town of Whitsett Town Clerk	Local	2031	New Action for the 2026 update

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
P-8	Continue to work with partners to identify and assess which areas of Guilford County are most vulnerable to extreme heat impacts.	Excessive Heat	High	Guilford County GIS, Guilford County Emergency Management; Town of Whitsett Town Clerk	Local	2031	New Action for the 2026 update
Property Protection							
PP-1	Continue to identify potential mitigation projects (e.g. acquisition, elevation, reconstruction, etc) and continue to require floodplain dedication.	Flooding	Moderate	Town of Whitsett Town Clerk	Local	2031	The town has not implemented any major mitigation projects in recent years, but will continue to work with the county to identify potential mitigation projects that may help reduce flood risk.
PP-2	When available, work with the county and state to invest in generator projects and power redundancy to ensure power availability during hazard events, particularly for critical facilities.	All Hazards	Moderate	Town of Whitsett Town Clerk	State and Federal funding as available; HMGP	2031	Town has purchased and installed a Backup Power Generator to provide Power availability to the Town Hall

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
Structural Projects							
SP-1	Support county as it researches safe room grant opportunities to construct safe rooms in schools and vulnerable population locations.	Tornadoes and Thunderstorms	Moderate	Town of Whitsett Town Clerk	Various	2031	Little progress has been made on this action since the last plan update as grant opportunities have not been available. The town will continue to work with the county to research opportunities to implement this action.
Public Education and Awareness							
PEA-1	Provide information, prevention tips, safety ideas, etc. in the town newsletter and on the town website for hazards pertinent to town residents	All Hazards	Moderate	Town of Whitsett Town Clerk	Town	2031	The Town continues to provide a copy of the most recent version Multi-jurisdictional Hazard Mitigation plan in the Town's office for citizens to review.
PEA-2	Maintain an all-hazards public education program to educate and prepare residents for all hazards identified in Guilford County.	All Hazards	High	Guilford County Emergency Management, Town of Whitsett Town Clerk	Local	2031	Our Town Administrator attended several review and training sessions online for the latest information.
PEA-3	Promote the availability of flood insurance to County and Town property owners.	Flooding	High	Guilford County NFIP/CRS; Town of Whitsett Town Clerk	Local	2031	The Town intends to place on our Web Page how citizens can identify Flood maps and any information on Flood Insurance programs.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2026)
PEA-4	As new Repetitive Loss Properties are identified within the County and municipalities, contact all owners and inform them of the assistance available through the federal flood assistance programs, in addition to other flood protection measures.	Flooding	High	Guilford County NFIP/CRS; Town of Whitsett Town Clerk	Local	2031	The Town intends to place on our Web Page any outreach programs and contact information in the event a Flood Disaster occurs.
PEA-5	Develop outreach program to local school administrators to help them identify sheltering areas for all schools	Tornadoes and Thunderstorms	Moderate	Guilford County Emergency Management; Town of Whitsett Town Clerk	Local	2031	The Town has reached out the GC Fire Marshall to see if this is something we can work together on.
PEA-6	Continue to engage with the owners of high hazard dams to assist with the development and maintenance of response plans.	Dam Failure	High	Guilford County Emergency Management, Town of Whitsett Town Clerk	Local	2031	New Action for the 2026 update
PEA-7	Continue to promote and expand the reach of the Guilford Emergency Alert Notification and Information (GEANI) system.	All Hazards	High	Guilford County Emergency Management; Town of Whitsett Town Clerk	Local	2031	New Action for the 2026 update
PEA-8	Research and implement ways to promote purchasing insurance and the services that the NC Department of Insurance offers pre and post disaster.	All Hazards	High	Guilford County Emergency Management; Town of Whitsett Town Clerk	Local	2031	New Action for the 2026 update

SECTION 8
PLAN MAINTENANCE

This section discusses how the Guilford County Mitigation Strategy and Mitigation Action Plan will be implemented and how the Multi-jurisdictional 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:

- 8.1 Monitoring and Evaluating the Previous Plan
- 8.2 Implementation and Integration
- 8.3 Monitoring, Evaluation, and Enhancement
- 8.4 Continued Public Involvement

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44 CFR Requirement
44 CFR Part201.6(c)(4)(i): The plan shall include a plan maintenance process that includes a section describing the method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle. ***44 CFR Part 201.6(c)(4)(ii):*** The plan maintenance process shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

8.1 MONITORING AND EVALUATING THE PREVIOUS PLAN

Since the previous plan was adopted, each jurisdiction has worked to ensure that mitigation was integrated into local activities and that the mitigation plan was appropriately implemented. The participants jointly outlined a process in the previous mitigation plan for monitoring and evaluating the plan throughout the interim period between plan updates.

All participants were ultimately successful in implementing the monitoring and evaluation processes that were outlined in the previous plan as all eleven jurisdictions participated in annual meetings to discuss the mitigation plan and the priorities that were outlined in it. The specific process is outlined below with an explanation of how the monitoring and evaluating process was carried out, as well as any changes that were identified that would be useful to implement during the next update.

Guilford County
During the 2021-2025 timeframe, the Guilford County Hazard Mitigation Plan included an annual review process and progress report on the plan. This review process was carried out by the Emergency Management Director at the request of the County Manager and Board of County Commissioners. During this review process, the Emergency Management Director solicited comments from all affected county departments and local governments via the hazard mitigation planning team. During this review,

the County Board of Commissioners received a report on the implementation status of the plan which included a review of mitigation actions in the plan and progress that had been made towards completing those actions.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during this time and the HMP planning team generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

The planning team noted that reporting was done on the progress of the plan through the interim review period via annual meetings to discuss these progress reports. Going forward, the planning team will continue to conduct an annual Hazard Mitigation Planning Team meeting every year. This meeting will include monitoring, evaluating, and updating the plan, with particular emphasis on the mitigation actions and progress towards completing those.

8.2 IMPLEMENTATION AND INTEGRATION

Each agency, department, or other partner participating under the Guilford County Multi-Jurisdictional 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. 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 Guilford County Hazard Mitigation Planning Team 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 Guilford County.

Since the previous plan was adopted, each 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 emergency operations plans;
- Integrating information in the mitigation plan into county Geographic Information

Systems; and
- Integrating the mitigation plan into the local reserve fund 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 Hazard Mitigation Planning Team and the 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 Multi-jurisdictional Hazard Mitigation Plan is deemed by the Hazard Mitigation Planning Team to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

8.3 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.

The Hazard Mitigation Planning Team shall meet once every year to evaluate the progress attained and to revise, where needed, the activities set forth in the Plan. This meeting shall be held in the month upon which final plan approval is attained, however, it may be necessary to schedule in the month prior or after in any given year, depending on the schedules of local officials. The findings and recommendations of the Planning Team will be documented in the form of a report that can be shared with interested municipalities, the county, and other stakeholders. The Hazard Mitigation Planning Team 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 Guilford County. The Guilford County Emergency Management Director will be responsible for reconvening the Hazard Mitigation Planning Team for these reviews.

Five Year Plan Review

The Plan will be thoroughly reviewed by the Hazard Mitigation Planning Team every five years to determine whether there have been any significant changes in Guilford County 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 Guilford County/municipal 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 Guilford County Emergency Management Director will be responsible for reconvening the Hazard Mitigation Planning Team 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 Guilford County Multi-jurisdictional Hazard Mitigation Plan will be submitted to the State Hazard Mitigation Officer at North Carolina Emergency Management (NCEM) for final review and approval in coordination with the Federal Emergency Management Agency (FEMA).

Because the plan update process can take several months to complete, and because Federal funding may be needed to update the plan, it is recommended that the five-year review process begin at the beginning of the third year after the plan was last approved. This will allow the participants in the Guilford County Multi-Jurisdictional Hazard Mitigation Plan to organize in order to seek Federal funding if necessary and complete required plan update documentation before the plan expires at the end of the fifth year.

Disaster Declaration

Following a disaster declaration, the Guilford County Multi-jurisdictional 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 Guilford County Emergency Management Director to reconvene the Hazard Mitigation Planning Team 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 Hazard Mitigation Planning Team in a report that will include an evaluation of the effectiveness of the Plan and any required or recommended changes or amendments. The report will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommended strategies to overcome them.

Plan Amendment Process

Plan amendments are sometimes needed before the 5-year plan update takes place. Potential reasons why an update could be needed include the following:

- Errors, inaccuracies, or omissions in the current Plan to include missing or newly identified mitigation actions.
- New issues or needs not addressed in the Plan.

- Changes in data or assumptions used in the Plan.

When an amendment process is needed, the jurisdiction proposing the amendment will share details of the proposed changes with all relevant parties, including affected departments, residents (if needed), businesses (if needed), and North Carolina Emergency Management.

Once the proposed amendment has been circulated, the prosing jurisdiction will coordinate with NCEM and FEMA to adopt the amended plan. Other jurisdictions participating in the plan will not be required to re-adopt the amended plan until the 5-year update.

Incorporation Into Existing Planning Documents

The Guilford County Hazard Mitigation Planning Team intends to make available to all of Guilford County and its municipalities a process by which the requirements of this hazard mitigation plan will be incorporated into other plans. During the planning process for new and updated local planning documents, such as a comprehensive plan, capital improvements plan, or emergency operations plan to name a few examples, Guilford County Emergency Management will provide a copy of the hazard mitigation plan to the advisory committee of each relevant planning document. Guilford County Emergency Management will advise the advisory committee members to ensure that all goals and strategies of new and updated local planning documents are consistent with the hazard mitigation plan and will not increase the risk of hazards or vulnerability of the jurisdictions.

This process will be carried out for each of the planning documents described in *Section 7: Capability Assessment* of this document. It should also be noted that most jurisdictions within the county are participants in the county-level version of each type of plan and do not have stand-alone jurisdictional plans of their own. Therefore, when Emergency Management shares and advises on the hazard mitigation plan, they are acting on behalf of the municipalities. It should be further noted that due to the smaller size of many municipalities, municipal representatives of the Hazard Mitigation Planning Team are often the same person who participates in the update of comprehensive plans, zoning ordinances, and other planning documents. As such, much of the engrained knowledge these officials have gained from participating in the hazard mitigation planning process is transferred to these processes.

Therefore, each municipality's process for integrating the hazard mitigation plan into other planning mechanisms is the same as the county level process because these planning mechanisms are carried out as countywide plans or ordinances and each community's stake in each process is intricately linked.

8.4 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 also be made. These efforts may include, among others:

- Advertising meetings of the Hazard Mitigation Planning Team in local newspapers, public bulletin boards and/or County and municipal office buildings;
- Designating willing and voluntary citizens and private sector representatives as official members of the Hazard Mitigation Planning Team;
- Utilizing local media to update the public on any maintenance and/or periodic review activities taking place;
- Utilizing the websites of participating jurisdictions to advertise any maintenance and/or periodic review activities taking place; and
- Keeping copies of the Plan in public libraries.

Appendix A
PLAN ADOPTION

This appendix includes the FEMA APP Letter and the local adoption resolutions for each of the participating jurisdictions.

Appendix B
PLANNING TOOLS

This appendix includes the following:

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

English-US

Guilford County Hazard Mitigation Plan 2025 Survey

We need your help!

Guilford County and its associated municipalities are working together to become less vulnerable to natural disasters, and your participation in the process is important to us!

County departments, along with local jurisdictions and other partners, are working to update the previous Guilford County Multi-Jurisdictional Hazard Mitigation Plan. This plan identifies and assesses the region's various hazard risks and identifies strategies that determine how to best minimize or manage those risks.

Plan Update Project Website: https://arcg.is/1Gb5ia0

This survey is 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 designed to help lessen the impacts of future hazard events.

NOTE: Survey closes on August 31, 2025

If you have any questions regarding this survey or would like to learn about more ways you can participate in the development in the Guilford County Multi-Jurisdictional Hazard Mitigation Plan, please contact us:

Nathan Slaughter, Project Manager
nslaughter@espassociates.com
ESP Associates

1. Where do you live?*

- ○ Gibsonville
- ○ Greensboro
- ○ High Point
- ○ Jamestown
- ○ Oak Ridge
- ○ Pleasant Garden
- ○ Sedalia
- ○ Stokesdale
- ○ Summerfield
- ○ Whitsett
- ○ Unincorporated Guilford County

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

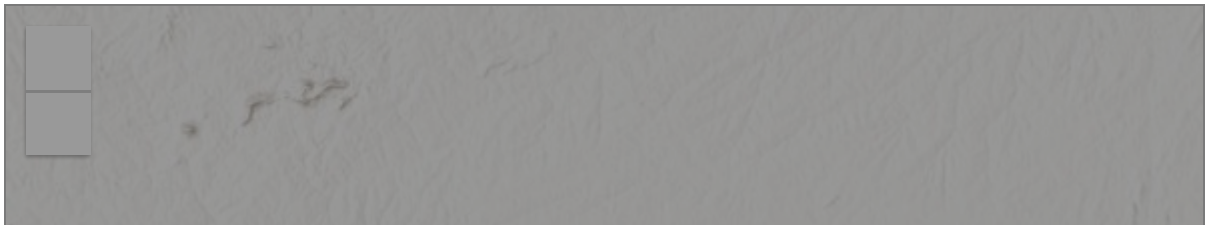
- ○ Yes
- ○ No

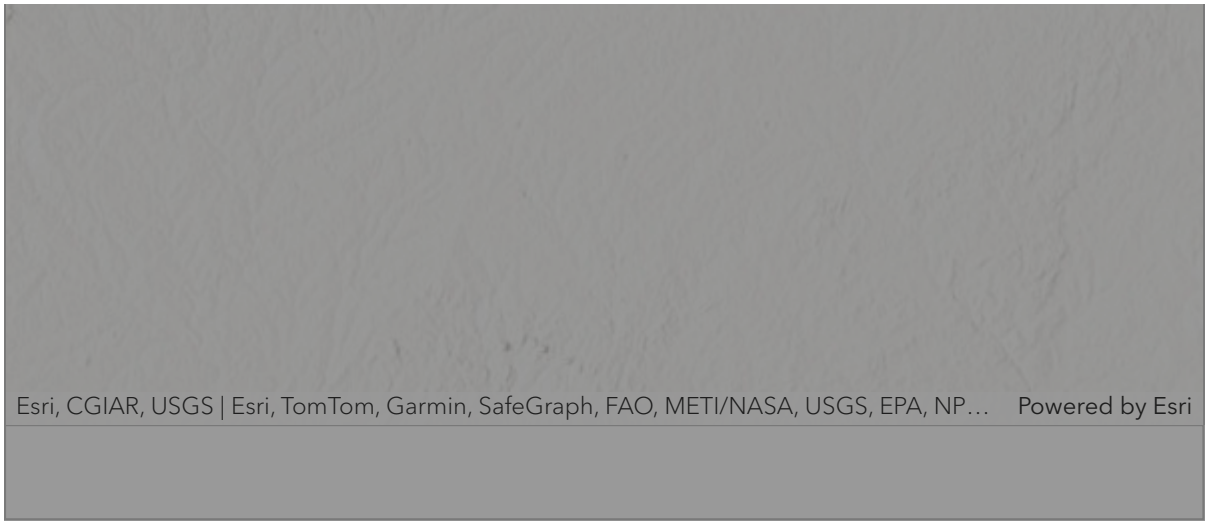
3. If "Yes," please explain below.

1000

4. If you responded "Yes" that you have been impacted by a disaster, please draw a polygon shape on the map below to indicate the approximate area/community.

- **Please also include any relevant descriptions of the hazards or areas** in Question 3 (directly above)!





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

- ○ Extremely concerned
- ○ Somewhat concerned
- ○ Not concerned

6. Please select the one (1) hazard you think is the HIGHEST threat to your neighborhood:*

- ○ Cyberattack
- ○ Civil Disturbance
- ○ Dam Failure
- ○ Drought
- ○ Earthquakes
- ○ Electromagnetic Pulse (EMP)
- ○ Erosion
- ○ Excessive Heat
- ○ Flooding
- ○ Food Emergency
- ○ Hazardous Substances
- ○ Hurricane and Coastal Hazards
- ○ Infectious Disease
- ○ Landslides
- ○ Lightning
- ○ Radiological
- ○ Severe
- ○ Severe Winter

Emergency	Thunderstorms and High Winds	Weather
○ Terrorism	○ Tornadoes	○ Wildfire

7. Please select the one (1) hazard you think is the SECOND HIGHEST threat to your neighborhood:*

○ Cyberattack	○ Civil Disturbance	○ Dam Failure
○ Drought	○ Earthquakes	○ Electromagnetic Pulse (EMP)
○ Erosion	○ Excessive Heat	○ Flooding
○ Food Emergency	○ Hazardous Substances	○ Hurricane and Coastal Hazards
○ Infectious Disease	○ Landslides	○ Lightning
○ Radiological Emergency	○ Severe Thunderstorms and High Winds	○ Severe Winter Weather
○ Terrorism	○ Tornadoes	○ Wildfire

8. Are there any other hazards that you feel pose a wide-scale or

increasing threat to your community? If so, please explain:

Note other previously identified hazards from the 2021 plan:

- Bioterrorism
- Building/Structure Collapse
- Communications System Disruption/Failure
- Energy/Power/Utility Failure
- Pipeline Failure
- Resource Shortage (Water/Fuel)
- Transportation Incident

1000

9. Is your home located in a floodplain?*

- Yes
- No
- I'm not sure

10. Do you have flood insurance?*

- Yes
- No
- I'm not sure

11. If you do not have flood insurance, why not?

- [ ] Not located in floodplain
- [ ] Too expensive
- [ ] Not necessary because it never floods
- [ ] Not necessary because I am elevated or otherwise protected

- [ ] Never really considered it
- [ ] Other

12. If "Other" for not having flood insurance, please explain below:

1000

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

- ( ) Yes
- ( ) No

14. If "Yes," please explain below:

1000

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

- ( ) Yes
- ( ) No

16. Do you know what office to contact to find out more information about how to reduce your risks to hazards in your area?*

- [ ] Yes
- [ ] No

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

- [ ] Newspaper
- [ ] Television
- [ ] Radio
- [ ] Internet (including social media)
- [ ] Mail
- [ ] Public Workshops and Meetings
- [ ] School Meetings

18. Are there any other ways you prefer to receive information? If so, please explain:

1000

19. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?

1000

20. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important? If so, please explain:

1000

21. Prevention - Rules that frame the way the community grows. This includes administrative or regulatory actions around land development and building. Examples include: zoning, building codes, open space preservation or conservation and floodplain regulations.*

- Very important
- Somewhat important
- Not important

22. Property Protection - Changing existing buildings or removing buildings to prevent hazards from damaging them. Examples include: buyouts, relocation, elevation (to protect from floods), making buildings stronger and adding things like storm shutters.*

- Very important
- Somewhat important
- Not important

23. Natural Resource Protection - Preserving areas, or restoring areas to original habitat to perform natural functions. This can be done in addition to minimizing hazard losses. Examples include: habitat preservation, slope stabilization and forest management.*

- Very important
- Somewhat important
- Not important

24. Structural Projects - Projects that lessen the impact of a hazard by changing the natural progression of the hazard. Examples include: dams, levees, retention ponds, retaining walls and storm sewers.*

Very important	Somewhat important	Not important

25. Emergency Services - Actions that protect people and/or protect property during and immediately after a hazard event. Examples include: planning for evacuation, warning systems or protecting or reinforcing emergency facilities or systems.*

Very important	Somewhat important	Not important

26. Public Education and Awareness - Actions that inform people about hazards and how they can protect themselves, their family and their property. Examples include: outreach/media campaigns, school education programs, written materials and special events.*

Very important	Somewhat important	Not important

27. Name?

28. Position/Organization?

29. Email?

Submit

Powered by ArcGIS Survey123

Local Capability Assessment Survey

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

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

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

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

Local Capability Assessment Survey

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

Local Capability Assessment Survey

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

Staff / Personnel Resources	Yes	No	Department / Agency	Comments
Planners with knowledge of land development and land management practices				
Engineers or professionals trained in construction practices related to buildings and/or infrastructure				
Planners or engineers with an understanding of natural and/or human-caused hazards				
Emergency manager				
Floodplain manager				
Land surveyors				
Scientist familiar with the hazards of the community				
Staff with education or expertise to assess the community's vulnerability to hazards				
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program				
Resource development staff or grant writers				

Local Capability Assessment Survey

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

Financial Resources	Yes	No	Department / Agency	Comments
Capital Improvement Programming				
Community Development Block Grants (CDBG)				
Special Purpose Taxes (or taxing districts)				
Gas / Electric Utility Fees				
Water / Sewer Fees				
Stormwater Utility Fees				
Development Impact Fees				
General Obligation, Revenue and/or Special Tax Bonds				
Partnering arrangements or intergovernmental agreements				
Other: _____				

Local Capability Assessment Survey

4. POLITICAL CAPABILITY - Political capability can be generally measured by the degree to which local political leadership is willing to enact policies and programs that reduce hazard vulnerabilities in your community, even if met with some opposition. Examples may include guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum State or Federal requirements (e.g., building codes, floodplain management, etc.). Please identify some general examples of these efforts if available and/or reference where more documentation can be found.

Local Capability Assessment Survey

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

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

Points System for Capability Ranking

0-19 points = Limited overall capability
20-39 points = Moderate overall capability
40-68 points = High overall capability

I. Planning and Regulatory Capability
(Up to 43 points)

Yes = 3 points
Under Development = 1 point
Included under County plan/code/ordinance/program = 1 point
No = 0 points

- Hazard Mitigation Plan
- Comprehensive Land Use Plan
- Floodplain Management Plan
- National Flood Insurance Program
- NFIP Community Rating System

Yes = 2 points
Under Development = 1 point
Included under County plan/code/ordinance/program = 1 point
No = 0 points

- Open Space Management Plan / Parks & Recreation Plan
- Stormwater Management Plan
- Natural Resource Protection Plan
- Flood Response Plan
- Emergency Operations Plan
- Continuity of Operations Plan
- Evacuation Plan
- Disaster Recovery Plan
- Flood Damage Prevention Ordinance
- Post-disaster Redevelopment / Reconstruction Ordinance

Yes = 1 point
No = 0 points

- Capital Improvements Plan
- Economic Development Plan
- Historic Preservation Plan
- Zoning Ordinance
- Subdivision Ordinance
- Unified Development Ordinance
- Building Code
- Fire Code

II. Administrative and Technical Capability
(Up to 15 points)

Yes = 2 points
Service provided by County = 1 point
No = 0 points

- Planners with knowledge of land development and land management practices
- Engineers or professionals trained in construction practices related to buildings and/or infrastructure
- Planners or engineers with an understanding of natural and/or human-caused hazards
- Emergency manager
- Floodplain manager

Yes = 1 point
No = 0 points

- Land surveyors
- Scientist familiar with the hazards of the community
- Staff with education or expertise to assess the community's vulnerability to hazards
- Personnel skilled in Geographical Information Systems (GIS) and/or Hazus
- Resource development staff or grant writers

III. Fiscal Capability
(Up to 10 points)

Yes = 1 point
No = 0 points

- Capital Improvement Programming
- Community Development Block Grants (CDBG)
- Special Purpose Taxes (or tax districts)
- Gas / Electric Utility Fees
- Water / Sewer Fees
- Stormwater Utility Fees
- Development Impact Fees
- General Obligation / Revenue / Special Tax Bonds
- Partnering arrangements or intergovernmental agreements
- Other

MITIGATION ACTION WORKSHEETS

Mitigation Action Worksheets are used to identify potential hazard mitigation actions that participating jurisdictions in the region will consider to reduce the negative effects of identified hazards. The worksheets provide a simple yet effective method of organizing potential actions in a user-friendly manner that can easily be incorporated into the county's Hazard Mitigation Plan.

The worksheets are to be used as part of a strategic planning process and are designed to be:

a.) completed electronically (worksheets and instructions will be e-mailed to members of the Hazard Mitigation Planning Team following the Mitigation Strategy Workshop);

b.) reviewed with your department/organization for further consideration; and

c.) returned according to the contact information provided below.

Please return all completed worksheets to:

Nathan Slaughter, Project Manager ESP Associates

nslaughter@espassociates.com

INSTRUCTIONS

Each mitigation action should be considered to be a separate local project, policy or program and each individual action should be entered into a separate worksheet. By identifying the implementation requirements for each action, the worksheets will help lay the framework for engaging in distinct actions that will help reduce the community's overall vulnerability and risk. Detailed explanations on how to complete the worksheet are provided below.

Proposed Action: Identify a specific action that, if accomplished, will reduce vulnerability and risk in the impact area. Actions may be in the form of local policies (i.e., regulatory or incentive-based measures), programs or structural mitigation projects and should be consistent with any pre-identified mitigation goals and objectives.

Site and Location: Provide details with regard to the physical location or geographic extent of the proposed action, such as the location of a specific structure to be mitigated, whether a program will be citywide, countywide or regional, etc.

History of Damages: Provide a brief history of any known damages as it relates to the proposed action and the hazard(s) being addressed. For example, the proposed elevation of a repetitive loss property should include an overview of the number of times the structure has flooded, total dollar amount of damages if available, etc.

Hazard(s) Addressed: List the hazard(s) the proposed action is designed to mitigate against.

Category: Indicate the most appropriate category for the proposed action as discussed during the Mitigation Strategy Workshop (Prevention; Property Protection; Natural Resource Protection; Structural Projects; Emergency Services; Public Education and Awareness).

Priority: Indicate whether the action is a "high" priority, "moderate" priority or "low" priority based generally on the following criteria:

1. Effect on overall risk to life and property
2. Ease of implementation / technical feasibility
3. Project costs versus benefits
4. Political and community support
5. Funding availability

Estimated Cost: If applicable, indicate what the total cost will be to accomplish this action. This amount will be an estimate until actual final dollar amounts can be determined. Some actions (such as ordinance revisions) may only cost "local staff time" and should be noted so.

Potential Funding Sources: If applicable, indicate how the cost to complete the action will be funded. For example, funds may be provided from existing operating budgets or general funds, a previously established contingency fund, a cost-sharing federal or state grant program, etc.

Lead Agency/Department Responsible: Identify the local agency, department or organization that is best suited to implement the proposed action.

Implementation Schedule: Indicate when the action will begin and when the action is expected to be completed. Remember that some actions will require only a minimal amount of time, while others may require a long-term or continuous effort.

MITIGATION ACTION	
Proposed Action:	
BACKGROUND INFORMATION	
Site and Location:	
History of Damages:	

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	
Category:	
Priority (High, Moderate, Low):	
Estimated Cost:	
Potential Funding Sources:	
Lead Agency/Department Responsible:	
Implementation Schedule:	

Appendix C
LOCAL MITIGATON PLAN REVIEW TOOL

GUILFORD COUNTY HMPC PARTICIPANTS

ORGANIZATION	NAME	DEPARTMENT/ROLE	ATTENDED 6/24 MTG	ATTENDED 8/26 MTG	ATTENDED 9/17 MTG	ATTENDED 9/24 MTG
Guilford County	Catherine Hughes	EM Coordinator	X	X	X	X
Guilford County	Ashley Dinkins	Program Supervisor	X	X		
Guilford County	Erris Dunston	Assistant County Manager	X			
Guilford County	Jim Albright	Emergency Services Director	X			
Guilford County	Peter Purcell	CIO	X	X		
Guilford County	James Tardiff	Stormwater Program Administrator	X	X	X	X
Guilford County	Toy Beeninga	Budget & Management Services Director	X			
Guilford County	James Kurfees	CTO	X	X	X	X
Guilford County	Jaime Joyner	Director of HR	X			
Guilford County	Eddi Cabrera Blanco	Communications Manager	X			
Guilford County	Debra Mack	Mental Health Director	X	X		
Guilford County	Michael Townsend	Assistant Fire Marshal	X	X		
Guilford County	Conor Baker	EM Coordinator	X	X	X	
Guilford County	Matthew Crawford	Inspection Director	X			
Guilford County	Justin Wright	Special Operations Division	X			X
Guilford County	Dwight Godwin	Parks Director	X	X		
Guilford County	Linda McElroy	Communications Director	X	X		
Guilford County	Rosanne Wiley	Child Support Services	X			
Guilford County	Jason Hardin	Deputy Planning/Development Director	X	X	X	
Guilford County	Brent Gatlin	Watershed Section Manager	X	X	X	X
Guilford County	Vincent Daugherty	Security Director	X			
Guilford County	Raul Gomez	Disaster Preparedness Coordinator	X			
Guilford County	Robert Carmon	Deputy Fire Marshall	X	X		
Guilford County	Tommy Sluder	Sr EM Director	X	X	X	X
Guilford County	Todd Griffith	Fire Life Safety Coordinator	X	X		
Guilford County	Mitchell Byers	GIS Specialist		X	X	X
Guilford County	Paula Cox	Environmental Health Division Director		X		
Guilford County	Marlena Isley	GIS Manager		X		
Guilford County	Robin Keller	Clerk to Board		X		
Guilford County	Maria Lyons Legrande	Continual Care Specialist		X		

GUILFORD COUNTY HMPC PARTICIPANTS

Guilford County	Jeffrey McCartney	Chief Information Security Director		X	X	X
Guilford County	Jorge Ortega	Animal Services Director		X		
Guilford County	Anita Ramachandran	Public Health Director		X		
Guilford County	Donna Riner	Deputy Director of Registry of Deeds		X		
Guilford County	Vince Roberts	Social Services Agency Business Manager		X		
Guilford County	Robert Shelly	Veterans Service Director		X		
Guilford County	Donald Warn	Chief Financial Officer		X		
Guilford County	Irma Zimmerman	Transit Services Manager		X		
Guilford County	Oliver Bass	Planning & Zoning Manager				X
Gibsonville	Brandon Parker	Town Planner	X			
Greensboro	Christine Moore	Deputy Director Guilford Metro 911	X			
Greensboro	Johnnie Hill	Water Resources/Floodplain Admin	X	X		X
Greensboro	Jason Geary	Engineering Division Manager	X			
Greensboro	Nathanael Moore	GSO Transportation deputy director	X			
Greensboro	Shree Dorestant	Chief Sustainability Officer	X	X		X
Greensboro	Bryan Vickery	EFD Special Operations	X			
Greensboro	Danielle Quick	Sr. Engineering Specialist	X	X		X
Greensboro	Robert Felts	Risk & Safety Administrator		X		
Greensboro	Michael Lewis	Deputy Director of Development Services		X		X
Greensboro	Virginia Spillman	Assistant Director of Water Resources		X		X
High Point	Michael Foster		X	X		
High Point	Matt Carpenter	Traffic Operations Engineer		X		
High Point	Steven Grose	HPPD Special Projects Coordinator		X		
High Point	Dennis Salgado	Chief Park Ranger		X		
Jamestown	Paul Blanchard	Public Services Director				X
Kernersville	Scott Alderman	Fire Rescue Chief		X		
Oak Ridge	Ashley Royal	Deputy Town Clerk	X	X		X

GUILFORD COUNTY HMPC PARTICIPANTS

Pleasant Garden	Dean Maddox	Mayor				X
Sedalia	Cam Dungee	Town Administrator				
Summerfield	Justin Snyder	Planning Director	X	X		X
Whitsett	Karen Horne	Town Administrator		X		X
Bennett College	Jermaine Thomas	Executive Director of Campus Operations		X		
Cone Health	Ben Wooten	Director of Emergency Management	X			
ESP Associates, Inc.	Nathan Slaughter	Project Manager	X	X	X	
ESP Associates, Inc.	John Flores	Hazard Mitigation Planner	X	X		
ESP Associates, Inc.	Fabiha Rahman	GIS Specialist/Planner	X			
ESP Associates, Inc.	Hannah DeLude	Hazard Mitigation Planner		X		X
Guilford Technical Community College	Gene Sapino	Chief Campus Police	X			
Guilford Technical Community College	Michael MacIntosh	Campus Police Lieutenant	X			
Hands on NWNC	Amy Lytle			X		
Julian Fire Department	Cameron Shepard	Fire Chief	X	X		
NC Agricultural and Technical State University	Dakota Staley	Emergency Management Specialist	X	X		
NC Dept of Public Safety	Carl Baker	Mitigation Plans Manager	X	X		
NC Dept of Public Safety	John Mello	Hazard Mitigation Planner		X		
Piedmont Triad Regional Council	Chloe Davis	Disaster Recovery fellow	X			
Piedmont Triad Regional Council	Jesse Day	Regional Planning Director		X		
Red Cross	Marguerite Davis	Disaster Preparedness Coordinator	X			
University of North Carolina at Greensboro	Michael Burke	EM Coordinator	X			

Stakeholder Meeting
June 24th, 2025
Greensboro, NC
2:00pm – 3:10pm

Participants (In-Person & Online)

Name	Organization/Role
Albright, Jim	Emergency Services Director, Guilford County
Baker, Carl	Mitigation Plans Manager, NCEM
Baker, Conor	Emergency Management Coordinator, Guilford County
Beeninga, Toy	Budget & Management Services Director, Guilford County
Burke, Michael	Emergency Coordinator, UWCG
Cabrera Blanco, Eddi	Comms Manager, Guilford County
Carmon, Robert	Deputy Fire Marshal/Chief of Inspections & Investigations, Guilford County
Crawford, Matthew	Inspections Director, Guilford County
Daugherty, Vincent	Security Director, Guilford County
Davis, Chloe	Disaster Recovery, PTRC
Davis, Marguerite	American Red Cross, Disaster Preparedness Coordinator
DeLude, Hannah	Hazard Mitigation Planner, ESP Associates
Dinkins, Ashley	Program Supervisor, Guilford County
Dorestant, Shree	Chief Sustainability Officer, City of Greensboro,
Dunston, Erris	Assistant County Manager, Guilford County
Gatlin, Brent	Watershed Section Manager, Guilford County
Geary, Jason	Engineering Division Manager, City of Greensboro
Godwin, Dwight	Parks Director, Guilford County
Gomez, Raul	Disaster Preparedness Coordinator, Guilford County
Griffith, Todd	Fire Life Safety Coordinator, Guilford County
Flore, John	Hazard Mitigation Planner, ESP Associates
Foster, Michael	Assistant Fire Chief/Emergency Manager, City of High Point
Hardin, Jason	Deputy Planning and Development Director, Guilford County
Hill, Johnnie	Water Resources/Floodplain Administrator, City of Greensboro
Hughes, Catherine	Emergency Management Coordinator, Guilford County
Joyner, Jaime	Director of Human Resources, Guilford County
Kurfeos, James	Chief Technology Officer, Guilford County
MacIntosh, Michael	Campus Police Lieutenant, GTCC
Mack, Debra	Mental Health Director, Guilford County
McElroy, Linda	Communications Director, Guilford County

Mello, John	Hazard Mitigation Planner, NCEM
Moore, Christine	Deputy Director, Guilford Metro 911
Moore, Nathaniel	GSO Transportation Deputy Director, GSO
Parker, Brandon	Planning Director, Town of Gibsonville
Purcell, Peter	Chief Information Officer, Guilford County
Quick, Danielle	Senior Engineering Specialist, City of Greensboro
Rahman, Fabiha	Planner, ESP Associates
Royal, Ashley	Deputy Town Clerk/PIO/HR Manager, Town of Oak Ridge
Sapino, Gene	Campus Police Chief, GTCC
Shepard, Cameron	Fire Chief, Julian
Slaughter, Nathan	Department Manager, ESP Associates
Sluder, Tommy	Senior Emergency Management Coordinator, Guilford County
Snyder, Justin	Planning Director, Town of Summerfield
Staley, Dakota	Emergency Management Specialist, NC A&T
Tardiff, James	Stormwater Program Administrator, Guilford County
Townsend, Michael	Assistant Fire Marshal, Guilford County
Vicky, Bryan	EFD Special Ops, City of Greensboro
Wiley, Rosanne	Child Support Services, Guilford County
Wooten, Ben	Emergency Management Director, Cone Health
Wright, Justin	Special Operations Division, Guilford County

Introductions & Meeting Objectives

The Stakeholder Meeting for the Guilford County Multi-Jurisdictional Hazard Mitigation Plan Update 2025 was held in Greensboro at the Guilford County EOC with a virtual option to facilitate efficient collaboration. Catherine Hughes, Emergency Management Coordinator with Guilford County, introduced herself and briefly touched on her role within the county.

As the Hazard Mitigation Program Manager, Hughes is tasked with year-to-year management to stay up to date on grant and funding opportunities. At the beginning of each year, Guilford County publishes a report on the county website to assist with CRS points/credits. The county's core planning team is much smaller than the 100+ invitees of the Stakeholder Meeting, but those invites are intended to reach a broad audience of stakeholders, including all participating jurisdictions.

Nathan Slaughter, Project Manager with ESP Associates, gave a brief overview of the meeting agenda and objectives. Meeting objectives included (1) Review scope and planning process, (2) Identify and engage key stakeholders, and (3) Outline roles and responsibilities. Participants, online and in-person, were asked to introduce themselves, their role, and their organization/agency. They were also asked to sign-in or enter their information in the Teams chat for documentation purposes.

Roles & Responsibilities

Carl Baker, Mitigation Plans Manager, was then introduced to touch on the roles and responsibilities of all parties as well as the plan review and approval process. NCEM oversees the plan review and approval process, including elements such as plan updates funded through HMGP, with the State covering the non-federal share. NCEM also supports jurisdictions throughout the update process by reviewing draft plans for accuracy and federal compliance, submitting them for FEMA approval, and coordinating adoptions before final submittal to FEMA.

The local jurisdictions' roles were outlined, emphasizing their responsibilities to invite stakeholders, participate in HMPC meetings, provide input (particularly on the Capability Assessment and Mitigation Action Strategy), and review draft plans. They also present the adoption notice for approval by local or county boards.

The contractor's role was described as facilitating HMPC meetings, researching and updating all sections of the HMP, coordinating input from the local HMPC, and submitting drafts for review. The contractor also manages the coordination of adoptions and submission of the final plan. ESP is the primary consultant and WSP is the sub-consultant for this endeavor. WSP is responsible for the risk assessment portion of this plan update.

Plan review and approval process was reviewed, which involves NCEM's evaluation of 33 review elements, including mitigation actions that may require revisions. The process includes submitting draft plans to FEMA, initiating the adoption process, and awaiting FEMA's approval letter. Once fully adopted, the final plan is submitted to FEMA for official approval.

Brief Mitigation Overview

During the meeting, mitigation was reviewed, which refers to *proactive measures taken to reduce the impact of hazards before they occur*, with the goal of minimizing future risks and damages. It was noted that all mitigation actions are categorized into two major groups (existing development and future development) and fall under one of the six techniques summarized (prevention, preparedness, natural resource protection, emergency services, property protection, and education and awareness). It was noted that during an activity performed for the 2020 plan update, the HMPC voted for Prevention, Emergency Services, and Public Education and Awareness as the top 3 techniques.

Purpose of Update

The purpose of the plan update was discussed, and its importance was emphasized. The update is necessary to reflect changing risks, such as population increases, community growth, the emergence of new hazards and man-made threats, shifting conditions, and evolving development patterns. The plan aims to enhance community resilience across social, economic, and environmental dimensions, ensuring the community is better prepared to withstand and recover from disasters.

Furthermore, the update is essential for maintaining compliance with Federal and State requirements, including DMA 200, NC GS 166 A, and funding programs like HMGP and FMA, which are critical for securing ongoing support and funding. Participants asked about future FEMA funding. CRS elements were also highlighted at this time along with the key benefits of CRS participation. Recently, several communities' CRS rating were updated and they were able to use the HMP for substantial points under Section 510. Participants shared new information on CRS recertification letters and guidance that the planning team will look into. Finally, the plan contributes to heightened preparedness by addressing both existing and emerging threats, with the goal of protecting lives and property, and ensuring the continuity of essential services during and following disasters.

Plan Update Process

The planning process was reviewed, which outlined four essential steps:

1. Organizing resources – The planning team has started working with participating county and municipalities within this county and will conduct public outreach/stakeholder engagement for diverse perspectives.
2. Conducting a risk assessment – This will begin with hazard identification (*What can happen here*?) considering historical occurrence and emerging hazards. After hazards have been identified, the planning team will examine hazard impact (*What do these hazards do when they occur within the county*?), while considering capability to act. The hazards identified in the previous plan update were shared at this time where it was noted that this list was extensive compared to other plans.
3. Developing a mitigation plan – Existing actions from the previous update must be reviewed, including project implementation status updates (as required by FEMA). In addition to project status updates, new mitigation actions will be discussed during the Mitigation Strategy Meeting and integrated into the mitigation plan. Participating jurisdictions have had a mitigation action plan in place for over fifteen years. Updating the mitigation action plan will be more streamlined since Catherine and her team have been conducting annual reviews for mitigation actions.
4. Final adoption and implementation – The final step is to adopt the plan and begin action implementation. The draft plan will be sent to the Planning Committee and then will go through its first round of review by NCEM. FEMA will provide the final review and approval of the plan.

SWOT Analysis

A Menti Poll was conducted to engage participants and gather feedback that will be used to guide the planning process. The questions are provided below:

1. What do you see as the most significant strengths your county has when it comes to hazard mitigation and resilience?
2. Has your community recently completed projects/implemented actions to address vulnerability? Please share & include your community's name!
3. What weaknesses, challenges, or barriers have hindered mitigation efforts in the past?
4. Can you identify opportunities (e.g. partnerships, funding sources, or existing efforts) that we could leverage to enhance the planning process?
5. Are there any non-governmental organizations that should be included in the planning process and/or CRS Steering Committee?

Results to this Menti activity are provided in a separate PDF.

Project Information/Resources

Participating communities were asked to post relevant project information and updates to facilitate ongoing communication. The team highlighted that the project website and public survey were already accessible online and would be updated regularly throughout the planning process. The website provides key resources, including the project overview, meeting minutes and presentations, the public survey, the previous 2020 HMP, and relevant planning resources. A printable, PDF version of the public survey was requested at this time.

Additionally, the critical role of participating jurisdictions was reiterated, emphasizing that their input and expertise will be essential to enhance the plan and ensure it remains relevant and useful. The active involvement of local stakeholders was recognized as vital to the success of the update process. The primary role and key tasks assigned to local jurisdictions was also shared at this time to give a general overview.

Q&A Session

The floor was opened for participants to ask questions or voice concerns. Questions posed are summarized below:

1. Q: Will public meetings would be held before or after the delivery of the draft.
    a. A: This update will occur at an expedited rate due to a shortened timeline and the draft delivery date will be revised as needed. The first public meeting will likely be

held prior to the draft delivery, while the second public meeting will occur shortly after the draft plan is complete.

2. Q: Can you talk about how this plan update will look different than the previous update?
    a. A: It will similar to the previous update. The plan will be updated to reflect what has happened over the last five years, reviewing hazard occurrence and new data for the vulnerability assessment. The only requirement that has been removed, but can still remain within the plan, pertains to climate change and social vulnerability. These elements do not need to be removed, but will not be reviewed by FEMA. If the county determines they'd like to keep these elements in the plan, any new information will be assessed for inclusion in the plan.

The condensed timeline for this plan update was highlighted at this time. Communities were asked to begin thinking about the adoption process as it needs to be adopted by all participating jurisdictions by January 2026. ESP does have a sample adoption resolution that will be shared as a reference document.

Meeting Closeout

The meeting concluded with a call for collaborative updates among all stakeholders. Contact information was shared at this time. Meeting minutes and the presentation will be shared with participants, as requested, and uploaded to the project website for documentation purposes. The meeting officially adjourned at 3:10pm.

What do you see as the most significant strengths your region has when it comes to hazard mitigation and resilience?

Collaboration and resource-gathering

Available resources here

Joint collaboration of public safety community

RRT

Resources

Availability of resources county wide.

Multiple partners

Collaboration in place already

Mentimeter

What do you see as the most significant strengths your region has when it comes to hazard mitigation and resilience?

Great resource base and alignment.

Jurisdiction collaboration and staff

Resources

Multiple plans

Resources

Diverse governmental agency staffing and knowledge

Collaboration among agencies and jurisdictions

Collaboration with state and local

7 27

What do you see as the most significant strengths your region has when it comes to hazard mitigation and resilience?

Collaboration between programs

Past experience and thorough after action studies to learn from responses, what went wrong and what went right

Automatic Aid

Guilford County Emergency Management Team

Collaboration

Relationship between county and other municipalities Regional response teams

collaboration, planning, and resources

Resources

Mentimeter

What do you see as the most significant strengths your region has when it comes to hazard mitigation and resilience?

Jurisdiction collaboration and resources

Collaboration and resource-gathering

Existing plans

Pre-established teams that already work together.

Proactive planning

Strong Multi-Jurisdictional Collaboration and community engagement

Joint collaboration of public safety community Resources

Alignment

7 27

Mentimeter

What do you see as the most significant strengths your region has when it comes to hazard mitigation and resilience?

Lot of new agencies in place since last update

Acquisition and demo of flood prone properties

7 27

Mentimeter

Has your community recently completed projects/implemented actions to address vulnerability? Please share & include your community's name!

Training drills

Annual review of EM programs

Cooling centers

Experience

Yes. Working to close out two acquisitions in the unincorporated area

Training

We are working on a comprehensive plan update and unified development ordinance update to incorporate hazard mitigation components and better storm water and floodplain language.

UDO

5 11

Mentimeter

Has your community recently completed projects/implemented actions to address vulnerability? Please share & include your community's name!

Acquired starlink to address communications vulnerabilities.

upcoming Train-the trainer Series for the region

Acquisition projects in progress for RL structures

Unified Development Ordinance

Training , UDO

Comp Plan and UDO updates go with Summerfield

Restrictions

5 11

Mentimeter

What weaknesses, challenges, or barriers have hindered mitigation efforts in the past?

Lack of political buy in and funding/staffing availability

Budget and failure to imagine.

Limited staff capacity to lead and drive mitigation and resilience initiatives and projects.

Funding...

Funding

$$$

Funding !!

Cost is almost always the issue

3 17

Mentimeter

What weaknesses, challenges, or barriers have hindered mitigation efforts in the past?

staff resources

budget

Funding. Slow timeline of the application and implementation process

Staffing

Competing priorities

Acquisition grants can be slow and cumbersome

Staff resources

Burocracey

3 17

Mentimeter

What weaknesses, challenges, or barriers have hindered mitigation efforts in the past?

Lack of collaboration between the government sector and non-profit organizations who are key in mitigation and/or possible funding.

Not aware of any in Guilford, but many communties in NC losing BRIC funds

No matter how great your plan is there are is always the u nknown

3 17

Mentimeter

Can you identify opportunities (e.g. partnerships, funding sources, existing initiatives) that we could leverage to enhance the planning process?

Cultural and historical resource grants, public private partnerships

Private contractors

non profit collaboration such as the NC VOAD

Regularly engage the planning committee to keep mitigation at top of mind and drive new initiatives. Someone needs to own this process after plan is completed.

Harvest learning from recent disasters - and have the funding and will to fix them

Health care providers

University researcher centers

Public/ privite partnerships

Can you identify opportunities (e.g. partnerships, funding sources, existing initiatives) that we could leverage to enhance the planning process?

Health care coalition

AARs

Public-private partnerships

identifying opportunities for funding within the Foundational grant space

Mentimeter

Are there any specific community groups, faith-based organizations, businesses, etc. that should be included in the planning process?

Continuum of Care, Faith entities

Baptist men

Appointed committees and advisory boards, advocacy organizations

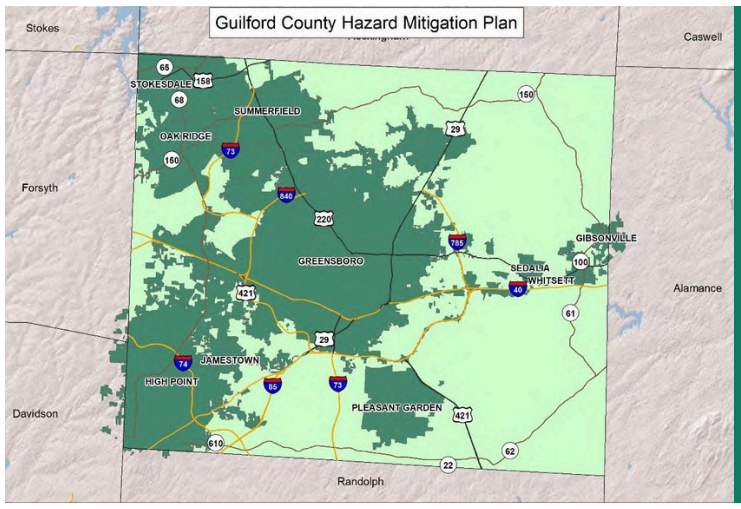
United Way Salvation Army Catholic Charities americorp

Food banks, Allied churches, demolition companies

More community based organizations

UNIVERSITY

1 6



GUILFORD COUNTY

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 2025 UPDATE

QR CODE TO PUBLIC SURVEY

Background

The Guilford County Multi-Jurisdictional Hazard Mitigation Plan aims to assess, reduce, and prepare for the impact of natural and man-made hazards in the region. The 2025 Plan Update involves the identification of vulnerabilities and prioritization of mitigation strategies to better prepare for, respond to, and recover from a hazardous event. Through collaboration and coordination, the Plan Update seeks to engage stakeholders, raise awareness, and facilitate measures to mitigate risk and build a safer, more resilient county for current and future generations.

What is Mitigation?

FEMA defines Hazard Mitigation as:
"Sustained action taken to reduce or eliminate long-term risk to human life and property from hazards."

1 *EXISTING*

Mitigate hazard impacts on existing development in our communities (i.e. houses, businesses, infrastructure, critical facilities)

2 *FUTURE*

Ensure future development is conducted in a manner that does not increase vulnerability (i.e. strategic planning, policy, and procedures)

Disaster Mitigation Act of 2000

The Disaster Mitigation Act (DMA) of 2000 represents a major shift from reactive response to proactive prevention requiring local communities to develop/maintain hazard mitigation plans.

- **Revitalized Federal Planning Requirements**
  - State and Local Hazard Mitigation Plans
- **Federal Grant Funding Eligibility**
  - Hazard Mitigation Grant Program (HMGP)
  - Flood Mitigation Assistance (FMA)

**Plans should be updated every 5 years to remain current.

Mitigation Techniques

1. Prevention – Planning and Zoning, Building Codes, Floodplain Regulations
2. Property Protection –Aquisition, Relocation, Elevation
3. Natural Resource Management – Floodplain Protection, Watershed Management, Riparian Buffers
4. Structural Projects – Reservoirs, Levees/Dams, Channel Modification
5. Emergency Services – Warning Systems, Evacuation Planning, Shelters
6. Public Education and Awareness – Outreach Projects, Real Estate Disclosures, Hazard Map Information

Task 1 Scope: Plan Development

Subtask	Status	Notes
Task 1.1: Planning Process	In Progress	Involves internal kickoff, planning team meetings (3 minimum), and public meetings (2 minimum).
Task 1.2: Risk Assessment	In Progress	Update previously developed risk assessment with latest data for hazard profiles and risk assessment techniques.
Task 1.3: Capability Assessment	In Progress	Project team to update previous capability assessment survey from last update. Communities to confirm changes and revise as needed.
Task 1.4: Mitigation Strategy	Not Started	Update status of existing mitigation actions from previous plan and propose new actions based on need.
Task 1.5: Plan Maintenance Procedures	Not Started	Includes analysis of previous methods/schedules of plan monitoring, evaluating, and updating.

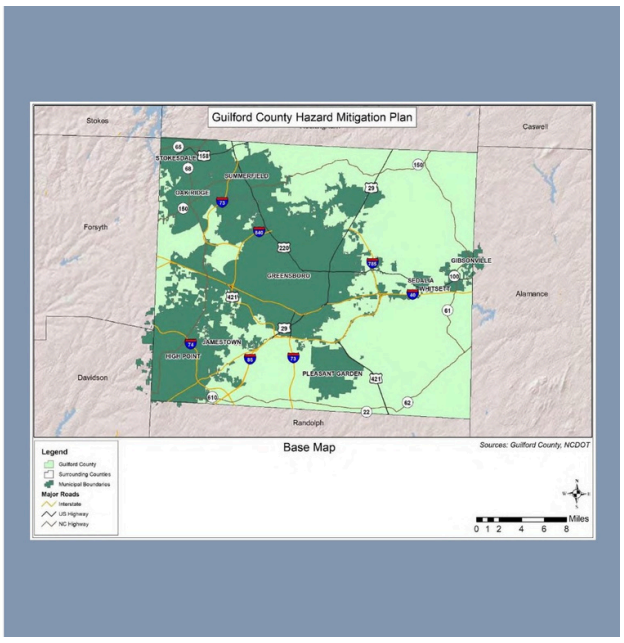
Project Website

ESP

Guilford County Hazard Mitigation Plan Update

Welcome to the official website for the Guilford County Multi-Jurisdictional Hazard Mitigation Plan 2025 Update!

ESP GIS



The project team has developed a Project Website where all information pertaining to the plan update will be hosted, including meeting minutes & presentations as well as the Public Survey!

SCAN ME!

Your Role in the Process

1. **Tell us who should be involved in the process.** Have we missed anyone? This can include community groups, non-profits, businesses, etc.
2. **Share the project website to your county/municipal page.** We're actively updating this site, so sharing/promoting is all you need to do!
3. **Complete the survey and encourage others to do so**. Print copies and place them in community buildings. Let us know if translation is needed.
4. **Determine location, date, and times for meetings in a timely fashion.** Our aim is to send invites out with at least 2-week notice.
5. **Review your Capability Assessment.** Identify new capabilities or adjust existing capabilities. Efforts underway should be noted.
6. **Review your Mitigation Plan.** Provide a detailed status update on each action and brainstorm new actions that address existing gaps/weaknesses.
7. **Collaborate amongst other agencies/departments.** This update spans beyond EM and will benefit from the cross-sectoral collaboration/expertise.
8. **Reach out to smaller jurisdictions to ensure their participation.** Whether actively present or represented through the county, this will help expedite the update and adoption process.

Thank you!

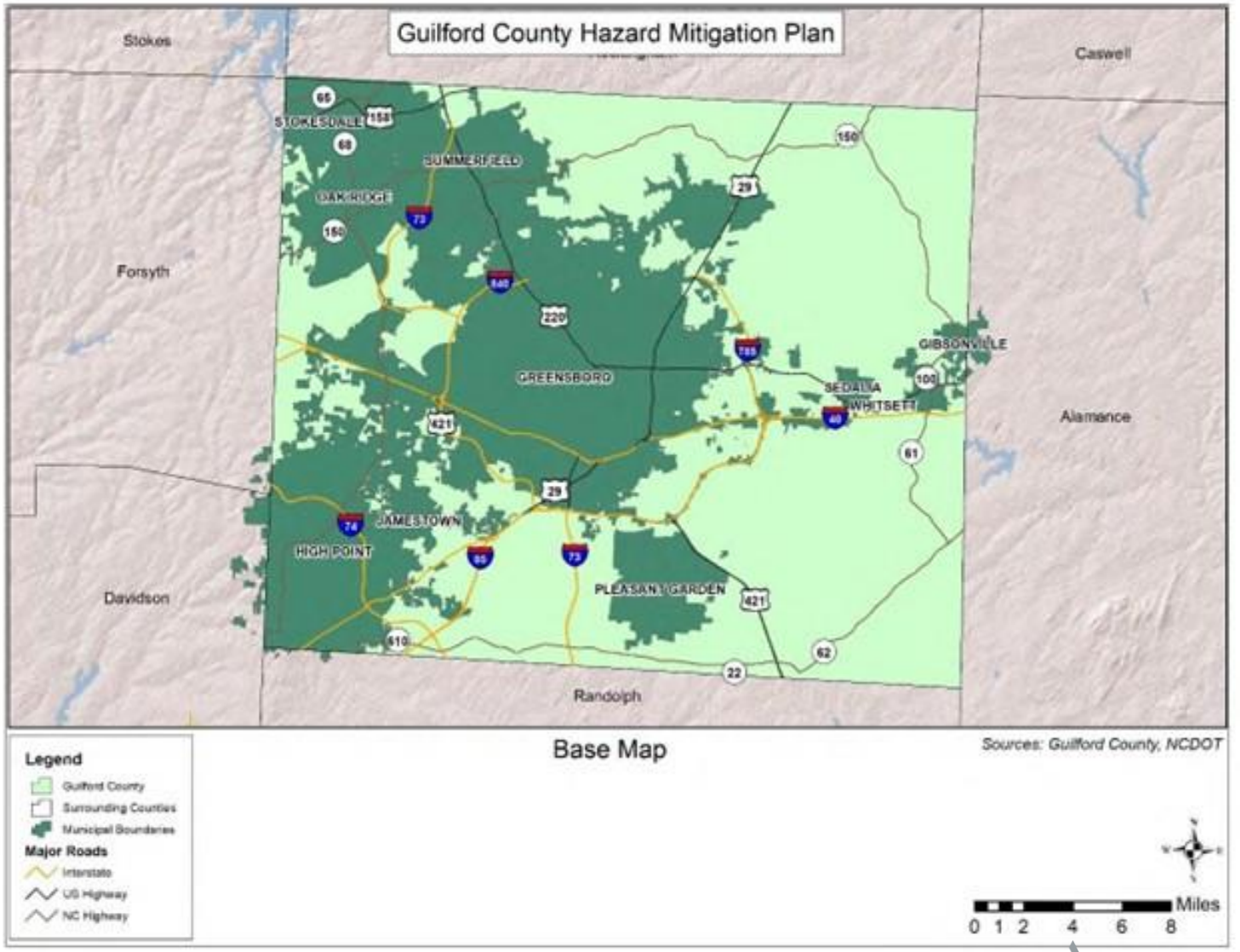
Thank you for your participation in the Guilford County Multi-Jurisdictional Regional HMP 2025 Update!

Guilford County

Hazard Mitigation Plan Update

Stakeholder Meeting

June 24th, 2025



Agenda

- Introductions & Meeting Objectives
- Roles & Responsibilities (NCEM)
- Brief Mitigation Overview
- Purpose of Update
- Plan Update Process
- SWOT Analysis
- Project Information/Resources
- Q&A

Meeting Kickoff

- Welcome & Introductions
- Reminder to Sign In!

Meeting Objectives



Review Scope and Planning Process



Identify & Engage Key Stakeholders



Outline Roles & Responsibilities

Project Roles and Approval Process

NCEM Facilitated

Carl Baker, Mitigation Plans Manager with NCEM, will be reviewing:

1. Project Team Roles & Responsibilities (NCEM, Local Jurisdictions, and Contractor)
2. Plan Review & Approval Process (Elements, Timeline, Issuance)

Hazard Mitigation Plan (HMP) Update Process

- NCEM Role
- Local Jurisdiction Role
- Contractor Role
- Plan Review and Approval Process
- NCEM Hazard Mitigation Plans (Use QR Code)



NCEM Role

- Plan updates are funded through the HMGP (State pays the non-fed share)
- Support jurisdictions throughout the plan update process
- Review draft plans for accuracy and compliance with Federal guidance
- Submit plans for FEMA approval
- Coordinate plan adoptions and submit final plan to FEMA

Local Jurisdiction Role

- Invite stakeholders and attend Hazard Mitigation Planning Committee (HMPC) meetings
- Provide input for plan update, particularly the Capability Assessment and Mitigation Action Strategy/Plan
- Review the draft plan
- Present adoption notice to local/county board for approval

Contractor Role

- Facilitate HMPC meetings
- Research and update all sections of the HMP
- Coordinate input from local HMPC into plan update (HIRA, Capability Assessment, Mitigation Actions, etc.)
- Submit draft plan to NCEM for review
- Coordinate adoptions and submit final plan

Plan Review and Approval Process

- NCEM reviews submitted draft plan
  - 33 review elements
  - Mitigation Actions, may require revisions such as category, status, etc. Must have one per hazard, or one all hazard action. Emergency Services actions do not count towards the minimum requirements.
- Submit draft plan to FEMA for review and approval
  - Begin adoption process
- FEMA issues approval letter
  - Once plan is fully adopted a final plan is submitted to FEMA

Background/ Overview

What is Mitigation?

“mit-i-gate”

1: to cause to become less harsh or hostile.

2: to make less severe or painful.

Hazard Mitigation

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

Basic Types of Mitigation



Mitigating against hazard impacts on **existing development**

- Houses
- Businesses
- Infrastructure
- Critical Facilities



Ensuring **future development** is conducted in a way that does not increase vulnerability

- Plans
- Policies
- Procedures

Mitigation Techniques

NOTE: During an activity performed for the previous plan update, the HMPC voted Prevention, Emergency Services, and Public Education & Awareness as the top 3 techniques

1. Prevention
2. Property Protection
3. Natural Resource Management
4. Structural Projects
5. Emergency Services
6. Education and Awareness

Purpose of Plan Update

Why is it Necessary?

- Reflect on Changing Risks
- Increase Community Resilience
- Ensure Compliance and Funding
- Heighten Preparedness

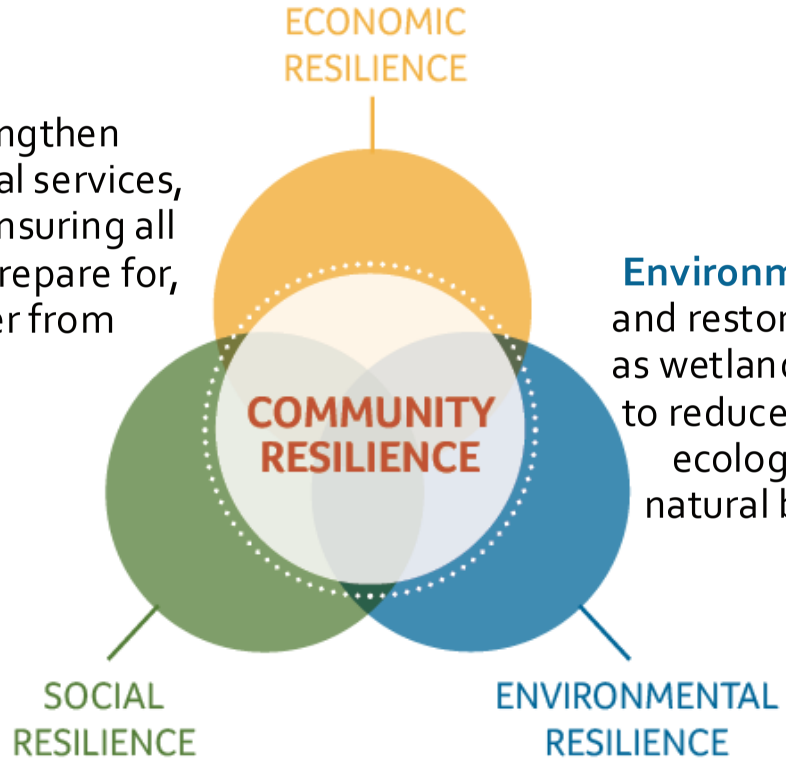
Addressing Changing and Emerging Risk

Population Increase and Community Growth	Greater Exposure to Hazard Risk Increased Exposure = More Damage
More Hazards (Man-Made)	Included in State Plan Ex. Technological, Civil Disturbance, Terrorism
Changing Conditions	Anticipated Increase in Frequency and Magnitude **Optional Inclusion/Reference to Climate Change
Development Patterns	Increased Impermeable Surfaces More Infrastructure and Assets at Risk

Increasing Community Resilience

Economic Resilience: Support the stability and recovery of local businesses and employment opportunities to ensure the community can withstand and bounce back from hazard impacts.

Social Resilience: Strengthen community networks, social services, and access to resources, ensuring all residents can effectively prepare for, respond to, and recover from hazards.



Environmental Resilience: Protect and restore natural ecosystems such as wetlands, forests, and floodplains to reduce hazard impacts, promote ecological health, and sustain natural buffers against disasters.

Ensuring Compliance and Funding



Ensure compliance with federal and state requirements

Disaster Mitigation Act of 2000

NC GS 166 A



Maintain eligibility for disaster mitigation funding and assistance programs

HMGP

FMA

Community Rating System (CRS)

Specific CRS elements will be integrated into the hazard mitigation planning process including:

1. Public and Targeted Outreach (Public Meetings Timing)
2. Hazard Mapping and Regulations
3. Flood Damage Reduction Activities (SDE Procedures)
4. CRS Steering Committee (50% NGO/Public)
5. Thorough Documentation of Process (Section 2)

CRS Key Benefits

Participation in the CRS offers economic benefits and supports hazard mitigation efforts:

- **Financial Incentives** – Potential for reduced insurance premiums and access to mitigation grants
- **Recognition and Credibility** – Demonstrates community's commitment to risk reduction and transparency
- **Compliance and Stakeholder Engagement** – Encourages collaboration among agencies, insurers, and residents

Heightening Preparedness

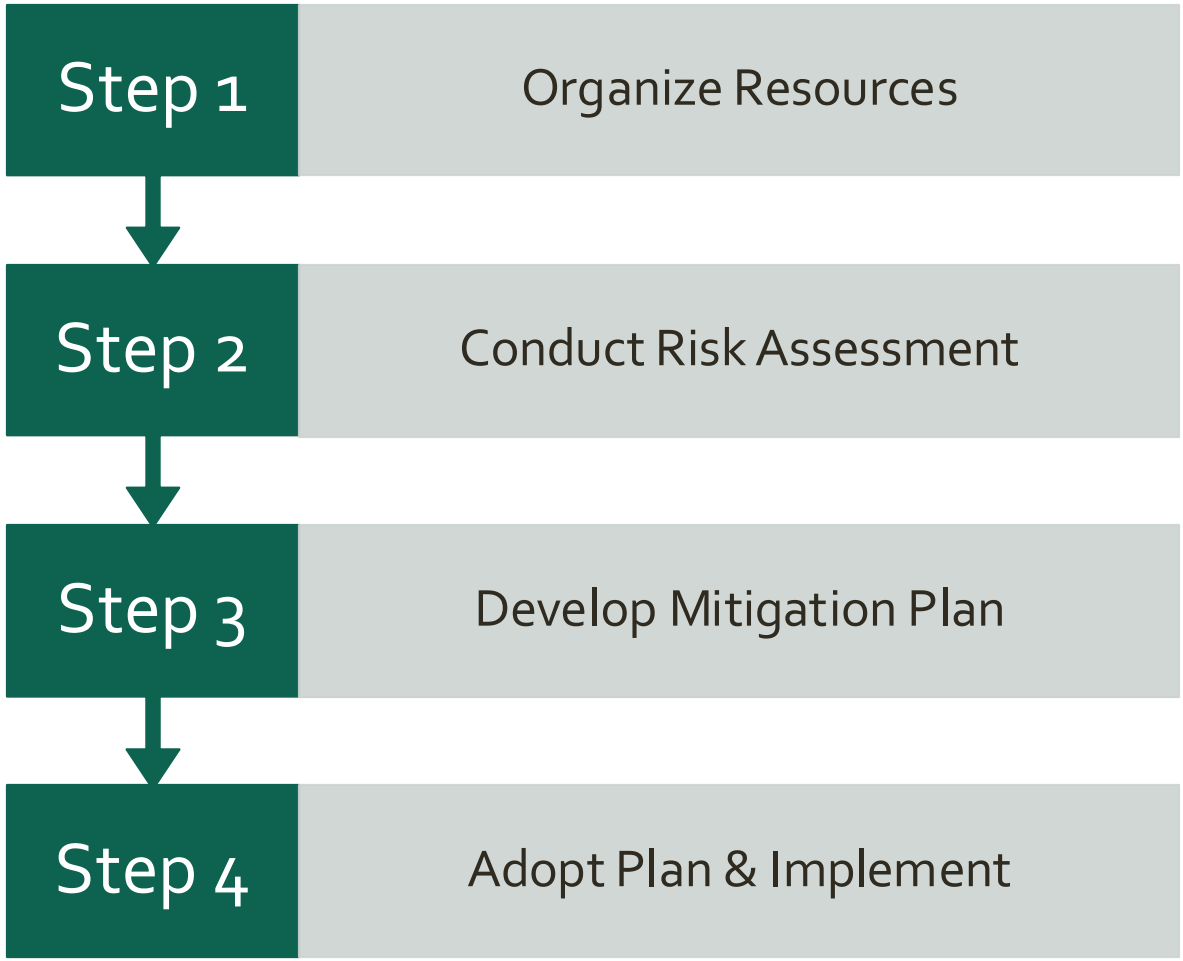
The Plan Update ensures that the participating jurisdictions are better prepared to:

1. Address existing and emerging hazards
2. Protect lives and property
3. Sustain continuity of essential services during and following an event



Planning Process

How will it be done?



Step 1: Organize Resources

Planning	Planning for Public Involvement
Coordinating	Coordinating with Departments and Agencies
Finalizing	Finalizing a List of Stakeholders for Involvement (HMPC)



Hazard Identification

What Can Happen Here?

- Previously Identified Hazards
- Identify New Hazards



Vulnerability Assessment

What Will be Affected/Impacted?

- Will Use County Parcel Data, FEMA HAZUS Analysis, and NCEM Data



Capability Assessment

What Can We Do About It?

- What Mitigation Actions are Feasible
- Where Gaps Exist

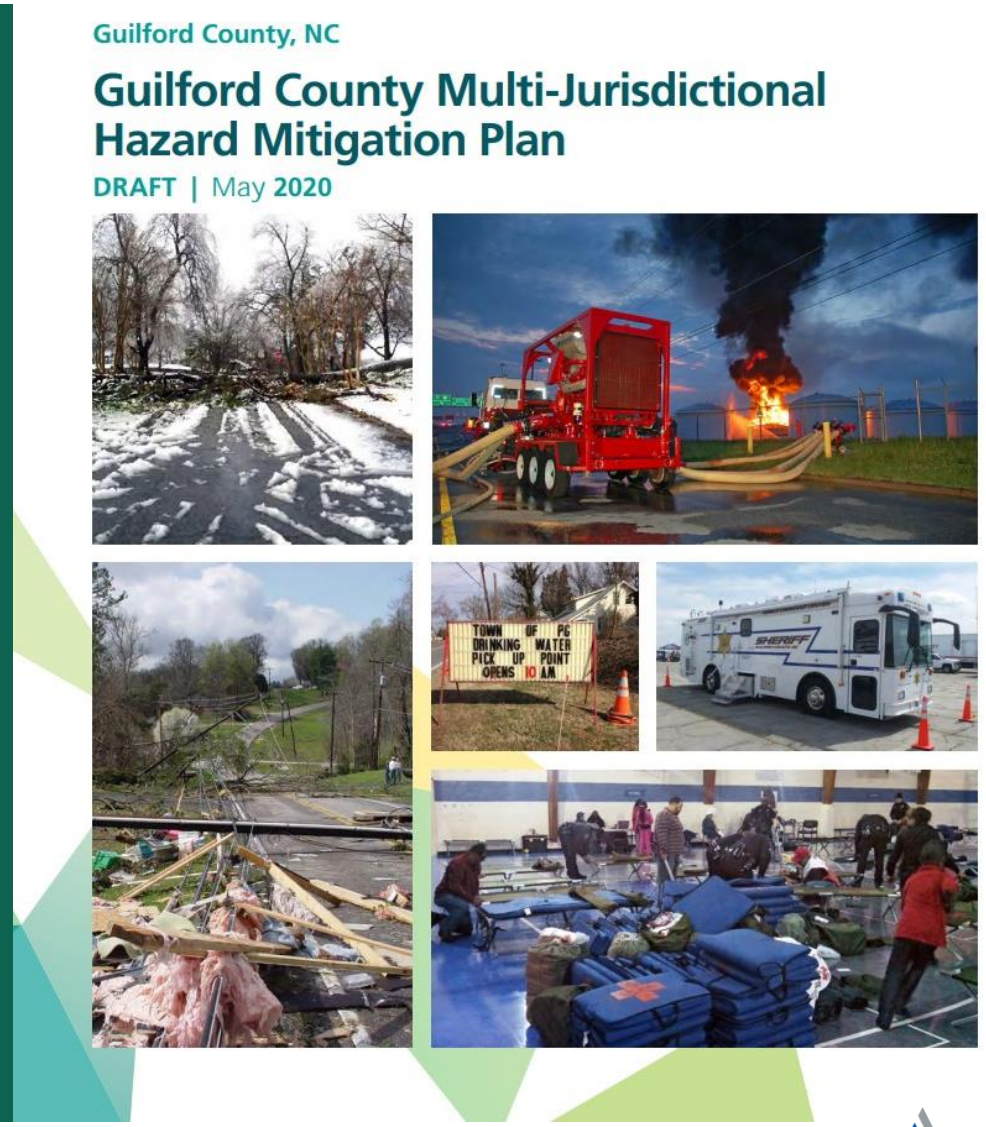
Step 2: Risk Assessment

Previously Identified Hazards (2020)

HIGH RISK	Winter Storm Hurricane / Other Tropical Disturbance Thunderstorm (Wind/Lightning) Flooding Hazardous Materials Incident Tornado Public Health / Emerging Disease Threat Communications Systems Disruption / Failure
MODERATE RISK	Energy / Power / Utility Failure Transportation Incident Drought Resource Shortage (Water / Fuel) Pipeline Failure Cyber-Security Threat Hail Extreme Heat
LOW RISK	Fire Bioterrorism Civil Disturbance Terrorism Extreme Cold Nuclear Power Plant Emergency Earthquake Building / Structure Collapse

Step 3: Develop a Mitigation Plan

1. Setting Planning Goals
2. Reviewing Mitigation Alternatives
3. Drafting an Action Plan



Step 4: Adopt Plan and Implement Actions

- Seeking Review and Approval from Relevant Authorities
- Securing Funding and Managing Resources of Mitigation Projects and Activities
- Executing the Identified Mitigation Actions
- Continuously Monitoring the Progress of Mitigation Activities

Integration Efforts

Leveraging existing efforts ensures a more robust and efficient hazard mitigation plan, supporting:

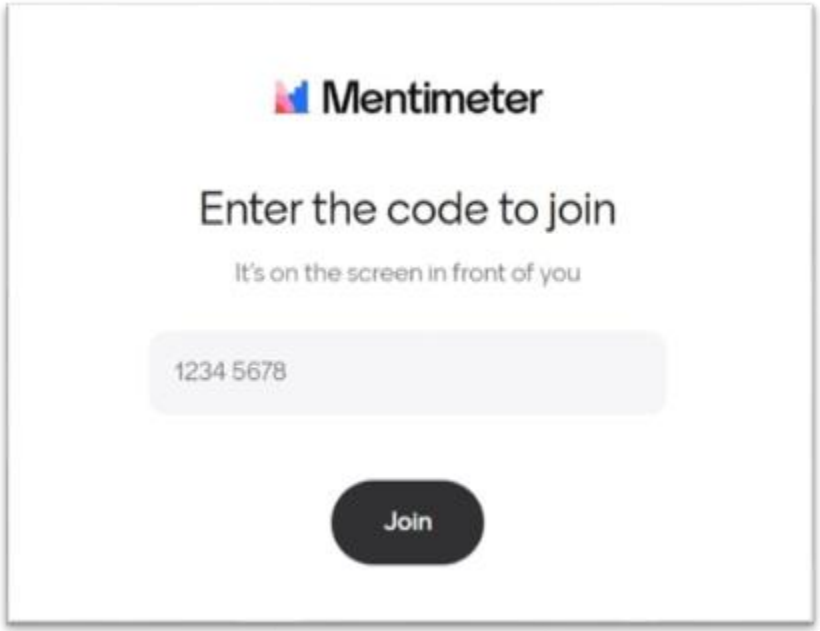
1. Comprehensive Risk Perspective
2. Resource Optimization
3. Enhanced Coordination
4. Plan Continuity and Alignment
5. Stakeholder Buy-In

Interactive Session

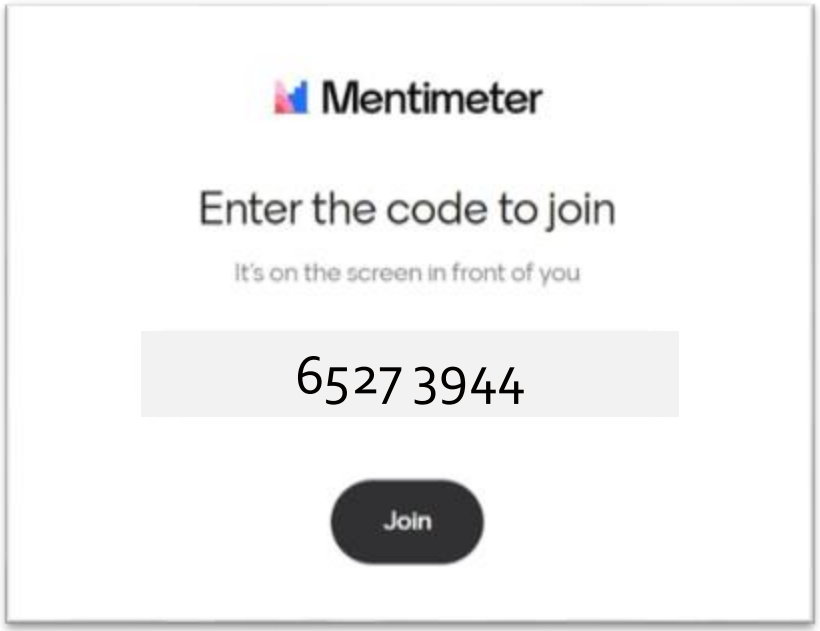
SWOT Analysis

We'll be going through a series of open-ended questions that will be used to inform the plan update.

Your input matters!



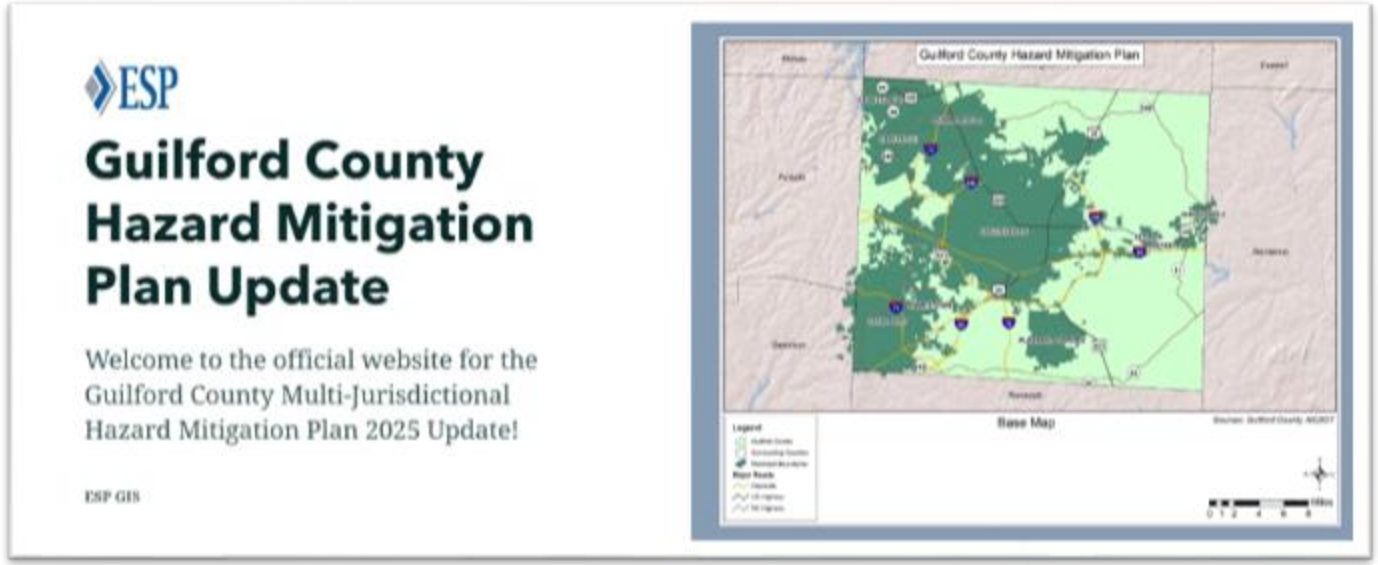
Menti Poll


Mentimeter
Enter the code to join
It's on the screen in front of you
6527 3944
Join

Project Information

- Project Team requests counties/municipalities post relevant project information and updates
- Can be used as a Tool for HMPC Coordination and Public Outreach
- Project Website & Public Survey are readily available online!

Visit and Share the Project Website



This website will be updated regularly throughout the planning process to provide access to:

1. Project Overview
2. Meeting Minutes & Presentations
3. Public Survey
4. Previous HMP (2020)
5. Relevant Planning Resources

Complete and Share the Public Survey!

Scan the QR Code for Access to the Public Survey!

Project Schedule

Project Kickoff Date – 5/16/25	Larger Stakeholder Meeting – 6/24/25	Public Meeting #1 – TBD
HIRA/Mitigation Meeting – Mid Summer 2025	Public Meeting #2 – TBD	Proposed Delivery of Draft Plan – 7/19/25
	Existing Plan Expiration Date – 1/19/26	



Your Role Moving Forward

Participating local jurisdictions play a critical role in the plan update and we wanted to reiterate that your input/expertise ensures plan relevance and usefulness:

1. **Tell us who should be involved in the process.** Have we missed anyone? This can include community groups, non-profits, businesses, etc.
2. **Share the project website to your county/municipal page.** We're actively updating this site, so sharing/promoting is all you need to do!
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Your Role Moving Forward cont.

Participating local jurisdictions play a critical role in the plan update and we wanted to reiterate that your input/expertise ensures plan relevance and usefulness:

5. **Review your Capability Assessment.** Identify new capabilities or adjust existing capabilities. Efforts underway should be noted.
6. **Review your Mitigation Plan.** Provide a detailed status update on each action and brainstorm new actions that address existing gaps/weaknesses.
7. **Collaborate amongst other agencies/departments.** This update spans beyond EM and will benefit from the cross-sectoral collaboration/expertise.
8. **Reach out to smaller jurisdictions to ensure their participation.** Whether actively present or represented through the county, this will help expedite the update and adoption process.



Questions

Questions/Comments/Concerns

Adjourn –
Thank you!

Guilford County Contact Information

Catherine Hughes –

chughes@guilford-es.com

Tommy Sluder –

csluder@guilford-es.com

Adjourn – Thank you!

Contractor Contact Information
Nathan Slaughter – nslaughter@espassociates.com
John Flores – jflores@espassociates.com
Hannah DeLude – hdelude@espassociates.com
David Stroud – david.stroud@wsp.com
Abigail Moore – abigail.moore@wsp.com

HIRA Meeting
August 26th, 2025
3:00pm – 4:00pm
Jamestown, NC

I. Meeting Objectives

a. IDENTIFY HAZARDS
b. ASSESS HAZARDS AND VULNERABILITY
c. DETERMINE POTENTIAL IMPACTS AND PRIORITIES
d. DISCUSS FINDINGS
e. EDUCATE AND INFORM

II. Hazard Identification and Risk Assessment

a. IDENTIFIED HAZARDS
b. PROFILED HAZARD EVENTS
c. INVENTORIED ASSETS
d. ESTIMATED LOSSES

III. Capability Assessment

a. CAPABILITY INDICATORS
b. CAPABILITY OVERALL RATINGS
c. SUBSTANTIAL DAMAGE ESTIMATES (SDE) PROCEDURES

IV. Mitigation Strategy

a. PRIORITY RISK INDEX (PRI) SCORES
b. MITIGATION GOALS
c. MITIGATION ALTERNATIVES (EXISTING AND NEW)
d. MITIGATION ACTION PLAN

V. Initial Public Survey Results

a. TOTAL RESPONSES TO DATE
b. KEY FINDINGS

VI. Next Steps

a. SUBMIT UPDATED AND NEW MITIGATION ACTIONS
b. REVIEW DRAFT CAPABILITY ASSESSMENT
c. SUBMIT DRAFT PLAN FALL 2025

HIRA Meeting
August 26th, 2026
Jamestown, NC
3:00pm – 4:30pm

Participants

Guilford County		
Name	**Organization**	**Role/Department**
Alderman, Scott	Town of Kernersville	Fire Rescue Chief
Baker, Conor	Guilford County	Emergency Management Coordinator
Byers, Mitchell	Guilford County	GIS Specialist
Carmon, Robert	Guilford County	Fire Marshal
Carpenter, Matt	City of High Point	Traffic Operations Engineer
Cox, Paula	Guilford County	Environmental Health Division Director
Dinkins, Ashley	Guilford County	Health and Environmental Risk Assessment Team Supervisor
Dorestant, Shree	City of Greensboro	Chief Sustainability Officer
Felts, Robert	City of Greensboro	Risk and Safety Administrator
Foster, Michael	City of High Point	Assistant Fire Chief/Emergency Manager
Gatlin, Brent	Guilford County	Watershed Engineer/Floodplain Administrator
Godwin, Dwight	Guilford County	Parks and Recreation Director
Griffith, Todd	Guilford County	Fire Life Safety Coordinator
Grose, Steven	City of High Point	HPPD Special Projects Coordinator
Hardin, Jason	Guilford County	Deputy Planning and Development Director
Hill, Johnnie	City of Greensboro	Engineering Supervisor
Horne, Karen	Town of Whitsett	Town Administrator
Hughes, Catherine	Guilford County	Emergency Management Coordinator
Isley, Marlena	Guilford County	GIS Manager
Keller, Robin	Guilford County	Clerk to Board
Kurfees, James	Guilford County	Chief Technology Officer
Lewis, Michael	City of Greensboro	Deputy Director of Development Services
Lyons Legrande, Maria	Guilford County	Continual Care Specialist
Mack, Debra	Guilford County	Mental Health Director
McCartney, Jeffrey	Guilford County	Chief Information Security Director
McElroy, Linda	Guilford County	Communications Director
Ortega, Jorge	Guilford County	Animal Services Director
Purcell, Peter	Guilford County	Chief Information Officer
Quick, Danielle	City of Greensboro	Senior Engineering Specialist
Ramachandran, Anita	Guilford County	Public Health Director
Riner, Donna	Guilford County	Deputy Director of Registry of Deeds
Roberts, Vince	Guilford County	Social Services Agency Business Manager
Royal, Ashley	Town of Oak Ridge	Deputy Town Clerk
Salgado, Dennis	City of High Point	Chief Park Ranger
Shelly, Robert	Guilford County	Veterans Service Director
Shepard, Cameron	Town of Julian	Fire Chief
Sluder, Tommy	Guilford County	Senior Emergency Management Coordinator

Snyder, Justin	Town of Summerfield	Planning Director
Spillman, Virginia	City of Greensboro	Assistant Director of Water Resources
Tardiff, James	Guilford County	Stormwater Program Administrator
Townsend, Michael	Guilford County	Assistant Fire Marshall
Warn, Donald	Guilford County	Chief Financial Officer
Zimmerman, Irma	Guilford County	Transit Services Manager
Outside Stakeholders		
Name	**Organization**	**Role/Department**
Baker, Carl	NCEM	Mitigation Plans Manager
Day, Jesse	PTRC	Regional Planning Director
DeLude, Hannah	ESP Associates	Hazard Mitigation Planner
Flores, John	ESP Associates	Hazard Mitigation Planner
Lytle, Amy	Hands on NWNC	Executive Director
Mello, John	NCEM	Hazard Mitigation Planner
Slaughter, Nathan	ESP Associates	Project Manager
Staley, Dakota	NC A&T	Emergency Management Specialist
Thomas, Jermaine	Bennett College	Executive Director of Campus Operations

Introductions & Meeting Objectives

Catherine Hughes, Emergency Management Coordinator, welcomed all participants to the meeting and gave a brief overview of the meeting agenda and objectives. Meeting objectives included (1) HIRA Purpose in Mitigation, (2) Build Consensus, (3) Confirm PRI, and (4) Link Mitigation. Nathan Slaughter, Project Manager with ESP Associates, then proceeded to facilitate the remainder of the presentation. This meeting was focused on sharing initial findings (quantitative analysis) and collecting targeted feedback from the HMPC (qualitative analysis/ground truthing).

Brief HIRA Overview

To provide context at the front end of the meeting, the role of HIRA in mitigation was reviewed in great depth. HIRA, which stands for Hazard Identification and Risk Assessment, serves as the foundation for developing effective mitigation plans. It is essential not only for state and federal compliance, but also guides the entire planning process. By understanding the risks associated with various hazards and having an HMP in place, communities can better position themselves for important funding sources, such as the Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), and the Flood Mitigation Assistance (FMA) program.

Essential steps in the HIRA process were summarized. The HIRA process begins with the identification of hazards that may impact communities, using data and information from various sources, including existing plans and the North Carolina Hazard Mitigation Plan. The County has a comprehensive list of hazards exceeding the State Plan. Using best available data, hazard impacts and the susceptibility of local assets and infrastructure are then assessed to estimate the

associated risks to property, people, and infrastructure. Guilford County is a relatively dense areas, meaning there is more infrastructure/critical facilities to consider. The Priority Risk Index (PRI) is developed to help prioritize risks, using a scoring matrix, to inform mitigation efforts.

In addition to assessing hazards and their impacts, community capability is considered. This involves identifying existing gaps, conflicts, and opportunities within current systems, while also highlighting past achievements in mitigation. Documentation is an essential component of the plan update as FEMA emphasizes the need to maintain a clear record of the findings, methodologies, and processes involved.

Risk Assessment Findings

The initial assessment findings for the plan update were shared with a focus on the high-risk hazards and the risk assessment methodology. The process began with a review of past disaster declarations to understand the historical context of hazards affecting the county. Each significant hazard was profiled in line with FEMA requirements and summarized during the meeting. The presentation focused on profiles of the top five highest risk hazards (in order) which included:

1. Excessive Heat – This is the leading cause of injury and/or death that is hazard-related. Its impacts are critical, and its spatial extent is large. Events could quadruple by the 2060s.
2. Flooding – This hazard varies per jurisdiction. Heavy rain events (exacerbated by climate change) can lead to decreased warning time. Flood models are based on older maps and do not account for heavy rainfall.
3. Severe Winter Weather – This hazard does not result in a lot of damage. Winter weather does pose a risk to the community as it impacts driving conditions.
4. Dam & Levee Failure – There has been more interest in dams since Matthew, Florence, and Helene. The HHPD is now in place and in order to qualify for the program, the dam needs to be in poor/unsatisfactory condition.
5. Drought – This hazard impacts other hazards such as wildfire or water supply issues. This hazard may not be as much of a risk as it is currently being scored.

These findings were presented to the group, and the PRI scoring would be reviewed and updated. This information will be used to guide upcoming mitigation planning efforts and help prioritize strategies to reduce risk and enhance community resilience against the identified hazards faced by Guilford County. Additionally, it was noted that new localized data from the County is going to be supplemented for the critical facilities inventory. This will ensure the information is accurate and relevant.

Initial PRI Findings

High Risk (≥ 3.0)	Excessive Heat Flooding Severe Winter Weather
Moderate Risk (2.0 – 2.9)	Dam & Levee Failure Drought Hurricane & Tropical Storm Tornadoes/Thunderstorm Wind/Hail Wildfire Infectious Disease Cyber Threat Hazardous Substances Radiological Emergency Bioterrorism Civil Disturbance Communications Systems Disruption/Failure Energy/Power/Utility Failure Pipeline Failure Resource Shortage Transportation Incident Terrorism
Low Risk (< 2.0)	Earthquake Lightning Building/Structure Collapse

The initial priority risk index (PRI) scores were reviewed, noting that input received from the HMPC would be used to adjust the scoring. It was suggested that Cyber be increased to high-risk. Adjacent communities have experienced cyber threats/instances. Although the County has tools in place to mitigate the threat, there is a significant cyber risk that continues to grow. The length of time for these events can be significant and the frequency may be inaccurate (data isn't necessarily tracked).

Informing Mitigation Actions

The connection between the HIRA and mitigation strategies was outlined. With a clearer understanding of risks, the conversation shifted towards developing informed, effective, and practical mitigation measures. The mitigation action plan includes existing actions from each jurisdiction. The implementation status of each action must be reviewed to ensure compliance with FEMA requirements. Additionally, there is an opportunity to incorporate new projects as part of the mitigation action plan.

Project Schedule

The typical timeline to update a hazard mitigation plan is typically one year. This update, however, is being conducted on a shorter project timeline to ensure completion before the current plan expires on January 19th, 2026. With this accelerated schedule, the draft plan is anticipated to be completed by late fall 2025, allowing for sufficient review time, adoption, and continued eligibility for state and federal mitigation funding programs.

Project Information/Resources

The team highlighted that the project website and public survey were already accessible online and would be updated regularly throughout the planning process. The website provides key resources, including the project overview, meeting minutes and presentations, the public survey, the previous HMP, and relevant planning resources. The public survey had over 200 responses at the time of the meeting, indicating high public engagement. The survey will close at the end of August to ensure adequate time to review, analyze, and incorporate survey findings.

Meeting Closeout

The meeting concluded with a call for collaborative updates among counties and municipalities. Contact information was shared at this time. Meeting minutes and the presentation will be shared with participants and uploaded to the project website for documentation purposes. The meeting officially adjourned at 4:30pm.

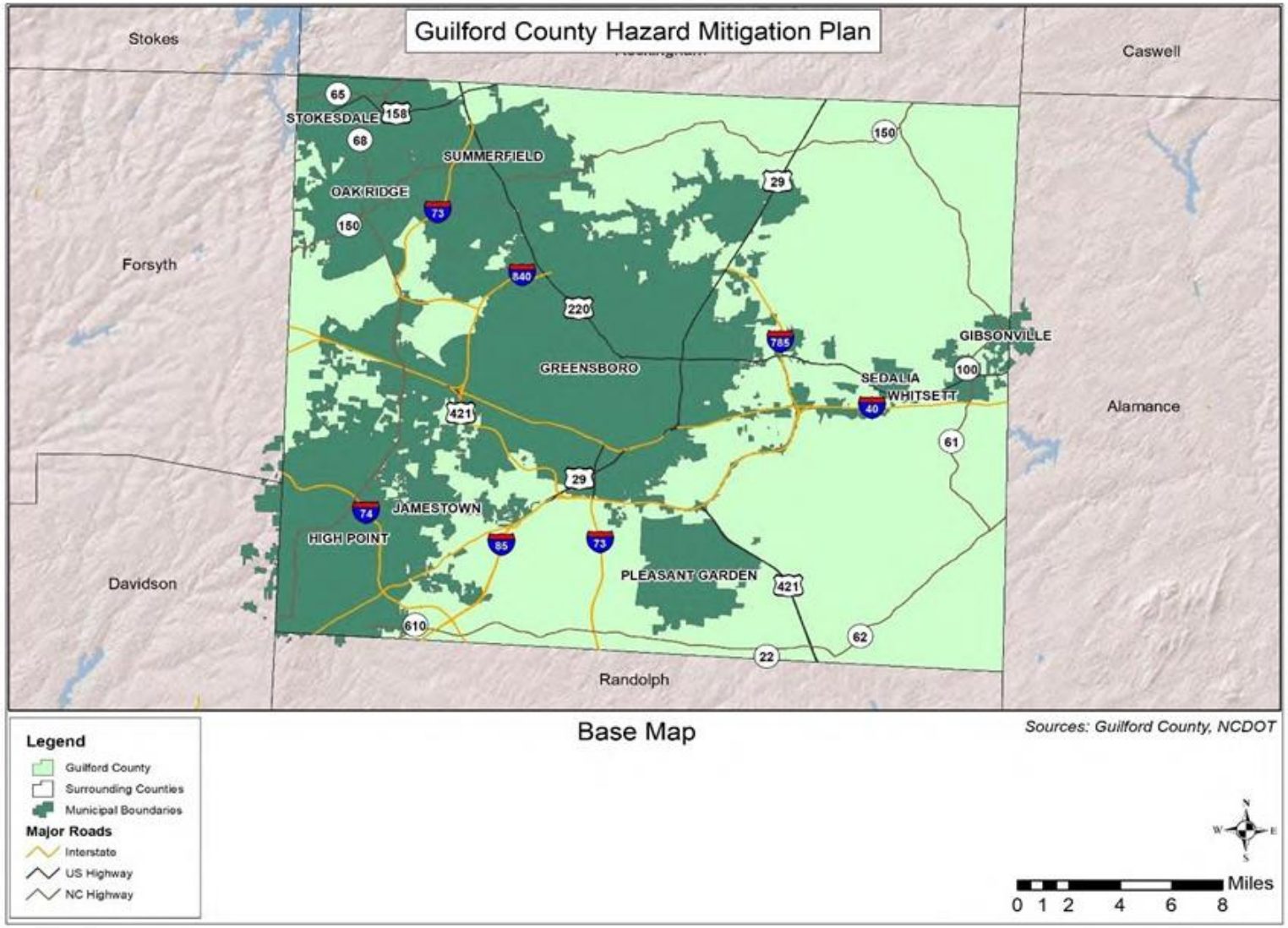
Guilford County

2025 Hazard Mitigation Plan Update

HIRA Meeting

August 26, 2025

High Point, NC



Agenda

- Welcome & Introductions
- Meeting Objectives
- HIRA Overview
- Risk Assessment Findings
- Public Survey Findings
- Project Schedule & Next Steps
- Q&A Session

Introductions

Welcome!

In-Person Attendees: Reminder to Sign-In

Virtual Attendees: Enter Name, Role, Organization in Chat

Meeting Objectives



Explain Purpose



Build Consensus



Confirm PRI



Link Mitigation

Importance of HIRA

What is HIRA?

- HIRA: Hazard Identification and Risk Assessment
- A systematic process for communities to identify hazards and evaluate risks

Importance of HIRA in Mitigation Planning

1. Foundation for Mitigation Plans – HIRA is a core component required by FEMA and State regulations
2. Guides Decision-Making – Helps communities prioritize actions and allocate resources effectively
3. Enhances Resilience – Aids in developing strategies to reduce risk and improve community capacity

Foundation for Mitigation Plans

State and Federal Compliance

- FEMA Compliance – Mandated by FEMA as part of the hazard mitigation planning process to qualify for federal assistance
- State Regulations – Many states, including North Carolina, have adopted similar requirements to align with FEMA guidelines

Best Practices and Standards

- Inclusive Stakeholder Engagement – Ensures various community voices, needs, and experiences are represented
- Incorporates Climate Change – Supports relevant and effective mitigation plans that address emerging risks

Guides Decision-Making



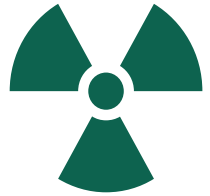
Data-Driven Insights

Comprehensive Hazard Analysis

- Identifies and evaluates all potential hazards
- Utilizes historical data and predictive modeling to assess future risk

Quantitative Risk Assessment

- Measures the likelihood of hazards occurring and potential impacts
- Provides numerical data that supports discussions and planning



Understanding Local Risks

Community-Specific Information

- Tailor assessment to reflect community characteristics (geography, demographics, etc.)
- Highlights unique vulnerabilities based on characteristics

Stakeholder Involvement

- Engages residents, business owners, and organizations
- Encourages sharing of local knowledge and experiences

Enhances Resilience

Proactive Risk Management

Promotes a culture of preparedness and resilience within communities, reducing the impact of disasters

Transparent Process

Fosters transparency by sharing data/findings with stakeholders to build trust and encourage community input

Long-Term Sustainability

Contributes to the long-term sustainability and safety of communities, minimizing future losses and/or damages

Shared Responsibility

Promotes a collaborative approach to hazard mitigation involving multiple stakeholders in the development and implementation of mitigation strategies

Problem Identification

The HIRA focuses on *problem identification*, which will then be used to develop solutions (mitigation actions).

Qualitative and quantitative analyses were conducted for problem identification:

1. Qualitative – Initial public survey results were used to identify general concerns and key hazard areas
2. Quantitative – Risk assessment findings were used to identify hazards and evaluate risk

Risk Assessment

The **risk assessment methodology** described in the FEMA publication *Understanding Your Risks – Identifying Hazards and Estimating Losses* was referenced throughout this update, which breaks the assessment down to a simple four-step process.



Caveat: Using Best Available Data

The 2025 Plan Update reflects the current **best available data.** Key resources used/referenced throughout the update process include, but are not limited to:

- NOAA/NCEI Storm Events
- NCEM RMT
- NCEM IRISK
- 2023 NC State HMP
- 2021 Guilford County HMP

Identify Significant Hazards

Profile Hazard Events

Inventory Assets

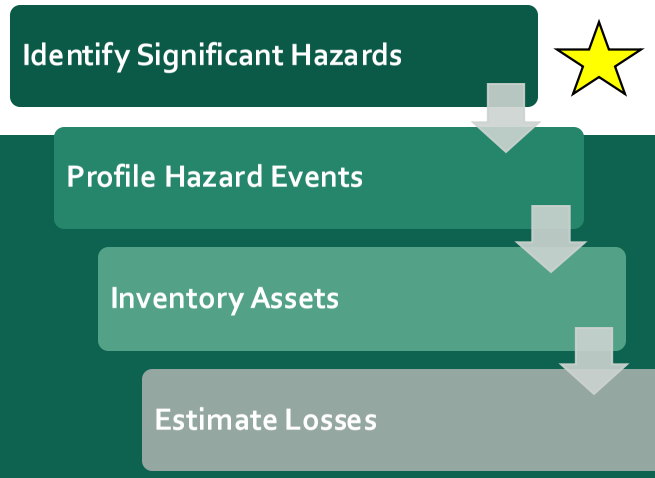
Estimate Losses

Step 1: Identify Significant Hazards

Significant hazard identification was completed using existing hazard data, past disaster declarations, local knowledge, and information from the 2023 State Plan and 2021 Guilford County Multi-Jurisdictional HMP.

Disaster #	Dec. Date	Incident Type	Event Title
844	9/25/1989	Hurricane	Hurricane Hugo
827	5/17/1989	Tornado	Tornadoes
1134	9/6/1996	Hurricane	Hurricane Fran
1103	2/23/1996	Snowstorm	Winter Storm
1087	1/13/1996	Snowstorm	Blizzard of 96
1292	9/16/1999	Hurricane	Hurricane Floyd
1312	1/31/2000	Severe Storm	Severe Winter Storm
1457	3/27/2003	Severe Ice Storm	Ice Storm
1448	12/12/2002	Severe Ice Storm	Severe Ice Storm
1553	9/18/2004	Hurricane	Hurricane Ivan
4167	3/31/2014	Severe Ice Storm	Severe Winter Storm
4393	9/14/2018	Hurricane	Hurricane Florence
4364	5/8/2018	Severe Storm	Tornado and Severe Storms
4487	3/25/2020	Biological	COVID-19 Pandemic

Source: FEMA Disaster Declarations Summary, June 27, 2025



Step 1: Identify Significant Hazards

Hazard	Included in 2023 State HMP?	Included in 2021 Guilford County HMP?	Included in 2025 Guilford County HMP?
Flooding	X	X	X
Hurricanes and Coastal Hazards	X	X	X
Severe Winter Weather	X	X	X
Excessive Heat	X	X	X
Earthquake	X	X	X
Wildfire	X	X	X
Dam & Levee Failure	X	--	X
Drought	X	X	X
Tornadoes/Thunderstorms	X	X	X
Landslide	X	--	X
Sinkholes	X	--	--
Hazardous Substances	X	X	X
Radiological Emergency	X	X	X
Terrorism	X	X	X
Bioterrorism	--	X	X
Infectious Disease	X	X	X
Cyber Threat	X	X	X
Electromagnetic Pulse	X	--	--
Civil Disturbance	X	X	X
Food Emergency	X	--	--
Building/Structural Collapse	--	X	X
Pipeline Failure	--	X	X
Transportation Incident	--	X	X
Energy/Power/Utility Failure	--	X	X
Communications System Disruption/Failure	--	X	X
Resource Storage (Water/Fuel)	--	X	X



Step 2: Profile Hazard Events

44 CFR Requirement

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

Hazard profiles were created for significant hazards for further evaluation, which considers the following factors:

1. Background
2. Location
3. Extent
4. Historical Occurrence
5. Probability of Future Occurrence
6. Changing Future Conditions
7. Summaries by Jurisdiction
8. Vulnerability Assessment

***Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage.*



Step 2: Profile Hazard Events

The hazard profiles summarized on subsequent slides pose the greatest threat to the region and include:

1. Excessive Heat (High Risk)
2. Flooding (High Risk)
3. Severe Winter Weather (High Risk)
4. Dam & Levee Failure (Moderate Risk)
5. Drought (Moderate Risk)

***Hazard risk was quantified using the Priority Risk Index (PRI), which will be discussed in-depth before presenting initial HIRA findings. Information gathered for the hazard profiles was used to complete the PRI scoring matrix.*

Excessive Heat

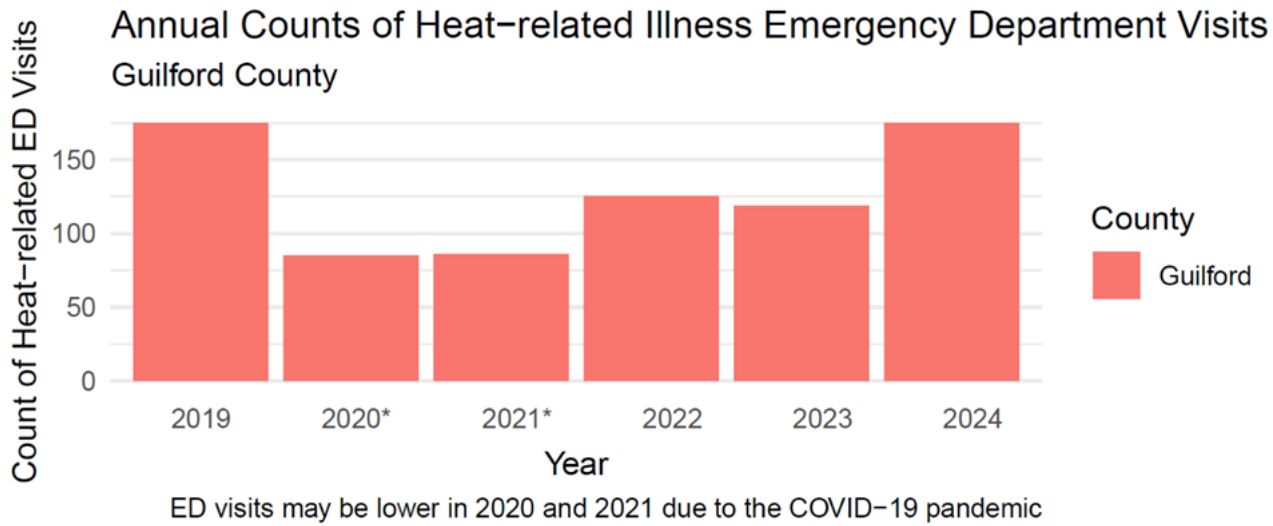
Probability	Impact	Spatial Extent	Warning Time	Duration
Highly Likely	Critical	Large	> 24 hours	< 1 Week

Definition – A long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees.

Recorded Events – According to the NC Climate Office and the Heat Index Climatology Tool, a total of 256 extreme heat events have occurred between 1999-2024.

Climate Change – County-specific climate projections indicate that extreme heat days in the region could more than quadruple by 2060.

Key Vulnerabilities – Consequences will most likely impact the public, responders, the environment, and farmers.



Source: NC DETECT

Flooding

Probability	Impact	Spatial Extent	Warning Time	Duration
Possible – Highly Likely	Critical	Negligible-Small	6 to 12 hours	< 1 Week

Definition – The rising and overflowing of water onto normally dry land; a general and temporary condition of partial or complete inundation of 2 or more acres/properties

Recorded Events – The NCEI records 126 total flash flood and flood incidents occurring in Guilford County between 1999-2024, totaling over $18 million in property damages.

Climate Change – The county averages 9 days/decade of extreme precipitation and this number is likely to increase to 12 day/decade by 2060.

Key Vulnerabilities – Over 6% of the county falls within the SFHA. Greensboro, Jamestown, and High Point all have more than 8% of their areas in the SFHA.

Jurisdiction	Event Count	Deaths	Injuries	Property Damage	Crop Damage
Gibsonville	0	0	0	$0	$0
Greensboro	39	1	0	$2,322,000	$0
High Point	9	0	0	$15,130,000	$5,000,000
Jamestown	2	0	0	$15,000	$0
Oak Ridge	3	0	0	$0	$0
Pleasant Garden	2	0	0	$0	$0
Sedalia	0	0	0	$0	$0
Stokesdale	0	0	0	$0	$0
Summerfield	6	0	0	$0	$0
Whitsett	0	0	0	$0	$0
Guilford County (unincorporated)	65	0	0	$910,000	$0
Total	126	1	0	$18,377,000	$5,000,000

Summary of Historical Flood Occurrences by Participating Jurisdiction (1999-2024)
Source: NCEI

Severe Winter Weather

Probability	Impact	Spatial Extent	Warning Time	Duration
Highly Likely	Limited	Large	> 24 hours	< 1 Week

Definition – A heavy snow event involves an accumulation of 4+ inches in 12 hours or less; an ice storm has significant amounts of freezing rain/are a result of cold air damming

Recorded Events – The NCEI records 75 total severe winter weather events occurring in Guilford County between 1999-2024, totaling nearly $9 million in property damages.

Climate Change – There is a level of uncertainty associated with climate change impacts on future severe winter storms.

Key Vulnerabilities – Hazardous driving conditions, power outages, disruption of utilities, and school/business closures are primary impacts of winter weather in the county.

Number	Date	Disaster Type	Incident Start	Incident End
EM 3033	3/2/1977	Drought and Freezing	3/2/1977	3/2/1977
EM 3110	3/17/1993	Severe Snowfall and Winter Storm	3/13/1993	3/17/1993
DR 1087	1/13/1996	Blizzard	1/6/1996	1/13/1996
DR 1103	2/23/1996	Snowstorm	2/2/1996	2/9/1996
DR 1448	12/12/2002	Severe Ice Storm	12/4/2002	12/6/2002
DR 1457	3/27/2003	Ice Storm	2/27/2003	2/28/2003
DR 4167	3/31/2014	Severe Winter Storm	3/6/2014	3/7/2014

Emergency & Disaster Declarations in Guilford County due to Severe Winter Weather
Source: FEMA

Dam & Levee Failure

Probability	Impact	Spatial Extent	Warning Time	Duration
Unlike - Possible	Limited - Critical	Negligible	< 6 hours	< 1 Week

Definition – A dam failure is the collapse or breach of a dam that causes downstream flooding; usually occurs when the spillway capacity is inadequate

Recorded Events – There are no records of damages, deaths, or injuries with dam failure in Guilford County.

Climate Change – There is a level of uncertainty associated with climate change impacts on future severe winter storms.

Key Vulnerabilities – There are a total of 398 dams in Guilford County, where 85 are rated as high hazard.

Dam Name	NID ID	Inspection Date	Nearest City & Distance (mi.)	EAP in Place
Forest Oaks Lake Dam	NC00676	08/14/2024	Alamance, 16 mi	Y
Friendly Lake Dam	NC00593	08/12/2024	Greensboro, 1 mi	Y
Pringle Dam	NC04757	02/01/2024	Greensboro, 2 mi	N
Roth Dam	NC02819	08/13/2024	Randleman, 14 mi	N
Welborn Dam	NC02807	01/30/2024	Randleman, 10 mi	N

High Hazard Dams in Guilford County with Condition Assessment of "Poor"
Source: National Inventory of Dams;

Drought

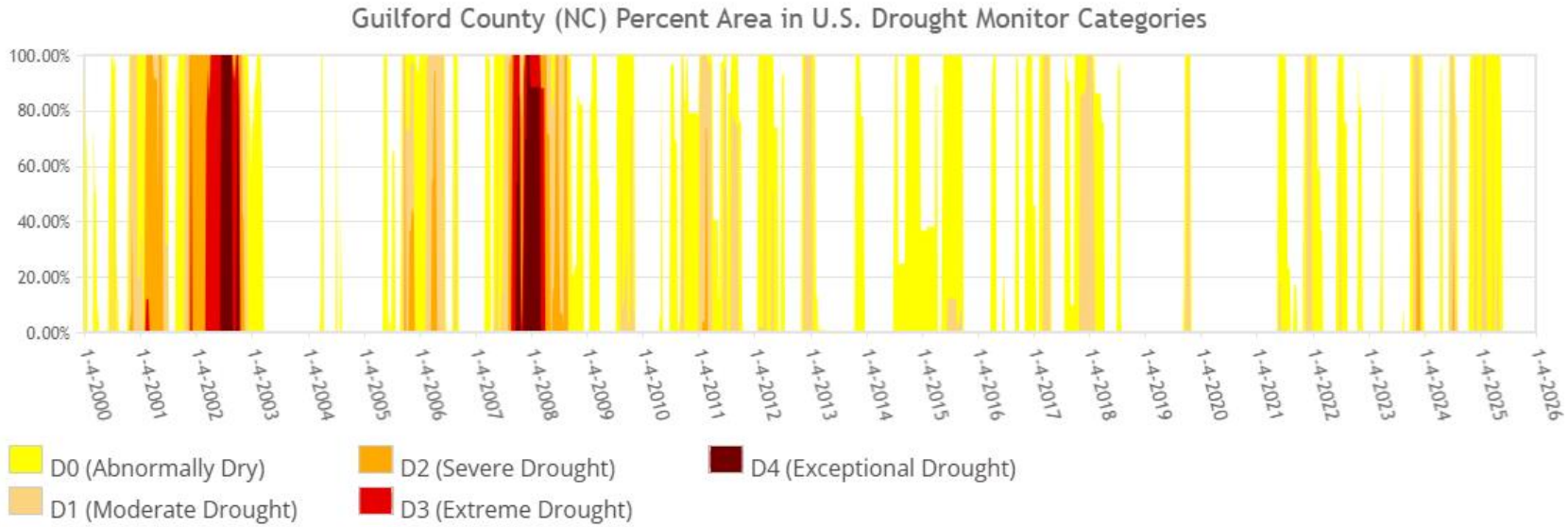
Probability	Impact	Spatial Extent	Warning Time	Duration
Likely	Minor - Limited	Large	> 24 hours	> 1 Week

Definition – A deficiency in precipitation over an extended period of time; the duration of a drought varies widely

Recorded Events – The US Drought Monitor indicates Guilford County was in some level of drought condition 52% of the time between 2000 and 2025.

Climate Change – Increased temperature, increased evaporation rates, & decreased surface soil moisture levels) suggest that drought will increase in intensity/duration in the Southeast.

Key Vulnerabilities – Drought is most likely to impact the agricultural industry and local wildlife, while also heightening wildfire risk.



Drought Conditions in Guilford County (2000-2025)
Source: US Drought Monitor



Step 3: Inventory Assets

The **asset inventory** identified and quantified key assets as part of the risk assessment and reviewed:

1. Population (Total County, Elderly, and Children)
2. Properties (Building Counts and Values)
3. Critical Infrastructure and Key Resources (Key Resources by Type, Critical Facilities, High Potential Loss Properties, and Agriculture)



Step 3: Inventory Assets

Physical assets in the inventory consist of:

Improved property is expressed in terms of number of parcels and total assessed value of improvements (buildings) that may be exposed to identified hazards:

Occupancy Type	Improved Parcel Count	Total Improved Value
Agriculture	622	$150,103,515
Commercial	5,418	$6,836,373,056
Education	752	$1,878,378,395
Government	567	$1,261,635,363
Industrial	3,403	$4,165,028,461
Religious	8	$2,483,253
Residential	198,806	$31,483,313,516
Regional Total	209,576	$45,777,315,559

Current Improved Parcels, as of July 2025
Source: County Parcel Data; iRISK Database Building Footprints

Identify Significant Hazards

Profile Hazard Events

Inventory Assets

Estimate Losses

Step 3: Inventory Assets

Physical assets in the inventory consist of:

Critical facilities vary per jurisdiction. Identified critical facilities include fire stations, police stations, medical care facilities, schools, government facilities, emergency operation centers, and other building deemed important:

Jurisdiction	FEMA Lifeline Type								Total
	Communications	Energy	Food, Hydration, Shelter	Hazardous Materials	Health and Medical	Safety and Security	Transportation	Water Systems	
Unincorporated Guilford County	0	0	19	1	4	28	0	1	53
City of Greensboro	0	0	146	9	42	44	0	0	241
City of High Point	0	0	48	5	26	17	0	1	97
Town of Gibsonville	0	0	1	0	0	2	0	0	3
Town of Jamestown	0	0	0	0	0	1	0	0	1
Town of Oak Ridge	0	0	0	0	0	2	0	0	2
Town of Pleasant Garden	0	0	1	0	0	1	0	0	2
Town of Sedalia	0	0	1	0	0	0	0	0	1
Town of Stokesdale	0	0	0	0	0	1	0	0	1
Town of Summerfield	0	0	3	0	0	3	0	0	6
Town of Whitsett	0	0	0	0	0	1	0	0	1
Guilford County Total	0	0	219	15	72	100	0	2	408

Critical Facilities by FEMA Lifeline Type
Source: NCEM Risk Management Tool

Identify Significant Hazards

Profile Hazard Events

Inventory Assets

Estimate Losses

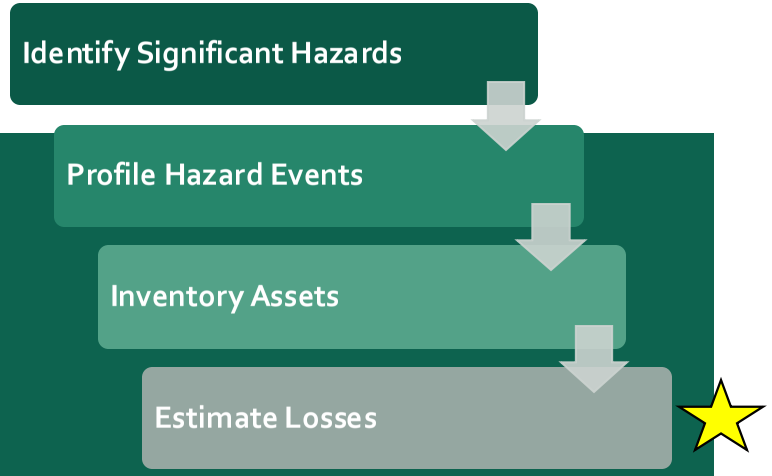
Step 3: Inventory Assets

Social assets are included as part of the vulnerability assessment:

Social assets are addressed to determine population at risk to the identified hazards. Key factors, such as age, may provide additional insights regarding socially vulnerable populations. An example is displayed below:

Jurisdiction	Total Population	Population at Risk		All Elderly Population	Elderly Population at Risk		All Children Population	Children at Risk	
		Number	Percent		Number	Percent		Number	Percent
Unincorporated Guilford County	126,765	128	0%	20,442	21	0%	7,162	7	0%
Greensboro	277,272	720	0%	39,884	104	0%	16,134	42	0%
High Point	105,221	315	0%	17,209	52	0%	6,407	19	0%
Gibsonville	4,488	21	0%	1,194	6	1%	177	1	1%
Jamestown	8,546	7	0%	1,847	1	0%	301	0	0%
Oak Ridge	8,318	3	0%	993	0	0%	399	0	0%
Pleasant Garden	5,294	0	0%	1,173	0	0%	170	0	0%
Sedalia	645	0	0%	94	0	0%	31	0	0%
Stokesdale	5,318	5	0%	587	1	0%	271	0	0%
Summerfield	11,050	0	0%	1,519	0	0%	680	0	0%
Whitsett	2,641	0	0%	282	0	0%	150	0	0%
Total	555,558	1,199	0%	85,224	185	0%	31,882	69	0%

Population Impacted by the 10 Year Flood Event
Source: NCEM Risk Management Tool



Step 4: Estimate Losses

A **vulnerability assessment** was conducted for each hazard to **estimate losses** based on its potential to cause significant human and/or monetary losses. Data used to support this assessment include:

1. Foundational GIS datasets (critical facilities, building footprints, topography, transportation layers)
2. Hazard-specific GIS datasets (state and federal agencies)
3. Existing and relevant plans (description of inventory and risks)
4. Exposure and vulnerability estimates (NCEM RMT/IRISK)
5. Risk and loss estimates (FEMA NRI)

Priority Risk Index (PRI)

The Priority Risk Index (PRI) Overview:

1. **Objective Scoring System** – Quantifies the level of risk for various hazards (scored low, moderate, and high)
2. **Key Factors Considered** – Probability of occurrence, impact severity, warning time, and duration of hazard event
3. **Prioritizes Hazards** – Helps identify which hazards pose the greatest threat
4. **Informs Mitigation Strategies** – Guides resource allocation to address the most significant risks

PRI Scoring Matrix

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	

Initial PRI Findings

High Risk (≥ 3.0)	Excessive Heat Flooding Severe Winter Weather
Moderate Risk (2.0 – 2.9)	Dam & Levee Failure Drought Hurricane & Tropical Storm Tornadoes/Thunderstorm Wind/Hail Wildfire Infectious Disease Cyber Threat Hazardous Substances Radiological Emergency Bioterrorism Civil Disturbance Communications Systems Disruption/Failure Energy/Power/Utility Failure Pipeline Failure Resource Shortage Transportation Incident Terrorism
Low Risk (< 2.0)	Earthquake Lightning Building/Structure Collapse

PRI Breakdown

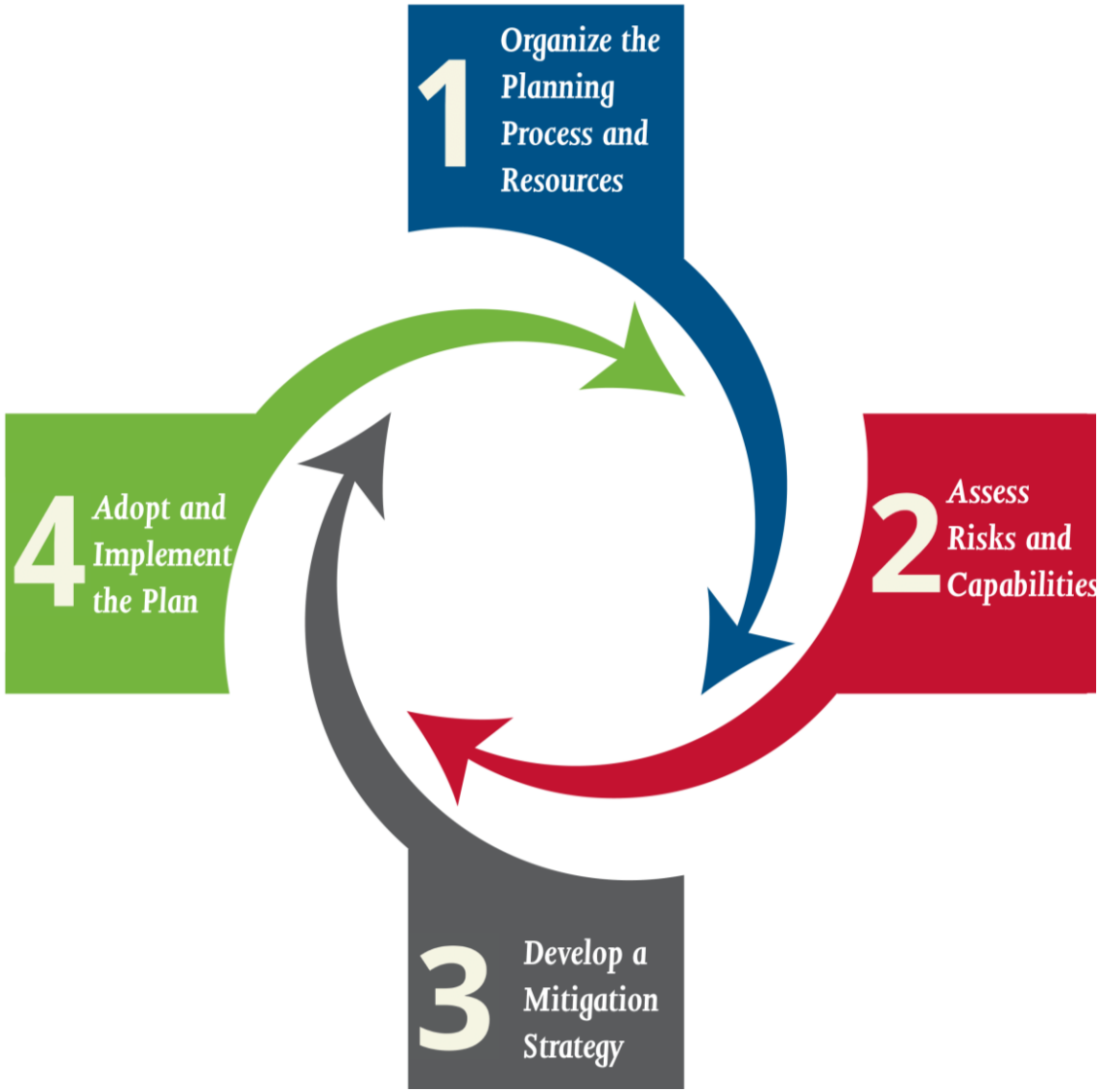
Summary of PRI Results for Top 5 Highest Ranked Hazards:

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Dam & Levee Failure[1]	Unlikely-Possible	Limited-Critical	Negligible	Less than 6 hrs	Less than 1 week	1.8-2.4
Drought[1]	Likely	Minor-Limited	Large	More than 24 hours	More than 1 week	2.5-2.8
Excessive Heat	Highly Likely	Critical	Large	More than 24 hours	Less than 1 week	3.3
Flooding[1]	Possible-Highly Likely	Critical	Negligible-Small	6 to 12 hours	Less than 1 week	2.5-3.1
Severe Winter Weather	Highly Likely	Limited	Large	More than 24 hours	Less than 1 week	3.0

1Note: PRI ratings for this hazard vary by jurisdiction. The range of ratings are shown here.

***Adjustments to any of the criteria listed will alter the overall PRI score and will be reflected in the final plan.*

Linking to Mitigation Strategy



Informing Mitigation Actions

Findings from the HIRA provide a strong foundation for the action mitigation plan, helping communities develop informed, effective, and practical mitigation strategies.



Ensures mitigation actions are based on comprehensive data and analysis



Combines knowledge of hazards, risks, and existing capabilities to form a robust yet feasible strategy



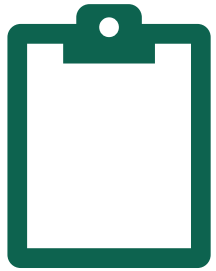
Focuses efforts on the most significant vulnerabilities and improves overall preparedness



Informs ongoing updates and refinements to the mitigation strategy as new data and insights emerge

Public Survey Results

Initial public survey results were used to identify:



Common concerns reflect common themes derived from open-ended survey responses



Hazard areas involve specific assets or areas in the region that were explicitly called out in survey responses

Common Concerns

Common concerns identified from the public survey results include:

- Infrastructure Failure
- Resource Shortage
- Chemical/Pollution Accidents
- Transportation Incidents
- Civil Unrest/Disturbance

Key Hazard Areas

Key hazard areas were identified through the public survey and captured in using a polygon feature.

1. Deep River (water quality)
2. Randleman Lake (water quality)
3. Bull Run Creek (water quality)
4. McLeansville Road and Huffine Mill Road (flooding due to Buffalo Creek)
5. Galimore Dairy and I-40 (hazardous substances)
6. Belews Lake Nuclear Plant (hazardous substances)

Additional areas identified during today's meeting will be added for consideration as well.

Initial Public Survey Results

Key findings are summarized below:



52% of respondents reside in Greensboro, NC.



Severe thunderstorm and high winds was identified as the #1 threat, followed by flooding.



41% of respondents have taken steps to make their home more resistant against hazards.



89% of respondents are interested in making their home more resistant to hazards.



85% of respondents do not know what office to contact to reduce their risk to hazards in their area.

Initial Public Survey Results

Key findings are summarized below:



Emergency Services – 85% of respondents ranked this technique as "Very Important."



Prevention - 80% of respondents ranked this technique as "Very Important."



Natural Resource Protection - 77% of respondents ranked this technique as "Very Important."



Public Education & Awareness - 76% of respondents ranked this technique as "Very Important."



Structural Projects - 68% of respondents ranked this technique as "Very Important."



Property Protection - 57% of respondents ranked this technique as "Very Important."

Next Steps

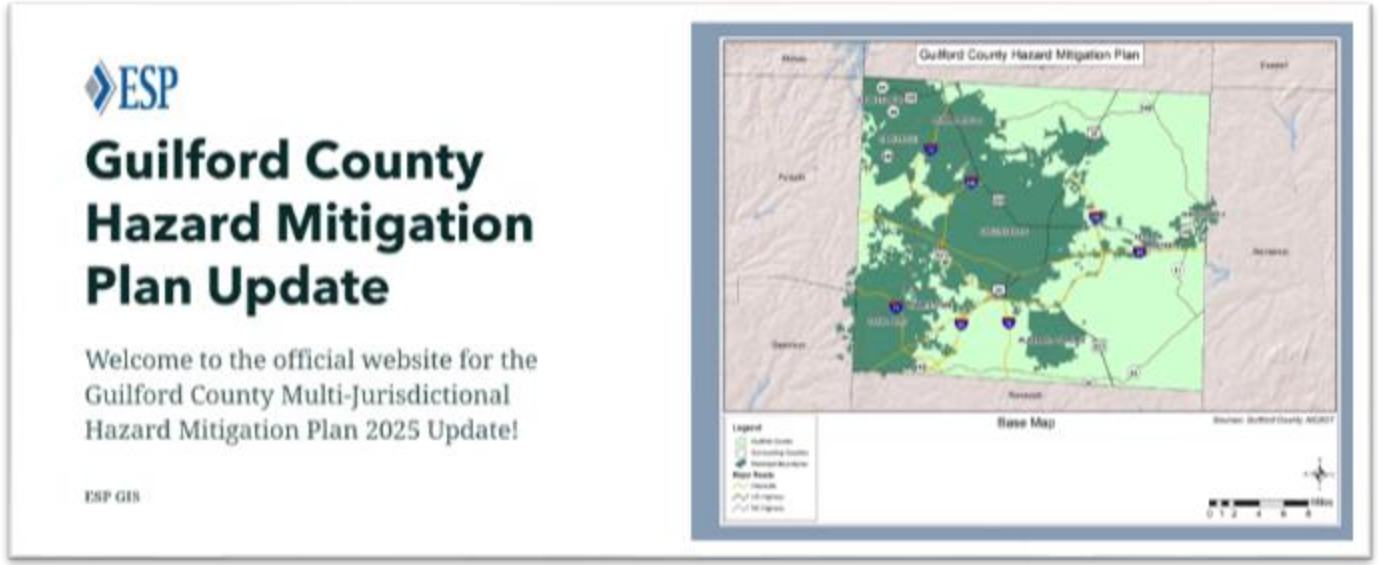
1. **<u>Review</u>: Follow-Up Meeting Materials**
   - HIRA and Public Survey Findings
2. **<u>Review</u>: Existing Mitigation Action Plan** (2021 HMP)
   - Review Status Updates for Each Action
3. **<u>Brainstorm</u>: New Mitigation Strategies** (2025 HMP)
   - Consider Evolving Needs and Conditions
   - Address Existing Gaps/Weaknesses

Project Schedule

Project Kickoff Date – 5/16/25	Larger Stakeholder Meeting – 6/24/25	Public Meeting #1 – 8/14/25
Public Meeting #2 – 8/26/25	**HIRA Meeting – 8/26/25**	Mitigation Meeting – Late Summer 2025
Proposed Delivery of Draft – Late Summer 2025	Existing Plan Expiration Date – 1/19/26	



Visit and Share the Project Website



This website will be updated regularly throughout the planning process to provide access to:

1. Project Overview
2. Meeting Minutes & Presentations
3. Public Survey
4. Previous HMP (2021)
5. Relevant Planning Resources

Complete and Share the Public Survey!

Scan the QR Code for Access to the Public Survey!



Questions

Questions/Comments/Concerns

Adjourn – Thank you!

Guilford County Contact Information:

Catherine Hughes – chughes@guilford-es.com

Tommy Sluder – csluder@guilford-es.com

Adjourn – Thank you!

Contractor Contact Information:

Nathan Slaugher – nslaughter@espassociates.com

Hannah DeLude – hdelude@espassociates.com

John Flore – jflores@espassociates.com

Fabiha Rahman – frahman@espassociates.com

David Stroud – david.stroud@wsp.com

Abigail Moore – abigail.moore@wsp.com

Public Meeting 1 & 2
August 14th, 2025 in Greensboro, NC
August 26th, 2025 in High Point, NC
6:00pm – 7:00pm

I. Meeting Objectives

a. ENGAGE THE COMMUNITY
b. GATHER INPUT
c. EDUCATE AND INFORM
d. ENHANCE PLAN RELEVANCE

II. Mitigation Overview

a. MITIGATION DEFINITIONS
b. TYPES OF MITIGATION
c. MITIGATION TECHNIQUES

III. Purpose of Update

a. REFLECT ON CHANGING RISKS
b. INCREASE COMMUNITY RESILIENCE
c. ENSURE COMPLIANCE AND FUNDING
d. INCREASE PREPAREDNESS

IV. Project Overview

a. FOUR-PHASE PLANNING PROCESS
b. PROJECT SCHEDULE
c. PLAN STRUCTURE
d. PLAN SECTIONS

V. Project Schedule

a. INTERNAL KICKOFF MEETING – 5/16/25
b. LARGER KICKOFF MEETING – 6/24/25
c. PROPOSED DELIVERY OF DRAFT – 7/19/25
d. EXISTING PLAN EXPIRATION DATE – 1/19/25

VI. Project Resources

a. PROJECT WEBSITE
b. PUBLIC SURVEY
c. CONTACT INFORMATION

Public Meetings #1 & #2
Summary Meeting Minutes
6:00pm – 7:00pm

Meeting minutes for Public Meetings #1 and #2 are combined since the meetings followed the same format. The Menti Polls conducted at the end of each meeting contain meeting-specific information, which can be found in the follow-up materials.

Participants

Public Meeting #1 and Public Meeting #2 for the Guilford County Multi-Jurisdictional Hazard Mitigation Plan were hybrid meetings held in the evening (6pm) for optimal turnout. The first public meeting was held at the NC Cooperative Extension Building on August 14, 2025, with 25 people in attendance. The second public meeting was held at the High Point Public Library on August 26, 2025, with a total of 15 people in attendance. The meetings were comprised of interested residents and municipal staff, ensuring diverse perspectives. Municipal staff are summarized below.

Guilford County		
Name	**Organization**	**Role/Department**
Foster, Michael	City of High Point	Assistant Fire Chief/Emergency Manager
Grose, Steven	City of High Point	Special Projects Coordinator
Hill, Johnnie	City of Greensboro	Engineering Supervisor
Hughes, Catherine	Guilford County	Emergency Management Coordinator
Quick, Danielle	City of Greensboro	Senior Engineering Specialist
Sluder, Tommy	Guilford County	Senior Emergency Management Coordinator
Outside Stakeholders		
Name	**Organization**	**Role/Department**
DeLude, Hannah	ESP Associates	Hazard Mitigation Planner
Hughes, Lauren	Northwest Guilford County CERT	President
Slaughter, Nathan	ESP Associates	Project Manager

**Note: Total number of participants was recorded, but participant-specific information will not be disclosed as part of the planning for privacy reasons.

Introductions & Meeting Objectives

Catherine Hughes, Emergency Management Coordinator, welcomed all participants to the meeting and gave a brief overview of the meeting agenda and objectives. Meeting objectives included (1) Engage the community, (2) Gather input, (3) Educate and inform, and (4) Enhance plan relevance. Nathan Slaughter, Project Manager with ESP Associates, then proceeded to facilitate the remainder of the presentation. In addition to the agenda and objectives, the format of the meeting was briefly explained, which would involve an educational component at the beginning of the meeting and an

interactive activity toward the end of the meeting. This activity was optional, allowing those who opted to stay to provide input that would be used to inform the planning process.

Brief Mitigation Overview

During the meeting, mitigation was reviewed, which refers to *proactive measures taken to reduce the impact of hazards before they occur*, with the goal of minimizing future risks and damages. It was noted that all mitigation actions are categorized into two major groups (existing development and future development) and fall under one of the six techniques summarized (prevention, preparedness, natural resource protection, emergency services, property protection, and education and awareness).

The public meeting was used as an example of education and awareness to inform a larger audience about the hazard mitigation plan update. It was noted that during an activity performed for the 2021 update, the HMPC voted for prevention, emergency services, and education and awareness as the top 3 techniques.

Purpose of Update

The purpose of the plan update was discussed, and its importance was emphasized. The update is necessary to reflect changing risks, such as population increases, community growth, the emergence of new hazards and man-made threats, shifting conditions, and evolving development patterns. The plan aims to enhance community resilience across social, economic, and environmental dimensions, ensuring the county is better prepared to withstand and recover from disasters.

Furthermore, the update is essential for maintaining compliance with Federal and State requirements, including DMA 200, NC GS 166 A, and funding programs like HMGP and FMA, which are critical for securing ongoing support and funding. Finally, the plan contributes to heightened preparedness by addressing both existing and emerging threats, with the goal of protecting lives and property, and ensuring the continuity of essential services during and following disasters.

Plan Update Process

The planning process was reviewed, which outlined four essential steps:

1. Organizing resources – The planning team has started working with the Hazard Mitigation Planning Committee (HMPC), which is comprised of staff/personnel from participating

counties and municipalities within this county as well as any stakeholders identified that have an interest in hazard mitigation.

2. Conducting a risk assessment – This will begin with hazard identification (*What can happen here*?) considering historical occurrence and emerging hazards. After hazards have been identified, the planning team will examine hazard impact (*What do these hazards do when they occur within the region*?), while considering capability to act. There are a lot of hazards covered in the previous plan update, including man-made and technological hazards. The HMPC reviewed this information at the HIRA Meeting (8/26). Public survey responses will also be used to identify key concerns.
3. Developing a mitigation plan – Existing actions from the previous update must be reviewed, including project implementation status updates (as required by FEMA). It is important to revisit actions to determine if they've been completed, if they remain in progress or are ongoing, or if they are no longer relevant/should be removed from the plan. In addition to project status updates, new mitigation actions will be discussed during the Mitigation Strategy Meeting and integrated into the mitigation plan.
4. Final adoption and implementation – The final step is to adopt the plan and begin action implementation. The draft plan will be sent to the Planning Committee and then will go through its first round of review by NCEM. FEMA will provide the final review and approval of the plan.

Project Schedule

The typical timeline to update a hazard mitigation plan is typically one year. This update, however, is being conducted on a shorter project timeline to ensure completion before the current plan expires on January 19th, 2026. With this accelerated schedule, the draft plan is anticipated to be completed by late fall 2025, allowing for sufficient review time, adoption, and continued eligibility for state and federal mitigation funding programs.

Project Information/Resources

Participating counties and municipalities were asked to post relevant project information and updates to facilitate ongoing communication. The team highlighted that the project website and public survey were already accessible online and would be updated regularly throughout the planning process. The website provides key resources, including the project overview, meeting minutes and presentations, the public survey, the previous 2021 HMP, and relevant planning resources. The public survey had over 200 responses at the time of the meeting, indicating high public engagement. The survey will close at the end of August to ensure adequate time to review, analyze, and incorporate survey findings.

County Q&A Sessions

Following the educational component of the presentation, a Menti Poll was shared/distributed to engage participants and gather feedback. The questions are provided below:

1. What are key concerns or challenges you believe should be addressed in the hazard mitigation plan update?
2. Are there any specific areas or infrastructure that you feel require additional consideration? Please list location detail.
3. Do you have any additional suggestions or feedback regarding the plan update that you would like to share at this time?

Participants were encouraged to share input in the meeting chat or had the ability to come off mute and share their thoughts with the group. Menti Poll findings are included in the follow-up materials.

Meeting Closeout

The meeting concluded with a call for collaborative updates among counties and municipalities. Contact information was shared at this time. Meeting minutes and the presentation will be shared with participants, as requested, and uploaded to the project website for documentation purposes. The meeting officially adjourned at 7:10pm.

Mentimeter

What are key concerns or challenges you believe should be addressed in the hazard mitigation plan update?

Variability of weather is a growing concern

Fire wise programs for housing developments. How much does Army Corp of Engineers participate in with all the privately owned dams? As in not the marjor dams.

Localized flooding seems to be more prevalent. Is that tracked and monitored? Why does it occur?

Basic needs such as electricity, water supply and movement of people to escape any hazardous conditions

1 3

Mentimeter

Are there any specific areas or infrastructure that you feel require additional consideration? Please list location detail.

Mentimeter

Do you have any additional suggestions or feedback regarding the plan update that you would like to share at this time?

What are key concerns or challenges you believe should be addressed in the hazard mitigation plan update?

Flooding

Flooding, extreme heat

Changing weather patterns with less ability to warn.

Flooding

Cyber Security.

Would like to have a standing list of agencies to call or maps to follow

Hurricanes and flooding, especially after the perhaps unexpected destruction Helen caused in western NC. How prepared is Guilford County if faced with a direct hit by a similar storm?

How to pay for it, or how to pool the costs between the communities in the county.

Mentimeter

What are key concerns or challenges you believe should be addressed in the hazard mitigation plan update?

CoHP has seperate power grid, i.e. not Duke Power, what are plans to assist CoHP get power back online?

Evacuation plans

2 9

Mentimeter

Are there any specific areas or infrastructure that you feel require additional consideration? Please list location detail.

Runoff sites and drainage; standing water on roads during storms is a hazard.

Where are gathering points for warming stations if power out in winter? How would transport be accomplished if snow is bad, and people who are housebound needed same?

Stormwater infrastructure is not built for current weather patterns

3

Do you have any additional suggestions or feedback regarding the plan update that you would like to share at this time?

Make announcement on Next Door about these meetings.

Can you touch on some changes made from the previous Hazard Mitigation plan aside from moving cyber threats to a higher tier?

Adressing excessive trash in the streets that can and will end up in water drains causing flooding

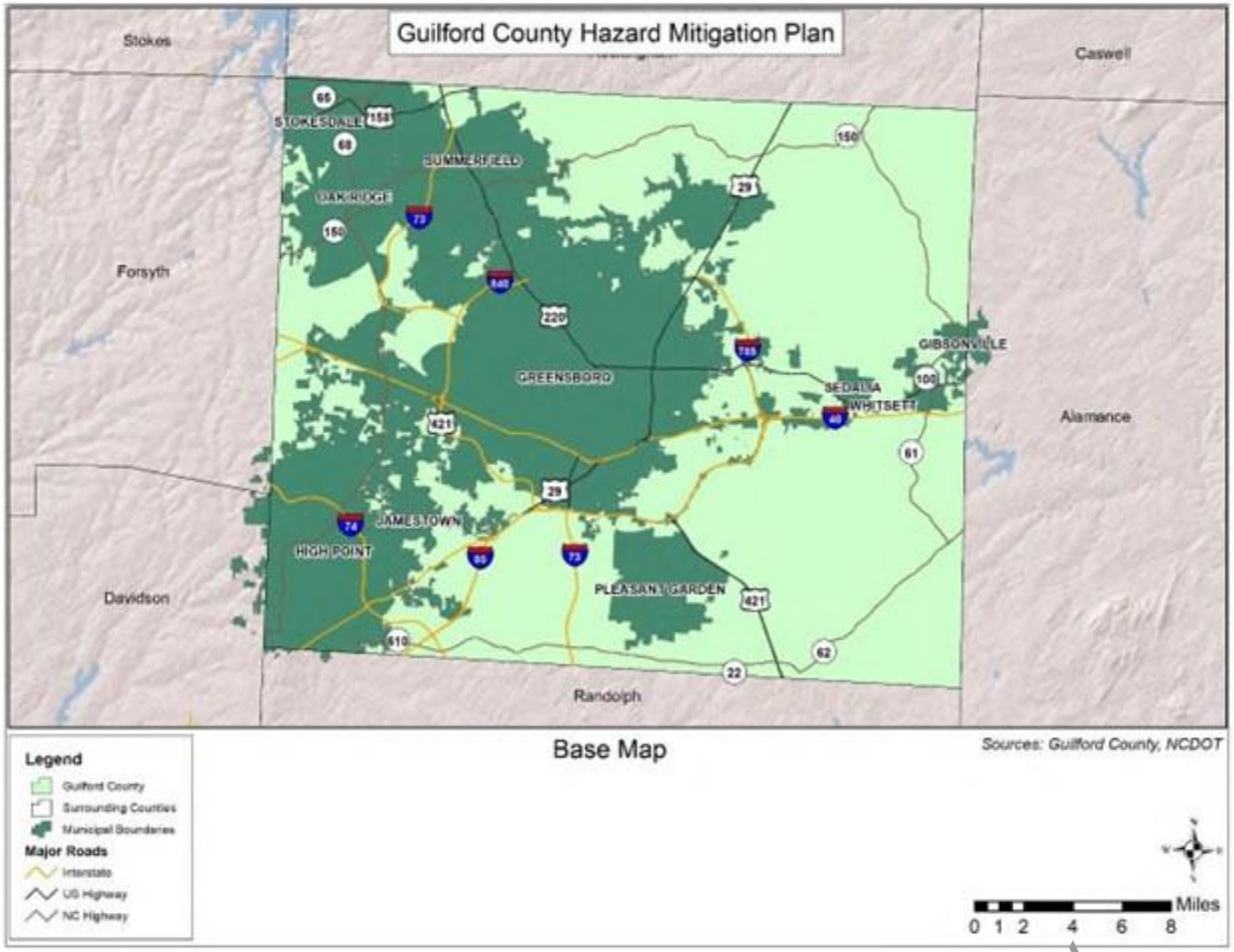
Guilford County

Hazard Mitigation Plan Update

Public Meeting #1

NC Cooperative Extension

August 14, 2025



Agenda

- Welcome & Introductions
- Meeting Objectives
- Brief Mitigation Overview
- Purpose of Update
- Plan Update Process
- Project Schedule
- Project Information/Resources
- Q&A Session
- *Optional:* Menti Poll

Meeting Kickoff



Welcome & Introductions



Reminder to Sign In!

Meeting Objectives



Engage the Community



Gather Input



Educate and Inform



Enhance Plan Relevance

Background/ Overview

What is Mitigation?

“mit-i-gate”

1: to cause to become less harsh or hostile.

2: to make less severe or painful.

Hazard Mitigation

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

Basic Types of Mitigation



Mitigating against hazard impacts on **existing development**

- Houses
- Businesses
- Infrastructure
- Critical Facilities



Ensuring **future development** is conducted in a way that does not increase vulnerability

- Plans
- Policies
- Procedures

Mitigation Techniques

NOTE: During an activity performed for the previous plan update, the HMPC voted Prevention, Emergency Services, and Public Education & Awareness as the top 3 techniques

1. Prevention
2. Property Protection
3. Natural Resource Management
4. Structural Projects
5. Emergency Services
6. Education and Awareness

Mitigation Techniques – Examples

Prevention
Planning/Zoning
Building Codes
Open Space Preservation
Floodplain Regulations
Stormwater Mgmt.
Drainage Maintenance

Natural Resource Mgmt.
Floodplain Protection
Watershed Mgmt.
Riparian Buffers
Erosion/Sediment Control
Wetland Restoration
Habitat Preservation

Emergency Services
Warning Systems
Response Equipment
Shelter Operations
Evacuation Planning
Response Training
Sandbagging

Property Protection
Acquisition/Relocation
Building Elevation
Critical Facility Protection
Retrofitting
Safe Room/Shutters
Insurance

Structural Projects
Reservoirs
Dams, Levees, Dikes
Stormwater Diversions
Retention Basins
Channel Modification
Storm Sewers

Education/Awareness
Outreach Projects
Speaker Series
Hazard Map Info
Real Estate Disclosure
Library Materials
Hazard Expositions

Purpose of Plan Update

Why is it Necessary?

- Reflect on Changing Risks
- Increase Community Resilience
- Ensure Compliance and Funding
- Heighten Preparedness

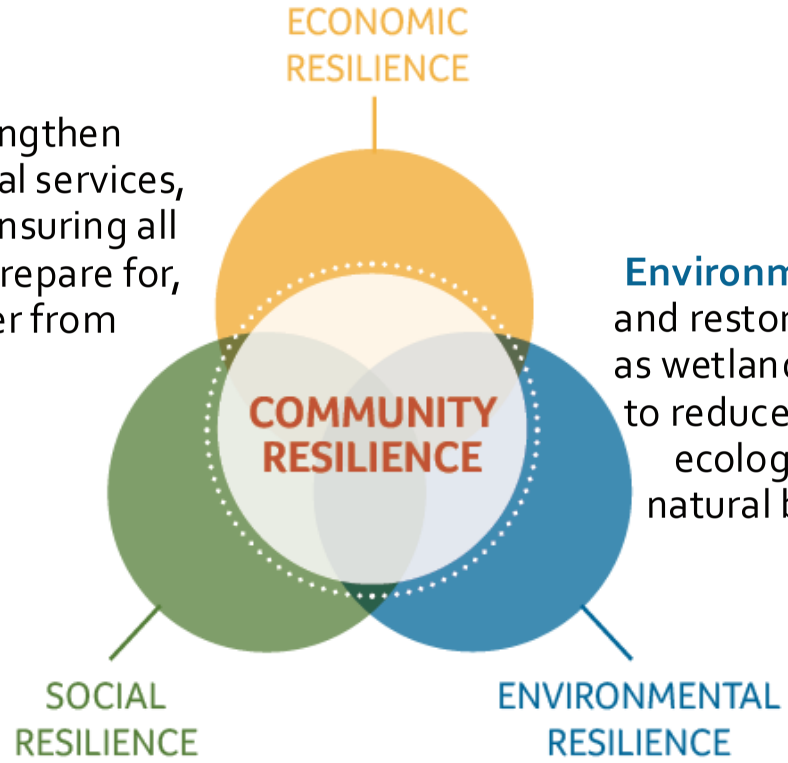
Addressing Changing and Emerging Risk

Population Increase and Community Growth	Greater Exposure to Hazard Risk Increased Exposure = More Damage
More Hazards (Man-Made)	Included in State Plan Ex. Technological, Civil Disturbance, Terrorism
Changing Conditions	Anticipated Increase in Frequency and Magnitude **Optional Inclusion/Reference to Climate Change
Development Patterns	Increased Impermeable Surfaces More Infrastructure and Assets at Risk

Increasing Community Resilience

Economic Resilience: Support the stability and recovery of local businesses and employment opportunities to ensure the community can withstand and bounce back from hazard impacts.

Social Resilience: Strengthen community networks, social services, and access to resources, ensuring all residents can effectively prepare for, respond to, and recover from hazards.



Environmental Resilience: Protect and restore natural ecosystems such as wetlands, forests, and floodplains to reduce hazard impacts, promote ecological health, and sustain natural buffers against disasters.

Ensuring Compliance and Funding

Ensure compliance with federal and state requirements	Disaster Mitigation Act of 2000 NC GS 166 A
Maintain eligibility for disaster mitigation funding and assistance programs	HMGP FMA

Heightening Preparedness

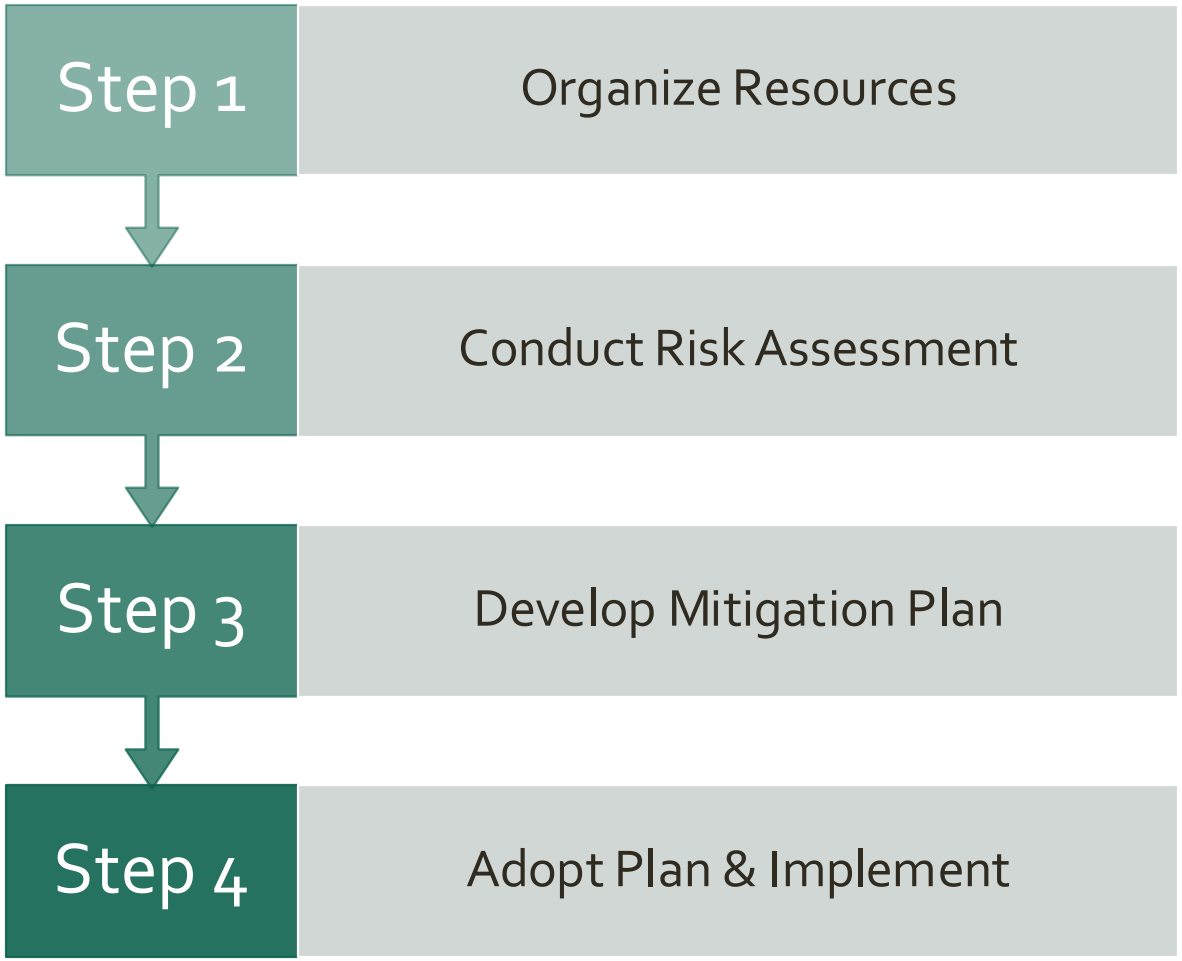
The Plan Update ensures that the participating jurisdictions are better prepared to:

1. Address existing and emerging hazards
2. Protect lives and property
3. Sustain continuity of essential services during and following an event



Planning Process

How will it be done?



Step 1: Organize Resources

Planning	Planning for Public Involvement
Coordinating	Coordinating with Departments and Agencies
Finalizing	Finalizing a List of Stakeholders for Involvement (HMPC)



Hazard Identification

What Can Happen Here?

- Previously Identified Hazards
- Identify New Hazards



Vulnerability Assessment

What Will be Affected/Impacted?

- Will Use County Parcel Data, FEMA HAZUS Analysis, and NCEM Data



Capability Assessment

What Can We Do About It?

- Determine What Mitigation Actions are Feasible
- Identify Strengths & Gaps

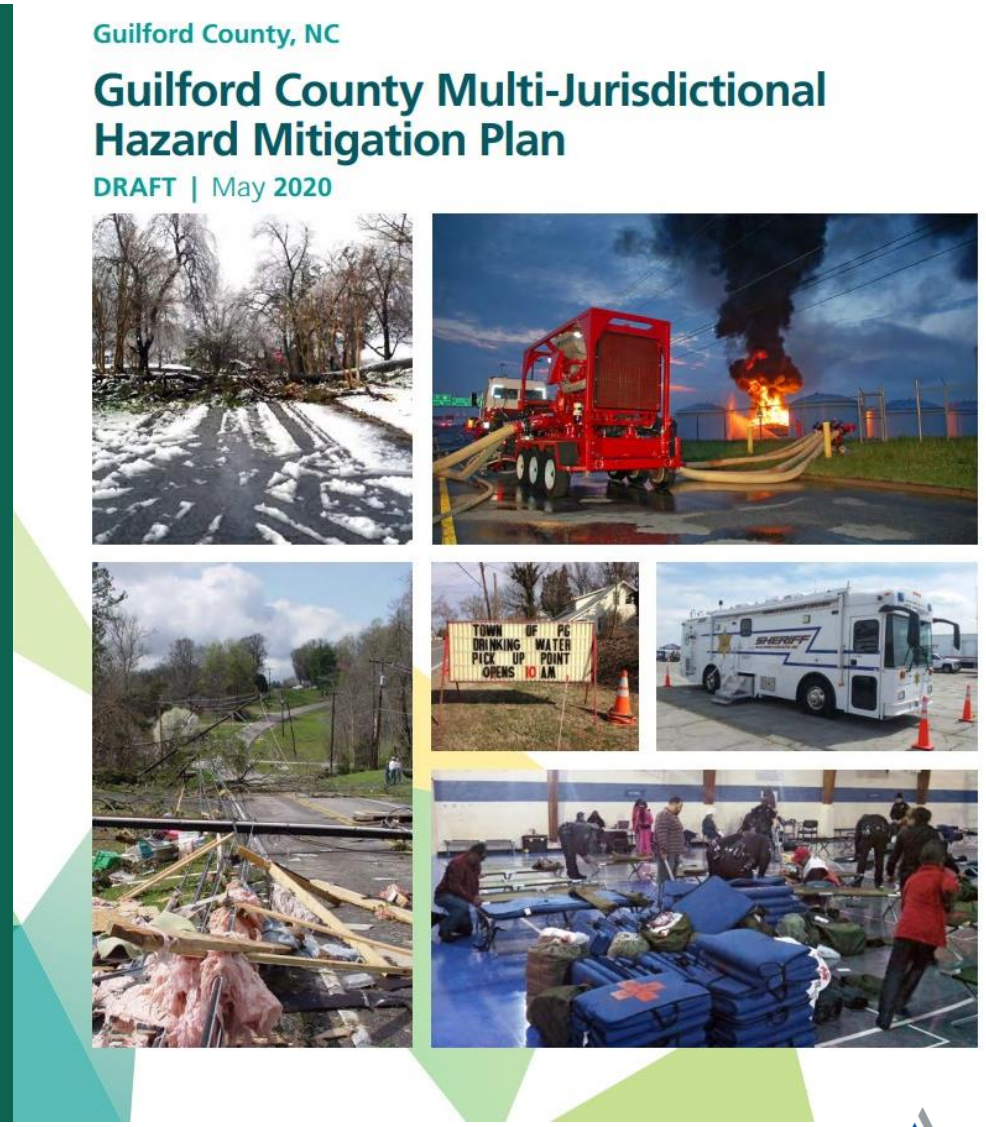
Step 2: Risk Assessment

Previously Identified Hazards (2020)

HIGH RISK	Winter Storm Hurricane / Other Tropical Disturbance Thunderstorm (Wind/Lightning) Flooding Hazardous Materials Incident Tornado Public Health / Emerging Disease Threat Communications Systems Disruption / Failure
MODERATE RISK	Energy / Power / Utility Failure Transportation Incident Drought Resource Shortage (Water / Fuel) Pipeline Failure Cyber-Security Threat Hail Extreme Heat
LOW RISK	Fire Bioterrorism Civil Disturbance Terrorism Extreme Cold Nuclear Power Plant Emergency Earthquake Building / Structure Collapse

Step 3: Develop a Mitigation Plan

1. Setting Planning Goals
2. Reviewing Mitigation Alternatives
3. Drafting an Action Plan



Step 4: Adopt Plan and Implement Actions

- Seeking Review and Approval from Relevant Authorities
- Securing Funding and Managing Resources of Mitigation Projects and Activities
- Executing the Identified Mitigation Actions
- Continuously Monitoring the Progress of Mitigation Activities

Project Schedule

Project Kickoff Date – 5/16/25	Larger Stakeholder Meeting – 6/24/25	Public Meeting #1 – 8/14/25
Public Meeting #2 – 8/26/25	HIRA/Mitigation Meeting – 8/26/25	Proposed Delivery of Draft – Late Summer 2025
	Existing Plan Expiration Date – 1/19/26	



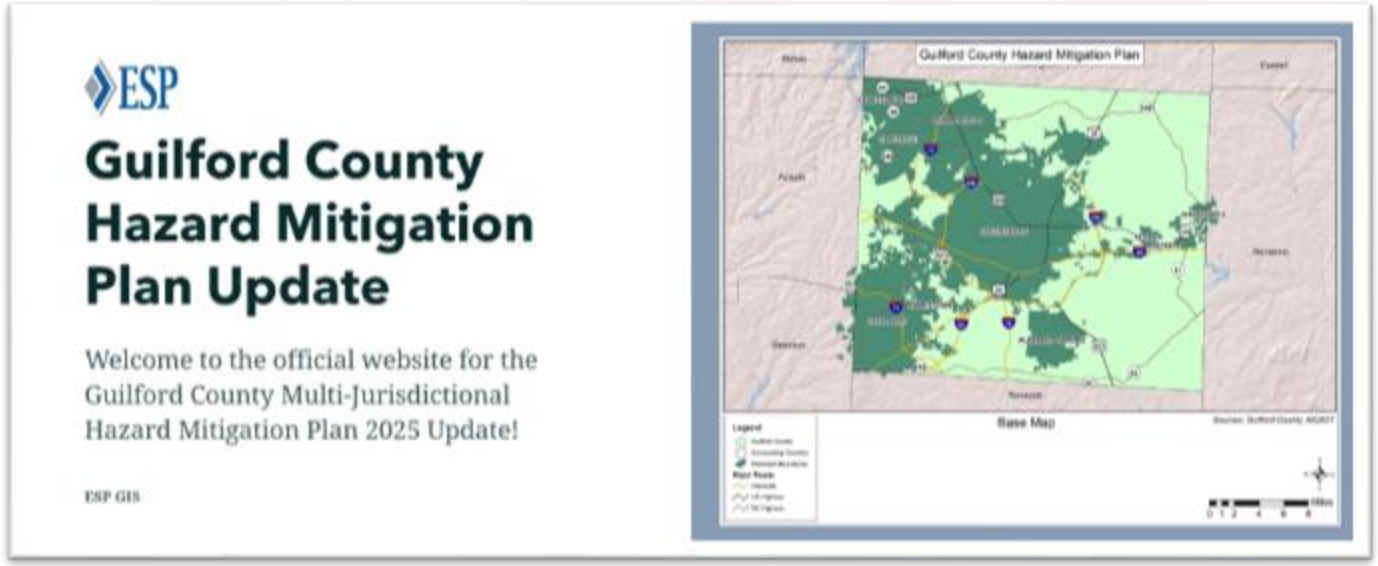
Valuable Project Resources

How will information be gathered & shared?

1. Creation of a Designated Project Website – This will remain accessible throughout the lifespan of the project & beyond
2. Creation & Distribution of a Public Survey – Intended to gather public input & ensure community needs and priorities are adequately addressed



Visit and Share the Project Website



This website will be updated regularly throughout the planning process to provide access to:

1. Project Overview
2. Meeting Minutes & Presentations
3. Public Survey
4. Previous HMP (2020)
5. Relevant Planning Resources

Initial Public Survey Results

As of 8/13/25, there are a total of 217 survey responses. Key findings are summarized below:



52% of respondents reside in Greensboro, NC.



Severe thunderstorm and high winds was identified as the #1 threat, followed by flooding.



41% of respondents have taken steps to make their home more resistant against hazards.



89% of respondents are interested in making their home more resistant to hazards.



85% of respondents do not know what office to contact to reduce their risk to hazards in their area.

Initial Public Survey Results

Respondents were asked to rank the 6 mitigation techniques. Key findings are summarized below:



Emergency Services – 85% of respondents ranked this technique as "Very Important."



Prevention - 80% of respondents ranked this technique as "Very Important."



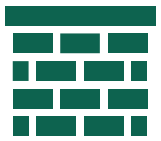
Natural Resource Protection - 77% of respondents ranked this technique as "Very Important."



Public Education & Awareness - 76% of respondents ranked this technique as "Very Important."



Structural Projects - 68% of respondents ranked this technique as "Very Important."



Property Protection - 57% of respondents ranked this technique as "Very Important."

Complete and Share the Public Survey!

Scan the QR Code for Access to the Public Survey!



Questions

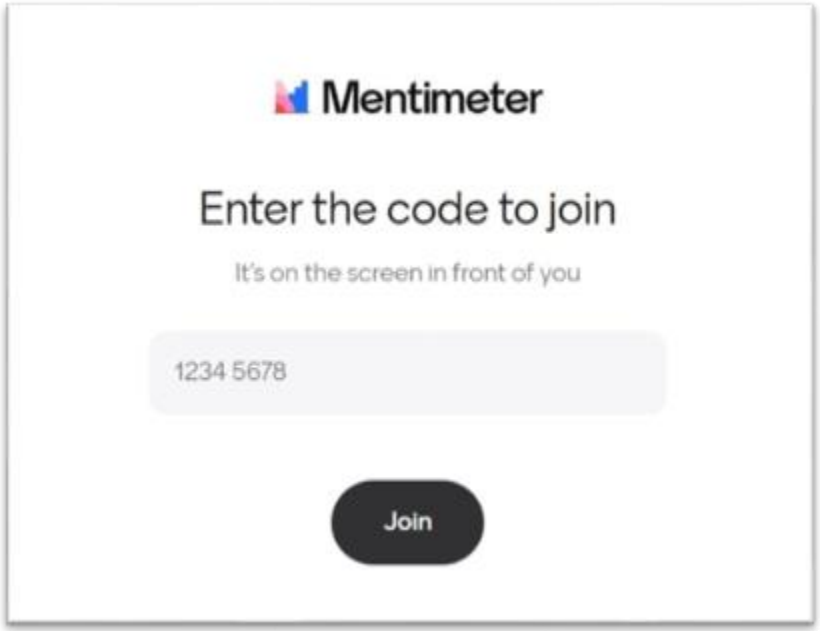
Questions/Comments/Concerns

Optional Interactive Session

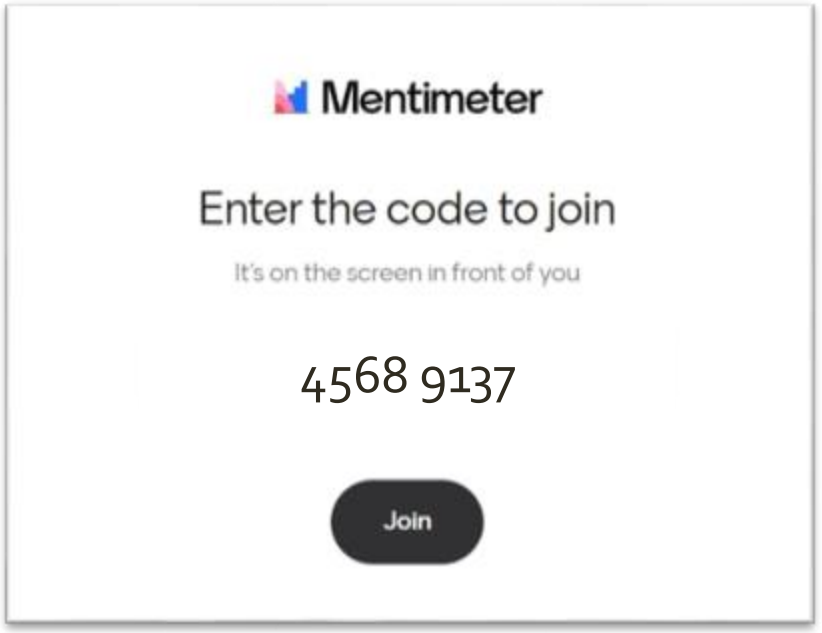
Menti Poll

We'll be going through a series of open-ended questions that will be used to inform the plan update.

Your input matters!



Menti Poll



Enter the code listed above

or scan the QR to begin!

Adjourn –
Thank you!

Guilford County Contact Information

Catherine Hughes –

chughes@guilford-es.com

Tommy Sluder –

csluder@guilford-es.com

Adjourn – Thank you!

Contractor Contact Information
Nathan Slaughter – nslaughter@espassociates.com
John Flores – jflores@espassociates.com
Hannah DeLude – hdelude@espassociates.com
David Stroud – david.stroud@wsp.com
Abigail Moore – abigail.moore@wsp.com

Capability & Mitigation Strategy Meetings
September 17th, 2025 at 2:00pm – 3:30pm
September 24th, 2025 at 10:00am – 11:30am
Greensboro, NC

I. Meeting Objectives

a. EXPLAIN CAPABILITY PURPOSE
b. REVIEW RISK ASSESSMENT FINDINGS
c. REVIEW SURVEY RESULTS
d. IDENTIFY GAPS AND WEAKNESSES
e. LINK MITIGATION

II. Initial Findings

a. 3-STEP APPROACH
b. PRIORITY RISK INDEX (PRI) SCORES
c. PRI UPDATED BASED ON INPUT

III. Capability Assessment

a. CAPABILITY INDICATORS
b. CAPABILITY OVERALL RATINGS
c. SUBSTANTIAL DAMAGE ESTIMATES (SDE) PROCEDURES

IV. Linking Findings to Mitigation Strategy

a. COUNTY'S ANNUAL MITIGATION UPDATE
b. EXISTING ACTIONS BY TECHNIQUE
c. DATA-DRIVEN ACTIONS

V. Initial Public Survey Results

a. TOTAL RESPONSES TO DATE
b. COMMON CONCERNS
c. IDENTIFIED HAZARD AREAS

VI. Identified Gaps & Priorities

a. POWER REDUNDANCY
b. EMERGENCY SERVICES
c. ALERT & WARNING (GEANI)
d. DAM & LEVEE FAILURE
e. EXTREME HEAT & PUBLIC HEALTH
f. NATURAL RESOURCE PROTECTION

Capability & Mitigation Strategy Meetings
Summary Meeting Minutes

Meeting minutes for Capability and Mitigation Strategy Meetings are combined. The first meeting was held on September 17th, 2025, from 2:00pm – 3:30pm and primarily focused on the existing mitigation action plan. The second meeting was held on September 24th, 2025, from 10:00am – 11:30am, which primarily focused on the capability assessment findings and how capability impacts the mitigation strategy. Both meetings were held at the Guilford County Emergency Services Training Center in Greensboro, NC. There was a virtual option for those who were unable to attend in-person to encourage optimal stakeholder turnout.

Participants

Guilford County		
Name	**Organization**	**Role/Department**
Baker, Conor	Guilford County	Emergency Management Coordinator
Bass, Oliver	Guilford County	Planning & Zoning Manager
Blonchard, Paul	Town of Jamestown	Public Services Director
Byers, Mitchell	Guilford County	GIS Analyst
Dorestant, Shree	City of Greensboro	Chief Sustainability Officer
Dungee, Cam	Town of Sedalia	Town Administrator
Foster, Michael (-)	City of High Point	Assistant Fire Chief/Emergency Manager
Gatlin, Brent	Guilford County	Watershed Section Manager
Grose, Steven (-)	City of High Point	Special Projects Coordinator
Hardin, Jason	Guilford County	Deputy Director of Planning & Development
Hill, Johnnie	City of Greensboro	Engineering Supervisor
Horne, Karen	Town of Whitsett	Town Administrator
Hughes, Catherine	Guilford County	Emergency Management Coordinator
Kurfees, James	Guilford County	Chief Technology Officer
Lewis, Michael	City of Greensboro	Deputy Director of Development Services
Maddox, Dean	Town of Pleasant Garden	Town Mayor
McCartney, Jeffrey	Guilford County	Chief Information Security Officer
Quick, Danielle	City of Greensboro	Senior Engineering Specialist
Royal, Ashley	Town of Oak Ridge	Deputy Town Clerk/PIO
Sluder, Tommy	Guilford County	Senior Emergency Management Coordinator
Snyder, Justin	Town of Summerfield	Planning Director
Spillman, Virginia	City of Greensboro	Assistant Director of Water Resources
Tardiff, James	Guilford County	Stormwater Program Administrator
Wright, Justin	Guilford County	Sheriff/JCPC Board Vice Chair
Outside Stakeholders		
Name	**Organization**	**Role/Department**
DeLude, Hannah	ESP Associates	Hazard Mitigation Planner
Slaughter, Nathan	ESP Associates	Project Manager

Introductions & Meeting Objectives

The Guilford County Hazard Mitigation Planning team convened to review progress on the 2025 HMP Update and shift the focus toward development of mitigation strategies. Catherine Hughes, Emergency Management Coordinator, welcomed all participants to the meeting and gave a brief overview of the meeting agenda and objectives. Meeting objectives included (1) Explain Capability Purpose, (2) Review HIRA and Survey Findings, (3) Identify Gaps and Weaknesses, and (4) Link Mitigation. Nathan Slaughter, Project Manager with ESP Associates, then proceeded to facilitate the remainder of the presentation.

Hazard Identification and Risk Assessment

The HIRA process was reviewed, a three-step approach that includes identifying hazards, assessing their impacts, and evaluating local capabilities to manage those risks. Emphasis was placed on HIRA's role as a foundation of FEMA-approved mitigation planning and its importance in guiding informed, data-driven decision-making. Key updates from the recent HIRA meeting included the elevation of cyber threat to a high-risk category based on stakeholder feedback. The County also plans to incorporate localized data into the critical facilities inventory to improve risk analysis accuracy and inform future mitigation actions.

Capability Assessment

Preliminary findings from the capability assessment indicated that 36 percent of participating jurisdictions have high capacity and 64 percent moderate capacity to support hazard mitigation. Guilford County provides extensive technical assistance to partner communities, and several county-level plans already encompass local jurisdictions. The capability assessment process was discussed as a means of evaluating resources, tools, and readiness across communities, using a set of indicators that capture planning, regulatory, administrative, technical, and financial capacities.

At the onset of the multi-jurisdictional plan, the capability assessment was developed using capability assessment surveys intended for each participating jurisdiction to complete. To reduce the level of effort of communities, the project team has updated this information using the existing information from previous plan iterations as well as information provided/readily available on municipal websites. Participants were encouraged to review this information's accuracy.

Linking Findings to Mitigation Strategy

The team discussed how the HIRA and public survey results together provide the foundation for updating the Mitigation Action Plan. The County's Annual Mitigation Update (June 2025) documented six completed mitigation projects and strategies in 2024. The plan's existing actions were categorized by mitigation technique to identify both strengths and potential areas for improvement.

This analysis revealed that Prevention/Planning and Property Protection techniques represent the majority of the County's mitigation portfolio, reflecting strong foundational policies and regulatory frameworks. However, Natural Resource Protection, Emergency Services, and Alert and Warning Systems emerged as areas with fewer active initiatives, highlighting opportunities to diversify the mitigation strategy.

The team emphasized that linking findings from the HIRA, public survey, and capability assessment ensures that future mitigation actions address both technical vulnerabilities and community-driven priorities.

Public Survey Results

The project team provided an overview of the public survey results, which were used to supplement the HIRA and to capture local perspectives on hazard impacts, vulnerabilities, and community priorities. The survey served as a critical tool for engaging residents, businesses, and partner agencies in identifying both recurring and emerging hazard concerns across Guilford County.

The input received through the survey reflects a strong level of local awareness of hazard risks and provides a community-driven foundation for updating the mitigation strategy. Initial results were analyzed to identify common concerns, hazard-specific problem areas, and opportunities for targeted mitigation actions.

Common concerns included:

- Flooding and drainage issues were among the most frequently cited concerns, particularly along creeks, low-lying roadways, and areas with inadequate stormwater infrastructure.
- Hazardous materials (hazmat) and industrial exposure risks were noted in proximity to major transportation corridors and industrial zones, such as near Galimore Dairy and I-40 and Belews Lake Nuclear Plant.
- Traffic safety hazards were identified at several key locations, including Neelley Road and Wendover Avenue, where flooding, congestion, or roadway design were contributing factors.

- Water contamination and environmental quality emerged as community-wide concerns, particularly tied to Buffalo Creek, Deep River, Friendly Lake, and Randleman Lake, where runoff and industrial pollutants were cited.
- Pipeline and utility corridor risks were reported, notably along the Oak Ridge area, where residents expressed concerns about pipeline failure and maintenance.
- Wildfire vulnerability was mentioned in rural and wooded areas such as Alamance Church Road, where dense vegetation and limited access routes elevate response challenges.
- Brownfield sites and abandoned industrial properties were identified in Jamestown, High Point, and Greensboro, highlighting ongoing concerns over redevelopment safety and potential contamination.

Hot spot areas identified included:

- Galimore Dairy & I-40 – hazardous materials exposure and transportation corridor risks
- Huffine Mill Road & McLeansville Road – roadway flooding and downstream impacts along Buffalo Creek
- Belews Lake Nuclear Plant vicinity – hazardous material and radiological safety concerns
- East side of Oak Ridge – pipeline failure potential along easement crossings
- Alamance Church Road – brush and vegetation-related wildfire risks
- Wendover Avenue and Neelley Road – traffic safety hazards due to flooding and congestion
- Deep River and Randleman Lake – 1,4-dioxane contamination concerns
- Friendly Lake – sedimentation and construction runoff issues
- Airport vicinity – fuel storage and hazmat risks near oil/gas tank facilities

The public survey reinforced that Guilford County residents are acutely aware of flood, infrastructure, and environmental risks, and they support proactive mitigation and resilience efforts. The results underscore the importance of integrating **c**ommunity-identified issues into the County's updated Mitigation Action Plan. These findings, in combination with the technical HIRA and capability assessment data, will directly inform the prioritization of new or revised mitigation actions.

Identified Gaps and Priorities

The formal presentation ended with a discussion of key vulnerabilities identified through the risk assessment, capability analysis, and public feedback. These gaps highlight areas where Guilford County and participating jurisdictions face heightened exposure or limited capacity to manage hazard impacts, underscoring the need for targeted attention in the updated mitigation strategy.

1. Power Redundancy – Frequent severe weather events have exposed weaknesses in the County's power distribution and critical infrastructure systems, leaving communities/neighborhoods vulnerable to prolonged outages.
2. Emergency Services – While the County's emergency management network is well-established, varying levels of staffing, training, and coordination across jurisdictions create

vulnerabilities in response capability during large-scale or simultaneous incidents. Limited resources and communication gaps can delay response time and complicate coordination among municipalities, especially in rural areas with fewer personnel or equipment.

3. Alert and Warning (GEANI) – The County's existing emergency alert system, GEANI, provides valuable notifications but suffers from inconsistent coverage and uneven participation across communities. This variability can limit residents' access to timely, life-safety information during emergencies, particularly among populations with language barriers, limited technology access, or low enrollment rates.
4. Dam and Levee Failure – Several small and privately owned dams across Guilford County present structural and administrative vulnerabilities. The potential for dam or levee failure, especially during extreme rainfall, represents a cascading risk that could amplify flood impacts in surrounding areas.
5. Extreme Heat and Public Health – Rising average temperatures and an increase in extreme heat days have created new vulnerabilities for the County, particularly among elderly residents, low-income households, and outdoor workers.
6. Natural Resource Protection – Degraded natural systems and increasing surface water contamination were noted as growing concerns, particularly in Buffalo Creek, Deep River, and Randleman Lake, where runoff, sedimentation, and pollutant loading have contributed to both environmental decline and elevated flood risk.

Meeting Closeout

The meeting concluded with closing remarks from the project team, thanking participants for their continued collaboration and input throughout the planning process. Attendees were reminded that the project team will continue refining the capability assessment and mitigation strategy based on local feedback and updated information. Participants were asked to submit any revisions or additions to their community's capability information and mitigation action plan to the project team by close of business on October 8, 2025.

Additionally, jurisdictions were provided with an adoption resolution template to assist with the formal approval process once the regional plan is finalized and ready for submittal to the respective Boards for adoption. The team reiterated that early preparation of adoption materials will help streamline the final review and approval process once the State and FEMA have completed their plan evaluation.

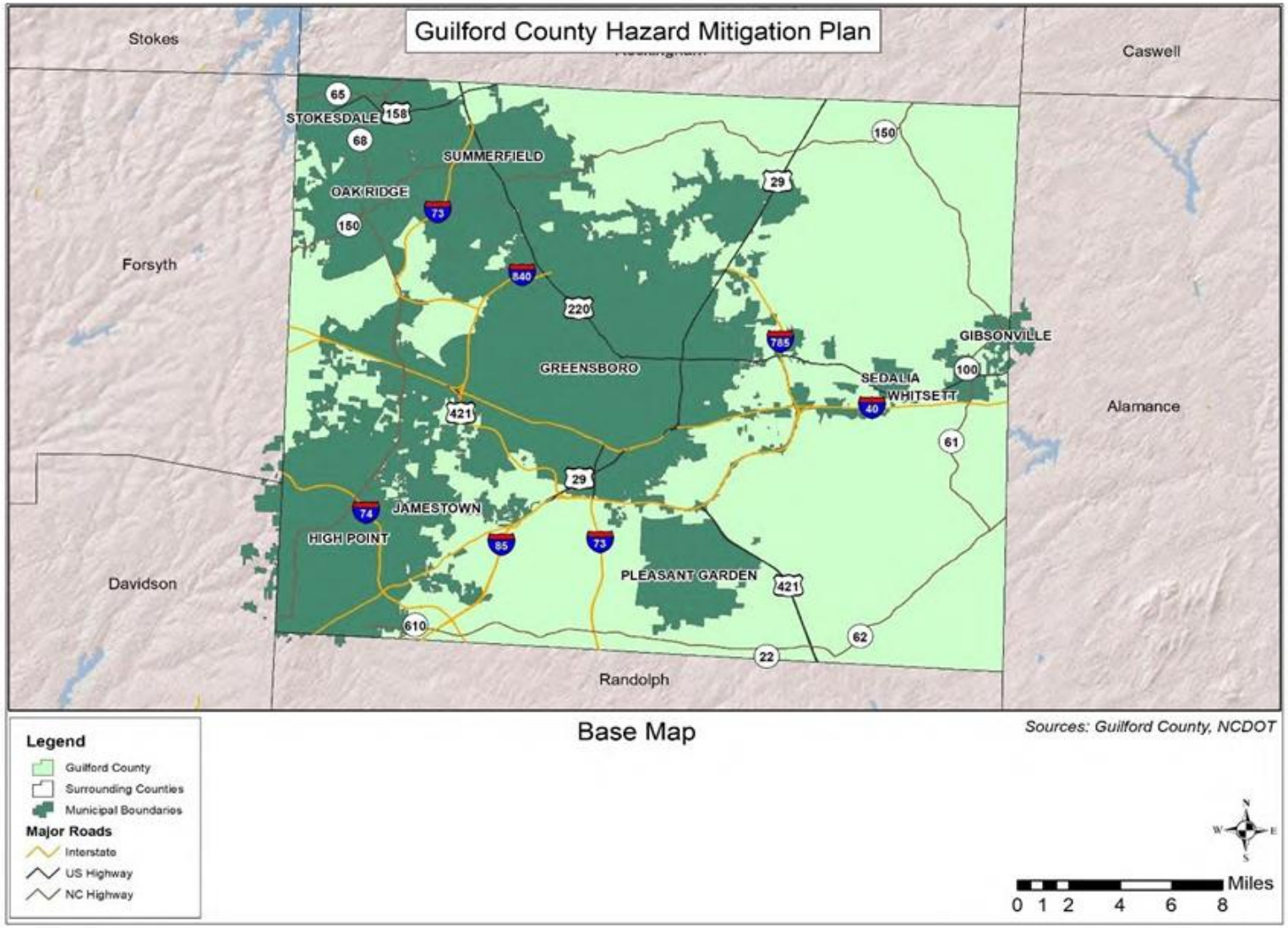
Guilford County

2025 Hazard Mitigation Plan Update

Capability & Mitigation Strategy Meeting

September 24th, 2025

Greensboro, NC



Agenda

- Welcome & Introductions
- Meeting Objectives
- Risk Assessment Findings
- Capability Assessment Review
- Linking Mitigation Actions
- Brainstorm Session

Meeting Objectives



Explain Purpose



Review Findings



Identify Gaps



Link Mitigation

Importance of HIRA

What is HIRA?

- HIRA: Hazard Identification and Risk Assessment
- A systematic process for communities to identify hazards and evaluate risks

Importance of HIRA in Mitigation Planning

1. Foundation for Mitigation Plans – HIRA is a core component required by FEMA and State regulations
2. Guides Decision-Making – Helps communities prioritize actions and allocate resources effectively
3. Enhances Resilience – Aids in developing strategies to reduce risk and improve community capacity

HIRA Process

The HIRA is a **three-step risk assessment process** that helps communities understand their risk and what they need to do address those risks.

Identify Hazards
What hazards could impact our community?

Assess Impacts
To what extent would that impact our community?

Assess Capability
What is our community's ability to reduce that risk?

Identify Hazards

Assess Impacts

Assess Capability

Step 1: Identify Significant Hazards

Hazard	Included in 2023 State HMP?	Included in 2021 Guilford County HMP?	Included in 2025 Guilford County HMP?
Flooding	X	X	X
Hurricanes and Coastal Hazards	X	X	X
Severe Winter Weather	X	X	X
Excessive Heat	X	X	X
Earthquake	X	X	X
Wildfire	X	X	X
Dam & Levee Failure	X	--	X
Drought	X	X	X
Tornadoes/Thunderstorms	X	X	X
Landslide	X	--	X
Sinkholes	X	--	--
Hazardous Substances	X	X	X
Radiological Emergency	X	X	X
Terrorism	X	X	X
Bioterrorism	--	X	X
Infectious Disease	X	X	X
Cyber Threat	X	X	X
Electromagnetic Pulse	X	--	--
Civil Disturbance	X	X	X
Food Emergency	X	--	--
Building/Structural Collapse	--	X	X
Pipeline Failure	--	X	X
Transportation Incident	--	X	X
Energy/Power/Utility Failure	--	X	X
Communications System Disruption/Failure	--	X	X
Resource Storage (Water/Fuel)	--	X	X

Identify Hazards

Assess Impacts

Assess Capability

Step 2: Assess Impacts

Priority Risk Index (PRI) Findings

High Risk (≥ 3.0)	Excessive Heat Flooding Severe Winter Weather Cyber Threat
Moderate Risk (2.0 – 2.9)	Dam & Levee Failure Drought Hurricane & Tropical Storm Tornadoes/Thunderstorm Wind/Hail Wildfire Infectious Disease Hazardous Substances Radiological Emergency Bioterrorism Civil Disturbance Communications Systems Disruption/Failure Energy/Power/Utility Failure Pipeline Failure Resource Shortage Transportation Incident Terrorism
Low Risk (< 2.0)	Earthquake Lightning Building/Structure Collapse

Based on stakeholder input obtained at the recent HIRA meeting, cyber threat was moved to high risk.

Additionally, localized data provided by the County will be used for the critical facilities inventory to heighten accuracy and inform mitigation measures.

Identify Hazards

Assess Impacts

Assess Capability

Step 3: Assess Capability

Initial Capability Assessment Findings

Jurisdiction	Overall Capability Score	Overall Capability Rating
GUILFORD COUNTY	53	**High**
Gibsonville	37	**Moderate**
Greensboro	50	**High**
High Point	45	**High**
Jamestown	35	**Moderate**
Oak Ridge	38	**Moderate**
Pleasant Garden	35	**Moderate**
Sedalia	34	**Moderate**
Stokesdale	33	**Moderate**
Summerfield	42	**High**
Whitsett	32	**Moderate**

Capability Rating Summary
High Capability – 4 jurisdictions
Moderate Capability – 11 jurisdictions
Low Capability – 0 jurisdictions

- 36% of participating communities have high capacity
- 64% of participating community have moderate capacity
- Guilford County provides significant technical support and/or assistance
- Several county plans encompass participating communities

Purpose of Capability Assessment

Measures community capability to implement hazard mitigation activities

Identifies and targets gaps, conflicts, and opportunities with existing local plans, programs, policies, etc.

Identifies mitigation measures already in place or underway

Coupled with the Risk Assessment, the Capability Assessment **helps to form the foundation for identifying mitigation actions**

Process for Capability Assessment

Conduct Inventory	Identify relevant plans, policies, and programs Assess resource availability (personnel, funding sources, technology, and equipment
Assessment Tools	Use standardized checklists for evaluation Implement scoring or ranking
Analyze Data	Collect data into a centralized location Identify common themes, strengths, weaknesses
Review and Validate	Adjust findings based on stakeholder review and insights
Document Findings	Create a detailed report that includes all inventory results, assessment methodologies, and analyses

Capability Indicators

Indicators help evaluate a community's resources, capability, and readiness to effectively implement and maintain mitigation activities.

Plans and Regulatory – Plans, programs, & ordinances

Administrative and Technical – Relevant staff, personnel, and expertise

Fiscal Resources – Bonds, fees, and taxes

Education and Resources – Education programs, volunteer groups, and certifications

Mitigation Resources – Mitigation grants and activities

Political Will – Decision-making, investments, regulation enforcement

Indicator Examples

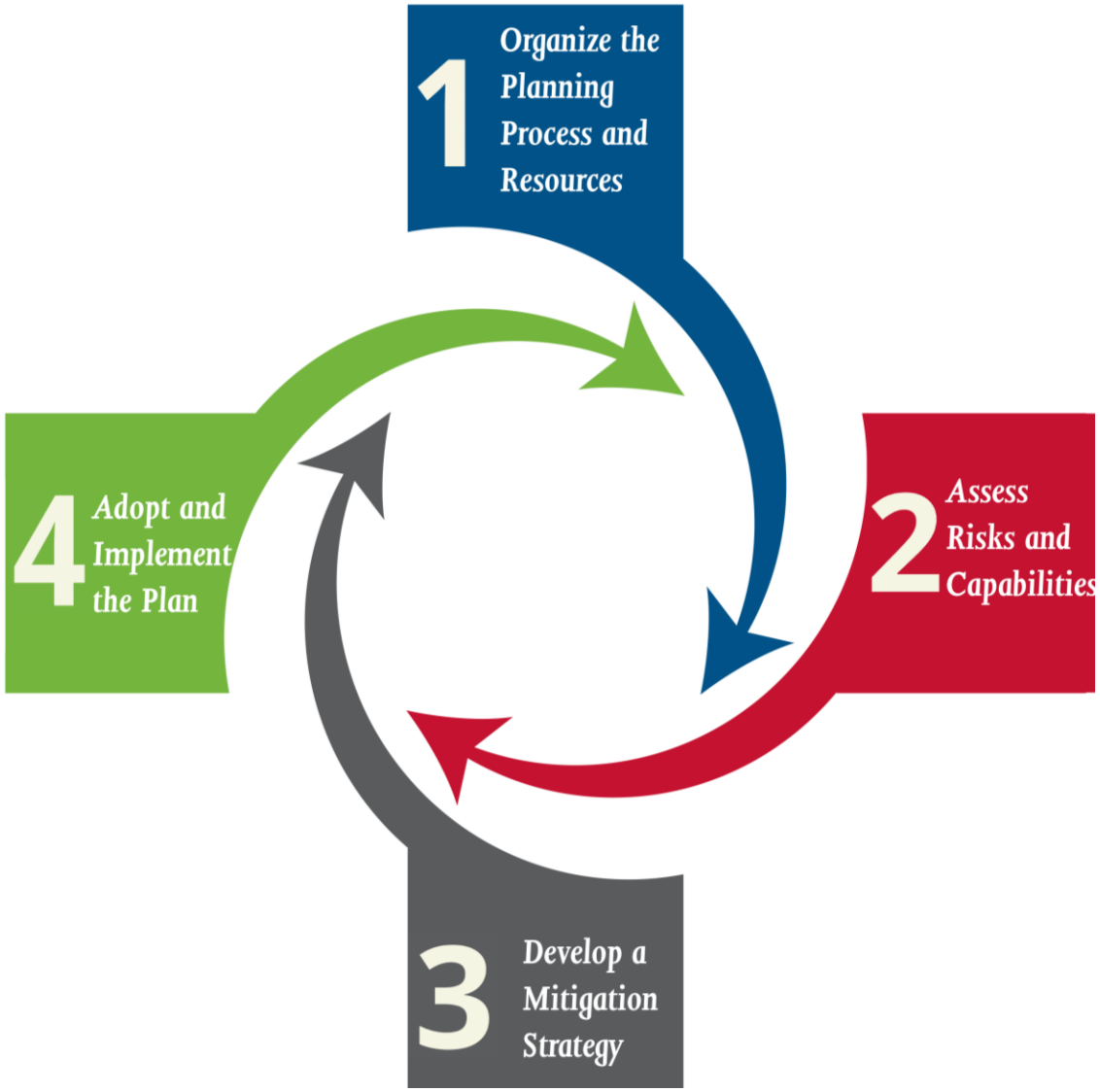
Plans and Regulatory
Hazard Mitigation Plan
Comprehensive Land Use Plan
Stormwater Management Plan
Flood Prevention Ordinance
National Flood Insurance Program
Community Rating System

Fiscal Resources
Capital Improvement Program
CDBG Funding
Special Purpose Taxes
Gas/Electric Utility Fees
Stormwater Utility Fees
Special Tax Bonds

Administrative and Technical
Building Official
Emergency Manager
Floodplain Manager
Grant Writers
Land Surveyors
GIS-Skilled Personnel

Education and Outreach
Local Citizen Groups
School Programs
Ongoing Education Programs
Storm Ready Certification
Firewise Community Certification
Public-Private Partnerships

Linking to Mitigation Strategy



Informing Mitigation Actions

Findings from the HIRA and Public Survey provide a strong foundation for the Mitigation Action Plan , helping communities develop informed, effective, and practical mitigation strategies.



Ensures mitigation actions are based on comprehensive data and analysis



Combines knowledge of hazards, risks, and existing capabilities to form a robust yet feasible strategy



Focuses efforts on the most significant vulnerabilities and improves overall preparedness



Informs ongoing updates and refinements to the mitigation strategy as new data and insights emerge

Hazard Mitigation Annual Update

All participating communities have a Mitigation Plan in place. Guilford County reviews and updates this plan on an annual basis. Based on the Hazard Mitigation Annual Update (June 2025), 6 mitigation projects and strategies were completed in 2024:

Community Name	Mitigation Technique	Project Description
City of Greensboro	Property Protection	Building Inspection Initiative: Encouraging wind-resistant design techniques for new residential construction
Guilford County	Prevention	No Change Needed: Augment enforcement of the State Building Code and related County ordinances by encouraging wind-resistant design techniques for new residential construction during County's permitting process
Guilford County	Property Protection	EMS Occupation of Base 1: Declaration, Guilford County applied under the Post Disaster Mitigation Grant program to relocated EMS Base 1
Town of Whitsett	Property Protection	Backup Power Generation at Town Hall: When available, work with County and State to invest in generator projects and power redundancy to ensure power availability during hazard event, particularly critical facilities
Town of Gibsonville	Prevention	Starting 5-Year Update with Guilford County: Continue to identify and document hazard occurrences
City of High Point	Property Protection	Installation of generations at critical facilities lacking/in need of power redundancy

Mitigation Action Plan Breakdown

Existing mitigation actions were sorted by mitigation technique as designated in the plan. This information is intended to identify strengths and potential gaps within the strategy.

Community	Prevention	Property Protection	Structural Projects	Emergency Services	Public Education	Natural Resource	ACTION TOTAL
Guilford	6	6	3	2	6	0	23
Gibsonville	8	3	0	0	5	0	16
Greensboro	6	3	0	1	5	0	15
High Point	4	4	1	2	5	0	16
Jamestown	6	2	1	0	5	0	14
Oak Ridge	6	2	1	0	5	0	14
Pleasant Garden	6	2	1	0	5	0	14
Sedalia	6	2	1	0	5	0	14
Stokesdale	6	2	1	0	5	0	14
Summerfield	8	2	1	2	5	1	19
Whitsett	6	2	1	0	5	0	14
TECHNIQUE TOTAL	**68** **(39.3%)**	**30** **(17.3%)**	**11** **(6.4%)**	**7** **(4%)**	**56** **(32.4%)**	**1** **(0.6%)**	**173**

Public Survey Results

Key findings are summarized below:



Emergency Services – 88% of respondents ranked this technique as "Very Important."



Prevention - 80% of respondents ranked this technique as "Very Important."



Natural Resource Protection - 78% of respondents ranked this technique as "Very Important."



Public Education & Awareness - 78% of respondents ranked this technique as "Very Important."



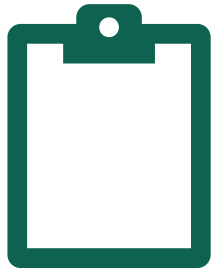
Structural Projects - 71% of respondents ranked this technique as "Very Important."



Property Protection - 59% of respondents ranked this technique as "Very Important."

Public Survey Results

Initial public survey results were used to identify:



Common concerns reflect common themes derived from open-ended survey responses



Hazard areas involve specific assets or areas in the region that were explicitly called out in survey responses

Common Concerns

Common concerns identified from the public survey results include:

- Utility Failure/Power Outage
- Rapid Growth/Development
- Communication Systems/Warning
- Emergency Services
- Water Issues/Shortage

Common Concerns Explained

Water Issues/Shortages
Water Mains Above Ground
Contaminated Drinking Water
Pollution of Groundwater
Attack on Water Processing Plant

Utility Failure/Power Outage
Attack on Power Grid
Above Ground Power Lines
Water/Sewer Concerns
Low Priority in Rural Areas

Emergency Services/Response
Limited in Rural/Remote Areas
Equipment/Infrastructure Concern
Failure of ES/Medical System
Shelter Plans/Operations

Communications/Warning
Heat/Flood Related Failures
Unsecure Cell Towers/Power Stations
Reactive Alerts
Extended Wi-Fi Outages

Rapid Growth/Development
Need Stricter Regulations
Inadequate Infrastructure
Traffic Congestion/Safety

Key Hazard Areas

Key hazard areas were identified through the public survey:

- Galimore Dairy and I-40 (hazardous substances)
- Huffine Mill Road (flooding)
- Neelley Road (traffic safety)
- Blewes Lake Nuclear Plant (hazmat)
- East Side of Oak Ridge (pipeline failure along easement crossing)
- Alamance Church Road (wildfire concern; brush/old trees)
- Jamestown, High Point, Greensboro (brownfield sites)
- Deep River, Randleman Lake (1,4 dioxane)
- North and South Buffalo Creek come diverge at McLeansville Road and Huffine Mill Road (flooding of roadways and downstream areas along Buffalo Creek)
- Bull Run Creek and Deep River (industrial waste polluters)
- Friendly Lake (construction runoff in lake)
- Oil/gas/pipeline/storage tanks near airport (hazmat)
- Wendover Avenue (traffic safety)

Potential Gaps

Based on the highest-ranked hazards, common concerns identified in the survey, and the existing mitigation action plan, the following areas have been deemed a potential gap:

1. Natural Resource Protection / Water Contamination
2. Emergency Services
3. Alert & Warning Systems
4. Power Redundancy / Hardening



Brainstorming

Mitigation Action Worksheet

Adjourn – Thank you!

Guilford County Contact Information:

Catherine Hughes – chughes@guilford-es.com

Tommy Sluder – csluder@guilford-es.com

Adjourn – Thank you!

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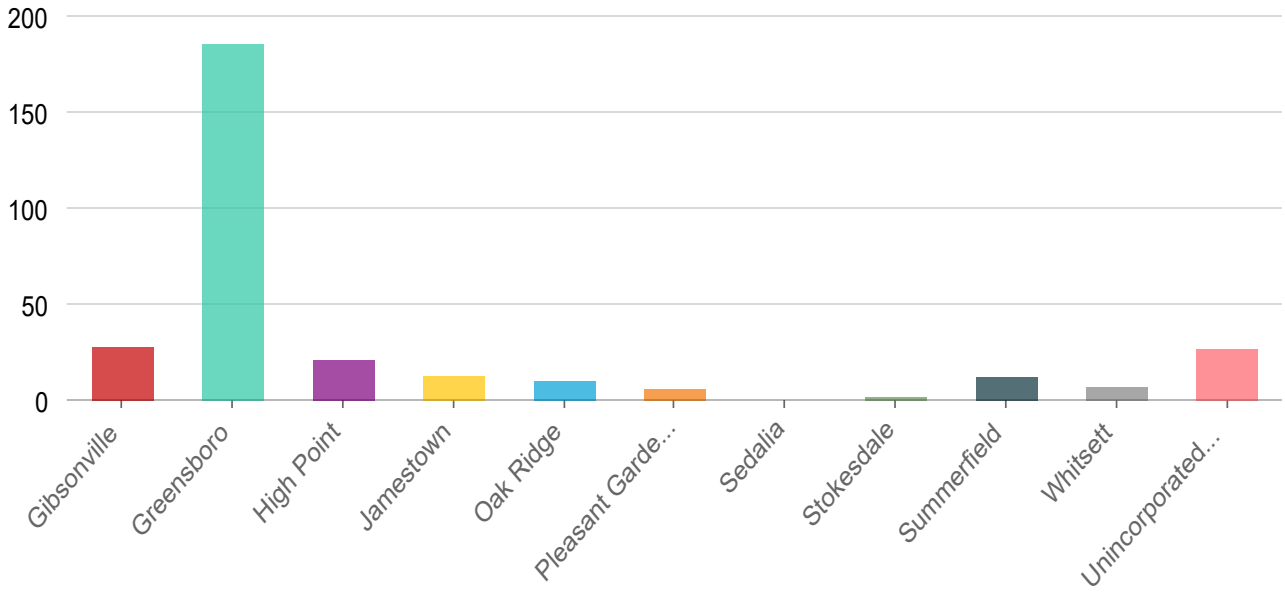
David Stroud – david.stroud@wsp.com

Abigail Moore – abigail.moore@wsp.com

Guilford County Hazard Mitigation Plan Survey

Your Community

1. Where do you live? *



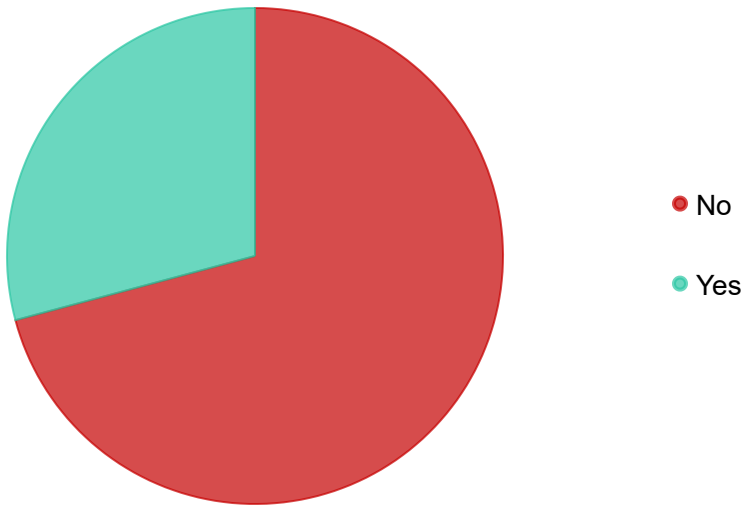
Answers	Count	Percentage
Gibsonville	28	8.97%
Greensboro	186	59.62%
High Point	21	6.73%
Jamestown	13	4.17%
Oak Ridge	10	3.21%
Pleasant Garden	6	1.92%
Sedalia	0	0%
Stokesdale	2	0.64%
Summerfield	12	3.85%

Whitsett	7	2.24%
Unincorporated Guilford County	27	8.65%

Answered: 312 Skipped: 0

Hazard/Disaster Awareness

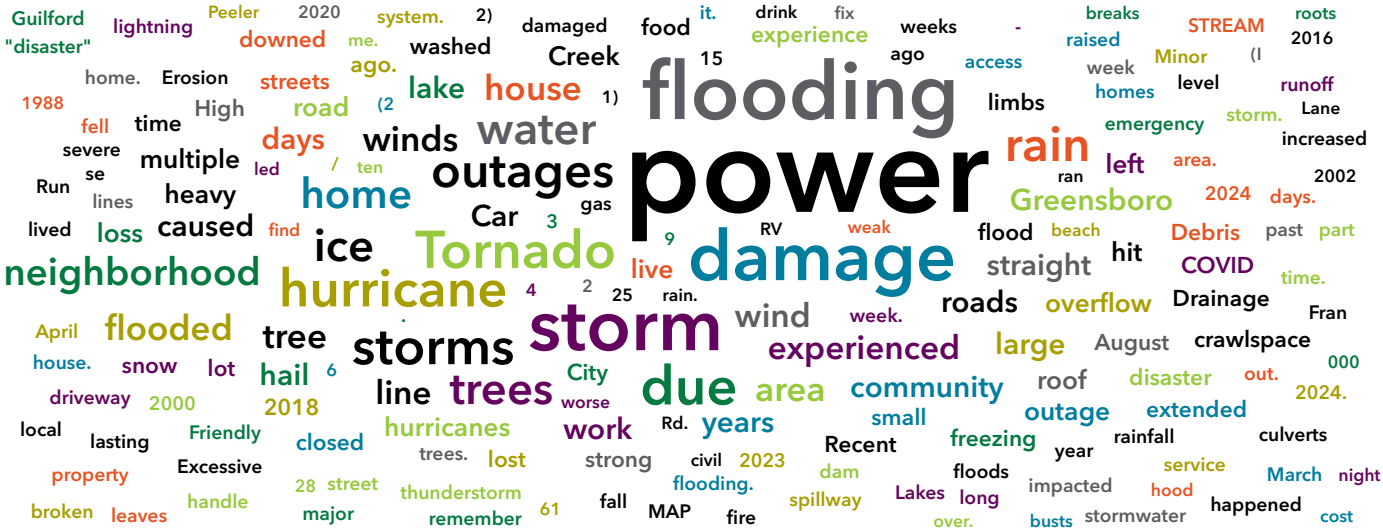
2. Have you ever experienced or been impacted by a disaster in Guilford… *



Answers	Count	Percentage
No	221	70.83%
Yes	91	29.17%

Answered: 312 Skipped: 0

3. If "Yes," please explain below.

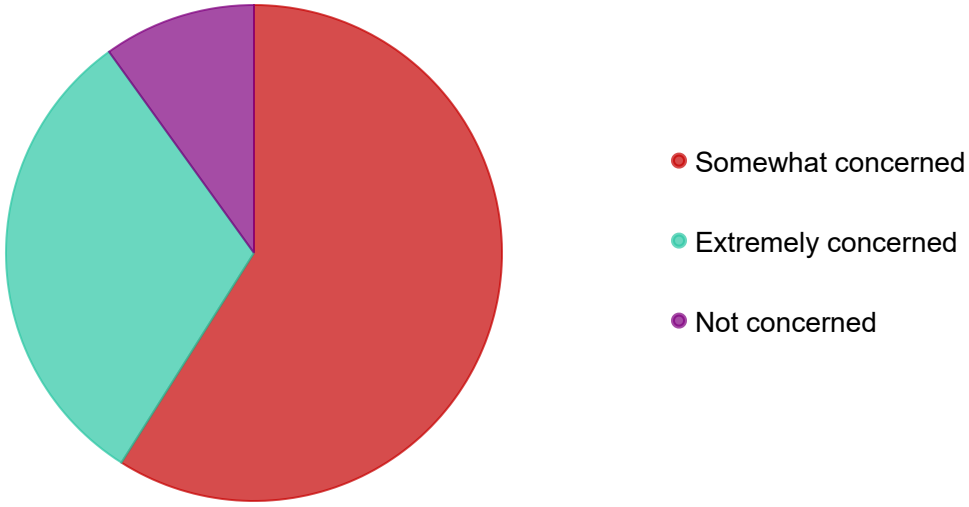


Word	Count
power	34
flooding	21
storm	19
damage	18
due	13
storms	12
Tornado	12
hurricane	12
rain	11
outages	11
ice	10
water	10
trees	10
home	9

seniors	1
families	1
find	1
shelter	1
clothing	1
more.	1
March.	1
shed.	1
uprooted.	1
neighbors	1
scratched	1
debris.	1
1)	1
period	1
fall.	1
2)	1
Witnessed	1
underground	1
catch	1
burn.	1

Answered: 94 Skipped: 218

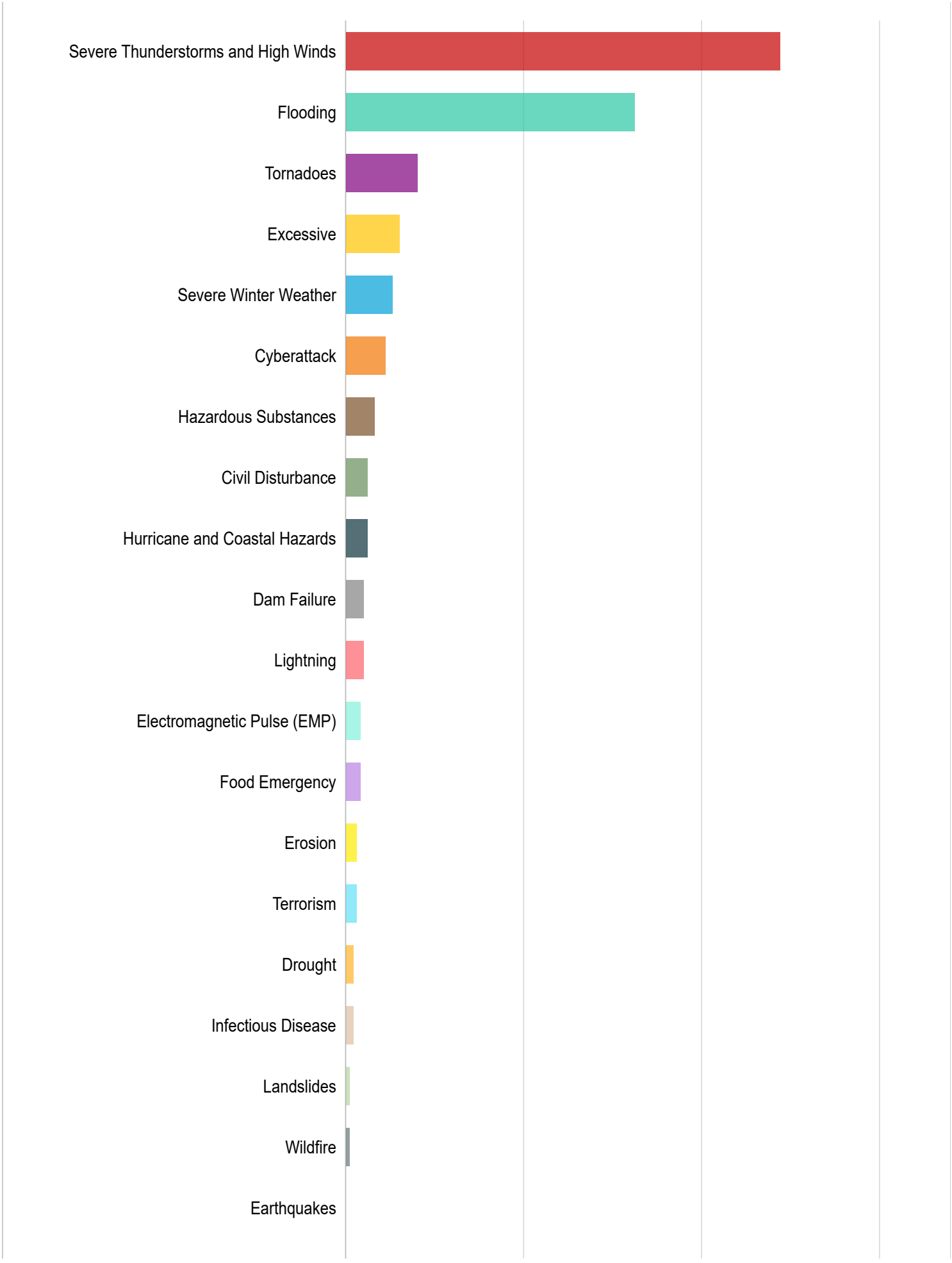
5. How concerned are you about the possibility of your community bein… *



Answers	Count	Percentage
Somewhat concerned	184	58.97%
Extremely concerned	97	31.09%
Not concerned	31	9.94%

Answered: 312 Skipped: 0

6. Please select the one (1) hazard you think is the HIGHEST threat to yo… *


Severe Thunderstorms and High Winds
Flooding
Tornadoes
Excessive
Severe Winter Weather
Cyberattack
Hazardous Substances
Civil Disturbance
Hurricane and Coastal Hazards
Dam Failure
Lightning
Electromagnetic Pulse (EMP)
Food Emergency
Erosion
Terrorism
Drought
Infectious Disease
Landslides
Wildfire
Earthquakes

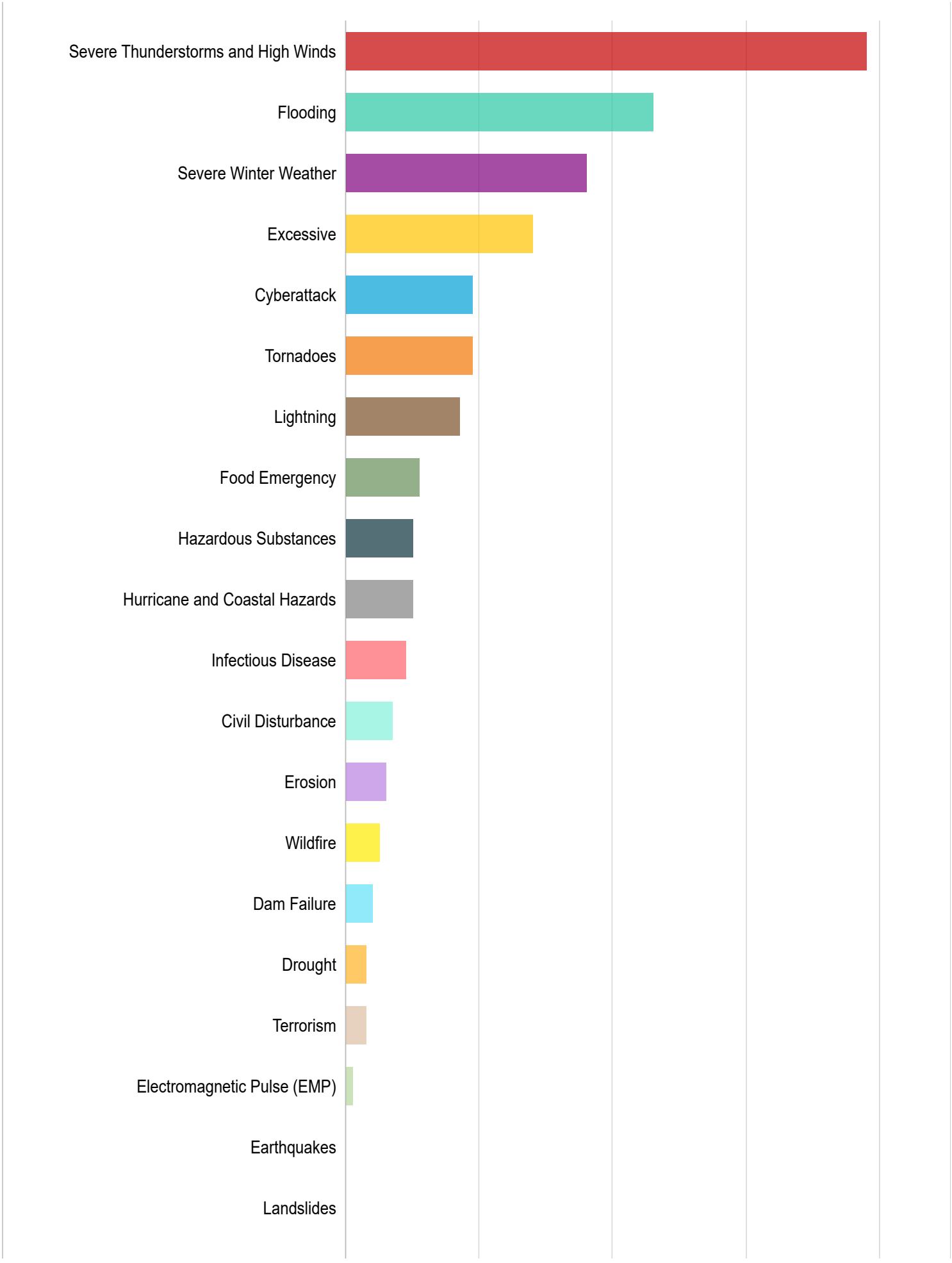


Answers	Count	Percentage
Severe Thunderstorms and High Winds	122	39.1%
Flooding	81	25.96%
Tornadoes	20	6.41%
Excessive Heat	15	4.81%
Severe Winter Weather	13	4.17%
Cyberattack	11	3.53%
Hazardous Substances	8	2.56%
Civil Disturbance	6	1.92%
Hurricane and Coastal Hazards	6	1.92%
Dam Failure	5	1.6%
Lightning	5	1.6%
Electromagnetic Pulse (EMP)	4	1.28%
Food Emergency	4	1.28%
Erosion	3	0.96%
Terrorism	3	0.96%
Drought	2	0.64%
Infectious Disease	2	0.64%
Landslides	1	0.32%
Wildfire	1	0.32%

Earthquakes	0	0%
Radiological Emergency	0	0%

Answered: 312 Skipped: 0

7. Please select the one (1) hazard you think is the SECOND HIGHEST… *


Severe Thunderstorms and High Winds
Flooding
Severe Winter Weather
Excessive
Cyberattack
Tornadoes
Lightning
Food Emergency
Hazardous Substances
Hurricane and Coastal Hazards
Infectious Disease
Civil Disturbance
Erosion
Wildfire
Dam Failure
Drought
Terrorism
Electromagnetic Pulse (EMP)
Earthquakes
Landslides

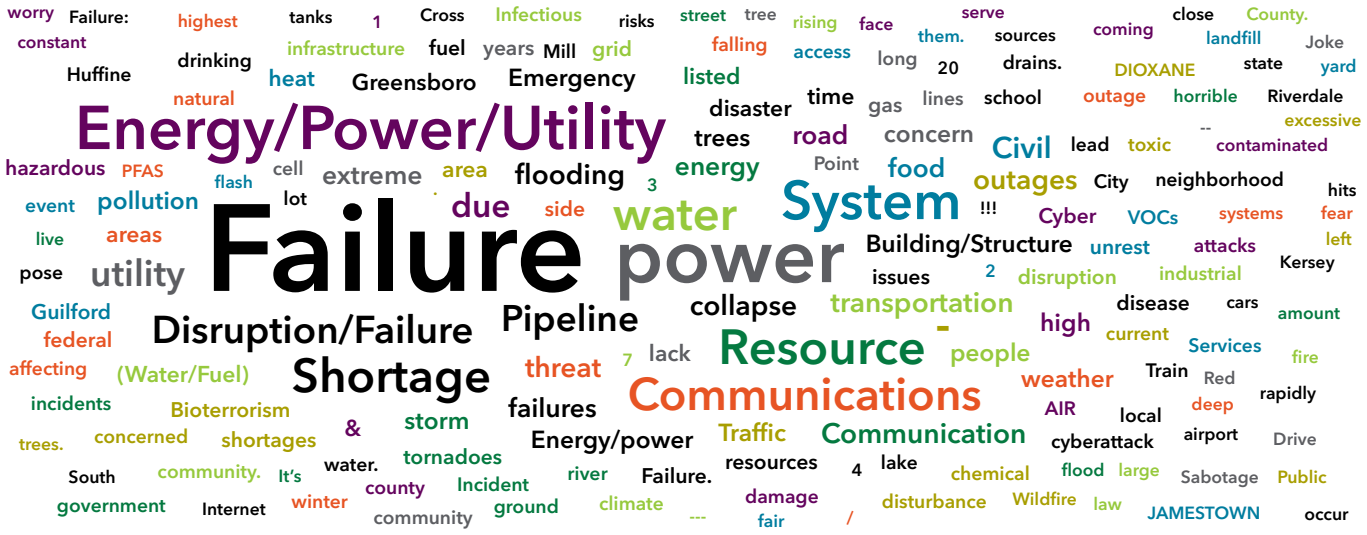


Answers	Count	Percentage
Severe Thunderstorms and High Winds	78	25%
Flooding	46	14.74%
Severe Winter Weather	36	11.54%
Excessive Heat	28	8.97%
Cyberattack	19	6.09%
Tornadoes	19	6.09%
Lightning	17	5.45%
Food Emergency	11	3.53%
Hazardous Substances	10	3.21%
Hurricane and Coastal Hazards	10	3.21%
Infectious Disease	9	2.88%
Civil Disturbance	7	2.24%
Erosion	6	1.92%
Wildfire	5	1.6%
Dam Failure	4	1.28%
Drought	3	0.96%
Terrorism	3	0.96%
Electromagnetic Pulse (EMP)	1	0.32%
Earthquakes	0	0%

Landslides	0	0%
Radiological Emergency	0	0%

Answered: 312 Skipped: 0

8. Are there any other hazards that you feel pose a wide-scale or increasing threat t…



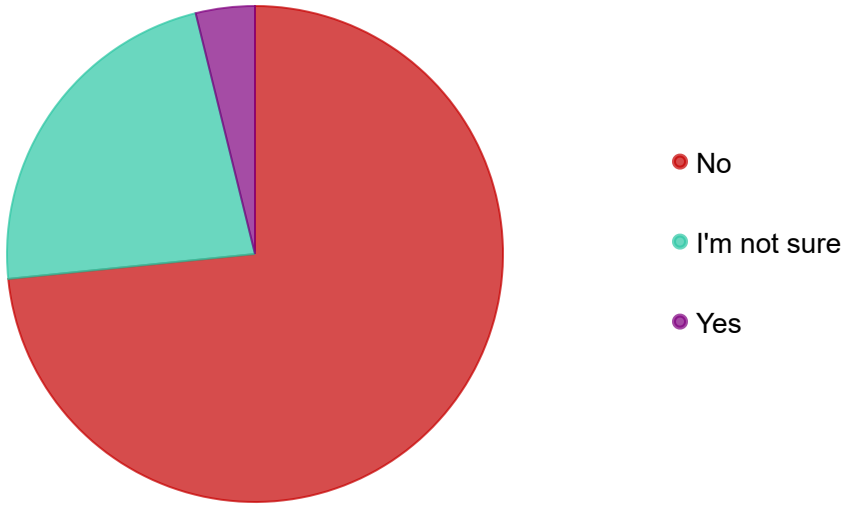
Word	Count
Failure	75
power	43
Energy/Power/Utility	32
System	28
Resource	24
Shortage	23
water	23
-	23
Communications	21

Disruption/Failure;	1
Medical	1

Answered: 175 Skipped: 137

Flood Insurance

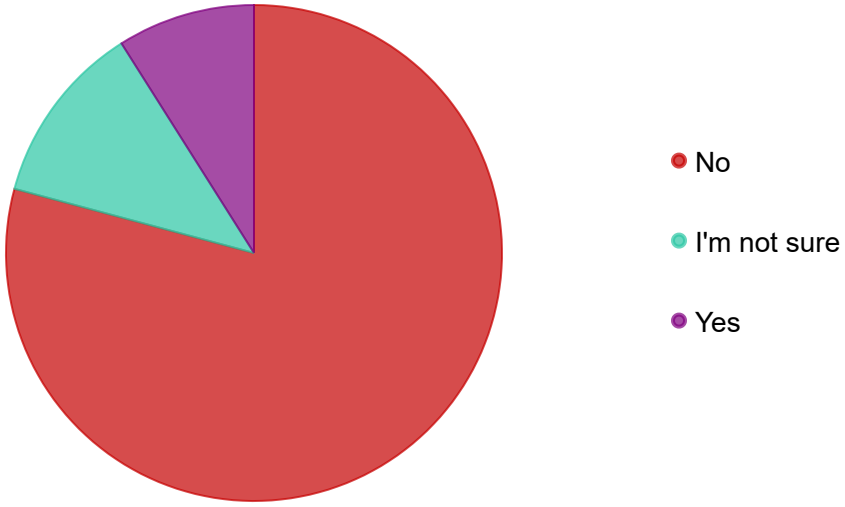
9. Is your home located in a floodplain? *



Answers	Count	Percentage
No	229	73.4%
I'm not sure	71	22.76%
Yes	12	3.85%

Answered: 312 Skipped: 0

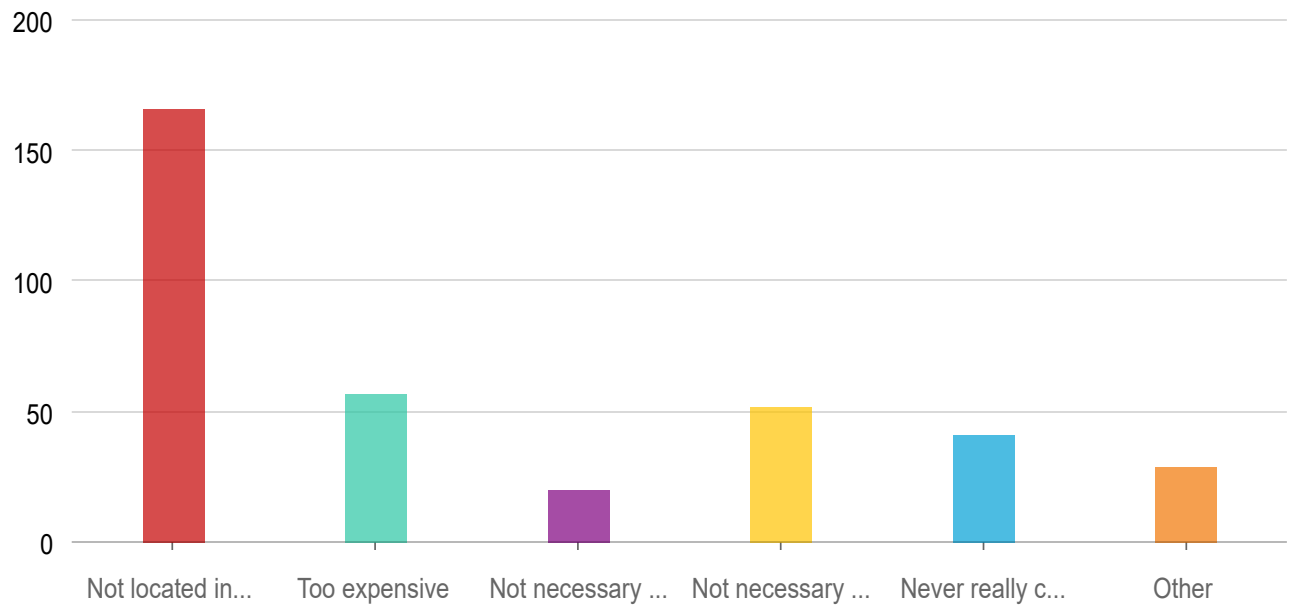
10. Do you have flood insurance? *



Answers	Count	Percentage
No	247	79.17%
I'm not sure	37	11.86%
Yes	28	8.97%

Answered: 312 Skipped: 0

11. If you do not have flood insurance, why not?



Answers	Count	Percentage
Not located in floodplain	166	53.21%
Too expensive	57	18.27%
Not necessary because it never floods	20	6.41%
Not necessary because I am elevated or otherwise protected	52	16.67%
Never really considered it	41	13.14%
Other	29	9.29%

Answered: 277 Skipped: 35

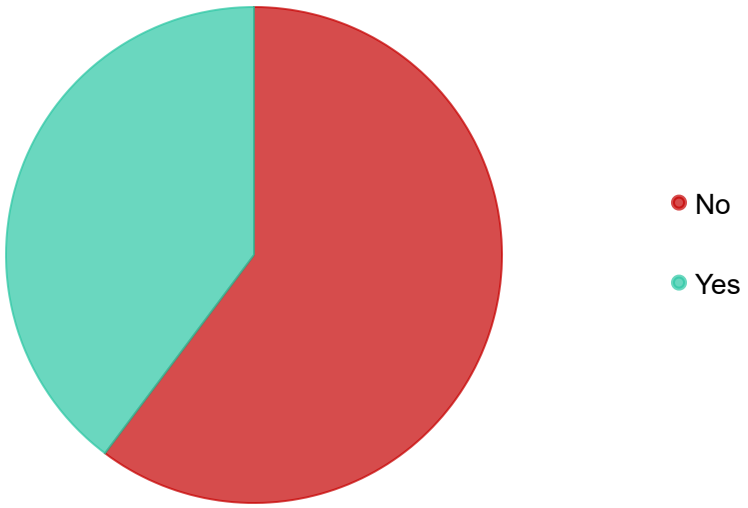
12. If "Other" for not having flood insurance, please explain below:



Word	Count
flood	20
insurance	19
home	8
insurance.	5

Steps to Hazard Resilience

13. Have you taken any steps to make your home or neighborhood more… *



Answers	Count	Percentage
No	188	60.26%
Yes	124	39.74%

Answered: 312 Skipped: 0

14. If "Yes," please explain below:

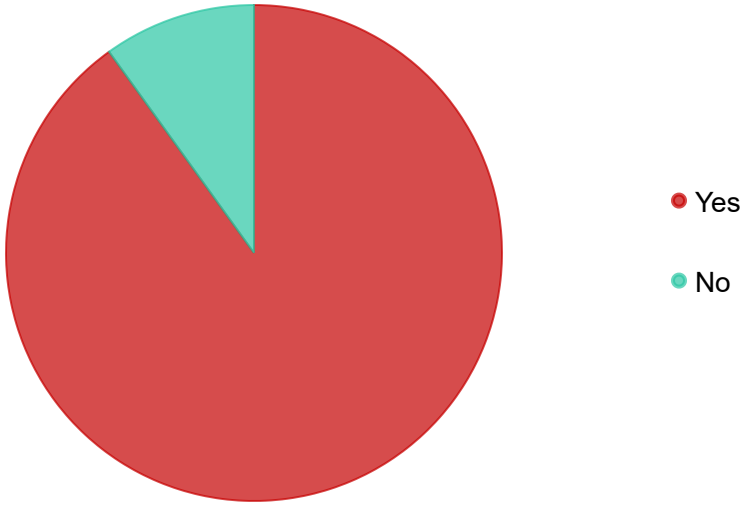


Word	Count
water	32
trees	32
cut	15
house	13
house.	13
drainage	9
tree	9
emergency	9
neighbors	9
yard	8
food	8
-	8
home	8
landscaping	7

dry	1
storms	1
-Add	1
mosquito	1
bacteria	1
pond	1
lawns	1
personally	1
inform	1
engage	1
tasks	1
cameras	1
I’ve	1
planted	1
maple	1
heat.	1

Answered: 121 Skipped: 191

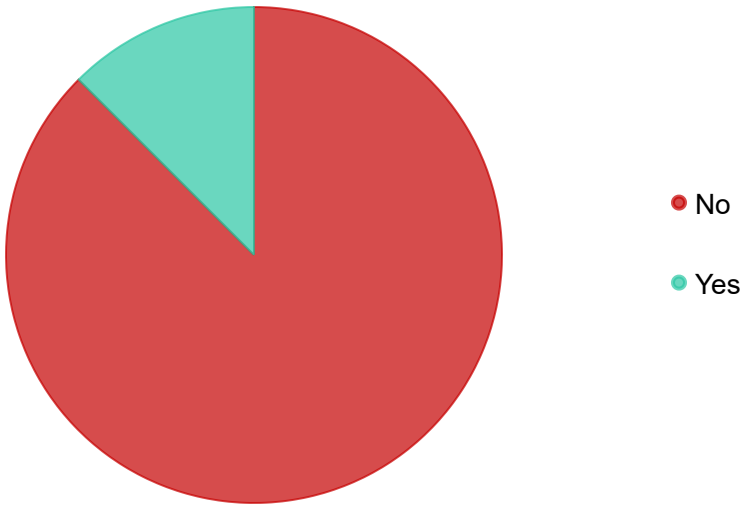
15. Are you interested in making your home or neighborhood more… *



Answers	Count	Percentage
Yes	281	90.06%
No	31	9.94%

Answered: 312 Skipped: 0

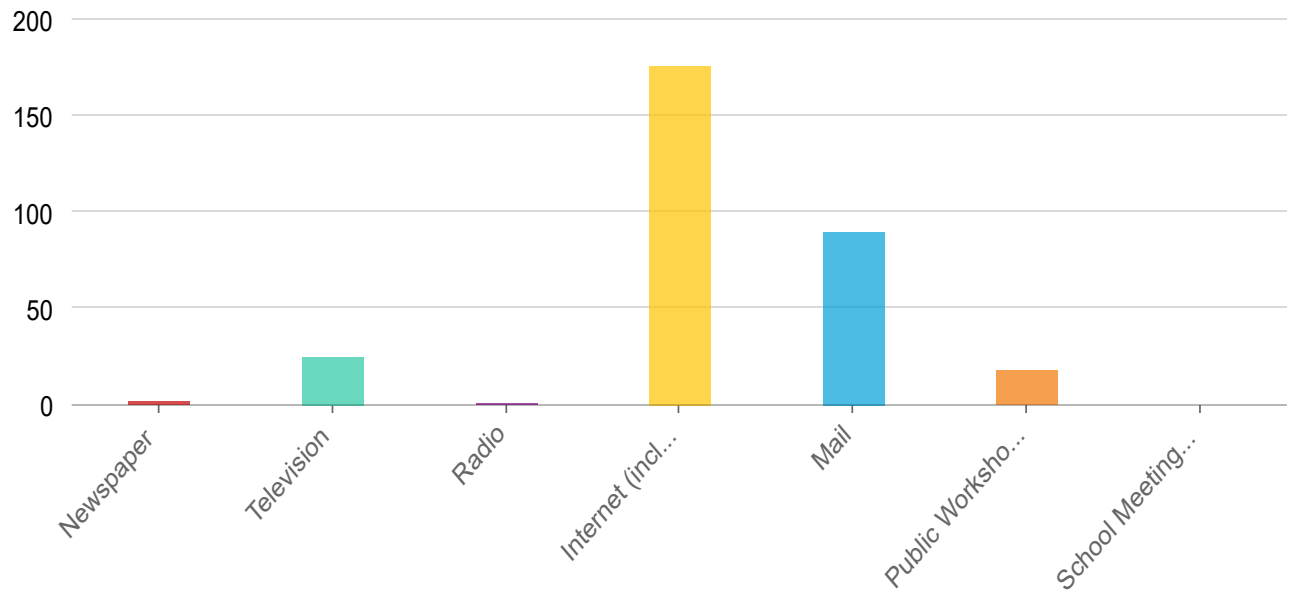
16. Do you know what office to contact to find out more information abo… *



Answers	Count	Percentage
No	273	87.5%
Yes	39	12.5%

Answered: 312 Skipped: 0

17. What is the most effective way for you to receive information about… *



Answers	Count	Percentage
Newspaper	2	0.64%
Television	25	8.01%
Radio	1	0.32%
Internet (including social media)	176	56.41%
Mail	90	28.85%
Public Workshops and Meetings	18	5.77%
School Meetings	0	0%

Answered: 312 Skipped: 0

18. Are there any other ways you prefer to receive information? If so, please explain:



Word	Count
Email	43
Text	29
mail	23
public	14
Internet	10
meetings	9
message	8
Social	8
County	8
messages	7
Workshops	7
radio	6

System	1
myself.	1
App	1
push	1
1st	1
:Public	1
/Trainings	1
2nd	1

Answered: 161 Skipped: 151

19. In your opinion, what are some steps your local government could take to reduc…

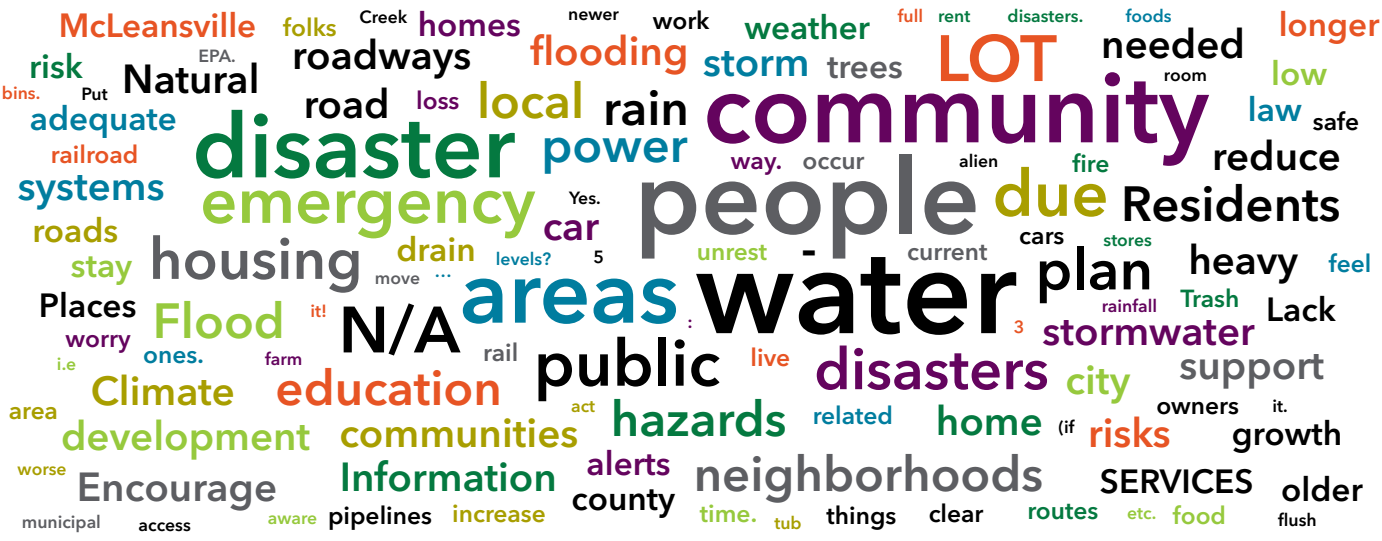


Word	Count
trees	29
power	22
water	21

engagement.	1
seasonal	1
fair	1
personnel.	1
held	1
fighters.	1
threatening	1
personal	1

Answered: 214 Skipped: 98

20. Are there any other issues regarding the reduction of risk and loss associated…



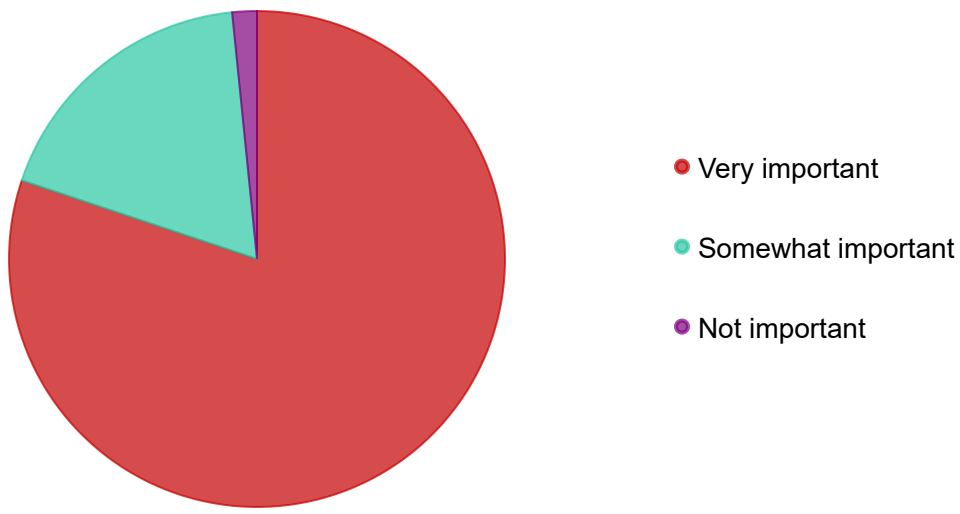
Word	Count
water	14
people	12
community	11

called	1
back	1
wrapping	1
up.	1
lying	1
around.	1

Answered: 99 Skipped: 213

Hazard Mitigation Categories

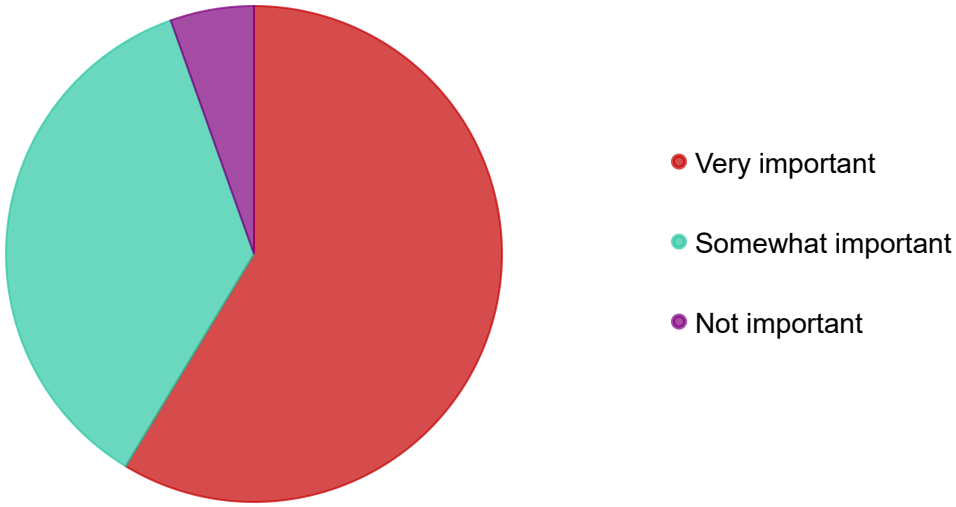
21. Prevention - Rules that frame the way the community grows. This… *



Answers	Count	Percentage
Very important	250	80.13%
Somewhat important	57	18.27%
Not important	5	1.6%

Answered: 312 Skipped: 0

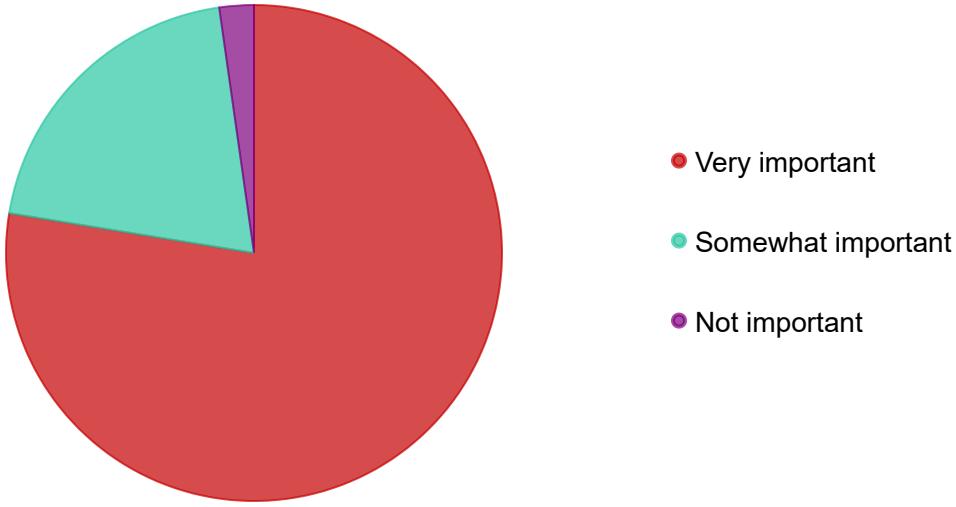
22. Property Protection - Changing existing buildings or removing… *



Answers	Count	Percentage
Very important	183	58.65%
Somewhat important	112	35.9%
Not important	17	5.45%

Answered: 312 Skipped: 0

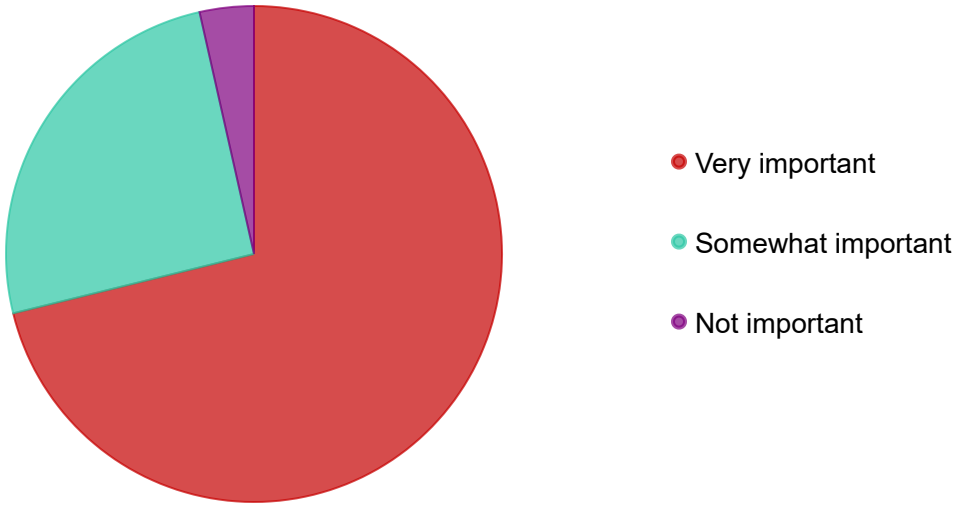
23. Natural Resource Protection - Preserving areas, or restoring areas to… *



Answers	Count	Percentage
Very important	242	77.56%
Somewhat important	63	20.19%
Not important	7	2.24%

Answered: 312 Skipped: 0

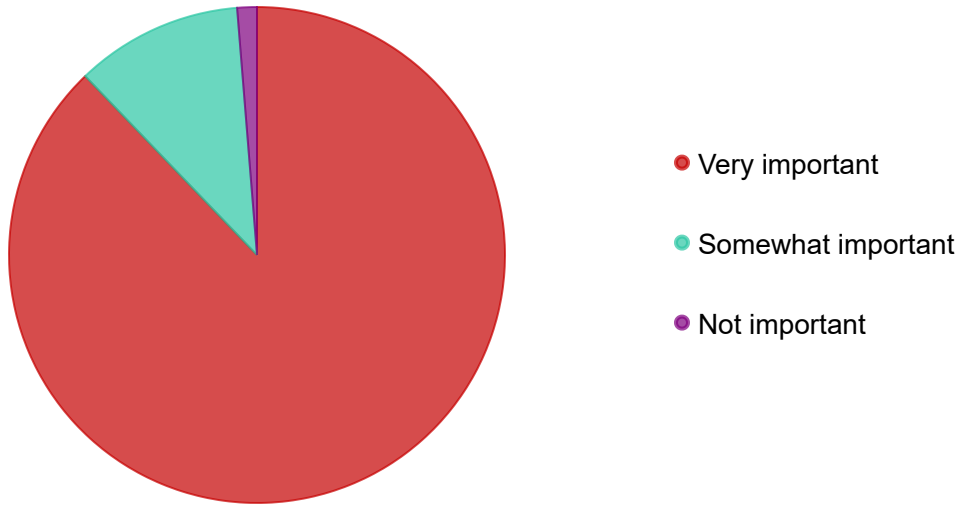
24. Structural Projects - Projects that lessen the impact of a hazard by… *



Answers	Count	Percentage
Very important	222	71.15%
Somewhat important	79	25.32%
Not important	11	3.53%

Answered: 312 Skipped: 0

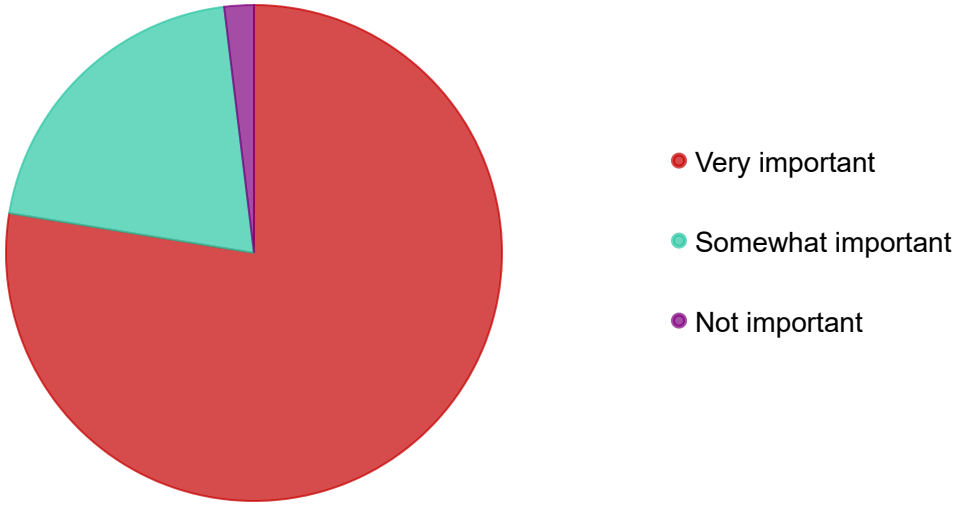
25. Emergency Services - Actions that protect people and/or protect… *



Answers	Count	Percentage
Very important	274	87.82%
Somewhat important	34	10.9%
Not important	4	1.28%

Answered: 312 Skipped: 0

26. Public Education and Awareness - Actions that inform people about… *



Answers	Count	Percentage
Very important	242	77.56%
Somewhat important	64	20.51%
Not important	6	1.92%

Answered: 312 Skipped: 0

Optional Contact Information

- **27. Name?**

Appendix E

COMPLETED MITIGATION ACTIONS

Guilford County

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2024)
P-5	Augment enforcement of the State Building Code and related County ordinances by encouraging wind-resistant design techniques for new residential construction during the county's permit process.	Hurricanes and Tropical Storms, Tornadoes	High	County and municipal code enforcement officials	None identified at this time	Completed	No change (2018 NC Building Code Effective January 1, 2019 remains current and in effect). Wind load design criteria for Guilford County remains 115 mph.
SP-3	Research and implement, if feasible, a building code modification to require that all vulnerable population facilities (assisted care facilities, group homes, etc.) have an alternate power source to sustain operations during power outages.	Power Outages	High	Guilford County Emergency Management	Local	Completed	This is now required as per the section 2702.1.7 of new 2018 NC State Building Codes which became effective as of 1/21/2019. This action is considered complete.

City of Greensboro

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2024)
PP-2	Augment enforcement of the State Building Code and related City of Greensboro ordinances by encouraging wind-resistant design techniques for new residential construction during the city's permit process.	Hurricanes and Tropical Storms, Tornadoes	High	City of Greensboro code enforcement officials	None identified at this time	Completed	The 2018 NC Building Codes became mandatory on January 1, 2019. The wind speed design criteria increased from 90 mph to 115 mph for Guilford County. This action is considered complete. Building Inspections Initiative

Appendix F
Wildfire Hazard Maps

1. Functional Wildfire Urban Interface

The Functional Wildland Urban Interface is used to define the **location** section of wildfire in the Risk Assessment.

Figure 1.1 – FWUI, Guilford County

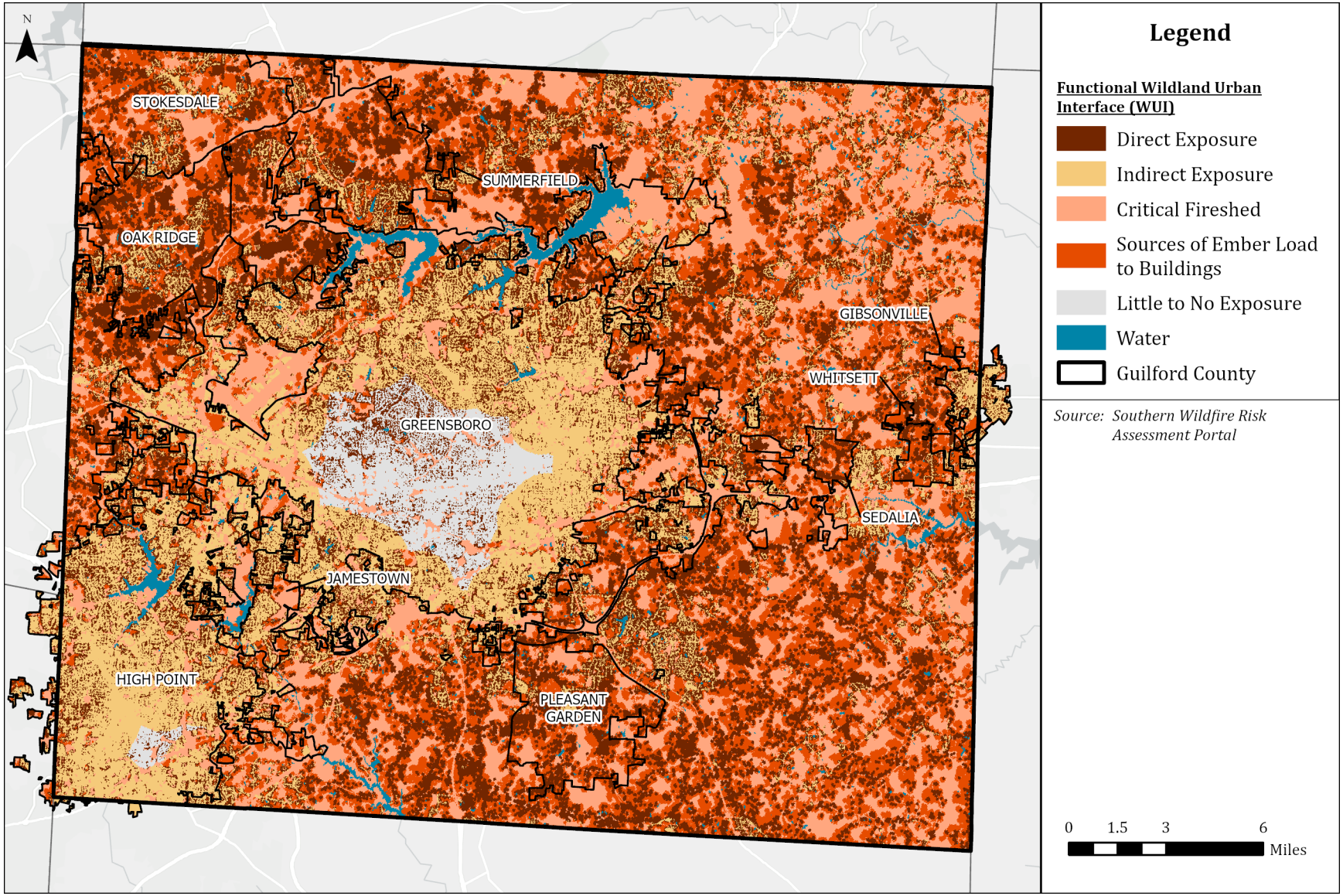


Figure 1.2 – FWUI, Town of Gibsonville

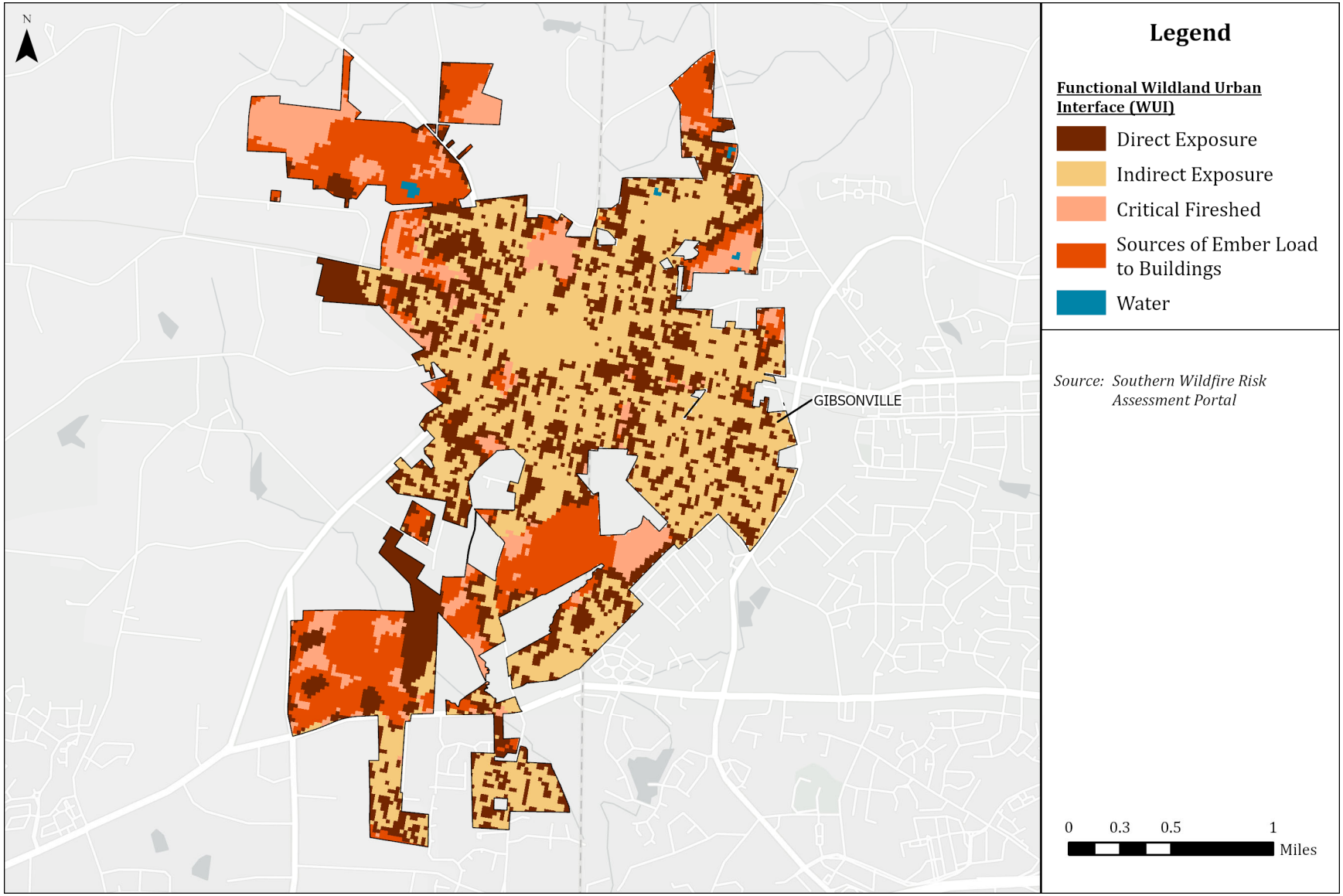


Figure 1.3 – FWUI, City of Greensboro

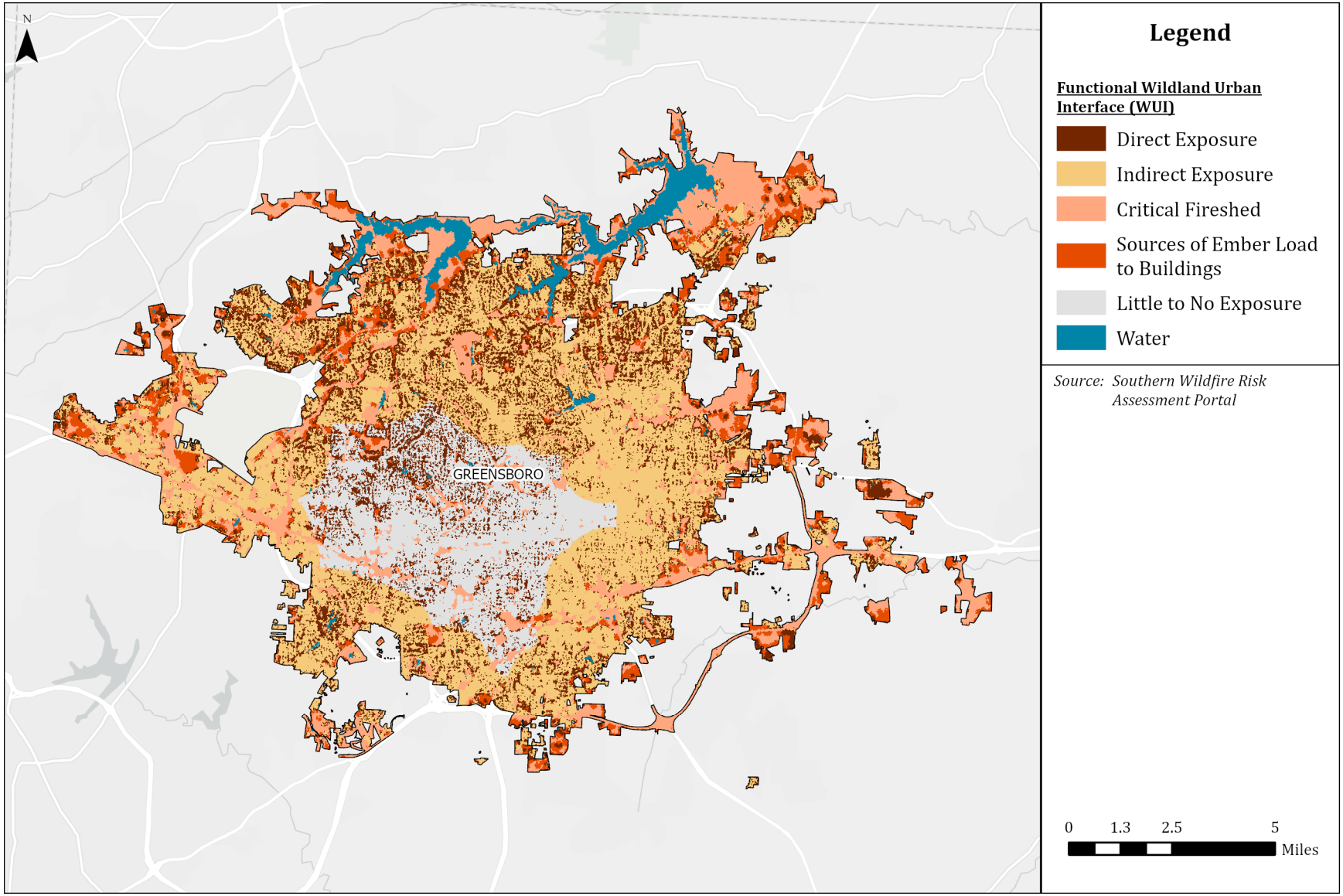


Figure 1.4 – FWUI, City of High Point

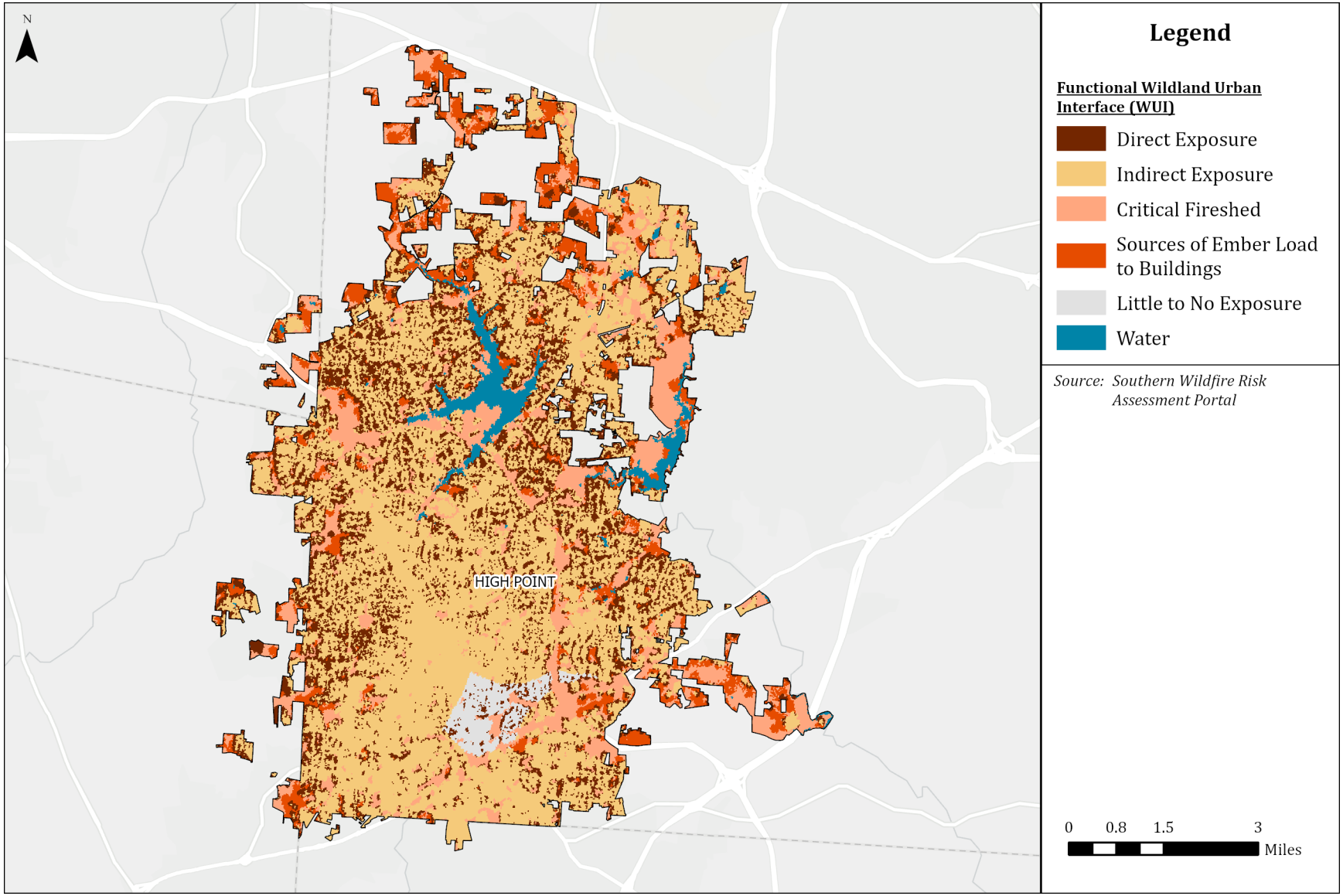


Figure 1.5 – FWUI, Town of Jamestown

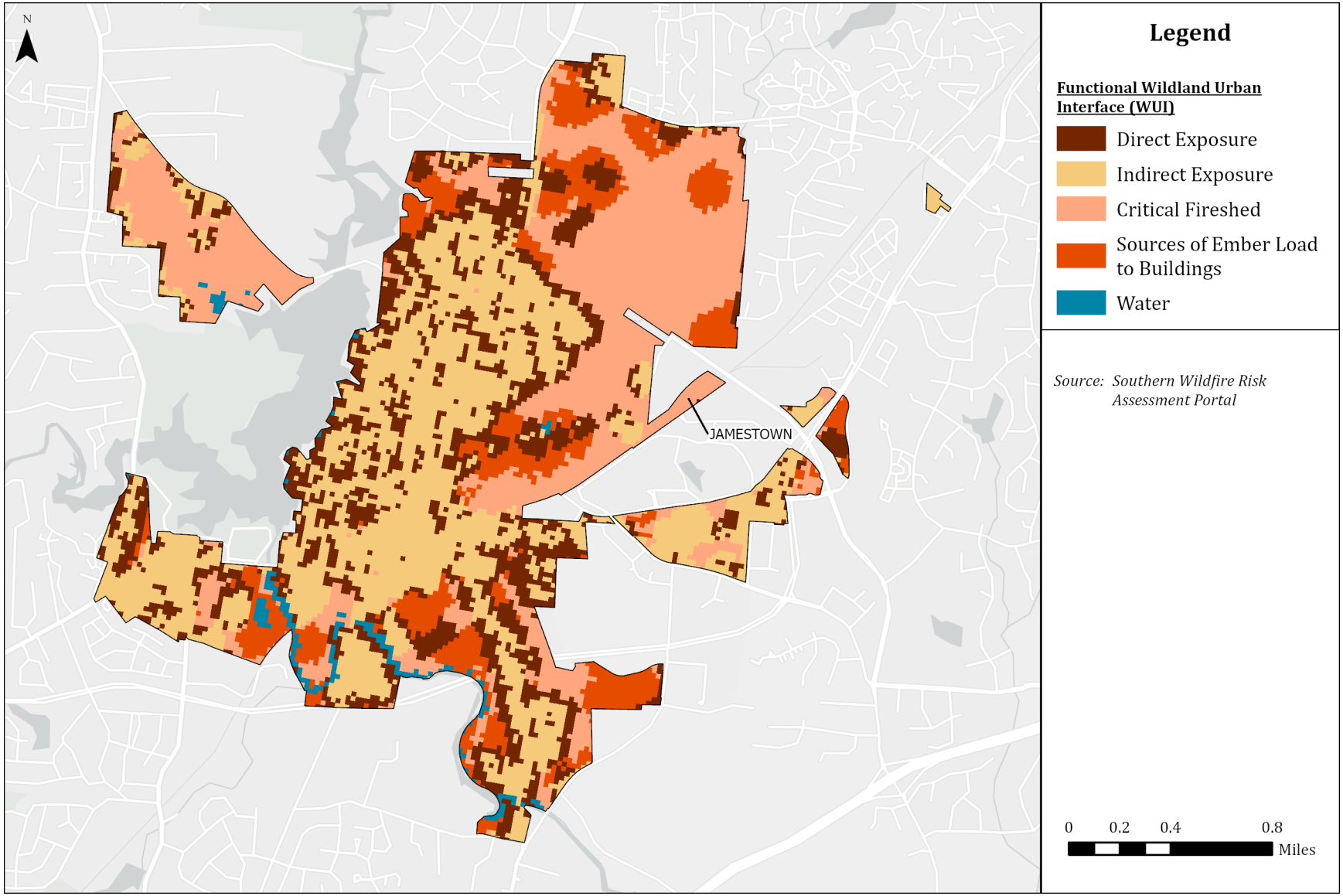


Figure 1.6 – FWUI, Town of Oak Ridge

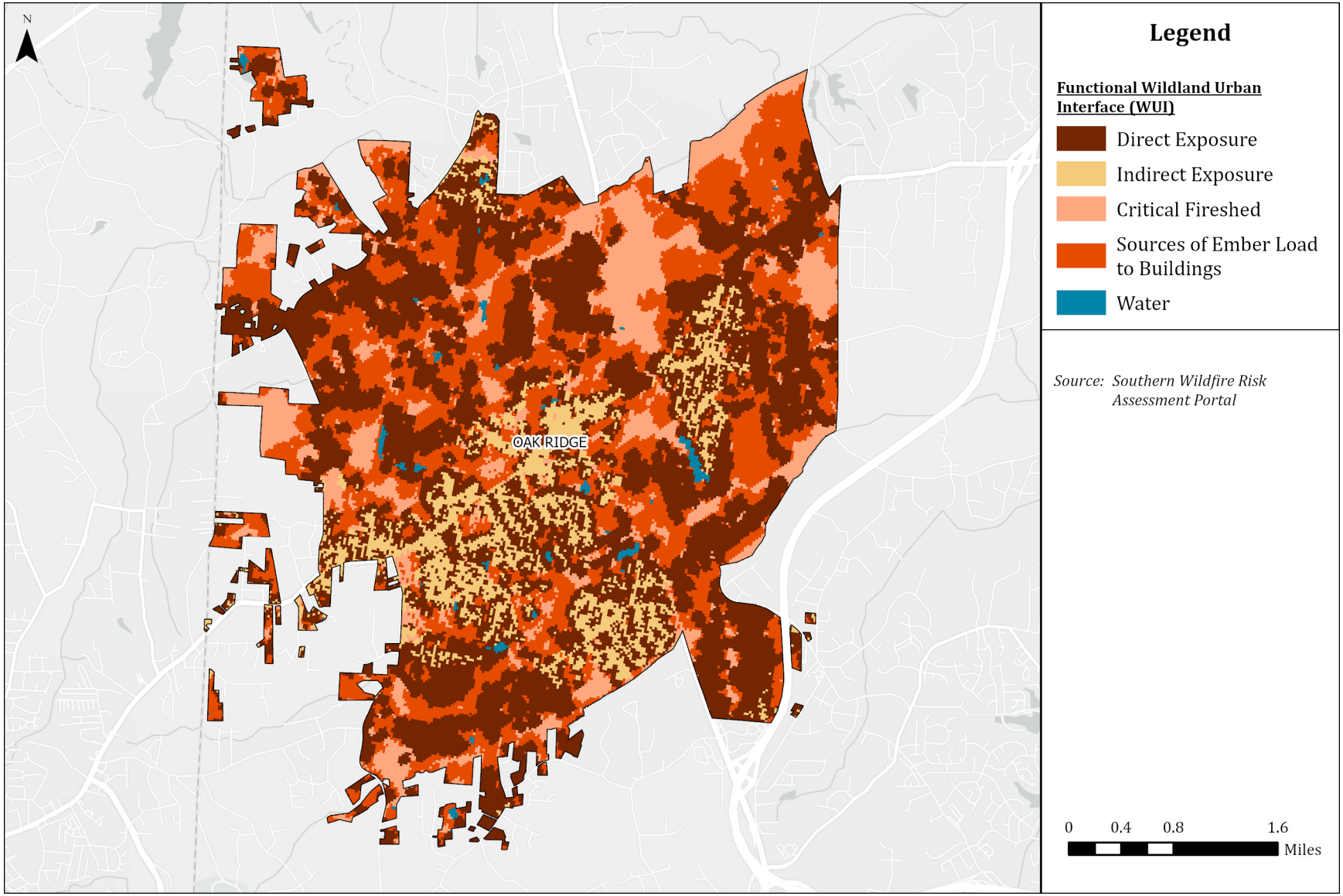


Figure 1.7 – FWUI, Town of Pleasant Garden

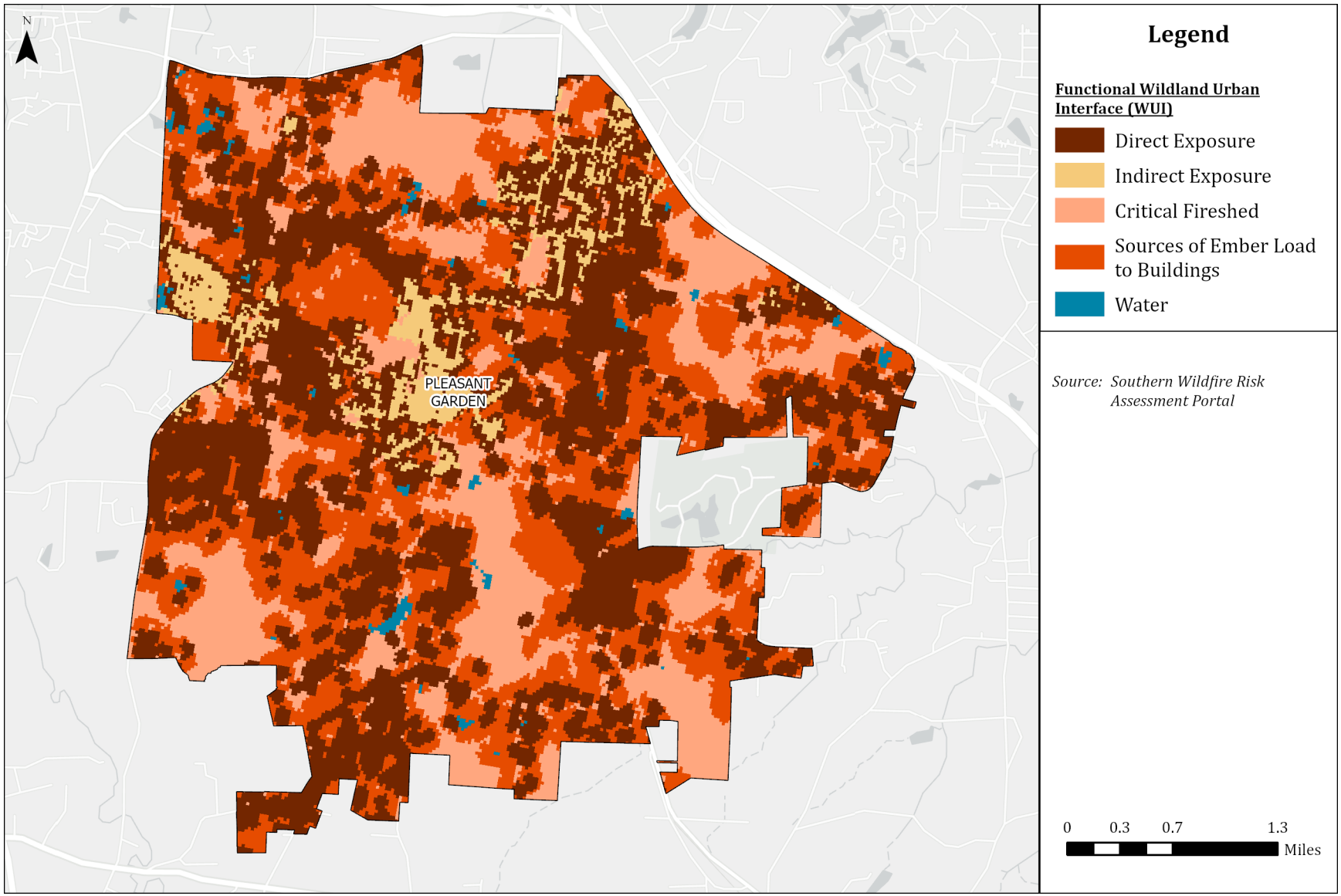


Figure 1.8 – FWUI, Town of Sedalia

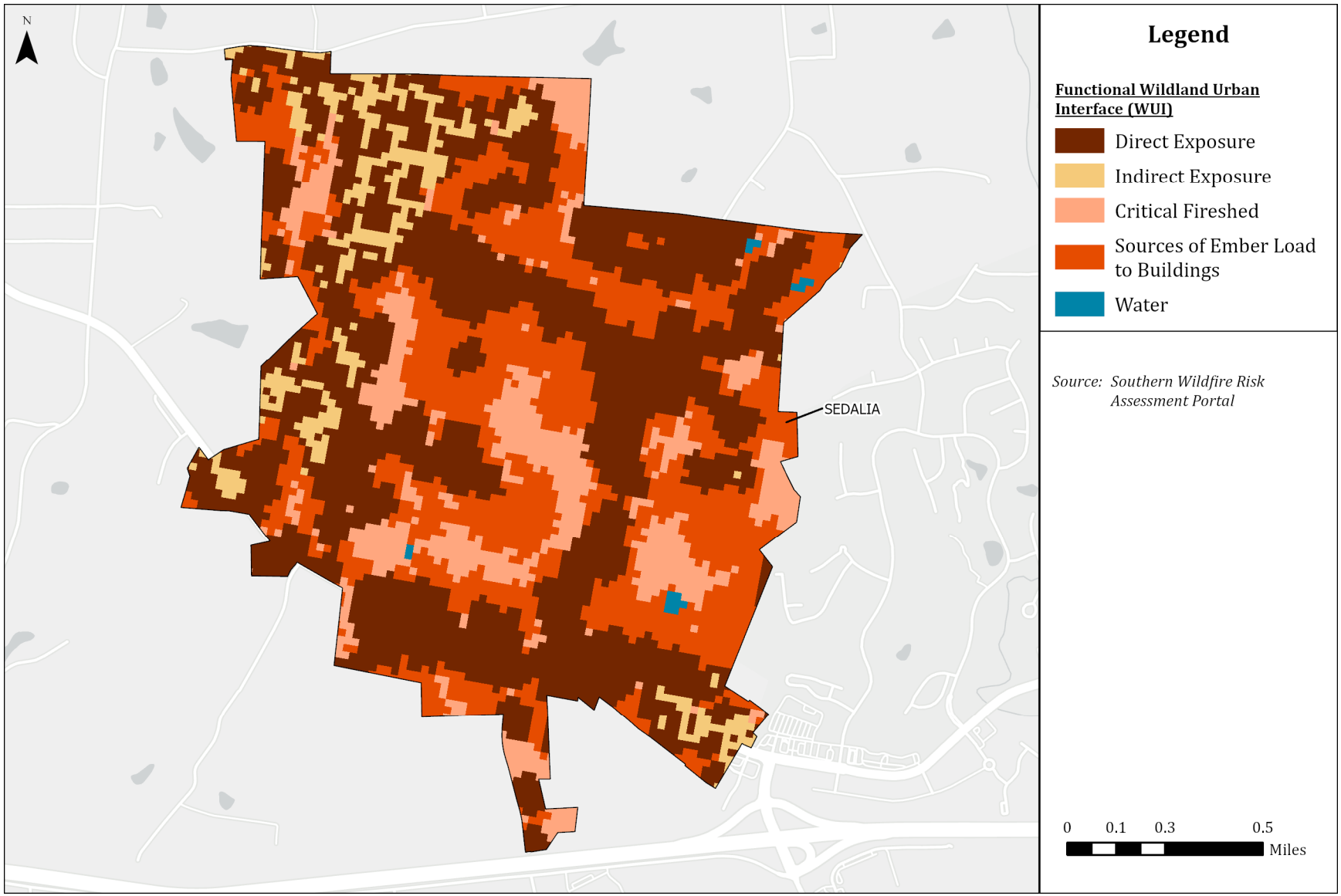


Figure 1.9 – FWUI, Town of Stokesdale

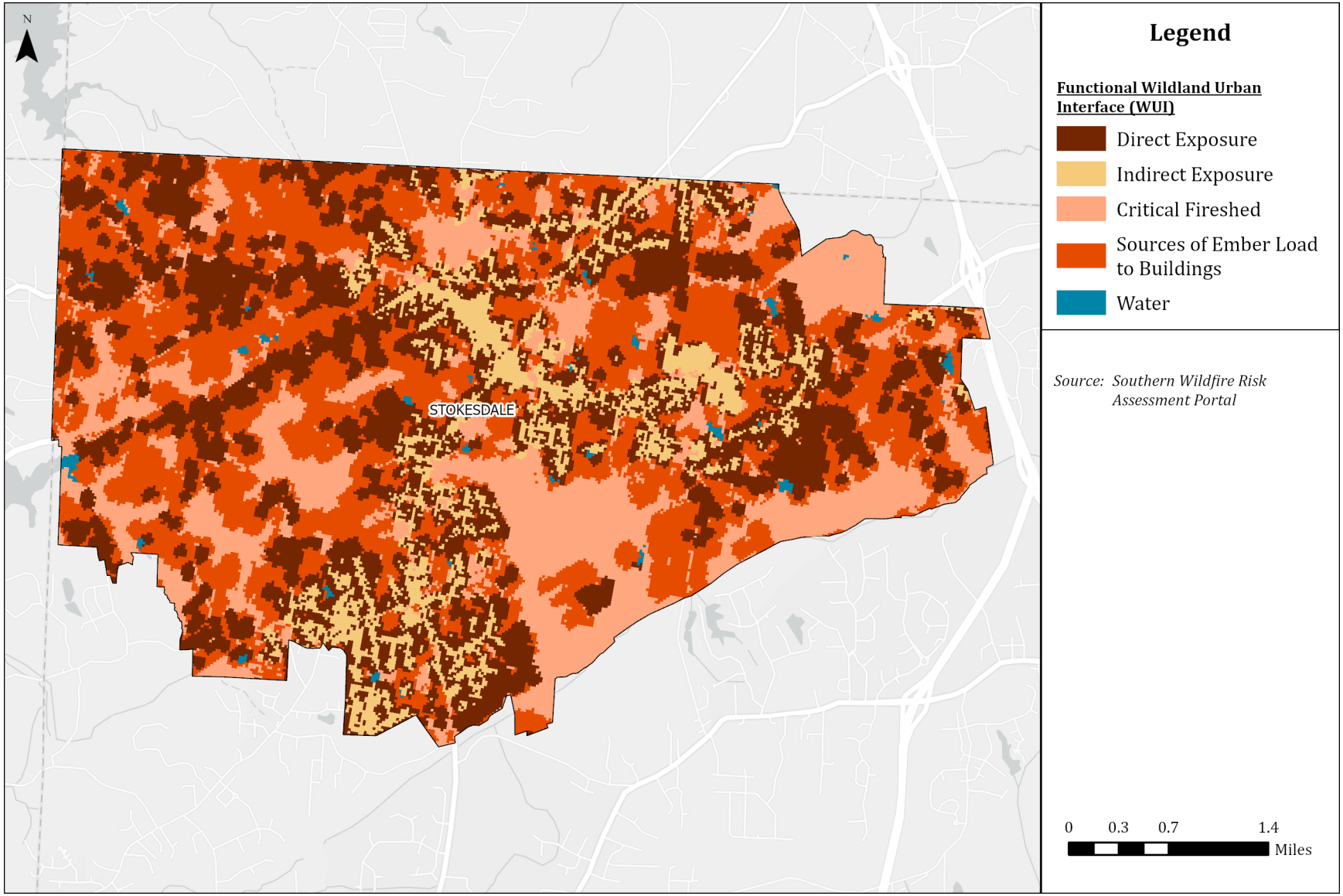


Figure 1.10 – FWUI, Town of Summerfield

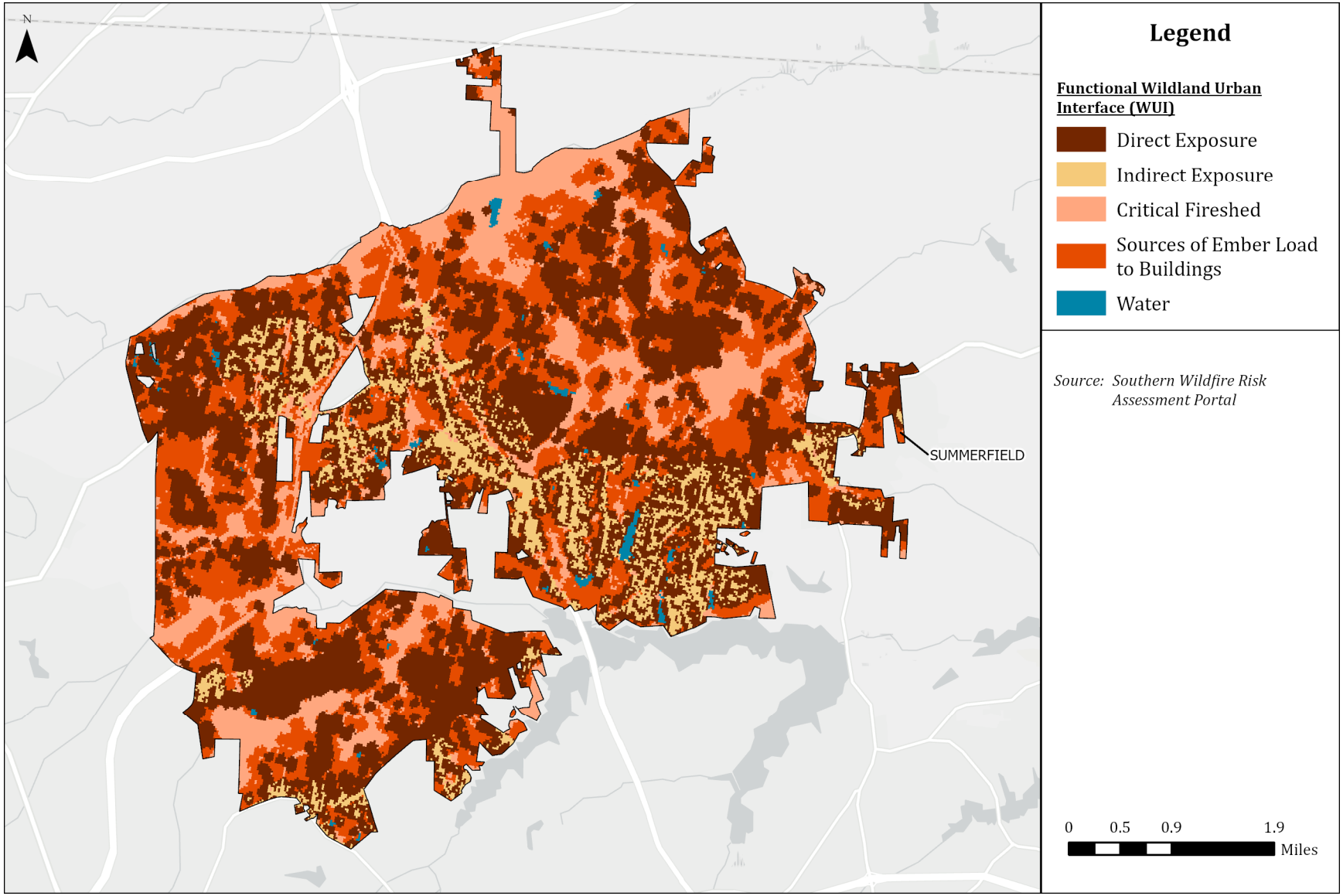
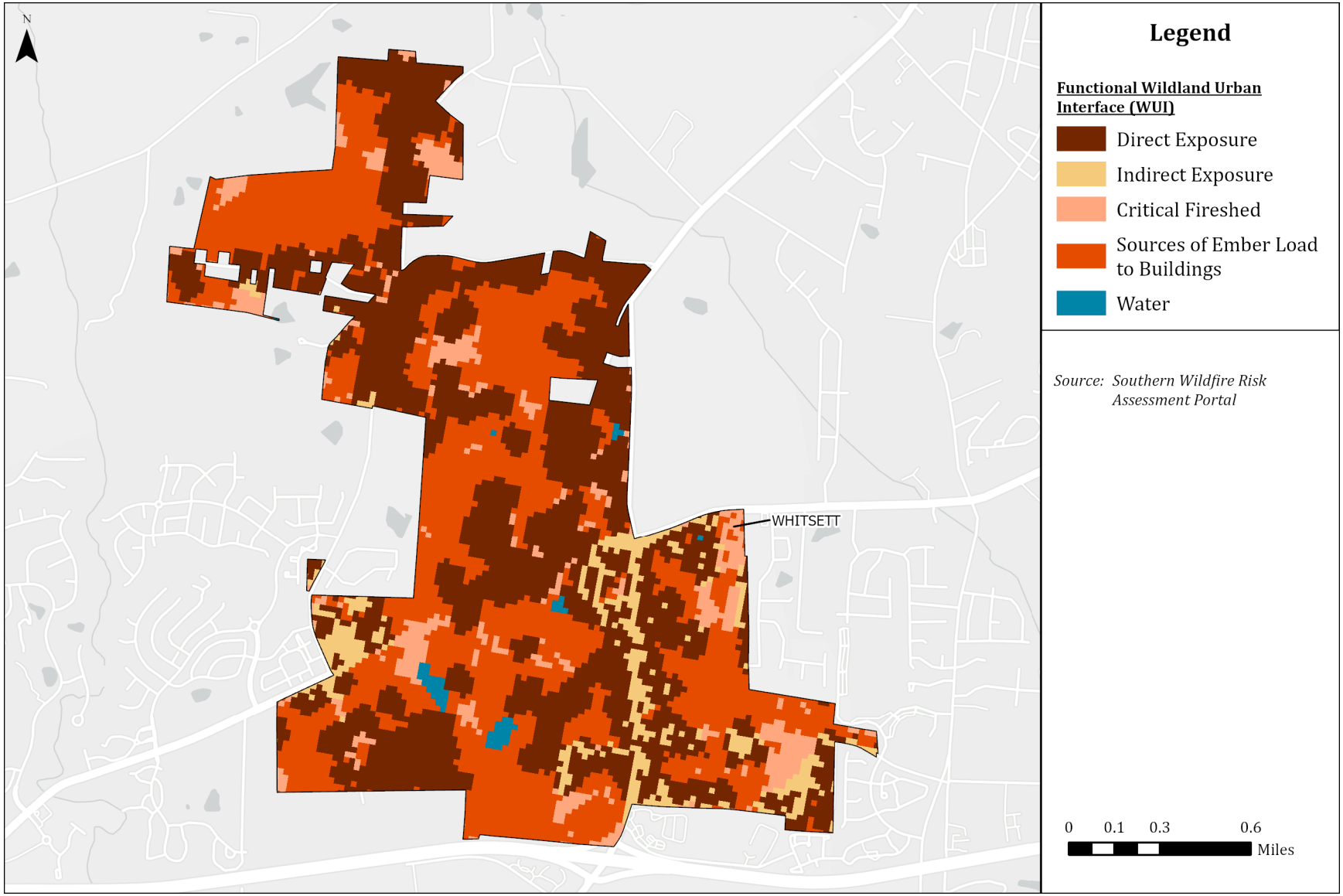


Figure 1.11 – FWUI, Town of Whitsett



2. Fire Intensity

The Fire Intensity scale is used to define the **extent** section of wildfire in the Risk Assessment.

Figure 2.1 – Fire Intensity, Guilford County

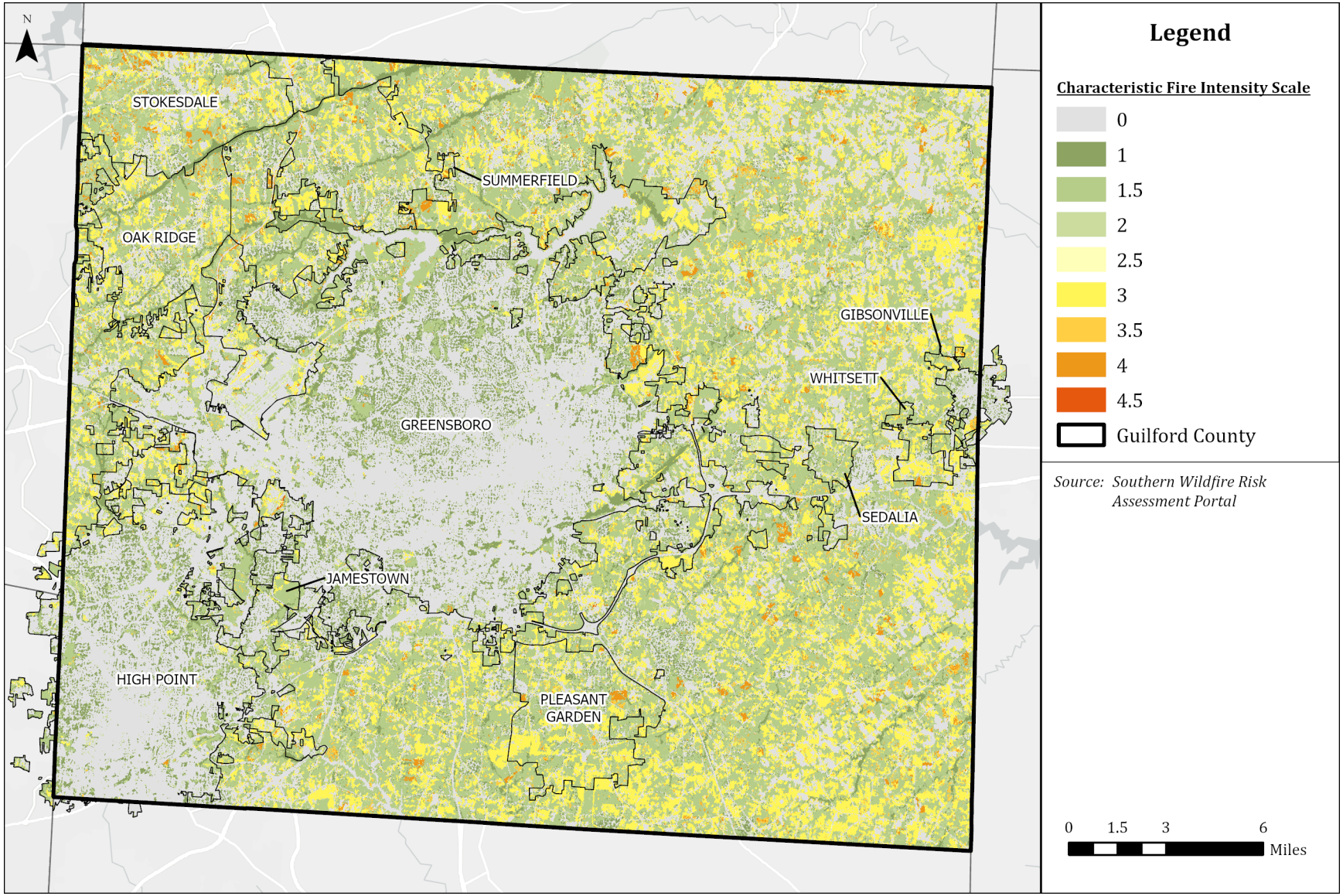


Figure 2.2 – Fire Intensity, Town of Gibsonville

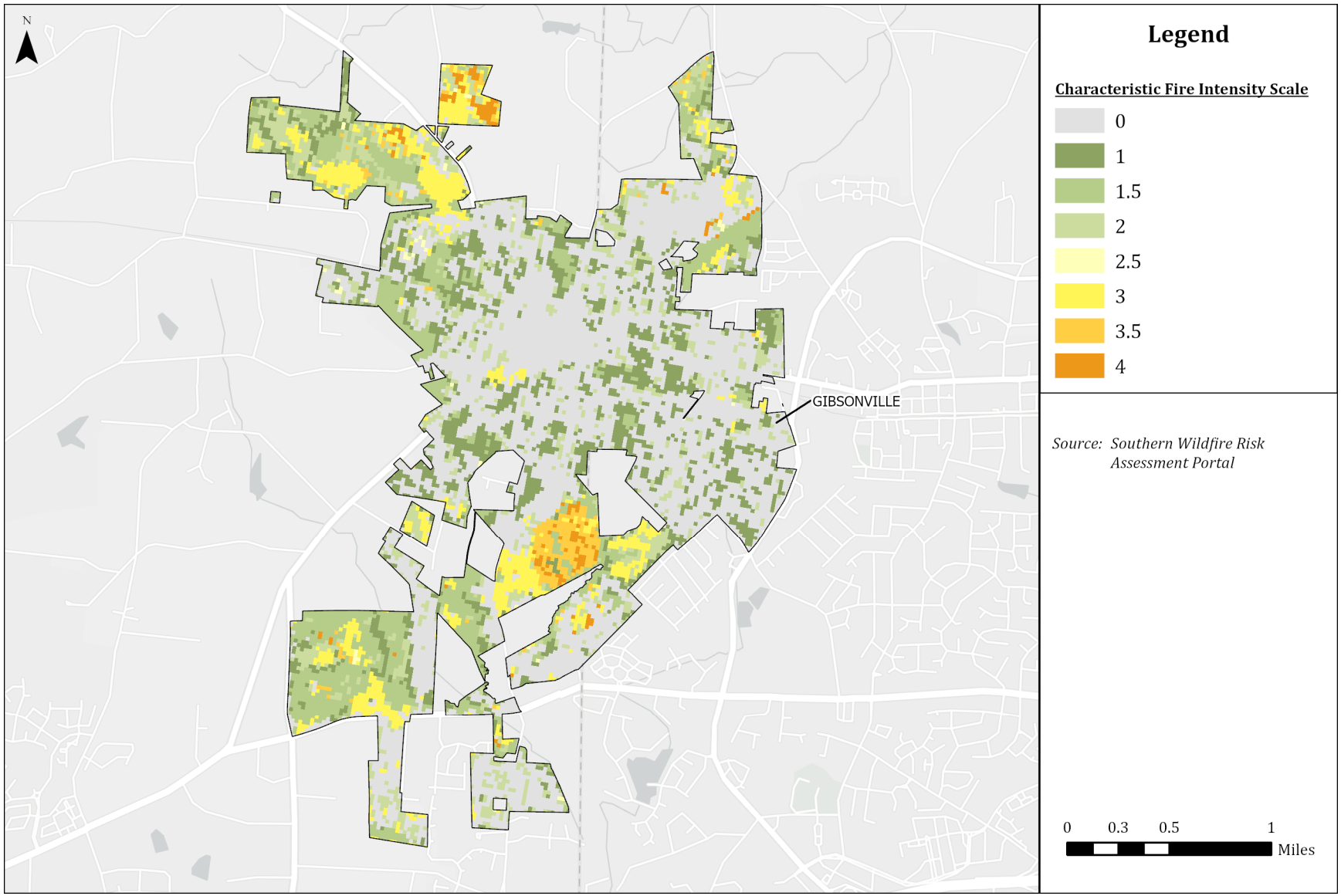


Figure 2.3 – Fire Intensity, City of Greensboro

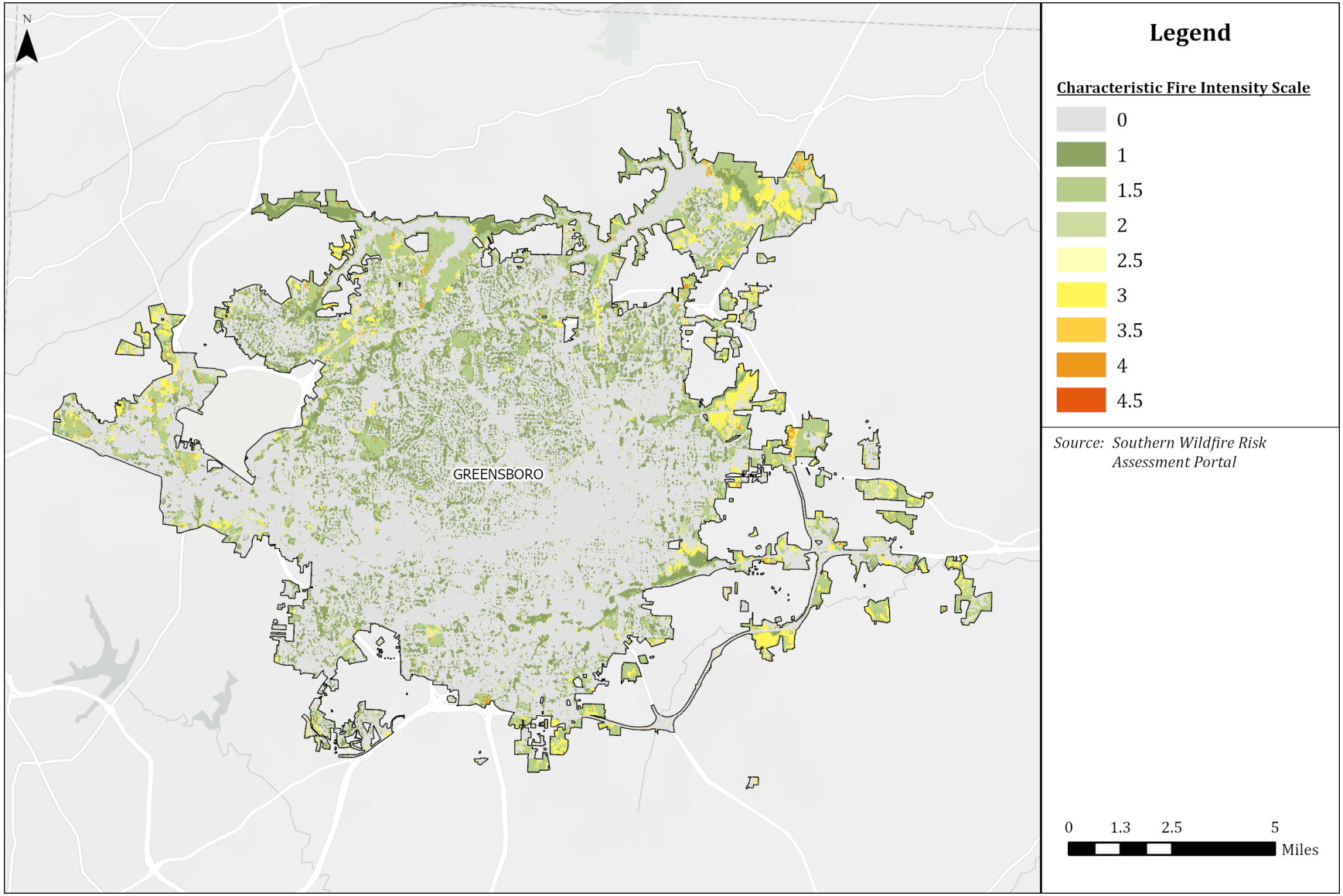


Figure 2.4 – Fire Intensity, City of High Point

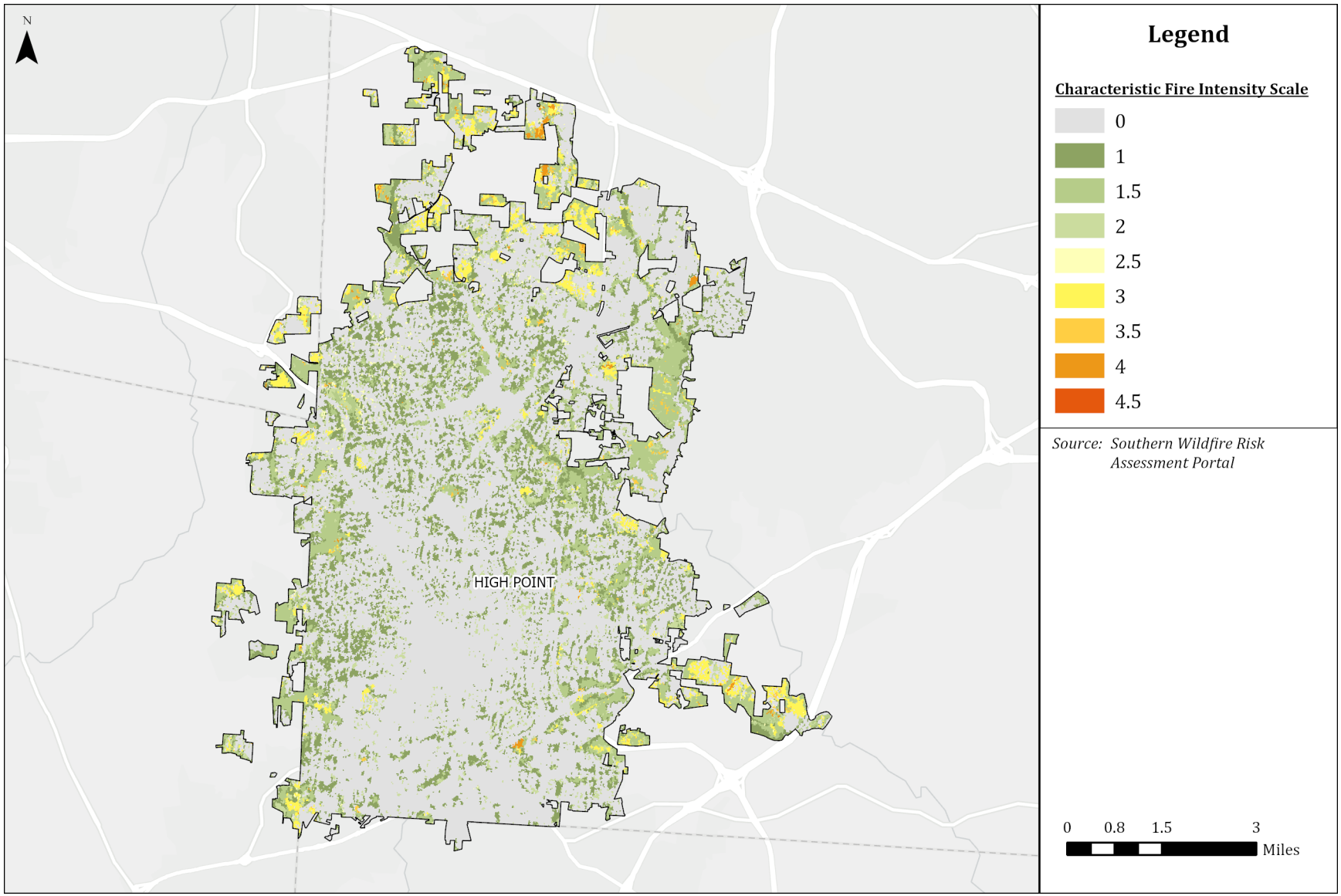


Figure 2.5 – Fire Intensity, Town of Jamestown

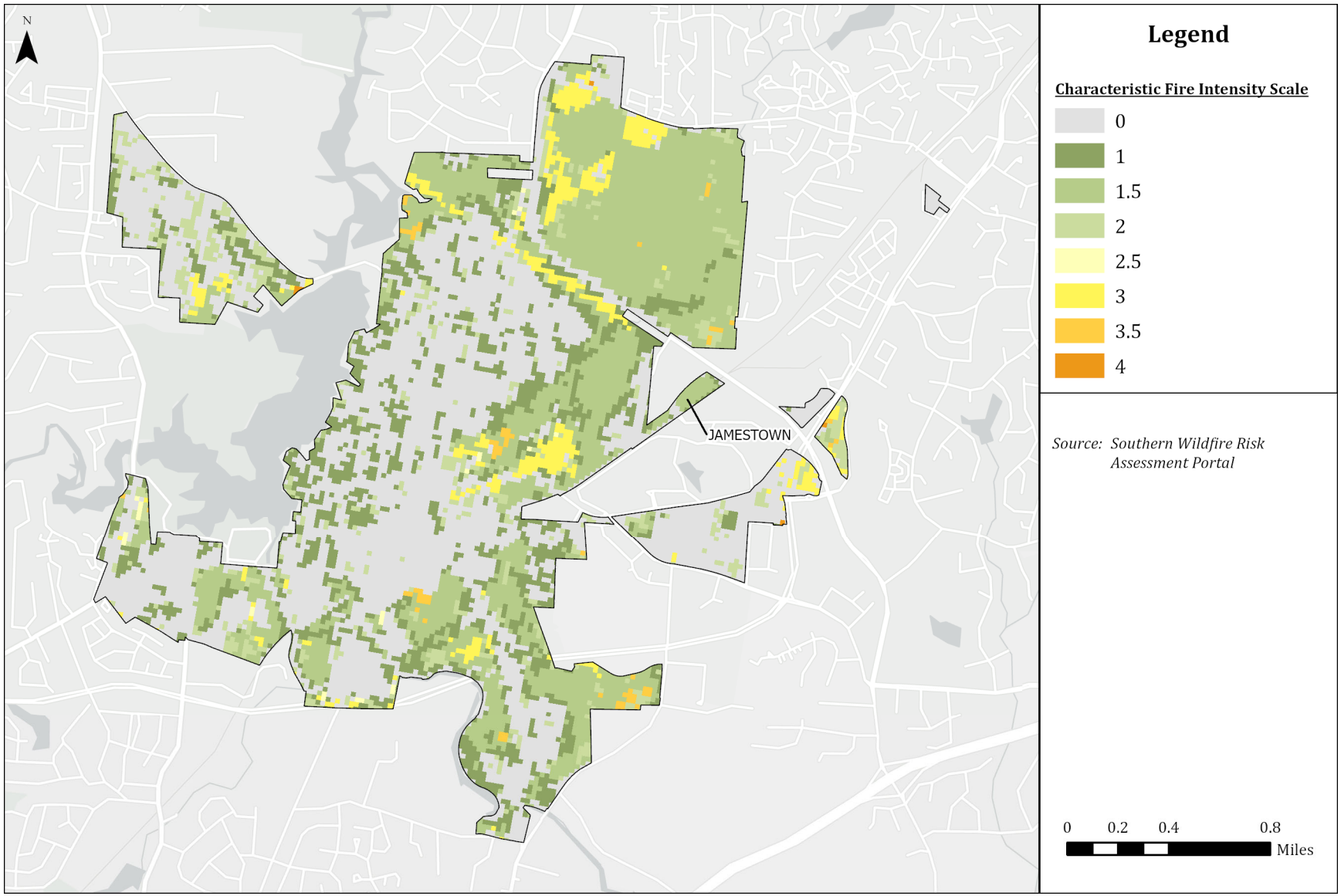


Figure 2.6 – Fire Intensity, Town of Oak Ridge

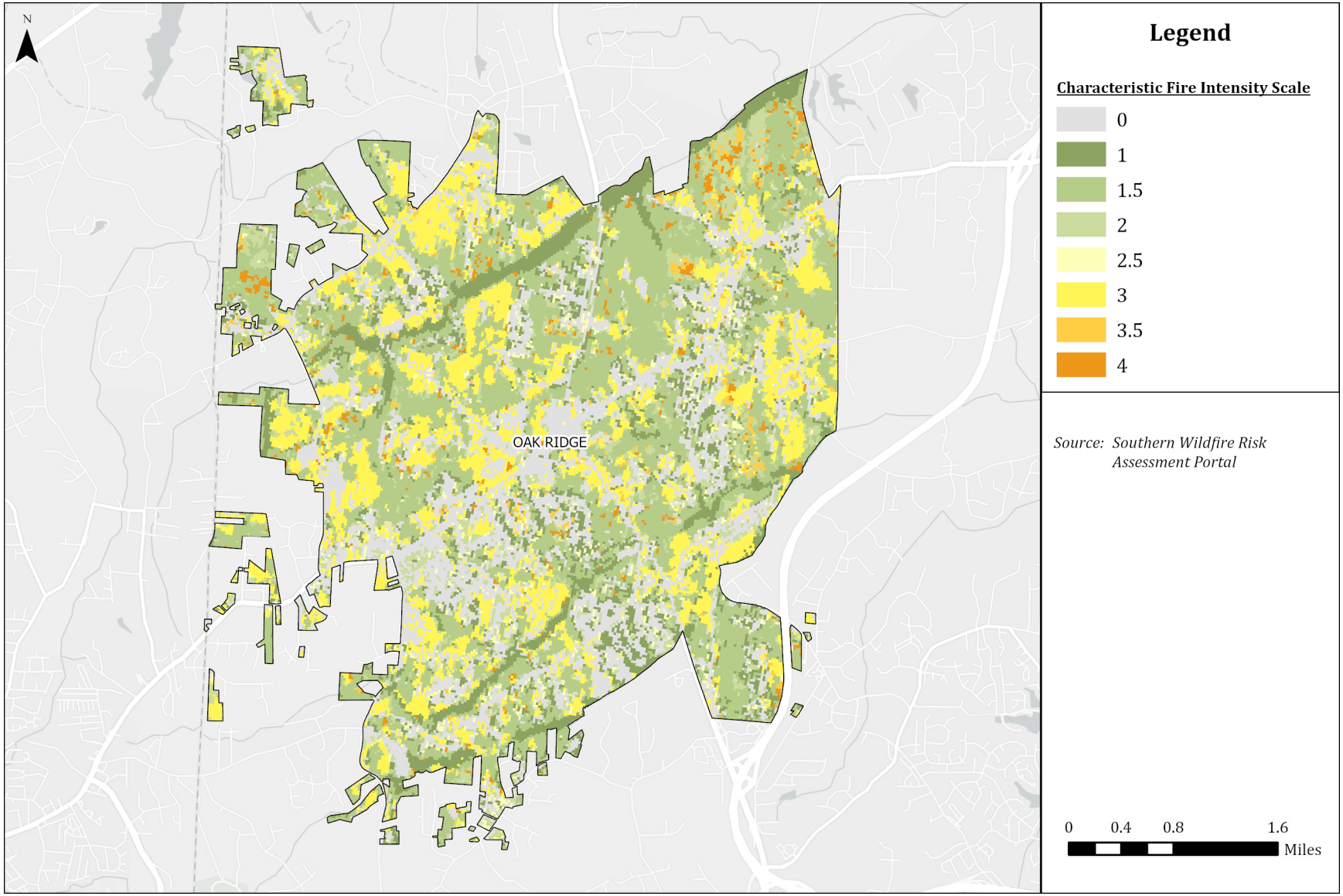


Figure 2.7 – Fire Intensity, Town of Pleasant Garden

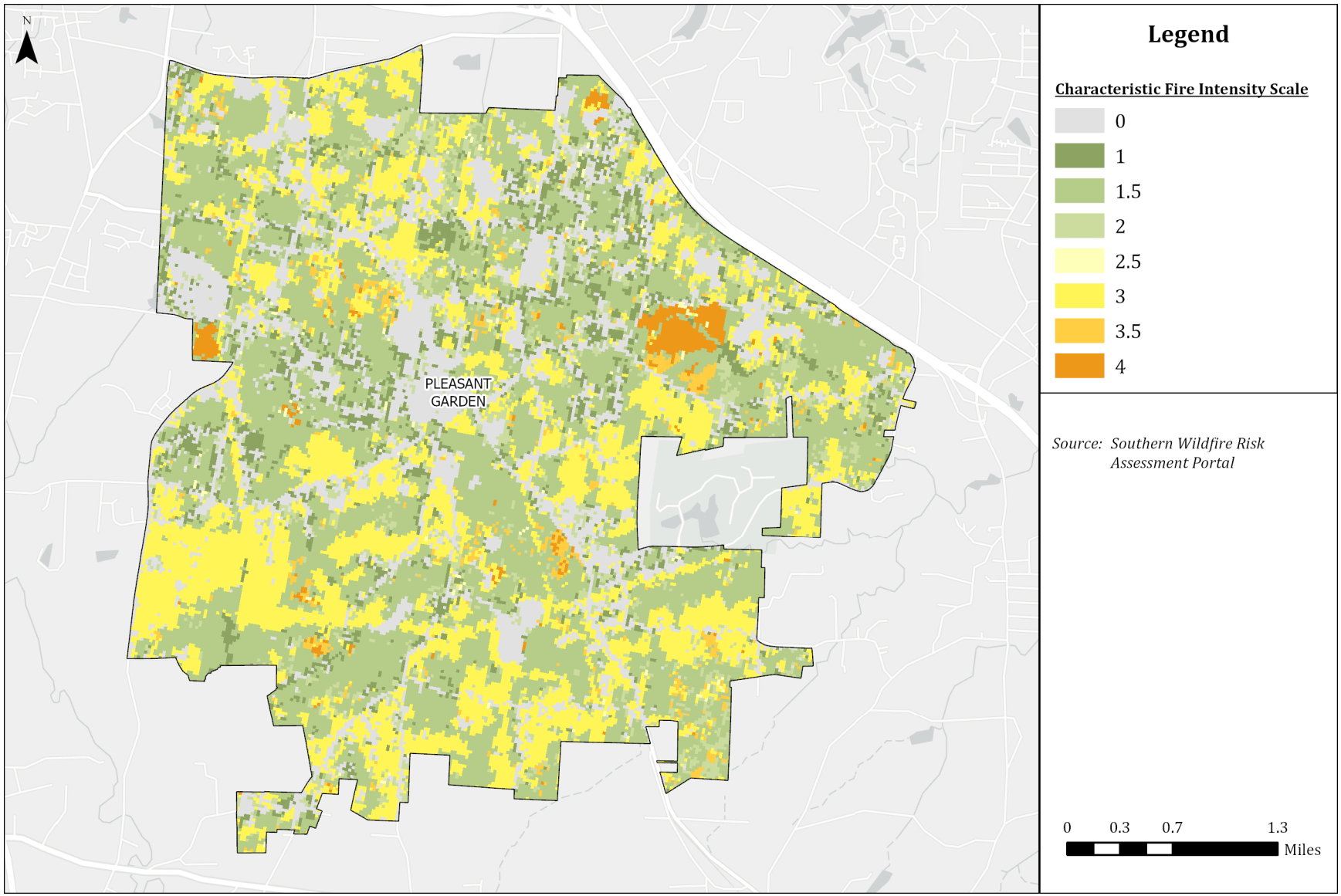


Figure 2.8 – Fire Intensity, Town of Sedalia

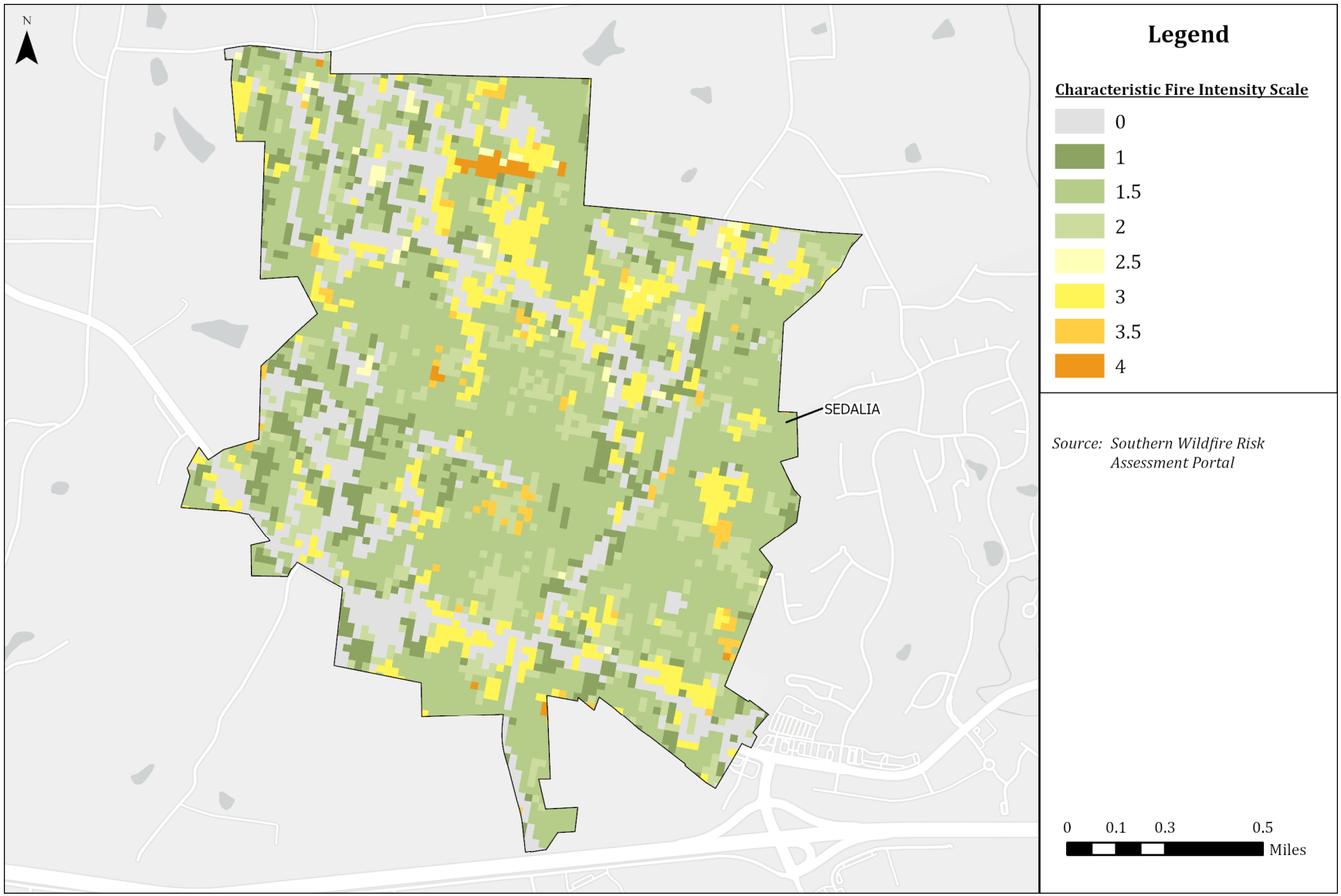


Figure 2.9 – Fire Intensity, Town of Stokesdale

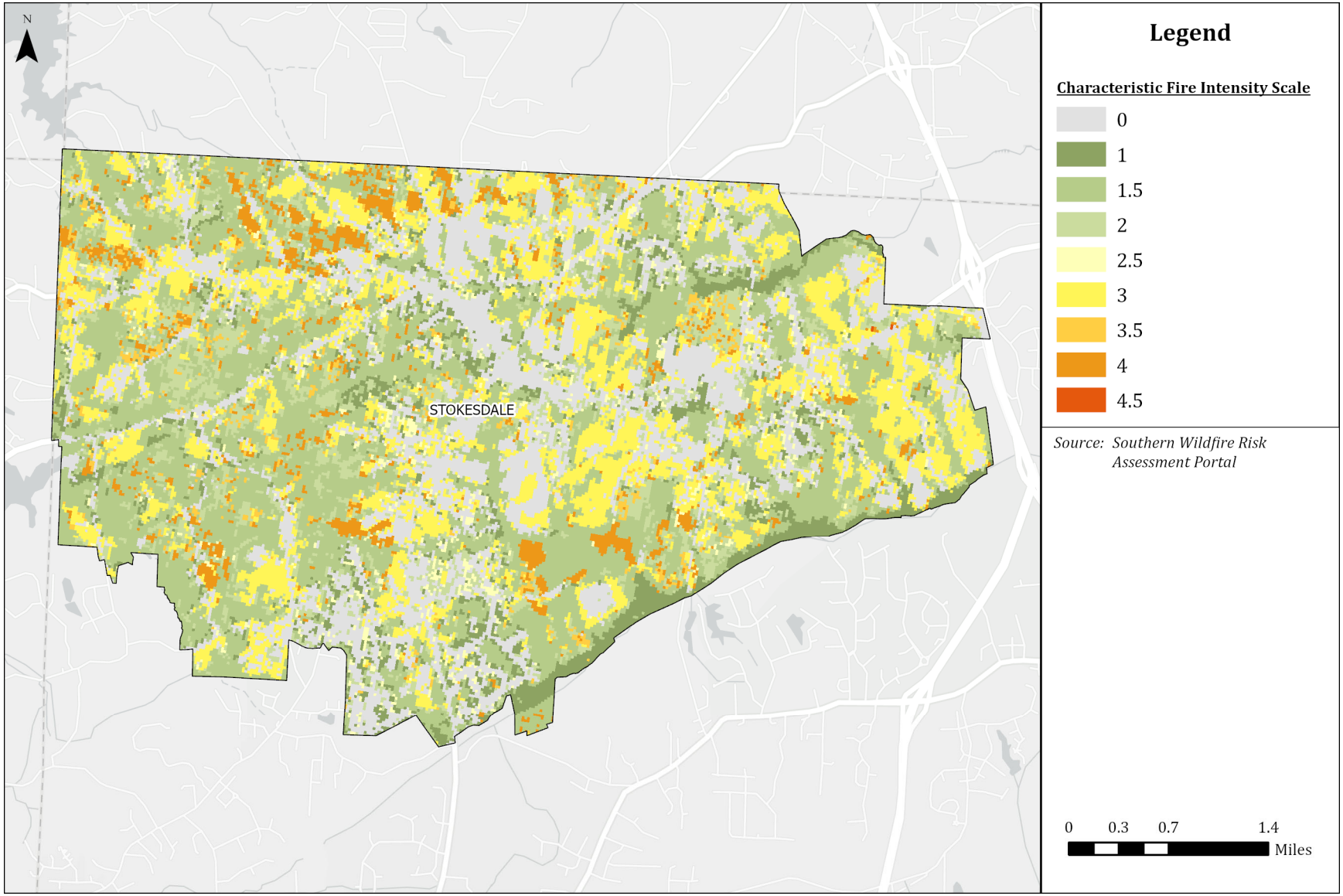


Figure 2.10 – Fire Intensity, Town of Summerfield

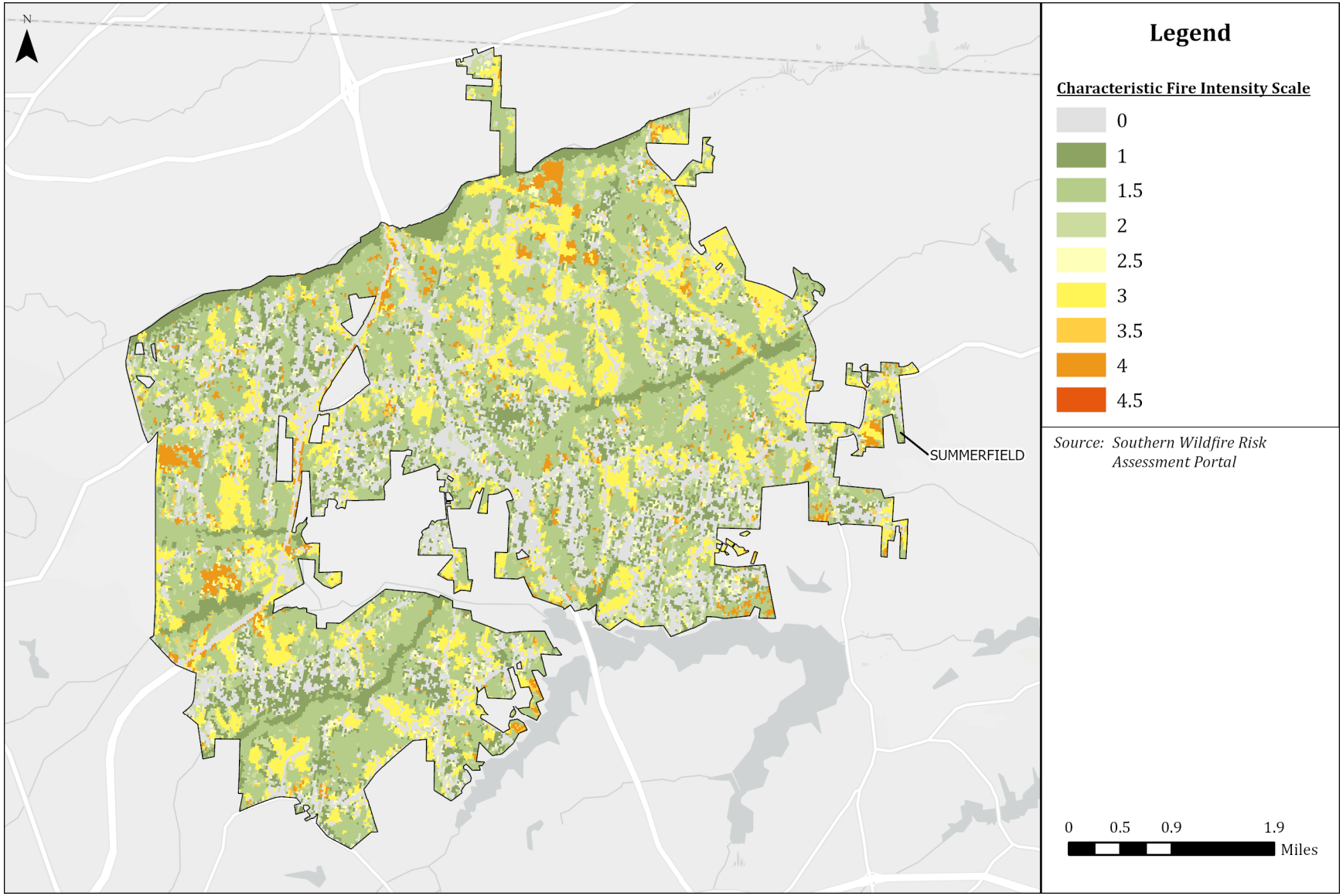
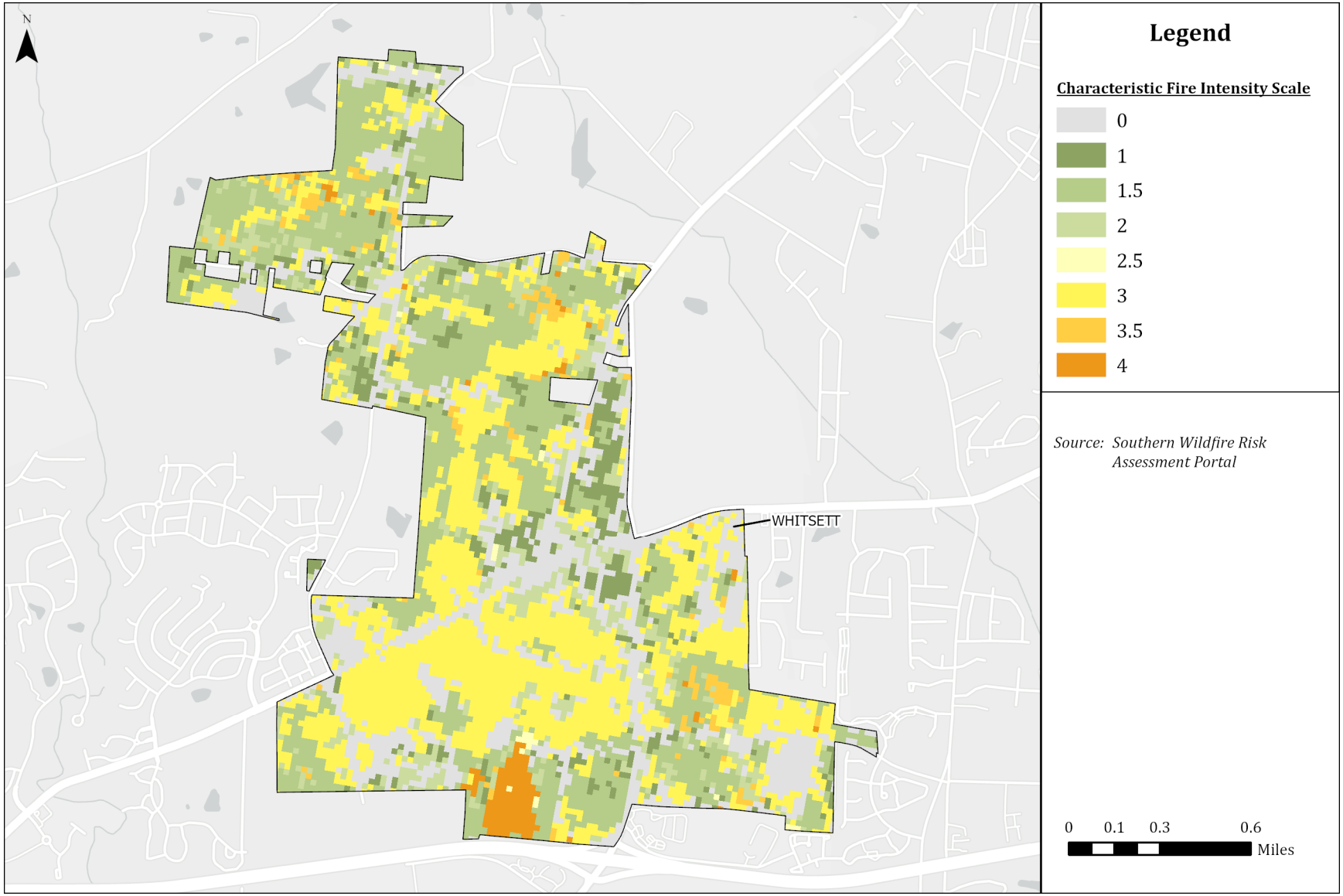


Figure 2.11 – Fire Intensity, Town of Whitsett



3. Burn Probability

The Burn Probability scale is used to define the **probability of future occurrence** section of wildfire in the Risk Assessment.

Figure 3.1 – Burn Probability, Guilford County

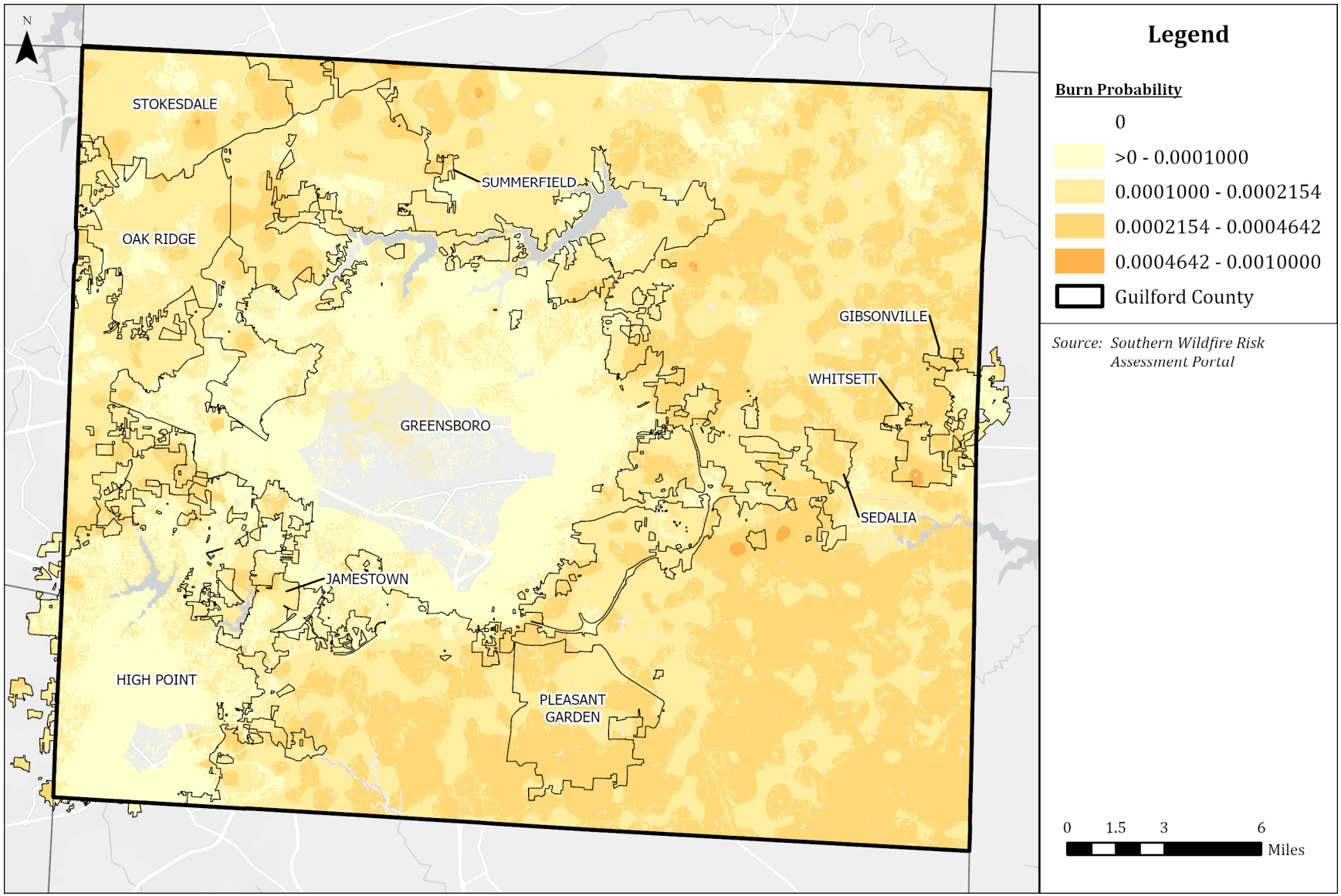


Figure 3.2 – Burn Probability, Town of Gibsonville

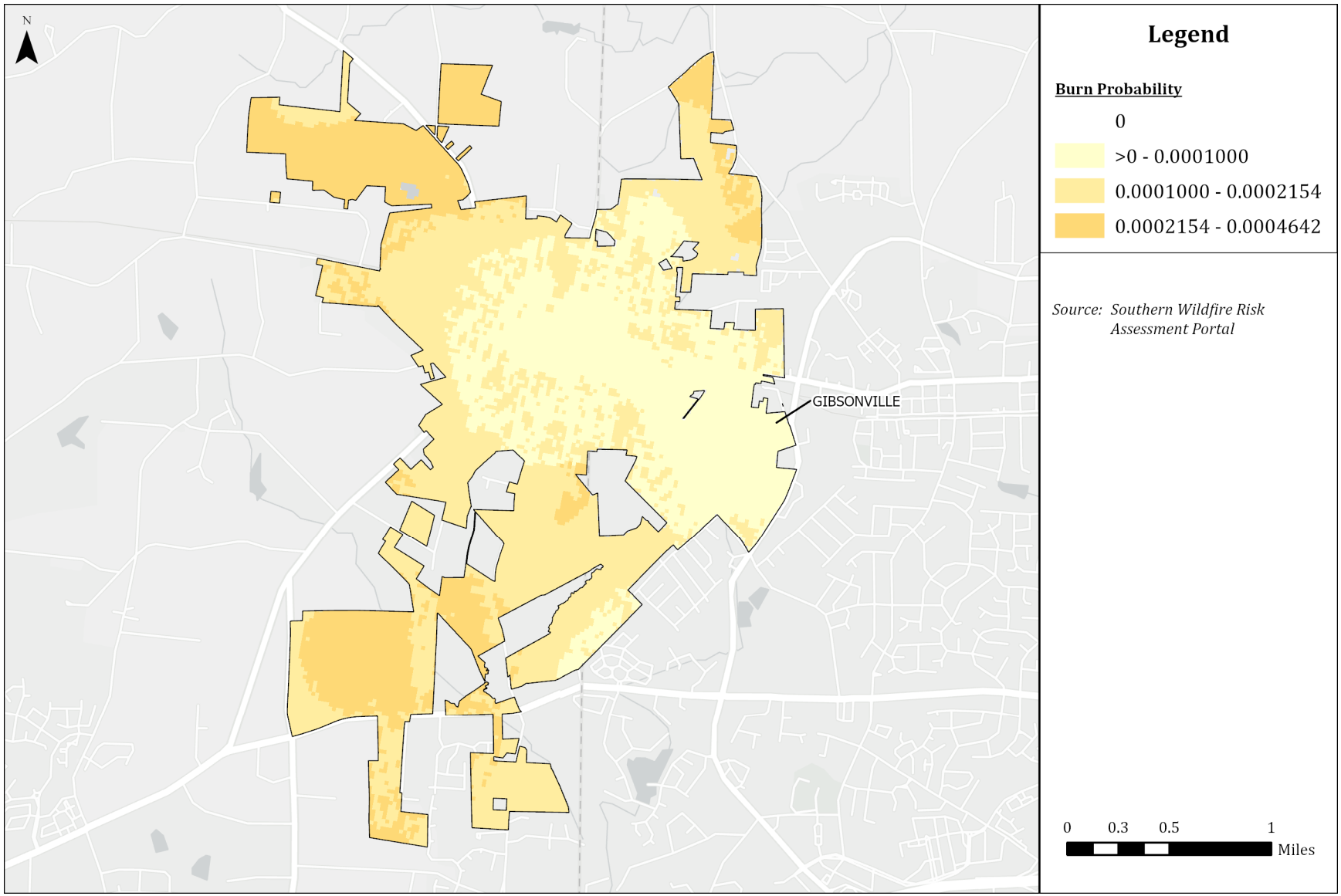


Figure 3.3 – Burn Probability, City of Greensboro

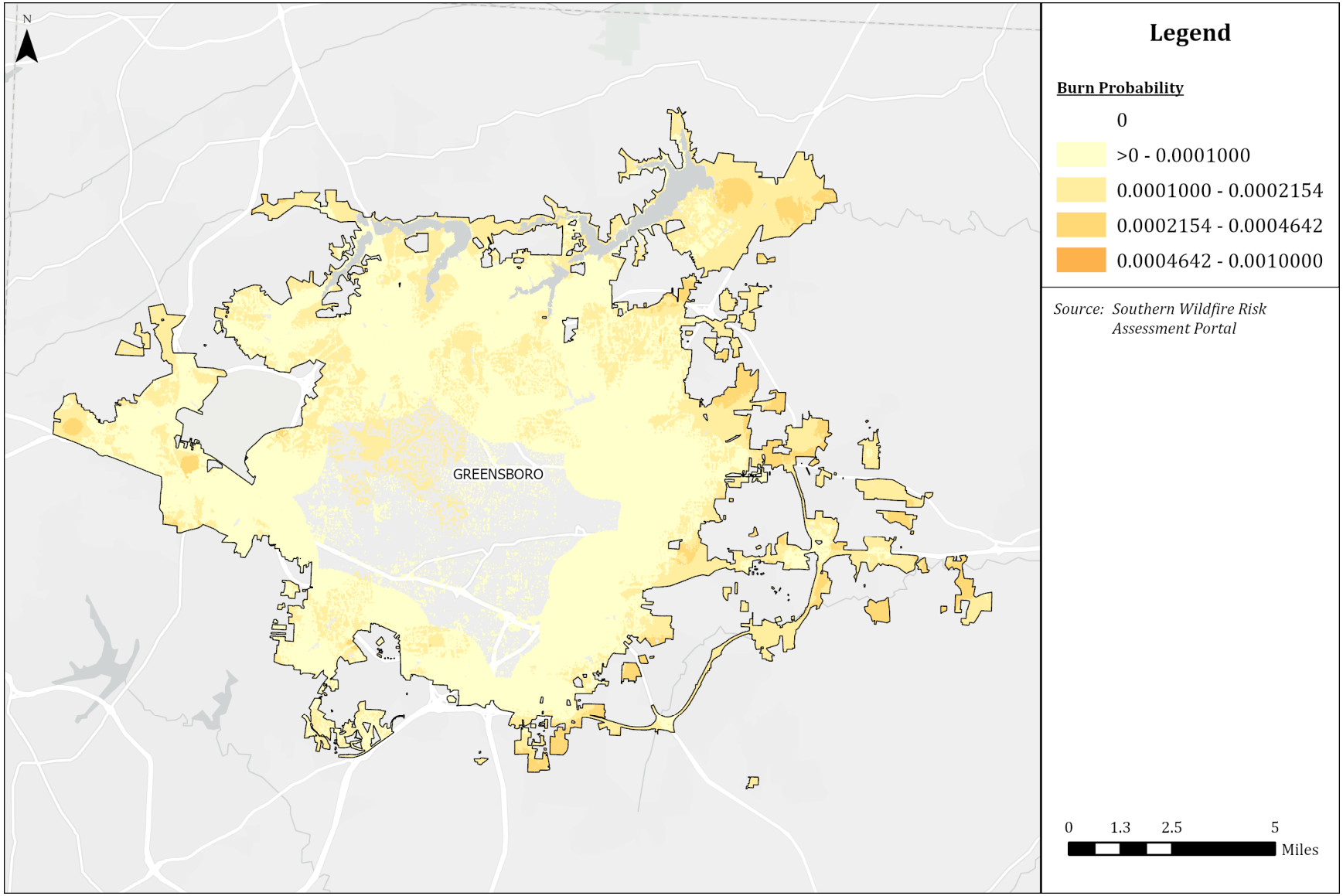


Figure 3.4 – Burn Probability, City of High Point

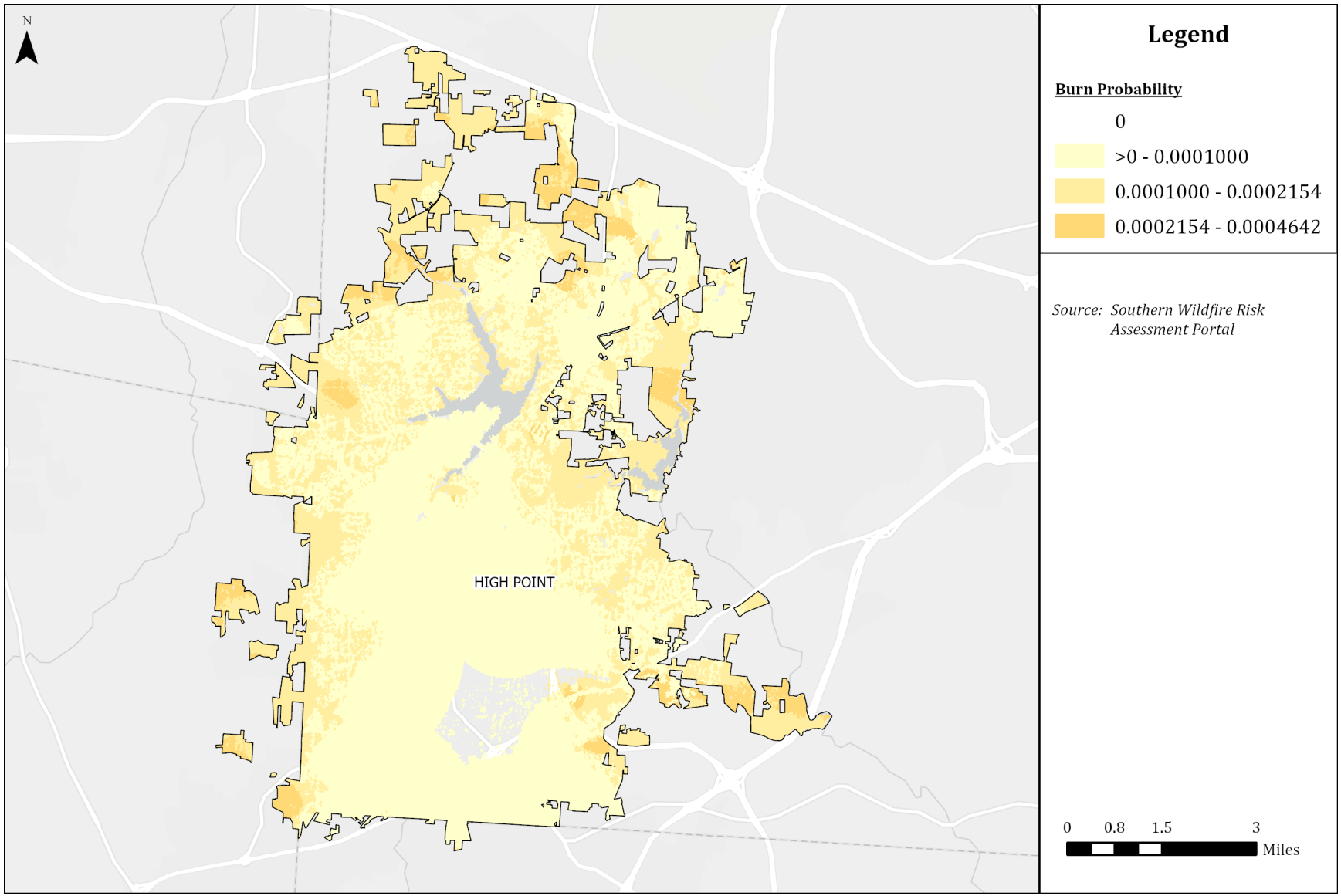


Figure 3.5 – Burn Probability, Town of Jamestown

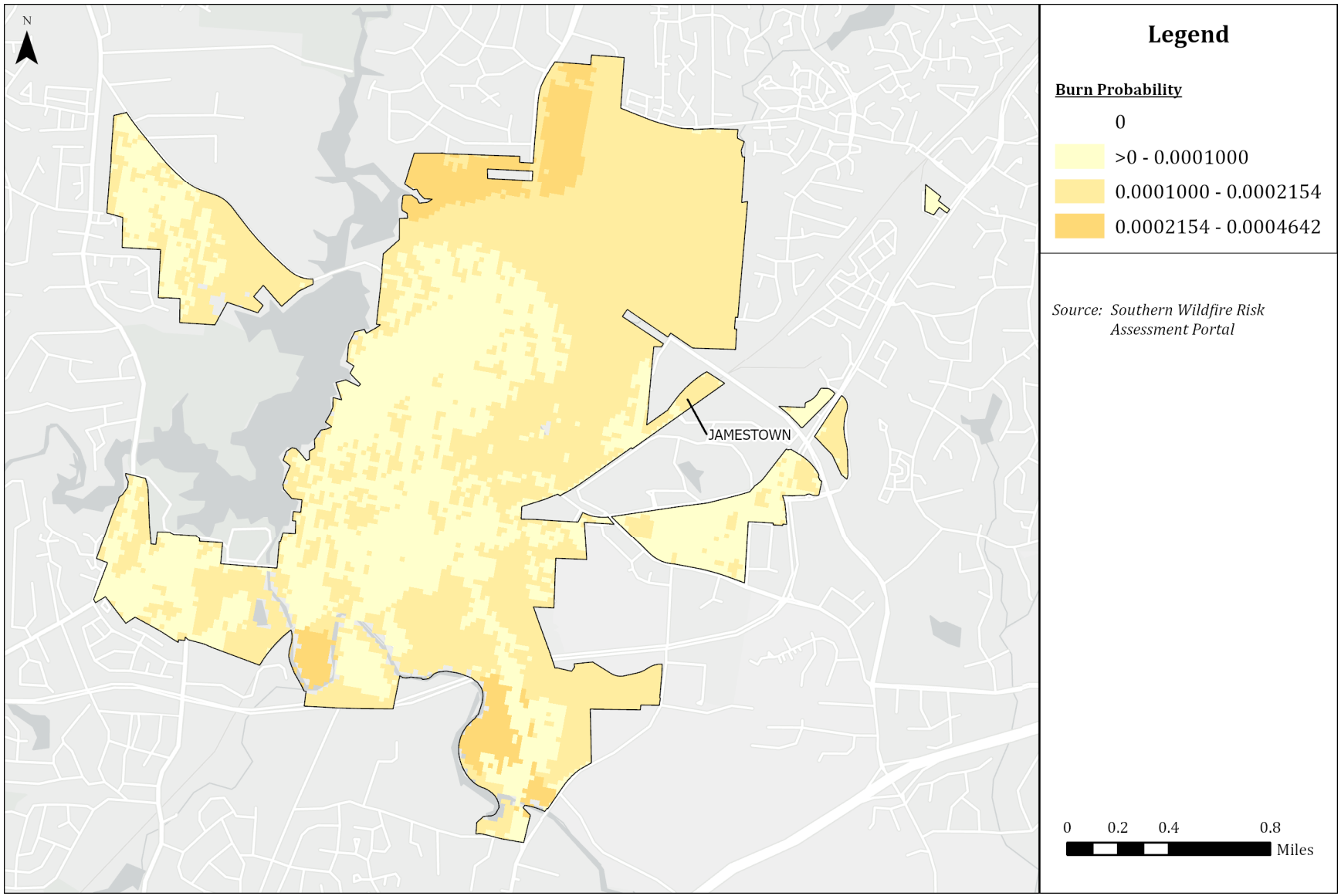


Figure 3.6 – Burn Probability, Town of Oak Ridge

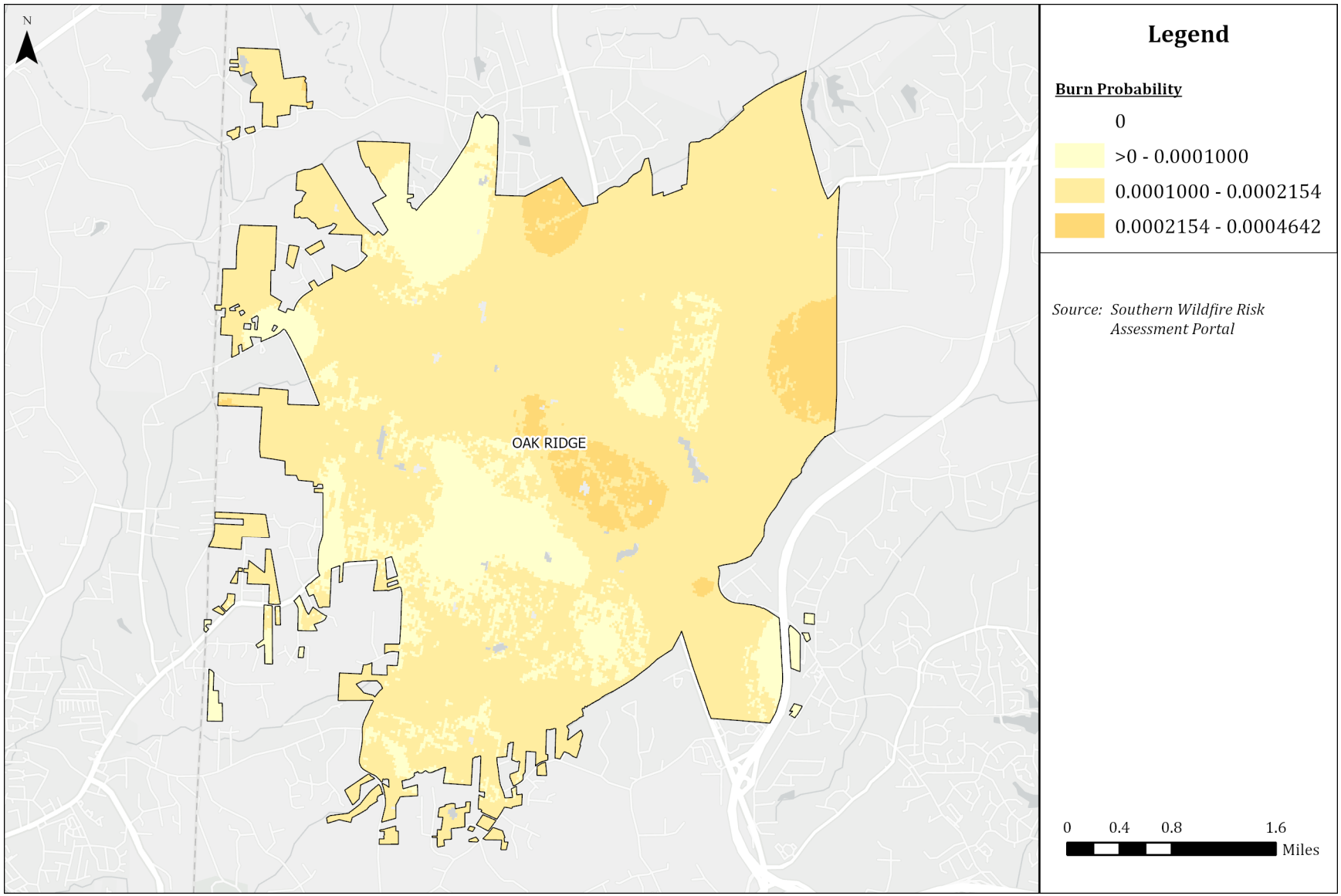


Figure 3.7 – Burn Probability, Town of Pleasant Garden

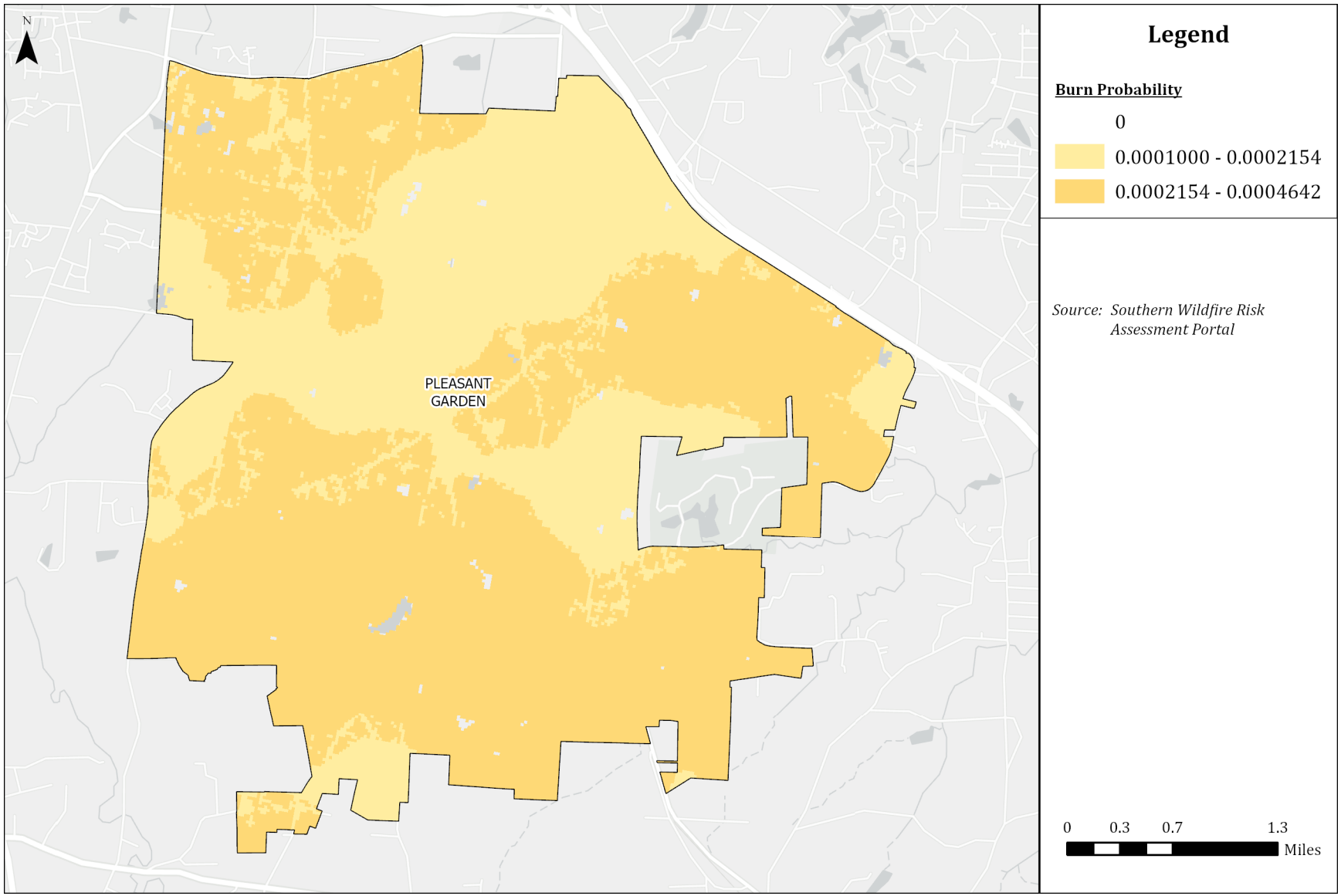


Figure 3.8 – Burn Probability, Town of Sedalia

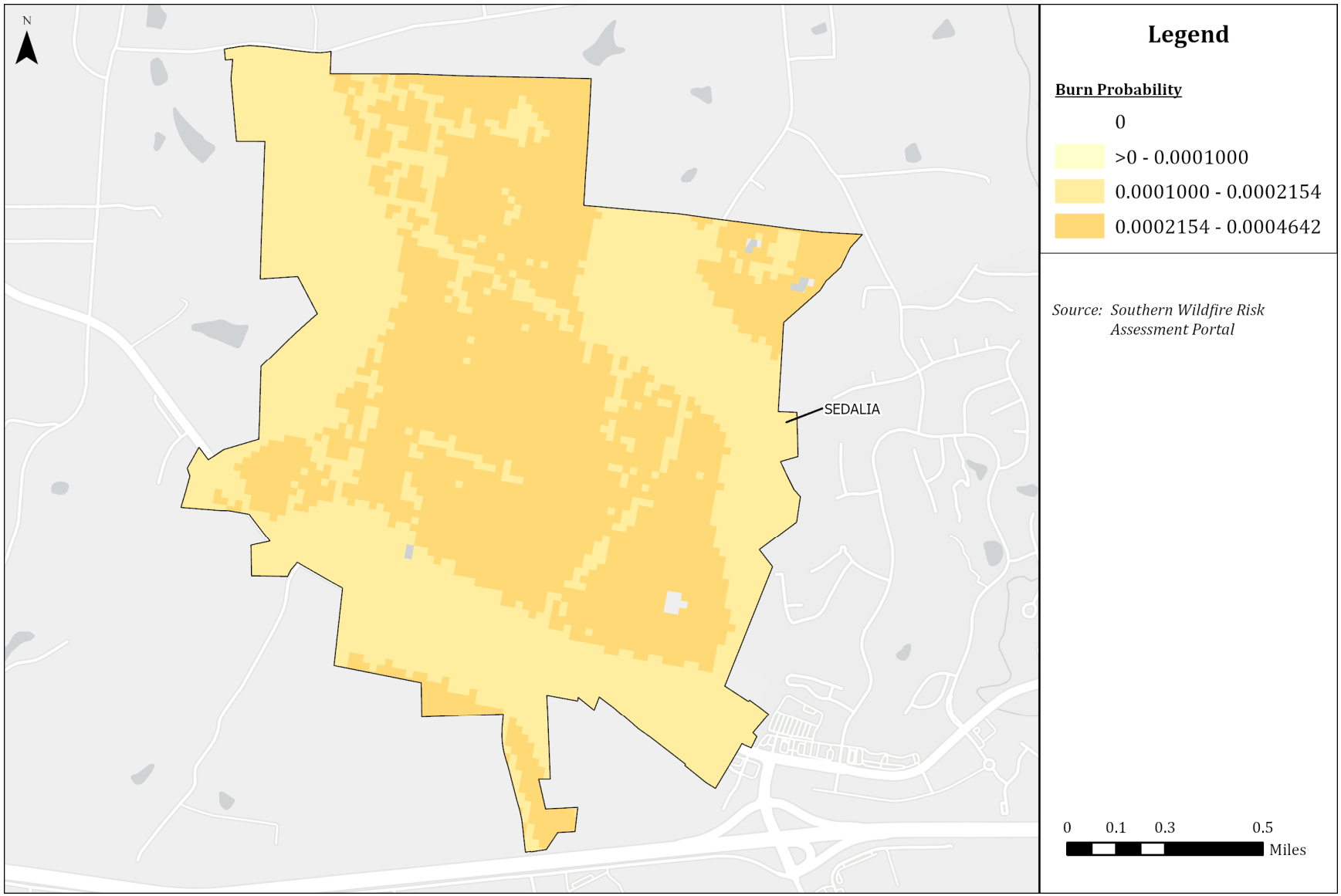


Figure 3.9 – Burn Probability, Town of Stokesdale

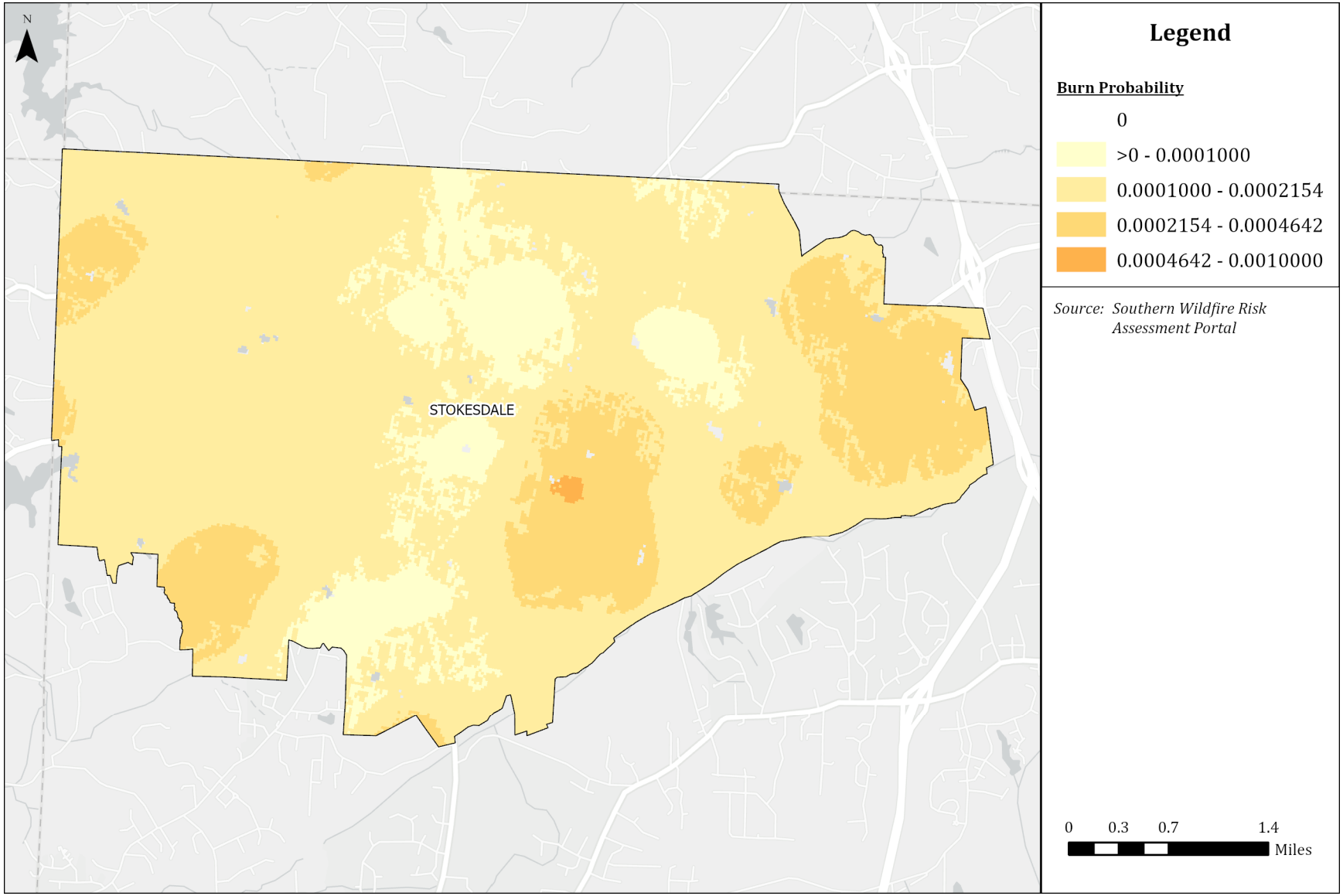


Figure 3.10 – Burn Probability, Town of Summerfield

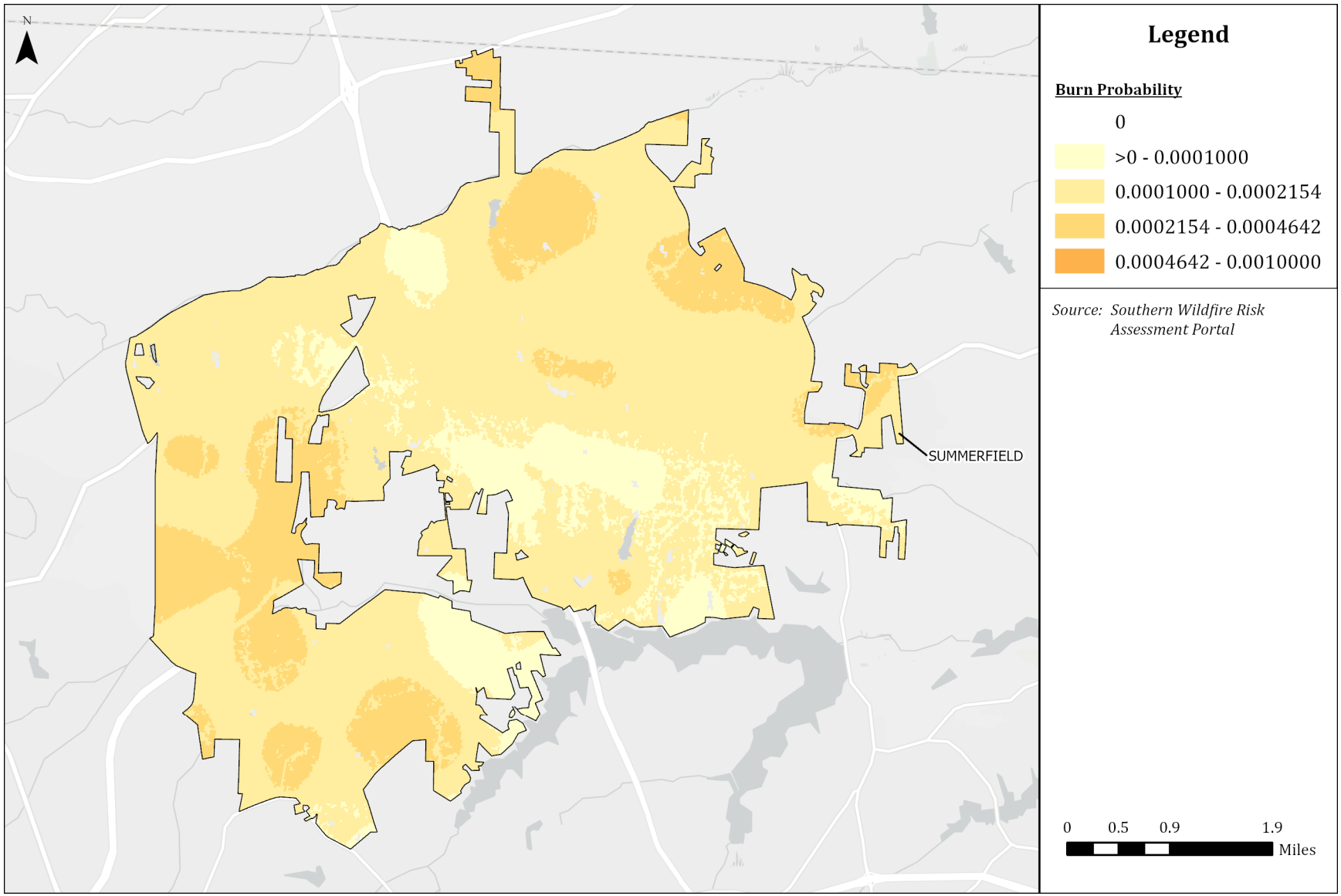


Figure 3.11 – Burn Probability, Town of Whitsett

