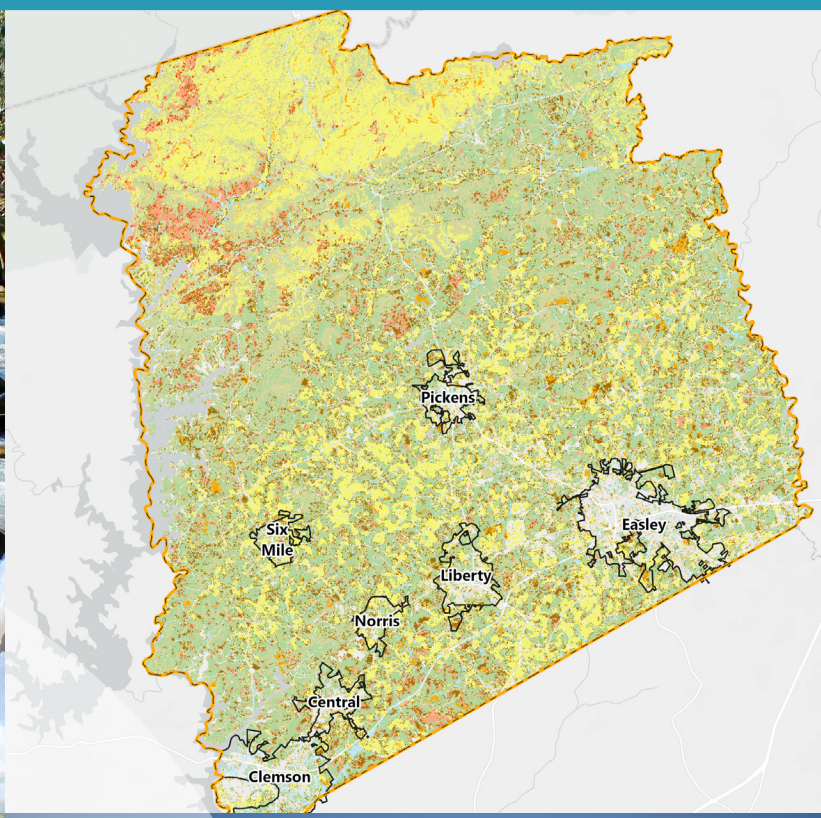
PICKENS COUNTY

# Multi-Jurisdictional Hazard Mitigation Plan










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# EXECUTIVE SUMMARY

The purpose of this Hazard Mitigation Plan (HMP) is to reduce or eliminate risk to people and property from natural and technological or human-caused hazards. Every community faces different hazards and has different resources to draw upon in combating problems along with unique interests that influence the solutions to those problems. Because there are many ways to manage and mitigate the effects of hazards and many agencies that can help, every community must decide on the best approach for their unique situation. Planning is one of the best ways to develop a customized program for hazard mitigation.

A well-prepared HMP provides a framework for all interested parties to work together and reach consensus on identifying priority risks and selecting the preferred activities to mitigate those risks. The HMP planning process supports a comprehensive review of mitigation alternatives so that problems are addressed by the most appropriate and efficient solutions. It also enables communities to coordinate mitigation projects with other local goals and activities, preventing conflicts and reducing the costs of implementing each individual project.

Pickens County and its incorporated communities followed the planning process prescribed by the Federal Emergency Management Agency (FEMA) and the 2017 Community Rating System (CRS) Coordinator's Manual. This plan was developed under the guidance of a Hazard Mitigation Planning Committee (HMPC) comprised of representatives of County, City, and Town departments, residents, and outside stakeholders. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to the county and assessed each community's vulnerability to those hazards. The hazards addressed in this plan were chosen by the HMPC based on the previous plan, the 2018 South Carolina Hazard Mitigation Plan, and consideration of hazard frequency and potential severity of damage. The following hazards are identified and profiled in this plan:

- Dam/Levee Failure
- Drought
- Earthquake
- Flooding
- Hurricane/Tropical Storm
- Severe Storm
- Tornado/Windstorm
- Wildfire
- Winter/Ice Storm
- Cyber Security Threat
- Disruption of Utility Systems
- Hazardous Materials Incident
- Public Health Threat
- Radiological Incident
- Urban Fire

The conclusions drawn from each individual hazard profile and vulnerability assessment were used to prioritize all potential hazards to Pickens County using the Priority Risk Index (PRI). This method provides a standardized numeric value to each hazard for comparability. A higher PRI value indicates a hazard poses a higher risk to the community. The PRI is a weighted sum of values assigned across five categories: probability, impact, spatial extent, warning time, and duration. Each hazard is assigned a value between 1 and 4 for each category based on a defined set of criteria. Higher PRI scores reflect a higher priority rating. The table below summarizes the PRI results for the hazards addressed in this plan.

**Summary of PRI Results**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| *Natural Hazards* | | | | | | |
| Dam/Levee Failure | Possible | Critical | Small | More than 24 hrs | Less than 1 week | 2.3 |
| Drought | Highly Likely | Limited | Large | More than 24 hrs | More than 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | Less than 6 hrs | Less than 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | More than 24 hrs | Less than 1 week | 2.7 |

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Flood | Highly Likely | Critical | Small | 6 to 12 hours | Less than 1 week | 3.1 |
| Hurricane/Tropical Storm | Likely | Limited | Large | More than 24 hrs | Less than 24 hrs | 2.6 |
| Severe Storm (Thunderstorm Wind, Hail, Lightning) | Highly Likely | Minor | Large | 6 to 12 hrs | Less than 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | Less than 6 hrs | Less than 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | More than 24 hrs | Less than 1 week | 2.7 |
| *Technological & Human-Caused Hazards* | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | Less than 6 hrs | Less than 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | Less than 6 hrs | More than 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | Less than 6 hrs | Less than 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | More than 24 hrs | More than 1 week | 2.8 |
| Radiological Threat | Unlikely | Critical | Moderate | Less than 6 hrs | More than 1 week | 2.6 |
| Urban Fire | Highly Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 3.0 |

This plan also examines each community's capabilities in place to mitigate the identified hazards. Opportunities to expand and improve capabilities were considered when developing the mitigation strategy. The HMPC set shared goals and objectives and reviewed a wide range of mitigation alternatives to develop a mitigation action plan with appropriate, feasible actions for each community to implement. The plan goals are as follows:

**Goal 1:** Reduce impact of hazards on the public and community, including vulnerable populations.

**Goal 2:** Future mitigation and response plans will have the ability to include more specific mitigation actions or address more specifically the existing hazards.

**Goal 3:** The community will have the capability to initiate and sustain emergency response operations during and after a hazard event.

**Goal 4:** Protect natural resources that provide hazard risk reduction benefits.

**Goal 5:** Develop partnerships with organizations, resources, etc. within the community to compensate for limited resources, with the purpose of reducing risk in the community.

To achieve these goals, this plan identifies 61 mitigation actions. As part of the identification and prioritization of mitigation projects, emphasis was placed on the use of program and policy alternatives to help make Pickens County less vulnerable to hazards while improving the economic, social, and environmental health of the community. The concept of multi-objective planning was emphasized in the development of the mitigation strategy, particularly in identifying ways to link 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.

# 1 INTRODUCTION

Section 1 provides a general introduction to hazard mitigation, a review of the purpose, scope, and authority of the plan, and a summary of the plan organization and contents. It comprises the following subsections:

- 1.1 Background
- 1.2 Purpose and Need
- 1.3 Scope
- 1.4 Authority
- 1.5 Plan Organization
- 1.6 What's Changed in the Plan
- 1.7 Glossary

## 1.1 BACKGROUND

Each year in the United States, natural and human-caused hazards take the lives of dozens if not hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. Hazards are a part of our natural and built environment, and in many cases they will inevitably continue to occur. Many natural hazards are predictable, and much of the damage caused by these events can be reduced or even eliminated. There is much we can do to mitigate the impacts of hazards on our communities and prevent them from resulting in disasters.

As defined by FEMA, "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event. Hazard mitigation planning is the process through which a community identifies its hazards, determines likely impacts, sets mitigation goals, and selects, prioritizes, and implements appropriate mitigation strategies. Every community faces different hazards, has different resources available to combat problems, and has different interests that influence the solutions to those problems. There is no one solution for managing or mitigating the effects of hazards. Planning is one of the best ways to develop a customized program that fits the unique needs and capabilities of a community.

A key component of local mitigation planning is to develop, adopt, and update a local hazard mitigation plan, which establishes the broad community vision and guiding principles for reducing hazard risk, and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities. A comprehensive mitigation strategy addresses both current and future hazard vulnerabilities, to account for how development and growth patterns may increase or decrease local vulnerability.

Hazard mitigation includes 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 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.

Pickens County and the jurisdictions of Central, Clemson, Easley, Liberty, Norris, Pickens, and Six Mile previously developed the 2018 Pickens County Hazard Mitigation Plan. This update draws from the previous plan to reevaluate local hazard risks and vulnerabilities, review capabilities, and evaluate mitigation alternatives. Additionally, this update documents the efforts of each jurisdiction to implement identified actions and integrate hazard mitigation principles and practices into routine government activities and functions. The plan remains a living document, with implementation and evaluation procedures established to help achieve meaningful objectives and successful outcomes over time.

## 1.2 PURPOSE AND NEED

The purpose of the Pickens County Multi-Jurisdictional Hazard Mitigation Plan is to identify, assess, and mitigate hazard risk to better protect the people and property within the County from the effects of natural and human-caused hazards. This plan documents progress on existing hazard mitigation planning efforts, updates the previous plan to reflect current conditions in the planning area including relevant hazards and vulnerabilities, increases public education and awareness about the plan and planning process, maintains grant eligibility for participating jurisdictions, maintains compliance with state and federal requirements for local hazard mitigation plans, and identifies and outlines strategies the participating jurisdictions will use to decrease vulnerability and increase resiliency.

A well-prepared hazard mitigation plan will allow for all possible activities to be reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and activities, preventing conflicts and reducing the costs of implementing each individual activity. This plan provides a framework for all interested parties to work together toward mitigation. It establishes the vision and guiding principles for reducing hazard risk and proposes specific mitigation actions to reduce identified vulnerabilities.

## 1.3 SCOPE

This plan is an update to the 2018 Pickens County Hazard Mitigation Plan, which included participation from the county and all seven municipal jurisdictions involved in this plan update. The previous plan was approved by FEMA in October 2018. Pickens County has remained committed to mitigation and the planning process, including ongoing implementation efforts and regular review of the changing exposure, vulnerability, and risk in the planning area to maintain the plan.

The planning area of this Multi-Jurisdictional Hazard Mitigation Plan update includes Pickens County and its incorporated jurisdictions of Central, Clemson, Easley, Liberty, Norris, Pickens, and Six Mile. All participating jurisdictions will adopt this plan in accordance with standard local procedures. Copies of adoption resolutions will be provided in Appendix A.

Pickens County and its participating jurisdictions, following the planning process prescribed by FEMA and under the guidance of a Hazard Mitigation Planning Committee (HMPC), conducted a risk assessment that identified hazards that pose a risk to the planning area, profiled each hazard, and assessed the planning area's vulnerability to these hazards. The hazards identified and profiled in this plan are as follows:

- Dam/Levee Failure
- Drought
- Earthquake
- Flooding
- Hurricane/Tropical Storm
- Severe Storm
- Tornado/Windstorm
- Wildfire
- Winter/Ice Storm
- Cyber Security Threat
- Disruption of Utility Systems
- Hazardous Materials Incident
- Public Health Threat
- Radiological Incident
- Urban Fire

## 1.4 AUTHORITY

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) to invoke new and revitalized approaches to mitigation planning. Section 322 of DMA 2000 emphasizes the need for state and local government entities to closely coordinate on mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for federal mitigation grant funds. These funds include the Hazard Mitigation Grant Program (HMGP), the Building Resilient Infrastructure and Communities (BRIC) program, which replaced the Pre-Disaster Mitigation (PDM) program, and the Flood Mitigation Assistance (FMA) Program, all 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.

This plan was prepared in coordination with FEMA Region IV and the South Carolina Emergency Management Division (SCEMD) to ensure that it meets all applicable federal and state planning requirements. This plan has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S.C. 5165, enacted under Section 104 of DMA 2000, Public Law 106-390 of October 30, 2000, as implemented at CFR 201.6 and 201.7 dated October 2007. A Local Mitigation Plan Review Tool, found in Appendix B, provides a summary of FEMA and SCEMD's current minimum standards of acceptability and notes the location within this plan where each planning requirement is met. This plan will be monitored, maintained, and updated in compliance with the above legislation.

This plan was developed in a joint and cooperative manner by members of a planning committee which included representatives of city and town departments, federal and state agencies, citizens, and other stakeholders. This plan will ensure that Pickens County and its incorporated jurisdictions remain eligible for federal disaster assistance including FEMA's HMGP, BRIC, and FMA programs.

## 1.5 PLAN ORGANIZATION

The Pickens County Multi-Jurisdictional Hazard Mitigation Plan is organized into the following sections:

- Section 1: Introduction
- Section 2: Planning Process
- Section 3: Community Profile
- Section 4: Hazard Identification
- Section 5: Hazard Risk & Vulnerability Assessment
- Section 6: Capability Assessment
- Section 7: Mitigation Strategy
- Section 8: Plan Implementation & Maintenance
- Annexes
- Appendix A: Plan Adoption
- Appendix B: Local Mitigation Plan Review Tool
- Appendix C: Planning Process Documentation
- Appendix D: Mitigation Alternatives
- Appendix E: References

# 1.6 WHAT'S CHANGED IN THE PLAN

## *1.6.1 UPDATES AND REVISIONS BY SECTION*

For this update, the plan format was revised to reflect the updated planning process. All plan content was reviewed and updated; information from the 2018 plan was incorporated into new plan sections where still relevant and appropriate. The following changes were made in reformatting the plan:

- The executive summary was updated as an unnumbered section.
- The introduction was streamlined, and community profile information was separated into a new section.
- A new section was added to describe the planning process.
- The hazard identification was separated into a new section.
- Risk and vulnerability assessment information was consolidated into one section and presented within each hazard profile.
- A new section was added to describe plan implementation and maintenance procedures.

A summary of each plan section is provided below.

Section 1: Introduction provides background information on the plan and why it was developed.

Section 2: Planning Process provides a review of the 10-step process used to prepare this plan. This section identifies participants on the Hazard Mitigation Planning Committee (HMPC), describes how the public and other stakeholders were involved, summarizes the meetings held, and discusses the multi-jurisdictional planning approach.

Section 3: Community Profile provides a general overview of Pickens County, including relevant geographic, demographic, environmental, and economic characteristics. Development and land use patterns are also discussed. This baseline information provides a snapshot of the planning area and helps local officials recognize those social, environmental, and economic factors that play a role in determining vulnerability to hazards.

The Risk Assessment is presented in two sections: Section 4: Hazard Identification and Section 5: Hazard Risk & Vulnerability Assessment. Together, these sections identify and assess the hazards that pose a threat to the planning area; rank and prioritize these hazards based on their frequency of occurrence, spatial extent, and potential impact of each hazard; and evaluate the vulnerability of the planning area to each hazard.

Section 6: Capability Assessment reviews Pickens County's capacity to implement mitigation strategies and identifies opportunities to increase and enhance that capacity. Specific capabilities addressed in this section include planning and regulatory capability, administrative and technical capability, fiscal capability, outreach capability, and political capability. Information on capabilities was updated based on conversations with staff from each participating community.

Section 7: Mitigation Strategy presents the goals and objectives for hazard mitigation in Pickens County, the action evaluation and prioritization process for considering mitigation alternatives, and the ultimate list of specific mitigation actions recommended for implementation by each participating jurisdiction. Updates to this section of the plan in particular reflect the changes in the communities' priorities for mitigation.

Section 8: Plan Implementation & Maintenance details the measures that the participating jurisdictions will take to ensure the plan's implementation as well as the procedures by which the plan will be regularly evaluated and updated to remain a current and useful planning document.

### 1.6.2 SUMMARY OF KEY UPDATES

This hazard mitigation plan update involved a comprehensive review and update of all information in the existing plan and an assessment of the success of the County and participating municipalities in evaluating, monitoring, and implementing the mitigation strategy. Only the information and data still valid from the existing plan was carried forward as applicable into this update. The following requirements were addressed during the development of this plan update:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Table 1.1 provides a comparison of the hazards addressed in the 2018 South Carolina Hazard Mitigation Plan and the 2018 Pickens County plan and provides the final decision made by the HMPC as to which hazards were included in this updated 2023 Pickens County Multi-Jurisdictional Hazard Mitigation Plan.

**Table 1.1 Hazard Identification Summary**

| Hazard | Included in 2018 South Carolina HMP? | Included in 2018 Pickens County HMP? | Included in 2023 Plan Update? |
|---|---|---|---|
| Coastal Hazards (Storm Surge, Coastal Flooding) | Yes | No | No |
| Dam & Levee Failure | No | Yes | Yes |
| Drought | Yes | Yes | Yes |
| Earthquake | Yes | Yes | Yes |
| Extreme Heat | No | No | Yes |
| Flooding | Yes | Yes | Yes |
| Geologic Hazards (Sinkhole, Landslide) | Yes | No | No |
| Hail | Yes | Yes (with Severe Storm) | Yes (with Severe Storm) |
| Hurricane and Tropical Storm | Yes | Yes | Yes |
| Sea Level Rise | Yes | No | No |
| Severe Thunderstorm & Lightning | Yes | Yes (profiled separately) | Yes (as Severe Storm) |
| Temperature Extremes | No | Yes | No (Heat addressed separately; cold addressed with Winter/Ice Storm |
| Tornado/Windstorm | Yes | Yes | Yes (wind addressed with Severe Storm) |
| Tsunami | Yes | No | No |
| Wildfire | Yes | Yes | Yes |
| Winter Storms | Yes | Yes | Yes |
| Civil Disturbance/Crime | No | Yes | No |
| Cyberterrorism | No | No | Yes |
| Disruption of Transportation Systems | No | Yes | No |

| Hazard | Included in 2018 South Carolina HMP? | Included in 2018 Pickens County HMP? | Included in 2023 Plan Update? |
|---|---|---|---|
| Disruption of Utility Services | No | Yes | Yes |
| Economic Crisis | No | Yes | No |
| Hazardous Materials | Yes | Yes | Yes |
| Nuclear Power Plant Incident | Yes | Yes | Yes |
| Public Health & infectious Disease | Yes | Yes | Yes |
| Terrorism | Yes | Yes | No |
| Urban Fire | No | Yes | Yes |

In addition to specific changes in hazard analyses in Section 5, the following items were also addressed in this plan update:

- Geographic Information System (GIS) mapping and analysis was used, to the extent data allowed, to analyze hazard risk and vulnerability.
- Assets at risk to identified hazards were identified by property type and values of properties based on parcel data and a critical facilities inventory provided by Pickens County.
- A discussion on climate change and its projected effect on specific hazards was included in each hazard profile in the risk assessment.
- The discussion on growth and development trends was updated based on community input and 2020 American Community Survey data.
- Enhanced public outreach, community data collection, and stakeholder coordination efforts were conducted throughout the plan update process to meet the more rigorous requirements of the 2017 CRS Coordinator's Manual, in addition to DMA requirements.

### 1.6.3 DOCUMENTATION OF PLAN PROGRESS

Progress toward implementation of the mitigation strategy developed in the previous plan is also documented in this plan update. Table 1.2 details the status of mitigation actions from the previous plan. Section 7.4 Plan Update Requirement details all completed and deleted actions from the 2018 plan. Details on the actions being carried forward are provided in Section 7.5 Mitigation Action Plan.

**Table 1.2 Status of Previous Mitigation Actions**

| Jurisdiction | Completed | Deleted | Carried Forward |
|---|---|---|---|
| Pickens County | 13 | 20 | 50 |
| Town of Central | 9 | 14 | 25 |
| City of Clemson | 9 | 14 | 29 |
| City of Easley | 9 | 14 | 27 |
| City of Liberty | 9 | 14 | 25 |
| Town of Norris | 13 | 20 | 50 |
| City of Pickens | 11 | 16 | 30 |
| Town of Six Mile | 13 | 20 | 49 |

## 1.7 GLOSSARY

- BRIC – Building Resilient Infrastructure & Communities
- CDC – Centers for Disease Control and Prevention
- CRS – Community Rating System
- DMA – Disaster Mitigation Act
- EPA – United States Environmental Protection Agency
- FEMA – Federal Emergency Management Agency
- FIRM – Flood Insurance Rate Map
- FMA – Flood Mitigation Assistance
- FSCSC – Fire Safe South Carolina
- GIS – Geographic Information Systems
- HMA – Hazard Mitigation Assistance
- HMGP – Hazard Mitigation Grant Program
- HMPC – Hazard Mitigation Planning Committee
- NCEI – National Centers for Environmental Information
- NDMC = National Drought Mitigation Center
- NFIP – National Flood Insurance Program
- NFPA – National Fire Protection Administration
- NHC – National Hurricane Center
- NID – National Inventory of Dams
- NOAA – National Oceanic and Atmospheric Administration
- NWS – National Weather Service
- SCEMD – South Carolina Emergency Management Department
- SCFD – South Carolina Fire Department
- SFHA – Special Flood Hazard Area
- SouthWRAP – Southern Group of State Foresters, Wildfire Risk Assessment Portal
- USACE – United States Army Corps of Engineers
- USDM – United States Drought Monitor
- USDOT – United States Department of Transportation
- USFA – US Fire Association
- USGS – United States Geological Survey
- USNRC – United States Nuclear Regulatory Commission
- WHO – World Health Organization

# 2 PLANNING PROCESS

**44 CFR §201.6(b): An open public involvement process is essential to the development of an effective plan. To develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:**
1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and
3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
**44 CFR §201.6(c)(1): The plan shall include the following:**
1) 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.

Section 2 provides a review of the process followed for the development of the Pickens County Multi-Jurisdictional Hazard Mitigation Plan including a summary of the opportunities for public and stakeholder involvement and incorporation of existing plans and information. This section contains the following subsections:

- 2.1 Overview of Hazard Mitigation Planning
- 2.2 Preparing the Plan
- 2.3 Hazard Mitigation Planning Committee
- 2.4 Involving the Public
- 2.5 Involving Stakeholders

## 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 for implementation. Plan maintenance procedures are established for the routine monitoring of implementation progress, as well as the evaluation and enhancement of the mitigation plan itself. These plan maintenance procedures ensure that the plan remains a current, dynamic, and effective planning document over time that becomes integrated into the routine local decision-making process.

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

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

Mitigation planning can produce long-term benefits by breaking the repetitive cycle of disaster loss. The goal of hazard mitigation is that the investments made before a hazard event will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery, and reconstruction. Furthermore, mitigation practices will enable local residents, businesses, and industries to re-establish themselves in the wake of a disaster, getting the community and the local economy back on track with less interruption.

Mitigation planning can also achieve multiple objectives in the community beyond risk reduction. For example, the acquisition of land in known hazard areas can preserve open space, maintain environmental health, and enhance recreational opportunities. Thus, it is essential that any local mitigation planning process be integrated with other concurrent local planning efforts and that the identification of mitigation strategies consider other community goals or initiatives that will complement or hinder implementation.

## 2.2 PREPARING THE PLAN

The planning process for preparing the Pickens County Multi-Jurisdictional Hazard Mitigation Plan was based on DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

1. Planning Process;
2. Risk Assessment;
3. Mitigation Strategy; and
4. Plan Maintenance.

Into this process, the County's planning consultant integrated a more detailed 10-step planning process used for FEMA's Community Rating System (CRS) program. Thus, the modified 10-step process used for this plan meets the requirements of six major programs: FEMA's Hazard Mitigation Grant Program (HMGP); Building Resilient Infrastructure and Communities (BRIC) Program; CRS Program; Flood Mitigation Assistance (FMA) Program; Severe Repetitive Loss Program; and new flood control projects authorized by the U.S. Army Corps of Engineers.

Table 2-1 shows how the 10-step CRS planning process aligns with the four phases of hazard mitigation planning pursuant to the Disaster Mitigation Act of 2000.

**Table 2.1 Mitigation Planning and CRS 10-Step Process Reference Table**

| DMA Process | CRS Process |
|---|---|
| **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 |

The process followed for the preparation of this plan, as outlined in Table 2-1 above, is as follows:

#### 2.2.1.1 *PHASE I – PLANNING PROCESS*

### PLANNING STEP 1: ORGANIZE TO PREPARE THE PLAN

With Pickens County's commitment to participate in the DMA planning process, community officials worked to organize resources for development of the plan. An initial meeting was held with key community representatives to discuss the plan development process and multi-jurisdictional participation needs. The Pickens County Deputy Emergency Management Agency Director led the County's effort to reorganize and coordinate for the plan update. Consultants from WSP assisted the County through the planning process and preparation of the plan document.

### PLANNING STEP 2: INVOLVE THE PUBLIC

Public involvement in the development of the plan was sought through open public meetings and workshops, a plan website, a survey, and other various methods, as detailed in Section 2.4.

### PLANNING STEP 3: COORDINATE

The HMPC formed for development of the 2018 plan was reconvened for this plan update, with new members identified as needed to fill vacated positions and an expansion of the committee to incorporated additional stakeholder participants. More details on the HMPC are provided in Section 2.3. Stakeholder coordination was incorporated into the formation of the HMPC as well as through additional outreach methods, detailed in Section 2.5.

***Coordination with Other Community Planning Efforts and Hazard Mitigation Activities***

In addition to stakeholder involvement, coordination with other community planning efforts was also seen as integral to the planning process. Mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Pickens County and its participating jurisdictions use a variety of planning mechanisms, such as land use plans, subdivision regulations, building codes, and ordinances to guide growth and development. Outside entities have also developed plans that can inform or affect mitigation planning in the county. Integrating existing planning efforts, mitigation policies, and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. As detailed in Table 2.2, the development of this plan incorporated information from existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

These and other documents were reviewed and considered, as appropriate, during the collection of data to support the planning process and plan development, including the hazard identification, vulnerability assessment, capability assessment, and mitigation strategy development.

**Table 2.2 Summary of Existing Planning Mechanisms Reviewed**

| Resource Referenced | Use in this Plan |
|---|---|
| Comprehensive Plans (Pickens County, Central, Clemson, Liberty, and Pickens) | These comprehensive plans were referenced to understand development trends for the community profiles in Section 3 and the jurisdictional annexes and for the hazard profiles in Section 5. The comprehensive plans were also referenced to develop in the capability assessment in Section 6. |
| Pickens County Emergency Operations Plan | The EOP, revised in 2021, was referenced for the development of the Capability Assessment in Section 6. |
| Pickens County Hazard Mitigation Plan, 2018 | The previous hazard mitigation plan was referenced throughout this entire plan update, including in identifying and evaluating hazards in Section 4 and Section 5, reporting on implementation of existing actions in Section 2 and 7, developing the mitigation action plans in Section 7, and developing the capability assessment in Section 6. |

| Resource Referenced | Use in this Plan |
|---|---|
| Pickens County Unified Development Standards Ordinance, 2019 | The UDSO was reviewed and referenced to develop the capability assessment in Section 6. |
| Pickens County Stormwater Ordinance | The stormwater ordinance was reviewed and referenced to develop the capability assessment in Section 6. |
| South Carolina Hazard Mitigation Plan, 2018 | The State Hazard Mitigation Plan was referenced for the hazard identification in Section 4 and in the development of hazard profiles in Section 5. |
| Pickens County and Incorporated Areas Flood Insurance Study (FIS) | The FIS report, revised 12/21/2017, was referenced in the preparation of flood hazard profile in Section 5. |
| Local Stormwater Management, Flood Damage Prevention, Building Code, and Zoning Ordinances | Local ordinances were discussed with each community during data collection and referenced in the capability assessment in Section 6 and where applicable for updates in mitigation action plans in Section 7. |
| Watershed Plan for Sediment in the South Saluda River | This plan produced by Save Our Saluda was reviewed to develop hazard risk and vulnerability assessment in Section 5 and the mitigation strategy in Section 7. |
| Watershed Plan for Sediment in the North Saluda River and Saluda Lake | This plan produced by Save Our Saluda was reviewed to develop hazard risk and vulnerability assessment in Section 5 and the mitigation strategy in Section 7. |

#### 2.2.1.2 *PHASE II – RISK ASSESSMENT*

### PLANNING STEPS 4 AND 5: IDENTIFY/ASSESS THE HAZARD AND ASSESS THE PROBLEM

The HMPC completed a comprehensive effort to identify, document, and profile all hazards that have, or could have, an impact on the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities. A draft of the risk and vulnerability assessment was made available on the plan website for the HMPC, stakeholders, and the public to review and comment. A more detailed description of the risk assessment process and the results are provided in Section 4 Hazard Identification and Section 5 Hazard Risk & Vulnerability Assessment.

The HMPC also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk from and vulnerability to hazards. Meetings were held with representatives from each participating jurisdiction to review existing capabilities, check in on progress toward implementation of existing mitigation actions, and discuss capability updates. These meetings are documented in Appendix C. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. This information can be found in Section 6 Capability Assessment.

#### 2.2.1.3 *PHASE III – MITIGATION STRATEGY*

### PLANNING STEPS 6 AND 7: SET GOALS AND REVIEW POSSIBLE ACTIVITIES

WSP facilitated brainstorming and discussion sessions with the HMPC that described the purpose and process of setting broad planning goals, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of prioritization criteria. This information is included in Section 7 Mitigation Strategy.

### PLANNING STEP 8: DRAFT AN ACTION PLAN

A complete first draft of the plan was prepared based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7. This draft was shared for HMPC, stakeholder, and public review and comment via the plan website. Comments were received from the HMPC and were integrated into the final draft, which was submitted to the South Carolina Emergency Management Division (SCEMD) and FEMA Region 4 to review and approve, contingent upon final adoption by all participating jurisdictions.

#### 2.2.1.4 *PHASE IV – PLAN MAINTENANCE*

### PLANNING STEP 9: ADOPT THE PLAN

To secure buy-in and officially implement the plan, the plan will be reviewed and adopted by all participating jurisdictions. Adoption is discussed in Section 8, and resolutions will be provided in Appendix A.

### PLANNING STEP 10: IMPLEMENT, EVALUATE AND REVISE THE PLAN

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. Each jurisdiction participating in this plan is responsible for plan implementation within their jurisdiction. Elected officials, officials appointed to head County, City, and Town departments, and community staff are charged with leading implementation of various activities in the plan. Each participating jurisdiction will need to decide which action(s) to undertake first based on the priority assigned to the actions in the planning process and the availability of funding and administrative support. Regular monitoring and maintenance, led by Pickens County Emergency Management and conducted by the HMPC, will ensure continued progress toward implementation.

Section 8 Plan Implementation & Maintenance provides the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. Section 8 also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

## 2.3 HAZARD MITIGATION PLANNING COMMITTEE

As with the previous plan, this Hazard Mitigation Plan was developed under the guidance of a Hazard Mitigation Planning Committee (HMPC). The HMPC represents a community-based planning team made up of representatives from various municipal departments from all of the participating jurisdictions as well as other key stakeholders identified to serve as critical partners in the planning process. To reconvene the committee, an email was sent to contacts from the previous planning effort. Where there were vacancies on the committee, new members were invited to participate. Additional stakeholder representatives were also invited to participate on the committee to promote a wider range of expertise and points of view throughout the planning process.

For the Pickens County HMPC, “participation” meant the following:

- Providing facilities for meetings;
- Attending and participating in the HMPC meetings;
- Collecting and providing requested data (as available);
- Providing information on local capabilities;
- Providing an update on previously adopted mitigation actions;
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the plan;

- Reviewing and providing comments on plan drafts;
- Informing the public, local officials, and other interested parties about the planning process and providing opportunity for them to comment on the plan;
- Coordinating and participating in the public input process; and
- Coordinating the formal adoption of the plan by local governing bodies.

During the planning process, the HMPC members communicated through video conference meetings, email, and telephone conversations. This continued communication ensured that coordination was ongoing throughout the entire planning process despite the fact that not all HMPC members could be present at every committee meeting. Additionally, draft documents were distributed via a plan update website so that the HMPC members could easily access and review them and provide comments.

Members of the HMPC are listed in Table 2-3 by jurisdiction and agency. Stakeholder representatives, who provided input to support all jurisdictions in the planning process, included critical facilities, non-profits and churches active in disasters, businesses, and other public organizations.

**Table 2.3 HMPC Members**

| Jurisdiction | Representative | Role, Agency |
|---|---|---|
| Pickens County | Denise Kwiatek | Director, Pickens County Emergency Management |
| Pickens County | Mike Dunaway | Director, Pickens County EMS |
| Pickens County | Cynthia Deckard | Planner, Pickens County Planning Department |
| Pickens County | Allison Fowler | Director, Pickens County Community & Tourism Development |
| Central | Elijah Reynolds | Fire Dept |
| Central | Isaiah Reynolds | Fire Dept |
| Clemson | Allison Gantte | Asst. Administrator, Clemson |
| Easley | Matthew Littleton | Fire Chief, Easley Fire Department |
| Easley | Tommy Holcombe | Assistant City Administrator, Easley |
| Liberty | Erica Woods | Mayor, Liberty |
| Liberty | Michael Calvert | City Administrator, Liberty |
| Norris | Ann Clardy | Town Clerk, Norris |
| Pickens City | Chris Elrod | Fire Chief, Pickens Fire Department |
| Six Mile | Roy Stoddard | Mayor, Six Mile |
| Six Mile | Rita Martin | Town Clerk, Six Mile |
| Stakeholder | Josh Young | Pickens County School District |
| Stakeholder | Russell Holliday | Manager, Ortec, Inc. (Tier II Facility) |
| Stakeholder | Paige Doyle | Manager, Ortec, Inc. (Tier II Facility) |
| Stakeholder | Sara Custer | Director of Emergency Management, Clemson University |
| Stakeholder | Melise Ellison | Director of Emergency Services, Red Cross |
| Stakeholder | Jordan Bradway | Director of Emergency Management and Preparedness, Prisma Health |
| Stakeholder | Marlee Dysart | Safety Operations Manager, Anmed Health Cannon |
| Stakeholder | Jim Kaplan | President, Cornell Dublier (Tier II Facility) |
| Stakeholder | Lance Estep | Planning Director, Appalachian Council of Governments |
| Stakeholder | Julie Capaldi | President & CEO, United Way of Pickens County |
| Stakeholder | Karen Culley | VP of Community Impact, United Way of Pickens County |
| Stakeholder | John Ross | Plant Superintendent, Six Mile Rural Water District |
| Stakeholder | Emily DeRoberts | Community Relations Manager, Duke Power |
| Stakeholder | Lisa Hallo | Deputy Director, Upstate Forever |
| Stakeholder | Jon Patterson | Discipleship Director, New Springs |
| Stakeholder | Matt Hennon | Executive Pastor of Operations, 5 Point Church |
| Stakeholder | Melanie Ruhlman | President, Save Our Saluda |

### 2.3.1 HMPC MEETINGS

The formal HMPC meetings followed the 10 CRS Planning Steps. These meetings were essential for facilitating discussion, gaining consensus, and initiating data collection efforts with local government staff, community officials, and other identified stakeholders. More importantly, the meetings and workshops prompted continuous input and feedback from relevant participants throughout the drafting stages of the plan. The meeting dates, locations, and topics discussed are summarized in Table 2-4. More details on each meeting, including agendas, minutes, and sign-in sheets for the HMPC meetings are included in Appendix C. All HMPC meetings were open to the public; however, separate public meetings were also held and are summarized in Table 2-5.

In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency. These meetings were informal and are not documented here.

**Table 2.4 Summary of HMPC Meetings**

| Meeting Title | Meeting Topic | Meeting Date | Meeting Location |
|---|---|---|---|
| HMPC Mtg. #1 – Project Kickoff | 1) Introduction to DMA and CRS requirements and the planning process<br>2) Trends in disasters and justification for planning<br>3) Review of HMPC responsibilities and the project schedule. | October 3, 2022 1:00 p.m. | Pickens County EOC, 222 McDaniel Ave B-17, Pickens, SC |
| HMPC Mtg. #2 | 1) Review draft Hazard Identification & Risk Assessment (HIRA)<br>2) Discuss asset inventory, risk, and vulnerability | January 5, 2023 11:00 a.m. | Microsoft Teams Meeting |
| HMPC Mtg. #3 | 1) Discuss goals & objectives<br>2) Review mitigation action plan requirements<br>3) Discuss local capability<br>4) Discuss new mitigation action alternatives | February 16, 2023 1:00 p.m. | Microsoft Teams Meeting |
| HMPC Mtg. #4 | 1) Review the draft Hazard Mitigation Plan<br>2) Solicit comments and feedback | March 21, 2023 3:00 p.m. | Pickens County EOC, 222 McDaniel Ave B-17, Pickens, SC |

In addition to the formal HMPC meetings, the HMPC representatives for each participating community convened additional staff and stakeholders for community-specific data and input collection meetings. These meetings covered topics related to risk and vulnerability, capability, and mitigation action reporting. Table 2.5 summarizes the meeting dates for each community. Minutes from these meetings are provided in Appendix C.

**Table 2.5 Community Data Collection Meetings**

| Community | Meeting Date |
|---|---|
| Pickens County | November 7, 2022 |
| Central | November 11, 2022 |
| Clemson | October 25, 2022 |
| Easley | October 31, 2022 |
| Liberty | March 9, 2023 |
| Norris | November 10, 2022 |
| Pickens | January 24, 2023 |
| Six Mile | October 31, 2022 |

### 2.3.2 MULTI-JURISDICTIONAL PARTICIPATION AND SPECIAL CONSIDERATIONS

This plan update includes all of Pickens County's incorporated municipalities. The DMA planning regulations and guidance stress that to satisfy multi-jurisdictional participation requirements, each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC;
- Detail where within the planning area the risk differs from that facing the entire area;
- Identify potential mitigation actions; and
- Formally adopt the plan.

To satisfy multi-jurisdictional participation requirements, each participating jurisdiction was required to perform the following tasks:

- Designate representatives for the HMPC to participate in mitigation planning meetings;
- Report on the status of existing mitigation projects; and
- Update their local mitigation action plan.

Stakeholder groups and outside agencies were also involved in the planning effort and participated on the HMPC. In developing the mitigation action plan, these stakeholders were encouraged to support targeted mitigation efforts within their expertise that benefit several or all jurisdictions.

As a basis for each jurisdiction identifying their own mitigation strategies, jurisdiction-specific information was developed on current conditions, assets and exposure, risk and vulnerability, and capability. Current conditions information is provided in Section 3 Community Profile, which has a countywide summary of geographic and demographic data. More specific data is presented in each jurisdictional annex. Asset and exposure data is detailed by jurisdiction in Section 5.3, with more details provided in the annexes. The risk assessment also provides jurisdictional specific vulnerability data, and at the end of each hazard profile, a hazard summary table provides a discussion of jurisdictional differences and a Priority Risk Index (PRI) rating by jurisdiction to note any variations in risk across the planning area. The annexes also summarize jurisdictional specifics of risk and vulnerability for all natural hazards. Jurisdictional-level capability information is summarized in Section 6 and in the annexes.

## 2.4 INVOLVING THE PUBLIC

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

Public involvement in the development of the plan was sought using various methods including open public meetings, an interactive plan website, a public participation survey, and by making copies of draft plan documents available for public review online. Additionally, HMPC meetings were open to the public.

### 2.4.1 PUBLIC MEETINGS

All public meetings were advertised on the plan website and on the County's website and social media. Copies of meeting announcements are provided in Appendix C. The public meetings held during the planning process are summarized in Table 2-5.

**Table 2.6 Summary of Public Meetings**

| Meeting Title | Meeting Topic | Meeting Date | Meeting Location |
|---|---|---|---|
| Public Meeting #1 | 1) Introduction to DMA and CRS planning process and justification for planning<br>2) Review of preliminary risk assessment information<br>3) Plan website and public survey overview | October 12, 2022 5:00 p.m. | Microsoft Teams |
| Public Meeting #2 | 1) Review Draft Hazard Mitigation Plan<br>2) Solicit comments and feedback | March 21, 2023 5:00 p.m. | Pickens County EOC, 222 McDaniel Ave B-17, Pickens, SC |

### 2.4.2 OUTREACH EFFORTS

The HMPC employed a variety of public outreach methods including established public information mechanisms and resources within the community. Table 2.7 details public outreach efforts employed during the preparation of this plan.

**Table 2.7 Public Outreach Efforts**

| Location | Date | Event/Message |
|---|---|---|
| Plan website | Ongoing | Meeting announcements, meeting materials, and description of hazards; contact information provided to request additional information and/or provide comments |
| Local news story | October 2022 | Information on how to participate in the plan update process shared, including public meeting notice, request for input, and link to plan website. |
| Social media | October 2022 & March 2023 | Meeting announcements and plan update information, including link to the plan website |
| Public survey | October 2022 – February 2023 | Survey hosted online on plan website and made available via shareable link online and through the HMPC |
| Community websites | March 2023 | Meeting announcements and requests for comments or feedback on the draft plan. |
| Plan website - HIRA draft | January 2023 | Draft HIRA made available for review and comment online |
| Plan website - Draft Plan | March 2023 | Full draft plan made available for review and comment online |

A public survey was made available in October 2022 and remained open for response through February 2023. The public survey requested public input into the hazard mitigation plan update planning process, including the prioritization of hazards and the identification of goals and mitigation activities to lessen the risk and impact of future hazard events. The survey questions are shown in Appendix C along with response data for each question. The survey was available on the plan website and publicized through local government and stakeholder websites and social media. In total, five survey responses were received.

## 2.5 INVOLVING STAKEHOLDERS

In addition to representatives of each participating jurisdiction, the HMPC included a variety of stakeholders. Stakeholders on the HMPC included representatives from Pickens County School District; Clemson University, Tier II facilities, the Red Cross, the United Way, Prisma Health, Appalachian Council of Governments, Six Mile Rural Water District, Duke Power, Upstate Forever, Save Our Saluda, and two local churches, New Springs and 5 Point. Input from additional stakeholders, including neighboring communities, state agencies, other educational institutions, non-profits, and the business community, was solicited through an invitation to provide data and input, review the draft hazard identification and risk assessment and the draft plan, attend planning meetings, and otherwise participate in the planning process. A list of stakeholders invited to participate in the planning process is provided in Appendix C.

# 3 COMMUNITY PROFILE

Section 3 provides an overview of the current conditions in Pickens County. Details on each jurisdiction and the unincorporated county areas can be found in each jurisdiction's annex.

## 3.1 PLANNING AREA OVERVIEW

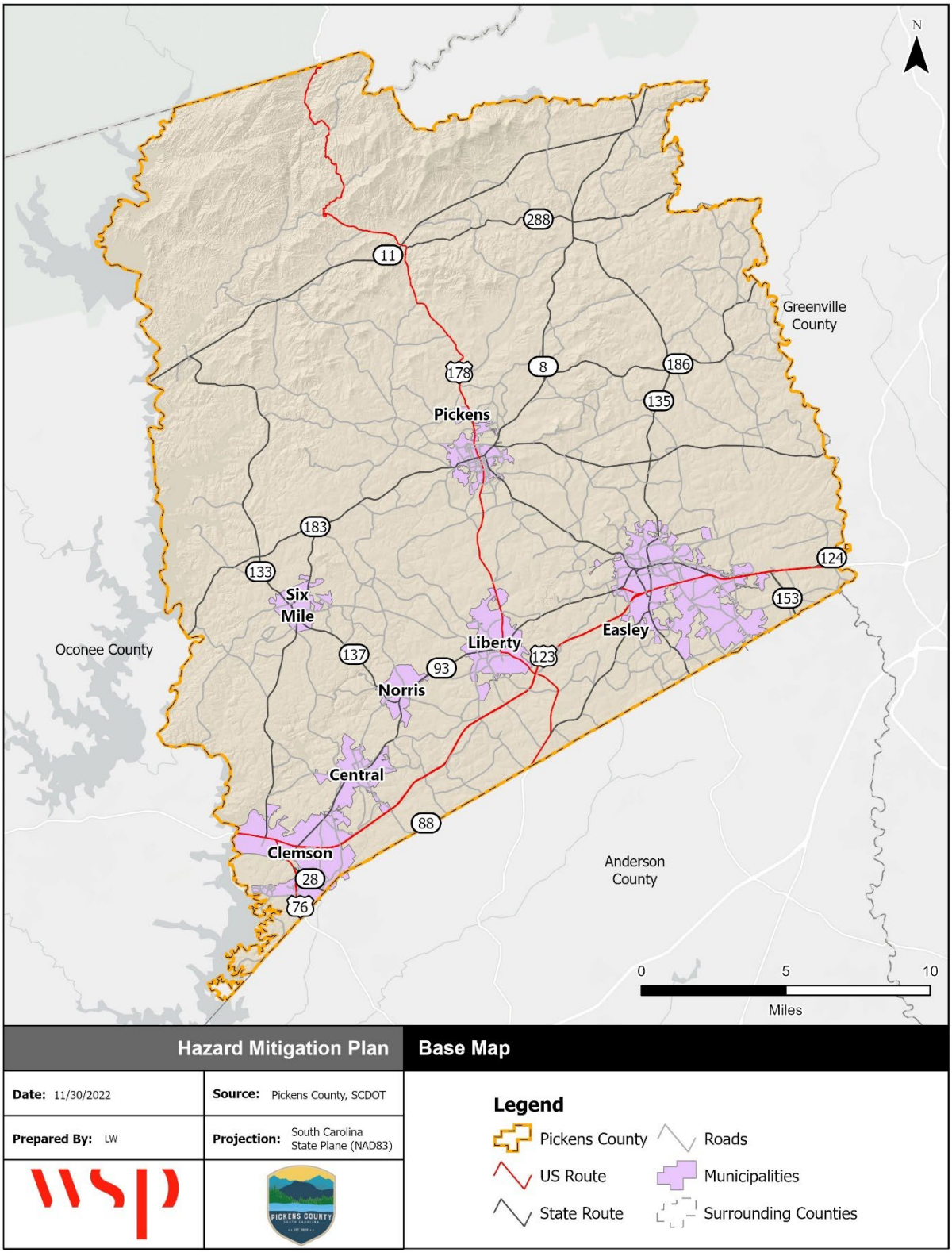
Pickens County is located along the northern border of South Carolina in the western part of the state. It is bordered by Oconee County to the west, Anderson County to the south, Greenville County to the east, and Transylvania County, North Carolina to the north. Elevations range between 600 and 3,547 feet above sea level, and include Sassafras Mountain, the state's highest point, according to the U.S. Department of the Interior.

Per the U.S. Census Bureau, the county has 496.3 square miles of land area. As of 2021 American Community Survey 5-Year Estimates, the County has a population of 129,617, which equates to an average population density of 261 people per square mile. However, most development is concentrated in the southern half of the county, interspersed with paster and open land as well as smaller areas of deciduous and evergreen forest. The northern portion of the county is very rural, with primarily deciduous forest and some evergreen stands (Fry, et al.).

There are seven incorporated municipalities in Pickens County: Central, Clemson, Easley, Liberty, Norris, Pickens, and Six Mile. The county seat is the City of Pickens.

An orientation map is provided as Figure 3.1 and reflects the boundaries of the County as well as the incorporated municipalities and major roads within the County.

**Figure 3.1 Location Map**

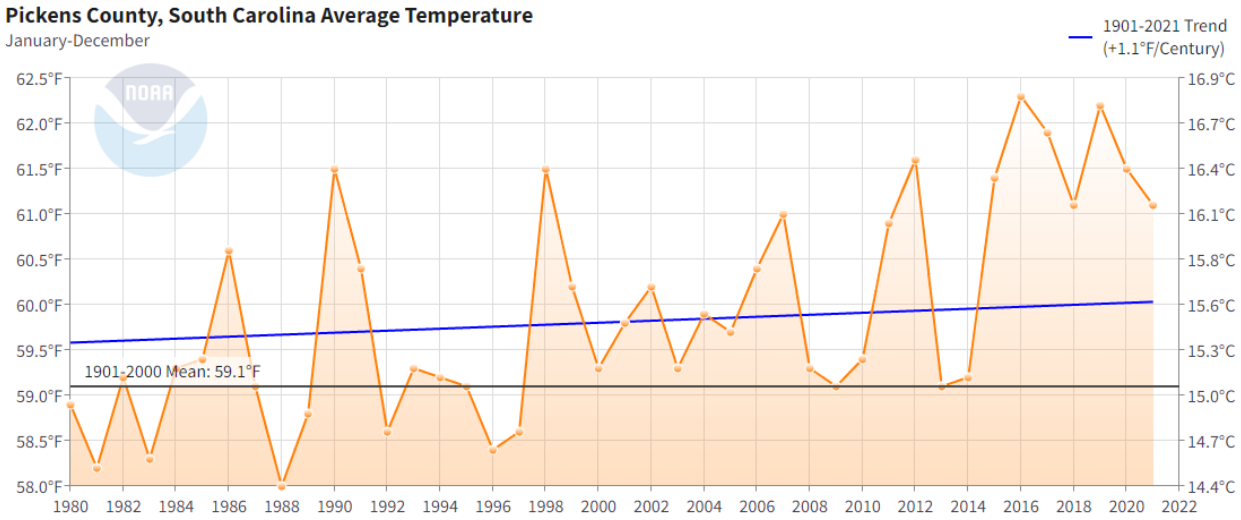


# 3.2 GEOGRAPHY AND CLIMATE

According to the Köppen climate classification system, Pickens County is classified as subtype Cfa (Humid Subtropical Climate) characterized by warm to hot summers and cold to mild winters. There is no dry or wet season, with variable precipitation distributed throughout the year.

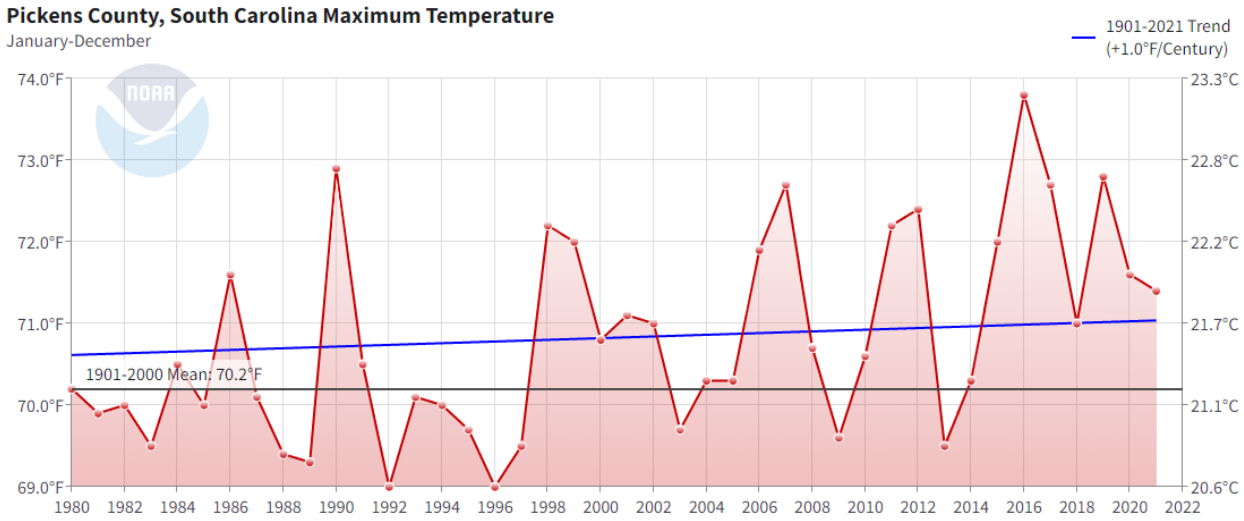
The following charts from the National Oceanic and Atmospheric Administration (NOAA) show the annual average temperature, average precipitation, average maximum temperature, and average minimum temperature for Pickens County from 1980 to 2022. The long-term average temperature is 59.1°F with an increasing trend of 1.1°F per century. Average annual temperature has equaled or exceeded the long-term average every year since 1998. Average maximum temperature and average minimum temperature also have increasing trends, with minimum temperature increasing at a slightly greater rate. Average annual precipitation is 58.82 inches, with a slightly decreasing trend of 0.21 inches per century.

**Figure 3.2 Average Temperature Trends for Pickens County, 1980-2022**



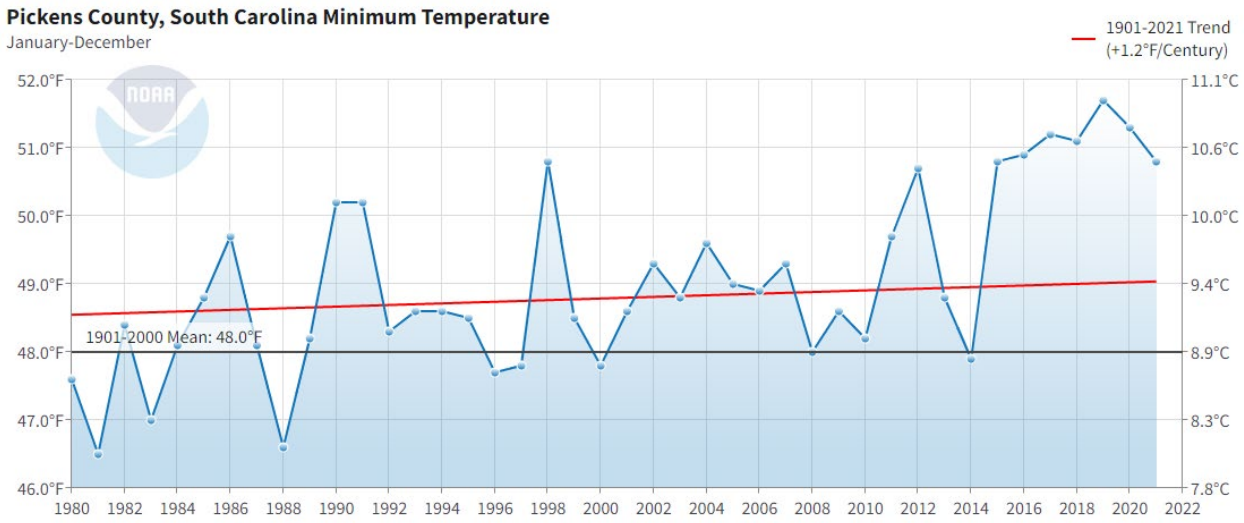

Source: NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published December 2022, retrieved on January 4, 2023 from https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series

**Figure 3.3 Maximum Temperature Trends for Pickens County, 1980-2022**



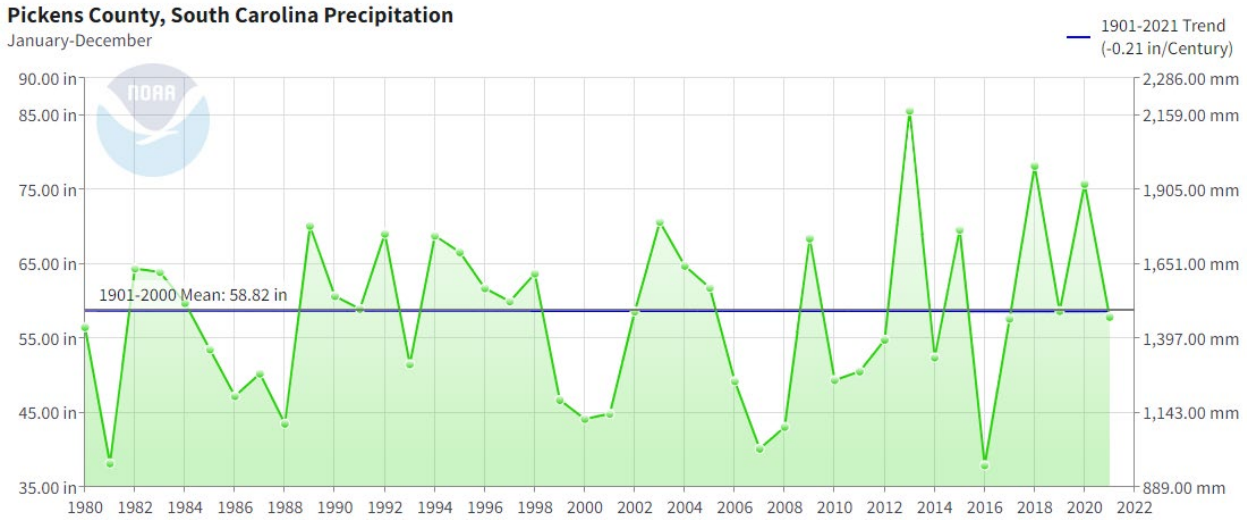

Source: NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published December 2022, retrieved on January 4, 2023 from https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series

**Figure 3.4 Minimum Temperature Trends for Pickens County, 1980-2022**




Source: NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published December 2022, retrieved on January 4, 2023 from https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series

**Figure 3.5 Precipitation Trends for Pickens County, 1980-2020**



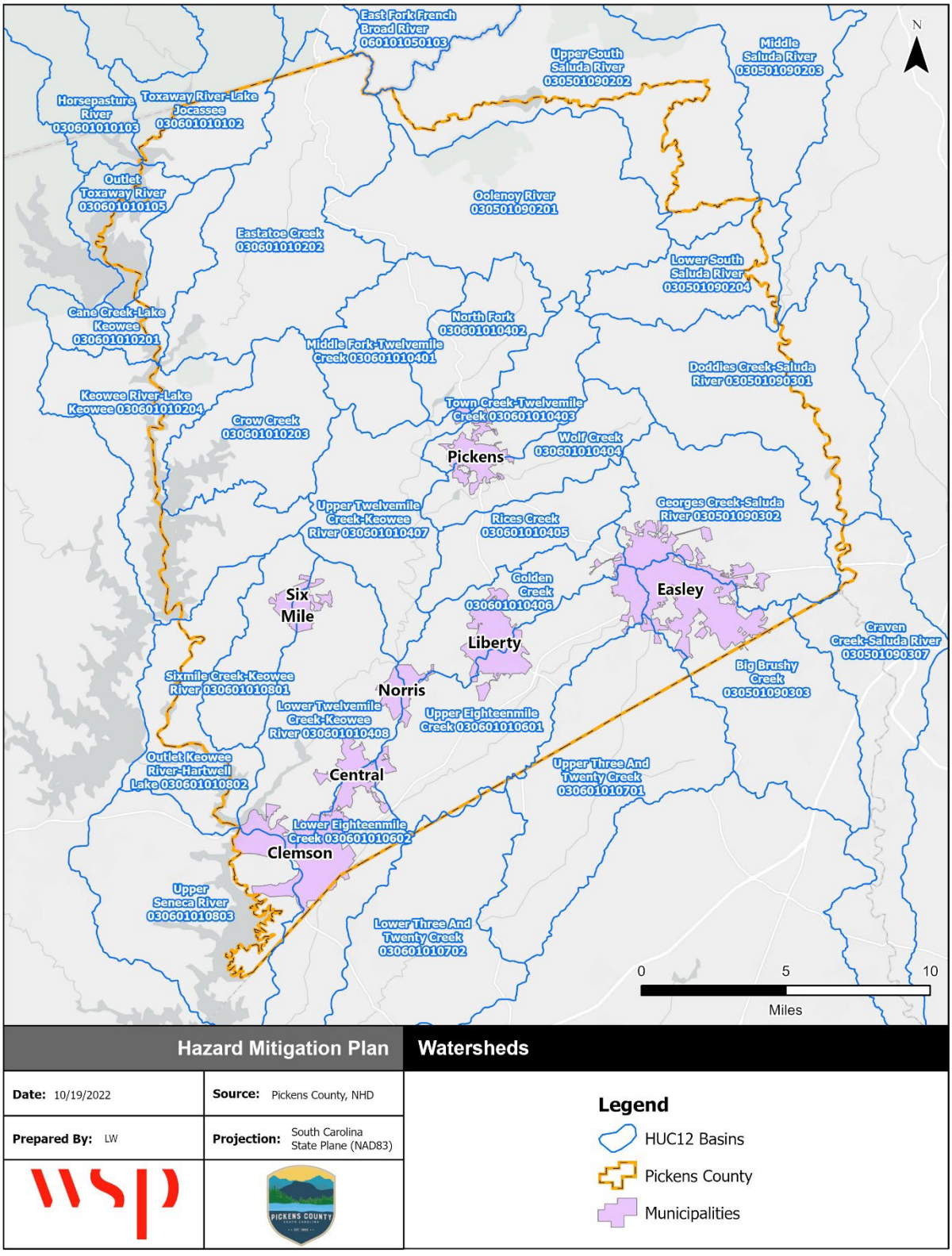

Source: NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published December 2022, retrieved on January 4, 2023 from https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series

Pickens County is situated within the Piedmont and Blue Ridge physiographic regions. These regions exhibit variations in topography, geology, hydrology, and vegetation. The Blue Ridge region is distinguished from other areas of South Carolina by elevations between 1,000 and 3,300 feet. The land is characterized by dissected mountains, rugged hills, and thick forests. The Piedmont region, similar to the Blue Ridge, has lower topographic relief with elevations ranging from 450 to 1,000 feet above sea level. Pickens County is home to 75 named summits, ridges, ranges, trails, and other mountain features in the Blue Ridge Mountains, part of the Appalachian Mountains. Sassafras Mountain (3,554 feet) is the tallest peak in the county and in South Carolina, though it straddles the North Carolina border.

Pickens County is bordered by waterways to the east and west. Lake Jocassee, Lake Keowee, and Lake Hartwell form the western boundary. These manmade lakes provide power for industry, domestic water supply, and recreation. The eastern border is the Saluda River which separates Pickens and Greenville Counties.

The Saluda River Basin originates in the Blue Ridge province and central portion of the Piedmont region and located in most of Greenville and Pickens Counties. Pickens County is divided into four watershed districts: Georges Creek, Oolenoy, Brushy Creek, and Three and Twenty. Three subdivided watersheds encompass approximately 69,169 acres in Pickens County: Eighteen Mile creek, Golden Creek, and Lower Twelve Mile Creek. Eight Mile creek originates in Easley and travels southwest along US 123, and flows through the towns of Liberty, Norris, Central, and Pendleton, ending in Lake Hartwell. Golden Creek also originates in Easley and flows southwest along the eastern edge of Eighteen Mile creek and converges into Lower Twelve Mile creek in Norris. Eventually, Lower Twelve Mile creek flows into Lake Hartwell through Easley, Liberty, Central, Six Mile, Norris, and Clemson.

**Figure 3.6 HUC-12 Drainage Basins**




Source: USGS NHD

# 3.3 TRANSPORTATION

## MAJOR HIGHWAYS

Pickens County has a road network that includes a mix of federal highways, state routes and local roads. The County has 651 miles of county roads, 234 miles of state primary highway system, 477 miles of state secondary highway system, and 75 county bridges. Primary highway corridors in the County include:

- U.S. 76
- U.S. 123 and U.S. 123 Connector
- U.S. 178

State highway routes in the County include:

- SC 8 and SC 8 Connector
- SC 11
- SC 28 and SC 28 Business
- SC 88
- SC 93
- SC 124
- SC 133
- SC 135
- SC 137
- SC 153
- SC 183
- SC 186
- SC 288

U.S. 123 runs generally east to west across the southern portion of the county from Greenville to Easley and Clemson. U.S. 178 runs generally north to south through the middle of the county from the North Carolina border through Pickens and Liberty to Anderson County. U.S. 76 runs through Clemson in the southernmost corner of the county.

None of these routes are registered on the National Hazardous Materials Route Registry.

## PUBLIC TRANSIT

Pickens County has a public transit service run through Clemson Area Transit (CAT) – a fare-free transit service provided by Clemson University, City of Clemson, Town of Central, Town of Pendleton, City of Seneca, Anderson County, SCDOT, and the Federal Transit Administration (FTA). The CAT operates around 19 buses.

## AIRPORTS

The Pickens County Airport is a County-owned public use airport located in Liberty, SC.

## FUTURE TRANSPORTATION SYSTEMS AND COUNTY TRANSPORTATION PRIORITIES

The County's comprehensive plan explains that as Pickens County's low density residential development style is likely to continue over the coming decades, there will be additional needs for new roadways and additional capacity on the existing network. The Greenville Pickens Area Transportation Study's (GPAT) Long Range Transportation Plan *Horizon 2040* was adopted in June 2016 and updated in January 2021. The plan has roadway recommendations including 123 corridor improvements and 137 intersection improvements throughout the six-county region (Greenville Urbanized Area). Design guidelines were also

recommended for bicycle and pedestrian infrastructure connections. The goals of the comprehensive plan's transportation element include: improve access to public transportation, expand Clemson Area Transit to provide new service areas to improve transit across the county.

## 3.4 CULTURAL, HISTORIC AND NATURAL RESOURCES

Pickens County has several natural amenities, including Lakes Keowee, Lake Jocassee to the west, the foothills of the Blue Ridge Mountains to the north, Table Rock State Park, and the highest point in South Carolina, Sassafras Mountain.

The county also has several museums, art centers, and historical sites. The National Register of Historic Places (NRHP) has 27 listings in Pickens County, including 8 historic districts and sites. Three of these listings are in Central, seven are in Clemson, five are in Easley, two are in Liberty, and ten are in Pickens. These properties and districts are listed in Table 3.1 below. Historic places are shown in Figure 3.7 through Figure 3.11.

**Table 3.1 Historic Property Listings in Pickens County**

| | Name on the Register | Date Listed | Location | City |
|---|---|---|---|---|
| 1 | Central High School | 5/20/1994 | 304 Church St. | Central |
| 2 | Central Roller Mills | 6/25/2013 | 300 Madden Bridge Rd. | Central |
| 3 | Morgan House | 3/29/2001 | 416 Church St. | Central |
| 4 | Clemson College Sheep Barn | 1/4/1990 | S. Palmetto Blvd., Clemson University campus | Clemson |
| 5 | Clemson University Historic District I | 1/4/1990 | Northern portion of campus along US 76 | Clemson |
| 6 | Clemson University Historic District II | 1/4/1990 | Center of campus | Clemson |
| 7 | Fort Hill | 10/15/1966 | Clemson University campus | Clemson |
| 8 | Hanover House | 6/5/1970 | Clemson University campus | Clemson |
| 9 | Stribling, J.C., Barn | 10/22/2001 | 220 Issaqueena Tr. | Clemson |
| 10 | Structural Science Building | 4/5/2010 | Clemson University | Clemson |
| 11 | Easley High School Auditorium | 1/21/1999 | 112 Russell St. | Easley |
| 12 | Easley Mill | 9/23/2013 | 601 S. 5th St. | Easley |
| 13 | Hester Store | 2/5/2013 | 1735 Hester Store Rd. | Easley |
| 14 | Sheriff Mill Complex | 11/20/1987 | SR 40 | Easley |
| 15 | Williams-Ligon House | 2/8/2012 | 1866 Farrs Bridge Rd. | Easley |
| 16 | Liberty Colored High School | 4/18/2003 | Jct. of SC 93 and Rosewood St. | Liberty |
| 17 | Smith, J. Warren, House | 1/26/2005 | 21 N. Palmetto St. | Liberty |
| 18 | Old Stone Church and Cemetery | 11/5/1971 | 1.5 mi. N of Pendleton off U.S. 76 | Pendleton |
| 19 | Civilian Conservation Corps Quarry No. 1 and Truck Trail | 6/16/1989 | Off Section Rd. 25/Hickory Hollow Rd., .7 mi. S of SC 11 | Pickens |
| 20 | Civilian Conservation Corps Quarry No. 2 | 6/16/1989 | .2 mi. N of Section Rd. 69/Sliding Rock Rd. near Oolenoy River | Pickens |
| 21 | Griffin-Christopher House | 10/21/2001 | 208 Ann St. | Pickens |
| 22 | Hagood Mill | 12/11/1972 | 3.5 mi. NW of Pickens on U.S. 178 | Pickens |
| 23 | Hagood-Mauldin House | 10/9/1997 | 104 N. Lewis St. | Pickens |
| 24 | Old Pickens Jail | 4/11/1979 | Johnson and Pendleton Sts. | Pickens |

| | Name on the Register | Date Listed | Location | City |
|---|---|---|---|---|
| 25 | Oolenoy Baptist Church Cemetery | 10/14/2003 | 201 Miracle Hill Rd. | Pickens |
| 26 | Roper House Complex | 6/16/1989 | SC Section Rd. 25, .1 mi. SE of SC 11 | Pickens |
| 27 | Table Rock Civilian Conservation Corps Camp Site | 6/16/1989 | Table Rock State Park Rd. Ext. at SC 11 | Pickens |
| 28 | Table Rock State Park Historic District | 6/15/1989 | SC 11, 4.5 mi. E of SC Primary Rd. 45 | Pickens |

Source: National Register of Historic Places Database

**Figure 3.7 Historic Places in Pickens County**

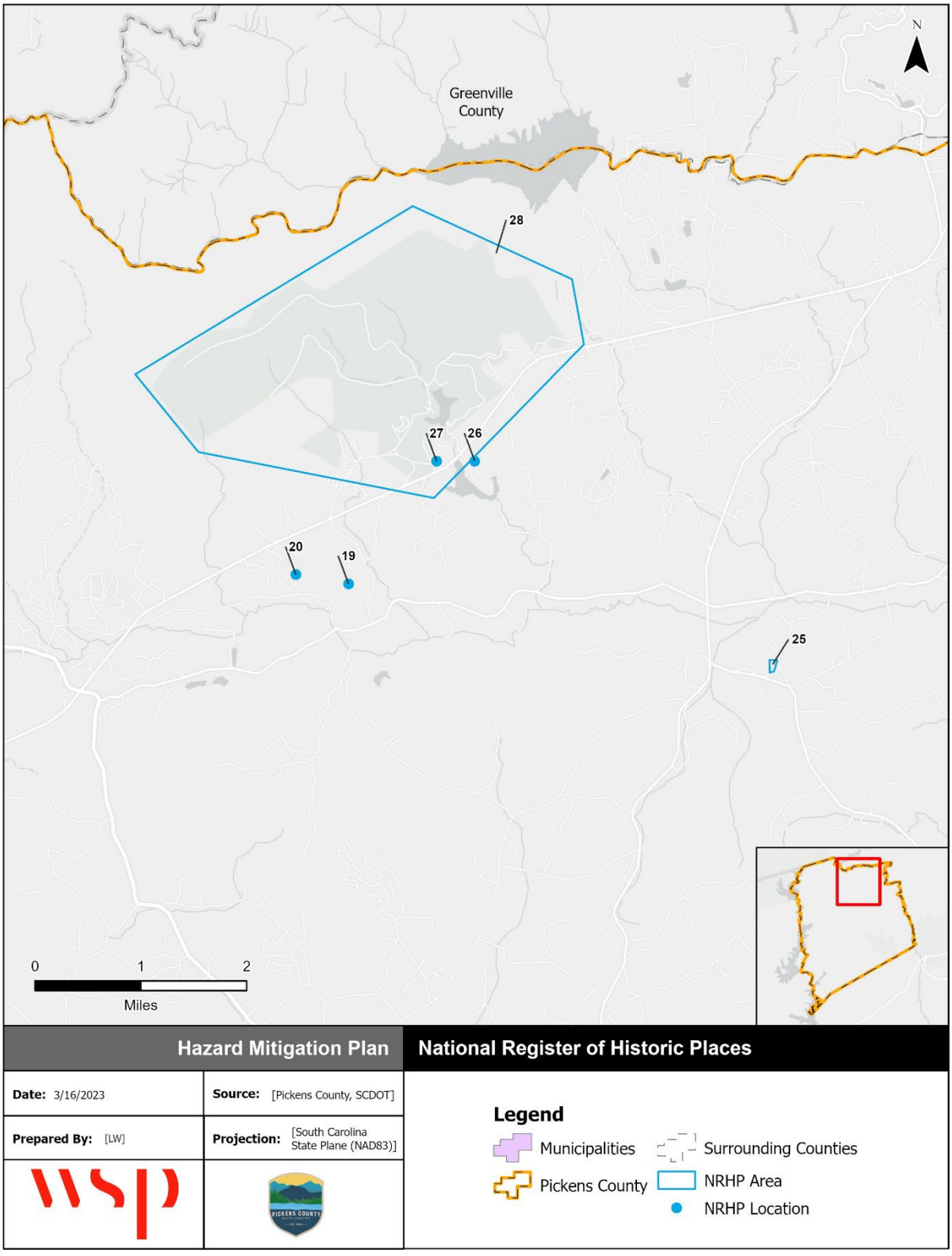


**Figure 3.8 Historic Places in Pickens County**

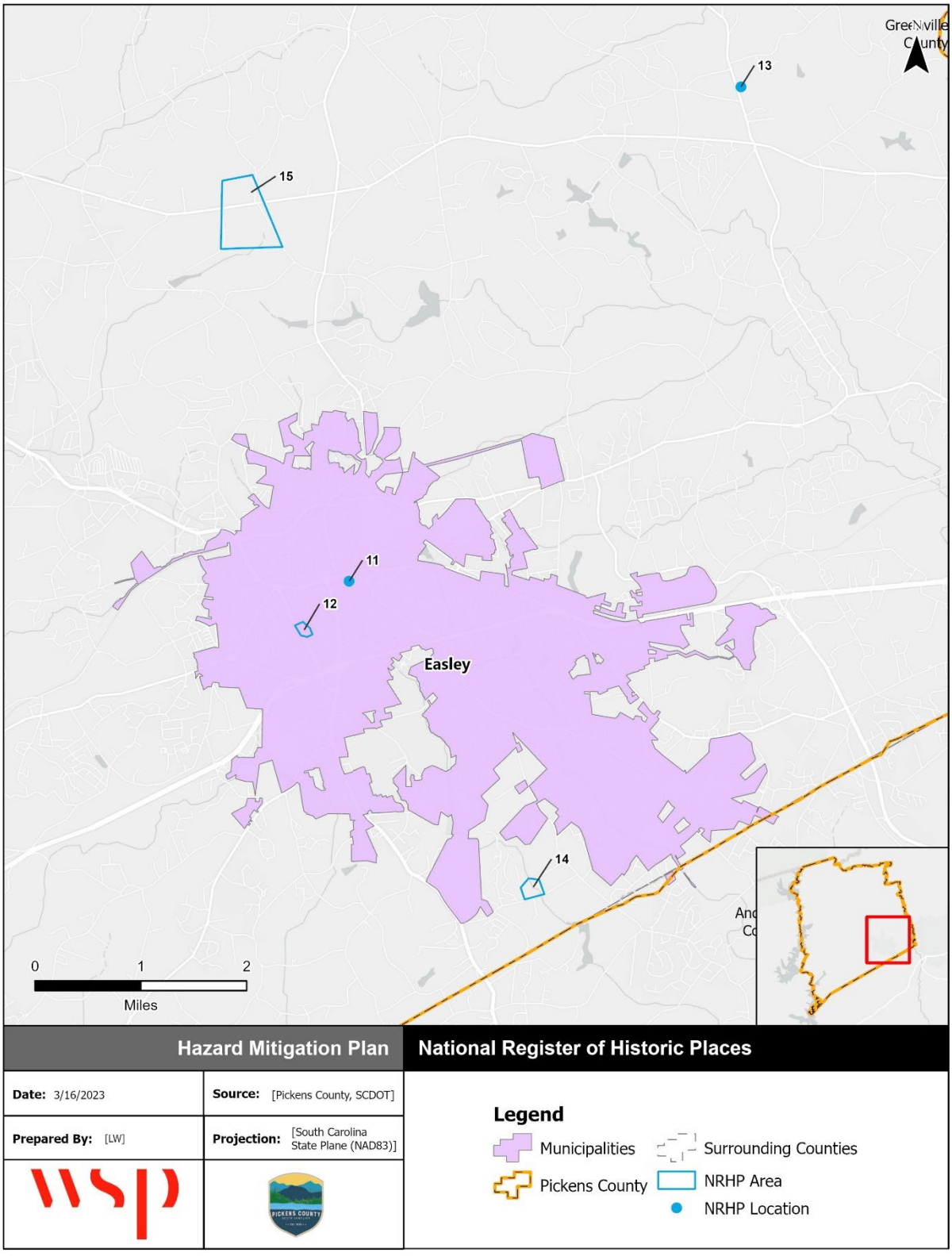


**Figure 3.9 Historic Places in Pickens County**

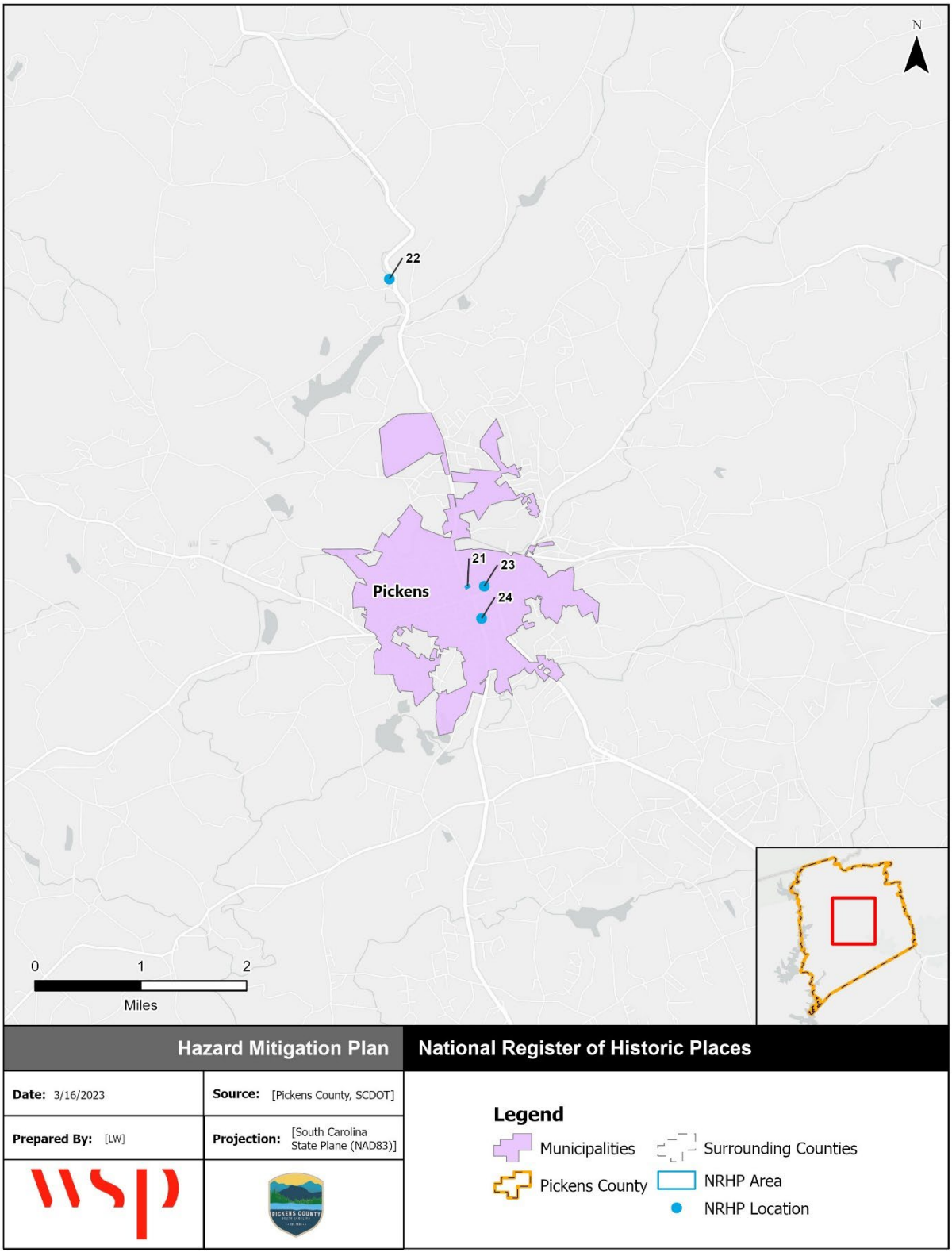


**Figure 3.10 Historic Places in Pickens County**

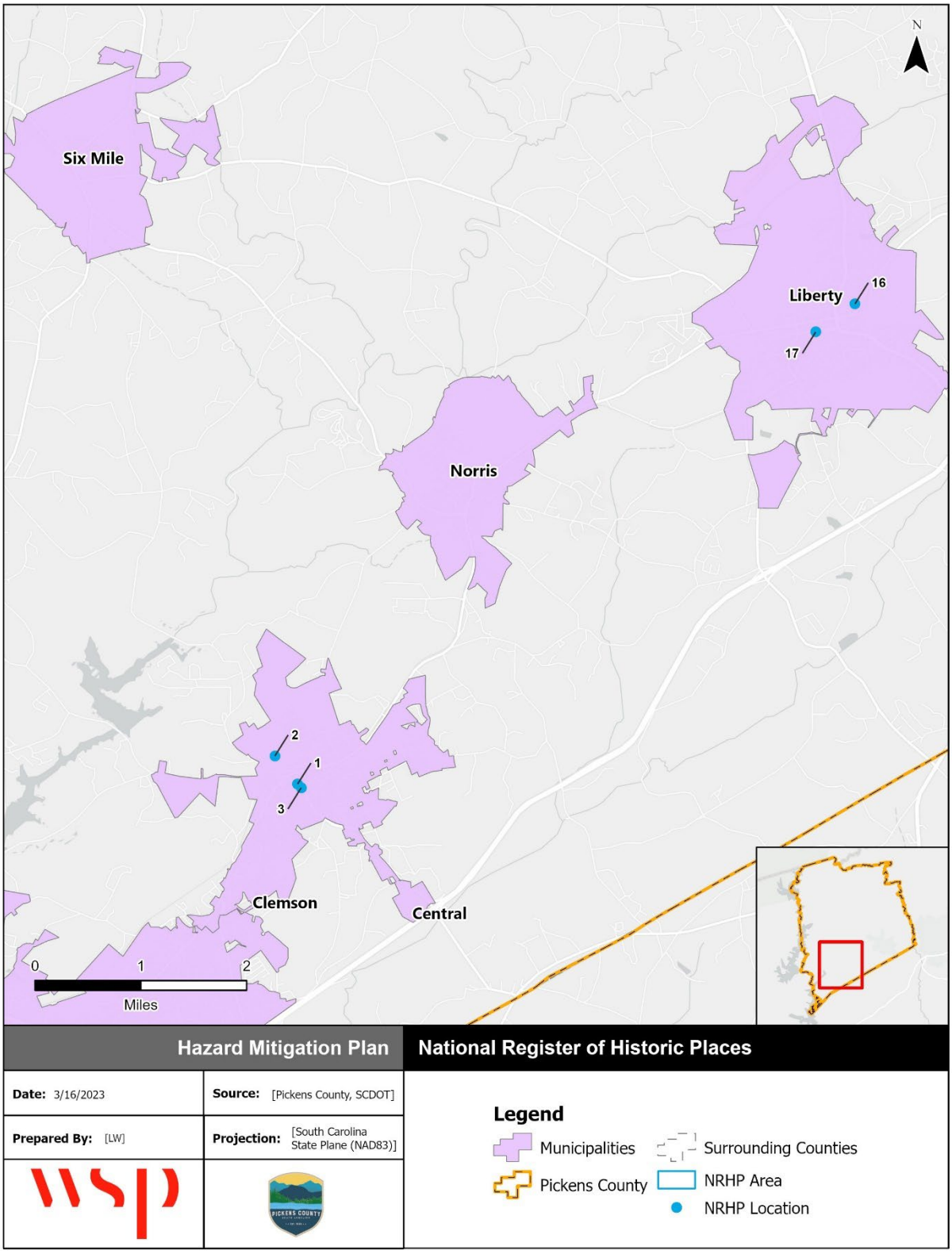
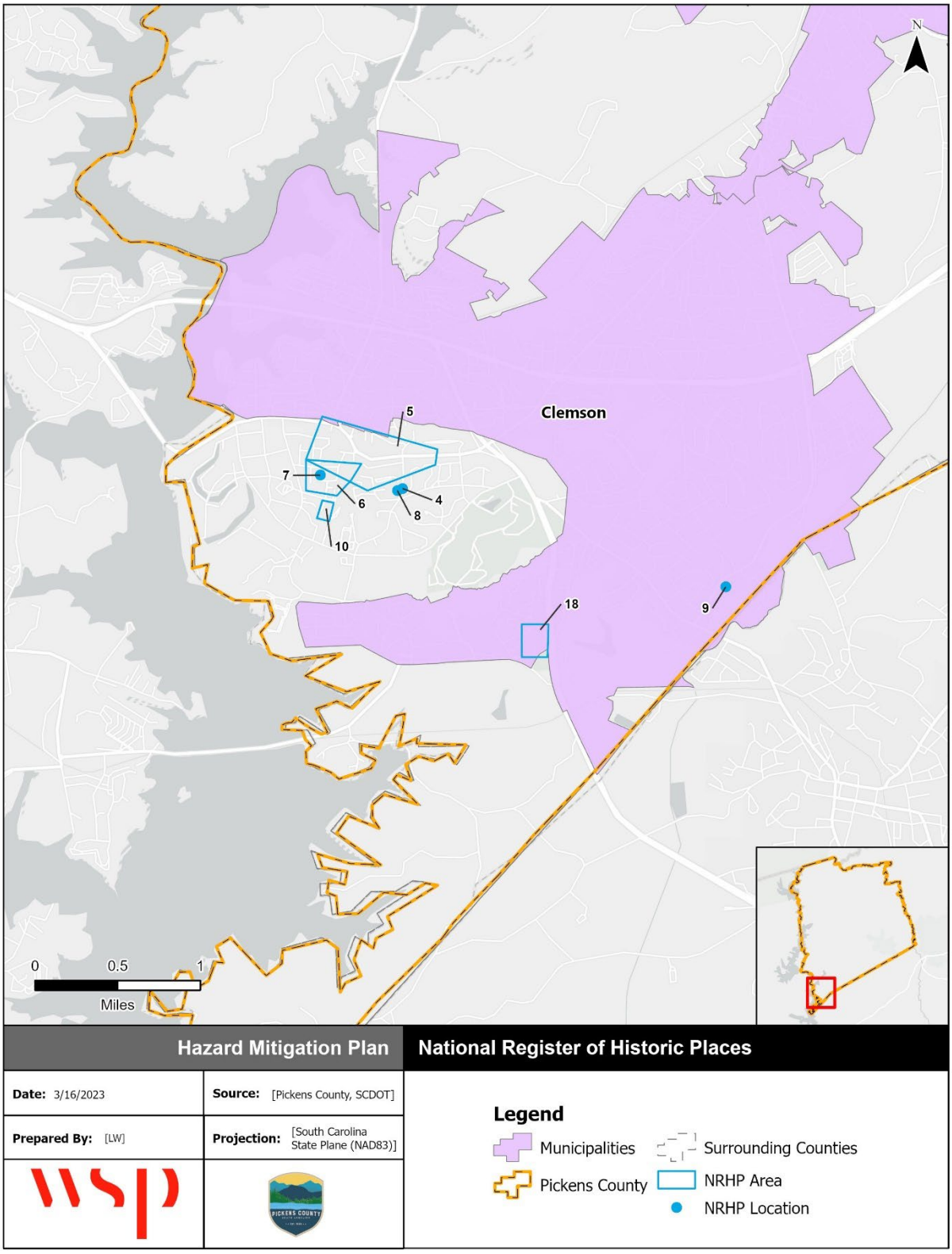


**Figure 3.11 Historic Places in Pickens County**



### 3.4.1 PARKS, PRESERVES, AND CONSERVATION

The Pickens County Parks and Recreation Department maintains 5 parks and recreation facilities throughout the county, providing citizens a variety of recreation opportunities. There are over 30 parks, trails, dog parks, and gardens throughout the County. More information about some of the parks can be found below.

*Cateechee Point* is a nine acre site on the Twelve Mile River in Norris Highway in Central. The Pickens County Park is a great spot for whitewater kayaking, fishing and picnicking. Cateechee Point is equipped with kayak racks, sheltered picnic areas and fishing decks.

*Mile Creek Park* is family friendly park with access to Lake Keowee and many recreation facilities and fishing.

*Grant Meadow Overlook* has sweeping mountain views in the Upstate. The overlook gives panoramic views of Table Rock State Park and the Blue Ridge escarpment.

*Long Shoals Recreation Area* is located just east of Highway 11 and is known for its natural water slide and trout fishing. The shoals extend along the Little Eastatoe Creek and The South Carolina Department of Natural Resources stocks the cool creek waters on a regular basis with brook, brown and rainbow trout. The park also includes picnic areas and a hiking trail.

*Equoni Point* is located in Central with access to the Twelve Mile River Blueway. Equoni Point allows paddlers to explore upstream and downstream and has a sheltered picnic area and fishing deck for visitors to enjoy.

### 3.4.2 WATER BODIES AND FLOODPLAINS

Natural floodplains in the county include wetland areas and low-lying land along the major rivers and coastal areas around the county. Natural floodplains reduce damage by allowing flood waters to spread out over large areas, aiding infiltration into the ground, reducing flow rates and acting as a flood storage area to reduce downstream peaks.

Pickens County is bordered by waterways to the east and west – Lake Jocassee, Lake Keowee, and Lake Hartwell boarders the western boundary. The Saluda River separates Pickens and Greenville Counties. There are also several streams, lakes, and freshwater ponds located throughout the county. Additional detail on the wetland systems associated with these waterbodies is provided in the subsections below.

#### NATURAL AND BENEFICIAL FLOODPLAIN FUNCTIONS

Floodplains in riverine areas perform natural functions that cannot be replicated elsewhere. When kept open and free of development, floodplains provide the necessary flood water conveyance and flood water storage needed by a stream or river. When the floodplain is able to perform its natural function, flood velocities and peak flows are reduced downstream. Natural floodplains reduce wind and wave impacts and their vegetation stabilizes soils during flooding.

Floodplains in their natural state provide many beneficial functions beyond flood reduction. Water quality is improved in areas where natural cover acts as a filter for runoff and overbank flows; sediment loads and impurities are also minimized. Natural floodplains moderate water temperature, reducing the possibility of adverse impacts on aquatic plants and animals. Floodplains can act as recharge areas for groundwater and reduce the frequency and duration of low flows of surface water. They provide habitat for diverse species of flora and fauna, some of which cannot live anywhere else. They are particularly important as breeding and feeding areas.

## WETLANDS

Wetlands benefit the ecosystem by storing, changing, and transmitting surface water and groundwater. Through these processes, pollution is removed, nutrients are recycled, groundwater is recharged, and biodiversity is enhanced. Wetland composition varies extensively, with five distinct categories for classification: riverine, lacustrine, palustrine, estuarine, and marine systems. Only riverine, lacustrine, and palustrine wetland systems are present in Pickens County. Wetland areas in Pickens County are shown in Figure 3.12.

### *THE RIVERINE SYSTEM*

The riverine system includes all wetlands and deep-water habitats contained within a channel with two exceptions: (1) wetlands dominated by trees, shrubs, emergent vegetation, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in excess of 0.5%. The riverine system is bounded on the landward side by upland, by the channel bank (including natural and man-made levees), or by wetlands dominated by trees, shrubs, emergent vegetation, emergent mosses, or lichens. In braided streams, the system is bounded by the banks forming the outer limits of the depression within which the braiding occurs.

### *THE LACUSTRINE SYSTEM*

Lacustrine wetlands are large, open, water-dominated systems (e.g., lakes). This definition also applies to modified systems which possess characteristics similar to lacustrine systems (e.g., deep standing or slow-moving waters).

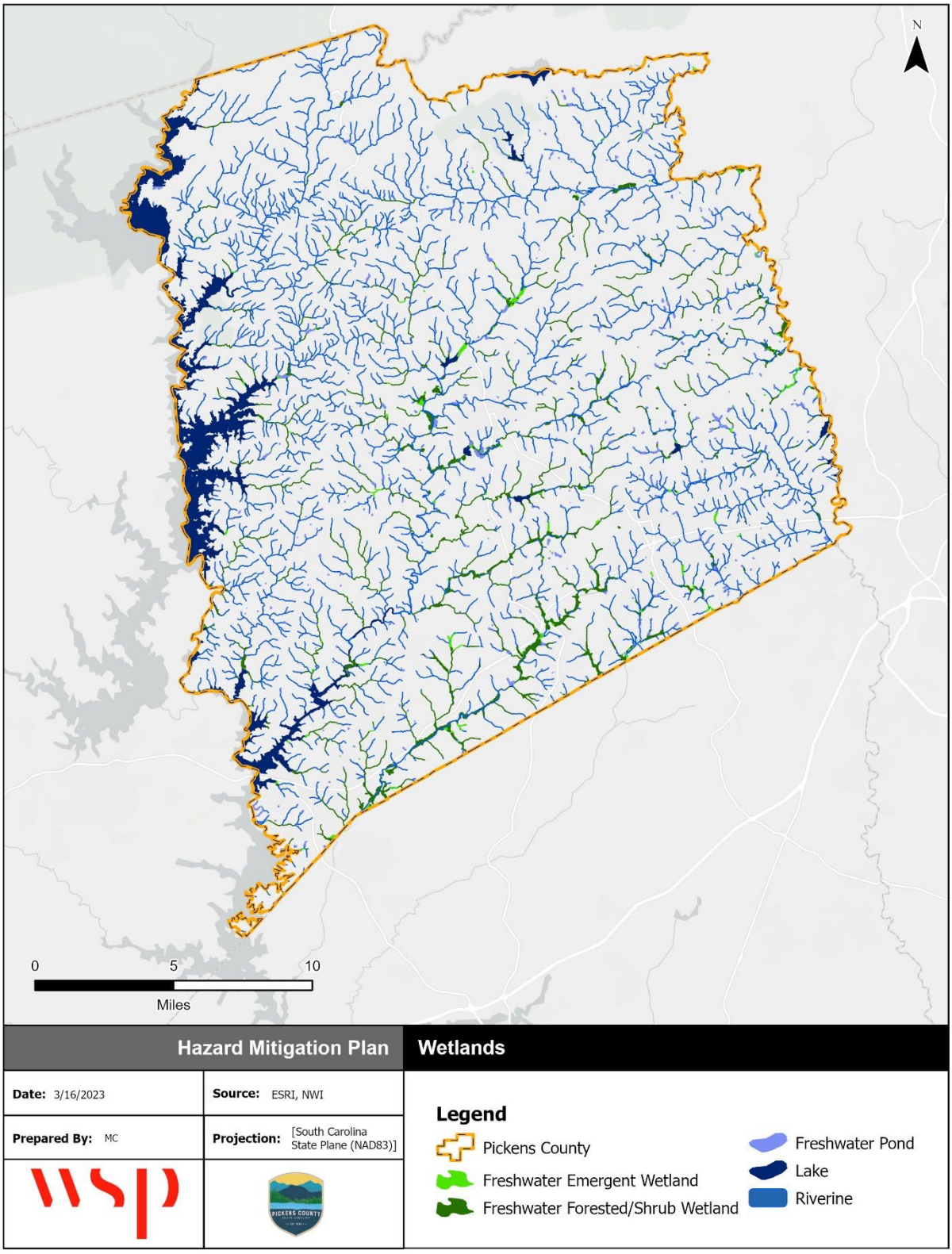
There are several lacustrine wetlands in Pickens County. They are present around larger bodies of water, primarily located in the western part of the county, however there are also a few lacustrine wetlands in central and northern parts of the county.

### *THE PALUSTRINE SYSTEM*

The palustrine (freshwater) system includes all non-tidal wetlands dominated by trees, shrubs, persistent emergent plants, emergent mosses or lichens, and all such wetlands that occur in areas where salinity due to ocean-derived salts is below 0.5%. The Palustrine system is bounded by upland.

Within Pickens County, this system includes freshwater emergent wetlands, freshwater forested/shrub wetlands, and freshwater ponds. Palustrine wetlands are the most common occurring classification of wetland in Pickens County. They are mostly found along freshwater river and creek corridors, including some of the smaller streams located throughout the county.

**Figure 3.12 Wetlands in Pickens County**



## THREATENED AND ENDANGERED SPECIES

The U.S. Fish and Wildlife Service maintains a regular listing of threatened species, endangered species, species of concern, and candidate species for counties across the United States. Pickens County has 16 species that are listed with the U.S. Fish and Wildlife Services. Table 3-2 below shows the species identified as threatened, endangered, or other classification for Pickens County.

**Table 3.2 Threatened and Endangered Species**

| Group | Common Name | Scientific Name | Federal Status |
|---|---|---|---|
| Clams | Alasmidonta raveneliana | Appalachian elktoe | Endangered |
| Mammals | Perimyotis subflavus | Tricolored bat | Proposed Endangered |
| Insects | Danaus plexippus | Monarch butterfly | Candidate |
| Mammals | Myotis lucifugus | Little brown bat | Under Review |
| Crustaceans | Cambarus spicatus | Little River crayfish | Under Review |
| Conifers and Cycads | Tsuga caroliniana | Carolina hemlock | Under Review |
| Insects | Macromia margarita | Margarita River skimmer | Under Review |
| Birds | Vermivora chrysoptera | Golden-winged warbler | Under Review |
| Mammals | Myotis septentrionalis | Northern Long-Eared Bat | Endangered |
| Reptiles | Glyptemys muhlenbergii | Bog turtle | Similarity of Appearance (Threatened) |
| Flowering Plants | Symphyotrichum georgianum | Georgia aster | Resolved Taxon |
| Flowering Plants | Echinacea laevigata | Smooth coneflower | Threatened |
| Amphibians | Aneides aeneus | Green salamander | Status Undefined |
| Amphibians | Eurycea chamberlaini | Chamberlain's Dwarf salamander | Under Review |
| Flowering Plants | Sarracenia rubra ssp. jonesii | Mountain sweet pitcher-plant | Endangered |
| Mammals | Plecotus rafinesquii | Rafinesque's big-eared bat | Species of Concern |

Source: U.S. Fish & Wildlife Service: https://ecos.fws.gov/ecp/report/species-listings-by-current-range-county?fips=45077

# 3.5 POPULATION

Pickens County has experienced moderate population growth over the past decade. Population decreased in the unincorporated county areas and remained steady in most of the smaller towns, but Central, Clemson, Easley, and Six Mile experienced larger population increases. Overall, Pickens County had 119,224 residents at the time of the 2010 Decennial Census and an estimated population of 131,404 by the 2020 Census. Overall growth kept pace with the state average. Table 3-3 provides the County's population counts from 2010 and 2020 according to Decennial Census data as well as the 2021 population estimate according to 5-year American Community Survey data.

**Table 3.3 Pickens County Population Counts and Trends**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Pickens County** | **119,224** | **131,404** | **12,180** | **10.2%** | **129,617** |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

Population density in the County increased from 237.4 persons per square mile in 2010 to 252.6 persons per square mile in 2020. Trends suggest that this number is likely to continue growing over the next decade,

with much of the County remaining rural while the more populated jurisdictions continue to grow. Figure 3-8 shows population density across the county in persons per square mile.

Demographic characteristics of the county are summarized in Table 3-4. According to 2020 American Community Survey, the median age in Pickens County is estimated to be 36.4. Of the population aged 25 years and over, 86.6 percent have a high school degree or higher and 27.1 percent have a bachelor's degree or higher. While most of Pickens County residents speak only English at home, approximately 4.8 percent of the residents speak a language other than English at home with 1.3 percent speaking English "less than very well." The racial characteristics of the County are presented in Table 3-5.

**Table 3.4 Demographic and Social Characteristics Compared to the State and Nation**

| Demographic & Social Characteristics | Pickens County | South Carolina | United States |
|---|---|---|---|
| Median Age | 36.4 | 39.8 | 38.4 |
| % of Population Under 5 years old | 4.9% | 5.6% | 5.9% |
| % of Population Over 65 years old | 16.6% | 17.8% | 16% |
| % of Population over 25 with high school diploma or higher | 86.6% | 88.8% | 88.9% |
| % of Population over 25 with bachelor's degree or higher | 27.1% | 29.8% | 33.7% |
| % with Disability | 15.1% | 14.3% | 12.6% |
| % Speak English less than "very well" | 1.3% | 2.8% | 8.2% |

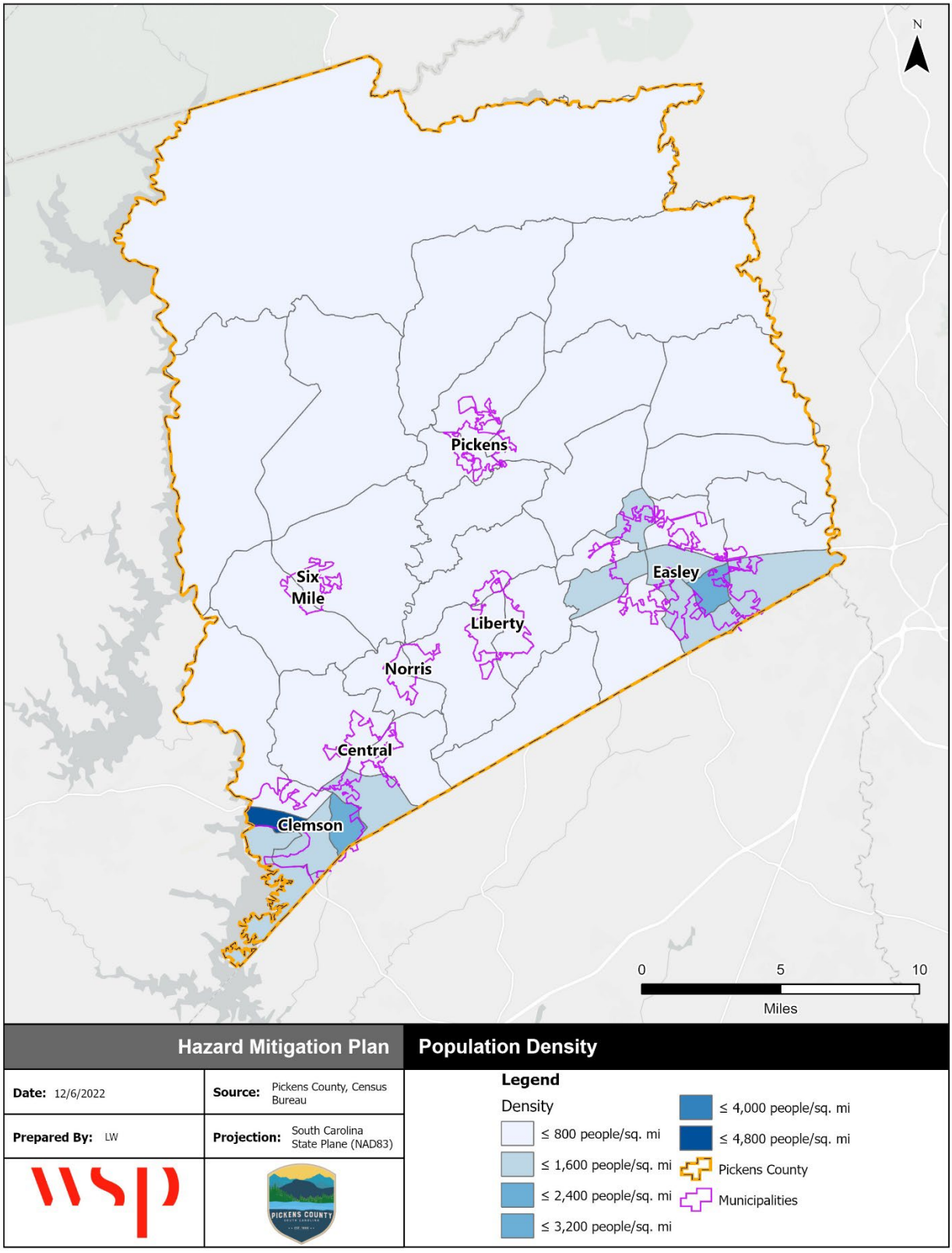
Source: U.S. Census Bureau, American Community Survey 2017-2021 5-Year Estimates

**Table 3.5 Demographics by Race and Sex**

| Pickens County | Population | % |
|---|---|---|
| *Total Population* | *129,617* | |
| **Sex** | | |
| Male | 64,979 | 50.1% |
| Female | 64,638 | 49.9% |
| **Race and Ethnicity** | | |
| White alone | 110,380 | 85.2% |
| Hispanic or Latino | 5,200 | 4.0% |
| Black or African American alone | 8140 | 6.3% |
| Asian alone | 2,293 | 1.8% |
| American Indian and Alaska Native alone | 159 | 0.1% |
| Native Hawaiian and Other Pacific Islander alone | 23 | 0.0% |
| Some other race alone | 109 | 0.1% |
| Two or more races | 3,313 | 2.6% |

Source: U.S. Census Bureau, American Community Survey 2017-2021 5-Year Estimates

**Figure 3.13 Population Density**




Source: U.S. Census Bureau, American Community Survey 2017-2021 5-Year Estimates

# 3.6 ECONOMY

Pickens County has a diverse portfolio of companies providing advanced manufacturing operations, metalworking, chemical and textile manufacturing, plastics and composites manufacturing, specialty devices, and software development. The jobs located in Pickens County are broadly distributed among several employment sectors. The largest sectors include educational services, manufacturing, and retail trade. Manufacturing is the primary growth industry in Easley, Liberty, and Pickens which combined have approximately 130 manufacturing plants. Clemson University is a major employer with over 3,500 faculty and staff.

Employment in the county is geographically distributed roughly in the same manner as population with concentration of the jobs in Clemson, Easley, and Pickens. A large portion of the population lives near the industrial park, County Commerce Park, which is 310-acres and located outside of Liberty and Easley. The industrial park is home to employers: Abbott, era-contract USA, IPSUM Technologies, JR Automation Technologies, KeyMark, Inc., Reliable Automatic Sprinkler Company, Safeplast USA, TaylorMade, and United Tool and Mold.

## *3.6.1 WAGES AND EMPLOYMENT*

The 2021 American Community Survey indicates that the median household income for Pickens County is $53,188 which is close to the state median household income, which is $58,234. At $100,735 the Town of Six Mile has a higher median household income than the other jurisdictions, while the City of Central has the lowest at $36,596. The per capita income for the County is $29,218, which is lower than the state statistic. Compared to the state (14.5%), a larger proportion of the population is living below the poverty level in the county (17.2%). The percentage of the population that lacks health insurance across the county is about 9.1% which almost the same as that of the state (10.5%). These patterns start to highlight some areas of social vulnerability of the county's population.

Table 3-6 shows economic statistics for each jurisdiction compared to the state average and Table 3-7 shows employment statistics for the county compared to the state average. Employment by industry statistics by participating jurisdictions can be found in each jurisdiction's annex.

**Table 3.6 Pickens County Economic Statistics, 2021**

| Economic Characteristics | Pickens County | South Carolina |
|---|---|---|
| Median Household Income | $53,188 | $58,234 |
| Per Capita Income | $29,218 | $32,823 |
| Unemployment Rate | 4.4% | 5.3% |
| % of Individuals Below Poverty Level | 17.2% | 14.5% |
| % Without Health Insurance | 9.1% | 10.5% |

Source: U.S. Census Bureau, American Community Survey 2017-2021 5-Year Estimates

**Table 3.7 Pickens County Employment by Industry, 2021**

| Industry | Pickens County | South Carolina |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 0.3% | 0.9% |
| Construction | 7.8% | 7.0% |
| Manufacturing | 14.5% | 13.5% |
| Wholesale trade | 2.3% | 2.3% |
| Retail trade | 11.0% | 11.5% |
| Transportation and warehousing, and utilities | 4.5% | 5.4% |
| Information | 0.8% | 1.5% |

| Industry | Pickens County | South Carolina |
|---|---|---|
| Finance and insurance, and real estate and rental and leasing | 3.9% | 5.9% |
| Professional, scientific, and management, and administrative and waste management services | 8.4% | 10.7% |
| Educational services, and healthcare and social assistance | 26.5% | 22.1% |
| Arts, entertainment, and recreation, and accommodation and food services | 10.9% | 9.8% |
| Other services, except public administration | 5.5% | 5.0% |
| Public administration | 3.5% | 4.5% |

Source: U.S. Census Bureau, American Community Survey 2017-2021 5-Year Estimates

The largest industry sector in the county in 2021 was "educational services, and healthcare and social assistance," comprising 26.5 percent of employment across the county. The "manufacturing" industry sectors provide the second largest amount of employment, comprising 11 percent. Other notable industry sectors include "arts, entertainment, and recreation, and accommodation and food services" (10.9%), and "Professional, scientific, and management, and administrative and waste management services" (8.4%).

Table 3-8 summarizes the top ten largest employers in Pickens County.

**Table 3.8 Major Employers**

| Company | # of Employees |
|---|---|
| Reliable Automatic Sprinkler Company, Inc. | 720 |
| Yokohama America, South Carolina | 470 |
| Abbott | 330 |
| Prisma | 300 |
| Danfoss | 260 |
| Milliken & Company | 258 |
| TaylorMade | 245 |
| Cornell Dubilier Marketing, Inc. | 220 |
| Wilbert Plastic Services | 215 |
| Southern Wesleyan University | 196 |
| Ortec, Inc. | 190 |

Source: Economic Development Alliance of Pickens County

## 3.7 HOUSING

Table 3-9 provides details on housing characteristics for the County. Counts by jurisdiction for these characteristics are in individual jurisdictional annexes. The American Community Survey estimates that there are 54,939 housing units in Pickens County, of which 88.4 percent are occupied. Renter-occupied units comprise 31.1 percent of the housing stock in Pickens County, which is close to the State value (29.7%), but significantly lower than the percentage of renter-occupied units in Central (82.2%) and Clemon (62.1%). With just over 22 percent of its occupied units belonging to renters, Norris and Six Mile have the lowest percentage of renter-occupied units of any jurisdiction in the county. However, both jurisdictions also have significantly less housing stock compared to the larger cities in Pickens County. A high percentage of renters is an indicator of higher pre- and post-disaster vulnerability as renters often do not have the financial resources of homeowners, are more transient, are less likely to have information about or access to recovery aid following a disaster and are more likely to require temporary shelter following a disaster (Cutter, et al. 2003). Higher rates of home ownership in the County and in some jurisdictions, such as Easley, Liberty, Norris, and Six Mile, where owner-occupied housing rates are above 60 percent, may indicate that more residents in these areas are able to implement certain types of mitigation

in their homes. The lowest percentage of owner-occupied housing is in Central (17.8%) and Clemson (37.9%).

Pickens County experienced a eight percent increase in housing units between 2010-2020, which very close to that of the state (8.6%). At $166,800, the median home value for Pickens County is higher than Central ($140,600), Liberty ($116,300), Norris ($102,700), Pickens ($145,200), but less than Clemson ($293,000), Easley ($182,100), Six Mile ($274,600), and the state value ($181,800). Of the County's owner-occupied housing units, 53.5 percent have a mortgage.

Detached single-family homes comprise over 62.4 percent of the total housing units in Pickens County. The next most common housing type is mobile homes, which consist of 18.4 percent of the total housing units. Multi-unit homes make up almost the same proportion of housing – 17.8 percent. This percentage consists of 2-unit properties, 3- or 4-unit properties, 5 to 9 unit properties, 10 to 19 unit properties, as well as properties with 20 or more units. Mobile home units can be more vulnerable to certain hazards, such as tornadoes and windstorms, especially if they are not properly secured with tie downs. Of the total occupied housing units in Pickens County, approximately 6.6 percent of householders have no vehicle available to them, which could cause difficulty in the event of an evacuation.

The majority of the County's housing stock, 59.7 percent, was built in the four decades between 1960 and 1999. Age can indicate the potential vulnerability of a structure to certain hazards. For example, Pickens County joined the National Flood Insurance Program in 1976. Therefore, based on housing age estimates, over 23 percent of housing in the County was built before any floodplain development restrictions were required.

**Table 3.9 Housing Counts and Characteristics, 2021**

| Housing Characteristics | Pickens County |
|---|---|
| Housing Units (2010) | 50,854 |
| Housing Units (2020) | 54,939 |
| Housing Units Percent Change (2010-2020) | 8.0% |
| Occupied Units, % (2021) | 88.4% |
| Owner-Occupied Units, % (2021) | 68.9% |
| Renter-Occupied Units, % (2021) | 31.1% |
| Median Home Value (2021) | $166,800 |
| Average Household Size | 2.49 |
| No Vehicle Available, % | 6.6% |
| % of Housing Units that are mobile homes | 18.4% |
| % Renter-Occupied Housing Units with Cost Burden* | 52.6% |

Source: U.S. Census Bureau 2010 Decennial Census, 2020 Decennial Census, American Community Survey 2017-2021 5-Year Estimates
*Cost burden is defined as spending 30 percent or more of household income on rent

In 2021, the median cost for rent in Pickens County was $842 compared the state median of $970. The majority (78%) of renters in the county paid between $500 and $1,500 a month. Over 52 percent of renters were paying 30 percent or more of their income on housing. The U.S. Department of Housing and Urban Development (HUD) defines those who pay more than 30 percent of their income for housing as cost burdened, indicating they may have difficulty affording necessities such as food, clothing, transportation, and medical care. This population could also be especially vulnerable when responding to a disaster.

## 3.8 SOCIAL VULNERABILITY

Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human caused threats, such

as toxic chemical spills. That is to say that even if different groups share similar exposure to a hazard, some groups may have a greater capacity to anticipate, cope, and recover from a disaster than others. Social vulnerability often refers to the population characteristics that have historically made certain groups of people more or less at risk when they are exposed to the impacts of a hazard event (Cutter, 2003; Berke et al., 2019). Common and determining characteristics include age, gender, income, race, and ethnicity, and language capacity (Cutter et al., 2003; Berke et al., 2015). However, additional characteristics can include social networks, education, cultural knowledge, and political power (Otto et al., 2017). Social vulnerability considerations were included in this plan update to identify areas across the County that might be more vulnerable to hazard impacts based on a number of factors.

The Center for Disease Control and Prevention (CDC) has developed a social vulnerability index (SVI) as a way to measure the resilience of communities when confronted by external stresses such as natural or human-caused disasters or disease outbreaks. The SVI is broken down to the census tract level and provides insight into particularly vulnerable populations to assist emergency planners and public health officials identify communities more likely to require additional support before, during, and after a hazardous event. The SVI indicates the relative vulnerability within census tracts based on 15 social factors: poverty, unemployment, income, education, age, disability, household composition, minority status, language, housing type, and transportation access. Higher social vulnerability is an indicator that a community may be limited in its ability to respond to and recover from hazard events. Therefore, using this SVI information can help the County and jurisdictions to prioritize pre-disaster aid, allocate emergency preparedness and response resources, and plan for the provision of recovery support.

Figure 3-9 displays social vulnerability information for Pickens County by census tract according to most recent data and analysis by the Centers for Disease Control and Prevention (CDC). Results are presented via a score that ranges from 0 (lowest vulnerability) to 1 (highest vulnerability). The SVI score for the entire county is 0.0667 which indicates a very low level of vulnerability. Within the county, the most vulnerable residents live in the southeastern part of the county, just outside of Easley and Central. There are areas of moderate vulnerability in the central portions of the County.

## NON-ENGLISH-SPEAKING POPULATION

Over four percent of the county population speaks a language other than English. Of that population, about 1.3% percent speak English “less than very well.” The most prominent language spoken other than English is Spanish, with 2.4 percent of the non-English speaking population speaking Spanish.

In its justification of SVI indicators, the CDC explains that disaster communication is made increasingly difficult for those with limited English proficiency. This difficulty is especially true in communities whose first language is neither English nor Spanish, and for whom translators and/or accurate translations of advisories may be scarce.

## SPECIAL NEEDS POPULATION

According to the American Community Survey, an estimated 19,474 residents, or 15.1 percent, of Pickens County’s population identify as having some form of disability including hearing, vision, cognitive, ambulatory, self-care, and/or independent living difficulties. Lack of public transportation options could pose significant issues for special needs population during an emergency or disaster.

## HOMELESS POPULATION

In 2018, for the first time, HUD’s Annual Homeless Assessment Report included the number of people experiencing homelessness who were sheltering in locations specifically for people displaced by presidentially declared natural disasters. The report found 3,864 displaced and homeless individuals. Additionally, the National Low Income Housing Coalition explains that people experiencing homelessness are particularly vulnerable during natural disasters and are often subject to discrimination during recovery. Resources are often prioritized for those displaced during disasters, despite the case that there is no

difference between those that were made homeless by a hazard event and those who otherwise lack stable housing.

The South Carolina Interagency Council on Homelessness (SCICH) is a statewide network of advocates, service providers and funders committed to ending homelessness. SCICH conducts a "Point in Time" (PIT) count every other year to estimate the number of homeless individuals across the State. SCICH has coordinated the statewide point in time count since 2005. This effort supports the requirements by the U.S. Department of Housing and Urban Development (HUD) for each state to collect and maintain data on their homeless populations.

As of 2022, the SCICH reports to HUD reported that South Carolina had an estimated 3,608 individuals experiencing homelessness on any given day. However, the Homeless Management Information System (HMIS), a statewide database used by homeless service providers to collect client level data on housing and services offered to people experiencing homelessness in South Carolina, found that over 13,300 households received homeless services. In 2021 around 68 percent of people seeking services were characterized as homeless as defined by HUD. Approximately 1 in 5 people receiving homeless servicers were children (under age 18) or youth (under age 24). There is one homeless shelter in the county, as well as an organization providing support to those experiencing homelessness.

## INMATES

The County Sheriff's office indicates that there are about 351 inmates in the Pickens County Jail System. This incarcerated population could require special planning during a hazard event depending on the location of jail facilities in the county. Additional planning for food, water, and health care may need to be considered.

## POVERTY

According to 2017-2021 American Community Survey estimates, 8.8 percent of the total Pickens population was below the poverty level. In its justification of SVI indicators, the CDC explains that economically disadvantaged populations are disproportionately affected by disasters. Low-income residents are less likely to have the income or assets necessary to prepare for a possible disaster or to recover after a disaster (Cutter et al. 2003). For low-income households, lost or damaged property is proportionately more expensive to replace, especially without homeowner's or renter's insurance. Similarly, for unemployed individuals may not have access to benefits plans that provide income and health cost assistance in the event of injury. Additionally, housing quality and access is closely tied to socio-economic status. Low-income households may live in less structurally sound houses or mobile homes, which are particularly vulnerable to strong storm or earthquakes.

Of the two census tracts in the county that are characterized as Highly Vulnerable (scores greater than 0.7501), an average of almost 26 percent of the population lives below the poverty line.

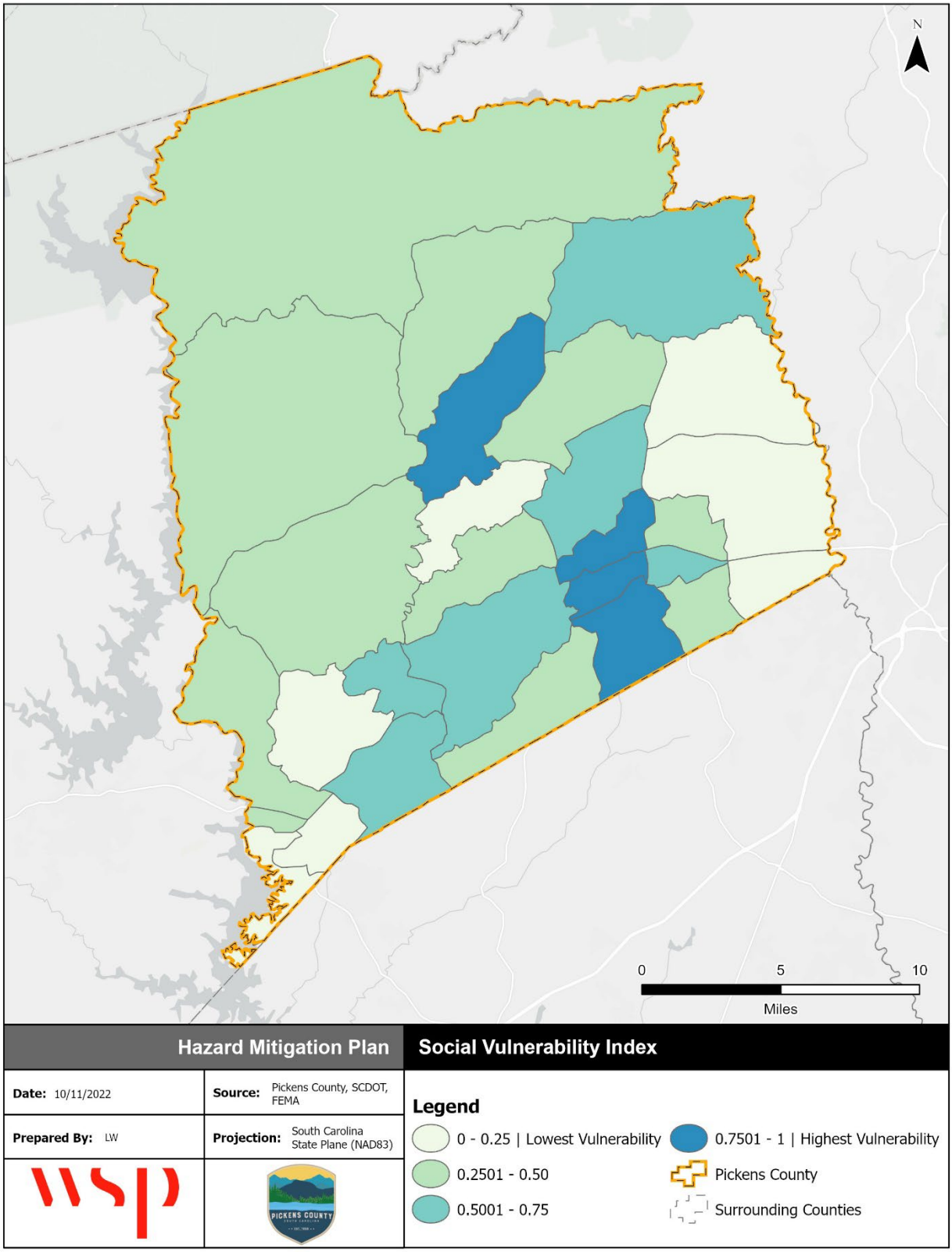
## MINORITY STATUS

Of the two census tracts in the county that are characterized as Highly Vulnerable, an average of 21.7% of the population is people of color. The CDC indicates that, "social and economic marginalization of certain racial and ethnic groups, including real estate discrimination, has rendered minority populations more vulnerable at all stages of disaster and hazard events." Similarly, the Urban Sustainability Network explains that, in the U.S., race is a major determinant of life outcomes. Like housing, it is inextricably tied to income and wealth. Further, race is a reliable predictor of hazard risk, including vulnerability to many of the hazards projected to intensify under changing climate conditions.

Historical and current discriminatory practices have resulted in the inequitable distribution of resources and access to opportunities for many lower-income populations and communities of color. The result is that social inequities can increase disproportionate risk and vulnerability in these communities.

It should be noted that 2.2 percent of the County's population includes Non-U.S. citizens, however, this number is likely under-reported. Immigrants and undocumented residents often face increased vulnerability during and after hazard events. Challenges include limited language proficiency; limited knowledge of local environmental conditions, including natural hazards, legal framework and institutions, and markets; limited social networks; lack of trust in authorities; restrictions on mobility; and discrimination. All of these challenges can make it difficult for immigrant communities to access necessary information, resources, and opportunities to prepare, cope with, and recover from hazard events.

**Figure 3.14 Social Vulnerability Index by Census Tract, 2018**




Source: Centers for Disease Control and Prevention (CDC)

# 3.9 LAND USE

Land use data was obtained from the County and 2022 One Pickens County Comprehensive Plan. The intent of the Comprehensive Plan is to serve as a planning document that guides the growth and development decisions of Pickens County. The Comprehensive Plan serves as a countywide implementation guide to promote local goals related to economic development, land use, transportation, housing, and cultural and natural resources. The description of the land use element in the plan states that "The Land Use element should be used with the Future Development map as the primary tools when making land development decisions. Ideally, new land uses should be consistent with those uses encouraged and supported by the Comprehensive Plan."

The plan used tax assessor data to establish a current land use map. The plan does indicate that a large portion of Pickens County is exempt from the tax assessment there is a significant amount of public land (Table Rock State Park in the north of the County, the Clemson Experimental Forest in the southwest, etc) or the land is within an incorporated municipality. Of the assessed land, the majority of the land use is dedicated to residential development, and a substantial portion is vacant lands. Commercial, Agricultural, and joint Residential/Commercial properties take up small portion of the county's land area, as much of the County's commercial land is concentrated in the seven municipalities. A summary of acreage is shown in the table below.

**Table 3.10 Existing Land Use Distribution**

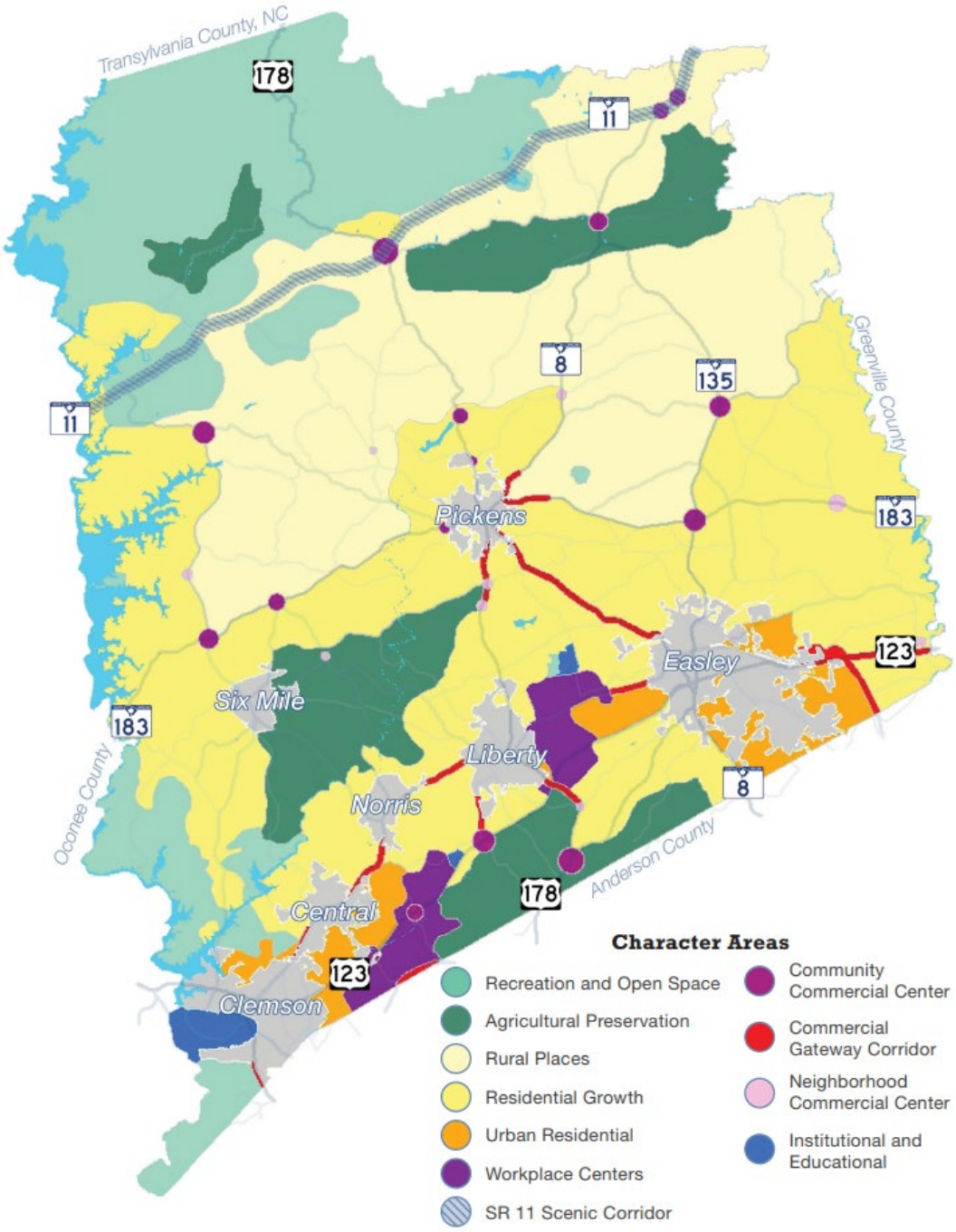
| Use | Total Acreage | Total Parcels | % of Total Acreage |
|---|---|---|---|
| Agriculture | 865 | 43 | <1% |
| Commercial | 1,976 | 37 | 1% |
| Residential (including Mobile Home) | 99,781 | 3,880 | 31% |
| Residential/Commercial | 2,163 | 55 | 1% |
| Vacant | 63,897 | 3041 | 20% |
| Municipalities | 22,085 | 7 | 7% |
| All Others (generally exempt) | 127,682 | N/A | 40% |

Source: Pickens County Tax Assessors Data, One Pickens County Comprehensive Plan, 2022

The plan provides character areas that lay out a vision and goals for the County in terms of future development and how various areas of the County should look, feel and operate in the future. The comprehensive plan includes a character area map that outlines types of uses and building and developing forms that should be encouraged in different areas throughout the County. This map has been updated form the one developed in the previous plan. A map of the areas is shown in Figure 3.15 below. There are 11 character areas which are as follows:

- Recreation and Open Space
- Agricultural Preservation
- Rural Places
- Residential Growth
- Urban Residential
- Neighborhood Commercial Center
- Community Commercial Center
- Commercial Gateway Corridor
- Workplace Centers
- Institutional and Educational
- SC 11 Scenic Corridor

**Figure 3.15 Pickens County Future Land Use Character Area Map**

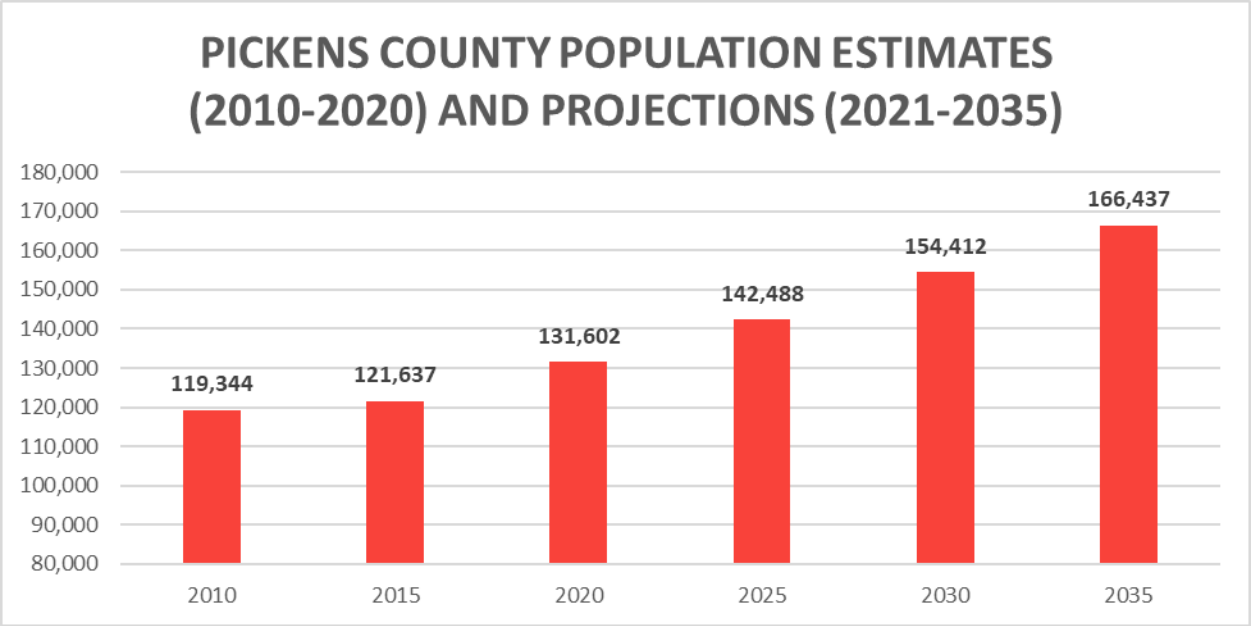



Source: One Pickens County Comprehensive Plan, 2022

## 3.10 GROWTH AND DEVELOPMENT TRENDS

According to the South Carolina Revenue and Fiscal Affairs Office (RFA), Pickens County is projected to reach a population of 166,437 by 2035, which represents a 26 percent increase from the 2020 population estimate. The comprehensive plan estimates that growth will be focused around Lake Hartwell and Lake Keowee as second homes and retirement communities continue to be in demand.

**Figure 3.16 Population Projections for Pickens County**




Source: South Carolina Revenue and Fiscal Affairs Office, Population Projections 2010-2035, revised September 2021 (https://rfa.sc.gov/data-research/population-demographics/census-state-data-center/population-data/population-projections-2000-2035-rev2019)

# 4 HAZARD IDENTIFICATION

**44 CFR §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.

This section documents the Hazard Identification process for the development of the Pickens County Multi-Jurisdictional Hazard Mitigation Plan. It contains the following subsections:

- 4.1 Overview
- 4.2 Hazard Identification
- 4.3 Past Occurrences and Disaster Declarations
- 4.4 Hazard Evaluation
- 4.5 Hazard Identification Results

## 4.1 OVERVIEW

Pickens County is vulnerable to a wide range of natural and human-caused hazards. FEMA regulations and guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards, but evaluation of human-caused hazards is not required for plan approval. However, Pickens County has included an assessment of both types of hazards in this plan in order to comprehensively evaluate risk and mitigation opportunities.

The hazard identification process was as follows:

1. The HMPC created a list of the full range of hazards to be considered for inclusion in this plan update, detailed in Section 4.2.
2. Past hazard occurrences and disaster declarations in the planning area were reviewed, as detailed in Section 4.3.
3. Based on preliminary information including past occurrences, disaster declarations, information from the previous plan, and other data, each hazard was reviewed to determine whether it was significant to the planning area and warranted further assessment, as summarized in Section 4.4.
4. The HMPC produced the final list of hazards to be included in this plan update, provided in Section 4.5.

## 4.2 FULL RANGE OF HAZARDS CONSIDERED

To identify hazards relevant to the planning area, the HMPC began with a review of the list of hazards identified in the 2018 South Carolina Hazard Mitigation Plan and the 2018 Pickens County Hazard Mitigation Plan as summarized in Table 4-1. The HMPC used these lists to identify a full range of hazards for potential inclusion in this plan update and to ensure consistency across these planning efforts. All hazards on the below list were evaluated for inclusion in this plan update. Not all hazards included in the 2018 plan were carried forward for inclusion in this plan update.

**Table 4.1 Full Range of Hazards Evaluated**

| Hazard | Included in 2018 South Carolina Hazard Mitigation Plan? | Included in 2018 Pickens County HMP? |
|---|---|---|
| Coastal Hazards (Storm Surge, Coastal Flooding) | Yes | No |
| Dam & Levee Failure | No | Yes |
| Drought | Yes | Yes |
| Earthquake | Yes | Yes |
| Extreme Heat | No | No |
| Flooding | Yes | Yes |
| Geologic Hazards (Sinkhole, Landslide) | Yes (profiled separately) | No |
| Hail | Yes | Yes (with Severe Storm) |
| Hurricane and Tropical Storm | Yes | Yes |
| Sea Level Rise | Yes | No |
| Severe Thunderstorm & Lightning | Yes | Yes (profiled separately) |
| Temperature Extremes | No | Yes |
| Tornado/Windstorm | Yes | Yes |
| Tsunami | Yes | No |
| Wildfire | Yes | Yes |
| Winter Storms | Yes | Yes |
| Civil Disturbance/Crime | No | Yes |
| Cyberterrorism | No | No |
| Disruption of Transportation Systems | No | Yes |
| Disruption of Utility Services | No | Yes |
| Economic Crisis | No | Yes |
| Hazardous Materials | Yes | Yes |
| Nuclear Power Plant Incident | Yes | Yes |
| Public Health & infectious Disease | Yes | Yes |
| Terrorism | Yes | Yes |
| Urban Fire | No | Yes |

## 4.3 PAST OCCURRENCES AND DISASTER DECLARATIONS

The HMPC evaluated the above list of hazards using existing hazard data, past disaster declarations, local knowledge, and information from the 2018 State Plan and the 2018 Pickens 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 key resource in this effort was the National Oceanic and Atmospheric Administration's National Center for Environmental Information (NCEI), which has been tracking tornado events since 1950, thunderstorm wind and hail since 1955, and other types of weather events since 1996. NCEI's Storm Events Database contains an archive by county of destructive storm or weather data and information which includes local, intense and damaging events. It should be noted that NCEI is not a complete record of all past weather events because it relies on local reporting of weather and storm events. NCEI receives storm data from the National Weather Service (NWS), which compiles their information from a variety of sources, including

but 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. Reports can include multiple events within one episode. The NCEI database contains 756 records of storm events that occurred in Pickens County from 1960 through 2022. Table 4-2 summarizes these events.

**Table 4.2 NCEI Severe Weather Data for Pickens County, 1960-2022**

| Type | # of Events | Property Damage | Crop Damage | Deaths | Injuries |
|---|---|---|---|---|---|
| Cold/Wind Chill | 14 | $0 | $100,000,000 | 0 | 0 |
| Drought | 73 | $0 | $0 | 0 | 0 |
| Extreme Cold/Wind Chill | 2 | $0 | | 0 | 0 |
| Flash Flood | 28 | $2,561,000 | $0 | 2 | 3 |
| Flood | 15 | $2,050,500 | $5,000,000 | 0 | 0 |
| Frost/Freeze | 3 | $0 | $7,000,000 | 0 | 0 |
| Hail | 157 | $650,000 | $0 | 0 | 0 |
| Heat | 2 | $0 | $0 | 1 | 0 |
| Heavy Rain | 8 | $11,000 | $10 | 0 | 0 |
| Heavy Snow | 30 | $0 | $0 | 0 | 0 |
| High Wind | 42 | $598,380 | $0 | 0 | 0 |
| Ice Storm | 12 | $13,230,000 | $0 | 0 | 1 |
| Lightning | 6 | $61,000 | $0 | 0 | 1 |
| Sleet | 6 | $0 | $0 | 0 | 0 |
| Strong Wind | 5 | $5,000 | $0 | 0 | 0 |
| Thunderstorm Wind | 292 | $715,000 | $0 | 2 | 5 |
| Tornado | 32 | $7,312,530 | $0 | 0 | 28 |
| Tropical Storm | 2 | $400,000 | $0 | 0 | 0 |
| Winter Storm | 26 | $20,000 | $0 | 0 | 0 |
| Wildfire | 1 | $0 | $0 | 0 | 0 |
| **Total:** | **756** | **$27,614,410** | **$112,000,000** | **5** | **45** |

Source: National Center for Environmental Information Events Database, retrieved November 2022,
Note: Losses reflect totals for all impacted areas for each event.

Note that the NCEI period of record varies by hazard. For the more in-depth evaluation of historical occurrences in each hazard profile, the full period of record available in NCEI was used.

The HMPC also researched past events that resulted in a federal and/or state emergency or disaster declaration for Pickens 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, Pickens County has been designated in six major disaster declarations, as detailed in Table 4-3, and ten emergency declarations, as detailed in Table 4-4.

**Table 4.3 FEMA Major Disaster Declarations, Pickens County**

| Disaster # | Dec. Date | Incident Type | Event Title | Individual Assistance Applications Approved | Total Individual and Households Program Dollars Approved | Total Public Assistance Grant Dollars Obligated |
|---|---|---|---|---|---|---|
| 4542 | 5/1/2020 | Severe Storms | Severe Storms, Tornadoes, And Straight-Line Winds | 1,089 | $5,569,334.41 | $15,387,550.14 |
| 4492 | 3/27/2020 | Biological | COVID-19 Pandemic | 9,643 | $64,938,288.51 | $471,868,230.34 |
| 4479 | 3/17/2020 | Severe Storms | Severe Storms, Tornadoes, Straight-Line Winds, And Flooding | -- | -- | $8,313,296.39 |
| 4346 | 10/16/2017 | Hurricane | Hurricane Irma | -- | -- | $33,283,932.18 |
| 1625 | 1/20/2006 | Severe Ice Storm | Severe Ice Storm | -- | -- | $11,286,153.18 |
| 1566 | 10/7/2004 | Hurricane | Tropical Storm Frances | 43,99 | $7,240,598.76 | -- |

Source: FEMA Disaster Declarations Summary, October 10, 2022
Note: Number of applications approved, and all dollar values represent totals for all counties in the state included in the disaster declaration.

**Table 4.4 FEMA Emergency Declarations, Pickens County**

| Disaster # | Dec. Date | Incident Type | Event Title/Description |
|---|---|---|---|
| 3470 | 3/13/2020 | Biological | COVID-19 |
| 3421 | 9/1/2019 | Hurricane | Hurricane Dorian |
| 3400 | 9/10/2018 | Hurricane | Hurricane Florence |
| 3386 | 9/7/2017 | Hurricane | Hurricane Irma |
| 3378 | 10/6/2016 | Hurricane | Hurricane Matthew |
| 3369 | 2/12/2014 | Severe Ice Storm | Severe Winter Storm |
| 3373 | 10/3/2015 | Severe Storms | Severe Storms and Flooding |
| 3233 | 9/10/2005 | Hurricane | Hurricane Katrina |
| 3047 | 8/4/1977 | Drought | Drought |
| 3585 | 9/29/2022 | Hurricane | Hurricane Ian |

Source: FEMA Disaster Declarations Summary, October 28, 2022

## 4.4 HAZARD EVALUATION

Using the above information and additional discussion, the HMPC evaluated each hazard's significance to the planning area to decide which hazards to include in this plan update. Table 4-5 summarizes how and why the determination for each hazard was made.

**Table 4.5 Hazard Evaluation**

| Hazard | Included in this Plan Update? | How Was Determination Made? | Why Was Determination Made? |
|---|---|---|---|
| **Natural Hazards** | | | |
| Coastal Hazards (Storm Surge, Coastal Flooding, and Sea Level Rise) | No | - Review of 2018 Pickens County HMP<br>- Review of FEMA Flood Insurance Study (FIS) | - Not included in the 2018 Pickens County HMP<br>- Coastal hazards would not impact the planning area due to its inland location. |
| Dam/Levee Failure | Yes | - Review of 2018 Pickens County HMP<br>- Review of South Carolina Dam Safety Program data | - Included in the 2018 Pickens County HMP<br>- There are 70 dams between the National Inventory of Dams and South Carolina Dam Safety inventory, including 37 high hazard dams. |
| Drought | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP<br>- Review of U.S. Drought Monitor data | - Included in the 2018 Pickens County HMP<br>- The U.S. Drought Monitor recorded extreme to exceptional drought conditions in 10 of the last 20 years in Pickens County. |
| Earthquake | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP<br>- Review of USGS seismic hazard maps | - Included in the 2018 Pickens County HMP<br>- Earthquakes have occurred in and around South Carolina. The state is affected by the Charleston seismic zone.<br>- According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 2% probability of exceedance in 50 years for Pickens County is approximately 20 to 30%g; FEMA recommends that earthquakes be evaluated for mitigation in areas with a PGA of 3%g or more. |
| Flooding | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP<br>- Review of NCEI data and disaster declarations | - Included in the 2018 Pickens County HMP<br>- NCEI records indicate that Pickens County has experienced 28 flash flood events and 8 heavy rain events in the 24 years from 1996-2020. The planning area has also received 4 disaster declarations for flood-related events. |
| Geologic Hazards (Sinkholes, Landslides, & Mass Wasting) | No | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Not included in the 2018 Pickens County HMP<br>- 2018 State plan found low incident rates in Pickens County |
| Hurricane & Tropical Storm | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- The planning area received a disaster declaration for Hurricane Irma. |

| Hazard | Included in this Plan Update? | How Was Determination Made? | Why Was Determination Made? |
|---|---|---|---|
| Severe Storm (including Thunderstorm Wind, Hail & Lightning) | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP<br>- Review of NCEI data and disaster declarations | - Included in the 2018 Pickens County HMP<br>- NCEI records indicate that Pickens County has experienced 51 damaging lightning, hail, and thunderstorm wind events in the 22-year period from 2000-2022.<br>- Thunderstorm Wind, Hail, and Lightning were consolidated for this plan update, as they are typically generated from the same storm systems. |
| Temperature Extremes | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- Pickens averages 41 days per year with temperatures exceeding 90 degrees Fahrenheit |
| Tornado | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- NCEI records indicate that Pickens County has experienced 32 tornados causing over $7 million in property damages.<br>- Tornado was isolated from thunderstorm wind for this plan update to align with the State HMP and because tornado impacts can be much more severe. |
| Tsunami | No | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Not included in 2018 Pickens County HMP<br>- Coastal hazards would not impact the planning area due to its inland location. |
| Wildfire | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP<br>- Review of Southern Wildfire Risk Assessment (SouthWRAP) data | - Included in the 2018 Pickens County HMP<br>- SouthWRAP data indicates some areas of moderate to high (index of -5 to -9) Wildland Urban Interface Risk Index |
| Winter/Ice Storm | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP<br>- Review of NCEI data | - Included in the 2018 Pickens County HMP<br>- NCEI records indicate that Pickens County has experienced 93 winter weather events causing over $13 million in property damage and over $100 million in crop damage. |
| **Technological and Human-Caused Hazards** | | | |
| Civil Disturbance/ Crime | No | - Review of 2018 Pickens County HMP | - Included in 2018 Pickens County HMP and not rated as a significant risk hazard |
| Cyber Security Threat | Yes | - Review of 2018 Pickens County HMP<br>- Review of Verizon Data Breach Investigations Report | - Included in 2018 Pickens County HMP under terrorism<br>- Identified as an emerging threat to government entities<br>- 2,792 incidents have occurred in the public administration sector in 2022 |

| Hazard | Included in this Plan Update? | How Was Determination Made? | Why Was Determination Made? |
|---|---|---|---|
| Disruption of Transportation Systems | No | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in 2018 Pickens County HMP and not rated as a significant risk hazard |
| Disruption of Utility Services | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in 2018 Pickens County HMP and identified as likely hazard to occur in the future |
| Economic Crisis | No | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in 2018 Pickens County HMP and not rated as a significant risk hazard |
| Hazardous Materials | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- There are 152 Tier II facilities located in Pickens County |
| Radiological Incident | Yes | - Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- The Oconee Nuclear Station is located within 10 miles of southwestern Pickens County.<br>- An incident is unlikely but could have major impacts. |
| Public Health Threat | Yes | - Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- The planning area received a disaster declaration for the COVID-19 pandemic. |
| Terrorism | No | - Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- Certain types of attacks are not high risk for Pickens. Cyberattack address in this plan |
| Urban Fire | Yes | - Review of SC State HMP<br>- Review of 2018 Pickens County HMP | - Included in the 2018 Pickens County HMP<br>- Fire Safe SC identifies high risk areas in Pickens County |

## 4.5 HAZARD IDENTIFICATION RESULTS

Below is the final list of hazards selected by the HMPC for inclusion in this plan:

**Natural Hazards**

- Dam/Levee Failure
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hurricane & Tropical Storm
- Severe Storm
- Tornado
- Wildfire
- Winter/Ice Storm

**Technological/Human-Caused Hazards**

- Cyber Security Threat
- Disruption of Utility Services
- Hazardous Materials
- Public Health Threat
- Radiological Incident
- Urban Fire

# 5 HAZARD RISK & VULNERABILITY ASSESSMENT

**44 CFR §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 §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.

This section describes and documents how Pickens County met Step 4: Assess the Hazard, and Step 5: Assess the Problem from the 10-step planning process. It includes detailed hazard profiles with risk and vulnerability assessment data for each of the hazards identified in Section 4. It contains the following subsections:

**Overview**
- 5.1 Overview
- 5.2 Methodology
- 5.3 Asset Inventory

**Natural Hazards**
- 5.4 Dam/Levee Failure
- 5.5 Drought
- 5.6 Earthquake
- 5.7 Extreme Heat
- 5.8 Flood
- 5.9 Hurricane & Tropical Storm
- 5.10 Severe Storm
- 5.11 Tornado/Windstorm
- 5.12 Wildfire
- 5.13 Winter/Ice Storm

**Technological/Human-Caused Hazards**
- 5.14 Cyber Security Threat
- 5.15 Disruption of Utility Systems
- 5.16 Hazardous Materials Incident
- 5.18 Public Health Threat
- 5.19 Radiological Incident
- 5. 20 Urban Fire

**Conclusions**
- 5.21 Conclusions on Hazard Risk & Vulnerability

## 5.1 OVERVIEW

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. "It 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 section presents detailed hazard profiles for each of the hazards identified in Section 4 as significant enough to warrant further evaluation. Each hazard profile includes a general description of the hazard, its location, extent, past occurrences, and the probability of future occurrences as well as a detailed vulnerability assessment identifying the assets at risk and potential loss estimates. Each profile also includes specific items noted by

members of the HMPC as they relate to unique historical or anecdotal hazard information for the planning area.

The hazard risk assessment includes all of Pickens County and its incorporated municipalities, City of Clemson, City of Easley, City of Liberty, City of Pickens, Town of Central, Town of Norris, and Sown of Six Mile.

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, infrastructure, and other assets to these hazards. The process allows for a better understanding of the potential risks natural hazards pose 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:




## 5.2 METHODOLOGY

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 where it may occur, the severity of potential events, records of past events, the probability of future occurrences, and potential impacts from the hazard. A vulnerability assessment was conducted for each hazard using quantitative and/or qualitative methods depending on the available data, to determine its potential to cause significant losses to life or property. 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 duration and speed of onset or warning time, as well as any secondary effects followed by details specific to the planning area.

### LOCATION

This section includes information on the hazard's physical extent, describing where the hazard can occur, with mapped boundaries where applicable.

### EXTENT

This section includes information on the hazard extent in terms of its potential magnitude 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.

### HISTORICAL OCCURRENCES

This section contains information on historical events, including the location and consequences of past events on record within or near the 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 20-year period equates to a 50 percent chance of experiencing a severe winter storm in any given year). Unless otherwise noted in the hazard profile, a

20-year period of record is used for determining probability in order to provide a uniform definition of probability and to reflect current conditions, including recent trends driven by climate change. Longer timeframes are used for hazards with significantly longer average recurrence intervals, such as earthquake, or where data limitations otherwise restrict the period of record.

The likelihood of future occurrences is categorized into one of the classifications as follows:

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

## CLIMATE CHANGE

For profiles of natural hazards, this section provides a summary of how climate change may be expected to alter the hazard based on current available research. This section also addresses potential for other future conditions, such as changes in population and development, to affect the hazard.

### *REGIONAL CLIMATE CHANGE PROJECTIONS*

Climate change refers to long-term shifts in temperature and weather patterns. Climate change can be due to natural internal processes or external forces such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC, 2014). However, the recent and rapid warming of the earth that has been observed over the past century has been cause for concern, as this warming is due to the accumulation of human-caused greenhouse gases, such as $CO_2$, in the atmosphere (IPCC, 2007). Global average temperature is estimated to have increased by about 1 degree Celsius since the pre-industrial period, and it is currently increasing by about 0.2 degrees Celsius per decade. This global increase in temperatures is having broad range of effects on global, regional and local climates.

Since 1901, the average surface temperature across the contiguous 48 states has risen at an average rate of 0.17°F per decade. Average temperatures have risen more quickly since the late 1970s (0.32 to 0.55°F per decade since 1979). Nine of the top 10 warmest years on record for the contiguous 48 states have occurred since 1998, and six of the warmest years on record have all occurred since 2012. As of January 2022, the average contiguous U.S. temperature was 54.5°F, 2.5 degrees above the 20th-century average and 2021 ranked as the fourth-warmest year in the 127-year period of record. (NOAA NCEI, 2022).

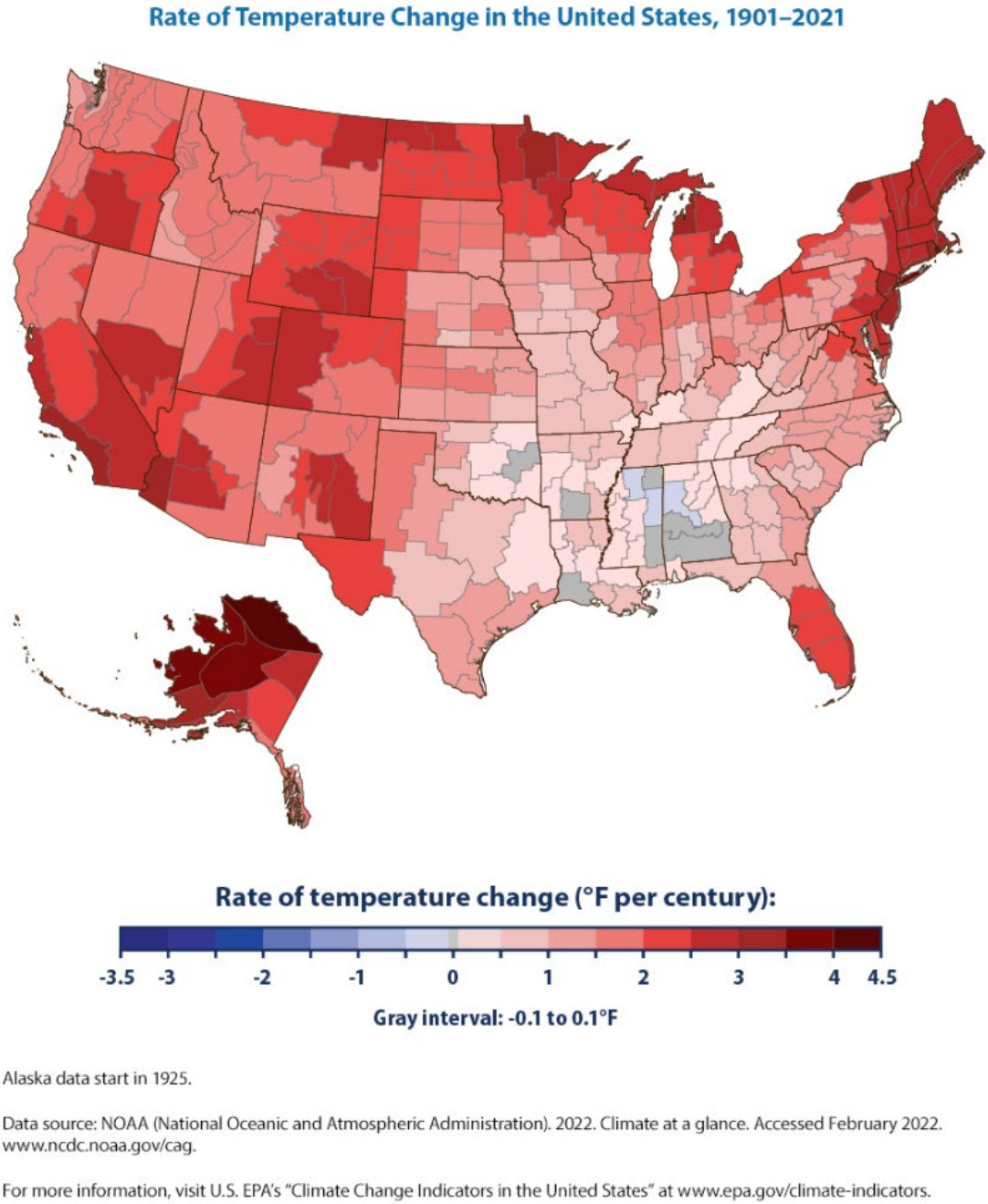
According to the Fourth National Climate Assessment, the Southeast region experienced high annual average temperatures in the 1920s and 1930s, followed by cooler temperatures until the 1970s. Since then, annual average temperatures have warmed to levels above the 1930s. The decade of the 2010s through 2017 has been warmer in the Southeast than any previous decade both for average daily maximum and average daily minimum temperature.

Figure 5-1, based on data from NOAA and prepared by the EPA, shows how annual average air temperatures have changed in different parts of the United States since 1901.

According to the IPCC, the extent of climate change effects on individual regions will vary over time and with the ability of different societal and environmental systems to mitigate or adapt to change. The Fourth National Climate Assessment explains that “throughout the southeastern United States, the impacts of sea level rise, increasing temperatures, extreme heat events, heavy precipitation, and decreased water availability continue to have numerous consequences for human health, the built environment, and the natural world.” It can reasonably be assumed that the following climate risks could impact Pickens County

planning area: 1) increasing temperatures; 2) increasing frequency and strength of severe weather events; 3) more heavy rain/flooding; and 4) more frequent and prolonged drought. A discussion of the effect of these climate risks on the individual hazards profiled in this plan has been included in the Probability of Future Occurrence section for each hazard as applicable.

**Figure 5.1 Rate of Temperature Change, 1901 - 2021**




Source: NOAA, Climate at a Glance, 2022, https://www.ncdc.noaa.gov/cag

## CONSEQUENCE ANALYSIS

This section discusses how the hazard may impact people, first responders, continuity of operations, the built environment, the natural environment, the local economy, and public confidence in local governance.

## VULNERABILITY ASSESSMENT

The Disaster Mitigation Act regulations require that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies Pickens County vulnerability to each hazard. People, properties and critical facilities, and environmental assets that are vulnerable to the hazard are identified.

The vulnerability assessments followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (August 2001). The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard. Data used to support this assessment included the following:

- Geographic Information System (GIS) datasets, including Pickens County parcel data and building point data from 2022, topography, transportation layers, and critical facility and infrastructure locations;
- Hazard layer GIS datasets from state and federal agencies indicating risk and/or past occurrences;
- Written descriptions of inventory and risks provided by the 2018 South Carolina Hazard Mitigation Strategy;
- Written descriptions of inventory and risks provided by the 2018 Pickens County Hazard Mitigation Plan; and
- Exposure and vulnerability estimates derived using local parcel data.

Two distinct risk assessment methodologies were used in the formation of this vulnerability assessment. The first consists of a ***quantitative*** analysis that relies upon best available data and technology, while the second approach consists of a somewhat ***qualitative*** analysis that relies on local knowledge and rational decision making. The quantitative analysis involved the use of the most recent version of Hazards U.S. Multi-Hazard (Hazus) software, a nationally applicable standardized set of models available from FEMA for estimating potential losses from earthquakes, floods, and hurricanes.

Hazus uses a statistical approach and mathematical modeling of risk to predict a hazard's frequency of occurrence and estimated impacts based on recorded or historic damage information. The Hazus risk assessment methodology is parametric, in that distinct hazard and inventory parameters—such as wind speed and building type—were modeled using the Hazus software to determine the impact on the built environment.

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. Exposure of other valued assets in the hazard area, such as the location of critical facilities and infrastructure, historic resources, and valued natural resources (e.g., an identified wetland or endangered species habitat), can also be estimated. Together, this information conveys the vulnerability of that area to that hazard. Pickens County's GIS-based risk assessment was completed using data collected from local, regional and national sources.

## CHANGES IN DEVELOPMENT

This section describes how changes in development have impacted vulnerability since the last plan was adopted. 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.

## KEY ISSUES

This section summarizes key mitigation planning concerns related to this hazard. Where possible, problem statements are provided at a jurisdictional level.

### 5.2.1 PRIORITY RISK INDEX

The conclusions drawn from the hazard profiling and vulnerability assessment process are used to prioritize all potential hazards to the Pickens County planning area.

The findings from the above sections of the hazard profiles are summarized using the Priority Risk Index (PRI) to score and rank each hazard's significance to the planning area. The PRI 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 in five categories (probability, impact, spatial extent, warning time, and duration). Each degree of risk is assigned a value (1 to 4) and a weighting factor as summarized in Table 5-1.

**Table 5.1 Priority Risk Index**

| 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** | |

The sum of all five risk assessment categories equals the final PRI value, demonstrated in the equation below (the lowest possible PRI value is a 1.0 and 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 Pickens County planning area as high, moderate, or low risk. This process and these criteria allowed the HMPC to focus on the hazards of greatest significance and to prioritize mitigation actions appropriately, allowing Pickens County to focus resources where they are most needed

PRI ratings are provided by category throughout each hazard profile for the planning area as a whole. Ratings specific to each jurisdiction are provided at the end of each hazard profile. The results of the risk assessment and overall PRI scoring are provided in Section 5.19 Conclusions on Hazard Risk.

### 5.2.2 EXPLANATION OF DATA SOURCES

The data collected for the hazard profiles and vulnerability assessment was obtained from multiple sources covering a variety of spatial areas including county- and jurisdictional-level information. Table 5-2 summarizes the primary data sources and risk assessment methodology for each of the profiled hazards.

**Table 5.2 Summary of Hazard Data Sources and Geographic Coverage**

| Hazard | Hazard Data Sources | Vulnerability Methodology |
|---|---|---|
| Dam/Levee Failure | SCDHEC, NID, FEMA, USACE | GIS Spatial Analysis |
| Drought | USDM, NDMC, USGS | Qualitative Analysis |
| Earthquake | USGS, NCEI, FEMA | Hazus v5 |
| Extreme Heat | NWS, NOAA | Qualitative Analysis |
| Flood | NCEI, FEMA | Hazus v5 |
| Hurricane & Tropical Storm | NHC, NOAA, NCEI | Hazus v5 |
| Severe Storm (Thunderstorm Wind, Hail & Lightning) | NWS, NOAA, NCEI | Qualitative Analysis |
| Tornado | NWS, NCEI | Qualitative Analysis |
| Wildfire | SouthWRAP | GIS Spatial Analysis |
| Winter/Ice Storm | NWS, NCEI | Qualitative Analysis |
| Cyber Security Threat | Internet Research | Qualitative Analysis |
| Disruption of Utility Systems | NCEI, Internet Research | Qualitative Analysis |
| Hazardous Materials Incident | EPA, USDOT | GIS Spatial Analysis |
| Public Health Threat | CDC, WHO | Qualitative Analysis |
| Radiological Event | USNRC | Qualitative Analysis |
| Urban Fire | NFPA, FSSC, SCFD, USFA | Qualitative Analysis |

CDC = Centers for Disease Control and Prevention; EPA = United States Environmental Protection Agency; FEMA = Federal Emergency Management Agency; FSCSC = Fire Safe South Carolina; NCEI = National Centers for Environmental Information; NDMC = National Drought Mitigation Center; NFPA = National Fire Protection Administration; NHC = National Hurricane Center; NID = National Inventory of Dams; NOAA = National Oceanic and Atmospheric Administration; NWS = National Weather Service; SCDHEC = South Carolina Department of Health and Environmental Control, SCFD = South Carolina Fire Department; SouthWRAP = Southern Group of State Foresters, Wildfire Risk Assessment Portal; USACE = United States Army Corps of Engineers; USDM = United States Drought Monitor; USDOT = United States Department of Transportation; USFA = US Fire Association; USGS = United States Geological Survey; USNRC = United States Nuclear Regulatory Commission; WHO = World Health Organization

# 5.3 ASSET INVENTORY

An inventory of assets was compiled to identify the total count and value of property exposure in Pickens County. This asset inventory serves as the basis for evaluating exposure and vulnerability by hazard. Assets identified for analysis include buildings, critical facilities, and critical infrastructure. Building exposure was estimated by summarizing building point data and tax parcel data provided by Pickens County. Critical facilities were provided by Pickens County GIS and were compiled alongside facilities identified by the individual municipalities.

For all non-spatially defined hazards, this full asset inventory represents the extent of property exposed to risk. For spatially defined hazards, property exposure is detailed in the hazard profile.

## *5.3.1 BUILDING EXPOSURE*

Table 5-3 provides building exposure by jurisdiction according to 2022 building points and tax parcel data provided by Pickens County. All occupancy types were summarized into the following categories: Agriculture, Commercial, Education, Government, Industrial, Religious, and Residential. Where occupancy was not provided, residential occupancy was assumed.

Content value estimations were based on the FEMA Hazus methodology of estimating value as a percent of improved structure values by property type. The residential property type assumes a content replacement value equal to 50% of the building value. Agricultural, commercial, education, government, and religious property types assume a content replacement value equal to 100% of the building value. The industrial property type assumes a content replacement value equal to 150% of the building value.

**Table 5.3 Pickens County Building Exposure by Jurisdiction and Occupancy**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| **Town of Central** | **1,315** | **$702,541,463** | **$369,449,638** | **$1,071,991,101** |
| Agriculture | 1 | $1,000 | $1,000 | $2,000 |
| Commercial | 70 | $27,881,420 | $27,881,420 | $55,762,839 |
| Education | 3 | $308,682 | $308,682 | $617,364 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 35 | $3,762,201 | $5,643,302 | $9,405,503 |
| Religious | 2 | $642,309 | $642,309 | $1,284,618 |
| Residential | 1,204 | $669,945,852 | $334,972,926 | $1,004,918,778 |
| **City of Clemson** | **4,815** | **$1,733,231,121** | **$982,806,500** | **$2,716,037,621** |
| Agriculture | 1 | $2,000 | $2,000 | $4,000 |
| Commercial | 282 | $221,764,482 | $221,764,482 | $443,528,965 |
| Education | 4 | $577,062 | $577,062 | $1,154,124 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 17 | $1,411,730 | $2,117,595 | $3,529,325 |
| Religious | 3 | $7,214,876 | $7,214,876 | $14,429,751 |
| Residential | 4,508 | $1,502,260,971 | $751,130,486 | $2,253,391,457 |
| **City of Easley** | **8,898** | **$1,700,976,296** | **$1,033,555,062** | **$2,734,531,358** |
| Agriculture | 3 | $54,600 | $54,600 | $109,200 |
| Commercial | 557 | $297,548,727 | $297,548,727 | $595,097,455 |
| Education | 6 | $5,381,319 | $5,381,319 | $10,762,638 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 181 | $28,021,579 | $42,032,369 | $70,053,948 |
| Religious | 10 | $7,106,023 | $7,106,023 | $14,212,046 |
| Residential | 8,141 | $1,362,864,048 | $681,432,024 | $2,044,296,072 |

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| **City of Liberty** | **1,403** | **$159,600,430** | **$93,638,196** | **$253,238,626** |
| Agriculture | 2 | $82,500 | $82,500 | $165,000 |
| Commercial | 92 | $21,114,710 | $21,114,710 | $42,229,419 |
| Education | 3 | $357,421 | $357,421 | $714,842 |
| Government | 1 | $0 | $0 | $0 |
| Industrial | 34 | $2,803,054 | $4,204,582 | $7,007,636 |
| Religious | 2 | $515,222 | $515,222 | $1,030,444 |
| Residential | 1,269 | $134,727,523 | $67,363,762 | $202,091,285 |
| **Town of Norris** | **326** | **$32,019,962** | **$18,665,155** | **$50,685,117** |
| Agriculture | 3 | $88,500 | $88,500 | $177,000 |
| Commercial | 11 | $1,544,846 | $1,544,846 | $3,089,692 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 22 | $1,801,005 | $2,701,508 | $4,502,513 |
| Religious | 1 | $74,992 | $74,992 | $149,984 |
| Residential | 289 | $28,510,619 | $14,255,310 | $42,765,929 |
| **City of Pickens** | **1,386** | **$205,974,063** | **$143,717,748** | **$349,691,811** |
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 174 | $70,770,025 | $70,770,025 | $141,540,051 |
| Education | 3 | $3,430,683 | $3,430,683 | $6,861,366 |
| Government | 1 | $0 | $0 | $0 |
| Industrial | 55 | $2,560,372 | $3,840,558 | $6,400,930 |
| Religious | 1 | $2,139,981 | $2,139,981 | $4,279,962 |
| Residential | 1,152 | $127,073,002 | $63,536,501 | $190,609,503 |
| **Town of Six Mile** | **309** | **$61,895,441** | **$33,404,182** | **$95,299,623** |
| Agriculture | 2 | $29,000 | $29,000 | $58,000 |
| Commercial | 15 | $2,878,979 | $2,878,979 | $5,757,958 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 10 | $799,131 | $1,198,697 | $1,997,828 |
| Religious | 1 | $406,682 | $406,682 | $813,364 |
| Residential | 281 | $57,781,649 | $28,890,825 | $86,672,474 |
| **Unincorporated Pickens County** | **27,991** | **$6,630,120,956** | **$3,613,606,008** | **$10,243,726,964** |
| Agriculture | 285 | $16,488,705 | $16,488,705 | $32,977,410 |
| Commercial | 593 | $176,947,175 | $176,947,175 | $353,894,350 |
| Education | 3 | $912,005 | $912,005 | $1,824,010 |
| Government | 10 | $4,573,862 | $4,573,862 | $9,147,724 |
| Industrial | 1,257 | $193,825,909 | $290,738,864 | $484,564,773 |
| Religious | 33 | $10,517,496 | $10,517,496 | $21,034,992 |
| Residential | 25,810 | $6,226,855,804 | $3,113,427,902 | $9,340,283,706 |
| **Countywide Totals** | **46,443** | **$11,226,359,733** | **$6,288,842,490** | **$17,515,202,222** |
| Agriculture | 297 | $16,746,305 | $16,746,305 | $33,492,610 |
| Commercial | 1,794 | $820,450,364 | $820,450,364 | $1,640,900,728 |
| Education | 22 | $10,967,172 | $10,967,172 | $21,934,344 |
| Government | 12 | $4,573,862 | $4,573,862 | $9,147,724 |
| Industrial | 1,611 | $234,984,982 | $352,477,472 | $587,462,454 |
| Religious | 53 | $28,617,581 | $28,617,581 | $57,235,161 |
| Residential | 42,654 | $10,110,019,468 | $5,055,009,734 | $15,165,029,202 |

Source: Pickens County GIS

The spatial distribution of this property inventory is shown by building count in Figure 5.2 and by building value in Figure 5.3.

**Figure 5.2 Building Count by Census Block**

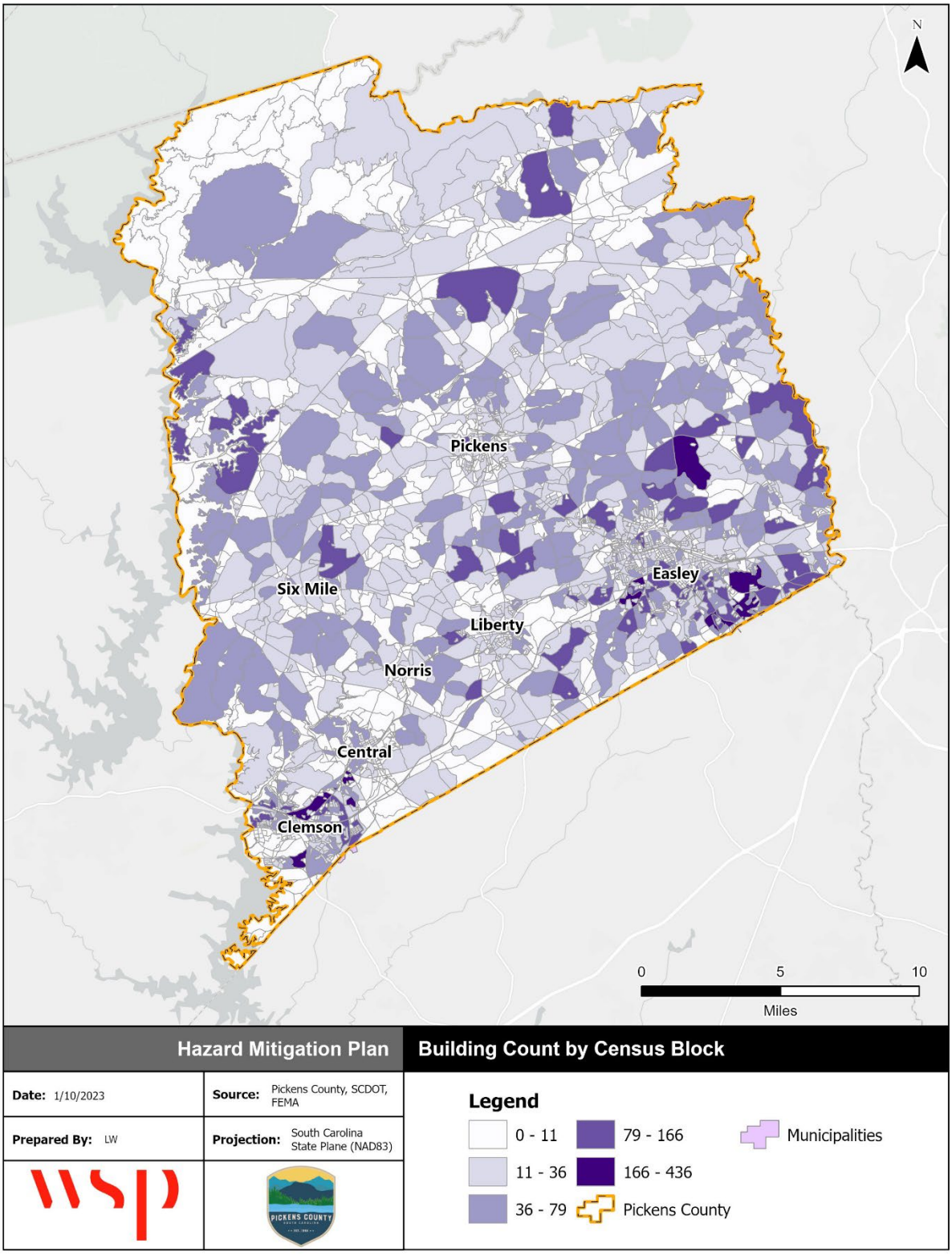
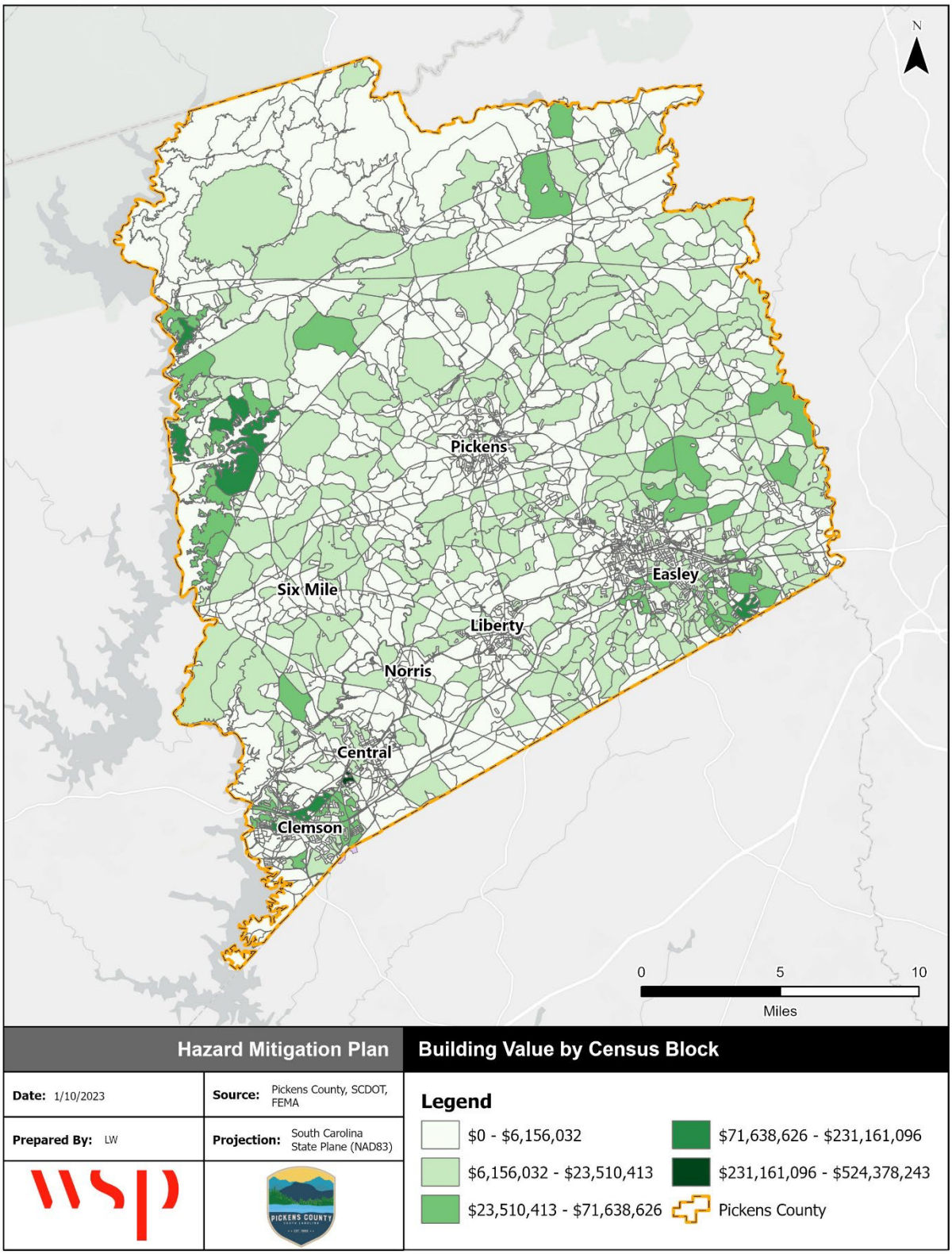


**Figure 5.3 Building Value by Census Block**



### 5.3.2 CRITICAL FACILITIES AND INFRASTRUCTURE EXPOSURE

Of significant concern with respect to any disaster event is the location of critical facilities and infrastructure in the planning area. For this plan update, critical facilities and infrastructure in Pickens County were categorized based on FEMA Community Lifelines. FEMA Lifelines are defined as facilities that "enable the continuous operation of critical government and business functions and [are] essential to human health and safety or economic security." Lifelines fall within the following categories:

- Safety and Security
- Food, Water, Shelter
- Health and Medical
- Energy
- Communications
- Transportation
- Hazardous Materials

Detailed lists of critical facilities and critical infrastructure are provided by their location in each jurisdictional annex. Critical facilities and infrastructure assessed in this risk assessment were identified by Pickens County Emergency Management and supplemented with data from Pickens County GIS Department. Some additional critical facilities and infrastructure were identified by individual municipalities.

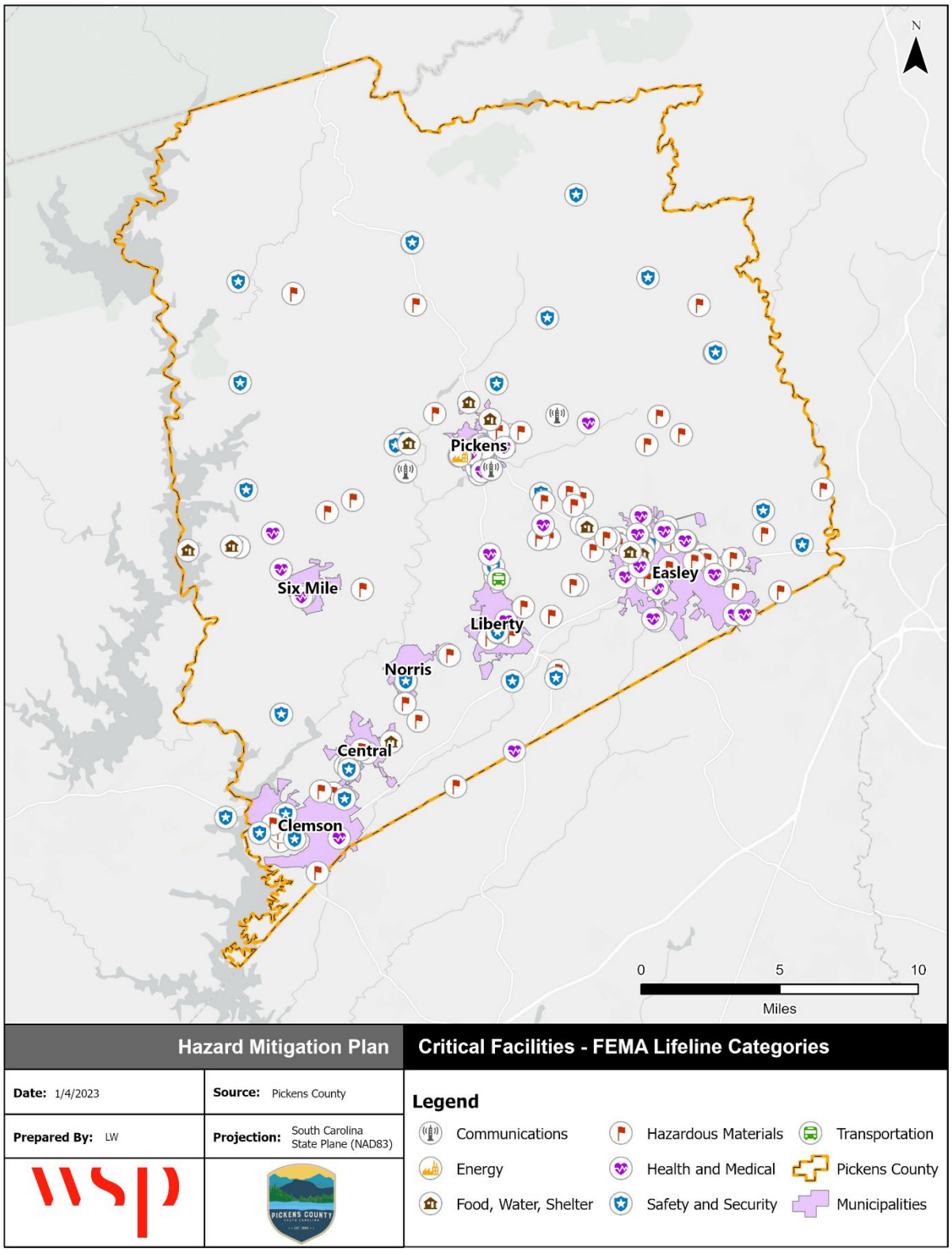
Table 5-4 summarizes all identified critical facilities and infrastructure by their location and FEMA lifeline category. A map of these facilities is provided in Figure 5.4.

**Table 5.4 Summary of Critical Facilities by FEMA Lifeline**

| Jurisdiction | Safety & Security | Food, Water, Shelter | Health & Medical | Energy | Communications | Transportation | Hazardous Materials | Total |
|---|---|---|---|---|---|---|---|---|
| Town of Central | 4 | 1 | 2 | | | | 2 | 9 |
| City of Clemson | 3 | | 1 | | | | 3 | 7 |
| City of Easley | 9 | 2 | 19 | | | | 11 | 41 |
| City of Liberty | 6 | | 2 | | | 1 | 7 | 16 |
| Town of Norris | 2 | | | | | | 1 | 3 |
| City of Pickens | 6 | 2 | 6 | 1 | 2 | | 4 | 21 |
| Town of Six Mile | 3 | | 1 | | | | | 4 |
| Unincorporated Pickens County | 32 | 4 | 12 | 1 | 2 | | 52 | 103 |
| **Total** | **65** | **9** | **43** | **2** | **4** | **1** | **80** | **203** |

Note: The jurisdiction association listed in the table above only reflects a facility's location. Critical facilities and infrastructure may be County maintained but located within the boundaries of an incorporated municipality.

**Figure 5.4 Critical Facilities**



# 5.4 DAM/LEVEE FAILURE

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Dam/Levee Failure | Possible | Critical | Small | More than 24 hrs | Less than 1 week | 2.3 |

## HAZARD DESCRIPTION

### 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, human-caused events, or a combination. Dam failures are of particular concern because the water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property, especially if the structure is breached or significantly damaged. Failure 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.

Dam failures can 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
- Poor operation or 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
- High winds from severe storms, which can cause significant wave action and result in substantial erosion

Dam failures can also occur as a cascading impact of earthquakes and landslides; however, due to the small risk and probability of these hazards in Pickens County, this is not considered relevant to the planning area.

### LEVEE FAILURE

FEMA defines a levee as “a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water in order to reduce the risk from temporary flooding.” Levee systems consist of levees, floodwalls, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices. Levees often have “interior drainage” systems that work in conjunction with the levees to take water from the landward side to the water side. An interior drainage system may include culverts, canals, ditches, storm sewers, and/or pumps.

Levees and floodwalls are constructed from the earth, compacted soil or artificial materials, such as concrete or steel. To protect against erosion and scouring, earthen levees can be covered with grass and gravel or

hard surfaces like stone, asphalt, or concrete. Levees and floodwalls are typically built parallel to a waterway, most often a river, in order to reduce the risk of flooding to the area behind it.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events. Levees reduce, not eliminate, the risk to individuals and structures behind them. A levee system failure or overtopping can create severe flooding and high water velocities. It is important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

For both dam and levee failure events, there is generally very little warning time. A failure resulting from heavy rains and flash flooding can occur within hours of the first signs of breaching. Due to the lack of advance warning, failures resulting from natural events, such as earthquakes, landslides, or heavy rainfall and flooding may be particularly severe. Depending on the cause, other failures and breaches can take much longer to occur, from days to weeks. The duration of the flood will vary but may last as long as a week.

***Warning Time: 1 – More than 24 hours***

***Duration: 3 – Less than 1 week***

## LOCATION

### DAM FAILURE

Information on the location of dams in the planning area was retrieved from the South Carolina Department of Health and Environmental Control (DHEC) and the National Inventory of Dams (NID). SC DHEC, along with the South Carolina Bureau of Water, houses the South Carolina Dams and Reservoirs Safety Program. Through this program, DHEC provides an inventory of all the dams in the state. The NID is a product of the U.S. Army Corps of Engineers which provides a database of dams across the United States. South Carolina DHEC's dam inventory identifies 65 dams in Pickens County, including three dams not included in the NID inventory. The NID reports 67 dams in Pickens County, including five dams not included in the DHEC inventory. In total, 70 dams were identified in Pickens County, including 37 high hazard dams, 6 significant hazard dams, and 27 low hazard dams (including one dam with an undetermined rating). Table 5-5 details all 70 dams reported within Pickens County with data provided in the NID.

**Table 5.5 Dam Inventory for Pickens County, SC**

| Dam Name | NIDID | Height (Ft.) | Storage (acre-feet) | Owner | Primary Purpose | Hazard Category |
|---|---|---|---|---|---|---|
| Anthonys Pond Dam | SC01385 | 25 | 24 | Private | Recreation | Low |
| B F Finley Dam 1 | SC00693 | 30 | 199 | Private | Recreation | High |
| B F Finley Dam 2 | SC00694 | 39 | 316 | Private | Recreation | High |
| B Frank Finley Dam | SC00695 | 34 | 250 | Private | Recreation | High |
| Big Rock Lake Dam | SC01378 | 30 | 67 | Private | Flood Risk Reduction | High |
| Brackers Pond Dam | SC01393 | 21 | 115 | Private | Irrigation | Low |
| Burgess Pond Dam | SC01388 | 19 | 62 | Private | Recreation | Low |
| Carl Newton Dam | SC02621 | 27 | 36 | Private | Other | Low |
| City Lake Farm Pond | SC01381 | 31 | 88 | Private | Recreation | Low |
| Cox Mini Farms Pond Dam | SC01391 | 23 | 71 | Private | Recreation | Low |
| Cox Pond Dam | SC01390 | 12 | 60 | Private | Recreation | Low |
| Dam On Christine Drive | SC05010 | 26 | 172 | Not Listed | Irrigation | High |

| Dam Name | NIDID | Height (Ft.) | Storage (acre-feet) | Owner | Primary Purpose | Hazard Category |
|---|---|---|---|---|---|---|
| Danny Cox Dam | SC02703 | 27 | 36 | Private | Fire Protection, Stock, Or Small Fish Pond | High |
| E W Pace Dam | SC00713 | 26 | 62 | Private | Recreation | Low |
| Finleys Lake Dam | SC00697 | 48 | 174 | Private | Flood Risk Reduction | High |
| Fred Finley Dam | SC01382 | 31 | 58 | Private | Recreation | Low |
| Fred Linsley Dam | SC02597 | 32 | 23 | Private | Debris Control | Low |
| Gallagher Pond Dam | SC01386 | 8 | 230 | Private | Recreation | Low |
| Garren Lake Dam | SC01804 | 34 | 192 | State | Recreation | Low |
| Georges Creek WCD Dam 1a | SC00702 | 36 | 1721 | Private; Local Government | Flood Risk Reduction | High |
| Gertrude Harris Dam | SC00703 | 24 | 72 | Private | Recreation | High |
| Glen Vick Pond Dam | SC02824 | 29 | 105 | Private | Fish and Wildlife Pond | Low |
| Golden Gate Dam | SCD5029 | 26.6 | 18 | Not Listed | -- | Significant |
| Hendricks Pond Dam | SC01389 | 25 | 165 | Private | Recreation | Low |
| Hipp Pond Dam | SCD4912 | 21 | 56 | Not Listed | | Undetermined |
| Issaqueena Lake Dam | SC00691 | 40 | 1207 | State | Recreation | Low |
| James Cushman Dam | SC02446 | 43 | 18 | Private | Recreation | High |
| Jesse Fletcher Dam | SC02681 | 29 | 30 | Private | Other | Significant |
| Jocassee | SC00529 | 385 | 1,160,298 | Public Utility | Hydroelectric | High |
| John Young Pond Dam | D4566 | - | - | - | - | Low |
| Keasler Pond Dam | SC01373 | 33 | 68 | Private | Recreation | High |
| Kenneth Merck Dam | D4551 | - | - | - | - | Low |
| Keowee River Club Dam | SC02805 | 63 | 150 | Private | Irrigation | Significant |
| Kings Sunset Nursery Dam | SC02765 | 28 | 90 | Private | Irrigation | High |
| Lake Calton Dam | SC00698 | 39 | 129 | Private | Recreation | High |
| Lake Diana Dam | SC00710 | 22 | 82 | Private | Recreation | High |
| Lamaster Pond Dam | SC01374 | 26 | 61 | State | Recreation | Low |
| Lawrence Ledford Dam | SC00711 | 25 | 75 | Private | Recreation | High |
| Loyds Pond Dam | SC01396 | 41 | 280 | Private | Recreation | High |
| Mallard Cove (Forest Dr) | SC01296 | 23 | 48 | Private | Recreation | High |
| Mcjunkins Pond Dam | SC01376 | 32 | 81 | Private | Recreation | Low |
| Merritts Pond | SC00712 | 28 | 68 | Private | Recreation | High |
| Nine Times Dam | SC02503 | 22 | 161 | Private | Recreation | High |
| Norton Dam | SC00708 | 29 | 158 | Private | Recreation | Low |
| Oolenoy River WCD Dam 10 | SC01383 | 43 | 208 | Private; Local Government | Flood Risk Reduction | High |
| Oolenoy River WCD Dam 9 | SC01384 | 66 | 322 | Private; Local Government | Flood Risk Reduction | High |
| Oolenoy WCD Dam 40 | SC02452 | 60 | 2,600 | Local Government | Recreation | High |
| Philpat Pond Dam | SC01399 | 25 | 45 | Not Listed | -- | Low |
| Pickens City Reservoir Lake Dam | SC00715 | 24 | 789 | Local Government | Water Supply | High |
| Pinnacle Lake Dam | SC00696 | 34 | 770 | State | Recreation | High |

| Dam Name | NIDID | Height (Ft.) | Storage (acre-feet) | Owner | Primary Purpose | Hazard Category |
|---|---|---|---|---|---|---|
| Praters Creek Dam | SC01377 | 49 | 550 | Private | Flood Risk Reduction | High |
| Ragsdale Pond Dam | SC01387 | 20 | 64 | Private | Recreation | Low |
| Reedy Cove Creek Lake Dam | SC01375 | 28 | 89 | Private | Recreation | Low |
| Rich Pond Dam | SC01397 | 32 | 53 | Private | Recreation | Low |
| Ripplelake Dr. Dam | SCD5049 | - | - | - | - | Significant |
| River Bluff Dam 2 | SC02535 | 27 | 65 | Private | Recreation | Significant |
| River Bluff Lower Dam | SC02537 | 34 | 60 | Private | Recreation | Low |
| River Bluff Upper Dam | SC02536 | 30 | 47.4 | Private | Recreation | Significant |
| Robert Cornett Dam | SC02448 | 30 | 24 | Not Listed | | Low |
| Spillway Dam - Keowee | SC00706 | 60 | 955,586 | Public Utility | Hydroelectric | High |
| Stanley Mcjunkin Dam | SC02648 | 37 | 170 | Private | Debris Control | High |
| Table Rock Reservoir Dam | SC00003 | 155 | 3,3112 | Local Government | Water Supply | High |
| Tony Stiwinter Dam | SC02447 | 25 | 5 | Private | Recreation | High |
| Twelve Mile Cr WCD Dam 12 | SC00716 | 32 | 174 | Private | Flood Risk Reduction | High |
| Twelve Mile Creek WCD 54a | SC00700 | 36 | 3,282 | Private; Local Government | Flood Risk Reduction | High |
| Twelve Mile Creek WCD Dam 16 | SC00699 | 42 | 2,299 | Private; Local Government | Flood Risk Reduction | High |
| Twelve Mile Creek WCD Dam 22 | SC00701 | 41 | 1,800 | Private; Local Government | Flood Risk Reduction | High |
| Twelve Mile Creek WCD Dam 5 | SC00714 | 49 | 399 | Private; Local Government | Flood Risk Reduction | High |
| Twelve Mile Creek WCD Dam 8 | SC00717 | 44 | 207 | Private; Local Government | Flood Risk Reduction | High |
| William Evatt Dam | SC01380 | 26 | 67 | Private | Recreation | High |

Source: South Carolina Dam Safety/SC DHEC; National Inventory of Dams, October 2022
Note: John Young Pond Dam, Kenneth Merck Dam, and Ripplelake Dr. Dam were not included in the NID. Hazard category information for these dams is from the SCDHEC inventory.

The planning area is also at risk to failure of upstream dams. Table 5-6 lists 14 high hazard dams located within a mile of Pickens County (or connected to systems within that range) in upstream areas of Oconee County and Greenville County. These structures could potentially impact Clemson and the unincorporated county in the event of a failure or overtopping.

**Table 5.6 Upstream High-Hazard Dams**

| Dam Name | NIDID | Height (Ft.) | Storage (acre-feet) | Owner | Year Built | Last Inspection Date | Nearest Downstream City & Distance |
|---|---|---|---|---|---|---|---|
| Saddle Dike No. 1 | SC00529S001 | 35 | 1,160,298 | Duke Energy | 1973 | 09/30/2020 | Clemson / 20mi |
| Saddle Dike No. 2* | SC00529S002 | 25 | 1,160,298 | Duke Energy | 1973 | 09/30/2020 | Clemson / 20mi |
| Jocassee Spillway | SC00529S003 | 64 | 1,160,298 | Duke Energy | 1973 | 09/30/2020 | Clemson / 20mi |
| Keowee Dam | SC00706 | 170 | 955,586 | Duke Energy | 1971 | 06/07/2021 | Clemson / 11mi |

| Dam Name | NIDID | Height (Ft.) | Storage (acre-feet) | Owner | Year Built | Last Inspection Date | Nearest Downstream City & Distance |
|---|---|---|---|---|---|---|---|
| Little River | SC00706S001 | 150 | 955,586 | Duke Energy | 1969 | 06/07/2021 | Newry |
| Oconee Intake Dike | SC00706S002 | 80 | 955,586 | Duke Energy | 1971 | 09/30/2020 | Newry |
| Keowee Dike – A | SC00706S004 | 25 | 955,586 | Duke Energy | 1969 | 09/30/2020 | Newry |
| Keowee Dike – B | SC00706S005 | 15 | 955,586 | Duke Energy | 1969 | 09/30/2020 | Newry |
| Keowee Dike – C | SC00706S006 | 15 | 955,586 | Duke Energy | 1969 | 09/30/2020 | Newry |
| Keowee Dike – D* | SC00706S006 | 40 | 955,586 | Duke Energy | 1969 | 09/30/2020 | Newry |
| Clemson Upper Diversion Dam | SC02753 | 75 | 3,438,700 | Federal Government | 1961 | 04/28/2017 | Clemson |
| Clemson Lower Diversion Dam | SC02754 | 75 | 3,438,700 | Federal Government | 1961 | 04/29/2017 | Clemson |
| Clemson Lower Diversion Dam – Saddle Dike | SC02754S001 | 30 | 3,438,700 | Federal Government | 1961 | 04/28/2017 | Clemson |
| Lake Gintomo Dam | SC01717 | 37 | 106 | Gintomo Corp. (Private) | 1966 | 07/06/2020 | -- |

Source: NID, SCDHEC

* These structures are outside of the one-mile buffer of Pickens County but are part of larger dam structure systems that are in the one-mile buffer and potentially in upstream areas that could impact the County.

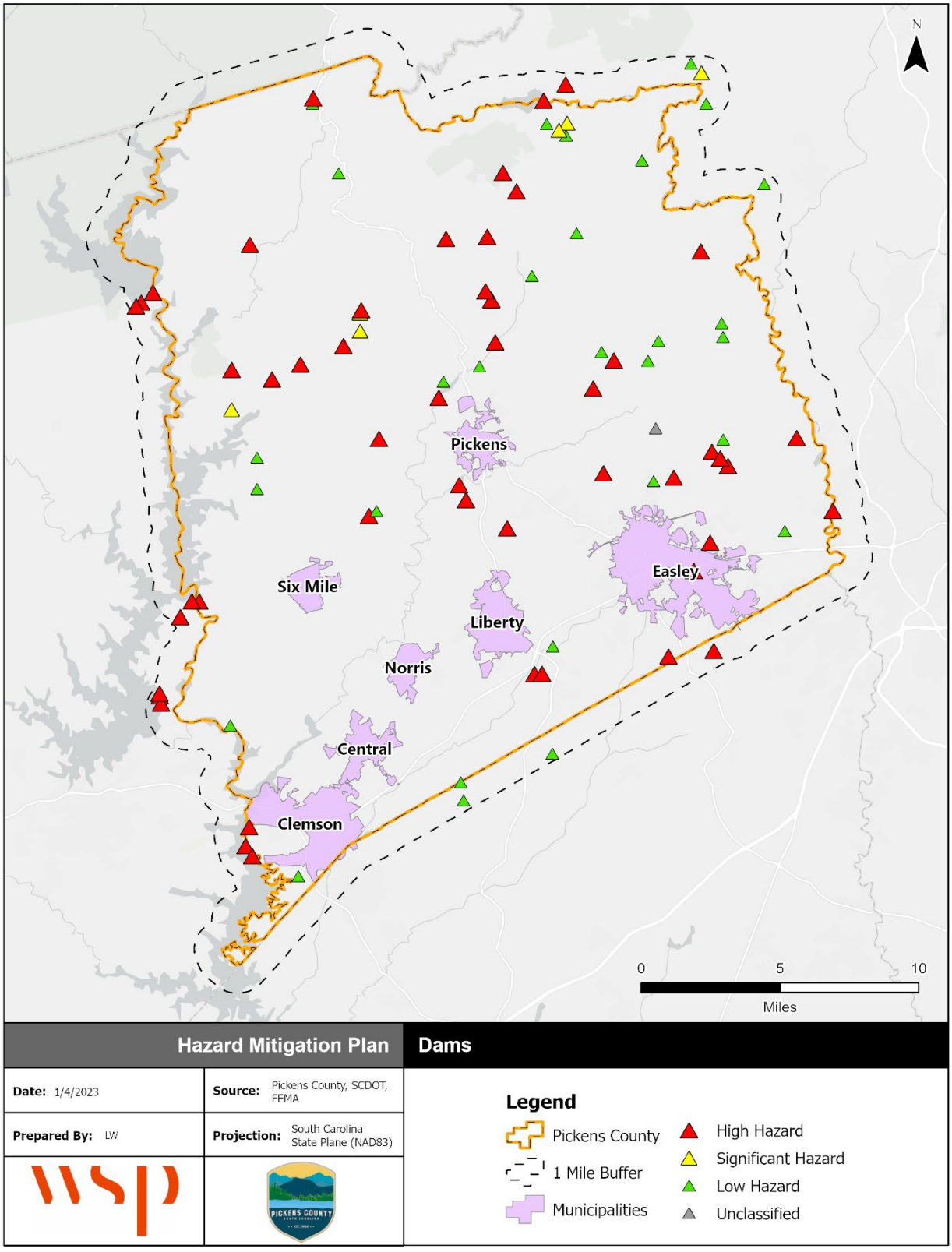
There is one additional dam within a mile of Pickens County—Brushy Creek WCD Dam in Anderson County—but based on the inundation area modeled by SCDHEC, this structure does not pose a risk to Pickens County.

Figure 5-3 shows the locations and hazard rankings of all 70 dams in Pickens County as well as all dams within one mile of the County.

In most cases the inundation area of any single dam is unlikely to exceed 10 percent of the planning area. However, there is potential for more widespread inundation if cascading dam failures occur and are preceded by heavy rainfall.

***Spatial Extent: 2 – Small***

**Figure 5.5 Dam Locations and Hazard Rating in Pickens County**




Source: National Inventory of Dams, September 2022; SCDHEC Dam Inventory, November 2022

## LEVEE FAILURE

The U.S. Army Corps of Engineers (USACE) maintains information on the nation's levees in the National Levee Database (NLD), which includes information on the Clemson Diversion Levee System located directly west of the city close to the University along Hartwell Lake, and Town Creek Levee System located in the City of Pickens along Town Creek.

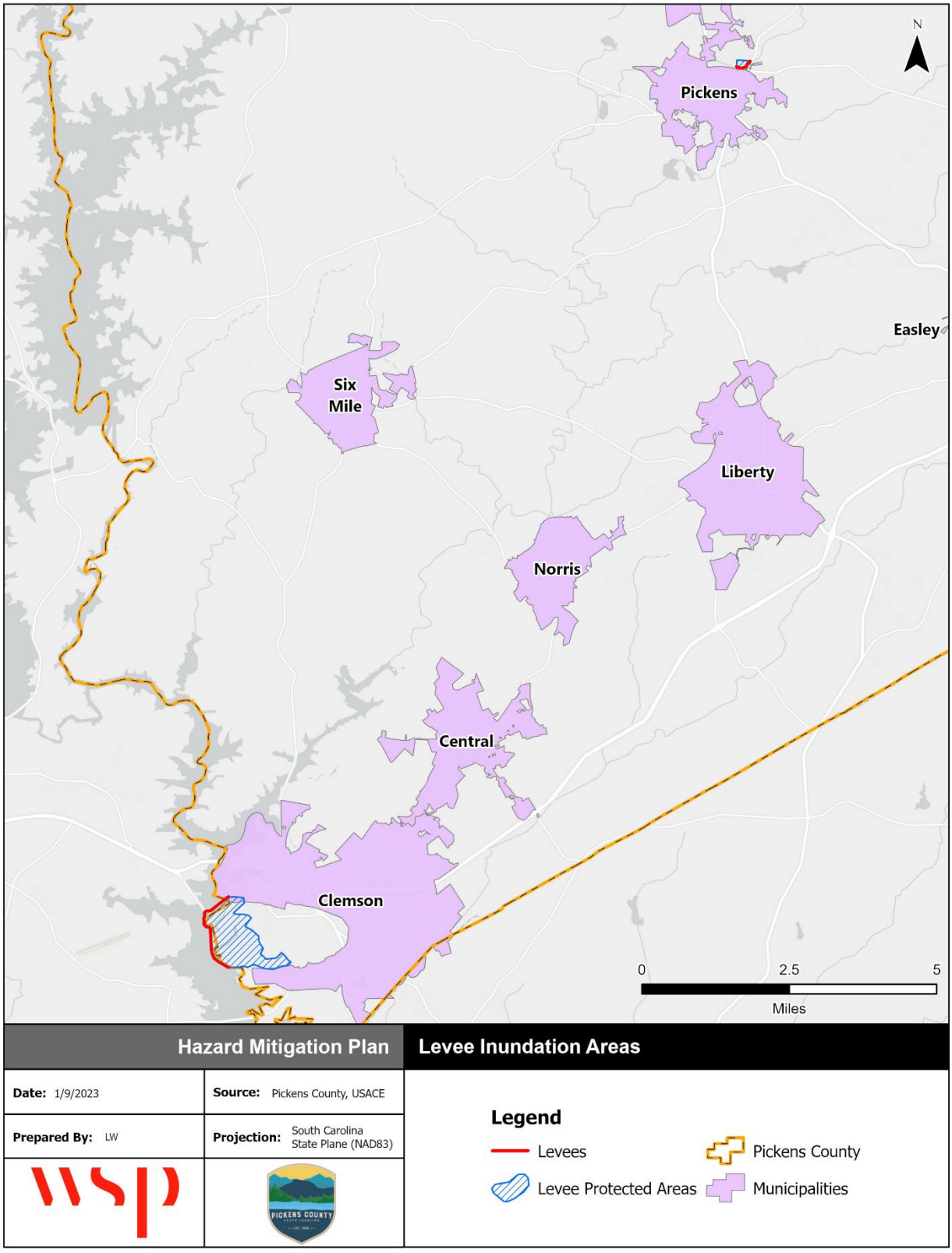
According to the NLD the Town Creek Levee is 0.3 miles long and owned and operated by Pickens County. The levee protected area is less than 0.03 square miles. The levee's risk is not available in the database, however it NLD does indicate that one building sits directly behind the levee with an estimated property value of $120 million.

The NLD description of the Clemson Diversion Levee System indicates that the structure is associated with Clemson Upper Diversion Dam project and is USACE federally constructed and operated. The levee is 1.07 miles long and the leveed area is 0.79 square miles, which is less than 10 percent of Pickens County's total area, but a significant portion of the Clemson University campus. The National Inventory of Dams rates the associated structures that comprise the system as moderate and low risk level.

Figure 5-4 shows the levee centerlines and the approximate areas protected by the levees. Based on the map shown in Figure 5-4, despite the levees' proximity to the City of Clemson and the City of Pickens, most of the levee protected areas are in the unincorporated county and on the Clemson University campus. These levee-protected areas make up a small portion of the County's total area and asset inventory.

***Spatial Extent – Small***

**Figure 5.6 Levee Protected Areas**




Source: FEMA

## EXTENT

### DAM FAILURE

Each state has definitions and methods to determine the Hazard Potential of a dam. In South Carolina, dams are recognized by the state if they are 25 feet or more in height or impound 50 acre-feet or more or if their potential failure may cause loss of human life. 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.

South Carolina Dams Program engineers determine the "hazard potential" of a dam based on the consequences of failure, meaning the probable damage in terms of loss of human life or damage that would occur if the structure failed. Dams are assigned one of three categories based on their hazard potential:

Class 1 – High Hazard: Dam failure would likely result in loss of life
Class 2 – Significant: Dam failure wouldn't likely result in loss of like but property, roads, and other key infrastructure would be damaged.
Class 3 – Low Hazard: Dams failure may cause minimal property damage to others. Loss of life is not expected.

The classification of the regulated dams guides design flood that the dam spillway must pass, sets the need for an Emergency Action Plan, and establishes the frequency that DHEC Dam Safety Program staff will inspect the dam. The Environmental Affairs Regional Offices are responsible for routine inspections and classification checks on dams. Routine inspections are performed on high hazard and significant hazard dams, and classification checks are done for low hazard dams by checking the area below the dams.

Where available, South Carolina Dams Program classifications are provided in Table 5-5 for the dams in Pickens County. Where not available, National Inventory of Dams (NID) classifications are provided. The NID database tracks dams that meet any of the following criteria:

- High hazard potential classification - loss of human life is likely if the dam fails,
- Significant hazard potential classification - no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns,
- Equal or exceed 25 feet in height and exceed 15 acre-feet in storage,
- Equal or exceed 50 acre-feet storage and exceed 6 feet in height.

Based on these criteria there are 37 high hazard dams in Pickens County; 34 identified by the South Carolina Dam Safety Program and an additional 3 identified by the NID. The NID and DHEC also identify six significant hazard dams and one dam of undetermined hazard potential.

Given the presence of numerous high hazard dams in the planning area, potential impact is considered critical. It is also possible that dams in the planning area present greater risk than when they were last evaluated due to downstream development and increased exposure, but without a reevaluation of these dams it is difficult to draw any conclusions. Following catastrophic flooding and dam failures around the Columbia, SC area in 2015, SC DHEC began conducting a thorough review of dams to reevaluate their hazard class. As a result, since the 2018 Pickens County HMP, the number of dams rated as high hazard increased from 10 to 37.

Another important consideration related to dam failure risk is the age and condition of existing dams. The NID reports that the average age of dams in Pickens County is 55 years. While age does not equate to hazard potential, according to the 2021 Report Card for America's Infrastructure, it does indicate that many dams were not built to current standards and/or may require rehabilitation or other action to ensure their continued safe operation. Based on the most recent inspection of dams in Pickens County, seven high hazard dams were found to be in poor condition. Dams failure may be more likely in structures that are in need of maintenance.

Some risk of dam failure can be mitigated by having an Emergency Action Plan (EAP) in place that help dam owners and emergency managers to coordinate on mitigation of risk for downstream residents and structures. EAPs contain important information about notification protocols, breach analyses, and actions to take if the dam is near failure or has failed. EAPs will serve as a plan for evacuation for each high hazard dam. SC DHEC requires EAPs for high and significant hazard dams. Only 18 high hazard dams currently have an EAP; however, this deficiency may be due in part to the recent reclassification of many dams. Pickens County Emergency Management reports that DHEC has been vigilant in working to obtain EAPs from dam owners in the County. Pickens County coordinates with DHEC regularly on dam safety.

Table 5-7 below lists the high hazard dams in Pickens County and the condition assessment rating and if an EAP has been prepared for the dam. Figure 5-5 below shows the high hazard dams in Pickens County.

***Impact: 3 – Critical***

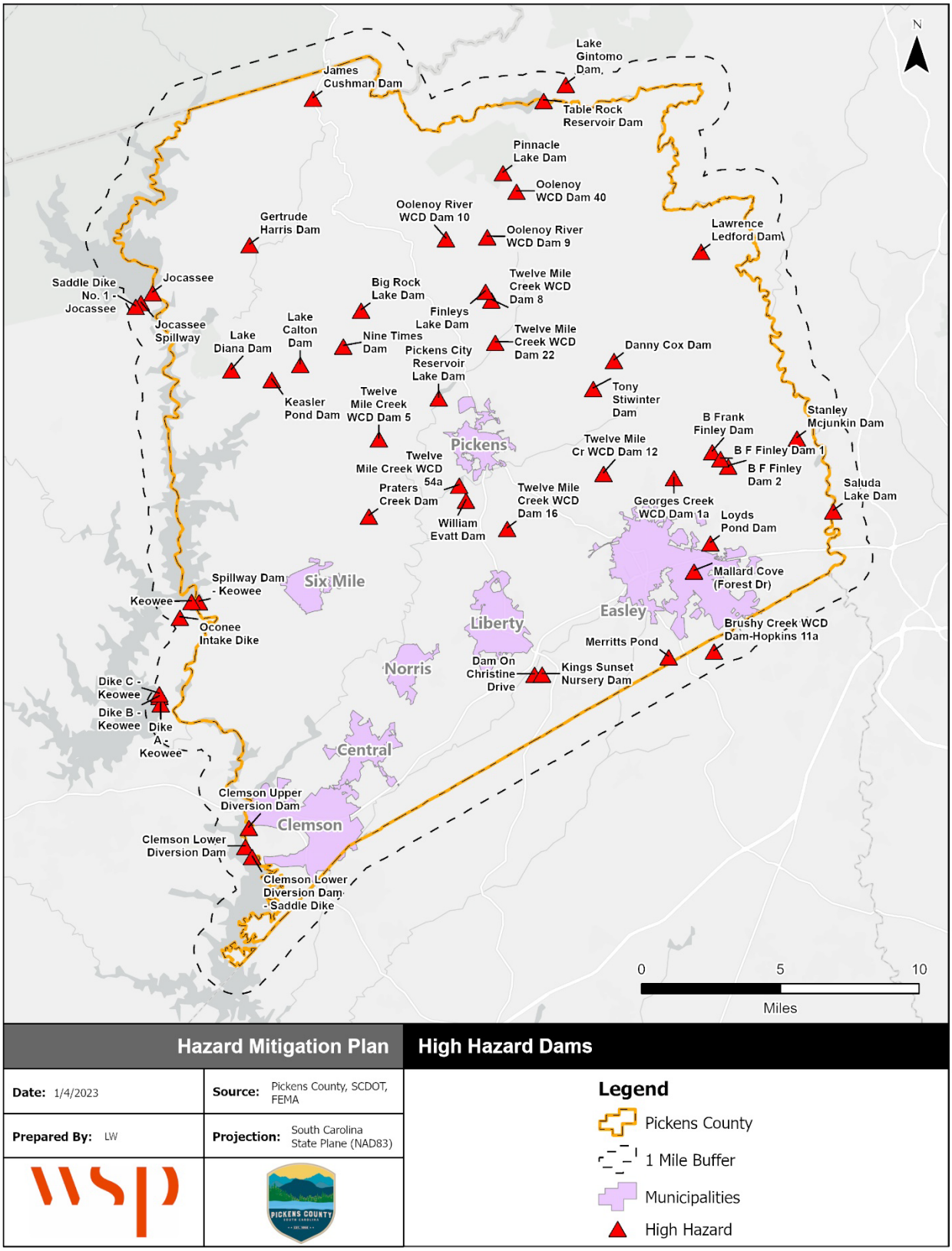
**Table 5.7 High Hazard Dam Condition Assessment and EAP Status**

| Dam Name | Condition Assessment | Last Inspection Date | EAP Prepared | EAP Last Revision Date |
|---|---|---|---|---|
| **Dams in Pickens County** | | | | |
| B F Finley Dam 1 | Poor | 2/3/2020 | Yes | 4/7/2017 |
| B F Finley Dam 2 | Fair | 2/3/2020 | Yes | 4/7/2017 |
| B Frank Finley Dam | Fair | 2/3/2020 | Yes | 4/7/2017 |
| Big Rock Lake Dam | Fair | 8/21/2020 | No | -- |
| Dam On Christine Drive | Fair | 8/25/2020 | No | -- |
| Danny Cox Dam | Fair | 12/14/2020 | No | -- |
| Finleys Lake Dam | Poor | 3/24/2020 | Yes | 4/18/2007 |
| Georges Creek WCD Dam 1a | Fair | 11/23/2020 | Yes | 6/13/2019 |
| Gertrude Harris Dam | Poor | 6/29/2020 | No | -- |
| James Cushman Dam | Fair | 12/14/2020 | No | -- |
| Jocassee | Not Available | 9/30/2020 | Yes | 12/21/2020 |
| Keasler Pond Dam | Poor | 11/25/2019 | No | -- |
| Kings Sunset Nursery Dam | Fair | 8/25/2020 | No | -- |
| Lake Calton Dam | Fair | 11/25/2019 | Yes | 2/8/2021 |
| Lake Diana Dam | Fair | 7/15/2019 | No | -- |
| Lawrence Ledford Dam | Poor | 11/4/2019 | No | -- |
| Loyds Pond Dam | Not Rated | 9/29/2020 | No | -- |
| Mallard Cove (Forest Dr) | Fair | 1/20/2021 | Yes | 6/22/1984 |
| Merritts Pond | Fair | 10/5/2020 | No | -- |
| Nine Times Dam | Poor | 3/18/2021 | Yes | 2/23/2017 |
| Oolenoy River WCD Dam 10 | Fair | 6/12/2020 | No | -- |
| Oolenoy River WCD Dam 9 | Fair | 6/12/2020 | No | -- |
| Oolenoy WCD Dam 40 | Fair | 6/12/2020 | Yes | 6/12/2019 |
| Pickens City Reservoir Lake Dam | Fair | 1/10/2020 | Yes | 1/27/2017 |
| Pinnacle Lake Dam | Fair | 2/3/2021 | No | -- |
| Praters Creek Dam | Fair | 4/7/2020 | No | -- |
| Spillway Dam - Keowee | Not Available | 6/7/2021 | Yes | 12/21/2020 |
| Stanley Mcjunkin Dam | Fair | 5/22/2020 | Yes | 6/12/2019 |
| Table Rock Reservoir Dam | Satisfactory | 8/22/2019 | Yes | 11/9/2015 |
| Tony Stiwinter Dam | Fair | 4/1/2020 | Yes | 5/9/2017 |
| Twelve Mile Cr WCD Dam 12 | Fair | 4/10/2020 | No | -- |
| Twelve Mile Creek WCD 54a | Fair | 4/7/2020 | Yes | 6/25/1995 |

| Dam Name | Condition Assessment | Last Inspection Date | EAP Prepared | EAP Last Revision Date |
|---|---|---|---|---|
| Twelve Mile Creek WCD Dam 16 | Fair | 4/7/2020 | No | -- |
| Twelve Mile Creek WCD Dam 22 | Fair | 4/10/2020 | Yes | -- |
| Twelve Mile Creek WCD Dam 5 | Fair | 4/10/2020 | No | -- |
| Twelve Mile Creek WCD Dam 8 | Fair | 3/24/2020 | No | -- |
| William Evatt Dam | Poor | 3/18/2021 | No | -- |
| **Potential Upstream Dams** | | | | |
| Saddle Dike No. 1 | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Saddle Dike No. 2 | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Jocassee Spillway | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Keowee Dam | Not Available | 06/07/2021 | Yes | 12/21/2020 |
| Little River | Not Available | 06/07/2021 | Yes | 12/21/2020 |
| Oconee Intake Dike | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Keowee Dike – A | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Keowee Dike – B | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Keowee Dike – C | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Keowee Dike – D | Not Available | 09/30/2020 | Yes | 12/21/2020 |
| Clemson Upper Diversion Dam | None Reported | 04/28/2017 | Yes | 7/14/2022 |
| Clemson Lower Diversion Dam | None Reported | 04/29/2017 | Yes | 7/14/2022 |
| Clemson Lower Diversion Dam – Saddle Dike | None Reported | 04/28/2017 | Yes | 7/14/2022 |
| Lake Gintomo Dam | Fair | 07/06/2020 | Yes | 06/12/2019 |

Source: National Inventory of Dams

**Figure 5.7 High Hazard Dams**



### LEVEE FAILURE

The NLD assigns levee risk classifications according to the likelihood of inundation due to breach and/or system component malfunction in combination with loss of life, economic, or environmental consequences. Neither levee system in Pickens County has been screened for a risk rating in the NLD. The Town Creek levee protects one building with a value of $120 million. No information is available in the NLD on property protected by the Clemson Diversion Levee System; however, it protects a large portion of the Clemson University campus. Given this level of exposure to potential levee failure, impacts could be critical.

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

There is no record of a significant dam failure occurring within Pickens County. According to the South Carolina 2018 Hazard Assessment, there were 15 dam incidents in the state between 1975 and 2007, resulting in five deaths and one injury. In October 2015, a heavy rainfall event in the state caused 51 regulated dams to fail and 192 additional dams were identified as needing inspection and potential repair. In 2016 around 25 dams were breached after Hurricane Matthew. However, none of the dams from these two events were within Pickens County.

## PROBABILITY OF FUTURE OCCURRENCE

Per the South Carolina Dam Inventory, NID database, and NLD, there are 37 high hazard dams, six significant hazard dams, 26 low hazard dams, and two levees with undetermined risk levels within Pickens County that could impact the planning area. Based on the lack of past occurrences, the probability of future dam or levee failure would be considered unlikely. However, in the case of structural failures, historical occurrence is not a good indicator of future probability. Based on HMPC input and given the current dam and levee inventory, the average age of dams, maintenance needs, and the potential impacts of climate change (discussed below), a dam or levee failure is considered likely in the future. Regular monitoring and maintenance is necessary and can help mitigate or prevent failures if appropriate actions are taken when it is determined a failure may occur.

***Probability: 3 – Likely***

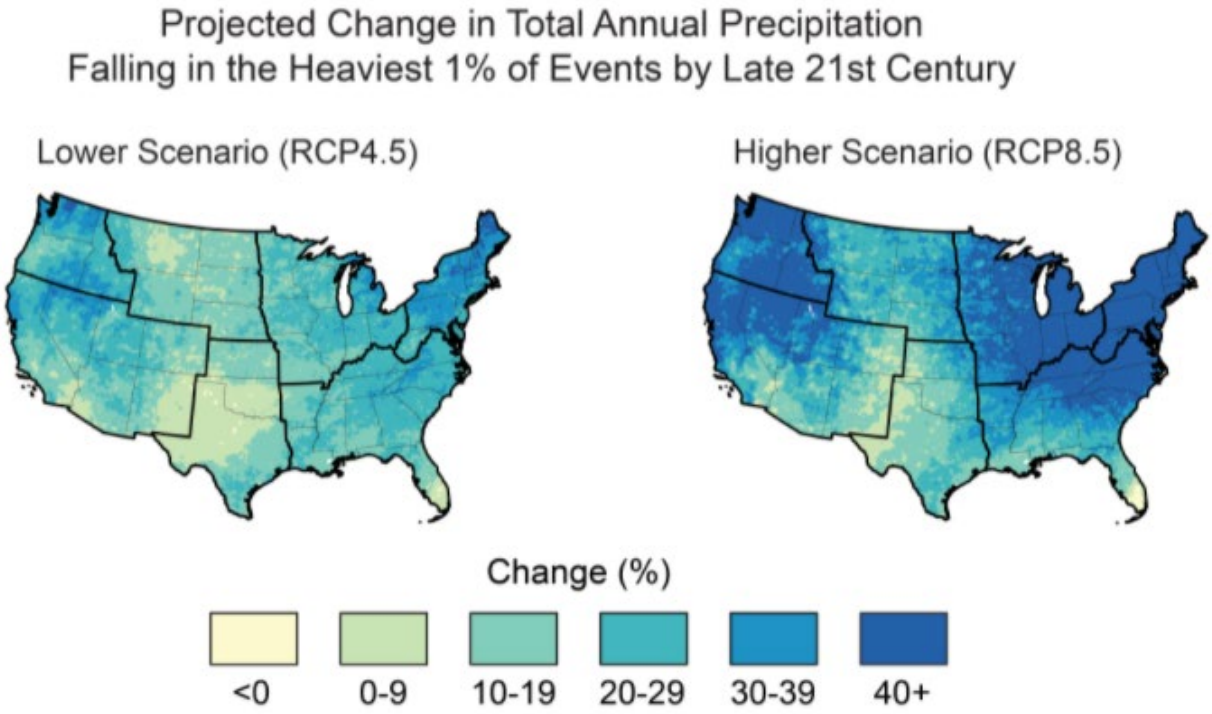
## CLIMATE CHANGE

A study from the Norwegian University of Science and Technology was conducted to investigate the impact of climate change scenarios on hydropower dam safety with a focus on impacts related to changes in precipitation and flood. Climate change projections suggest that precipitation may increase and occur in more extreme events, which may increase risk of flooding, putting stress on dams and increasing likelihood of dam failure. This study evaluated changes in design floods and concluded that outflow floods and flood water levels will increase in the future, the total hydrological failure probability of a dam will increase, and the extent and depth of flood waters will increase by the future dam break scenario (Chernet et al. 2014).

A study on the impacts of climate change on dams and reservoirs produced for the UK Department of Environment, Food and Rural Affairs indicates that concrete and masonry dams may be relatively resilient to climate change, but earthen embankments are most likely to be vulnerable to climate change because their structure may be weakened by increased erosion, more extreme fluctuations in water levels, and changes in vegetation and prolonged drying during hot weather. Increasing frequency and size of flows as well as increases in debris and vegetation may also increase vulnerability (Atkins, 2013).

There were no studies available on the local impacts of climate change on dams in Pickens County or South Carolina, however, these international studies can be taken as an indication that the risk of dam failure may increase in the future. Heavy rainfall events are projected to become more intense by the late 21$^{st}$ century, as shown in Figure 5-6. Therefore, conditions conducive to dam failure may occur more frequently as well.

**Figure 5.8 Projected Change in Heavy Rainfall Events**




Source: Fourth National Climate Assessment

## CONSEQUENCE ANALYSIS

Factors that influence the potential severity of a full or partial dam/levee failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

| Category | Consequences |
|---|---|
| Public | Major casualties and loss of life could result. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Localized impact expected to be severe for inundation area and moderate to light for other adversely affected areas. While impacts will mirror those of a flood event, residents who might be impacted by a dam/levee failure may believe themselves to be protected from flood events and may not anticipate the event. |
| Responders | Response capabilities may be challenged as responders will likely need to attempt to assist residents who are trapped in their homes or in flood waters. Responders may have difficulty accessing homes or other structures where support is needed. |
| Continuity of Operations (including Continued Delivery of Services) | Damage to facilities/personnel in the inundation area may require temporary relocation of some operations. Localized disruption of roads and/or utilities may postpone delivery of some services. Overall continuity of operations is unlikely to be affected as the event would likely be localized and most operations facilities are not at risk. |
| Property, Facilities and Infrastructure | Localized impact to facilities and infrastructure in the inundation area of the incident. Potentially catastrophic damages to roads, bridges, and homes are possible. Localized power outages could occur. Natural gas distribution networks may be damaged. Phone and internet systems could be impacted on a local scale. |

| Category | Consequences |
|---|---|
| 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. Ecosystems and habitats in the affected river/stream/lake could be destroyed. |
| Economic Condition of the Jurisdiction | Local economy and finances may be adversely affected, possibly for an extended period of time, depending on damage extent. |
| Public Confidence in the Jurisdiction's Governance | Localized impact expected to adversely affect only the dam owner and local entities. A catastrophic failure could result in more widespread loss of public confidence. Residents may view a dam/levee failure as a failure of government to property regulate and control the dam/levee. |

## VULNERABILITY ASSESSMENT

SCDHEC provides a web map of dam locations and approximate inundation areas for many dams, modeled with the DSS-WISE program using a sunny day, maximum pool scenario, meaning the breaches are not hydrologically induced but the dam is assumed to be holding its full storage. This methodology does not represent the worst-case scenario, as failure following heavy rainfall or flooding would be expected to cause more inundation. However, it provides a useful starting point to understand potential downstream risk. SCDHEC notes that the provided inundation areas are moderate accuracy and should be interpreted as such. Pickens County coordinates with SCDHEC to understand and monitor dam risk and plan for maintenance and mitigation needs.

SCDHEC provides this information for public viewing but does not allow data downloads for further analysis. As a result, exposure within the modeled inundation areas could not be evaluated, so population at risk and property at risk could not be estimated. However, based on a visual assessment of the provided inundation areas, the unincorporated county, Clemson, Easley, and Norris could be impacted by dam failure. There are no inundation areas shown to impact Central, Liberty, Pickens, or Six Mile.

The NID also provides inundation area mapping and risk assessments for some high hazard dams across the County. However, at this time the NID does not contain risk information for any high hazard dams in or upstream of Pickens County. The HMPC will continue to check this resource for dam inundation data for future updates of this plan.

### *PEOPLE*

There are 37 high hazard dams in the planning area, which by definition would cause probable loss of life in the event of a failure. 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. According to NID records, an estimated 46 percent of high hazard dams in the planning area have an Emergency Action Plan, which means 54 percent of dams that should have an EAP in place do not. Additionally, even if they are able to evacuate in time, displaced persons may still incur sheltering costs.

Several of the dam uses are of minor importance, such as aesthetics or recreational use. However, two dam reservoirs in the planning area, Pickens City Reservoir and Table Rock Reservoir, serve as drinking water supplies. The failure of either of these dams could disrupt the drinking water supply and present a public health problem.

The vulnerability of people to specific levee failure events was estimated based on the count of residential properties located within the levee protected areas. Using the count of residential property exposure and the

U.S. Census Bureau average household size estimate for the county of 2.41, Table 5-8 presents estimates of population at risk for each levee.

**Table 5.8 Exposure of People to Levee Failure Events**

| Structure | Residential Property Exposed | Estimated Population Exposed |
|---|---|---|
| Town Creek Levee System | 0 | 0 |
| Clemson Diversion Levee System | 26 | 63 |

Source: USACE, Pickens County GIS, U.S. Census Bureau

## *PROPERTY*

### DAM FAILURE

No dam inundation area data could be obtained for analysis; therefore, property exposure could not be estimated for each dam. There are no historical dam failures in the County with which to estimate annualized loss. As noted above, based on inundation areas displayed on SCDHEC's web map, the unincorporated county, Clemson, Easley, and Norris could be impacted by dam failure.

In general, vulnerability of the built environment includes damage to the dam itself and any structures 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 can also occur. Interruption of roads, bridges, and utility service can prevent continuity of some operations and cause economic loss. There could also be costs associated with the loss of operations of a dam in addition to the cost to rebuild the dam to higher standards. 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.

### LEVEE FAILURE

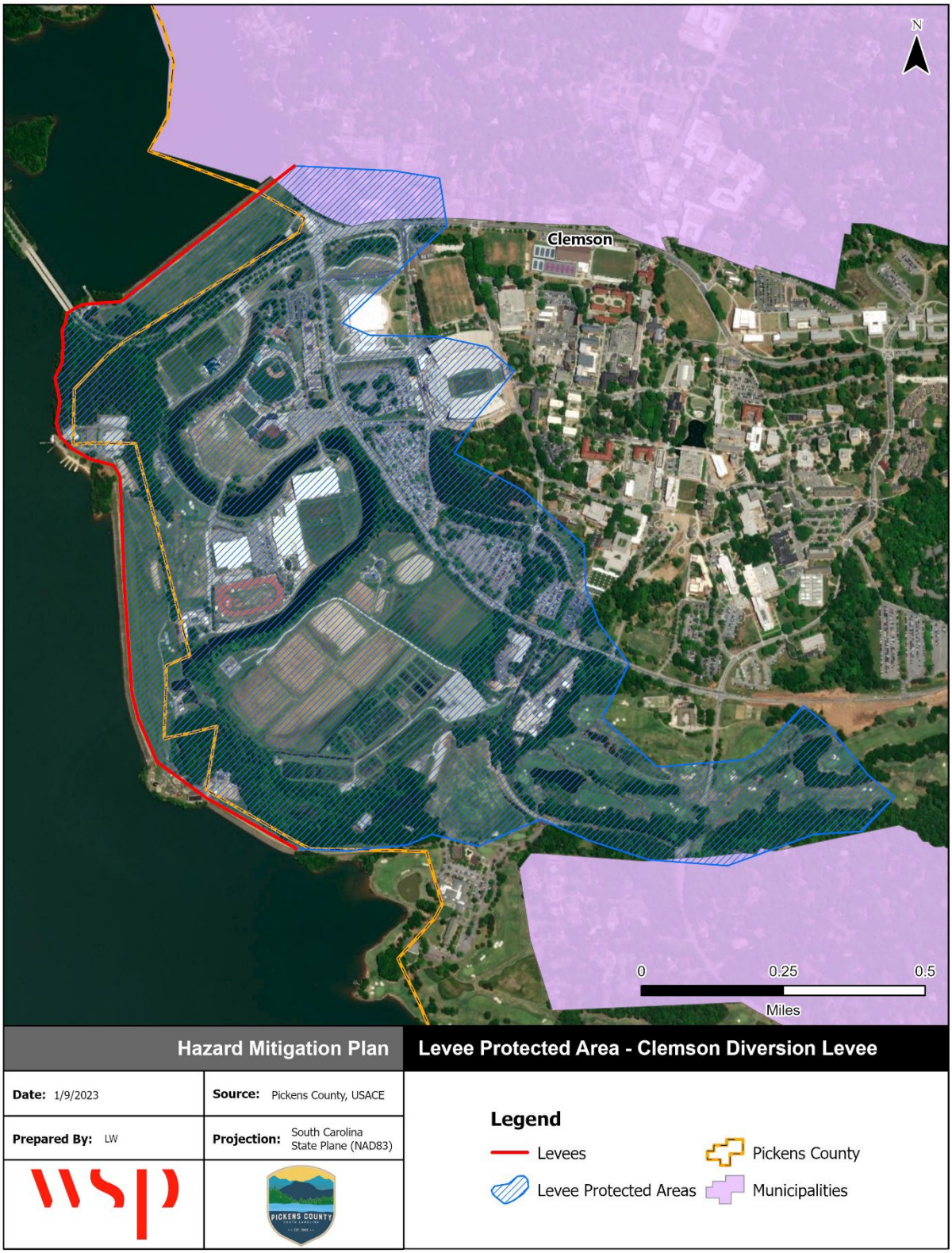
Property exposure to levee failure was estimated based on the extent of the levee protected area as mapped by the National Levee Database (NLD). Property and critical facilities in levee protected areas may be exposed to flooding in the event of a levee failure or overtopping.

Figure 5-7 and Figure 5-8 show the extent of each levee protected area and satellite imagery of the exposed development within these areas.

**Figure 5.9 Town Creek Levee System Protected Area**



**Figure 5.10 Clemson Diversion Levee System Protected Area**



According to the NLD, there is one parcel with a value of $120 million located in the area protected by the Town Creek Levee System, which appears to be a manufacturing and warehousing facility. There are no critical facilities within this levee protected area.

Property exposure by type in the area protected by the Clemson Diversion Levee System is summarized in Table 5-9. The only critical facility within this area is the Clemson University Police station, which is a Safety and Security lifeline.

**Table 5.9 Property Exposure to Clemson Diversion Levee System Failure**

| Occupancy | Estimated Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 3 | $5,455,584 | $5,455,584 | $10,911,168 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 1 | $12,000 | $18,000 | $30,000 |
| Religious | 0 | $0 | $0 | $0 |
| Residential | 26 | $12,279,337 | $6,139,669 | $18,419,006 |
| **Total** | **30** | **$17,746,921** | **$11,613,253** | **$29,360,174** |

Source: Pickens County GIS, USACE NLD

### *ENVIRONMENT*

Aquatic species within the reservoir of the dam will either be displaced or destroyed. The velocity of the flood wave will likely destroy downstream riparian and instream vegetation and destroy wetland function. The flood wave can 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. Upstream impacts may also occur, as headward erosion may change channel morphology, potentially causing degradation and habitat loss, at least temporarily until long-term equilibrium can be reestablished.

## CHANGES IN DEVELOPMENT

Development downstream of dams can significantly increase exposure. Dams are rated based on the potential impact of their failure. As development occurs, exposure downstream of a Significant Hazard dam may increase to the point that the dam should be rated as a High Hazard dam and require the associated Emergency Action Plan and more regular inspections. However, because inspections of Significant Hazard dams occur less frequently, there may be a delay in recognizing and acting on increases in risk.

It is also important to note that many residents of existing and new development may not know that they are located downstream of a dam. Similarly, residents in levee-protected areas may consider themselves safe from flooding as a result of the levee and may not understand their risk in the event of a levee failure.

## KEY ISSUES

- Dams are regulated by SC DHEC. Pickens County coordinates with DHEC to prepare for dam failure and conduct maintenance and mitigation on dams.
- There are 37 high hazard dams, and only 18 (48%) have an EAP. An EAP should be developed for the remaining high hazard dams. Other dams not rated high hazard do not require EAPs yet may have the potential to cause significant damage or loss of life due to subsequent downstream development.
- The average age of dams in Pickens County is 55 years. Older dams may require repairs and more regular maintenance.

- Residents and/or property owners may not be aware that they are located in a dam inundation area or a leveed area. This lack of awareness may increase vulnerability if residents and property owners are unprepared and/or unequipped to react in the event of a dam or levee failure.
- Inundation due to levee failure could impact the unincorporated County and Clemson University, but the probability of a levee failure is low.
- Related hazards: Flood

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes dam/levee failure risk by jurisdiction. Warning time and duration are inherent to the hazard and remain constant across jurisdictions. For jurisdictions with levees or dams upstream or within their boundaries, probability of failure is rated likely. Additionally, spatial extent of any dam failure will be small relative to the planning area, spatial extent of levee failure is inherent to the leveed area. For all other jurisdictions, probability is unlikely and spatial extent is negligible. Jurisdictions with high hazards dams upstream or within their boundaries were assigned an impact score of critical. All other jurisdictions were assigned an impact rating of limited.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 2 | 2 | 2 | 1 | 3 | 2.0 | M |
| Clemson | 3 | 3 | 2 | 1 | 3 | 2.6 | M |
| Easley | 3 | 3 | 2 | 1 | 3 | 2.6 | M |
| Liberty | 2 | 2 | 2 | 1 | 3 | 2.0 | M |
| Norris | 3 | 3 | 2 | 1 | 3 | 2.6 | M |
| Pickens | 2 | 2 | 2 | 1 | 3 | 2.0 | M |
| Six Mile | 2 | 2 | 2 | 1 | 3 | 2.0 | M |
| Unincorporated Pickens County | 3 | 3 | 2 | 1 | 3 | 2.6 | M |

# 5.5 DROUGHT

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Drought | Highly Likely | Limited | Large | More than 24 hrs | More than 1 week | 3.1 |

## HAZARD DESCRIPTION

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 5-10.

**Table 5.10 Types of Drought**

| Type | Details |
|---|---|
| **Meteorological Drought** | Meteorological Drought is based on the degree of dryness (rainfall deficit) and the length of the dry period. |
| **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. |
| **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. |
| **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. |

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.

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) is a measure of meteorological drought devised in 1965 and 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. One benefit of the PDSI is that it can capture impacts of climate change on drought because it accounts for key measures in evapotranspiration.

The **Standardized Precipitation Index** (SPI) is a way of measuring drought that, like the PDSI, is negative for drought and positive for wet conditions. However, 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).

By definition, drought develops and worsens over a period of time. It inherently has a slow speed of onset and a long duration. Additionally, due to the variety of indices for tracking drought, there is significant time to issue hazard warnings. Drought warnings can be regularly updated and allow for response to escalate depending on the severity of conditions.

***Warning Time: 1 – More than 24 hours***

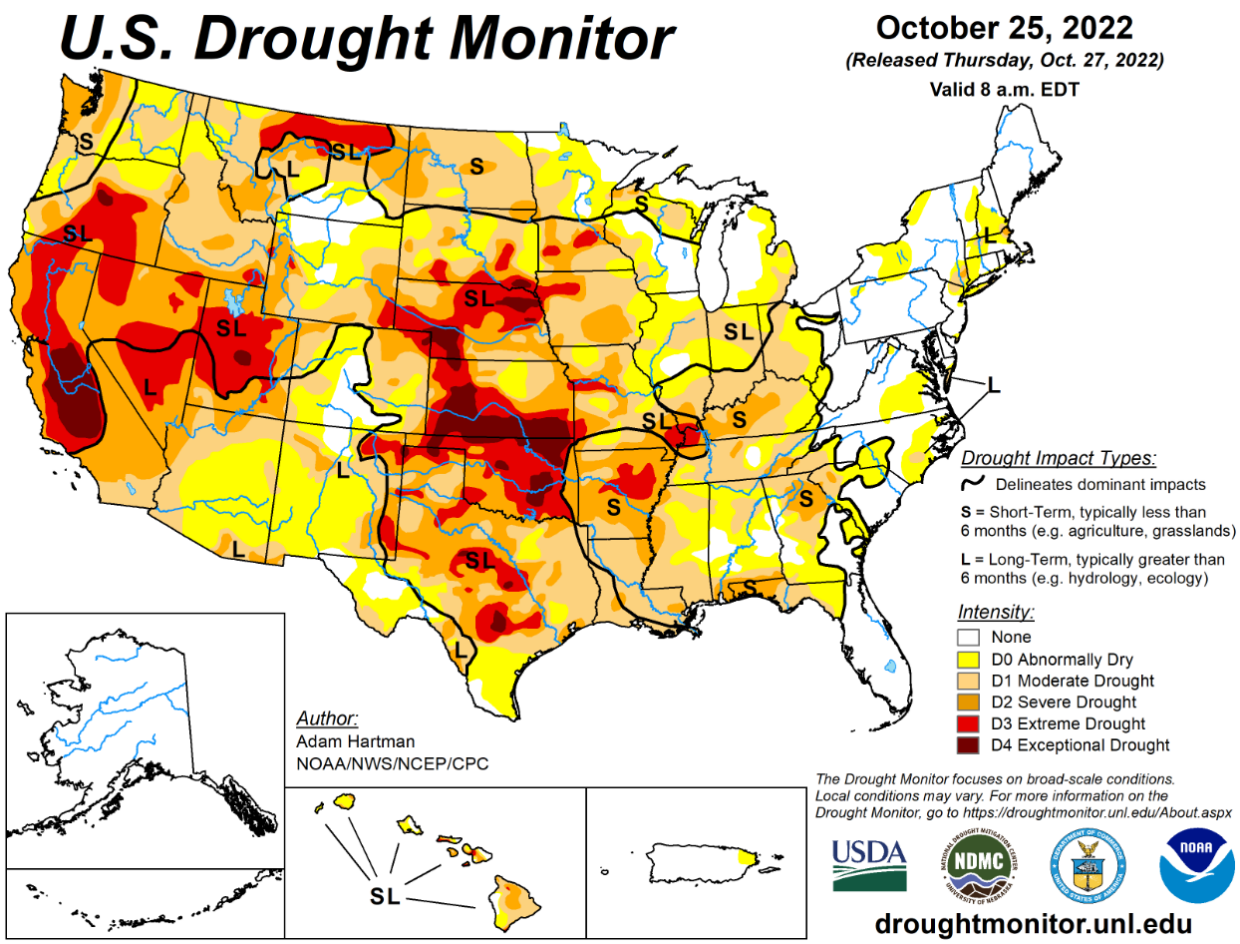
***Duration: 4 – More than one week***

The State of South Carolina adopted a Drought Response Plan specifies response strategies to varying levels of drought. These plan outlines state-level actions to assist and respond to drought.

## LOCATION

Drought is a regional hazard that can cover the entire planning area, and in some cases the entire state. The U.S. Drought Monitor map shown in Figure 5-9 below, depicts the current week's (October 25, 2022) drought conditions. According to the map, the Pickens County region of South Carolina is experiencing abnormally dry to moderate drought conditions. However, drought conditions can change quickly and are not confined to geographic or political boundaries. As a result, some areas may experience more severe drought events than what is shown on the map, and the map does not serve as a predictor of future conditions.

**Figure 5.11 US Drought Monitor National Conditions, Week of October 25, 2022**

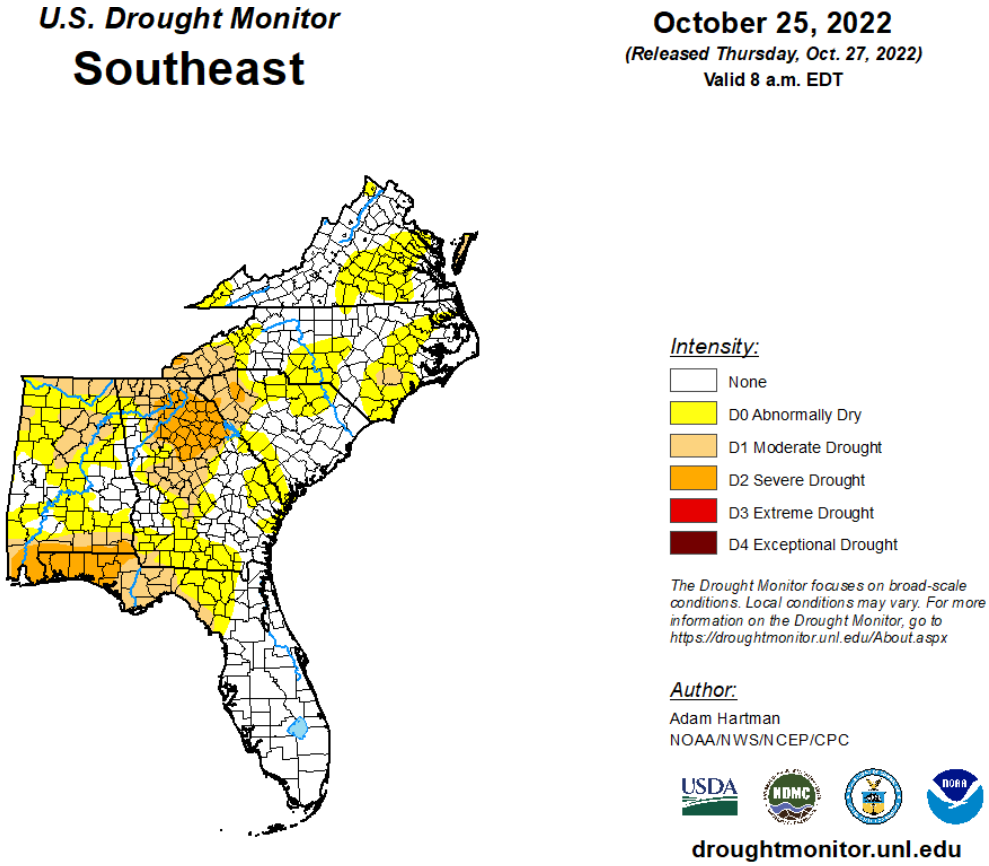



Source: NOAA National Weather Service, U.S. Drought Monitor, October 2022

Figure 5-10 provides the U.S. Drought Monitor's drought ratings for the southeast as of October 25, 2022; as of that date, the Pickens County was experiencing moderate drought conditions. The figure illustrates the large-scale, regional nature of drought.

***Spatial Extent: 4 – Large***

**Figure 5.12 US Drought Monitor for Week of October 25, 2022**




Source: NOAA National Weather Service, U.S. Drought Monitor, October 2022

## EXTENT

Drought extent can be defined 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 5-11 details the classifications used by the U.S. Drought Monitor and Figure 5-12 details impacts from past droughts in South Carolina and highlight expected impacts. A category of D2 (severe) on the U.S. Drought Monitor Scale can typically result in crop and livestock impacts, water conservation requirements, low river levels and dried up streams, and tree mortality.

**Figure 5.13 U.S. 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:<br>▪ short-term dryness slowing planting, growth of crops or pastures<br>Coming out of drought:<br>▪ some lingering water deficits<br>▪ 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<br>▪ Streams, reservoirs, or wells low, some water shortages developing or imminent<br>▪ 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<br>▪ Water shortages common<br>▪ 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<br>▪ 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<br>▪ 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: U.S. Drought Monitor

**Figure 5.14 Possible Impacts by U.S. Drought Monitor Category in South Carolina**

| Category | Historically observed impacts |
|---|---|
| D0 | Row crop growth is stunted, irrigation begins early |
| | Brush fires increase |
| D1 | Peach size is reduced; non-irrigated corn shows severe stress |
| | Fire risk increases; tree pests increase |
| | Water use is high; creeks, streams, and lakes are low |
| | Voluntary conservation of water and energy is requested |
| D2 | Cattle are lighter, producers are selling calves early and feeding cattle earlier |
| | Number of fires increases, and fires are more intense |
| | Fisheries are impacted; duck hunting areas close |
| | Boating recreation is compromised |
| | River and lake levels are low; saltwater intrusion occurs; hydroelectric power production is reduced |
| D3 | Hay is scarce and expense; owners are giving away horses |
| | Soil moisture is low, winter crops are slow to germinate |
| | Burn bans begin |
| | Small aquatic species are stressed |
| | Mandatory water restrictions are implemented, violators are fined; lake outflow is low |
| D4 | Producers are hauling water for cattle; auctions see record number of cattle |
| | Trees are stressed; fish are dying |
| | Daily life is compromised |
| | Wells are contaminated or running dry; lakes are extremely low with hazards exposed |

Source: U.S. Drought Monitor

The longest duration of drought to South Carolina in the past 22 years occurred when the state spent 156 weeks from January 2000 to December 2002 in moderate to exception drought. The most intense drought period occurred the week of August 20th, 2002, where D4 affected 50.71% of South Carolina.

***Impact: 2 – Limited***

## HISTORICAL OCCURRENCES

U.S. Drought Monitor records drought intensity weekly throughout the country. Table 5-11 presents the number of weeks that any portion of Pickens County spent in drought by intensity over the period from 2000 through 2022, for which the Drought Monitor has records for 1,192 weeks. Each week is attributed to the most severe drought category present in the County for that week.

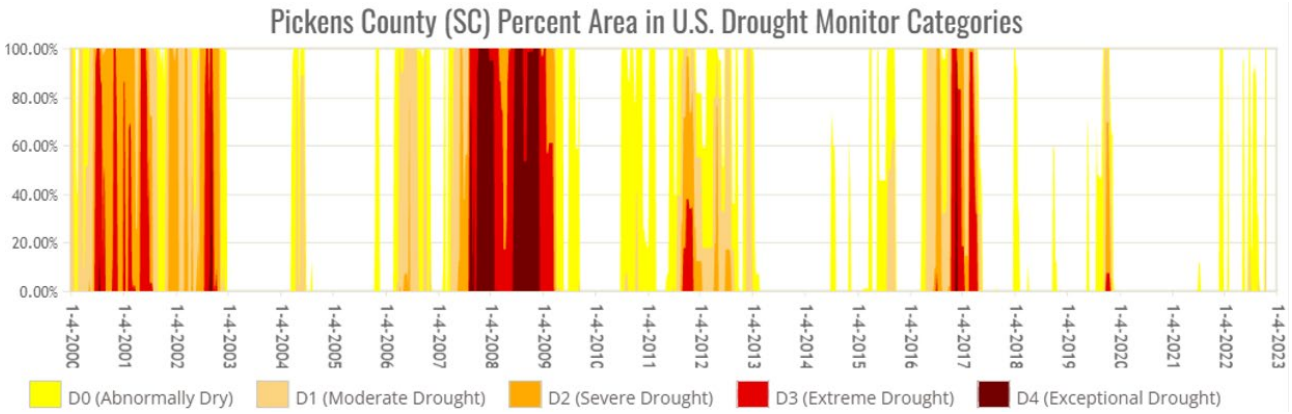
**Table 5.11 Weeks in Drought, 2000-2022**

| Weeks in Drought | | | | | | % of time in Severe Drought or Worse |
|---|---|---|---|---|---|---|
| Total | D0 | D1 | D2 | D3 | D4 | |
| 1,535 | 617 | 432 | 271 | 163 | 52 | 31.7% |

Source: U.S. Drought Monitor

Figure 5-13 shows the historical periods where the county was considered in some level of drought condition, between 2000 and 2022.

**Figure 5.15 US Drought Monitor Historical Trends – Pickens County**




Source: U.S. Drought Monitor

Table 5-12 summarizes the U.S. Drought Monitor data shown above to indicate the most severe drought condition reported each year.

**Table 5.12 Summary of Historical Drought Severity in Pickens County**

| Year | Severity |
|---|---|
| 2000 | Exceptional (D4) |
| 2001 | Extreme (D3) |
| 2002 | Exceptional (D4) |
| 2003 | No Drought |
| 2004 | Severe (D2) |
| 2005 | Abnormally Dry (D0) |
| 2006 | Moderate (D2) |
| 2007 | Exceptional (D4) |
| 2008 | Exceptional (D4) |
| 2009 | Extreme (D3) |
| 2010 | Moderate (D1) |
| 2011 | Extreme (D3) |
| 2012 | Moderate (D2) |
| 2013 | Moderate (D1) |
| 2014 | Abnormally Dry (D0) |
| 2015 | Moderate (D1) |
| 2016 | Exceptional (D4) |
| 2017 | Extreme (D3) |
| 2018 | Abnormally Dry (D0) |
| 2019 | Extreme (D3) |
| 2020 | No Drought |
| 2021 | Abnormally Dry (D0) |
| 2022 | Moderate (D1) |

Source: U.S. Drought Monitor

Data from the South Carolina State Climate Office was also reviewed to obtain additional information on historical drought events that may have been larger in scale or more regional in nature. These events are identified in Table 5-13. No additional records were noted by the State Climatologist since 2016.

**Table 5.13 Notable Historical Drought Occurrences in the State of South Carolina**

| Year | Area Affected | Impact Type |
|---|---|---|
| 1910-1911 | Statewide | Water Systems |
| 1925-1927 | Regional (Carolinas) | Agriculture, Water Systems, Business & Industry |
| 1930-1935 | Statewide | Agriculture |
| 1950-1957 | Statewide | Agriculture, Fire |
| 1985-1986 | Statewide | Agriculture, Fire, Recreation |
| 1998-2002 | Statewide | Agriculture, Fire, Water Supply, Tourism & Recreation, Business & Industry |
| 2007-2009 | Statewide | Water Systems, Tourism & Recreation, Agriculture |
| 2010-2013 | Western South Carolina | Water Systems, Tourism & Recreation |
| 2015-2016 | Piedmont and Upstate | Fire |

Source: SC State Climate Office

The National Drought Mitigation Center (NDMC), located at the University of Nebraska in Lincoln, provides a clearinghouse for information on the effects of drought, based on reports from media, observers, impact records, and other sources. According to the NDMC's Drought Impact Reporter, during the 22-year period from 2000 through 2022, 1,342 county-level drought impacts were noted for the State of South Carolina, of which 30 were reported to affect Pickens County. Table 5-14 summarizes the number of impacts reported by category and the years impacts were reported for each category. Note that the Drought Impact Reporter may assign multiple categories to each impact, and multiple impacts may be reported for a single year.

**Table 5.14 Drought Impacts Reported for Pickens County, 2000-2022**

| Category | Impacts | Years Reported |
|---|---|---|
| Agriculture | 11 | 2011, 2012, 2015, 2016, 2019, 2020, 2022 |
| Business & Industry | 1 | 2011, 2012 |
| Energy | 2 | 2016 |
| Fire | 8 | 2019, 2022 |
| Plants & Wildlife | 3 | 2019, 2020 |
| Relief, Response & Restrictions | 26 | 2011, 2012, 2015, 2016, 2017, 2019, 2020, 2022 |
| Society & Public Health | 5 | 2016, 2017, 2019 |
| Tourism & Recreation | 2 | 2016, 2019 |
| Water Supply & Quality | 12 | 2012, 2015, 2016, 2019, 2020 |

Source: Drought Impact Reporter, https://droughtimpacts.unl.edu/

There are 73 records of drought for Pickens County recorded by NCEI between 1998 and 2022, with the most recent reports occurring in 2016. The following provides a typical narrative for the types of drought events recorded in the NCEI database:

**July 1, 1998** – Dry weather continued through most of the month of July, affecting crops during the critical part of the growing season. Corn and other vegetables sustained the most damage.

**July 15, 1999** – A long term dry spell became a drought in July as no rainfall affected the region. The lack of rain and temperatures well into the 90s, and above 100 degrees, began to cause significant damage to crops.

**August 1, 1999** – Drought conditions worsened during August as high evaporation rates and little rainfall occurred. Water restrictions began in several communities. Hay and late crops dried up in many counties.

Ponds and wells began to dry up, affecting homeowners, farmers, and businesses such as nurseries. Boaters were running aground on recreational lakes due to low water levels.

**August 31, 2000** – A two-year drought was reaching a critical stage by late summer. Many 80-to-100-foot wells began going dry. Area lakes were at record low levels causing property damage to docks, boats, etc.

**November 1, 2000** – The long-term drought continued to affect the region. Rainfall during the month was near or slightly above normal, but this had little effect on the ground water levels. Numerous wells dried up during the fall, and well borers and drillers could not keep up with the demand. Large lakes reported record low levels and some communities continued or initiated water control measures.

**May 1, 2001** – Unprecedented drought conditions continued in upstate South Carolina. Hundreds of apple trees in western South Carolina were being cleared because of the lack of production caused by three years of drought. The Greenville Water System asked for voluntary water restrictions for the first time in its history. Some streams and rivers reached record low flow levels.

**August 1, 2002** – The effects of the long-term drought continued to take their toll on water supplies in Upstate communities in August. Many creeks and small streams reached their lowest levels in memory, while water levels on area lakes were as much as 10 feet below full pond. Mandatory water restrictions were imposed in some communities.

**May 1, 2004** – A period of dry weather began in August of 2003 culminated in moderate drought conditions across the Upstate by late spring of 2004. Streamflow and lake levels were running below normal, and some communities began instituting water restrictions.

**May 1, 2007** – The effects of an extended period of dry weather were exacerbated by an abnormally dry May, with many locations reporting one of the driest Mays in recorded history. By the end of May, many climatological stations were reporting yearly rainfall deficits as high as 10 inches. The result was severe to extreme drought conditions across much of western Upstate South Carolina by the end of the month. The very dry conditions added to agriculture hardships caused by a hard freeze and widespread damaging winds in April.

**July 1, 2008** – Unusually dry weather continued through the month of July, with severe to extreme drought conditions persisting across the area. Locations across Upstate South Carolina and extreme western North Carolina reported annual rainfall deficits of nearly 11 inches by the end of the month. Water well levels began to descend below record low levels, most of which were recorded during the 1999-2002 drought. Most major streams across the area continued to run 1-10 percent of normal flow. Agriculture continued to be hard hit, with some areas reporting a 100 percent loss of the corn crop.

**August 1, 2008** – During the early part of the month, flows on most of the major streams across the area were running at record low levels. Only a handful of streams were running at more than 1% to 7% percent of normal. Groundwater levels were 2-5 feet below normal. Significant agricultural impacts persisted, with losses to summer crops, including hay, estimated at 30%. The dry weather also affected the livestock industry, due to shortages of pasture crops necessary for feeding. By the end of the month, Tropical Storm Fay had dropped several inches of rainfall in parts of the area, providing some relief from the drought conditions.

**October 1, 2016** – Another month of meager rainfall and unusually warm temperatures, in which most locations across the northwest Piedmont and foothills of South Carolina saw less than a half inch of precipitation resulted in exacerbation of the drought conditions that began across the area during late Spring. Total rainfall from May through October ranged only from 10-13 inches across this area, which is roughly half of the normal amount. The main agricultural impact was to pastureland, as hay production was down as much as 50%. Unirrigated soybean crops were also damaged, with production down as much as 50% in some locations. Water levels on area reservoirs and stream flows on waterways remained well below normal, and voluntary water restrictions remained in place in some communities.

## PROBABILITY OF FUTURE OCCURRENCE

Over the 22-year period from 2000 to 2022, for which the U.S. Drought Monitor reports on 1,192 weeks, Pickens County experienced drought conditions ranging from abnormally dry to extreme drought every year, with drought recorded for a total of 918 weeks or 77% of that time period.

Taken together as periods of drought, the county experienced 77 separate periods of drought over the 22-year period from 2000 through 2022 where drought conditions reached or surpassed abnormally dry (D0) in at least 1 percent and up to 100 percent of the county. The length of these drought varied from 2 weeks to 152 weeks. In 31 of these periods of drought, conditions met or surpassed severe (D2) levels.

While severity may vary, given the historical record and the impacts of climate change (discussed below), drought is highly likely to occur in any given year (near 100 percent annual probability).

***Probability: 4 – Highly Likely***

## CLIMATE CHANGE

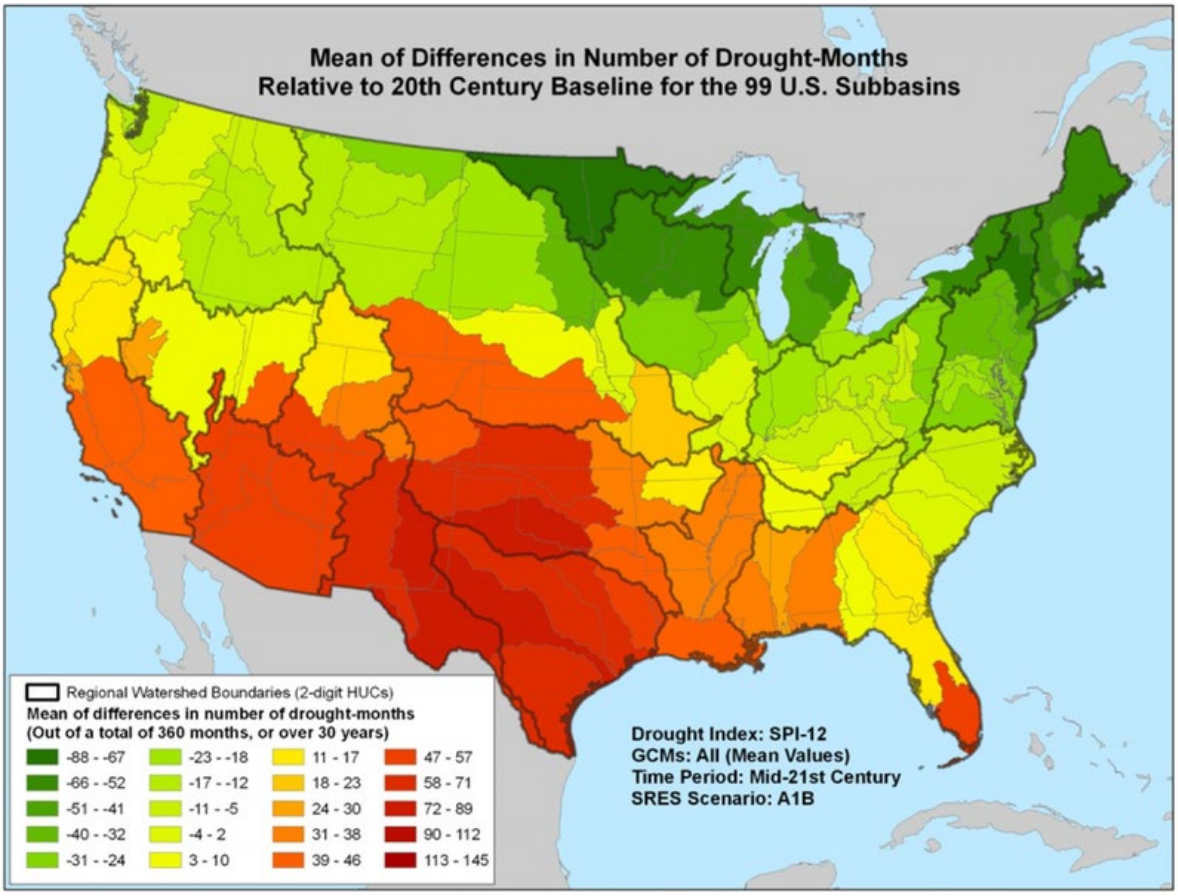
The Fourth National Climate Assessment reports that average and extreme temperatures are increasing across the country and average annual precipitation is decreasing in the Southeast. Heavy precipitation events are becoming more frequent, meaning that there will likely be an increase in the average number of consecutive dry days between rainfall events. 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.

Research conducted at the MIT Joint Program on the Science and Policy of Global Change suggests increasing frequency of drought across much of the southern U.S., with the Pickens County area and much of South Carolina projected to experience an average increase of 3 to 10 months of drought over a 30-year period, as shown in Figure 5-14.

The U.S. Climate Resilience Toolkit Climate Explorer is a tool that shows how climate conditions in the U.S. are projected to change over the coming decades. The Climate Explorer provides projections for two possible futures: one in which humans drastically reduce and stabilize global emissions of heat-trapping gases (labeled Lower emissions, also known as RCP4.5), and one in which we continue increasing emissions through the end of the 21st century (labeled Higher emissions, also known as RCP8.5).

One of the variables the tool estimates is the number of dry days per year, or the number of days with less than 0.01 inches of precipitation. Under the higher emissions scenario, it is estimated that by 2060 Pickens County will experience 177 dry days per year on average.

**Figure 5.16 Projected Mean Changes in the Number of Drought Months**




Source: Strzepek et al., 2010

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Drought can cause anxiety or depression about economic losses, conflicts over water shortages, reduced incomes, and fewer recreational activities. Farmers and agricultural producers are particularly vulnerable. Efforts to mitigate, such as using irrigation, have a high initial cost, including the need for an increase in management, cost of operations and maintenance, and lack of good quality water resources affected during drought. |
| Responders | Impacts to responders are unlikely. Exceptional drought conditions may impact the amount of water immediately available to respond to structure fire and 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. During prolonged or intense drought, alternative water supplies may be needed, or water restrictions may be put in place. |
| 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 and seek alternate supplies. Irrigation and outdoor landscaping would be affected, as would recreational uses, such as golf courses. |

| Category | Consequences |
|---|---|
| Environment | Environmental impacts include strain on local plant and wildlife; increased probability of wildfire; and decreased water quality. Pollution may increase due to lack of rainwater to dilute industrial and agricultural chemical runoff. Dry soil may result in instability, leading to erosion. These changes may cause habitat degradation through loss of wetlands, lake capacity, and vegetation. |
| 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 | Public confidence is unlikely to be severely impacted. However, when drought conditions persist with no relief, local or State governments must often institute water restrictions, which may impact public confidence. |

## VULNERABILITY ASSESSMENT

### *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 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 life.

### *PROPERTY*

Drought is unlikely to cause damages to the built environment, but it may cause severe property loss for the agricultural industry in terms of crop and livestock losses. According to the South Carolina Farm Bureau agribusiness is South Carolina's largest economic sector contributing nearly $42 billion and over 200,000 jobs to the state's economy. The most recent USDA Census of Agriculture (2017) estimates around 740 farms in Pickens County totaling 39,331 acres. There around 1,197 farmers in the county that have sold around $6.6 million in market value crops.

The USDA's Risk Management Agency (RMA) maintains a database of all paid crop insurance claims, with detail on the cause of losses. According to these records, Pickens County has had $1,335.20 in crop insurance claims for 85 acres affected by drought.

**Table 5.15 Crop Losses Due to Drought, Pickens County, 2000-2020**

| Year | Determined Acres | Indemnity Amount |
|---|---|---|
| 2000 | 65.0 | $919.20 |
| 2007 | 20.0 | $416.00 |
| **Total** | **85.0** | **$1,335.20** |

Source: USDA Risk Management Agency, Cause of Loss Records

### *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.

Another concern during a drought is that contaminants such as pesticides and fertilizers may concentrate in the soil as precipitation wanes and then enter waterways during heavy rains and flooding. This can threaten water quality with repercussions for agriculture, drinking water supply, and local plants and wildlife.

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.

## CHANGES IN DEVELOPMENT

Drought is predominantly controlled by larger weather patterns and less by human development. However, increased development and associated increases in impervious surfaces would mean less surface water would be able to directly infiltrate into the ground. Additionally, as population grows, water demand will likely increase, which could lower the threshold for socioeconomic drought – an inability of water supply to meet water demand.

According to the USDA Census of Agriculture, from 2012 to 2017, Pickens County's acres of farmland decreased from 39,331 acres to 34,217 acres. This trend suggests that changes in development are resulting in lower overall agricultural exposure to drought.

## KEY ISSUES

- In the County, Agriculture is responsible for 1,197 jobs and a total output of over $6.6 million. Extended periods of drought in the County may have large economic impacts.
- Past droughts have increased incidence of wildfire across the Southeast.
- Related Hazards: Extreme Heat, Wildfire

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes drought hazard risk by jurisdiction. Drought risk is largely uniform across the planning area. Warning time, duration, and spatial extent are inherent to the hazard and remain constant across jurisdictions. The majority of damages that result from drought are to water- and agriculture-dependent industries, which require water supply for irrigation and maintenance; therefore, the magnitude of the impacts is typically greater in areas with these industries. In more heavily developed areas, drought impacts may be limited to lawns and local gardens, but potential impacts on local water supplies may arise during severe, prolonged drought.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 4 | 2 | 4 | 1 | 4 | 3.1 | H |
| Clemson | 4 | 2 | 4 | 1 | 4 | 3.1 | H |
| Easley | 4 | 2 | 4 | 1 | 4 | 3.1 | H |
| Liberty | 4 | 2 | 4 | 1 | 4 | 3.1 | H |
| Norris | 4 | 2 | 4 | 1 | 4 | 3.1 | H |
| Pickens | 4 | 2 | 4 | 1 | 4 | 3.1 | H |
| Six Mile | 4 | 2 | 4 | 1 | 4 | 3.1 | H |
| Unincorporated Pickens County | 4 | 2 | 4 | 1 | 4 | 3.1 | H |

# 5.6 EARTHQUAKE

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Earthquake | Possible | Minor | Moderate | Less than 6 hours | Less than 6 hours | 2.0 |

## HAZARD DESCRIPTION

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.

Earthquakes can affect hundreds of thousands of square miles and can cause major damage to property and loss of life or injury in the affected area. Most property damage and deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site, and regional geology.

Earthquakes generally occur with little to no warning and last for a short period of time. However, earthquakes can often be followed by periods of aftershocks that vary in severity but can compound damages.

***Warning Time: 4 – Less than 6 hours***

***Duration: 1 – Less than 6 hours***

## LOCATION

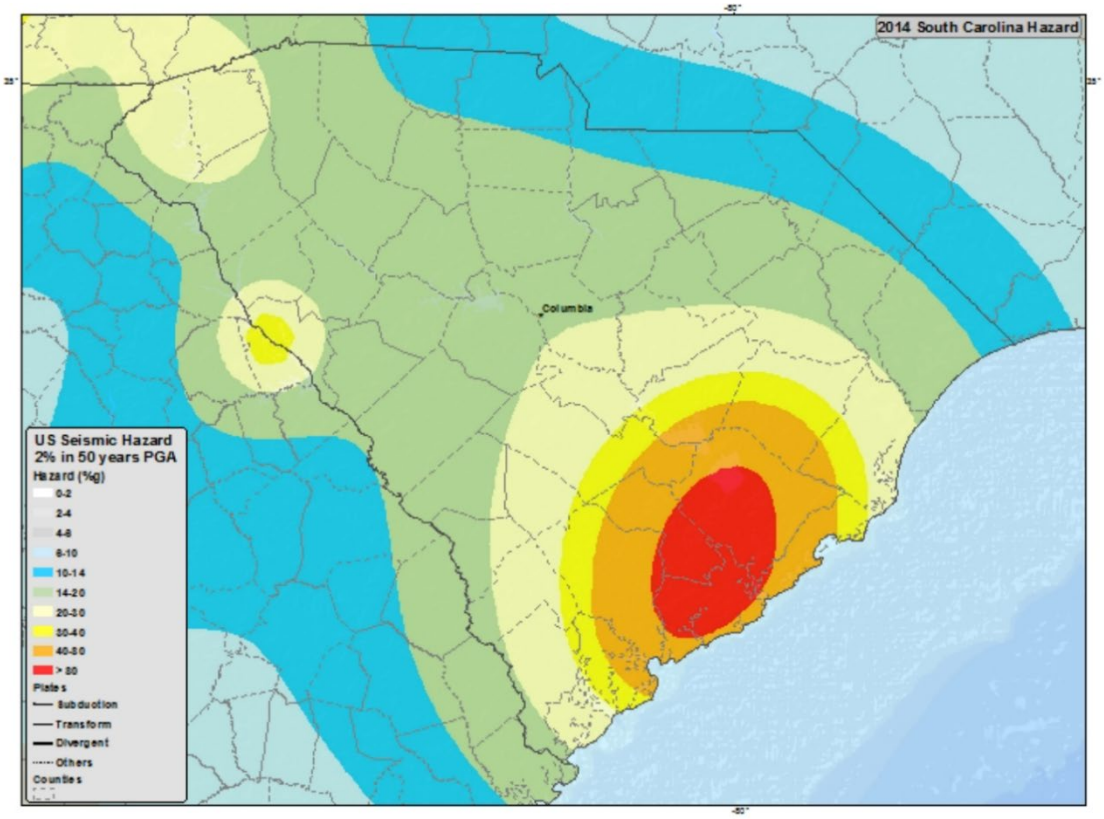
All of South Carolina is subject to earthquakes, with the coastal region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8.0 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout South Carolina. According to South Carolina Emergency Management, about 70 percent of South Carolina earthquakes are located in the Middleton Place-Summerville Seismic Zone.

Figure 5-15 on the following page depicts the earthquake intensity level for South Carolina based on the national USGS map of peak ground acceleration (PGA) with 2 percent probability of exceedance in 50 years. This is the probability that ground motion will reach a certain level during an earthquake. The data shows PGA (the fastest measured change in speed for a particle at ground level that is moving horizontally due to an earthquake) with a 2 percent probability of exceedance in 50 years. According to this map, Pickens County lies within an approximate zone with risk of PGA between 20 – 30 percent activity. This indicates that the region as a whole exists within an area at risk of moderate seismic activity.

Earthquakes are generally felt over a wide area, with impacts occurring hundreds of miles from the epicenter. Therefore, any earthquake that impacts Pickens County is likely to be felt across most if not all of the planning area.

***Spatial Extent: 3 – Moderate***

**Figure 5.17 Seismic Hazard Information for South Carolina**




Source: USGS 2014 Seismic Hazard Map – South Carolina

## EXTENT

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude. A description of the Richter Scale is given in Table 5-16.

**Table 5.16 Richter Scale**

| Magnitude | Effects |
|---|---|
| **Less than 3.5** | Generally, not felt, but recorded. |
| **3.5 – 5.4** | Often felt, but rarely causes damage. |
| **5.4 – 6.0** | At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions. |
| **6.1 – 6.9** | Can be destructive in areas up to 100 kilometers across where people live. |
| **7.0 – 7.9** | Major earthquake. Can cause serious damage over larger areas. |
| **8.0 or greater** | Great earthquake. Can cause serious damage in areas several hundred kilometers across. |

Source: FEMA

Although the Richter scale is usually used by the news media when reporting the intensity of earthquakes and is the scale most familiar to the public, the scale currently used by the scientific community in the United States is the Modified Mercalli Intensity (MMI) scale. The MMI scale is an arbitrary ranking based on observed effects. It describes the intensity of an earthquake at a particular location. Lower numbers of the MMI scale generally deal with the manner in which the earthquake is felt by people, while higher

numbers are generally based on observed structural damage. Figure 5-16 shows descriptions for levels of earthquake intensity on the MMI scale.

**Figure 5.18 Modified Mercalli Intensity (MMI) Scale Felt Intensities**

| CIIM Intensity | People's Reaction | Furnishings | Built Environment | Natural Environment |
|---|---|---|---|---|
| I | Not felt | | | Changes in level and clarity of well water are occasionally associated with great earthquakes at distances beyond which the earthquakes felt by people. |
| II | Felt by a few. | Delicately suspended objects may swing. | | |
| III | Felt by several; vibration like passing of truck. | Hanging objects may swing appreciably. | | |
| IV | Felt by many; sensation like heavy body striking building. | Dishes rattle. | Walls creak; window rattle. | |
| V | Felt by nearly all; frightens a few. | Pictures swing out of place; small objects move; a few objects fall from shelves within the community. | A few instances of cracked plaster and cracked windows with the community. | Trees and bushes shaken noticeably. |
| VI | Frightens many; people move unsteadily. | Many objects fall from shelves. | A few instances of fallen plaster, broken windows, and damaged chimneys within the community. | Some fall of tree limbs and tops, isolated rockfalls and landslides, and isolated liquefaction. |
| VII | Frightens most; some lose balance. | Heavy furniture overturned. | Damage negligible in buildings of good design and construction, but considerable in some poorly built or badly designed structures; weak chimneys broken at roof line, fall of unbraced parapets. | Tree damage, rockfalls, landslides, and liquefaction are more severe and widespread wiht increasing intensity. |
| VIII | Many find it difficult to stand. | Very heavy furniture moves conspicuously. | Damage slight in buildings designed to be earthquake resistant, but severe in some poorly built structures. Widespread fall of chimneys and monuments. | |
| IX | Some forcibly thrown to the ground. | | Damage considerable in some buildings designed to be earthquake resistant; buildings shift off foundations if not bolted to them. | |
| X | | | Most ordinary masonry structures collapse; damage moderate to severe in many buildings designed to be earthquake resistant. | |

Source: USGS

Table 5-17 approximates the Richter Scale magnitudes that would correspond with certain intensities on the MMI scale.

**Table 5.17 Comparison of Modified Mercalli Scale and Richter Scale**

| MMI Scale | Corresponding Richter Scale Magnitude |
|---|---|
| I | - |
| II | <4.2 |
| III | - |
| IV | - |
| V | <4.8 |
| VI | <5.4 |
| VII | <6.1 |
| VIII | - |
| IX | <6.9 |
| X | <7.3 |
| XI | <8.1 |
| XII | >8.1 |

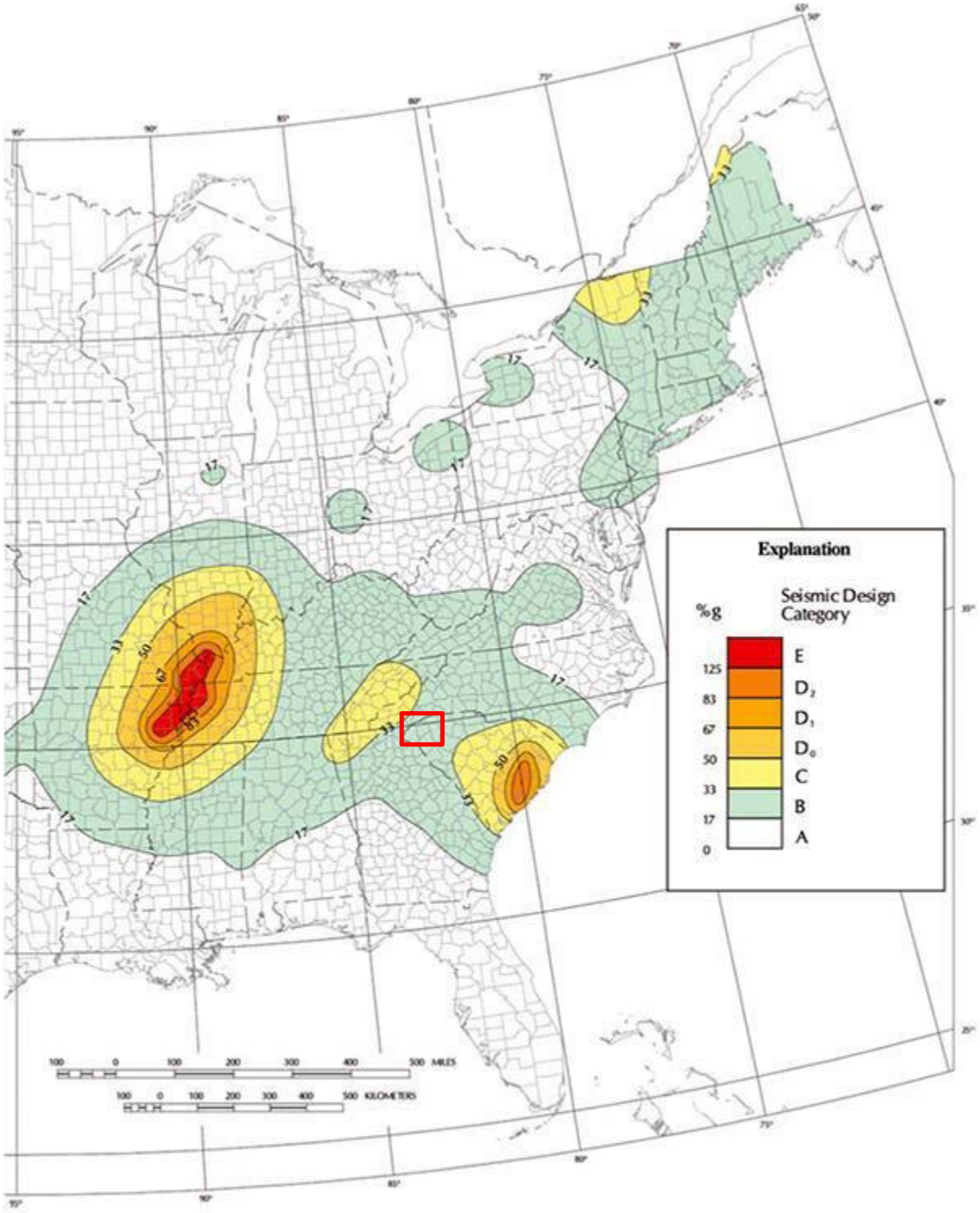
Source: FEMA

While there have not been any large-scale earthquakes in South Carolina in recent years, a 2001 study (Comprehensive Seismic Risk and Vulnerability Study for the State of South Carolina) confirmed the state is extremely vulnerable to earthquake activity.

The two most significant historical earthquakes to occur in South Carolina were the 1886 Charleston/Summerville earthquake and the 1913 Union County earthquake. The 1886 earthquake in Charleston was the most damaging earthquake to ever occur in the eastern United States. In terms of lives lost, human suffering and devastation, this was the most destructive United States earthquake in the 19th century. However, according to FEMA's Seismic Design Category (SDC) mapping shown in Figure 5-17, Pickens County (shown in the red rectangle) falls completely within SDC Category B, which indicates potential for shaking of moderate intensity but only slight damage with a few instances of fallen plaster and/or moved furniture.

***Impact: 1 – Minor***

**Figure 5.19 Seismic Design Category Mapping for the Eastern U.S.**




Source: FEMA
Note: Pickens County indicated by red rectangle.

## HISTORICAL OCCURRENCES

A list of earthquakes that have affected South Carolina from 1886 to 1971 is presented below in Table 5-18. This information is based on the USGS earthquake history for South Carolina and is not an exhaustive list of all seismic activity affecting the State. Where available, magnitude based on the Richter Scale is listed, otherwise intensity based on the Modified Mercalli scale is listed for the identified location.

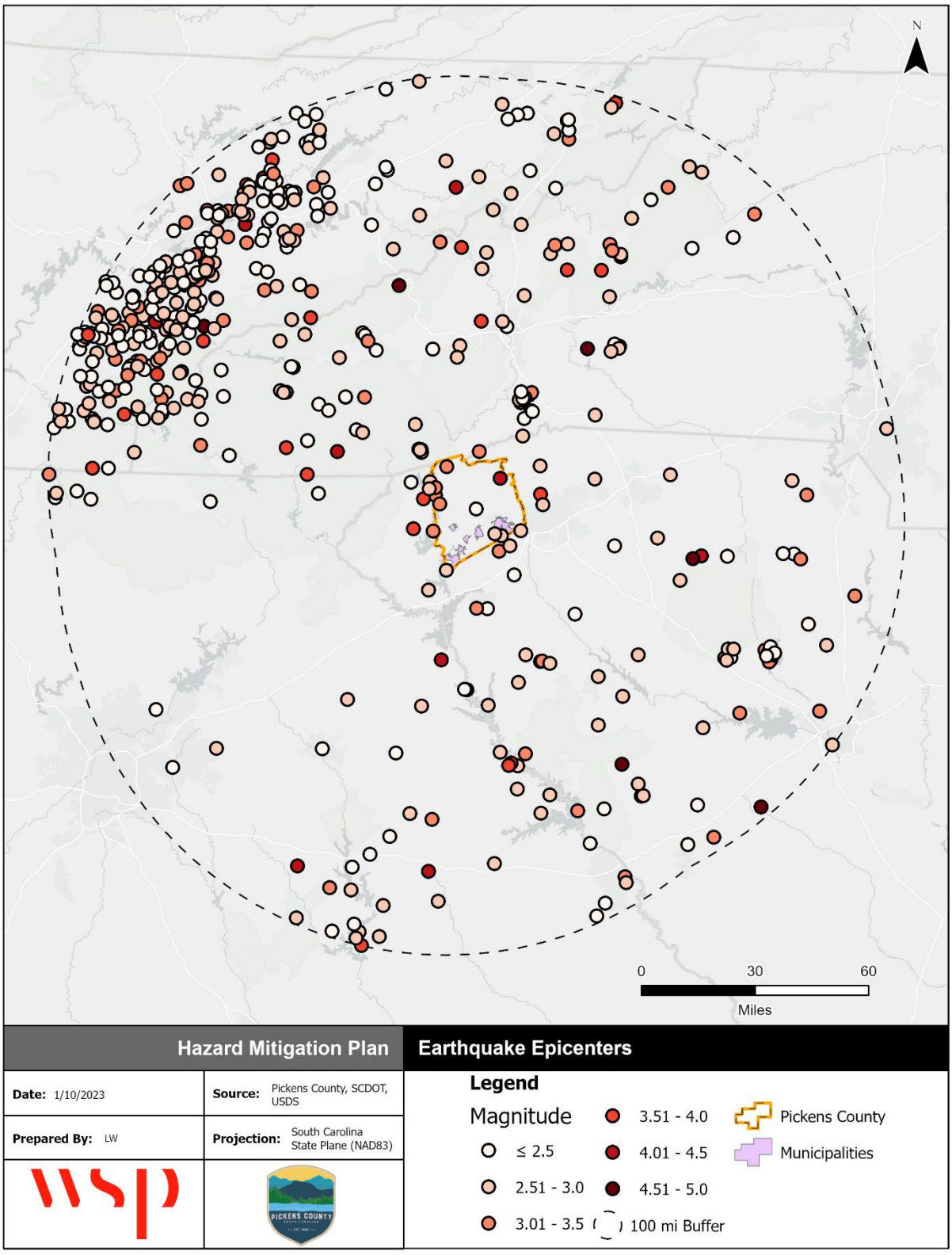
**Table 5.18 Major Earthquakes Affecting South Carolina**

| Date | Location | Magnitude/Intensity |
|---|---|---|
| 8/31/1886 | Charleston, SC | 7.3 |
| 1/23/1903 | Charleston, SC | IV |
| 4/19/1907 | Charleston, SC | V |
| 6/12/1912 | Charleston, SC | VI |
| 1/01/1913 | Union County, SC | VII |
| 9/22/1914 | Charleston, SC | IV |
| 10/20/1924 | Pickens County, SC | V |
| 7/26/1945 | Lake Murray, SC | V |
| 11/19/1952 | Charleston, SC | -- |
| 10/20/1958 | Anderson, SC | V |
| 8/03/1959 | Charleston, SC | VI |
| 10/26/1959 | Chesterfield, SC | V |
| 3/12/1960 | Off South Carolina Coast | -- |
| 7/23/1960 | Charleston, SC | -- |
| 4/20/1964 | Gaston, SC | V |
| 10/23/1967 | Charleston, SC | -- |
| 5/19/1971 | Orangeburg, SC | 3.4 |
| 7/13/1971 | Newry, SC | VI |

Source: USGS South Carolina Earthquake History

USGS also maintains a record of historical earthquake data with information on the earthquake epicenter and magnitude. Figure 5-18 shows historical earthquake epicenters within 100 miles of Pickens County from 1900 to 2022. There have been many earthquake events within this zone of analysis; however, none have been greater than a magnitude 5.0 event at the epicenter. Additionally, none of these events have caused significant shaking in Pickens County.

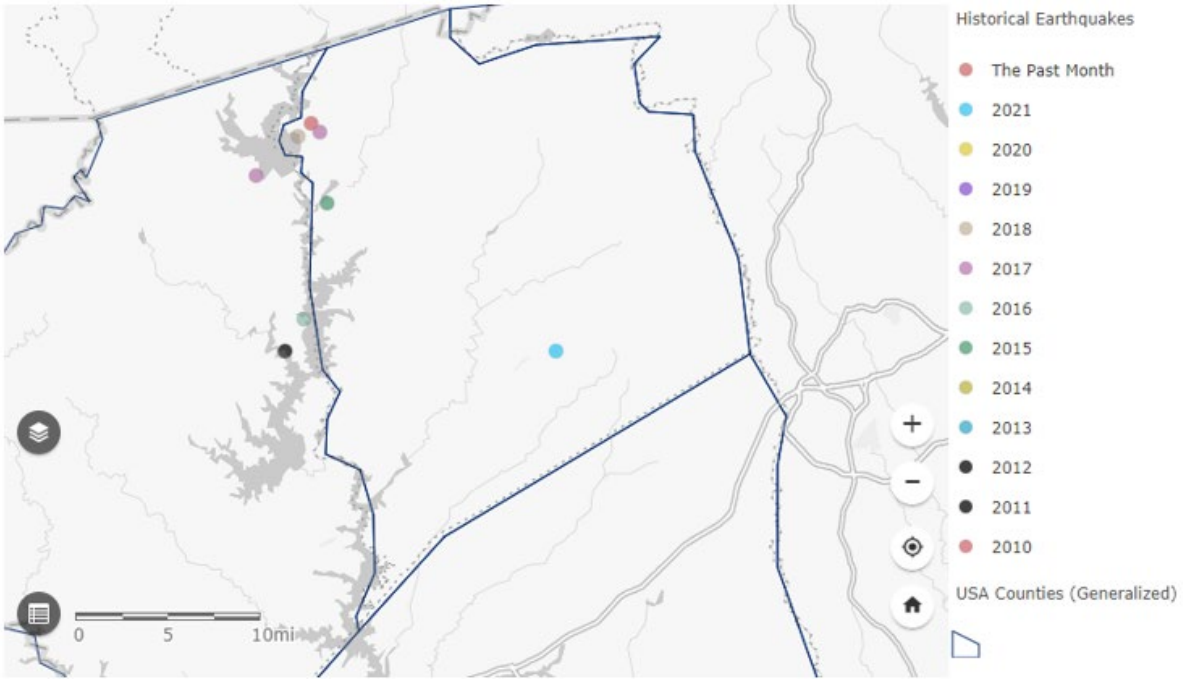
**Figure 5.20 Historical Earthquake Epicenters within 100 Miles of Pickens County, 1900-2022**




Source: USGS

South Carolina Emergency Management Division also maps recent earthquake activity in the State. Figure 5-19 below shows five earthquakes that have occurred in Pickens County since 2010.

**Figure 5.21 Pickens County Earthquakes 2010 – 2021**




Source: SCEMD; https://www.scemd.org/prepare/types-of-disasters/earthquakes/

Table 5-19 lists earthquakes that have impacted the Pickens County region since 1971 and reports the felt intensity of those earthquakes within the region. This list illustrates the relatively low level of intensity that generally impacts Pickens County from earthquake events. According to South Carolina Emergency Management, approximately 10 to 15 earthquakes are recorded annually in South Carolina with 3 to 5 of them felt or noticed by people.

**Table 5.19 Earthquakes Affecting the Pickens County Region Since 1971**

| Date | Location | Magnitude/Intensity |
|---|---|---|
| 7/13/1971 | Oconee County, SC | 3.7 |
| 11/25/1975 | Oconee County, SC | 3.2 |
| 1/19/1979 | Oconee County, SC | 2.8 |
| 8/26/1979 | Oconee County, SC | 3.7 |
| 2/13/1986 | Oconee County, SC | 3.0 |
| 9/11/1987 | Transylvania County, NC | 2.2 |
| 12/18/1987 | Transylvania County, NC | 2.7 |
| 9/25/1989 | Oconee County, SC | 1.8 |
| 1/2/1990 | Transylvania County, NC | 2.1 |
| 11/7/1990 | Transylvania County, NC | 2.4 |
| 11/22/1999 | Pickens County, SC | 1.7 |
| 11/26/1999 | Pickens County, SC | 1.7 |
| 6/6/2010 | Pickens County, SC | 1.9 |
| 7/16/2010 | Transylvania County, NC | 1.3 |
| 12/8/2012 | Oconee County, SC | 2.0 |
| 9/4/2015 | Pickens County, SC | 2.0 |

| Date | Location | Magnitude/Intensity |
|---|---|---|
| 7/21/2016 | Oconee County, SC | 1.9 |
| 8/8/2017 | Oconee County, SC | 1.7 |
| 10/2/2017 | Pickens County, SC | 1.9 |
| 11/14/2017 | Transylvania County, NC | 2.2 |
| 6/18/2018 | Pickens County, SC | 2.2 |
| 4/12/2019 | Transylvania County, NC | 2.2 |
| 11/16/2021 | Pickens County, SC | 2.2 |
| 4/23/2022 | Greenville County, SC | 2.2 |

Source: USGS Earthquake Maps: https://www.usgs.gov/programs/earthquake-hazards/information-region

## PROBABILITY OF FUTURE OCCURRENCE

Figure 5-18 above reflects the seismic hazard for Pickens County based on the national USGS map of peak acceleration with two percent probability of exceedance in 50 years. Pickens County is located within the zone with peak acceleration of 20-40%, which indicates moderate earthquake risk.

Based on historical occurrences, there have 25 earthquakes in the Pickens County region over the past 98 years (1924-2022). The estimated annual probability level for the county is slightly over 25 percent. The probability of a larger magnitude event is less likely but still possible. All past events in the immediate region have been below a magnitude 5, with the majority of earthquakes below a 3.7.

***Probability: 2 – Possible***

## CLIMATE CHANGE

According to NASA's Global Climate Change Program, 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. Additionally, it's possible that increased groundwater pumping as a result of climate change-driven increases in drought could add to stress buildup in tectonic plates and hasten the occurrence of earthquakes. Again, this relationship is hypothetical and not yet well studied. While not conclusive, early research suggest that more intense earthquakes may eventually be added to the adverse consequences that are caused by climate change.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | The public may experience shaking and the greatest threat to health and well-being is often from objects falling from shelves. |
| Responders | Minimal expected impact on responders given only moderate events. If a more severe incident occurs, responders may need to enter compromised structures or infrastructure. |
| Continuity of Operations (including Continued Delivery of Services) | There would likely be little disruption to services or operations due to a moderate earthquake. Any damage to transportation infrastructure, or critical facilities could interrupt access to some services. |
| Property, Facilities and Infrastructure | A moderate earthquake is unlikely to damage infrastructure such as roads, bridges, or gas/power/water lines. However, if severe enough, fires can be started by broken gas lines and power lines. 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. |

| Category | Consequences |
|---|---|
| Environment | No severe impacts expected, but damage to key infrastructure, utility systems, or facilities that house hazardous materials could harm the surrounding environment and may require remediation. |
| Economic Condition of the Jurisdiction | Economic loss is unexpected with moderate events, but could include property damage, business interruption costs, cost to repair public infrastructure, and debris removal costs. |
| Public Confidence in the Jurisdiction's Governance | Public confidence is unlikely to be affected from an earthquake event. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Earthquake events in Pickens County are unlikely to produce more than moderate ground shaking; therefore, injury or death is unlikely. Objects falling from shelves generally pose the greatest threat to safety. In severe cases, an earthquake could cause fatalities due to building collapse.

### *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. Wood-frame multi-unit structures, mobile homes, and unreinforced masonry buildings are most vulnerable. Impacts to buildings could include cracked foundations, chimneys breaking at the roof line, wood frames coming off their foundations, and racking of cripple walls.

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. Impacts of earthquakes also include debris clean-up and service disruption.

Pickens County has not been impacted by an earthquake with more than a moderate intensity. Major damage to the built environment due to future earthquakes is unlikely. However, there is potential for impacts to certain masonry buildings, as well as environmental damages with secondary impacts on structures.

Hazus 6.0 was used to determine earthquake risk based on probabilistic parameters for annualized loss and a scenario analysis for the 1886 Charleston earthquake. These analyses produced estimates of the likelihood of varying levels of damage as well as building-related economic losses.

Table 5-20 provides the estimate of buildings damaged at varying levels of severity by occupancy type for the 1886 Charleston earthquake event. Hazus does not return an estimate of buildings with damage for the probabilistic analysis of annualized loss. In the 1886 Charleston Earthquake Event, which is a potential worst case scenario for the planning area, there would be an estimated 550 buildings with moderate damage, about 43 buildings with extensive damage, and only 3 buildings with complete damage.

**Table 5.20 Estimated Building Damage, 1886 Charleston Earthquake Event**

| Occupancy | Estimated Buildings Damaged | | | | |
|---|---|---|---|---|---|
| | None | Minor | Moderate | Extensive | Complete |
| Agriculture | 43.77 | 2.39 | 0.73 | 0.10 | 0.00 |
| Commercial | 2,960.59 | 167.49 | 62.03 | 8.42 | 0.48 |
| Education | 43.73 | 2.32 | 0.84 | 0.10 | 0.01 |
| Government | 67.38 | 3.30 | 1.18 | 0.14 | 0.01 |
| Industrial | 437.77 | 23.87 | 9.16 | 1.14 | 0.05 |
| Other Residential | 12,967.01 | 816.68 | 317.63 | 19.94 | 0.73 |
| Religion | 244.94 | 12.38 | 4.88 | 0.75 | 0.06 |
| Single Family | 33,119.52 | 852.85 | 153.54 | 15.68 | 1.41 |
| **Total** | **49,885** | **1,881** | **550** | **43** | **3** |

Source: Hazus 6.0

Table 5-21 details estimated property damages for annualized loss and for the 1886 Charleston earthquake scenario. In the 1886 Charleston earthquake scenario, property damages across the county are estimated at $46.5 million. Annualized losses are estimated at $1.3 million. Most damages would be sustained by residential and commercial property.

**Table 5.21 Estimated Property Damages, Probabilistic and Scenario-Based Earthquake Events**

| Area | Residential | | Commercial | Industrial | Others | Total |
|---|---|---|---|---|---|---|
| | Single Family | Other | | | | |
| **Annualized Loss** | | | | | | |
| Structural | $39,200 | $66,100 | $53,400 | $12,400 | $36,400 | $207,500 |
| Non-Structural | $176,600 | $255,300 | $120,600 | $35,700 | $139,500 | $727,700 |
| Content | $67,200 | $65,400 | $63,900 | $24,100 | $78,800 | $299,400 |
| Inventory | $0 | $0 | $18,400 | $4,900 | $700 | $24,000 |
| **Total** | **$283,000** | **$386,800** | **$256,300** | **$77,100** | **$255,400** | **$1,258,600** |
| **1886 Charleston Earthquake Scenario** | | | | | | |
| Structural | $2,638,400 | $3,926,700 | $3,054,200 | $688,900 | $1,867,600 | $12,175,800 |
| Non-Structural | $7,259,700 | $9,611,000 | $4,533,100 | $1,038,000 | $5,142,800 | $27,584,600 |
| Content | $1,143,200 | $1,235,100 | $1,502,500 | $570,700 | $1,677,600 | $6,129,100 |
| Inventory | $0 | $0 | $451,900 | $116,500 | $19,900 | $588,300 |
| **Total** | **$11,041,300** | **$14,772,800** | **$9,541,700** | **$2,414,100** | **$8,707,900** | **$46,477,800** |

Source: Hazus 6.0

### *ENVIRONMENT*

An earthquake is unlikely to cause substantial impacts to the natural environment in Pickens County. Impacts to infrastructure, such as a ruptured gas line, could cause secondary damages to the surrounding environment. However, this type of damage is unlikely based on historical occurrences.

## CHANGES IN DEVELOPMENT

Development since 1886 has increased overall exposure in Pickens County. However, development changes have not affected the risk characteristics of earthquakes. The probability, impact, spatial extent, warning time, and duration of earthquakes in Pickens County have not changed, nor are they expected to in the near future.

## KEY ISSUES

- Poorly constructed masonry buildings that lack reinforcement may be vulnerable to the magnitude of earthquake that could be expected to impact Pickens County; these structures could be retrofitted for earthquake resilience.

## 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 |
|---|---|---|---|---|---|---|---|
| Central | 2 | 1 | 3 | 4 | 1 | 2.0 | M |
| Clemson | 2 | 1 | 3 | 4 | 1 | 2.0 | M |
| Easley | 2 | 1 | 3 | 4 | 1 | 2.0 | M |
| Liberty | 2 | 1 | 3 | 4 | 1 | 2.0 | M |
| Norris | 2 | 1 | 3 | 4 | 1 | 2.0 | M |
| Pickens | 2 | 1 | 3 | 4 | 1 | 2.0 | M |
| Six Mile | 2 | 1 | 3 | 4 | 1 | 2.0 | M |
| Unincorporated Pickens County | 2 | 1 | 3 | 4 | 1 | 2.0 | M |

# 5.7 EXTREME HEAT

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Extreme Heat | Likely | Minor | Large | More than 24 hrs | Less than 1 week | 2.7 |

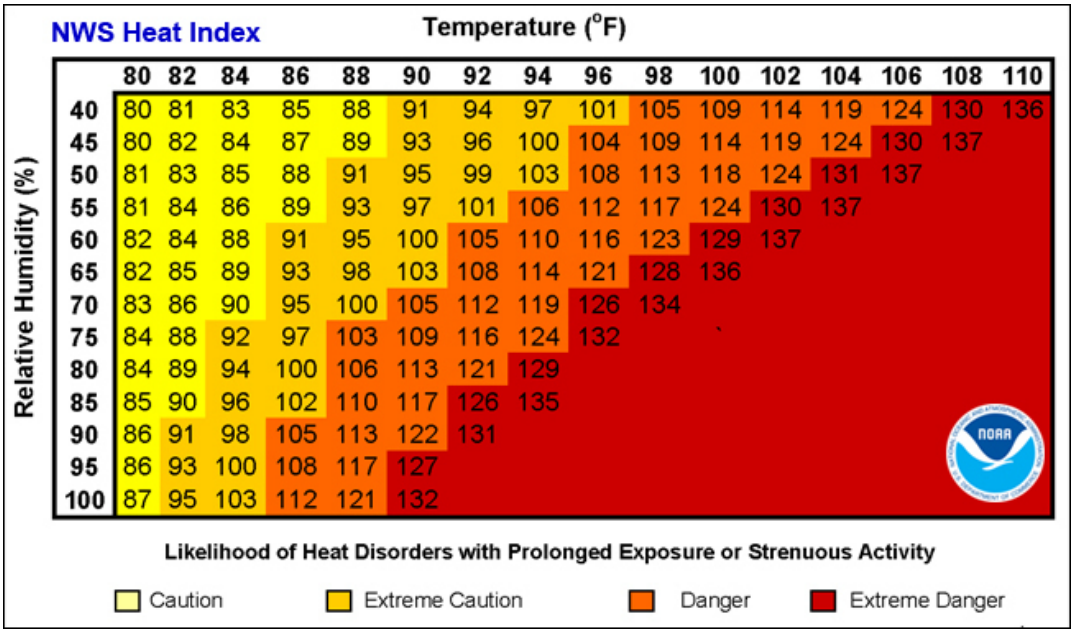
## HAZARD DESCRIPTION

As defined by FEMA, in most of the United States extreme heat is classified by a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. Extreme heat is often referred to as a "heat wave."

According to the National Oceanic and Atmospheric Administration (NOAA), heat is one of the leading weather-related killers in the United States. From 1999 through 2009, extreme heat exposure caused more than 7,800 deaths. Under extreme heat conditions, the human body has difficulties cooling through the normal method of the evaporation of perspiration and must work harder to maintain a normal temperature. Health risks rise when a person is overexposed to heat. The most dangerous place to be during an extreme heat incident is in a permanent home, with little or no air conditioning. Sun exposure, wind conditions, age, and physical condition influence susceptibility to heat disorder.

Ambient air temperature and relative humidity determine the relative intensity of heat conditions. The relationship of these factors creates what is known as the apparent temperature. The Heat Index Chart, shown in Figure 5-20, uses temperature and humidity to produce a guide for the apparent temperature, to better inform the public of heat dangers.

**Figure 5.22 Heat Index Chart**




Source: National Weather Service (NWS) https://www.weather.gov/safety/heat-index

The Heat Index Chart was devised for shady locations. Exposure to direct sun can increase Heat Index values by as much as 15°F.

Table 5-22 lists typical symptoms and health impacts of heat exposure according to the severity classifications shown in the heat index chart.

**Table 5.22 Typical Health Impacts of Extreme Heat**

| Classification | Heat Index | Effect on the Body |
|---|---|---|
| **Caution** | 80-90˚F | Fatigue possible with prolonged exposure and/or physical activity |
| **Extreme Caution** | 90-103˚F | Heat stroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity |
| **Danger** | 103-124˚F | Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity |
| **Extreme Danger** | 125˚F or higher | Heat stroke highly likely |

Source: National Weather Service, https://www.weather.gov/ama/heatindex

Hotter than average days in the summer increase illness and death by compromising the body's ability to regulate its temperature. This loss of temperature control can result in a cascade of illnesses, including heat cramps, heat exhaustion, heatstroke, and hyperthermia. Temperature extremes can also worsen chronic conditions, including cardiovascular, respiratory, and cerebrovascular disease and diabetes-related conditions.

The NWS 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.

While heat conditions may last several days, a warning can be issued even for one day of expected heat conditions.

***Warning Time: 1 – More than 24 hours***

***Duration: 3 – Less than one week***

## LOCATION

Summers in North America are hot, with the southern US experiencing heat waves periodically each summer. Extreme heat typically occurs over large areas impacting multiple counties at one time. All of Pickens County is vulnerable to extreme heat.

Areas that lack shade or have a high concentration of buildings, roads, and other infrastructure may experience higher temperatures. These materials absorb and re-emit the sun's heat more than natural areas like vegetation and water.

***Spatial Extent: 4 – Large***

## EXTENT

The heat index chart, shown in Figure 5-20 above, provides a measure of the severity of extreme heat. Per the NWS, heat index values above 90°F can cause heat-related disorders affecting public health and safety.

The extent of extreme heat in the planning area can be defined by the historical maximum temperature reached. The Northeast Regional Climate Center's Climate Information for Management and Operational Decisions (CLIMOD 2) tool was used to compile data on historical maximum temperatures in the planning area. Table 5-23 provides the monthly highest maximum temperature on record for the Pickens weather station.

**Table 5.23 Monthly Highest Max Temperature, Pickens Weather Station, 2001-2022**

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | 72 | 76 | 82 | 83 | 93 | 97 | 102 | 100 | 90 | 86 | 83 | 62 | 102 |
| 2001 | 65 | 74 | 73 | 92 | 91 | 96 | 95 | 94 | 89 | 83 | 81 | 72 | 96 |
| 2002 | 79 | 70 | 82 | 92 | 89 | 97 | 99 | 98 | 96 | 87 | 70 | 67 | 99 |
| 2003 | 68 | 72 | 79 | 86 | 88 | 91 | 93 | -- | 88 | 82 | 85 | 71 | -- |
| 2004 | 72 | 69 | 83 | 87 | 91 | 93 | 94 | 92 | 89 | 84 | 81 | 66 | 94 |
| 2005 | 73 | 74 | 80 | 83 | 88 | 92 | 98 | 96 | 92 | 86 | 81 | 66 | 98 |
| 2006 | 70 | 68 | 80 | 92 | 95 | 99 | 96 | 100 | 87 | 87 | 81 | 76 | 100 |
| 2007 | 70 | 72 | 89 | 85 | 90 | 97 | 93 | 101 | 95 | 88 | 79 | 77 | 101 |
| 2008 | 71 | 72 | 76 | 84 | 87 | 98 | 99 | 99 | 92 | 84 | 78 | 74 | 99 |
| 2009 | 69 | 75 | 86 | 89 | 85 | 97 | 93 | 96 | 90 | 84 | 78 | 66 | 97 |
| 2010 | 70 | 64 | 74 | 87 | 90 | 95 | 98 | 95 | 94 | 84 | 75 | 66 | 98 |
| 2011 | 64 | 77 | 84 | 84 | 97 | 96 | 97 | 100 | 97 | 82 | 74 | 66 | 100 |
| 2012 | 68 | 74 | 84 | 88 | 90 | 98 | 101 | 93 | 90 | 81 | 74 | 72 | 101 |
| 2013 | 71 | 66 | 77 | 83 | 88 | 93 | 93 | 92 | 89 | 86 | 75 | 72 | 93 |
| 2014 | 67 | 73 | 78 | 83 | 91 | 92 | 93 | 94 | 93 | 84 | 77 | 71 | 94 |
| 2015 | 68 | 67 | 85 | 86 | 89 | 95 | 96 | 97 | 94 | 85 | 76 | 75 | 97 |
| 2016 | 68 | 69 | 85 | 85 | 89 | 96 | 98 | 95 | 95 | 88 | 84 | 71 | 98 |
| 2017 | 77 | 79 | 85 | 85 | 88 | 90 | 95 | 93 | 91 | 88 | 81 | 73 | 95 |
| 2018 | 69 | 79 | 76 | 83 | 91 | 94 | 93 | 94 | 91 | 91 | 74 | 70 | 94 |
| 2019 | 70 | 76 | 75 | 85 | 94 | 91 | 94 | 95 | 98 | 97 | 76 | 70 | 98 |
| 2020 | 71 | 76 | 86 | 86 | 88 | 93 | 96 | 93 | 92 | 84 | 78 | 68 | 96 |
| 2021 | 66 | 75 | 82 | 84 | 90 | 91 | 93 | 94 | 88 | 84 | 77 | 77 | 94 |
| 2022 | 72 | 75 | 82 | 82 | 91 | 98 | 94 | 91 | 90 | 80 | -- | -- | -- |
| Mean | 70 | 73 | 81 | 86 | 90 | 95 | 96 | 96 | 92 | 85 | 78 | 70 | 97 |
| Max (Year) | 79 *2002* | 79 *2018* | 89 *2007* | 92 *2006* | 97 *2011* | 99 *2006* | 101 *2007* | 101 *2007* | 98 *2019* | 97 *2019* | 85 *2003* | 77 *2021* | 102 *2000* |

Source: Northeast Regional Climate Center CLIMOD 2

Per this historical temperature data, the highest temperature on record for the planning area during the last 21 years was 101°F, recorded in July 2012 and August 2007. Given the NWS classification of danger for heat cramps, heat exhaustion, and heat stroke at this temperature, the magnitude of heat in the Pickens County planning area is considered Extreme Caution.

***Impact: 2 – Limited***

## HISTORICAL OCCURRENCES

NCEI only has two recorded heat events for Pickens County – one event in June 2012 and July 2012. There was one death in June 2012 but not recorded injuries, or damages. Lack of recorded events does not mean more extreme heat events have not occurred. Narratives for the two events are below.

**June 29, 2012** – An oppressively hot and humid airmass spent several days building west of the Appalachians and finally made it east of the mountains, bringing very hot conditions to upstate South

Carolina. The high temperature at Greenville-Spartanburg International Airport hit 105 degrees on the 29th and 103 degrees on the 30th, both records for the day. The heat index hit 106 degrees. Excessive heat affected areas south of Interstate 85. An elderly woman died on the 30th from heat-related complications in an Easley nursing home after the air conditioning quit working. Even hotter conditions extended through July 1st, before thunderstorms brought somewhat cooler conditions.

**July 1, 2012** – Oppressive heat continued the first day of July over the Upstate, with Greenville-Spartanburg International Airport hitting an all-time record high temperature of 107 degrees. However, low dewpoints kept the heat index just below 110. Widespread thunderstorms developed during the afternoon hours, bringing a few days of relief from the heat.

Historical temperatures and heat index climatology derived from weather station data was evaluated to determine the frequency and severity of past heat events. Data from the Southeast Regional Climate Center indicates that over of the period of record from November 1962 through December 2018, the Greenville-Spartanburg weather station has averaged 41 days per year with temperatures at or above 90°F. This data is summarized in Table 5-24 below.

**Table 5.24 Average Days with Maximum Temperature ≥ 90˚F, 1962-2018**

| Station | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 03870 Greenville-Spartanburg | 0 | 0 | 0 | n/a | 2 | 9 | 15 | 11 | 3 | n/a | n/a | n/a | 41 |

Source: Southeast Regional Climate Center, NCEI Comparative Climate Data

Heat index records indicate that the Pickens County area regularly experiences heat index temperatures above 100°F. Table 5-25 provides counts of heat index values by threshold recorded from 2000 through 2022 at the Greenville Downtown Airport weather station (KGMU), Counts are provided as the number of hours in a given year where the heat index reached or exceeded 100°F. According to this data, the Pickens County area averages approximately 27 hours per year with heat index values above 100°F.

**Table 5.25 Historical Heat Index Counts, Greenville Downtown Airport (KGMU), 2000-2022**

| Year | Heat Index Value | | | | Total |
|---|---|---|---|---|---|
| | 100-104˚F | 105-109˚F | 110-114˚F | ≥115˚F | |
| 2000 | 19 | 0 | 0 | 0 | 19 |
| 2001 | 6 | 0 | 0 | 0 | 6 |
| 2002 | 2 | 1 | 0 | 0 | 3 |
| 2003 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 20 | 0 | 0 | 0 | 20 |
| 2006 | 14 | 0 | 0 | 0 | 14 |
| 2007 | 26 | 0 | 0 | 0 | 26 |
| 2008 | 8 | 3 | 2 | 0 | 13 |
| 2009 | 3 | 0 | 0 | 0 | 3 |
| 2010 | 57 | 9 | 0 | 0 | 66 |
| 2011 | 49 | 4 | 0 | 0 | 53 |
| 2012 | 36 | 6 | 0 | 0 | 42 |
| 2013 | 2 | 0 | 0 | 0 | 2 |
| 2014 | 2 | 0 | 0 | 0 | 2 |
| 2015 | 29 | 0 | 0 | 0 | 29 |
| 2016 | 27 | 0 | 0 | 0 | 27 |
| 2017 | 34 | 0 | 0 | 0 | 34 |

| Year | Heat Index Value | | | | Total |
|---|---|---|---|---|---|
| | 100-104˚F | 105-109˚F | 110-114˚F | ≥115˚F | |
| 2018 | 33 | 0 | 0 | 0 | 33 |
| 2019 | 58 | 5 | 0 | 0 | 63 |
| 2020 | 48 | 3 | 0 | 0 | 51 |
| 2021 | 25 | 0 | 0 | 0 | 25 |
| 2022 | 72 | 11 | 2 | 0 | 85 |
| **Sum** | **570** | **42** | **4** | **0** | **616** |
| **Average** | **25** | **2** | **0** | **0** | **27** |

Source: North Carolina Climate Office, Heat Index Climatology Tool

## PROBABILITY OF FUTURE OCCURRENCE

According to historical maximum temperature data for the Greenville-Spartanburg weather station, shown in Table 5-24 above, Pickens County has experienced a max temperature above 90°F during all of the last 23 years and a max temperature at or above 100°F during 5 of the last 23 years. The effects of humidity further compound heat conditions at these temperatures, as evidenced by the heat index climatology summarized in Table 5-25. Heat index values surpassed 100°F in 21 out of the last 23 years, which equates to over 91 percent annual chance of heat index values exceeding 100°F in any given year. Pickens County also averages 2 hours per year with a heat index above 105°F, which is the criteria for issuing a Heat Advisory.

***Probability: 3 – Likely***

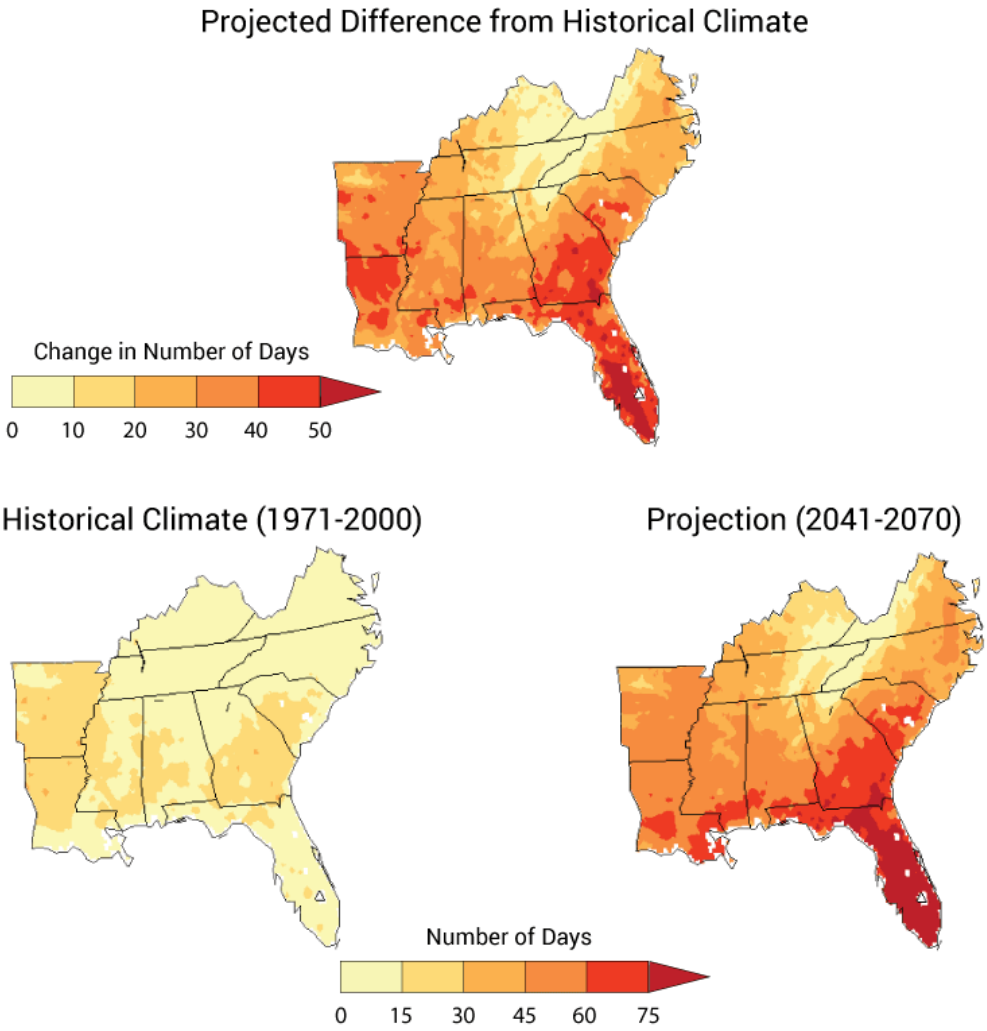
## CLIMATE CHANGE

Research shows that temperatures will continue to rise in the Southeast United States and globally, directly affecting Pickens County region in South Carolina. Based on NOAA NCEI data, the decade from 2010–2020 was the warmest on record for the Southeast, and the region is now experiencing a higher percentage of intensifying heat waves than any other part of the country. Climate Central estimates that by 2050, the typical number of heat wave days in South Carolina is projected to quadruple from 15 to nearly 60 days a year.

Per the Fourth National Climate Assessment, “extreme temperatures are projected to increase even more than average temperatures. Cold waves are projected to become less intense and heat waves more intense.” The number of days over 95°F is expected to increase by between 30 and 40 days annually, as shown in Figure 5-21.

However, daily minimum temperatures (overnight lows) have increased at a faster rate than maximum temperatures (afternoon highs). The number of days with high minimum temperatures (nighttime temperatures that stay above 75ºF) has been increasing across the Southeast, and this trend is projected to intensify, with some areas experiencing more than 100 additional warm nights per year by the end of the century. Exposure to high nighttime minimum temperatures reduces the ability of some people to recover from high daytime temperatures, resulting in heat-related illness and death.

**Figure 5.23 Projected Change in Number of Days Over 95˚F**




Source: NOAA NCDC from 2014 National Climate Assessment

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Extreme heat may cause illness and/or death. Children and infants, older adults, individuals with chronic conditions, and pregnant women are particularly vulnerable. |
| Responders | Consequences may be greater for responders if their work requires physical exertion, sun exposure, and/or wearing heavy protective gear. |
| Continuity of Operations (including Continued Delivery of Services) | Extreme heat would have minimal impacts on continuity of operations. Complications may arise if electricity demand results in power outages; however, this should be managed for critical operations with backup power and system redundancies. |
| Property, Facilities and Infrastructure | Minor impacts may occur, including possible damages to road surfaces, rail lines, and power lines as well as increased strain on power generation and water systems infrastructure. |
| Environment | Environmental impacts include strain on local plant and wildlife, including potential for illness or death. Crops and livestock may be affected. |

| Category | Consequences |
|---|---|
| Economic Condition of the Jurisdiction | Short term impacts could include reduced local spending if individuals are encouraged to stay inside. Farmers may face crop losses or increased livestock costs resulting in income loss. |
| Public Confidence in the Jurisdiction's Governance | Extreme heat is unlikely to impact public confidence because these events are frequent, and the public likely understands the potential impacts. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Extreme heat can cause heat stroke and even loss of human life. NCEI reports one death in June 2012. Older adults, very young children, people with chronic medical conditions, and pregnant women are most at risk to the effects of heat. People who are socially isolated are also at heightened risk, as are individuals who work outside under direct sun exposure. Even young and healthy individuals are susceptible to heat-related disorders if they participate in strenuous physical activities during hot weather or are not acclimated to hot weather.

Table 5-26 summarizes the percent of young children and older adults in the population by jurisdiction. Based on these statistics, exposure of vulnerable populations is a concern across the county. Easley, Norris, Liberty, the City of Pickens, and the unincorporated county have larger populations of older adults.

**Table 5.26 Population Under 5 Years of Age and Over 65 Years of Age by Jurisdiction**

| Jurisdiction | Population under 5 years of age (%) | Population over 65 years of age (%) |
|---|---|---|
| Central | 7.6 | 8.4 |
| Clemson | 2.5 | 11.6 |
| Easley | 6.5 | 19.5 |
| Liberty | 9.5 | 17.6 |
| Norris | 4.7 | 20.6 |
| Pickens | 8.3 | 21.3 |
| Six Mile | 7.5 | 10.1 |
| Unincorporated Pickens County | 4.6 | 16.9 |
| **Total** | **5.0** | **16.4** |
| *State Average* | *5.7* | *17.7* |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-year estimates

### *PROPERTY*

Impacts of extreme heat are not only focused on human health; prolonged heat exposure can have negative 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.

### *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.

## CHANGES IN DEVELOPMENT

Increases in impervious surface area can exacerbate heat conditions through the urban heat island effect, whereby the concentration of structures, infrastructure, and human activity, traps and stores heat, resulting in localized "heat islands." As development occurs, the area impacted by the urban heat island effect may grow. The severity of the urban heat island effect may be mitigated through the installation of cool roofs, urban trees, and other interventions that reflect heat or provide shade in urban areas.

## KEY ISSUES

- Populations most vulnerable to the effects of excessive heat are children under the age of 5 and those over the age of 65. The percentage of population over 65 in Easley, Norris, Liberty, the City of Pickens, and the unincorporated county is higher than that of the county and the state; the proportion of population under 5 years of age in Central, Easley, Liberty, Pickens, and Six Mile are higher than that of the county and the state.
- Individuals without access to air conditioning, especially older adults and individuals with underlying conditions making them more susceptible to heat stroke, are more vulnerable to extreme heat events. Cooling centers, fan distribution, and other mitigation actions could reduce vulnerability.
- Related Hazards: Drought

## 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 | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Clemson | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Easley | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Liberty | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Norris | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Pickens | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Six Mile | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Unincorporated Pickens County | 3 | 2 | 4 | 1 | 3 | 2.7 | M |

# 5.8 FLOOD

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Flood | Highly Likely | Critical | Small | 6 to 12 hrs | Less than 1 week | 3.1 |

## HAZARD DESCRIPTION

Flooding is defined by the rising and overflowing of water onto normally dry land. As specified 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. Inland flooding generally results from excessive precipitation and can stem from an overflow of inland waters or an unusual accumulation or runoff of surface waters from any source.

Flooding is the most frequent and costly natural hazard in the United States. Approximately 90 percent of all natural disasters in the U.S. involve flooding.

Inland flooding, the type of flooding that occurs in Pickens County, can typically be classified under two categories: general riverine flooding, which is defined by precipitation over a given river basin for a long period of time, and flash flooding, which is the product of heavy localized precipitation over a short period of time. The severity of a flooding event is typically determined by a combination of several major factors, including stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions, the degree of vegetative clearing, and impervious surface.

### *SOURCES AND TYPES OF FLOODING*

Flooding in Pickens County can be attributed to three main sources: riverine flooding, flash flooding, and localized stormwater flooding.

**Riverine Flooding:** Pickens County has numerous rivers, streams, and tributaries running throughout its jurisdiction that are susceptible to overflowing their banks during and following excessive precipitation events. The Pickens County, SC Flood Insurance Study (FIS) Report, dated December 12, 2017, was used to identify riverine flooding source. Per the 2017 FIS Report, Pickens County falls primarily within the Seneca Watershed. The primary flood sources in the County are the Twelvemile Creek and Eightmile Creek, however, additional creeks and smaller tributaries impact jurisdictions in Pickens such as Bushy Creek, Middle Branch, Town Creek, and Wolf Creek.

Riverine flooding is mapped and evaluated based on the floodplain, which is the area adjacent to rivers and streams that is expected to experience periodic flooding. Floodplains are discussed further under "Flooding and Floodplains" below.

**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 severe thunderstorms, hurricanes, or tropical storms, and sometimes combined with saturated soil or impermeable surfaces. Flash flooding can also result from dam or levee failures, which are discussed in Section 0, or from a sudden release of water held by a retention basin or other stormwater control facility.

Flash flooding can happen anywhere, in or out of floodplains. Flash flood hazards caused by surface water runoff are common in urbanized areas, where greater impervious surface (e.g., pavement and buildings) 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. The rapid onset allows little or no time for protective measures. Flash flood waters move at very fast speeds and can

damage buildings and infrastructure, tear out trees, and scour channels. Flash flooding can result in higher loss of life, both human and animal, than slower developing river and stream flooding.

**Localized Stormwater Flooding:** Localized stormwater flooding occurs when heavy rainfall and an accumulation of runoff overburden the stormwater drainage system. Localized stormwater flooding can be attributed to large amounts of developed and impervious land, which limit ground absorption and increases surface water runoff. The following structural drainage issues may cause or exacerbate localized stormwater flooding:

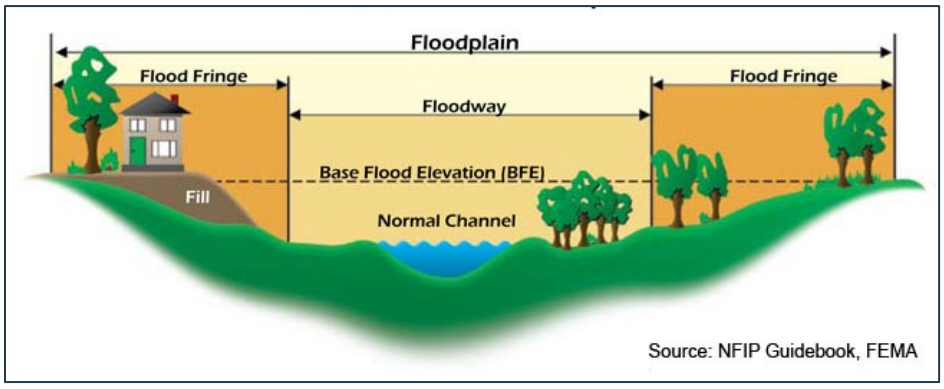
- **Inadequate Capacity** – An undersized/under capacity pipe system can cause water to back-up behind a structure which can lead to areas of ponded water and/or overtopping of banks.
- **Clogged Inlets** – Debris covering the asphalt apron and the top of grate at catch basin inlets may contribute to 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.

While localized flooding may not be as destructive riverine or coastal flooding, it is a chronic problem. The repetitive damage caused by such flooding can add up. Sewers may back up, yards can be inundated, and mechanical systems can be damaged when homes, businesses, and vehicles are flooded. These impacts, and other localized flooding impacts, can create public health and safety concerns. Drainage and sewer systems not designed to carry the capacity currently needed to handle increased storm runoff will only continue to cause flooding without mitigation.

## *FLOODING AND FLOODPLAINS*

A floodplain, as shown in Figure 5-22, 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 5.24 Characteristics of a Floodplain**




Source: FEMA

Floodplains are defined by the flood recurrence interval that is expected to cover them. In its common usage, the floodplain most often refers to the area that is inundated by the "100-year flood," better defined as the "1-percent-annual-chance flood" because it is the flood that has a 1 percent chance in any given year of being equaled or exceeded. The National Flood Insurance Program (NFIP) utilizes the 1-percent-annual-chance flood as a basis for floodplain management. The "500-year flood" or "0.2-percent-annual-chance 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. Similarly, 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 1-percent-annual-chance flood, which is the minimum standard used by most federal and state agencies, is used by the 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 many cases, have a map indicating where they will likely occur, they are in many ways often the most predictable and manageable hazard.

While weather forecasting can project periods of heavy rain, the likelihood of flooding is difficult to predict, leaving limited warning time for flood events. Especially as heavy rain events become more common, as discussed below under Climate Change, warning time for flooding may decrease, thereby increasing risk to those in harm's way.

***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). A FIRM 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 1-percent-annual-chance flood event. SFHAs and risk premium zones in Pickens County were identified using the digital FIRMs (DFIRMs), effective as of December 21, 2017.

The SFHA in Pickens County includes Zone AE. Structures located within the SFHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. The DFIRMs also delineate Shaded X Zones, which are subject to inundation from the 0.2-percent-annual-chance-flood. Descriptions of all mapped flood zones identified by the DFIRM are provided in Table 5-27.

**Table 5.27 Mapped Flood Insurance Zones within Pickens County**

| Zone | Description |
|---|---|
| **AE** | Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. The AE Zones also depict the SFHA due to riverine flood sources, and they represent the flood profile determined by hydrologic and hydraulic investigations. Base Flood Elevations (BFEs) are shown. |
| **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.) |

| Zone | Description |
|---|---|
| **Zone X (unshaded)** | Minimal risk areas outside the 1-percent and 0.2-percent-annual-chance floodplains. No BFEs or base flood depths are shown within these zones. Zone X (unshaded) is used on new and revised maps in place of Zone C. |

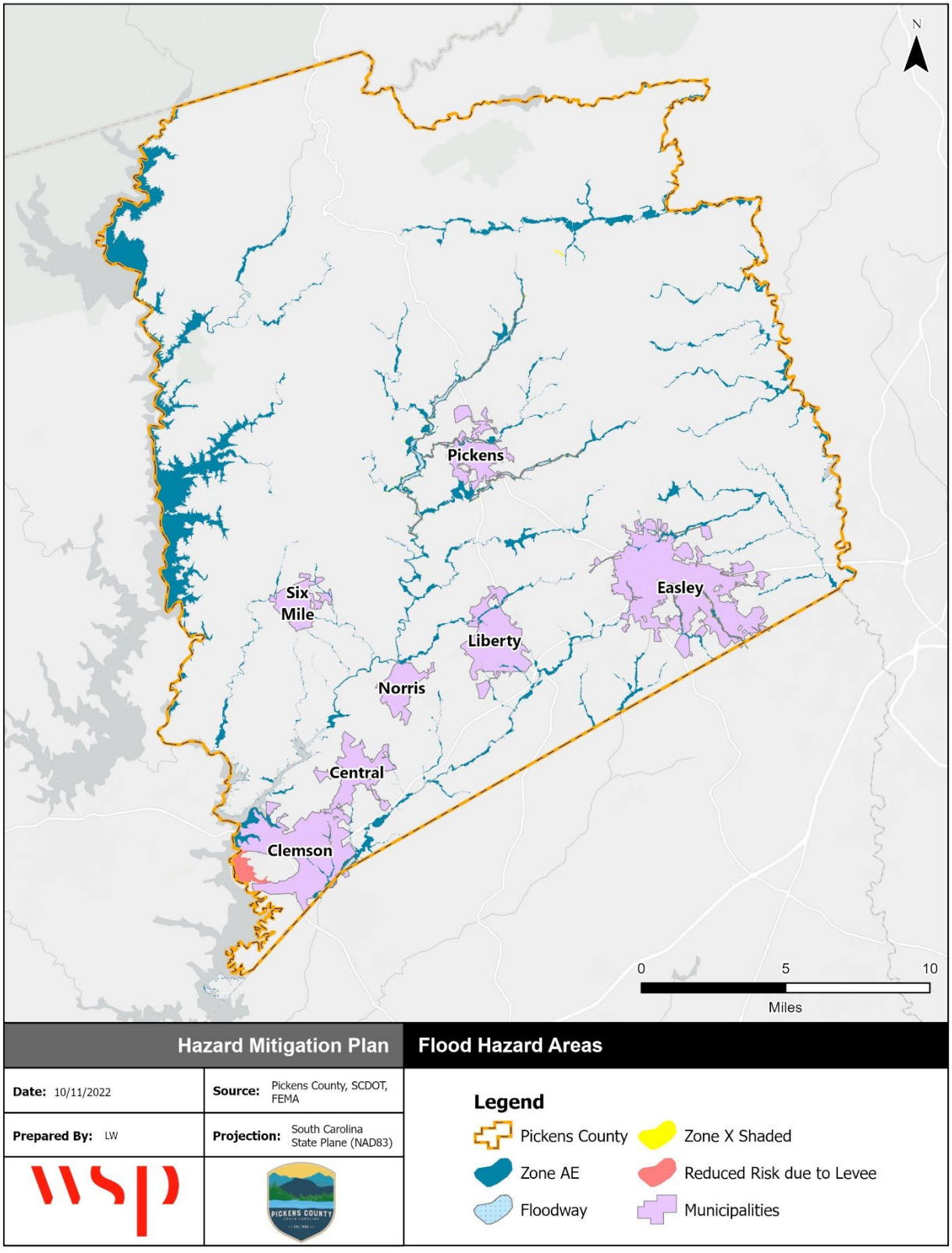
Source: FEMA

Pickens County also has areas designated as levee-protected areas. The Clemson Diversion Levee System is accredited by FEMA as reducing the risk from the 1-percent-annual-chance flood. However, areas protected by the levee are vulnerable should the levee fail. Levee failure is discussed in Section 5.4.

It is important to note that while FEMA digital flood data is recognized as the best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Floods can and do occur outside of the SFHA and Shaded X Zone.

Figure 5-23 reflects the mapped flood insurance zones in Pickens County. Maps for each participating jurisdiction are provided in the jurisdictional annexes.

**Figure 5.25 FEMA Flood Hazard Areas in Pickens County**




Source: FEMA 2017 DFIRM

Approximately 5.5 percent of the planning area falls within the SFHA. Table 5-28 provides a summary of the County's total area by flood zone per the effective DFIRM. This is further broken down by jurisdiction in each jurisdiction's annex.

**Table 5.28 Summary of Flood Zone Acreage in Pickens County**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 17,239.2 | 5.3% |
| Floodway | 859.8 | 0.3% |
| 0.2% Annual Chance Flood Hazard | 163.4 | 0.1% |
| Area with Reduced Risk due to Levee | 447.9 | 0.1% |
| Unshaded X | 308,038.6 | 94.3% |
| **Total** | **326,748.9** | -- |
| **SFHA Total** | **18,098.9** | **5.5%** |

Source: FEMA 2017 DFIRM

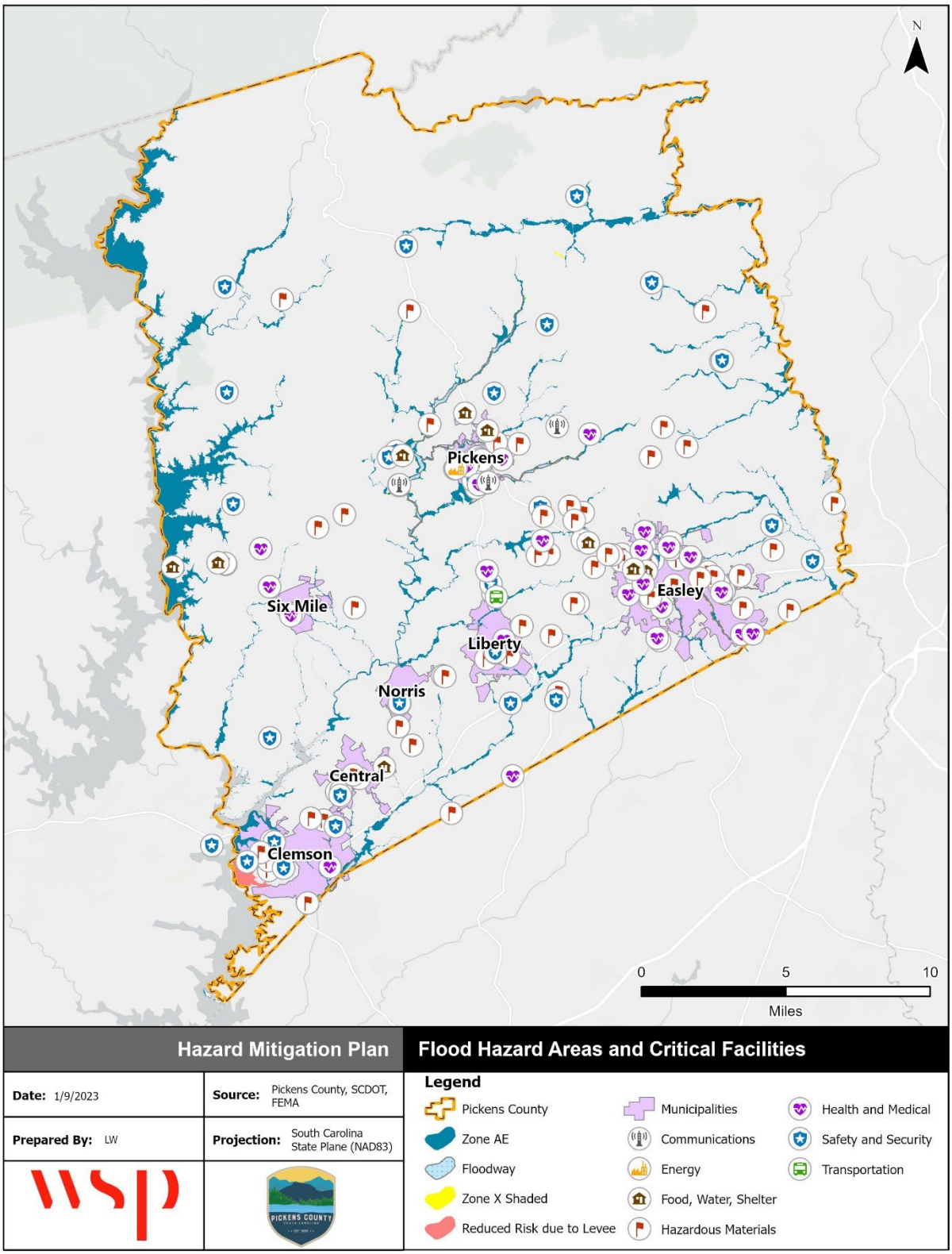
### *Spatial Extent: 2 – Small*

There is only one critical facility in the County located in the SFHA, a nursing home in Easley that is a Health & Medical lifeline.

Figure 5-24 shows the location of critical facilities relative to flood zones. More detail can be found in each jurisdiction's annex. Many facilities are located near but not in the SFHA.

In addition to riverine flooding, the planning area may also experience smaller scale localized stormwater flooding events. Areas of stormwater flooding, localized flooding, and other flood risk not shown on the FIRM as reported by HMPC members and jurisdiction representatives are detailed in the jurisdictional annexes.

**Figure 5.26 Critical Facilities and Flood Hazard Areas**



## EXTENT

Flood extent can be defined by the amount of land in the floodplain, detailed above in Table 5-28. The severity of a flood can also be measured by its depth and velocity. The depth of flooding that impacts a property is correlated with the property damages that result, where greater depths cause more substantial damages. Figure 5-25, in the vulnerability section, shows the flood depths throughout the County for the 1-percent-annual-chance flood event.

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

According to the NCEI Storm Events Database, Pickens County has experienced 51 flood-related events, including 15 flood events, 28 flash flood events, and eight heavy rain events since 1996. As summarized in Table 5-30 and detailed in Table 5-30, these events have resulted in over $4 million in property damage. Note that only those historical occurrences listed in the NCEI database are shown here, and other unrecorded or unreported events may have occurred within the planning area during this timeframe.

**Table 5.29 Flood Events in Pickens County**

| Event Type | # of Events | Deaths/Injuries | Property Damage | Crop Damage |
|---|---|---|---|---|
| Flood | 15 | 0/0 | $2,050,500 | $5,000,000 |
| Flash Flood | 28 | 2/3 | $2,561,000 | $0 |
| Heavy Rain | 8 | 0/0 | $11,000 | $0 |
| **Total:** | **51** | **2/3** | **$4,622,500** | **$5,000,000** |

Source: NCEI

**Table 5.30 NCEI Recorded Flooding Events, 1996-2022**

| Location | Date | Deaths/Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|
| **Flood** | | | | |
| Greater Pickens (Zone) | 1/27/1996 | 0/0 | $0 | $0 |
| Easley | 6/16/1998 | 0/0 | $0 | $0 |
| Greater Pickens (Zone) | 9/15/2002 | 0/0 | $0 | $0 |
| Greater Pickens (Zone) | 3/20/2003 | 0/0 | $200,000 | $0 |
| Greater Pickens (Zone) | 9/7/2004 | 0/0 | $1,250,000 | $5,000,000 |
| Pickens Mountains (Zone) | 9/7/2004 | 0/0 | $0 | $0 |
| Greater Pickens (Zone) | 9/9/2004 | 0/0 | $100,000 | $0 |
| Pickens Mountains (Zone) | 9/16/2004 | 0/0 | $0 | $0 |
| Greater Pickens (Zone) | 9/16/2004 | 0/0 | $0 | $0 |
| Greater Pickens (Zone) | 7/7/2005 | 0/0 | $0 | $0 |
| Central Portion | 6/26/2006 | 0/0 | $0 | $0 |
| Pickens | 3/1/2007 | 0/0 | $0 | $0 |
| Easley | 2/5/2010 | 0/0 | $0 | $0 |
| Nimmons | 5/16/2018 | 0/0 | $500 | $0 |
| Sunset | 2/6/2020 | 0/0 | $500,000 | $0 |
| **Flash Flood** | | | | |
| Easley | 2/28/1997 | 0/0 | $0 | $0 |
| Central | 10/26/1997 | 0/0 | $0 | $0 |
| Easley | 10/26/1997 | 0/0 | $0 | $0 |
| Pickens | 1/7/1998 | 1/3 | $50,000 | $0 |
| Pumpkintown | 1/8/1998 | 0/0 | $0 | $0 |

| Location | Date | Deaths/Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|
| Easley | 7/24/2000 | 0/0 | $0 | $0 |
| Clemson | 7/25/2001 | 0/0 | $0 | $0 |
| Southeast Portion | 3/19/2003 | 0/0 | $0 | $0 |
| Easley | 6/18/2003 | 0/0 | $0 | $0 |
| Clemson | 6/18/2003 | 0/0 | $0 | $0 |
| Pickens | 7/17/2003 | 0/0 | $0 | $0 |
| Easley | 7/30/2003 | 0/0 | $0 | $0 |
| Pickens | 9/22/2003 | 0/0 | $0 | $0 |
| Countywide | 9/7/2004 | 0/0 | $0 | $0 |
| Liberty | 12/9/2004 | 0/0 | $0 | $0 |
| Pickens | 7/7/2005 | 0/0 | $400,000 | $0 |
| Easley | 8/23/2005 | 0/0 | $0 | $0 |
| Pickens | 6/26/2006 | 0/0 | $50,000 | $0 |
| Clemson | 7/13/2013 | 0/0 | $200,000 | $0 |
| Cateechee | 8/6/2013 | 1/0 | $50,000 | $0 |
| Six Mile | 8/6/2013 | 0/0 | $100,000 | $0 |
| Cateechee | 8/6/2013 | 0/0 | $100,000 | $0 |
| Crow Creek | 8/6/2013 | 0/0 | $0 | $0 |
| Six Mile | 8/7/2013 | 0/0 | $0 | $0 |
| Clemson | 8/10/2014 | 0/0 | $100,000 | $0 |
| Clemson | 10/1/2015 | 0/0 | $10,000 | $0 |
| Crow Creek | 4/19/2019 | 0/0 | $1,000 | $0 |
| Sunset | 2/6/2020 | 0/0 | $1,500,000 | $0 |
| **Heavy Rain** | | | | |
| Clemson | 7/23/1997 | 0/0 | $0 | $0 |
| Countywide | 11/25/1999 | 0/0 | $0 | $0 |
| Easley | 7/14/2000 | 0/0 | $0 | $0 |
| Clemson | 2/22/2003 | 0/0 | $1,000 | $0 |
| Easley | 8/16/2003 | 0/0 | $10,000 | $0 |
| Countywide | 9/22/2003 | 0/0 | $0 | $0 |
| Central | 4/5/2005 | 0/0 | $0 | $0 |
| Easley | 5/27/2006 | 0/0 | $0 | $0 |
| | **Total** | **2/3** | **$4,622,500** | **$5,000,000** |

Source: NCEI

According to NCEI, 51 recorded flood-related events affected the planning area in the 26-year period from 1996 through 2022. These events caused an estimated $4,622,500 in property damage and $5,000,000 in crop damage, with two fatalities and three direct injuries. There are several countywide events on record, as well as specific impacts noted for Central, Clemson, Easley, Liberty, Pickens, and Six Mile.

The following event narratives are provided from the NCEI Storm Events Database to illustrate the impacts of flood events on the county:

**January 27, 1996** – Persistent rain through the day and night resulted in gradual rises on area streams. Thunderstorms with heavier rain moved through during the night pushing some streams above banks.

**July 23, 1997** – The remnants of Hurricane Danny moved out of northeast Georgia and across the Upstate from the late afternoon on the 23rd through the early morning of the 24th.Flash flooding from the heavy tropical rain caused most of the damage.

**October 26, 1997** – Heavy rain overnight culminated in widespread minor flooding. Numerous small streams flooded and covered some bridges and many roads. There were numerous traffic accidents because of the standing water and heavy rain.

**January 7, 1998** – Excessive rain fell just north of Pickens causing raging water flowing into a lake to wash out a road. Two cars drove into this washout and were swept into the lake, killing one young man and injuring three other people.

**July 24, 2000** – A cluster of slow-moving thunderstorms produced excessive rain in Easley. A retention pond overflowed and many streets were flooded. Water flowed into one downtown store and one road was washed out. Several roads had to be closed due to high water and downed trees. The storms became severe briefly over Liberty and downed many trees in the Whispering Pines subdivision. Roads were blocked and impassable and power connections were ripped from houses.

**September 22, 2003** – A strong storm system produced very heavy rainfall across portions of the Upstate, which resulted in some flooding across Pickens County. A creek flooded part of City Lake Road. Flooding of urban and poor drainage areas was fairly widespread across the county.

**September 7, 2004 –** After earlier flash flooding, general flooding continued into the overnight hours, as moderate to heavy rainfall continued over the county. Many streams overflowed their banks, flooding roads and highways. Water entered some homes and many businesses around Easley, Central, and Pickens. The Saluda Lake flooded homes along its western bank, while Twelvemile Creek flooded the flea market area. The Oolenoy River flooded miles of farmland. Vegetable crops in the northern part of the county were destroyed. Five bridges in the county were heavily damaged, requiring closure. Many other bridges and roads incurred some damage.

**June 26, 2006 –** Severe urban and poor drainage flooding and some stream flooding developed in Pickens when 8 to 10 inches fell across the county in about an 8-hour period. Several roads were closed in and around the city, including highway 178 North. Water entered several businesses along this section of 178 due to flooding along Towne Creek. Other closed roads included City Lake Rd, Hollingsworth Rd, and Runymeade Rd. The Pickens flea market flooded to depths of five feet as rapid runoff from heavy rain collected in this low lying area. Highway 183 was also flooded near the flea market.

**March 1, 2007** – Moderate to heavy rain fell for much of the afternoon and evening producing around three inches of rain by late evening across the northern part of the Upstate. This resulted in gradually rising water levels on several small streams and creeks, with several streams leaving their banks by late evening. Flooding in Pickens County included portions of the Saluda River and Gregory Creek, which flooded the bridge over Concord Church Rd near its intersection with Massingill Memorial. Mauldin Lake Rd was also under water due to flooding along Wolf Creek. Water was also over highway 183 in several places, mainly due to poor drainage.

**July 13, 2013 –** Numerous showers and thunderstorms developed along and ahead of a stationary front over the North Carolina Blue Ridge. As the storms moved into the Upstate, a few reports of severe weather were received early in the day, with the event transitioning to a flash flood by the evening hours. The Clemson Botanical Garden was heavily damaged by flash flooding. Damage to trails, bridges, and other infrastructure was estimated to total $200,000. Extensive damage was done to the garden's collection of rare plants, though it is difficult to estimate a dollar value for this loss.

**August 6, 2013** – Slow moving thunderstorms produced very heavy rain over western Upstate South Carolina, triggering areas of flash flooding. One fatality resulted from a car being swept into a flooded stream. An automated rain gauge four miles west of Clemson recorded 3.83 inches of rain in a two-hour period. A car was swept away by flood waters on Silver Creek Road. The car and its occupant were found separately downstream. The occupant was killed, and the car destroyed. Two other cars were swept away at this location with four passengers rescued.

**August 10, 2014** – A backdoor cold front moving from the northeast toward the southwest caused numerous thunderstorms and heavy rain showers to suddenly erupt as it moved across northern portions of Upstate South Carolina during the evening. The storms moved slowly, while multiple storms moved over some of the same areas repeatedly. The result was extreme rainfall rates that produced 3 to 6 inches of rain in only a couple of hours. Clemson University DPS reported multiple buildings were damaged by flood waters after 3 to 5 inches of rain fell in the area in just a couple of hours. In addition to the flooding resulting from drainage issues, some buildings were damaged by rainwater pouring through leaky roofs.

**October 1, 2015 –** Scattered, slow-moving thunderstorms developed across the South Carolina foothills in the late afternoon and evening in the vicinity of a nearly stationary front. One slow moving storm caused localized flash flooding across southwest Pickens County, after 2 to 4 inches of rain fell in a short period of time. Flash flooding developed in the Clemson and Central areas. Small tributaries of Twelvemile Creek overflowed and flooded roads in the Woodland Heights and Dellwood neighborhoods of Clemson. In Central, Maw Brdige Rd, Blue Jay Rd, Spring Forest Dr and Brock St were all closed due to poor drainage or small stream flooding.

**April 19, 2019 –** A large area of moderate to heavy rain showers, along with embedded clusters of strong to severe thunderstorms moved across Upstate South Carolina throughout the morning and afternoon of the 19th ahead of a slow-moving cold front. Some of the storms produced locally damaging winds. Initial slow movement of the showers and storms also produced a swath of 4 to 7 inches of rain across Oconee, Pickens, and northern Greenville Counties. Reports stated that flash flooding developed along a couple of small streams in northern Pickens County after 5 to 7 inches of rain fell across the area, most of which fell in around 6 hours.

**February 6, 2020 –** Unusually high levels of moisture for early February combined with a slow-moving frontal system to produce an extended period of moderate to heavy rainfall across Upstate South Carolina. Intense rain rates associated with bands of heavy rain showers and embedded thunderstorms developing along the front resulted in widespread flash flooding. The main impact was within the Twelvemile Creek basin. A stream gauge on the creek near Liberty exceeded major flood stage. Significant flooding occurred to the Pickens County Flea Market on Highway 183, and most of the bridges over Twelvemile Creek became inundated. One home was rendered uninhabitable due to water damage. Flash flooding of the Saluda River also occurred on the Pickens County side of west Greenville, where water was beginning to inundate some houses by late evening. Town Creek overflowed its banks in the city of Pickens and inundated and caused significant damage to an industrial park that was in the process of being converted to new business sites. Two people had to be rescued from this location. Other roads were flooded and closed throughout the county due to a combination of drainage and small stream flooding. Dozens of roads were closed at the height of the event.

Pickens County has received one Major Disaster Declarations and one Emergency Declaration for severe storms that included elements of flooding, in 2015 and 2020. Additionally, the county received eight declarations for hurricanes and tropical storms between 2004 and 2022 which included damages associated with flooding.

### *SUMMARY OF INSURED FLOOD LOSSES*

Flood insurance policy records provide another measure of historical flood occurrences. According to records in the FEMA Community Information System (CIS), there have been 45 paid flood insurance claims in Pickens County since 1976, totaling over $500,000 in claims payments. These records are summarized in Table 5-31 by jurisdiction. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in Pickens County were either uninsured, denied claims payment, or not reported. Additional detail on active policies and paid claims are provided in each jurisdictional annex.

**Table 5.31 Summary of Insured Flood Losses in Pickens County**

| Location | Number of Policies in Force | Closed Paid Losses | Total Closed Paid Losses |
|---|---|---|---|
| Town of Central | 1 | 0 | $0.00 |
| City of Clemson | 33 | 11 | $67,167.34 |
| City of Easley | 27 | 8 | $128,546.69 |
| City of Liberty | 0 | 0 | $0.00 |
| Town of Norris[1] | 0 | 0 | $0.00 |
| City of Pickens | 4 | 4 | $27,219.04 |
| Town of Six Mile | 0 | 0 | $0.00 |
| Unincorporated Pickens County | 56 | 22 | $346,282.65 |
| **Total** | **121** | **45** | **$569,215.72** |

Source: FEMA Community Information System
[1]The Town of Norris does not participate in the NFIP

## 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, and the Shaded X Zone is the area that will be inundated by the flood event having a 0.2-percent chance of being equaled or exceeded in any given year. This delineation is a useful way to identify the most at-risk areas. However, flooding does not occur in set intervals; any given flood may be more or less severe than the defined 1-percent-annual-chance flood. There is also risk of localized stormwater flooding in areas outside the SFHA and at different intervals than the 1-percent-annual-chance flood.

Floods of varying severity occur regularly in Pickens County. NCEI reports 51 flood-related events in the 24-year period from 1996 through 2020, which equates to an annual probability of over 100%, and an average of 2.1 flood events per year. Overall, flood events remain a threat in Pickens County, and the probability of future occurrences remains highly likely. Flood events will continue to occur with varying magnitudes and probabilities. It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk and probability varies throughout Pickens County.

***Probability: 4 – Highly Likely***

## CLIMATE CHANGE

According to the Fourth National Climate Assessment, the frequency and intensity of heavy precipitation events is expected to increase across the country. More specifically, there is a 90-100% probability that by the late 21st century most areas of the U.S. will exhibit an increase of at least 5% in the maximum 5-day precipitation. Overall increases in precipitation totals are also expected in the Southeast. The mean change in the annual number of days with rainfall over 1 inch for the Southeastern U.S. is 0.5 to 1.5 days. Therefore, with more rainfall falling in more intense incidents, the planning area may experience more frequent flash flooding and localized stormwater flooding. Increased flooding may also result from more intense tropical cyclones; 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. The effects of climate change on hurricanes and tropical storms are discussed further in Section 5.9.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Localized impact expected to be severe for flooded areas. People may become stranded in their homes or vehicles. Flooding may cause injuries or loss of life. People may also suffer large financial losses, especially if they do not have flood insurance for their home and/or contents. |

| Category | Consequences |
|---|---|
| Responders | First responders are at risk when attempting to rescue people from flooded homes or vehicles. 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. |
| Continuity of Operations (including Continued Delivery of Services) | Floods can severely disrupt normal operations, especially when there is a loss of power or when flooding blocks access to facilities or travel routes. Damage to facilities in the affected area may require temporary relocation of some operations. Localized disruption of roads, facilities, and/or utilities 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 are possible. Flooding may adversely impact crops and other vegetation through inundation and impacts to the soil. Conversely, flooding in wetlands can support biodiversity and may control invasive water weeds. Shallow flooding could also create breeding grounds for mosquitos and increase exposure to mosquito-borne diseases. Snakes may also make their way to the flooded areas. |
| Economic Condition of the Jurisdiction | Local economy and finances may be adversely affected, possibly for an extended period of time. During floods (especially flash floods), roads, bridges, buildings and vehicles can be destroyed. Businesses may need to shut down if they are damaged. According to the NFIP, almost 40 percent of small businesses that are impacted by a flood never reopen their doors. It may take years for affected communities to rebuild and recover and for business to return to normal. |
| Public Confidence in the Jurisdiction's Governance | Public confidence is often impacted by flood events, especially when impacted individuals do not have flood insurance, or when government aid for recovery is needed, which can be a difficult process to navigate. The ability to respond and recover may be questioned and challenged if planning, response, and recovery are not timely and effective. |

## VULNERABILITY ASSESSMENT

### Methodology & Assumptions

WSP performed a Level 2 flood loss analysis in Hazus 6.0 by leveraging 2022 building data and tax parcel data provided by Pickens County. Parcel centroids were used to approximate building locations. WSP leveraged a depth raster for all portions of the SFHA with base flood elevations made available in the FEMA database; this depth raster was then loaded in Hazus along with the parcel data. Losses were calculated based on Hazus standard depth damage functions.

Flood damage is directly related to the depth of flooding by the application of a depth damage curve. In applying the curve, a specific depth of water translates to a specific percentage of damage to the structure, which translates to the same percentage of the structure's replacement value.

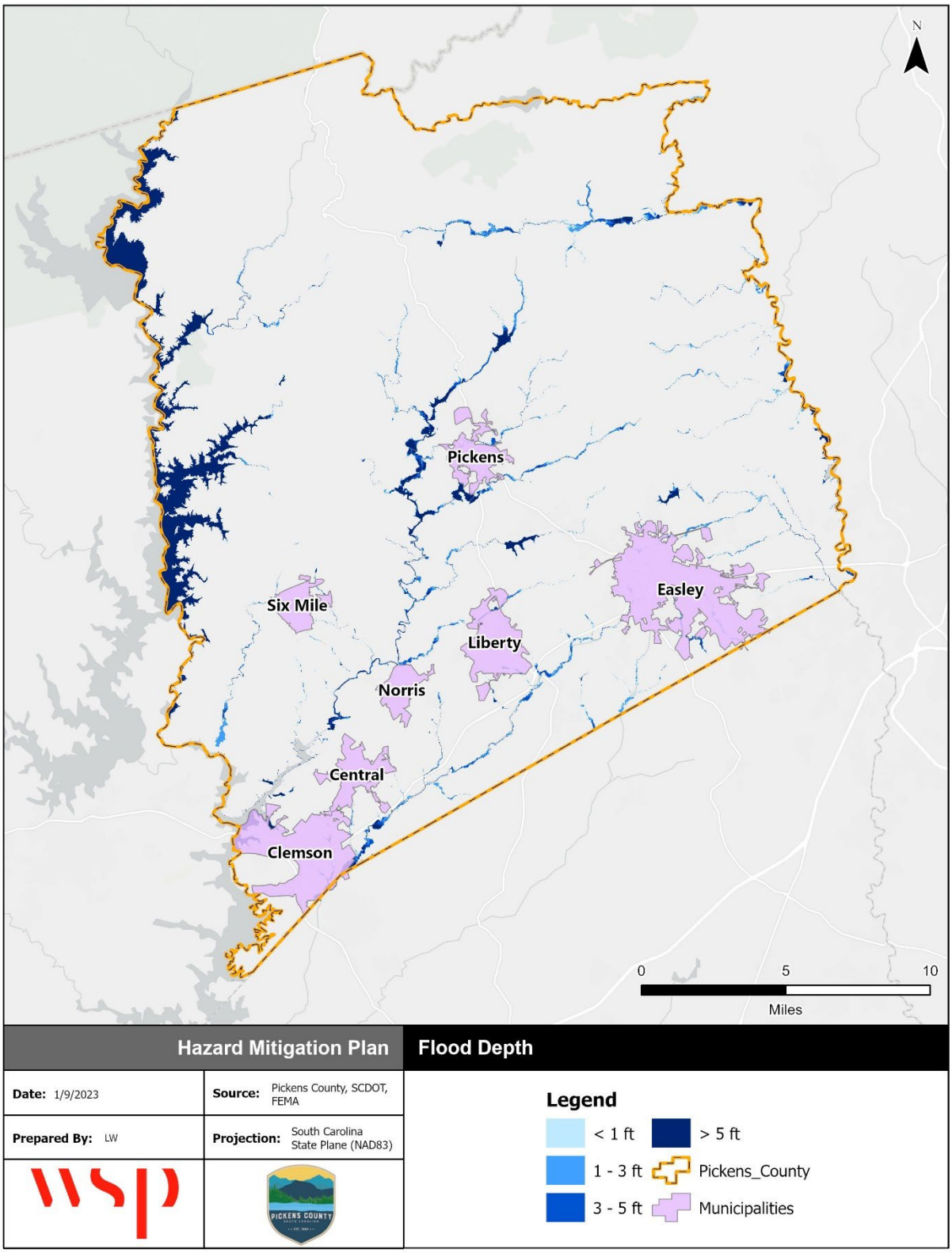
Figure 5-25 depicts the depth of flooding that can be expected within the Pickens County planning area during the 1-percent-annual-chance flood event. Table 5-32 provides the depth damage factors that were used to calculate flood losses for the planning area. These depth damage factors are based on the default depth damage curve in Hazus.

**Table 5.32 Depth Damage Percentages**

| Depth (ft) | Percent Damaged (%) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Agricultural | Commercial | Education | Government | Industrial | Religious | Residential |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 18 |
| 1 | 6 | 9 | 5 | 5 | 10 | 10 | 22 |
| 2 | 11 | 14 | 7 | 8 | 12 | 11 | 25 |
| 3 | 15 | 16 | 9 | 13 | 15 | 11 | 28 |
| 4 | 19 | 18 | 9 | 14 | 19 | 12 | 30 |
| 5 | 25 | 20 | 10 | 14 | 22 | 12 | 31 |
| 6 | 30 | 23 | 11 | 15 | 26 | 13 | 40 |
| 7 | 35 | 26 | 13 | 17 | 30 | 14 | 43 |
| 8 | 41 | 30 | 15 | 19 | 35 | 14 | 43 |
| 9 | 46 | 34 | 17 | 22 | 29 | 15 | 45 |
| 10 | 51 | 38 | 20 | 26 | 42 | 17 | 46 |
| 11 | 57 | 42 | 24 | 31 | 48 | 19 | 47 |
| 12 | 63 | 47 | 28 | 37 | 50 | 24 | 47 |
| 13 | 70 | 51 | 33 | 44 | 51 | 30 | 49 |
| 14 | 75 | 55 | 39 | 51 | 53 | 38 | 50 |
| 15 | 79 | 58 | 45 | 59 | 54 | 45 | 50 |
| 16 | 82 | 61 | 52 | 65 | 55 | 52 | 50 |
| 17 | 84 | 64 | 59 | 70 | 55 | 58 | 51 |
| 18 | 87 | 67 | 64 | 74 | 56 | 64 | 51 |
| 19 | 89 | 69 | 69 | 79 | 56 | 69 | 52 |
| 20 | 90 | 71 | 74 | 83 | 57 | 74 | 52 |
| 21 | 92 | 74 | 79 | 87 | 57 | 78 | 53 |
| 22 | 93 | 76 | 84 | 91 | 57 | 82 | 53 |
| 23 | 95 | 78 | 89 | 95 | 58 | 85 | 54 |
| 24 | 96 | 80 | 94 | 98 | 58 | 88 | 54 |

Source: Hazus

**Figure 5.27 1% Annual Chance Flood Depth**



*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 fatalities. Individuals face high risk when driving through flooded streets.

Another important consideration for the health and safety of residents and visitors is the ability to safely evacuate flooded areas. Most of Pickens County is relatively rural with a growing elderly population. Isolated and aging individuals may have difficulty evacuating due to lack of transportation access or limited evacuation options.

Pickens County has one pre-identified shelter, Pickens County High School, which does include a backup generator. However, the County primarily uses churches as shelters.

An estimate of population at risk to flooding was developed based on the Hazus loss estimates for residential property. Counts of residential buildings at risk were multiplied by the average household size for each jurisdiction, as reported in the 2020 American Community Survey 5-year estimates. The resulting estimates of population at risk are shown in Table 5-33. Overall, an estimated 437 people are at risk to the 1%-annual-chance flood based on the vulnerability of their homes.

**Table 5.33 Pickens County Population at Risk to Flood**

| Jurisdiction | Household Factor | Residential Parcels at Risk | Population at Risk |
|---|---|---|---|
| Town of Central | 2.04 | 0 | 0 |
| City of Clemson | 2.40 | 27 | 65 |
| City of Easley | 2.22 | 56 | 124 |
| City of Liberty | 2.35 | 5 | 12 |
| Town of Norris | 3.08 | 0 | 0 |
| City of Pickens | 2.20 | 1 | 2 |
| Town of Six Mile | 2.60 | 0 | 0 |
| Unincorporated Pickens County | 2.41* | 97 | 234 |
| **Total** | -- | -- | **437** |

Source: FEMA; U.S. Census Bureau 2016-2020 ACS 5-Year Estimates; Pickens County GIS
*Pickens County average household factor

### *PROPERTY*

Residential, commercial, and public buildings, as well as critical facilities and infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed by flood waters. Table 5-34 summarizes the property exposure by occupancy in each flood zone throughout the County.

**Table 5.34 Property Exposure by Flood Zone and Occupancy**

| Occupancy | Estimated Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| **Zone AE** | **334** | **$72,369,998** | **$38,844,762** | **$111,214,760** |
| Agriculture | 6 | $139,500 | $139,500 | $279,000 |
| Commercial | 17 | $3,301,053 | $3,301,053 | $6,602,106 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 20 | $939,486 | $1,409,229 | $2,348,715 |
| Religious | 0 | $0 | $0 | $0 |
| Residential | 291 | $67,989,959 | $33,994,980 | $101,984,939 |
| **Floodway** | **33** | **$4,106,536** | **$2,526,992** | **$6,633,528** |
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 5 | $51,900 | $51,900 | $103,800 |

| Occupancy | Estimated Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 8 | $447,774 | $671,661 | $1,119,435 |
| Religious | 0 | $0 | $0 | $0 |
| Residential | 20 | $3,606,862 | $1,803,431 | $5,410,293 |
| **Area with Reduced Flood Risk due to Levee** | **4** | **$2,935,610** | **$1,700,710** | **$4,636,320** |
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 2 | $441,810 | $441,810 | $883,620 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 1 | $12,000 | $18,000 | $30,000 |
| Religious | 0 | $0 | $0 | $0 |
| Residential | 1 | $2,481,800 | $1,240,900 | $3,722,700 |
| **Zone X (Shaded)** | **34** | **$6,940,296** | **$4,377,782** | **$11,318,078** |
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 1 | $211,027 | $211,027 | $422,055 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 6 | $802,121 | $1,203,181 | $2,005,302 |
| Religious | 0 | $0 | $0 | $0 |
| Residential | 27 | $5,927,148 | $2,963,574 | $8,890,722 |
| **Zone X (Unshaded)** | **46,038** | **$11,140,007,293** | **$6,241,392,244** | **$17,381,399,536** |
| Agriculture | 291 | $16,606,805 | $16,606,805 | $33,213,610 |
| Commercial | 1,769 | $816,444,574 | $816,444,574 | $1,632,889,147 |
| Education | 22 | $10,967,172 | $10,967,172 | $21,934,344 |
| Government | 12 | $4,573,862 | $4,573,862 | $9,147,724 |
| Industrial | 1,576 | $232,783,601 | $349,175,401 | $581,959,002 |
| Religious | 53 | $28,617,581 | $28,617,581 | $57,235,161 |
| Residential | 42,315 | $10,030,013,699 | $5,015,006,849 | $15,045,020,548 |

Source: FEMA Effective DFIRM; Pickens County GIS

Table 5-35 details the estimated losses for the 1%-annual-chance flood event for the entire planning area. The total damage estimate value is based on damages to the total of improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

**Table 5.35 Estimated Building Damage and Content Loss for 1% Annual Chance Flood**

| Occupancy Type | Total Buildings with Loss | Total Value (Building & Contents) | Estimated Building Damage | Estimated Content Loss | Estimated Total Damage | Loss Ratio |
|---|---|---|---|---|---|---|
| Agriculture | 6 | $279,000 | $30,309 | $42,947 | $73,256 | 26% |
| Commercial | 16 | $3,840,246 | $508,002 | $1,068,568 | $1,576,570 | 41% |
| Educational | 0 | $0 | $0 | $0 | $0 | 0% |
| Government | 0 | $0 | $0 | $0 | $0 | 0% |
| Industrial | 20 | $3,086,215 | $181,569 | $450,964 | $632,534 | 20% |
| Religious | 0 | $0 | $0 | $0 | $0 | 0% |
| Residential | 186 | $63,857,690 | $11,991,510 | $5,392,411 | $17,383,920 | 27% |
| **Total** | **228** | **$71,063,151** | **$12,711,390** | **$6,954,890** | **$19,666,280** | **28%** |

Source: Hazus 6.0; Pickens County GIS

Most of these estimated losses are attributed to unincorporated Pickens County, Clemson, and Easley, with no estimated losses in Central, Norris, or Six Mile, and limited estimated losses in Liberty and Pickens. Loss estimates are detailed by jurisdiction in each jurisdiction's annex.

The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all buildings located within the flood zones included in this Hazus analysis) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator a community may have more difficulties recovering from a flood. Overall, the 1%-annual-chance flood event is projected to cause a 28% loss ratio, which indicates more significant difficulty for recovery.

Details on the one critical facility at risk to the 1%-annual-chance flood are provided in Table 5-36, including the depth of flooding estimated to occur.

**Table 5.36 Critical Facilities Exposed to Flood and Expected Flood Depth**

| FEMA Lifeline | Facility Name | Jurisdiction | Flood Zone | 100-Year Flood Depth (NAVD FT) |
|---|---|---|---|---|
| Health and Medical | Nursing Home | Easley | AE | 2.47 |

Source: FEMA, Hazus, Pickens County

Table 5-37 summarizes current active flood insurance policies, premiums, and insurance in force by occupancy across all jurisdictions; Table 5-38 summarizes these statistics by flood zone. Current insurance in force exceeds the building loss estimate of $19,666,280 for the 1-percent-annual-chance flood (detailed in Table 5-35). However, while 111 residential buildings have coverage, an estimated 186 residential buildings are estimated to be vulnerable to damages from the 1-percent-annual-chance flood, which means that at least 75 vulnerable residential buildings lack flood insurance coverage. In fact, when evaluating coverage by flood zone, only 38 buildings in the SFHA have flood insurance coverage, yet an estimated 228 buildings would sustain losses from the 1-percent-annual-chance event, which suggests that at least 190 vulnerable buildings lack coverage.

**Table 5.37 NFIP Policy and Claims Data by Occupancy Type, Countywide**

| Occupancy | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total Closed Paid Losses |
|---|---|---|---|---|---|
| Single Family | 111 | $69,275 | $30,016,700 | 42 | $569,215.72 |
| 2-4 Family | 0 | $0 | $0 | 0 | $0 |
| All Other Residential | 0 | $0 | $0 | 0 | $0 |
| Non-Residential | 7 | $8,846 | $2,909,000 | 3 | $0 |
| **Total** | **118** | **$78,121** | **$32,925,700** | **45** | **$569,215.72** |

Source: FEMA CIS, accessed January 2023; includes Central, Clemson, Easley, Pickens, and Pickens County; Liberty and Six Mile participate in the NFIP but have no reported policies or claims.

**Table 5.38 NFIP Policy and Claims Data by Flood Zone, Countywide**

| Flood Zone | Number of Policies in Force | Total Premium | Total Coverage | Number of Closed Paid Losses | Total Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 38 | $33,973 | $9,108,400 | 12 | $208,478.18 |
| A Zone | 0 | 0 | $0 | 10 | $86,113.72 |
| B, C & X Zone Standard | 60 | $34,878 | $17,692,300 | 9 | $203,341.76 |
| B, C & X Zone Preferred | 20 | $9,270 | $6,125,000 | 14 | $71,282.06 |
| **Total** | **118** | **$78,121** | **$32,925,700** | **45** | **$569,215.72** |

Source: FEMA CIS, accessed January 2023; includes Central, Clemson, Easley, Pickens, and Pickens County; Liberty and Six Mile participate in the NFIP but have no reported policies or claims.

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. However, some property owners in high-risk areas may drop their flood insurance coverage once they have paid off their mortgage, which could make them more vulnerable to future losses.

## 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. Some repetitive loss buildings are classified as "severe repetitive loss" properties if they have 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.

According to NFIP records as of December 2022, there were a total of eight repetitive loss properties within the planning area, located in Easley and Pickens County. Only one of these buildings is insured. All repetitive loss properties are residential.

Table 5-39 summarizes repetitive loss properties by jurisdiction as identified by FEMA through the NFIP and reported in the FEMA Community Information System.

**Table 5.39 Repetitive Loss Properties by Jurisdiction**

| Jurisdiction | Property Count | % Insured | Total Amount of Claims Payments (Building & Contents) | SRL Count |
|---|---|---|---|---|
| Central | 0 | - | - | - |
| Clemson | 0 | - | - | - |
| Easley | 4 | 25% | $113,261.95 | 0 |
| Liberty | 0 | - | - | - |
| Norris | -- | -- | -- | -- |
| Pickens | 0 | - | - | - |
| Six Mile | 0 | - | - | - |
| Pickens County | 4 | 0% | $69,006.92 | 0 |
| **Total** | **8** | **12.5%** | **$182,268.87** | **0** |

Source: FEMA CIS accessed January 2023
SRL = Severe Repetitive Loss
Note: Norris does not participate in the NFIP due to limited area at risk.

Data was not available on the location of repetitive loss areas throughout Pickens County.

### *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.

## CHANGES IN DEVELOPMENT

It is very likely that development can and will change the flood hazard and increase risk. The County does not anticipate any major development projects over the next five years, however general trends in population growth and gradual development may affect future flooding conditions.

### *AREAS SUBJECT TO FUTURE FLOODING*

Areas subject to continued or worsening flooding in the future include existing floodplain areas, surrounding moderate risk areas, and urbanized areas with inadequate stormwater management. The following factors may influence future flooding:

- Changes in floodplain development and demographics may result in increased exposure and increased vulnerability. If development occurs in the floodplain without proper flood protection, these properties will be vulnerable to flood. Additionally, encroachments, such as new development and/or fill in the flood fringe, which is the area of the floodplain outside the floodway, reduce the natural floodplain and limit natural floodplain functions. Encroachments can cause a rise in the base flood elevation, putting new and existing development at greater risk. Increases in socially vulnerable populations, discussed in Section 3, within the floodplain can also increase future flood risk.
- Development in the watershed may alter flood patterns and increase flood frequency and intensity. Increased development anywhere in the planning area will likely lead to increased impervious surfaces; such development will limit infiltration and increase runoff. This is especially true of increased development within or near identified floodplains where development may contribute to increased runoff and simultaneously reduce natural floodplain areas and limit natural floodplain functions. There will be a greater strain on stormwater infrastructure to convey runoff and a possibility for more flash flooding and urban flooding where system capacity is overwhelmed.
- Climate change, as discussed above, may cause an increase in the frequency and intensity of heavy rainfall events. These changes could result in more frequent flooding and/or flooding of greater magnitude.

## KEY ISSUES

- About 5.5% of the county falls within the SFHA, including nearly 11.2% of Clemson, 5.6% of Pickens County. The rest of the jurisdictions have less than 5% of their total area in the SFHA.
- Flood insurance coverage in the community is inadequate: there are at least 216 buildings in the SFHA that are expected to be damaged by the 1%-annual-chance flood event but are uninsured.
- The loss ratio resulting from the Hazus analysis is 28% for the 1%-annual-chance flood, meaning it would be difficult to recover from without outside assistance.
- By being a member of the NFIP's CRS program, Pickens County is taking steps beyond the basic NFIP requirements to reduce flood risk.
- There are 8 repetitive loss properties across Pickens County and Easley. Mitigation strategies should prioritize these structures.

- Related Hazards: Hurricane, Severe Weather, Dam/Levee Failure

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes flood hazard risk by jurisdiction. Warning time and duration were considered uniform across the planning area. Probability was based on known flood risk areas and past events, with flooding considered highly likely in Pickens County, Clemson, Easley, and Pickens, likely in Central, Liberty, and Six Mile, and possible in Norris. Impact was assigned based on Hazus loss estimates, with possibility for critical impacts in unincorporated Pickens County, Clemson, Easley, Liberty, and Pickens, but limited impact in Central, Norris, or Six Mile. All participating jurisdictions have some area in SFHA but to varying degrees; Clemson has over 10% of its area in the SFHA, Pickens County, Pickens, Easley, Liberty, and Six Mile have between 1% and 10% of their area in the SFHA, and less than 1% of Central and Norris are in the SFHA.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 3 | 3 | 2 | 3 | 3 | 2.8 | M |
| Clemson | 4 | 3 | 3 | 3 | 3 | 3.3 | H |
| Easley | 4 | 3 | 2 | 3 | 3 | 3.1 | H |
| Liberty | 3 | 3 | 2 | 3 | 3 | 2.8 | M |
| Norris | 2 | 3 | 2 | 3 | 3 | 2.5 | M |
| Pickens | 4 | 3 | 2 | 3 | 3 | 3.1 | H |
| Six Mile | 3 | 3 | 2 | 3 | 3 | 2.8 | M |
| Unincorporated Pickens County | 4 | 3 | 2 | 3 | 3 | 3.1 | H |

# 5.9 HURRICANE/TROPICAL STORM

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Hurricane & Tropical Storm | Likely | Limited | Large | More than 24 hrs | Less than 24 hrs | 2.6 |

## HAZARD DESCRIPTION

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.

While hurricanes pose the greatest threat to life and property, tropical storms and depressions also can be devastating. A tropical disturbance can grow to a more intense stage through an increase in sustained wind speeds. The progression of a tropical disturbance is described below.

- **Tropical Depression:** A tropical cyclone with maximum sustained winds of 38 mph (33 knots) or less.
- **Tropical Storm:** A tropical cyclone with maximum sustained winds of 39 to 73 mph (34 to 63 knots).
- **Hurricane:** A tropical cyclone with maximum sustained winds of 74 mph (64 knots) or higher. In the western North Pacific, hurricanes are called typhoons; similar storms in the Indian Ocean and South Pacific Ocean are called cyclones.
- **Major Hurricane:** A tropical cyclone with maximum sustained winds of 111 mph (96 knots) or higher, corresponding to a Category 3, 4 or 5 on the Saffir-Simpson Hurricane Wind Scale.

Damage during hurricanes may also result from inland flooding from associated heavy rainfall.

***Warning Time: 1 – More than 24 hours***

***Duration: 2 – Less than 24 hours***

## LOCATION

Hurricanes and tropical storms can occur anywhere within the Pickens County planning area. While coastal areas are most vulnerable, the wind and rain impacts of hurricanes and tropical storms can be felt hundreds of miles inland. Wind impacts can occur uniformly across the planning area but may only affect a portion of the planning area during any given event. Heavy, prolonged rains from hurricanes and tropical storms can produce extensive urban and riverine flooding, especially if the storm is large and slow moving.

***Spatial Extent: 4 – Large***

## EXTENT

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (Table 5-40), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense. The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds and barometric pressure, which are combined to estimate potential property damage.

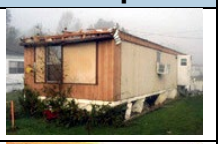
**Table 5.40 Saffir-Simpson Scale**

| 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

Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. While major hurricanes comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. Table 5-41 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. Category 1 and 2 storms are still dangerous, however, and require preventative measures.

**Table 5.41 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

The Saffir-Simpson scale provides a measure of hurricane extent. Based on historical storm tracks passing within 50 miles of the planning area, discussed below, Pickens County may reasonably experience up to a tropical storm or a low category hurricane. Flooding would likely be more significant than wind impacts.

***Impact: 2 – Limited***

## HISTORICAL OCCURRENCES

The NCEI database only reports two tropical storm events for Pickens County, both for Tropical Storm Zeta in October 2020. No deaths or injuries were reported but the storm did cause $200,000 in property damage. The County has received two Major Disaster Declarations and six Emergency Declarations for Hurricane events summarized in Table 5-42.

**Table 5.42 Hurricane-Related Disaster Declarations & Emergency Declarations**

| Disaster ID | Event Name | Declaration Date | Allocated Funding |
|---|---|---|---|
| DR-1566 | Tropical Storm Frances | 10/7/2004 | $7,240,598.76 |
| EM-3233 | Hurricane Katrina Evacuation | 9/10/2005 | $5,307,714.12 |
| EM-3378 | Hurricane Matthew | 10/6/2016 | --- |
| EM-3386 | Hurricane Irma | 9/7/2017 | --- |
| DR-4346 | Hurricane Irma | 10/16/2017 | $37,224,058.17 |
| EM-3400 | Hurricane Florence | 9/10/2018 | --- |
| EM-3421 | Hurricane Dorian | 9/1/2019 | --- |
| EM-3585 | Hurricane Ian | 9/29/2022 | --- |

Source: OpenFEMA Data Sets

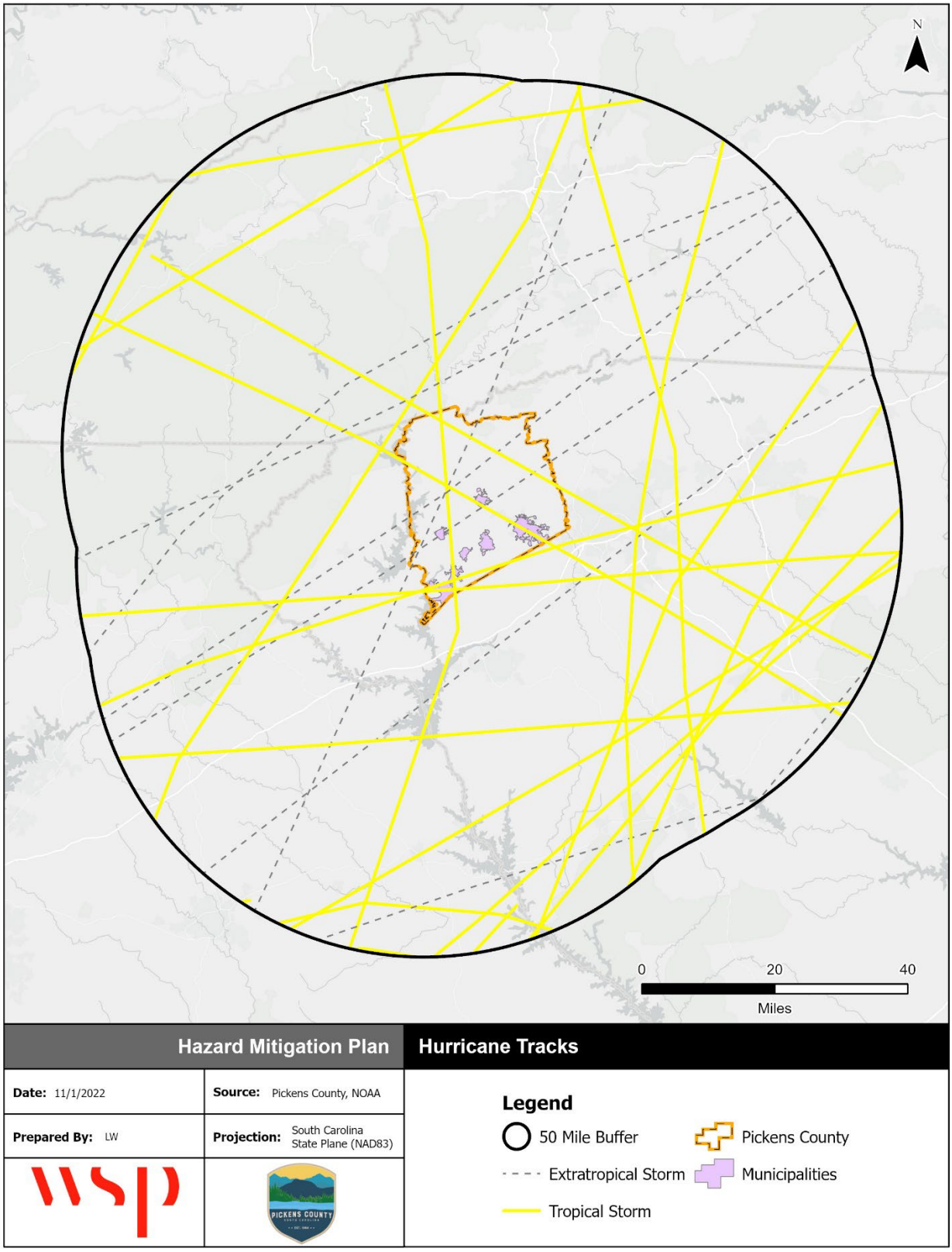
According to the NOAA Historical Hurricane Tracks dataset, 31 hurricanes or tropical storms, including 8 extratropical storms passed within 50 miles of Pickens County since 1850. This is the most current spatial data available. A list of all hurricanes and tropical storms that have come within 50 miles of Pickens since 1850 is provided in Table 5-43. These storm tracks are mapped in Figure 5-27.

**Table 5.43 Hurricane Tracks within 50 Miles of Pickens County, 1850-2021**

| Storm Name | Date | Storm Category |
|---|---|---|
| Not Named | 9/16/1859 | Tropical Storm |
| Not Named | 9/19/1875 | Extratropical Storm |
| Not Named | 9/10/1882 | Tropical Storm |
| Not Named | 9/11/1882 | Tropical Storm |
| Not Named | 6/22/1886 | Tropical Storm |
| Not Named | 7/8/1896 | Tropical Storm |
| Not Named | 9/15/1900 | Tropical Storm |
| Not Named | 9/28/1901 | Extratropical Storm |
| Not Named | 10/11/1902 | Extratropical Storm |
| Not Named | 9/16/1903 | Tropical Storm |
| Not Named | 9/18/1906 | Tropical Storm |
| Not Named | 9/23/1907 | Extratropical Storm |
| Not Named | 8/30/1911 | Extratropical Storm |
| Not Named | 6/14/1912 | Extratropical Storm |
| Not Named | 9/4/1913 | Tropical Storm |
| Not Named | 7/15/1916 | Tropical Storm |
| Not Named | 8/11/1928 | Extratropical Storm |
| Not Named | 10/9/1947 | Tropical Storm |
| Not Named | 8/28/1949 | Tropical Storm |
| Irene | 10/9/1959 | Tropical Storm |
| Abby | 6/8/1968 | Tropical Storm |
| Babe | 9/8/1977 | Tropical Storm |
| Danny | 8/17/1985 | Tropical Storm |
| Beryl | 8/17/1994 | Tropical Storm |
| Jerry | 8/27/1995 | Tropical Storm |
| Danny | 7/23/1997 | Tropical Storm |
| Frances | 9/8/2004 | Tropical Storm |
| Jeanne | 9/28/2004 | Tropical Storm |
| Cindy | 7/7/2005 | Extratropical Storm |
| Florence | 9/16/2018 | Tropical Storm |
| Zeta | 10/29/2020 | Tropical Storm |

Source: NOAA/National Hurricane Center, November 2022

**Figure 5.28 NOAA Historic Hurricane Tracks 1850-2021**




Source: NOAA/National Hurricane Center, November 2022

It is important to note that hurricanes and tropical storms tracking further than 50 miles from the planning area may still impact the area. For example, as detailed below, Hurricane Irma caused flooding and wind damage in the Pickens County area yet is not included in the above list.

NCEI's Storm Events Database records one tropical storm event, Tropical Storm Zeta, in Pickens County since 1950. Additionally, NCEI also reports a flood event, a heavy rain event, and three severe storm events associated with Hurricane Danny, Hurricane Ivan, Hurricane Frances, Tropical Storm Isidore, and Hurricane Irma. The event summaries and their local impacts, as reported in NCEI, are provided below:

**July 23, 1997** – The remnants of Hurricane Danny moved out of northeast Georgia and across upstate South Carolina from the late afternoon on the 23rd through the early morning of the 24th. Two weak, short-lived tornadoes were spawned. Heavy rain collapsed part of a small strip mall in Clemson. Flash flooding from the heavy tropical rain caused most of the damage.

**September 26, 2002** – Strong winds developed over the mountains and foothills of South Carolina, as the remnants of Tropical Storm Isidore passed across the Tennessee and Ohio valleys. The combination of wind and wet soil from heavy rainfall resulted in some fallen trees and power lines in scattered locations.

**September 7, 2004** – High winds associated with the remnants of Hurricane Frances produced some damage to trees and power lines across the South Carolina mountains.

**September 16, 2004** – Moderate to heavy rainfall associated with the remnants of Hurricane Ivan resulted in flooding along a few creeks during mid-evening across the northwest part of the upstate South Carolina. The flooding gradually became widespread and more severe during the overnight hours, especially in Oconee County, as the Tugaloo River flooded, trapping a number of families, some of which required rescue via helicopter. A number of bridges and roads were washed out or otherwise damaged by flood water. High winds developed across the mountains and a portion of the foothills during the evening as the remnants of Hurricane Ivan moved just west of the area. Numerous trees were blown down, many of which fell on vehicles and structures.

**September 11, 2017** – As Tropical Storm Irma moved north/northwest across the Florida Panhandle and southwest Georgia, strong winds developed over western portions of Upstate South Carolina. Although gusts only occasionally exceeded 50 mph in these areas, the prolonged nature of the event, combined with saturated soils resulting from heavy rainfall resulted in many trees falling on roads, power lines, vehicles, and structures. Many were without power for a day or more.

**October 29, 2020** – Tropical Storm Zeta moved quickly from near the mouth of the Mississippi River to the southern Appalachians during the night of the 28th into the morning of the 29th. This resulted in frequent wind gusts of 35 to 50 mph, with occasional gusts as high as 60 mph across upstate South Carolina throughout the morning. Numerous trees were blown down across the area, with hundreds of downed trees reported in some counties. Multiple trees fell on and damaged structures and vehicles throughout the area and power outages numbered in the hundreds of thousands.

## PROBABILITY OF FUTURE OCCURRENCE

In the 25-year period from 1996 through 2021, six hurricanes and tropical storms passed within 50 miles of Pickens County and impacts in the planning area were noted from three additional hurricanes and tropical storms. Using storms with reported impacts as an indicator of future probability, there is a 36 percent annual probability of hurricane or tropical storm force winds or rains impacting the planning area. Therefore, future hurricane or tropical storm impacts are considered likely.

***Probability: 3 – Likely***

## CLIMATE CHANGE

According to research synthesized by NOAA's Geophysical Fluid Dynamics Library as of March 2021, tropical cyclone intensity and rainfall rates are expected to increase as a result of climate change. Specifically, modeling studies for a 2-degree Celsius global warming scenario project an average increase of 10-15 percent for rainfall rates within about 100 km of a storm. Also in this scenario, tropical cyclone intensities are projected to increase by 1-10 percent, which implies even larger increases in the destructive potential per storm. According to the US Government Accountability Office, national storm losses from changing frequency and intensity of storms is projected to increase anywhere from $4-6 billion in the near future.

According to the Fourth National Climate Assessment, these changes are already being observed, with an increase in North Atlantic tropical cyclone activity since the 1970s. The Fourth National Climate Assessment also reports that there may be less frequent, low-category storm events (Tropical Storms, Category 1 Hurricanes), and more, high-category storm events (Category 4 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 the large storms that are generally responsible for the majority of deaths and damages associate with tropical cyclones.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Impacts include injury or death, loss of property, outbreak of diseases, mental trauma and loss of livelihoods. Power outages and flooding may 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 | Impacts on responders could be severe, including potential for death or injury during response operations. Downed trees and flooding may block roads. Response time may be reduced due to the large geographic scale of likely impacts and the high potential number of incidents requiring response. |
| Continuity of Operations (including Continued Delivery of Services) | Damage to facilities and/or personnel, power outages, road blockages, and other impacts from flooding or wind may require temporary relocation of some operations and may disrupt operations. Disruption or damage of roads and/or utilities may postpone delivery of some services. The County's EOP may mitigate some potential issues. |
| 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. Flood damages may also impact buildings and infrastructure. Regulatory waivers may be needed locally. |
| Environment | Hurricanes can devastate wooded ecosystems and remove foliage from forest canopies, and they can change habitats, affecting indigenous animal populations 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 can be adversely affected, possibly for an extended period of time, depending on damages. Intangible impacts are also likely, including business interruption and additional living expenses. |

| Category | Consequences |
|---|---|
| Public Confidence in the Jurisdiction's Governance | Similar to the flood hazard, these events have the potential to negatively impact public confidence due to the possibility of major event requiring substantial response and long-term recovery effort. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Young children, older adults, and individuals with limited mobility are especially vulnerable to harm from hurricanes. There should be plans in place to care for special-needs patients and individuals in hospitals and nursing homes who are unable to evacuate for medical reasons. 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.

The stress from disasters such as hurricanes can result in immediate and long-term physical and emotional health problems among victims. Many of the health impacts discussed in Section 5.8 Flooding are also relevant to hurricanes.

Individuals in manufactured and/or mobile homes are more vulnerable to hurricane winds, especially if their unit does not have tie downs and other wind safety measures. Overall, there are 9,911 occupied mobile or manufactured housing units in the planning area. As shown in Table 5-44, the majority of these units are located in Unincorporated Pickens County. Mobile and manufactured housing makes up a significantly larger proportion of the housing stock in Norris, making them particularly vulnerable to more severe impacts from hurricane events.

**Table 5.44 Mobile Home Units by Jurisdiction, 2020**

| Jurisdiction | Total Housing Units | Mobile Home Units | Mobile Home Units, Percent of Total |
|---|---|---|---|
| Central | 2,736 | 158 | 5.7% |
| Clemson | 7,801 | 111 | 1.4% |
| Easley | 9,945 | 405 | 4.1% |
| Liberty | 1,468 | 147 | 10.0% |
| Norris | 365 | 84 | 23.0% |
| Pickens | 1,583 | 162 | 10.2% |
| Six Mile | 361 | 22 | 6.1% |
| Unincorporated Pickens County | 30,680 | 8,822 | 28.8% |
| **Pickens County Total** | **54,939** | **9,911** | **18%** |

Source: American Community Survey 2016-2020 5-Year Estimates

### *PROPERTY*

Hazus 6.0 was used to determine hurricane risk based on probabilistic parameters for the 50-year and 100-year return periods. This analysis produced estimates of the likelihood of varying levels of damage as well as building-related economic losses. Note that Hazus only assesses hurricane wind and does not account for any other hazards associated with hurricane.

Table 5-45 provides the percent of buildings within each occupancy class that are estimated to sustain damage at varying levels of severity for the 50-year probabilistic event and the 100-year probabilistic event. In both scenarios, it is estimated that less than one percent of buildings in all occupancy classes would sustain minor damage. Based on these estimates, the probability of hurricane wind-related property damage is low.

**Table 5.45 Expected Building Damage, 50-year and 100-year Hurricane Events**

| Occupancy | Buildings at Risk | Value at Risk | Percent of Buildings by Occupancy with Damage | | | | |
|---|---|---|---|---|---|---|---|
| | | | None | Minor | Moderate | Severe | Destruction |
| **50-year event** | | | | | | | |
| Agriculture | 47 | $41,031,000 | 99.87% | 0.13% | 0.00% | 0.00% | 0.00% |
| Commercial | 3,199 | $3,379,584,000 | 99.83% | 0.17% | 0.00% | 0.00% | 0.00% |
| Education | 47 | $2,446,974,000 | 99.85% | 0.15% | 0.00% | 0.00% | 0.00% |
| Government | 72 | $120,674,000 | 99.77% | 0.23% | 0.00% | 0.00% | 0.00% |
| Industrial | 472 | $971,549,000 | 99.84% | 0.16% | 0.00% | 0.00% | 0.00% |
| Religion | 263 | $430,187,000 | 99.85% | 0.15% | 0.00% | 0.00% | 0.00% |
| Residential | 48,262 | $17,255,307,000 | 99.98% | 0.02% | 0.00% | 0.00% | 0.00% |
| **100-year event** | | | | | | | |
| Agriculture | 47 | $41,031,000 | 99.79% | 0.21% | 0.00% | 0.00% | 0.00% |
| Commercial | 3,199 | $3,379,584,000 | 99.71% | 0.29% | 0.00% | 0.00% | 0.00% |
| Education | 47 | $2,446,974,000 | 99.73% | 0.27% | 0.00% | 0.00% | 0.00% |
| Government | 72 | $120,674,000 | 99.71% | 0.29% | 0.00% | 0.00% | 0.00% |
| Industrial | 472 | $971,549,000 | 99.72% | 0.28% | 0.00% | 0.00% | 0.00% |
| Religion | 263 | $430,187,000 | 99.77% | 0.23% | 0.00% | 0.00% | 0.00% |
| Residential | 48,262 | $17,255,307,000 | 99.96% | 0.03% | 0.00% | 0.00% | 0.00% |

Source: Hazus 6.0

Table 5-46 details estimated property damages from the 50-year and 100-year hurricane wind events by occupancy type. In the 50-year event, property damages across the county are estimated at $1.5 million. In the 100-year event, property damages are estimated at $5.1 million. In both cases, all or most of the damages are sustained by residential property.

**Table 5.46 Estimated Property Damages, 50-year and 100-year Hurricane Wind Events**

| Area | Residential | Commercial | Industrial | Others | Total |
|---|---|---|---|---|---|
| **50-year Hurricane Event** | | | | | |
| Building | $776,640 | $0 | $0 | $0 | $776,640 |
| Content | $749,760 | $0 | $0 | $0 | $749,760 |
| Inventory | $0 | $0 | $0 | $0 | $0 |
| **Total** | **$1,526,400** | **$0** | **$0** | **$0** | **$1,526,400** |
| **100-year Hurricane Event** | | | | | |
| Building | $3,289,010 | $6,020 | $1,840 | $167,770 | $3,464,640 |
| Content | $1,625,730 | $0 | $0 | $0 | $1,625,730 |
| Inventory | $0 | $0 | $0 | $0 | $0 |
| **Total** | **$4,914,740** | **$6,020** | **$1,840** | **$167,770** | **$5,090,370** |

Source: Hazus 6.0

Loss ratio, which is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all buildings in the planning area) and displayed as a percentage of loss, provides an indication of how much property may be damaged and how difficult recovery might be. Estimated property damages for the 50-year hurricane wind event total $1,526,400, which equates to a loss ratio of less than one percent. Estimated property damages for the 100-year event total $5,090,370, which represents a loss ratio of less than 0.03 percent. Given that FEMA considers a loss ratio of 10 percent or more to be an indicator that a community will have significant difficulty recovering from an event, these loss ratios indicate that hurricane wind impacts would not cause a significant recovery burden. However, damages from an actual hurricane event would likely also involve flood impacts. Flood related vulnerability can be found in Section 5.8.

Given equal vulnerability to hurricane winds across Pickens County, all critical facilities are considered to be exposed to hurricane risk, but actual impacts would likely be minimal. Certain buildings may perform better than others based on their age and construction, among other factors.

Hazus estimates the total amount of debris that will be generated by a hurricane, breaking the debris down into four general categories: Brick/Wood, Reinforced Concrete/Steel, Eligible Tree Debris, and Other Tree Debris. Hazus also estimates the number of trucks needed to remove the building debris, assuming 25 tons of debris per truck. Table 5-47 summarizes debris generated and trucks needed by storm event. Based on these estimates, debris generation would be almost entirely tree debris in either event.

**Table 5.47 Estimated Debris Generation (tons)**

| Event Type | Tree Debris | | Brick/ Wood | Concrete/ Steel | Total | Building Debris Truckloads |
|---|---|---|---|---|---|---|
| | Eligible | Other | | | | |
| 50-year hurricane event | 110 | 332 | 0 | 0 | 442 | 0 |
| 100-year hurricane event | 300 | 716 | 19 | 0 | 1,035 | 1 |

Source: Hazus 6.0

### *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.

## CHANGES IN DEVELOPMENT

New development will not impact the incidence of hurricane wind, but can increase exposure, which in turn may increase risk. This is especially true for mobile home development, which is more vulnerable to wind.

## KEY ISSUES

- Norris and the unincorporated portions of the County are potentially more vulnerable to hurricane wind due to the greater percentage of mobile homes. Providing targeted outreach on the importance of tie-downs and enforcing the installation of tie-downs for mobile home units could mitigate this vulnerability.
- Related Hazards: Flood, Windstorm/Thunderstorm, Tornado

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes hurricane hazard risk by jurisdiction. Most aspects of hurricane risk, particularly related to wind, do not vary substantially by jurisdiction; however, mobile home units are more vulnerable than other housing types to wind damage. Therefore, impacts from wind may be more severe in Norris and unincorporated Pickens County.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 3 | 2 | 4 | 1 | 2 | 2.6 | M |
| Clemson | 3 | 2 | 4 | 1 | 2 | 2.6 | M |
| Easley | 3 | 2 | 4 | 1 | 2 | 2.6 | M |
| Liberty | 3 | 2 | 4 | 1 | 2 | 2.6 | M |
| Norris | 3 | 3 | 4 | 1 | 2 | 2.9 | M |
| Pickens | 3 | 2 | 4 | 1 | 2 | 2.6 | M |
| Six Mile | 3 | 2 | 4 | 1 | 2 | 2.6 | M |
| Unincorporated Pickens County | 3 | 3 | 4 | 1 | 2 | 2.9 | M |

# 5.10 SEVERE STORM

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Severe Storm (Thunderstorm Wind, Hail, & Lightning) | Highly Likely | Minor | Large | 6 to 12 hrs | Less than 6 hrs | 2.7 |

## HAZARD BACKGROUND

### *THUNDERSTORM WIND*

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

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: 3 – 6 to 12 hours***

***Duration: 1 – Less than six hours***

### *HAIL*

As defined by 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.

Hail falls when it becomes heavy enough to overcome the strength of the updraft and is pulled by gravity towards 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.

Hailstones are usually less than two inches in diameter and can fall at speeds of 120 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, but even small pea sized hail can cause damage.

Hailstorms in South Carolina cause damage to property, crops, and the environment, and kill and injure livestock. In the U.S., 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***

### *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. A lightning flash is composed of a series of strokes with an average of about four. The length and duration of each lightning stroke vary, but typically average about 30 microseconds.

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. Nationwide, lightning kills 75 to 100 people each year. Lightning strikes can also start building fires and wildland fires, and damage electrical systems and equipment.

The watch/warning time for a severe storm is usually a few hours. There is no warning time for any given lightning strike, which 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***

## LOCATION

Thunderstorm wind, lightning, and hail events do not have a defined vulnerability zone. The scope of lightning and hail is generally confined to the footprint of its associated thunderstorm. However, large-scale hail tends to occur in a more localized area within the storm. While the total area vulnerable to a lightning strike corresponds to the footprint of a given thunderstorm, a specific lightning strike is usually a localized event and occurs randomly. 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 Pickens County including all assets located within the County can be considered at risk to severe weather events. This includes the entire population of County and all critical facilities, buildings, and infrastructure.

***Spatial Extent: 4 – Large***

## EXTENT

### *THUNDERSTORM WIND*

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 the purpose of this severe weather risk assessment, the wind hazard will include data from High Wind, Strong Wind and Thunderstorm Wind. Hurricane Wind and Tornadoes are addressed as separate, individual hazards. The following definitions come from the NCEI Storm Data Preparation document.

- **High Wind** – Sustained non-convective winds of 40 mph 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 highest thunderstorm wind gust on record in Pickens County was 100 mph in 1990.

***Impact: 2 – Limited***

### *HAIL*

The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 5-48 indicates the hailstone measurements utilized by the National Weather Service.

**Table 5.48 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 | Softball |
| 4.5 inch | Grapefruit |

Source: National Weather Service

The Tornado and Storm Research Organization (TORRO) has further describes hail sizes by their typical damage impacts. Table 5-49 describes typical intensity and damage impacts of the various sizes of hail.

**Table 5.49 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 1961 and 2022 in Pickens County was a little over 1" in diameter; the largest hailstone recorded was 2.75" in 1998. The largest hailstone ever recorded in the U.S. fell in Vivian, SD on June 23, 2010, with a diameter of 8 inches and a circumference of 18.62 inches.

***Impact: 1 – Minor***

### *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, shown in Table 5-50, is a common parameter that is part of fire weather forecasts nationwide.

**Table 5.50 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 |

| Lightning Activity Level Scale | |
|---|---|
| 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

Lightning is one of the more dangerous weather hazards in the United States. Each year, lightning is responsible for deaths, injuries, and millions of dollars in property damage, including damage to buildings, communications systems, power lines, and electrical systems. Lightning also causes forest and brush fires. According to the National Lightning Safety Institute, lightning causes more than 26,000 fires in the United States each year. The institute estimates property damage, increased operating costs, production delays, and lost revenue from lightning and secondary effects to be in excess of $6 billion per year. Impacts can be direct or indirect. People or objects can be directly struck, or damage can occur indirectly when the current passes through or near it. However, generally lighting has minimal disruptions on quality of life.

***Impact: 1 – Minor***

## HISTORICAL OCCURRENCES

Table 5-51 shows detail for severe weather events reported by the NCEI since 1950 for Pickens County. There have been over 500 recorded events causing 6 injuries, 2 deaths and over $2M in property damage.

**Table 5.51 NCEI Severe Weather Events in Pickens County**

| Event Type | # of Events | Deaths/Injuries | Property Damage | Crop Damage |
|---|---|---|---|---|
| Hail | 157 | 0/0 | $650,000 | $0 |
| High Wind | 42 | 0/0 | $598,380 | $0 |
| Lightning | 6 | 0/1 | $61,000 | $0 |
| Strong Wind | 5 | 0/0 | $5,000 | $0 |
| Thunderstorm Wind | 292 | 2/5 | $715,000 | $0 |
| **Total** | **502** | **2/6** | **$2,029,380** | **$0** |

Source: NCEI, November 2022

The following narratives provide detail on select storms from the NCEI database:

**August 20, 1993** – A severe thunderstorm moving across Pickens County downed trees and power lines in the northern and eastern parts of the county. A barn near Pickens that was set on fire by lightning, burned and destroyed 3,000 bales of hay.

**March 19, 1996 –** High winds along and behind a very strong cold front caused widespread damage. Shallow rooted trees fell causing some damage to structures and power lines. A few outbuildings were damaged. Gusts were reported as high as 60 mph in a few spots with 30 to 40 mph sustained winds gusting to 50 mph common.

**June 2, 1997** – Severe thunderstorms developed rapidly after midnight and moved north through the Upstate. Large and damaging hail was the primary effect although a significant downburst at Clemson blew down numerous trees and caused power outages across the university's campus. No official estimates of damage were received by the time of this report, although damage to cars was reported to be extensive.

**June 14, 2001** – A couple of trees, and one power line were brought down by thunderstorm winds. Trained spotter reported dime-sized hail just outside the Easley city limits.

**April 22, 2005** – Divergent damage path ran from the intersection of Shady Grove and Martin School Rds to highway 178 north of Pickens. A spotter estimated 65 mph winds in Pickens. Several trees and lines were

down from Pickens to Liberty. At least one tree fell on a house near Liberty High School, and car was blown into another car at the Nissan plant near Liberty.

**May 20, 2005** – In the City of Pickens, a lightning strike killed 16 cows.

**February 10, 2008** – As a polar vortex dropped into New England, an unusually tight gradient developed over the mountains and western Upstate of South Carolina. This gradient, combined with daytime heating, helped to mix down areas of strong winds during the afternoon hours. Numerous trees were reported down across the Upstate and northwest Piedmont, some across roads and on homes. The gusty winds combined with ongoing drought conditions to produce numerous brush fires across the area during the afternoon.

**March 28, 2010** – Strong wind and moderate instability developed over the region ahead of a cold front. Several severe storms affected Upstate South Carolina during the late afternoon and evening hours. Large hail was the most commonly reported severe weather, though one supercell thunderstorm produced two tornadoes starting just over the state line up in the western piedmont of North Carolina. Golf ball size hail was reported by a spotter near the Greenville/Pickens Speedway. Additionally, lightning ignited a fire at an apartment building on Riverstone Ct, causing damage to the roof.

**March 31, 2012** – Scattered thunderstorms developed over the mountains ahead of the cold front. The storms then moved southeast, into upstate South Carolina. The storms produced quite a bit of hail, some large, over the central part of the upstate. A brief period of quarter size hail fell at the intersection of highways 183 and 133.

**May 23, 2014** – Scattered strong to severe discrete thunderstorm cells developed across the Piedmont during the afternoon ahead of a slow-moving, nearly stationary backdoor cold front. The storms produced a lot of hail with some larger than baseball size. New cells often developed upstream of mature cells, then moved over the same areas, such that some locations saw two or more rounds of large hail. Spotters and the public reported up to half dollar size hail across the city of Easley.

**June 23, 2018** – A cluster of thunderstorms producing damaging wind gusts moved from northeast Georgia into the South Carolina mountains and foothills during the afternoon. The County reported numerous trees and power lines blown down, mainly across the eastern half of Pickens County.

**June 14, 2021** – Scattered thunderstorms developed across upstate South Carolina during the afternoon. A couple of the storms produced large hail. Half dollar size hail was reported near Six Mile.

**February 17, 2022** – Strong south winds developed across the South Carolina Piedmont ahead of a cold front during the late evening into the overnight hours. A line of heavy rain showers developed across the northwest part of the Upstate late in the evening and produced damaging wind gusts in Oconee and Pickens Counties. Additionally, the persistent south winds ahead of the front also produced some minor damage in York County. There were reports of two large trees blown down along Highway 93 between Liberty and Easley.

## PROBABILITY OF FUTURE OCCURRENCE

Given the high number of previous events (502 records in 62 years), it is certain that severe weather events, including thunderstorm wind, lightning and hail, will occur in the future. This results in a probability level of highly likely for future severe weather events for the entire planning area.

The average hailstorm in Pickens County occurs in the afternoon and has a hail stone with a diameter of just over one inch. Over the 22-year period from 2000 to 2022, Pickens County experienced 105 reported hail incidents, which averages to about 0.99 hail incidents per year.

Based on historical occurrences recorded by NCEI for the 25-year period (1997-2022), 6 lightning events were reported as having caused death, injury, or property damage, which equates to 24% annual chance of a damaging lightning strikes per year. However, the lightning events recorded by the NCEI are only those

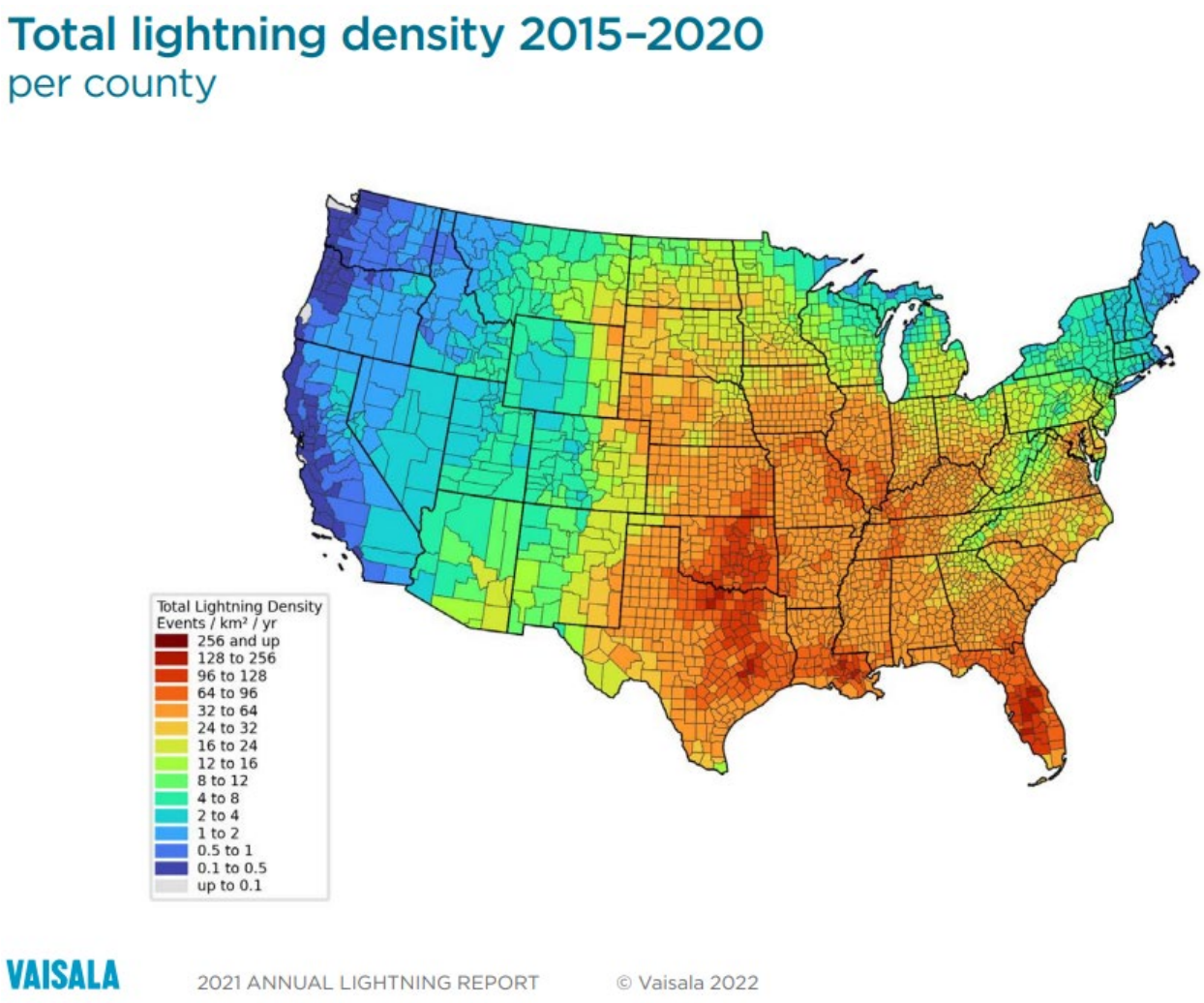
that are reported to have caused damage or injuries; it is certain that additional non-damaging lightning incidents will occur in Pickens County.

According to the total lighting density map in Vaisala 2021 Annual Lightning Report, shown in Figure 5-28, the majority of Pickens County is located in an area that experiences 24 to 32 lightning events per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.

Based on past occurrences, there is a 100% annual chance that Pickens County will experience severe weather.

***Probability: 4 – Highly Likely***

**Figure 5.29 Lightning Density (2015-2020)**



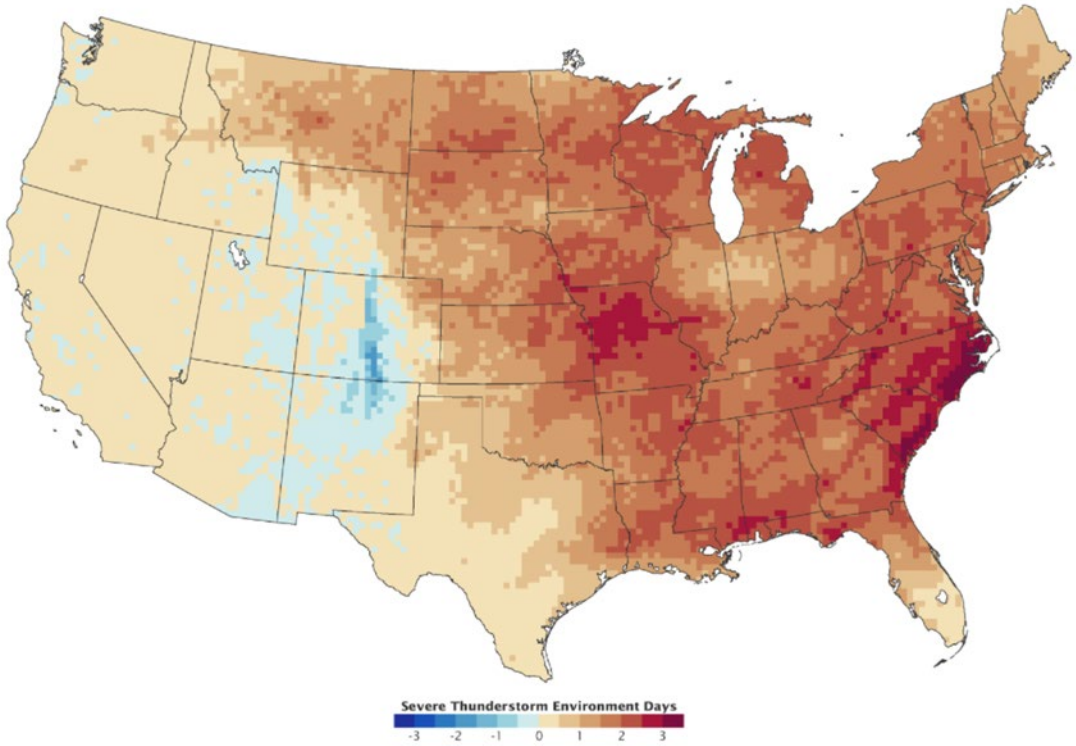

Source: Vaisala

## CLIMATE CHANGE

Higher temperatures and humidity may increase atmospheric variability associated with the origination of severe thunderstorms and tornadoes, and early research suggests that continued climate change and greenhouse forcing are likely to increase severe thunderstorm occurrence (Diffenbaugh, et al. 2013). Decreases in vertical wind shear can result in fewer or weaker severe thunderstorms and tornadoes. However, this decrease is most likely to occur when convective available potential energy is high in spring

and summer, which could result in more frequent severe storms. Shown in Figure 5-29, below, convective available potential energy (CAPE), a key factor in thunderstorm formation, is predicted to rise enough to overwhelm a slight decrease in vertical wind shear, leading to an increase in severe thunderstorms.

**Figure 5.30 Projected Increase in Severe Thunderstorm Days**




Source: NASA Earth Observatory

There has been a surge in the number of severe storms reported over the past 50 years, but this increase could at least be partially attributed to technological developments that allow for better identification and reporting of such storms. More specifically, the frequency and intensity of individual rainfall events associated with thunderstorms is likely to increase which can overwhelm local stormwater drainage systems, leading to street flooding and ponded water.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Impacts from lightning and hail can result in injuries and fatalities if a person is struck. Fatalities and injuries most often occur when a person is exposed and in outdoor conditions during a storm. Exposure to water and open areas also increases the likelihood that a person will be struck by lightning. |
| Responders | First responders can be impacted the same way as the general public. Downed trees, power lines and flood waters may prevent access to areas in need which prolongs response time. |
| Continuity of Operations (including Continued Delivery of Services) | Thunderstorm events can result in a loss of power which may impact operations. Downed trees, power lines and flash flooding may prevent access to critical facilities and/or emergency equipment. |
| Property, Facilities and Infrastructure | Thunderstorms can cause damage to buildings due to strong winds, lightning strikes and hail, especially windows, cars, siding, and mobile homes. Heavy |

| Category | Consequences |
|---|---|
| | rains associated with thunderstorm events may also lead to flash flooding which can damage roads and bridges. There is also a possibility of structure fire ignition. |
| Environment | Lightning can cause sparks to flare up in surrounding forests or immense shrubs. This is often the cause of bush fires, which then spread quickly due to the fast winds that accompany the storm. Trees often uprooted due to high winds or saturated soils. |
| Economic Condition of the Jurisdiction | Damages to power-related infrastructure could cause economic strain to return the system to full capacity. Damages to property can lead to costly recovery efforts like business interruption and additional living/operation expenses. |
| Public Confidence in the Jurisdiction's Governance | Public confidence is not generally affected by severe weather events. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

People and populations exposed to the elements are most vulnerable to severe weather. Individuals who work outdoors may also face increased risk. Risk of being struck by lightning is greater in open areas, at higher elevations, and on the water. NCEI reported 6 injuries and 2 deaths as a result of lightning and thunderstorm winds. 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.

Residents living in mobile homes are more vulnerable to hail events due to the lack of shelter locations and the vulnerability of the housing unit to damages. According to the 2020 American Community Survey (ACS) 5-Year Estimates, 9,911 occupied housing units (18 percent) in Pickens County are classified as mobile homes.

Severe weather 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.

### *PROPERTY*

NCEI records report over $2 million in property damage from thunderstorm-related wind events, hail, and lightning strikes. Based on these records, the planning area experiences an annualized loss of $32,258 in property damage. Because the location of future severe thunderstorm, lightning or hail events cannot be predicted, it is not possible to map geographic boundaries for these hazards. However, we can conclude that severe weather events including thunderstorm wind, lightning and hail have the potential to impact all existing and future buildings and facilities.

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. Hail can also directly damage property including destroyed windows and dented cars, buildings, and roofs. 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. Similarly, strong winds can cause direct property damage or cause trees and branches to damage surrounding property and facilities. Construction practices and building codes can help maximize the resistance of the structures to both wind and hail damage.

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 Pickens County, thus the NCEI is still used to form a baseline.

Additionally, thunderstorm winds, hail, and lightning can cause power outages that can have widespread consequences for the County. Large amounts of hail and fallen trees may need to be cleared from roadways and sidewalks, depending on accumulation

### *ENVIRONMENT*

Lightning may also result in the ignition of wildfires. However, this is part of a natural process, and the environment will return to its original state in time. 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.

## CHANGES IN DEVELOPMENT

Development is not expected to impact the incidence of severe storm. As the county grows, overall asset exposure will increase, which may increase risk.

## KEY ISSUES

- Severe weather events are highly likely to continue occurring in Pickens County. Communities should consider examining power redundancy and surge protection solutions for critical facilities to maintain operations in the event of a power outage.
- Past severe weather events caused injuries to individuals outside and/or in high-risk locations during these events. Solutions might include an awareness campaign to educate the public on severe weather risk and preparedness, with particular outreach focused on support for homeless and those with insecure housing options.
- The populations living in areas with a larger share of mobile home units are more vulnerable to thunderstorms and hail events, particularly if there are high wind impacts.
- Related Hazards: Flood, Hurricane, Tornado

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes severe storm hazard risk by jurisdiction. Most aspects of severe storm risk do not vary substantially by jurisdiction; however, mobile and manufactured home units are more vulnerable to structural damage. Around 18 percent of the housing stock in Pickens County comprises manufactured housing units. These communities may therefore face more severe impacts from severe weather events. Where priority ratings vary between, lightning, and hail for impact and spatial extent, these scores represent an average rating with greater weight given to lightning because it occurs much more frequently.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 4 | 1 | 4 | 3 | 1 | 2.7 | M |
| Clemson | 4 | 1 | 4 | 3 | 1 | 2.7 | M |
| Easley | 4 | 1 | 4 | 3 | 1 | 2.7 | M |
| Liberty | 4 | 1 | 4 | 3 | 1 | 2.7 | M |
| Norris | 4 | 1 | 4 | 3 | 1 | 2.7 | M |
| Pickens | 4 | 1 | 4 | 3 | 1 | 2.7 | M |
| Six Mile | 4 | 1 | 4 | 3 | 1 | 2.7 | M |
| Unincorporated Pickens County | 4 | 1 | 4 | 3 | 1 | 2.7 | M |

# 5.11 TORNADO

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Tornado | Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 2.7 |

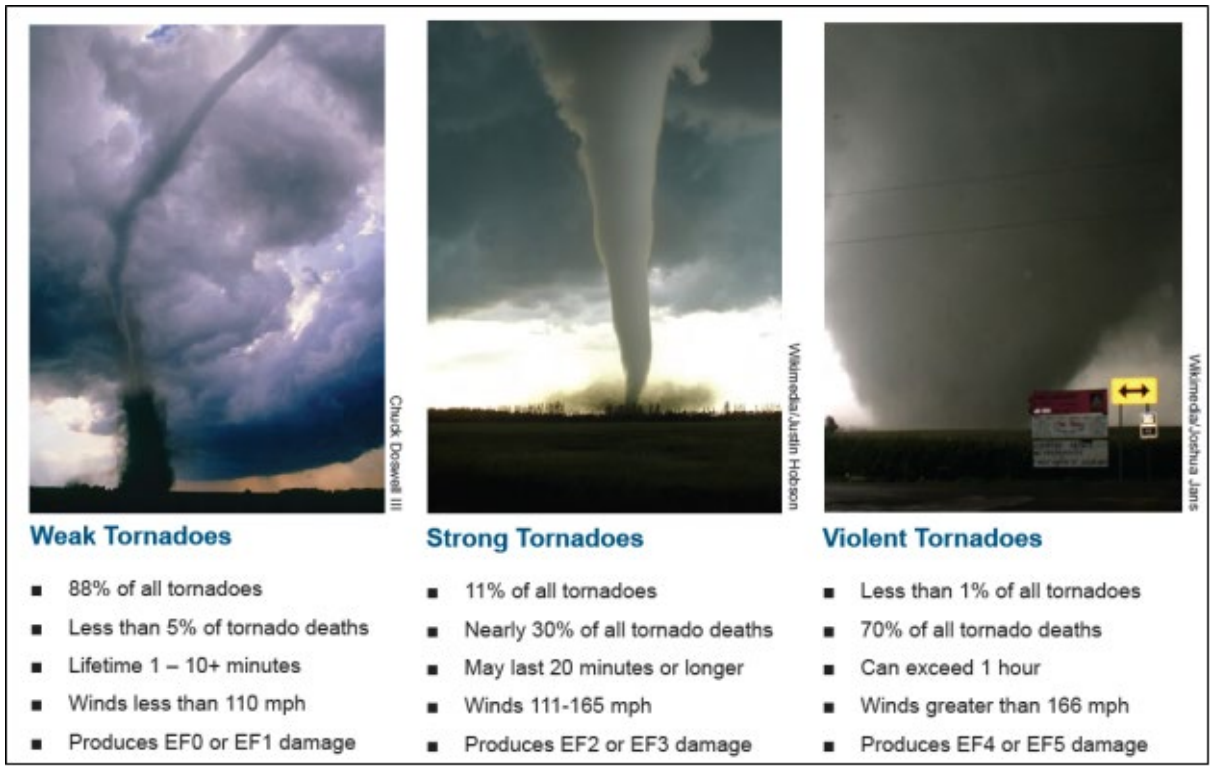
## HAZARD DESCRIPTION

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. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, sometimes accompanied by lightning or large hail.

NOAA records estimate that an average of 1,253 tornadoes occur in the United States each year. Most tornadoes are related to thunderstorms, which gain most of their energy from solar heating and latent heat released by the condensation of water vapor; therefore, tornadoes most often occur in the afternoon and evening hours, when temperatures are higher. Similarly, the months in which tornadoes are most likely correspond to the times of year with increased solar heating and strong frontal systems. In the Southeast, tornadoes are more likely in the early spring. However, tornadoes can occur at any time of day or year, with little warning.

The severity of tornadoes can vary significantly. According to the National Weather Service, tornado wind speeds normally range from 40 miles per hour to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles. A tornado's path might vary from only a few dozen yards wide to over a mile wide. Figure 5-30 summarizes the average breakdown of tornadoes and their impacts by their magnitude.

**Figure 5.31 Summary of Tornado Occurrences and Impacts by Magnitude**




Source: NOAA National Weather Service

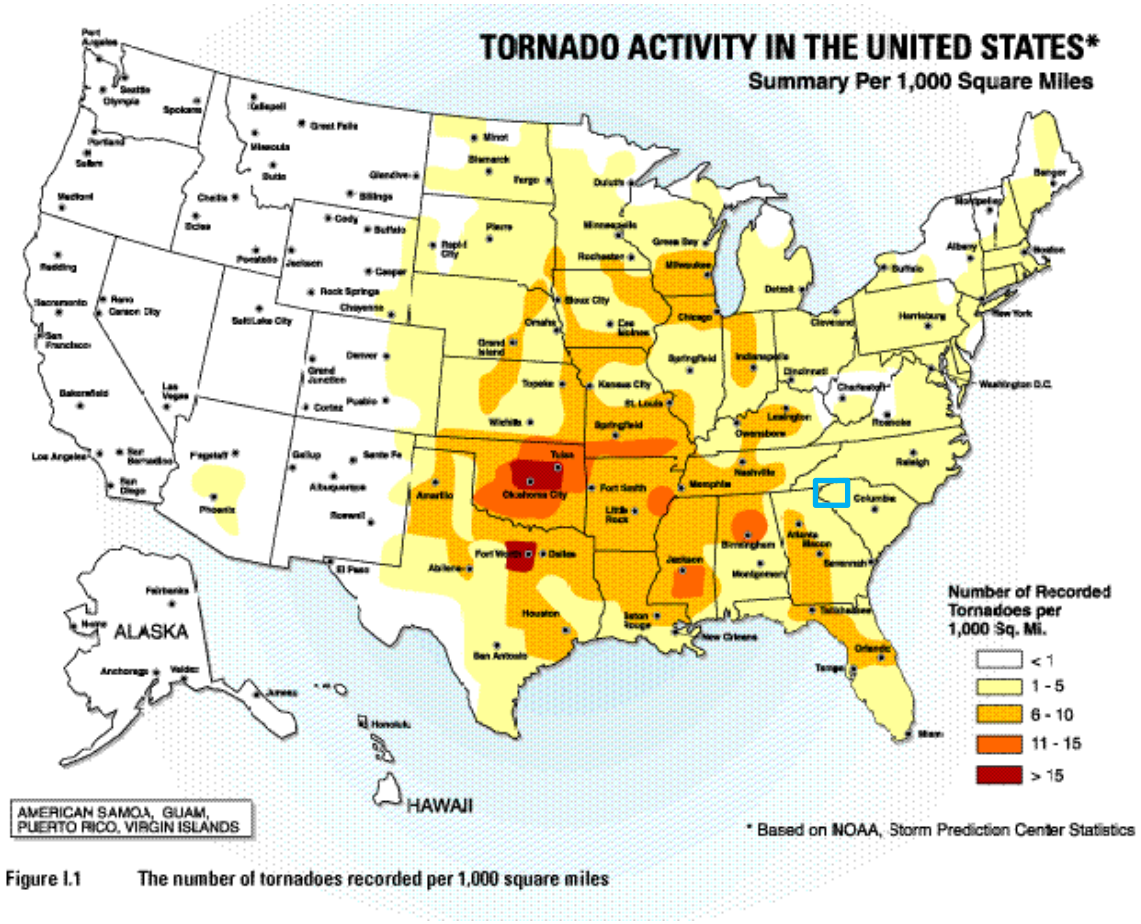
***Warning Time: 4 – Less than 6 hours***

***Duration: 1 – Less than 6 hours***

## LOCATION

According to the NOAA Storm Prediction Center (SPC), the highest concentration of tornadoes in the United States has been in Oklahoma, Texas, Kansas and Florida respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous tornadoes (earning the designation of "tornado alley"), tornadoes can and do occur throughout the central and eastern U.S., as shown in Figure 5-31, which depicts tornado activity based on the number of recorded tornadoes per 1,000 square miles. Pickens County, shown in the blue square, is in an area that averages 1-5 tornadoes per 1,000 square miles.

**Figure 5.32 Tornado Activity in the U.S.**



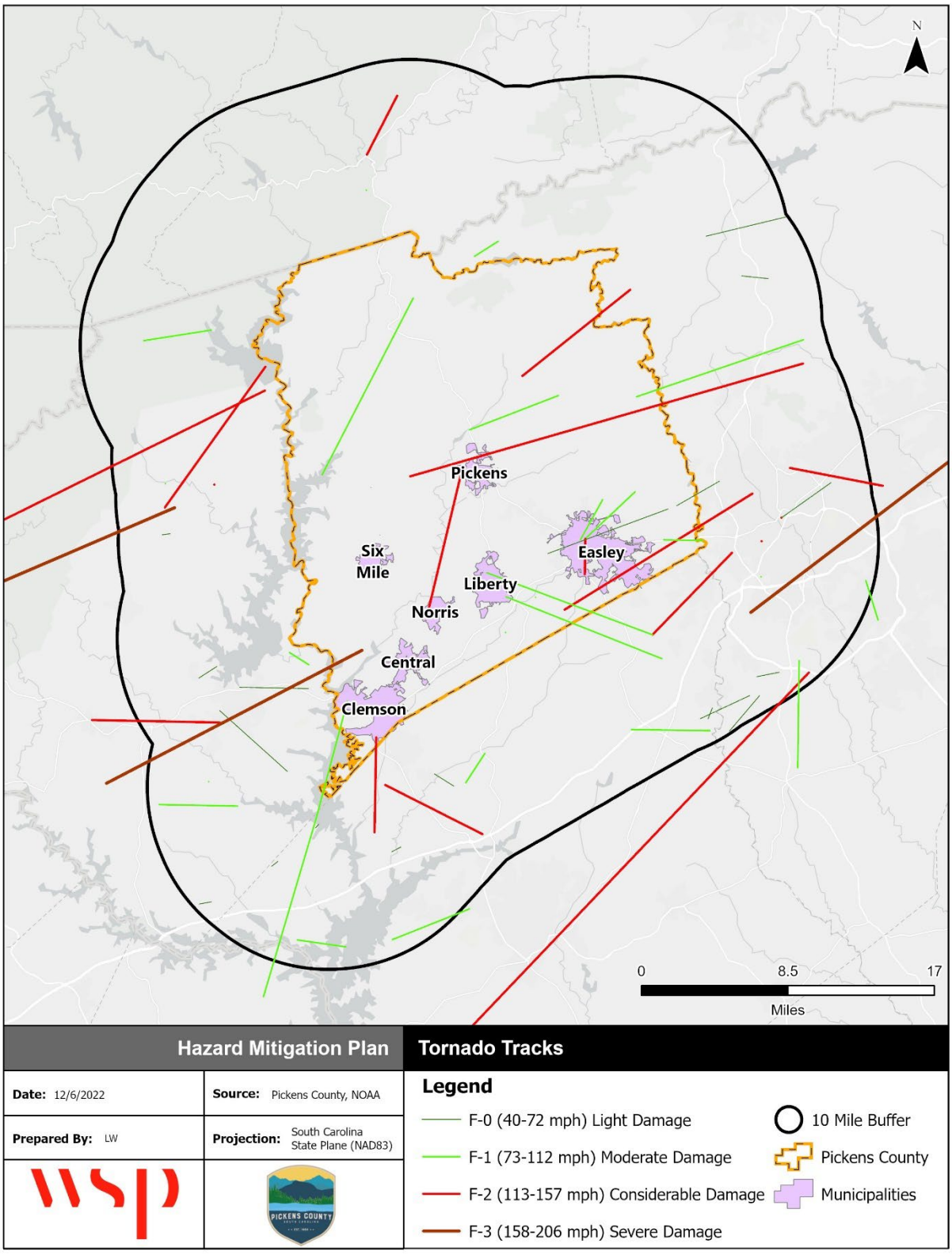

Source: American Society of Civil Engineers

Figure 5-32 reflects the tracks of past tornados that passed within 10 miles of Pickens County from 1950 through 2021 according to data from the NOAA/National Weather Service Storm Prediction Center.

Tornados can occur anywhere in the County. 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. All of Pickens County is exposed to this hazard.

***Spatial Extent: 2 – Small***

**Figure 5.33 Tornado Paths within 10 Miles of Pickens County, 1950-2021**




Source: NOAA/NWS Storm Prediction Center

## EXTENT

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 and better correlation between damage and wind speed. It is also more precise because it accounts for the materials affected and the construction of structures damaged by a tornado. Table 5-52 shows the wind speeds associated with the Enhanced Fujita scale ratings and the damage that could result at different levels of intensity.

**Table 5.52 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. |
| 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. |

The most intense tornados to pass through Pickens County since 1950 are four EF2 tornados in 2008, 2017, 2020, and 2017. These events caused an estimated $700,000 in property damage and the tornado in 2020 caused eight injuries.

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

According to NCEI records, Pickens County has experienced 32 tornadoes since 1950, listed in Table 5-53. These events are reported to have caused 28 injuries and over $7 million in property damage.

**Table 5.53 Recorded Tornadoes in Pickens County, 1950-2022**

| Date | Magnitude | Deaths/ Injuries | Property Damage | Crop Damage |
|---|---|---|---|---|
| 8/18/1961 | F1 | 0/0 | $2,500 | $0 |
| 3/31/1973 | F2 | 0/0 | $25,000 | $0 |
| 5/27/1973 | F2 | 0/0 | $25,000 | $0 |
| 3/24/1975 | F1 | 0/0 | $30 | $0 |
| 12/5/1977 | F1 | 0/0 | $250,000 | $0 |
| 11/10/1987 | F1 | 0/0 | $25,000 | $0 |
| 2/10/1990 | F1 | 0/0 | $250,000 | $0 |

| Date | Magnitude | Deaths/ Injuries | Property Damage | Crop Damage |
|---|---|---|---|---|
| 2/10/1990 | F1 | 0/0 | $250,000 | $0 |
| 2/14/1991 | F1 | 0/0 | $25,000 | $0 |
| 3/31/1993 | F0 | 0/0 | $0 | $0 |
| 6/27/1994 | F1 | 0/0 | $500,000 | $0 |
| 5/1/1995 | F0 | 0/0 | $5,000 | $0 |
| 1/7/1998 | F2 | 0/4 | $3,000,000 | $0 |
| 4/3/2000 | F1 | 0/0 | $0 | $0 |
| 5/2/2003 | F1 | 0/1 | $250,000 | $0 |
| 7/13/2003 | F1 | 0/0 | $200,000 | $0 |
| 7/13/2003 | F1 | 0/0 | $200,000 | $0 |
| 4/22/2005 | F1 | 0/0 | $15,000 | $0 |
| 1/5/2007 | F1 | 0/15 | $50,000 | $0 |
| 8/26/2008 | EF1 | 0/0 | $0 | $0 |
| 8/26/2008 | EF0 | 0/0 | $0 | $0 |
| 8/26/2008 | EF2 | 0/0 | $0 | $0 |
| 11/30/2010 | EF1 | 0/0 | $1,500,000 | $0 |
| 4/3/2017 | EF0 | 0/0 | $0 | $0 |
| 4/3/2017 | EF0 | 0/0 | $30,000 | $0 |
| 10/8/2017 | EF2 | 0/0 | $250,000 | $0 |
| 4/13/2020 | EF0 | 0/0 | $0 | $0 |
| 4/13/2020 | EF2 | 0/8 | $200,000 | $0 |
| 4/13/2020 | EF0 | 0/0 | $0 | $0 |
| 3/23/2022 | EF2 | 0/0 | $250,000 | $0 |
| 3/23/2022 | EF0 | 0/0 | $0 | $0 |
| 5/6/2022 | EF1 | 0/0 | $10,000 | $0 |
| **Total** | | **0/28** | **$7,312,530** | **$0** |

Source: NCEI

The following narratives provide detail on select storms from the NCEI database:

**January 1, 1998 –** A tornado developed from a fast moving severe thunderstorm that raced north out of eastern Georgia. The F2 tornado destroyed several houses and mobile homes and severely damaged many other homes and businesses. Damage was sustained to the south of the track of the tornado due to strong inflow into the storm. Damage from severe thunderstorm winds in the rear flank downdraft occurred north into Easley.

**July 13, 2003 –** The first of two tornadoes that tracked across Pickens County on the afternoon of the 13th moved from Liberty to the Anderson County line southeast of Liberty. In Liberty, roofs were blown off several buildings, and numerous trees and power lines were blown down. Damage to trees and power lines, and some structural damage continued as the tornado tracked southeast.

**April 22, 2005 –** A tornado touched down just northwest of Pickens, where three barns were destroyed near the intersection of Gravley Rd and Artie Rd. Numerous trees were blown down from the intersection of Red Hill and Reece Mill Rds east to highway 178. The tornado continued an intermittent ENE track, snapping off and uprooting numerous trees along an eight mile path before lifting west of Dacusville. At least one tree fell on a house, and at least one car was damaged. Newspaper reported thousands of power outages across the county. There was also a spotter report of mothball sized hail in Pickens.

**January 5, 2007** – A tornado touched down very briefly in the parking lot of the Liberty Elementary School. Nine vehicles were severely damaged. At least four vehicles were lifted off the ground or flipped over by

the wind. Some of the vehicles were occupied by parents awaiting school dismissal. Fifteen people received mostly minor injuries, with five being transported to the hospital. A shed was also blown over.

**August 26, 2008 –** The remnants of Tropical Storm Fay stalled just west of the Appalachians and slowly dissipated. A line of mini supercells developed southeast of the low, resulting in several tornadoes over the Upstate and Northwest Piedmont of South Carolina. A small amount of flash flooding also occurred. A tornado tracked from Oconee County into western Pickens County. The tornado lifted just after crossing the campus of Clemson University. The intermittent damage path was mainly limited to downed trees and power lines, although some minor structural damage was noted, especially on the Clemson campus near Memorial Stadium. Some trees and large limbs fell on and damaged automobiles in the Clemson area.

**November 30, 2010** – A strong cold front crossed the western Carolinas during the evening hours. The combination of strong wind shear and weak instability contributed to the development of a broken line of thunderstorms, a couple of which produced QLCS (non-supercell) tornadoes over the Upstate. A tornado damage path was surveyed starting in the Old Market Square area near downtown Easley. Numerous buildings in the downtown area received minor to significant roof damage. Some trees fell on homes. The tornado appeared to lift briefly as it traveled north northeast from the downtown area. However, the damage path appeared again in the Lenhardt Rd area just north of downtown. An anchored mobile home was rolled 60 to 80 feet and was completely destroyed at its location. Numerous trees were also uprooted or snapped in this area.

**April 3, 2017** – NWS storm survey determined a tornado touched down in eastern Pickens County near Saluda Dam and Pistol Club Roads, downing trees, damaging outbuildings, and ripping metal sheeting off roofs at a farm site. Some minor structural damage, mainly in the form of missing shingles, occurred to a nearby house. The tornado weakened as it moved E/NE and may have lifted briefly before crossing into Greenville County at Saluda Lake.

**April 13, 2020** – A strong storm system impacted the Southeast, resulting in a line of strong to severe thunderstorms that moved across upstate South Carolina during the early morning hours of the 13th. This resulted in severe weather, including a couple of strong tornadoes, one of which was the strongest tornado to impact the upstate area in more than 25 years. NWS Storm Survey found a tornado that began in Oconee County moved into Pickens County on Lake Keowee about two miles north of Clemson Blvd. Damage in Pickens County was primarily confined to snapped large tree limbs before the tornado lifted in the area around Six Mile Highway and R C Edwards School Rd.

**March 23, 2022** – A cold front moving across the region resulted in development of a line of scattered thunderstorms across Upstate South Carolina during the evening. A couple of the storms produced tornadoes in Pickens County, with one of those being significant. NWS storm survey found the path of a strong tornado that touched down. Numerous trees were blown down, one of which fell on a mobile home. The tornado traveled northeast, continuing to blow hundreds of trees. The tornado intensified as it moved towards Windmont Rd, which is where the worst damage was observed. Much of the roof was removed and one exterior wall collapsed on a brick house on Windmont Rd. Three occupants of this home were trapped and had to be rescued, with minor injuries. The tornado weakened as it continued northeast, before intensifying again in the area between Reece Mill Rd and Lost Valley Road, where a mobile home was split in two and rolled over off of its foundation on Crystal Ln and hundreds of trees were downed.

**May 6, 2022** – Scattered to numerous thunderstorms developed ahead of a frontal system across upstate South Carolina. Several of the storms produced brief large hail and damaging winds, while an EF1 tornado developed in Pickens County. The tornado tracked northeast to Earnest Way, where several trees were uprooted and snapped, and the roofs of a couple of mobile homes were damaged. The tornado continued northeast, where extensive tree damage was noted on private property with dozens of trees snapped or uprooted.

In 2020, Pickens County received two Major Disaster Declaration for severe storm events that included tornadoes. DR- 4542 (South Carolina Severe Storms) was declared in May 2020 and over $21.3 million dollars in funding was obligated to impacted states, and DR-4479 (South Carolina Severe Storms) was declared in March 2020 and received over $9.2 in obligated funding.

## PROBABILITY OF FUTURE OCCURRENCE

Probability of future occurrence was calculated based on past occurrences and was assumed to be uniform across the county.

According to NCEI, 32 tornadoes occurred between 1961 and 2022. This correlates to a 52% annual probability that the county will experience a tornado. Four of these past tornado events were a EF2 magnitude, therefore, the annual probability of a significant tornado event is approximately 6.6%.

***Probability: 3 – Likely***

## CLIMATE CHANGE

There presently is not enough data or research to quantify the magnitude of change that climate change may have related to tornado frequency and intensity. NASA's Earth Observatory has conducted studies which aim to understand the interaction between climate change and tornadoes. Based on these studies meteorologists are unsure why some thunderstorms generate tornadoes and others don't, beyond knowing that they require a certain type of wind shear. Tornadoes spawn from approximately one percent of thunderstorms, usually supercell thunderstorms that are in a wind shear environment that promotes rotation. Some studies show a potential for a decrease in wind shear in mid-latitude areas. Because of uncertainty with the influence of climate change on tornadoes, future updates to the mitigation plan should include the latest research on how the tornado hazard frequency and severity could change. The level of significance of this hazard should be revisited over time.

## CONSEQUENCE ANALYSIS

| 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 | 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. Mobile homes are particularly susceptible to damage during tornadoes. Buildings, critical facilities, and infrastructure are all vulnerable to damage. Impacts to infrastructure may also include structural damage, impassable or blocked roadways or bridges, failed utility lines, or railway failure. |
| Environment | Downed trees and damages to vegetation are likely. 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. |

| Category | Consequences |
|---|---|
| Economic Condition of the Jurisdiction | 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 in the jurisdiction's governance may be influenced by severe tornado events if response and recovery are not timely and effective. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Historical evidence shows that most of South Carolina is vulnerable to tornado activity, which often is associated with other severe weather events such as thunderstorm activity or tropical cyclone activity. People exposed to the elements or outside when a tornado occurs are most vulnerable. According to NCEI reports, 28 people in Pickens County have been injured by a tornado event.

The availability of sheltered locations such as basements, buildings constructed using tornado-resistant materials and methods, and public storm shelters, all reduce the exposure of the population. Residents of mobile and manufactured housing may be particularly vulnerable due to the structure's vulnerability and the lack of sheltered locations in these units. According to 2020 ACS 5-Year Estimates data, 9,911 occupied housing units (18%) in Pickens County are classified as "mobile homes." Norris is particularly vulnerable, with 23% of occupied units classified as mobile/manufactured homes. Individuals who work outdoors may also face increased risk.

### *PROPERTY*

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. Construction practices and building codes can help maximize the resistance of the structures to damage.

Secondary impacts of tornado damage often result from damage to infrastructure. Downed power and communications transmission lines, coupled with disruptions to transportation, create difficulties in reporting and responding to emergencies. These indirect impacts of a tornado put tremendous strain on a community. Based on NCEI data, the reported tornado events resulted in over $7 million in damage since 1961.

### *ENVIRONMENT*

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.

Secondary impacts may occur if hazardous materials are released into the environment as a result of tornado damages. In this case, remediation would be needed.

## CHANGES IN DEVELOPMENT

Development is not expected to impact the incidence of tornado events. As the county grows, overall asset exposure will increase, which may increase risk. The county and jurisdictions will want to ensure new development is constructed with building codes that withstand tornados and high winds.

## KEY ISSUES

- Wind-borne debris can become a dangerous hazard during tornado events. Educating the public on tornado risk and severe storms preparedness, including the need to secure loose items outdoors, may reduce potential damages in the event that a tornado spawns.
- Mobile homes and their occupants are particularly vulnerable to tornadoes; as such Norris may have higher vulnerability.
- Related Hazards: Hurricane, Severe Weather, Windstorm/Thunderstorm

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes tornado hazard risk by jurisdiction. Tornado hazard risk does not vary substantially by jurisdiction.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 3 | 3 | 2 | 4 | 1 | 2.7 | M |
| Clemson | 3 | 3 | 2 | 4 | 1 | 2.7 | M |
| Easley | 3 | 3 | 2 | 4 | 1 | 2.7 | M |
| Liberty | 3 | 3 | 2 | 4 | 1 | 2.7 | M |
| Norris | 3 | 3 | 2 | 4 | 1 | 2.7 | M |
| Pickens | 3 | 3 | 2 | 4 | 1 | 2.7 | M |
| Six Mile | 3 | 3 | 2 | 4 | 1 | 2.7 | M |
| Unincorporated Pickens County | 3 | 3 | 2 | 4 | 1 | 2.7 | M |

# 5.12WILDFIRE

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Wildfire | Likely | Limited | Moderate | Less than 6 hrs | Less than 1 week | 2.8 |

## HAZARD DESCRIPTION

A wildfire is an uncontained fire that spreads through the environment. Wildfires are part of the natural management of forest ecosystems but may also be caused by human factors. Wildfires can 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.

According to the South Carolina Forestry Commission, an average of 3,000 fires occur per year in the state of South Carolina. Given the size and population of the state, this is one of the highest rates in the nation. An average of about 18,000 acers are burned each year, and the largest fire to occur in the state burned 30,000 acres in Horry County in 1976. These statistics are based on fires handled by the Forestry Commission, there are other events handled by the Fire Service and forest industry.

Wildfire potential is usually highest in late winter and early spring (January through mid-April). March is frequently the busiest month for firefighters, but some of the largest fires have occurred during the first two weeks of April. South Carolina's fire season is in the winter because most vegetation is dead or dormant during that time. Fires do not start or spread as quickly when vegetation is green.

Annually in, South Carolina, around 35-45% of wildfires are due to debris burning, including planned fires that get out of hand. It also includes wildfires from urning trash, yard debris, construction waste, land clearing piles, crop stubble, and from prescribed burning for forestry or wildlife management purposes. Woods arson accounts for 25-30% of wildfires. This includes fires set to someone else's property without the owner's consent. There are three 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.

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.

Weather plays a major role in the birth, growth and death of a wildfire. In support of forecasting for fire weather, the National Weather Service Fire Weather Program emerged in response to a need for weather support to large and dangerous wildfires. This service is provided to federal and state land management agencies for the prevention, suppression, and management of forest and rangeland fires.

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.

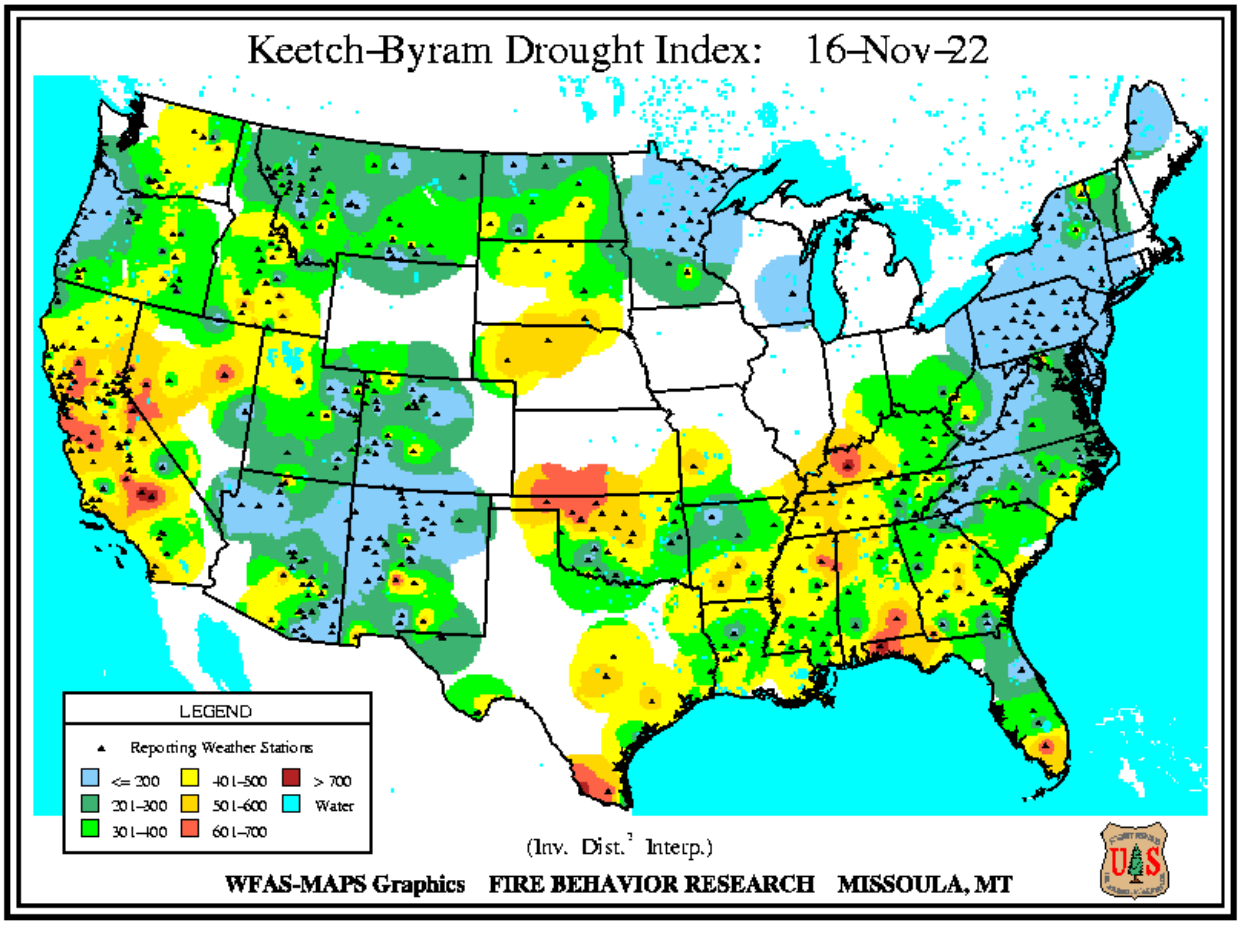
Pickens County experiences a variety of wildfire conditions found in the Keetch-Byram Drought Index, which is described in Table 5-54. The Keetch-Byram Drought Index (KBDI) for November 2021 is shown in Figure 5-33. The KBDI for Pickens County and surrounding areas at this time is less than or equal to 300.

**Table 5.54 Keetch-Byram Drought 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. |
| **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. |

Source: USFS Wildland Fire Assessment System

**Figure 5.34 Keetch-Byram Drought Index, November 2022**




Source: USFS Wildland Fire Assessment System

***Warning Time: 4 – Less than 6 hours***

***Duration: 3 – Less than 1 week***

## LOCATION

The location of wildfire risk can be defined by the acreage of Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels, and thus demarcates the spatial extent of wildfire risk. The WUI is essentially all the land in the county that is not heavily urbanized. he 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.

The Southern Wildfire Risk Assessment (SouthWRAP) estimates that 63 percent of Pickens County land area falls within the 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. Approximately 37 percent of the County's land area is outside of the WUI. Table 5-55 details the extent of the WUI in Pickens County, and Figure 5-34 maps the WUI.

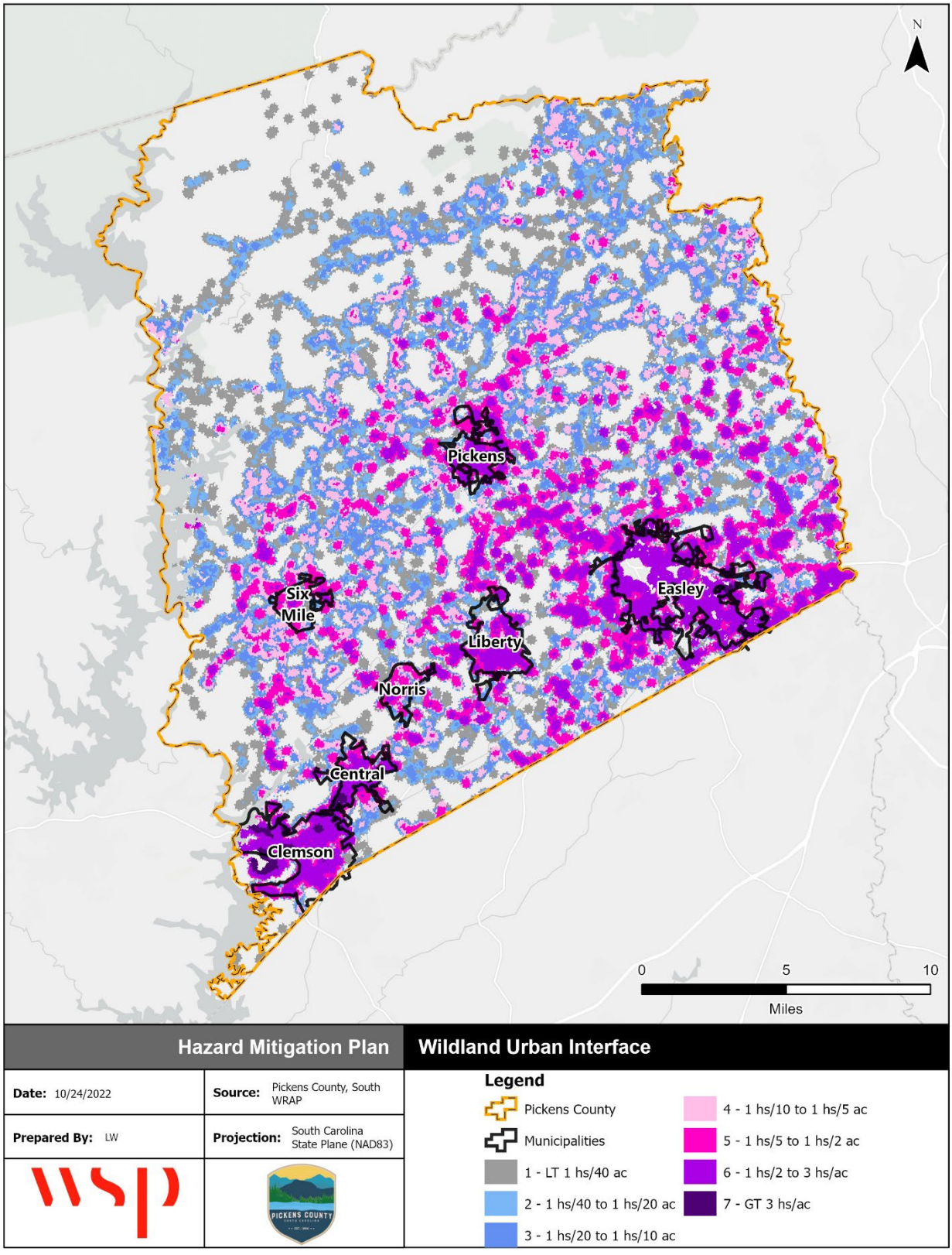
**Table 5.55 Wildland Urban Interface**

| Housing Density | | WUI Acres | Percent of WUI Acres |
|---|---|---|---|
| | LT 1hs/40ac | 46,311 | 12.9% |
| | 1hs/40ac to 1hs/20ac | 27,148 | 7.6% |
| | 1hs/20ac to 1hs/10ac | 37,625 | 10.5% |
| | 1hs/10ac to 1hs/5ac | 33,212 | 9.3% |
| | 1hs/5ac to 1hs/2ac | 37,371 | 10.4% |
| | 1hs/2ac to 3hs/1ac | 42,523 | 11.9% |
| | GT 3hs/1ac | 1,158 | 0.3% |
| | No Data | 132,574 | 37.0% |
| **Total** | | **357,920** | -- |

Source: Southern Wildfire Risk Assessment

***Spatial Extent: 3 – Moderate***

**Figure 5.35 Wildland Urban Interface, Pickens 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, shown in Table 5-56, consists of five classes, as defined by Southern Wildfire Risk Assessment. Table 5-57 details the characteristic fire intensity scale across Pickens County, and Figure 5-35 shows the potential fire intensity geographically.

**Table 5.56 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. |

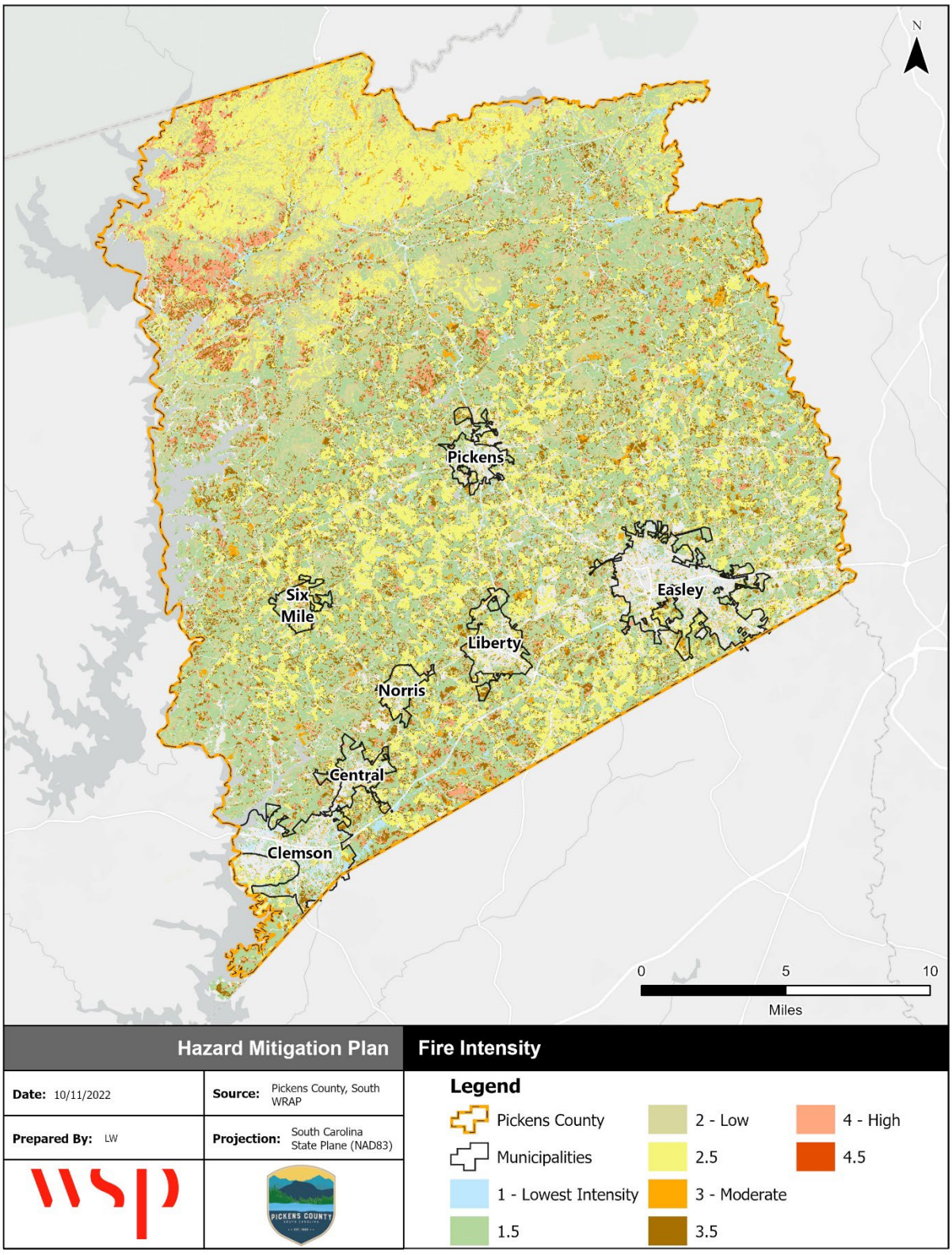
Source: Southern Wildfire Risk Assessment

**Table 5.57 Characteristic Fire Intensity, Pickens County**

| Fire Intensity Class | | Acres | Percent |
|---|---|---|---|
| | Non-Burnable | 41,121 | 12.6 % |
| | 1 Lowest Intensity | 7,417 | 2.3% |
| | 1.5 | 97,547 | 29.8% |
| | 2 Low | 60,130 | 18.4% |
| | 2.5 | 72,953 | 22.3% |
| | 3 Moderate | 6,008 | 1.8% |
| | 3.5 | 29,567 | 9.0% |
| | 4 High | 12,243 | 3.7% |
| | 4.5 | 604 | 0.2% |
| | 5 Highest Intensity | 0 | 0.0 % |
| **Total** | | **326,985** | --- |

Source: Southern Wildfire Risk Assessment

**Figure 5.36 Characteristic Fire Intensity, Pickens County**




Source: Southern Wildfire Risk Assessment

A small portion, approximately 3.9 percent, of Pickens County's total land area may experience up to a Class 4 or 4.5 Fire Intensity, which poses significant harm or damage to life and property. These areas scattered throughout the County but are slightly more concentrated in the Northern portion of the County, particularly on the Western side of the County. Approximately 10.9 percent of the county may experience Class 3 or 3.5 Fire Intensity, which has potential for harm to life and property but is easier to suppress with dozer and plows. Around 72.8 percent of the County is characterized as low intensity areas, between a class 1 and 2.5. the remainder of the County, around 12.6 percent is non-burnable. Given the small amount of land with high risk, potential impact is considered limited.

***Impact: 2 – Limited***

## HISTORICAL OCCURRENCES

From 1946 to 2020, the South Carolina Forestry Commission reports 3,682 wildfires in Pickens County and a total 24,123 acres burned. NCEI reports only two wildfire events, both for the same fire that occurred in October 2020. The 2020 fire reported $200,000 in property damages. Table 5-58 shows records for Pickens County wildfires over the last ten years.

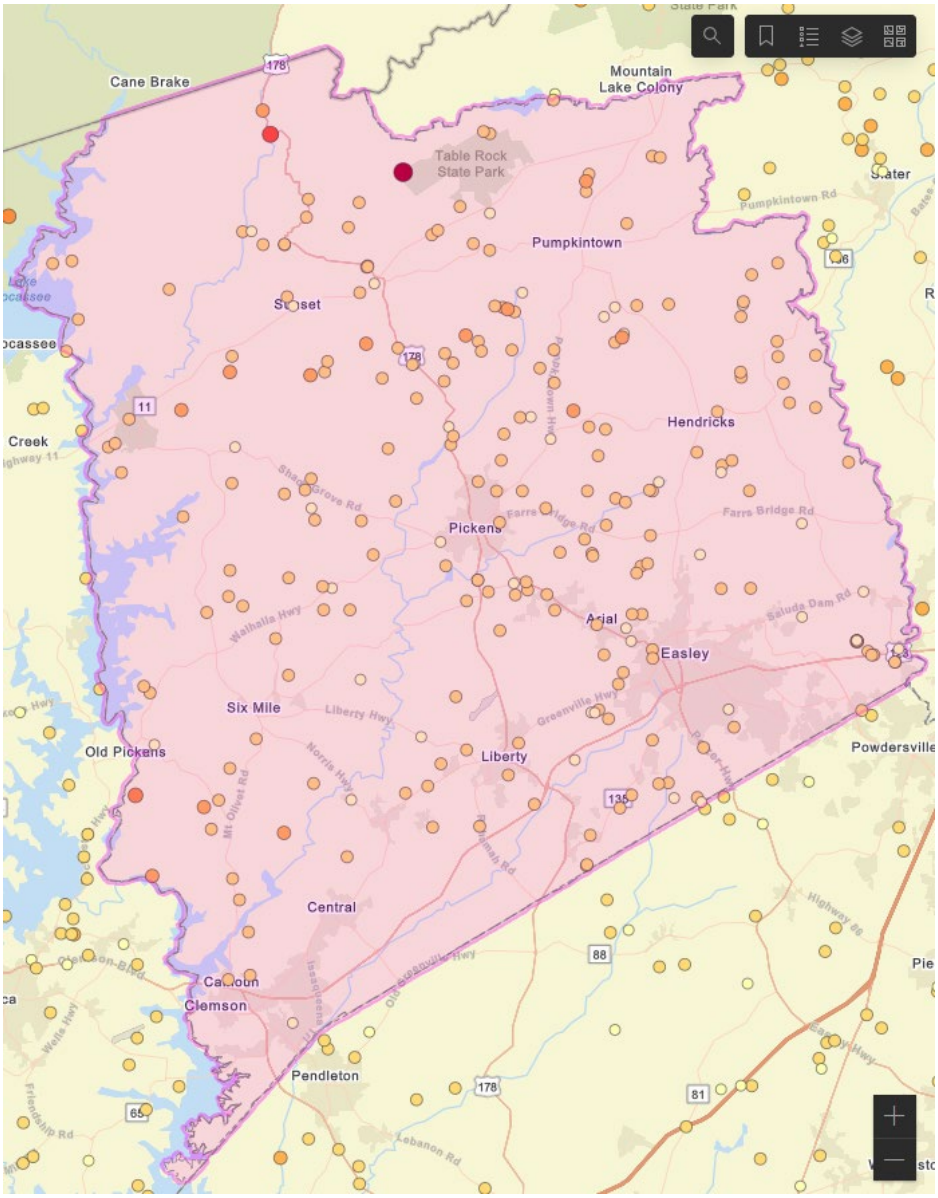
Between 2010 and 2020 Pickens has had 183 wildfires. Figure 5-36 is from the SC Forestry Commission's Wildfire Activity map, and it shows the location of fires in Pickens County from 2010 to 2022. Based on the map, smaller fires have occurred in Easley, the City of Pickens, Liberty, and just outside of Clemson. However, the majority of larger fires has occurred further north in unincorporated Pickens County. Based on the Forestry Commission's wildfire size classifications, the majority of fires in Pickens County are Class B, between 0.3 to 9.9 acres.

**Table 5.58 Records for Wildfire in Pickens County, 2010-2020**

| Year | Number of Fires | Acres Burned |
|---|---|---|
| 2010 | 36 | 62.6 |
| 2011 | 13 | 11.9 |
| 2012 | 17 | 38.8 |
| 2013 | 20 | 606.1 |
| 2014 | 19 | 46.2 |
| 2015 | 7 | 6.0 |
| 2016 | 36 | 10,718.0 |
| 2017 | 12 | 52.8 |
| 2018 | 9 | 53.4 |
| 2019 | 14 | 51.2 |
| 2020 | 36 | 62.6 |
| **Total** | **183** | **11,647** |

Source: South Carolina Forestry Commission

**Figure 5.37 Pickens County Wildfire Activity, 2010 – 2022**




Source: South Carolina Forestry Commission Wildfire Activity Map

Pickens County received a federal Fire Management Assistance Declaration in November 2016 for the Pinnacle Mountain Fire. A narrative about the 2016 fire from NCEI and the South Carolina Forestry Commission is below.

**November 9, 2016** – The Pinnacle Mountain Fire was the longest, largest, and costliest fire in Upstate history. It began on the southwest side of Pinnacle Mountain in Pickens County. An extended period of abnormally dry weather and drought conditions that began in late winter of 2016 and continued through the year resulted in very dry vegetation across the South Carolina mountains and foothills by mid-autumn. These conditions were exacerbated by an unusually warm summer and fall, when temperatures averaged as much as 5 degrees above normal.

Due to an escaped campfire, a wildfire was reported on the morning of Nov. 9 spreading up Pinnacle Mountain with embers falling down the cliffs. Crews immediately responded to the two-acre fire, but the

unforgiving terrain and inability to get bulldozers all the way around the perimeter prevented them from containing the blaze. The fire spread aggressively through Table Rock State Park, the Greenville Watershed, and a Wildlife Management Area. The fire took 26 days to contain, around $5 million, and support from states all over the county. Although more than 10,000 acres were burned, no lives were lost, and no property was damaged.

An extended period of abnormally dry weather and drought conditions that began in late winter of 2016 and continued through the year resulted in very dry vegetation across the South Carolina mountains and foothills by mid-autumn. These conditions were exacerbated by an unusually warm summer and fall, when temperatures averaged as much as 5 degrees above normal. In these conditions, a large wildfire ignited and spread during early November, and was not completely contained until a cold front brought much-needed rain to the area at the end of the month.

## PROBABILITY OF FUTURE OCCURRENCE

According to historic records, 3,682 wildfires have occurred between 1946 and 2020 – over a 100% chance of occurring each year, and an annualized average of around 49 fires per year.

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. The Burn Probability for Pickens County is illustrated in Figure 5-37 and summarized in Table 5-59.

**Table 5.59 Burn Probability, Pickens County**

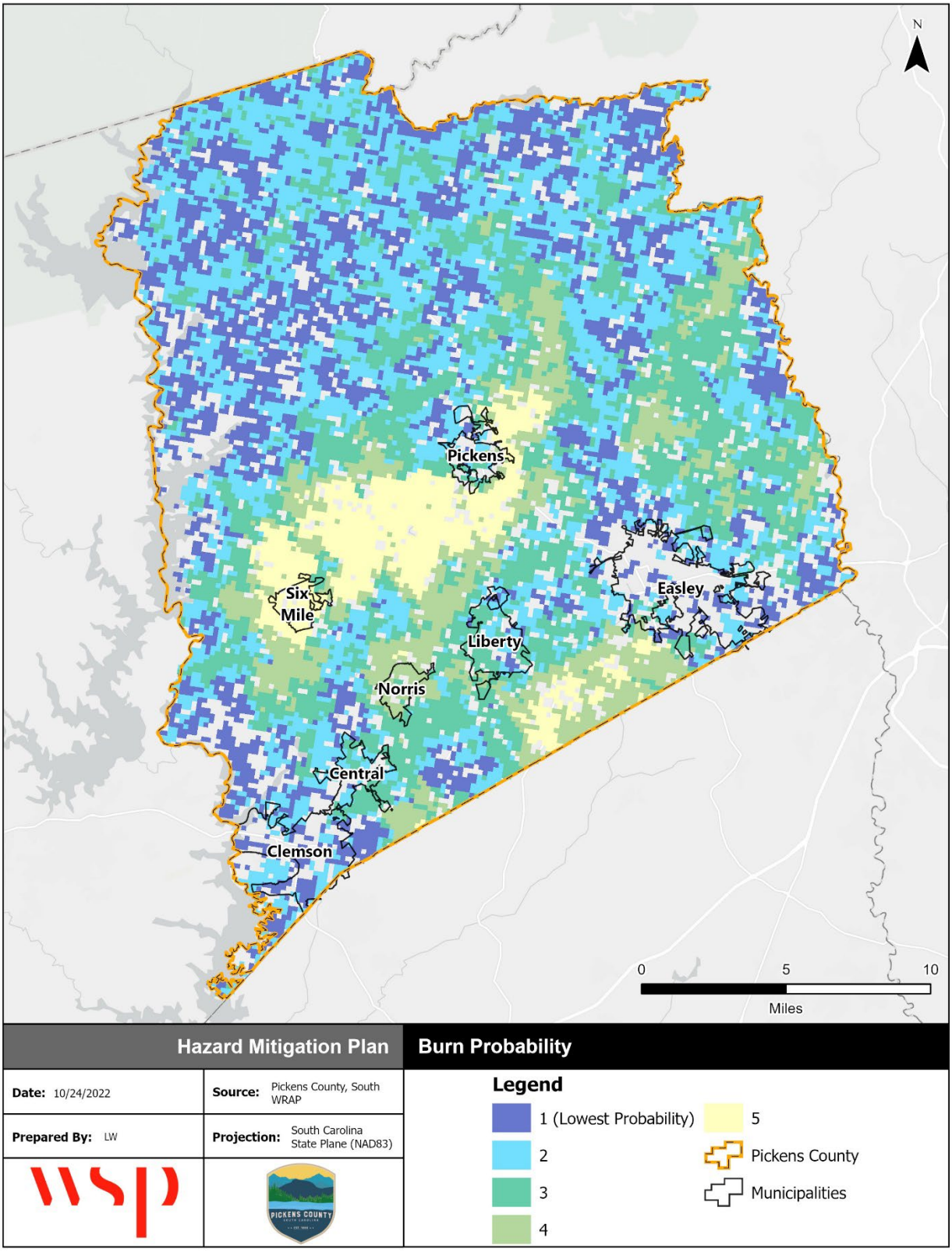
| Class | Acres | Percent |
|---|---|---|
| 1 | 66,706 | 20.3% |
| 2 | 88,214 | 26.9% |
| 3 | 66,760 | 20.4% |
| 4 | 31,777 | 9.7% |
| 5 | 20,320 | 6.2% |
| 6 | 0 | 0.0% |
| 7 | 0 | 0.0% |
| 8 | 0 | 0.0 % |
| 9 | 0 | 0.0 % |
| 10 | 0 | 0.0 % |
| **Total** | **273,777** | --- |

Source: Southern Wildfire Risk Assessment

Pickens County has areas of low probability (class 1 – 3), about 67.6% of burnable land, located throughout the entire County but more concentrated in the northern portion of Pickens County. The County also has areas of moderate burn probability (Class 4-5), 15.9% of burnable land and is primarily in the central and southeastern portions of the County. Land area around many of the jurisdictions including Pickens, Norris, Central and Six Mile is classified as moderate probability. Given the areas of moderate burn probably in most participating jurisdictions, the probability of wildfire across the county is considered likely, defined as between a 10% and 100% annual chance of occurrence.

***Probability: 3 – Likely***

**Figure 5.38 Burn Probability, Pickens County**




Source: Southern Wildfire Risk Assessment

## CLIMATE CHANGE

Wildfire risk depends on a number of factors, including temperature, soil moisture, and the presence of trees, shrubs, and other potential fuel. All these factors have strong direct or indirect ties to climate variability and climate change. Research shows that changes in climate create warmer, drier conditions. Per the Fourth National Climate Assessment, the Southeast is projected to experience an increase in the duration and intensity of drought, which is expected to increase wildfire occurrence and reduce the effectiveness of prescribed fire. Although total area burned by wildfire is greatest in the western U.S., the Southeast has historically had the highest number of wildfires and the most area burned by prescribed fire. In the Southeastern United States modeling suggests increased fire risk and a longer fire season, with at least a 30 percent increase from 2011 in the area burned by lightning-ignited wildfire by 2060.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | In addition to the potential for fatalities, wildfire and the resulting diminished air quality pose health risks. Smoke and air pollution can cause serious health problems, including asthma attacks and pneumonia, and can worsen chronic heart and lung diseases. Vulnerable populations include children, the elderly, and people with respiratory and cardiovascular problems. Even healthy citizens may experience symptoms such as sore throats and itchy eyes. |
| Responders | Wildfires are a significant threat to the health and safety of the emergency services, both while fighting the fire and from after effects from smoke inhalation and heat stroke. More rural areas may require response personnel ready to act. |
| 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. |
| Property, Facilities and Infrastructure | Damage to buildings and facilities, especially those in the wildland urban interface, is possible. Infrastructure, including roadways, communication networks and facilities, power lines, utilities, and water distribution systems, may also be damaged. New homes constructed without considering community wildland fire planning can create neighborhoods with limited accessibility and flammable buildings and landscaping. |
| 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. Water supplies can be degraded by post-fire erosion and stream sedimentation. |
| 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, and can destroy crops and other agricultural property. 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. Post-fire cleanup costs include rehabilitation and repair, equipment and capital goods replacement, drinking water pollution remediation, smoke damage, and increase in fire insurance premiums. |

| Category | Consequences |
|---|---|
| Public Confidence in the Jurisdiction's Governance | Wildfire events may cause issues with public confidence because they have very visible impacts on the community. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Wildfire can cause fatalities and human health hazards, particularly when air quality is a concern. Exposure to wildfire smoke can cause serious health problems, including asthma attacks and pneumonia, and can worsen chronic heart and lung diseases. Vulnerable populations include people with respiratory problems or with heart disease. Even healthy people may experience minor symptoms, such as sore throats and itchy eyes.

### *PROPERTY*

Wildfire can cause direct property losses, including damage to buildings, vehicles, landscaped areas, agricultural lands, and livestock. Wildfires burn 20-30 homes in the state every year, and hundreds more are threatened each fire season. Similarly, wildfire can cause loss of power, downed trees, or damage/blockage of roads and other transportation systems.

Exposure to wildfire was estimated using the SouthWRAP's Wildland Urban Interface Risk Index (WUIRI). SouthWRAP provides a WUI Risk Index that produces a rating of the potential impact of a wildfire on people and properties.

The WUI Risk Rating is derived using a Response Function modeling approach which involves assigning a net change in the value to a resource or asset based on susceptibility to fire at different intensity levels, such as flame length. The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

To calculate the WUI Risk Rating, the WUI housing density data was combined with Flame Length data and response functions were defined to represent potential impacts. The response functions were defined by a team of experts based on values defined by SouthWRAP. By combining flame length with the WUI housing density data, you can determine where the greatest potential impact to homes and people is likely to occur.

Table 5-60 summarizes the number of buildings and their total value that fall within areas rated -5 to -9 on the WUIRI. This table represents exposure within the area rated under -5, however, actual damages in the event of a wildfire would vary. Critical facility exposure to moderate and high risk for wildfire impacts is summarized in Table 5-61. Exposure to wildfire risk is detailed by jurisdiction in the jurisdictional annexes.

According to SouthWRAP's WUI Risk Index, shown in Figure 5-38, there are small areas all throughout the County with high impact risk potential. Most of these areas are outside of the participating jurisdictions boundaries. However, the majority of the County and jurisdictions have moderate impact risk ratings, between -4 and -5. As summarized in Table 5-60 there are over 34,000 buildings in moderate to high-risk areas, 92% of which are residential properties.

**Table 5.60 Building Counts and Values within WUIRI under -5**

| Occupancy | Estimated Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 105 | $5,049,235 | $5,049,235 | $10,098,470 |
| Commercial | 1401 | $591,915,741 | $591,915,741 | $1,183,831,483 |
| Education | 18 | $8,228,642 | $8,228,642 | $16,457,284 |
| Government | 7 | $2,537,328 | $2,537,328 | $5,074,656 |
| Industrial | 1071 | $130,676,270 | $196,014,406 | $326,690,676 |
| Religious | 36 | $20,132,045 | $20,132,045 | $40,264,089 |
| Residential | 31416 | $6,151,072,208 | $3,075,536,104 | $9,226,608,313 |
| **Total** | **34,054** | **$6,909,611,470** | **$3,899,413,501** | **$10,809,024,970** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

**Table 5.61 Critical Facility Exposure within WUIRI under -5**

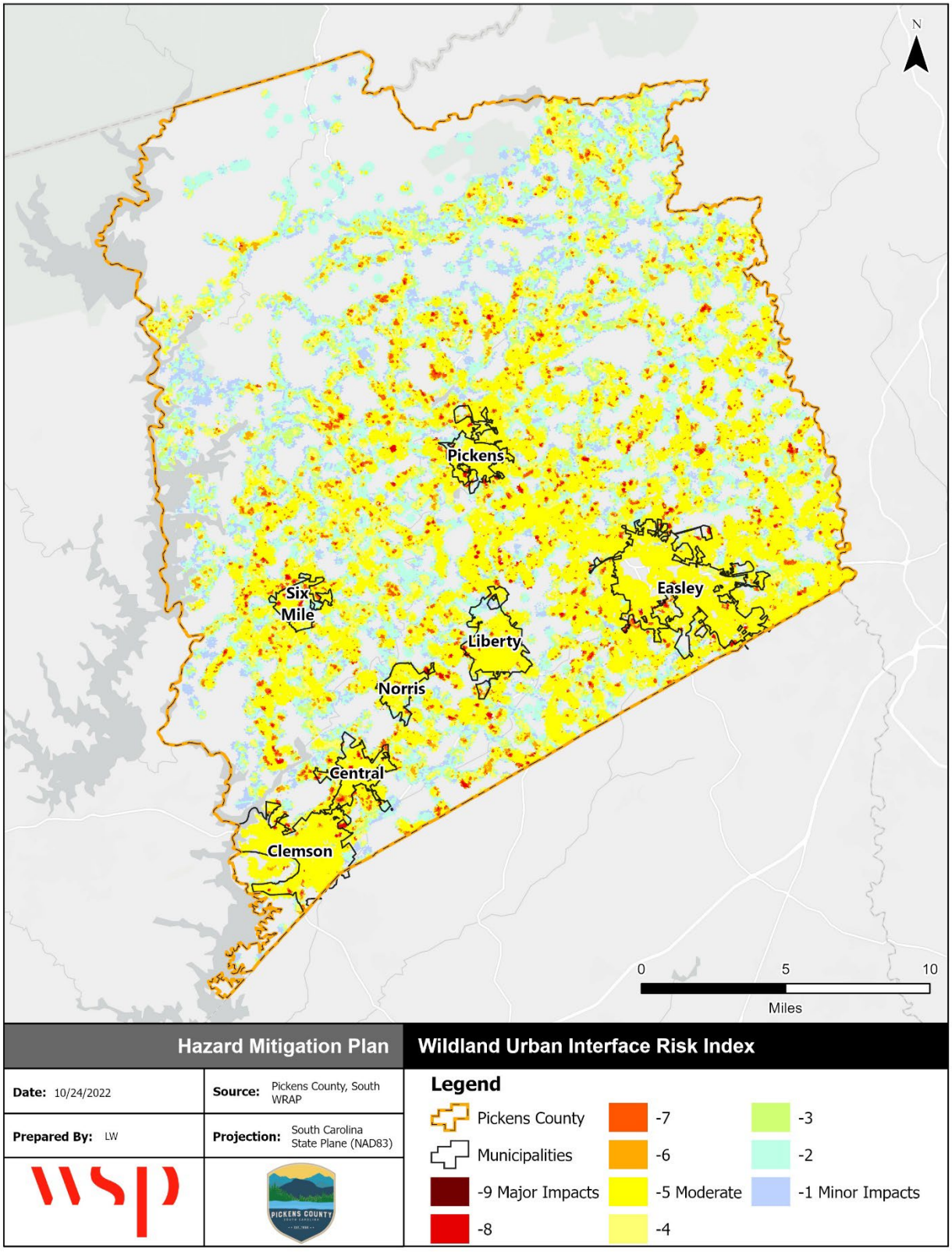
| FEMA Lifeline | Facility Count |
|---|---|
| Safety & Security | 44 |
| Food, Water, Shelter | 3 |
| Health & Medical | 34 |
| Energy | 2 |
| Communications | 2 |
| Transportation | 1 |
| Hazardous Materials | 23 |
| **Total** | **109** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

*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, and it plays a key role in shaping ecosystems by serving as an agent of renewal and change. However, fires also release carbon dioxide, a key greenhouse gas, into the atmosphere.

**Figure 5.39 WUI Risk Index, Pickens County**




Source: Southern Wildfire Risk Assessment

## CHANGES IN DEVELOPMENT

Increased development on the wildland fringe, areas immediately adjacent to the Wildland Urban Interface, will expand the WUI itself and further increase vulnerability. Conversely, as infill development occurs and urban areas become more densely developed, fuel sources may be removed such that these areas may fall out of the WUI.

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

## KEY ISSUES

- Small areas with moderate to high potential fire intensity exist in all participating jurisdictions; concentrations are higher in northern portions of the county. Fuels management can greatly reduce potential fire intensity and burn probability.
- Around 73% of buildings in the County are located in an area rated -5 or lower on the WUI Risk Index. Although a wildfire is not likely to impact the entirety of the area that falls within this classification at once, impacts of a potential wildfire could be severe. Comprehensive education for property owners, especially residential, could help mitigate losses in the event of a wildfire.
- 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.
- Related Hazards: Drought, Severe Weather

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes flood hazard risk by jurisdiction. Wildfire warning time and duration do not vary by jurisdiction. Spatial extent ratings were estimated based on the proportion of area within the WUI; all jurisdictions have at least 10% of their area in the WUI and were assigned a rating of 3. Impact ratings were based on fire intensity data from SouthWRAP; all jurisdictions have clusters of moderate to high fire intensity and were assigned a rating of 3. Probability ratings were determined based on burn probability data from SouthWRAP. All jurisdictions have clusters of moderate burn probability and were assigned a rating of 3.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 3 | 2 | 3 | 4 | 3 | 2.8 | M |
| Clemson | 3 | 2 | 3 | 4 | 3 | 2.8 | M |
| Easley | 3 | 2 | 3 | 4 | 3 | 2.8 | M |
| Liberty | 3 | 2 | 3 | 4 | 3 | 2.8 | M |
| Norris | 3 | 2 | 3 | 4 | 3 | 2.8 | M |
| Pickens | 3 | 2 | 3 | 4 | 3 | 2.8 | M |
| Six Mile | 3 | 2 | 3 | 4 | 3 | 2.8 | M |
| Unincorporated Pickens County | 3 | 2 | 3 | 4 | 3 | 2.8 | M |

# 5.13WINTER/ICE STORM

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Winter/Ice Storm | Likely | Limited | Large | More than 24 hrs | Less than 1 week | 2.7 |

## HAZARD DESCRIPTION

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

All winter storm events—snow, sleet, ice, freezing temperatures, etc.—have the potential to present dangerous conditions to the affected area. The typical elements of winter storm events are described below according to the NCEI Storm Events Database:

**Cold/Wind Chill –** Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory. Wind chill advisories are issued when the wind chill temperature is expected to fall between -15°F and -24°F. The NWS Wind Chill Temperature Index, as presented in Figure 5-39 below, provides a useful formula for calculating the dangers of winter winds and freezing temperatures.

**Frost/Freeze –** A surface air temperature of 32 degrees Fahrenheit (°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 –** Heavy snow is defined by accumulation meeting or exceeding locally/regionally defined 12 and/or 24-hour warning criteria, on a widespread or localized basis. In some heavy snow events, structural damage, due to the excessive weight of snow accumulations, may occur in the few days following the meteorological end of the event. Larger snowfalls pose a greater risk, reducing visibility due to blowing snow and making driving conditions treacherous. However, even small accumulations may cause costly damage or disruptions.

**Ice Storms** – NWS reports ice storms with ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is 1/4 or 1/2 inch or more). Ice storms in general 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 a north-south oriented mountain range. 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 (sleet). Sleet typically bounces when it hits the ground and does not stick to the surface but instead accumulates like snow, posing similar problems. It has the potential to accumulate into a layer of ice on surfaces. Freezing rain usually sticks to the ground, creating a sheet of ice on roadways and other surfaces.

**Winter Storm –** A winter weather event which has more than one significant hazard (i.e., heavy snow and blowing snow; snow and ice; snow and sleet; sleet and ice; or snow, sleet and ice) and meets or exceeds locally/regionally defined 12 and/or 24-hour warning criteria for at least one of the precipitation elements, on a widespread or localized basis.

**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. A Winter Weather event could result from one or more winter precipitation types (snow, or blowing/drifting snow, or freezing rain/drizzle), on a widespread or localized basis.

All winter storm elements—snow, sleet, ice, freezing temperatures, etcetera—have the potential to cause significant hazard to a community. Even small accumulations can down power lines and tree limbs, create hazardous driving conditions, and disrupt communication and power 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 several days after the initial incident until cleanup is completed.

***Warning Time: 1 – More than 24 hours***

***Duration: 3 – Less than 1 week***

## LOCATION

Severe winter weather is usually a countywide or regional hazard, impacting the entire county at the same time. The entirety of Pickens County is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Pickens County is accustomed to smaller scale severe winter weather conditions and is most likely to receive winter weather from December to February. Given the atmospheric nature of the hazard, severe winter weather can occur anywhere in the county.

***Spatial Extent: 4 – Large***

## EXTENT

Severe winter weather often involves 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.

NOAA uses the Regional Snowfall Index (RSI), shown in Table 5-62, to assess the societal impact of winter storms. The index uses the spatial extent of a storm, the amount of snowfall, and the juxtaposition of these elements with population 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.

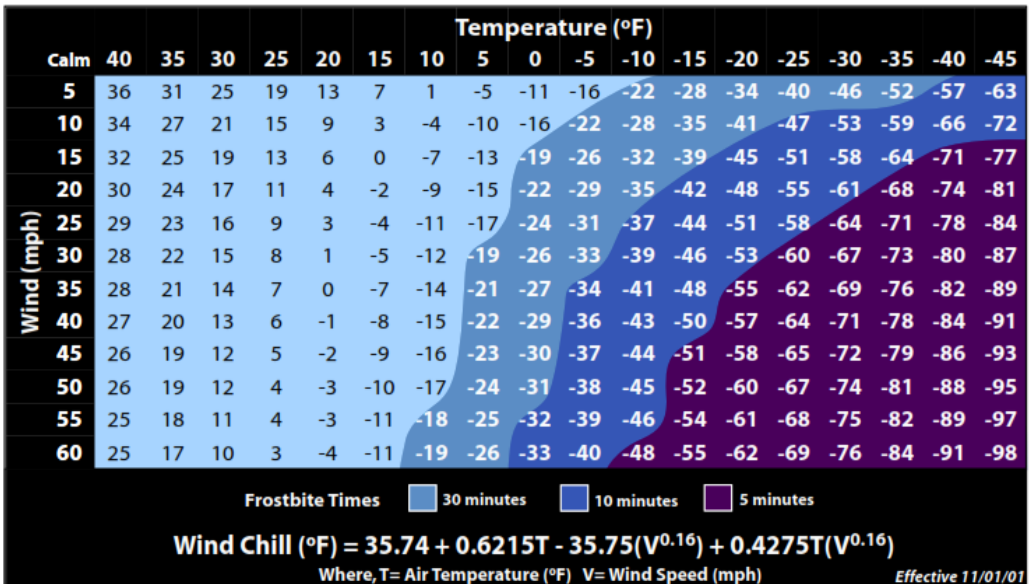
**Table 5.62 Regional Snowfall Index (RSI) Values**

| 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

The NWS Wind Chill Temperature Index, shown in Figure 5-39, provides a formula for calculating the dangers of winter winds and freezing temperatures.

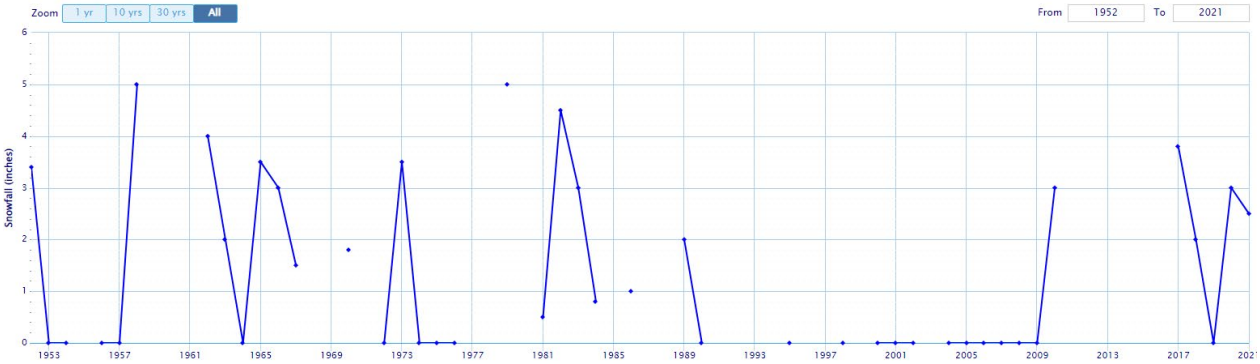
**Figure 5.40 NWS Wind Chill Temperature Index**




Source: https://www.weather.gov/safety/cold-wind-chill-chart

Figure 5-40 graphs snowfall extremes for Pickens, SC for the period of record from 1950 through 2021. Since 1950 the most snow the Pickens region has experienced is around five inches. Over the last ten years the maximum snowfall was 3.8 inches in 2017. On average, Pickens County receives around 4 – 8 inches of snowfall annually.

**Figure 5.41 Snowfall Extremes, Pickens, SC**




Source: Northeast Regional Climate Center CLIMOD 2

***Impact: 2 – Limited***

## HISTORICAL OCCURRENCES

Pickens County has received one Major Disaster Declaration and one Emergency Declaration for a severe winter storm in 2006 and 2014, respectively.

According to NCEI records, Pickens County has experienced 93 winter storm events since 1996, presented in Table 5-63. The South Carolina State Climate office reports around 103 winter weather events from 1958

to 1996. The NCEI events do not report any deaths or injuries but have resulted in over $13 million property damage and over $100 million in crop damage.

**Table 5.63 NCEI Records for Winter Storm Events in Pickens County (1950 – 2022)**

| Type of Winter Storm | # of Events | Deaths/Injuries | Property Damage | Crop Damage |
|---|---|---|---|---|
| Cold/Wind Chill | 14 | 0/0 | $0 | $100,000,000 |
| Extreme Cold/Wind Chill | 2 | 0/0 | $0 | $0 |
| Frost/Freeze | 3 | 0/0 | $0 | $7,000,000 |
| Ice Storm | 12 | 0/0 | $13,230,000 | $0 |
| Heavy Snow | 30 | 0/0 | $0 | $0 |
| Sleet | 6 | 0/0 | $0 | $0 |
| Winter Storm | 26 | 0/0 | $20,000 | $0 |
| **Total** | **93** | **0/0** | **$13,250,000** | **$107,000,000** |

Source: NCEI, November 2022

The following narratives provide detail on select storms from the NCEI database:

**January 6, 1996** – Mixed rain, freezing rain and sleet caused a gradual buildup of ice. Snow began to fall again near the North Carolina border. Some power outages developed by late evening especially east and north of Spartanburg. Numerous traffic accidents were reported with a number of injuries and at least one fatality. the precipitation gradually changed over to mostly snow by morning.

**December 3, 2000** – A developing surface cyclone off the Carolina Coast spread abundant moisture into Upstate South Carolina, which was still mired in a cold, winter-like temperature regime. The result was another widespread snowfall. The heaviest snow totals were near the South Carolina mountains, where Tigerville, in northern Greenville County, recorded 5 inches. However, the snow was not terrain-dependent, as Greenwood, with one of the lowest Upstate elevations, recorded 4 inches, as did Pickens, in the foothills of the mountains. Accumulations, in general, ranged from 1 to 3 inches.

**December 4, 2002** – Freezing rain began across upstate South Carolina during the early afternoon of the 4th, and had spread into the eastern piedmont by mid afternoon. Resultant damage due to ice accumulation began during the mid-to-late afternoon. The intensity of the freezing rain increased after midnight, and by dawn on the 5th, devastating ice accumulations of 1/2 to 1 1/2 inches were observed. Hundreds of thousands lost power, and the outages lasted for as long as 2 weeks in some areas.

**December 15, 2005** – Ice accretion began to cause damage across northern portions of upstate South Carolina just prior to sunrise. By late morning, the ice storm had become quite serious, as thousands of trees fell across the area, and power outages were widespread. Numerous trees and large limbs fell and damaged homes and vehicles. In Greenville and Spartanburg counties, around 200,000 customers lost power. Cherokee county reported that ice accumulated to a depth of one half to three-quarters of an inch, with the weight of the ice bringing down many power lines. In some areas, it took as much as 5 days to restore electricity. Duke Power estimated costs for overtime and line repair at 72 million dollars for the event in the western Carolinas, though these costs are not reflected in the property damage values for the event.

**April 8, 2007** – An early spring hard freeze saw temperatures fall to the upper teens and lower 20s across much of the western Carolinas and northeast Georgia on the morning of the 8th. This resulted in massive agricultural losses across the region. It was estimated that 90 percent of the apple and peach crop across the area was destroyed. As much as 50 percent of the berry crop was lost, while more than 50 percent of the grape crop across western North Carolina was damaged.

**January 10, 2011** – Moderate to heavy snow associated with a Gulf Coast storm system spread from south to north across the upstate and northwest piedmont of South Carolina. By sunrise, most areas had received

from 4 to 6 inches of snow. The snow became lighter after sunrise, but continued into the afternoon hours. Total snowfall ranged from 6 to 8 inches across the region. During the early afternoon, precipitation changed to light freezing rain and continued into the evening hours. This added as much as a tenth of an inch of ice to the heavy snowfall totals. Persistent cold temperatures ensured that many roads remained snow-packed or ice covered for several days. Some schools and businesses remained closed for as much as 5 days.

**January 7, 2014** – An arctic cold front blasted through the western Carolinas bringing gusty winds and the coldest air mass to have affected the region since 1994. By early evening, winds of 10 to 20 mph, with stronger gusts combined with temperatures falling into the 20s and teens to produce wind chill values below 0 across the South Carolina mountains. Wind chills across the higher elevations likely reached -15 or lower briefly on the night of the 6th. Although wind gradually diminished overnight, low temperatures on the 7th ranged from a little below zero above 3000 feet to the single digits across the Piedmont and foothills.

**March 16, 2017** – The 2017 growing season began early across Upstate South Carolina, due to an unusually warm February and early March that saw average temperatures of almost 10 degrees above normal. An episode of cold arctic high pressure in the middle of March led to a hard freeze on the morning of the 16th, when low temperatures in the lower to mid 20s were reported. This devastated the peach crop across the Upstate, with crop losses estimated at 80-90%. Other crops were damaged as well. While subsequent days of freezing temperatures caused further damage, the vast majority of the damage occurred on the 16th.

**January 16, 2022** – Moisture overspread the southern Appalachians as strengthening low pressure moved across the Deep South. Strong northeast winds supplied ample cold air for the precipitation to begin as light snow. Snow increased in intensity throughout the overnight, with snowfall rates of around an inch per hour. Heavy snowfall criteria of 2 to 4 inches was reached in many areas by daybreak, with accumulating snow continuing through the morning hours before tapering off to occasional snow showers that continued to produce light accumulations through the afternoon. Total snowfall ranged from 6 to 10 inches across much of the area. Travel was very difficult to nearly impossible across much of the area throughout the 16th and much of the 17th.

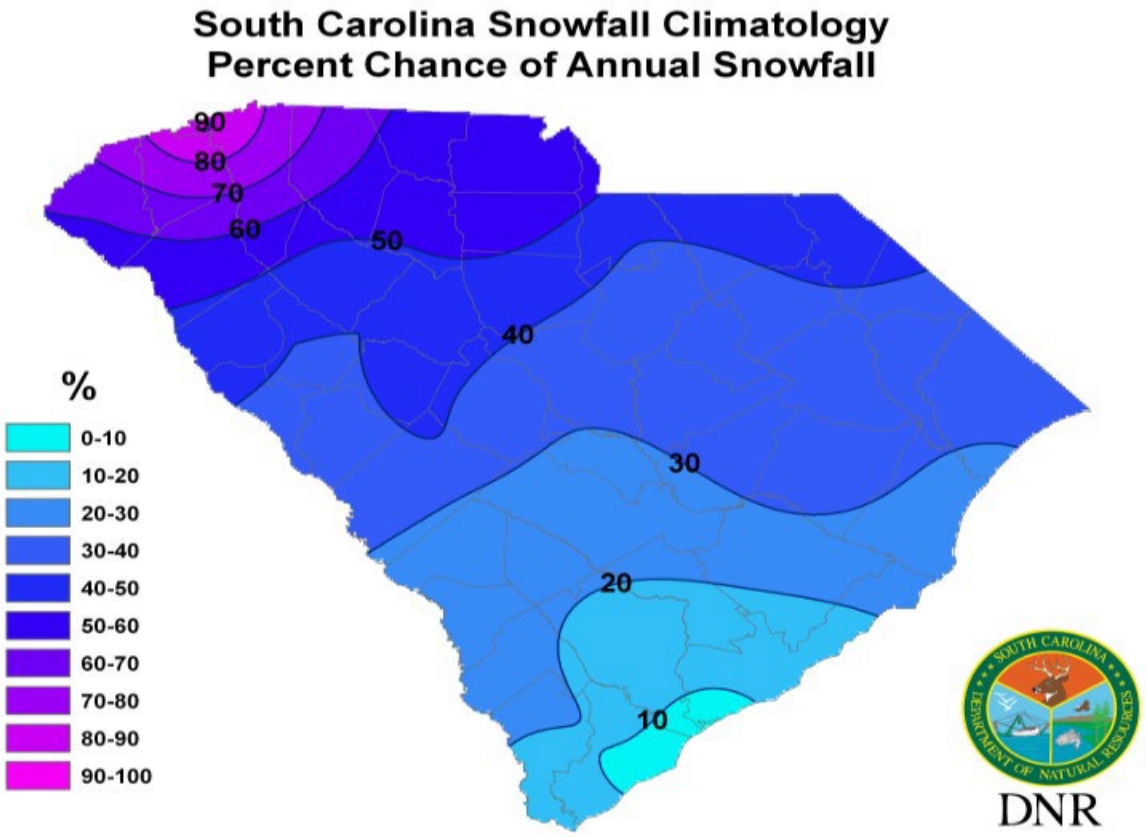
## PROBABILITY OF FUTURE OCCURRENCE

Based on both NCEI and the State Climatology Office, 196 winter storm and winter weather events have occurred over the 64-year period between 1958 – 2022, resulting in approximately a three winter weather or storm events in any given year.

The probability of a heavy snowfall occurring with that winter storm event is likely. Figure 5-41 below presents the probability of snowfall to be anywhere between 60% and 90% per year for the Pickens County Region, with the northern portion of the county having a higher percent chance.

***Probability: 3 – Likely***

**Figure 5.42 Probability of Snowfall**




Source: South Carolina State Climatology Office

## CLIMATE CHANGE

The atmosphere now holds more moisture which drives heavier than normal precipitation, including heaver snowfall. For the entire Northern Hemisphere, winter storms have increased in frequency and intensity since the 1950s, which could suggest greater hazard impacts in the future. However, winter storm tracks have shifted northward over the United States; therefore, the increase in intensity may be offset in South Carolina by the northward shift of the storm tracks.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Winter storms can create dangerous walking and driving conditions by limited visibility or making sidewalks and roads slick. Loss of power can create very cold conditions increasing the risk of hypothermia or frostbite. Individuals seeking alternative means of heating their homes may run the risk of carbon monoxide poisoning or fire hazards. |
| Responders | Responders face heightened risk due to slick roads and limited visibility. Snow and ice accumulations may block roads, limited access for responders to reach areas in need. |
| Continuity of Operations (including Continued Delivery of Services) | Continuity of operations is generally expected to be maintained. However, localized disruption of roads and/or utilities caused by incident may postpone delivery of some services or make it difficult for emergency management personnel to arrive at work. Schools may be delayed or closed, which can lead to logistical problems for teachers and administrators. |

| Category | Consequences |
|---|---|
| Property, Facilities and Infrastructure | Disruption of major and local roads is possible, limiting mobility. Air travel delays are possible. Disruption of utilities is likely; utilities at risk include water, cable, internet, water, and power. |
| Environment | Environmental damage to trees and other vegetation may occurred. Downed trees and limbs may cause secondary damages to property and people or may down power lines. Environmental impacts may result when snow is cleared from roadways, picking up contaminants from chemicals, oil products, and salt mixture used to de-ice roads. These contaminants can be carried to local waterways and impact water quality. |
| Economic Condition of the Jurisdiction | Local economy and finances may be adversely affected, depending on damage and business interruption costs. During a winter storm event, there is a high potential for business and office closures, modified business and office hours, and cancellation or postponement of events, especially due to power outages and poor road conditions. Crop and livestock can also be adversely affected causing significant loss of revenue. |
| Public Confidence in the Jurisdiction's Governance | Public confidence is unlikely to be impacted unless road clearing, power restoration, and other response activities are particularly slow. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Because winter storms are large scale events, all of the Pickens County population is exposed.

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 crashes due to poor visibility and/or slippery roads. According to the State Climatology Office, about 70% of snow- and ice-related injuries in South Carolina result from vehicle accidents and about 25% of those accidents occur when people are caught out in a storm. Additionally, exhaustion and heart attacks caused by overexertion may result from winter storms. People experiencing homelessness, residents living in old homes or home with poor insulation, and low-income families that struggle to maintain electricity and heating bills are more vulnerable to the impacts of winter weather, including hypothermia. Also, significant injury or fatality may occur if a large tree limb snaps while a resident is out driving or walking underneath it.

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.

NCEI also reports over $100 million in crop damage between 1996 and 2022. Agricultural workers are particularly vulnerable to winter weather as crop and livestock losses can directly impact their wellbeing.

### *PROPERTY*

A winter storm may cause damage to homes and vehicles when severe. Frozen or snow-covered trees and branches could fall on home or vehicles. Additionally, building and household pipes are at risk of freezing and cracking which could eventually cause water damage. NCEI records report over $13 million in property damage since 1996, this equals an annualized loss of over half a million dollars per year.

### *ENVIRONMENT*

Winter storm events may include ice or snow accumulation on trees which can cause large limbs, or even whole trees, to snap and potentially fall. Late season frost or freeze may harm vegetation, which can reduce habitats and threaten wildlife.

## CHANGES IN DEVELOPMENT

The winter weather hazard is not expected to be impacted by changes in development. Aside from increases in overall building and infrastructure exposure in the planning area that comes with growth, future development will not significantly increase risk of winter weather.

## KEY ISSUES

- Local capability to clear roads is limited. Expanding local capability could reduce hazard risk for travelers.
- Given the limited frequency of winter storm events, residents may be unprepared. Education and outreach as well as adequate communication can help mitigate potential accidents, injuries, or fatalities.
- Jurisdictions with a growing number of people experiencing homelessness and an aging population may face increased challenges during winter weather or storm events. Prior designation of shelters or warming facilities throughout the winter months may help minimize exposure. Identification and outreach to older adults and those that live alone can help identify the needs of those who may require assistance during severe winter weather.

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes severe winter weather 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 | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Clemson | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Easley | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Liberty | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Norris | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Pickens | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Six Mile | 3 | 2 | 4 | 1 | 3 | 2.7 | M |
| Unincorporated Pickens County | 3 | 2 | 4 | 1 | 3 | 2.7 | M |

# 5.14 CYBER SECURITY THREAT

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Cyber Security Threat | Possible | Critical | Large | Less than 6 hrs | Less than 1 week | 3.0 |

## HAZARD BACKGROUND

An intentional cyber disruption, or a cyber-attack, is usually malicious in intent. These types of disruptions are the most worrisome as they pose the potential to cause irreparable harm to the function and capability of critical or supporting systems that are used in daily operations. The FBI defines this intentional disruption as a threat: "a cyber-threat is any circumstance or event with the potential to adversely impact operations (including mission, functions, image, or reputation), agency assets, or individuals through an information system via unauthorized access, destruction, disclosure, modification of information, and/or denial of service."

Unlike physical threats, cyber threats are often difficult to identify and comprehend. Cyber-attacks can be intruders breaking into systems and altering files, using someone's computer to attack others, stealing confidential information, or erasing entire systems or files. Some attacks are more serious than others and can have wide ranging effects on individuals, organizations, and at the national level. Risks include disrupted services or power to transportation, data breaches with organizations, governments, or other institutions, and obtaining individuals' personal information.

The risks associated with the Nation's dependence on networked technologies led to the development of Presidential Policy Directive 41 (PPD-41): United States Cyber Incident Coordination, which outlines the roles of federal agencies during any significant cyber incident, whether involving government or private sector entities.

PPD-41 recognizes that the frequency of cyber incidents is increasing, and this trend is unlikely to be reversed anytime soon. The National Cyber Incident Response Plan (NCIRP) was developed according to the direction of PPD-41). In 2010, the Department of Homeland Security (DHS) issued the NCIRP Interim Version. This plan was recently updated in December of 2016 (https://www.us-cert.gov/ncirp).

The South Carolina Legislative Statue (S.C. Code. Ann. 39-1-90) defines a data breach as follows:

"Unauthorized access to and acquisition of computerized data not rendered unusable through encryption or redaction that compromises the security, confidentiality or integrity of personal identifying information maintained by the person, when illegal use of the information has occurred or is reasonably likely to occur or use of the information creates a material risk of harm to the resident."

The South Carolina Critical Infrastructure Cybersecurity (SC CIC) Program is a South Carolina Law Enforcement Division (SLED) initiative whose mission is to provide critical services and share cybersecurity intelligence to prevent cyber threats, incidents, or attacks that could affect the more than 90% of the State's critical infrastructure organizations.

The SC CIC team is trained to analyze, protect, respond to, mitigate, and recover from the effects and consequences of any such incidents or attacks on municipalities, counties, and private critical infrastructure to ensure the health, safety, and well-being of South Carolina's citizens and businesses.

***Warning Time: 4 – Less than six hours***

***Duration: 3 – 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 planning area can still impact people, businesses, and institutions within Pickens County. The converse is true as well, an event that impacts systems at the Citadel could cause impacts outside the campus.

***Spatial Extent: 4 – Large***

## EXTENT

The extent or magnitude 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 or processes. However, disruptions of large, integrated systems could impact many functions or processes, as well as many individuals that rely on those systems.

There is no universally accepted scale to quantify the severity of cyber-attacks. Data breaches are often described in terms of the number of records or identities exposed.

A cyberattack will not cause direct physical harm to people in the planning area, but it may still cause a significant disruption to critical systems the county depends on.

The City of Seattle Office of Emergency Management has summarized a list of common cyber-attacks and potential impacts which can be found in Table 5-64 below.

**Table 5.64 Common Cyber Attacks and Impacts**

| Type | Impact |
|---|---|
| **Malware** (ransomware, spyware, viruses, worms)<br>Malicious software used by attackers to breach a network through a vulnerability, such as clicking a link, that automatically downloads the software to the computer. | • Blocks legitimate access to components of the network<br>• Installs additional harmful software<br>• Obtains information by transmitting data from the hard drive<br>• Disrupts components and makes the system inoperable |
| **Phishing**<br>Fake communications (typically through email) appearing to be from a trustworthy source that allow hackers to obtain login information or install malware on a computer when someone interacts with their message. | • Obtains a person's confidential information for financial gain<br>• Obtains employee log-in credentials to attack a specific company<br>• Installs malware onto a computer |
| **Man-in-the-middle attack** (MitM)<br>Attackers insert themselves into a two-party transaction. Common points of entry include unsecure public Wi-Fi networks and computers affected with malware | • Interrupts a transaction to steal personal data |
| **Denial-of-service attack** (DoS)<br>Attackers flood a site host or network with digital traffic until the target site/service cannot respond or crashes completely. A distributed denial of service attack (DDoS) is when multiple machines are used to attack a single target. Botnets, which are networks of devices that are infected with malware, are often used in DDoS attacks. | • Legitimate users cannot access websites, online services, or devices<br>• Slows down network performance |

| Type | Impact |
|---|---|
| **Structured Query Language** (SQL)<br>Attackers use malicious code on vulnerable servers to force the server to reveal information. Can be done by submitting malicious code into vulnerable search boxes on websites. | • Obtains contents of an entire database, including sensitive information<br>• Allows attackers to modify and delete records in a database |
| **Zero-day exploit**<br>Attackers hack a network vulnerability before it is noticed and fixed by a patch or permanent solution. Used by nation-sate actors and sophisticated hackers | • Allows attacker to plant malware into a system without the victim knowing |

Cyber-crime can refer to any of the above incidents when motivated primarily by financial gain or other criminal intent. For example, 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.

Another example is cyber spying or espionage, which 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."

Similarly, 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.

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

As cyber disruption is an emerging hazard, the reporting and tracking of disruptive events can be difficult. In most cases, it is not required to report an event, and when it is reported most of the information is protected due to the sensitive nature of the systems that have been disrupted. However, there are several complex databases that track cyber disruption occurrences. Verizon has compiled a 2022 Data Breach Investigations Report (DBIR) that provides insight and analysis of over 23,000 incidents and 5,200 confirmed breaches around the world.

Figure 5-42 and Figure 5-43 show patterns over time for both incidents and actual breaches. Denial of Service attacks have been the most common incidents since mid-2018 and Basic Web Application Attacks have increased over the past year or so. System Intrusions have been the most common breaches, rapidly increasing in the past year and a half.

The Verizon report did an industry analysis to better understand specific challenges facing various industries and organizations – one of which is public administration. The report found that government agencies and the public sector is experiencing a dramatic increase in System Intrusion as financially motivated attacks rose. Basic Web Application Attacks were found to be the second most common followed by Miscellaneous Errors. These three types of incidents make up around 81% of actual breaches within the Public Sector.

Government agencies and other organizations in the Public Sector have emerged as targets in general over the last few years, but this year bad actors increasingly targeted this sector for potential financial gain. Much like corporations have had to protect their financial assets against attacks, agencies are also now on high

alert for guarding their financial information. The report also found that the Espionage motive was up 4% from last year, to 18% in 2022.

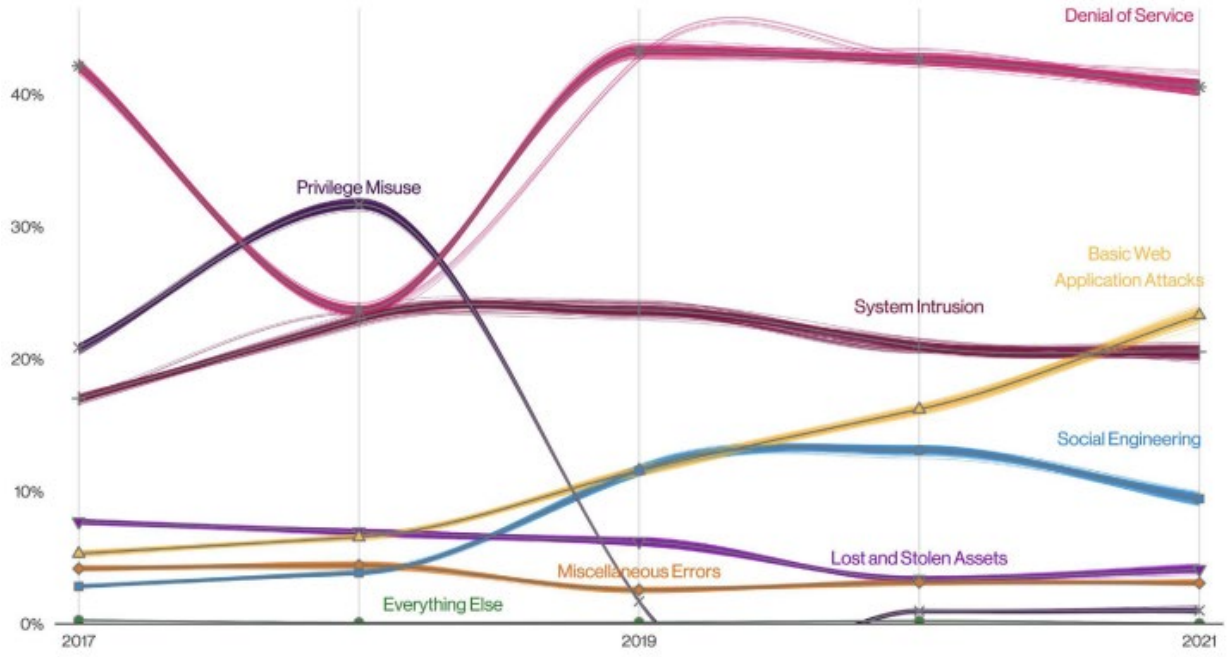
Table 5-65 below highlights additional statistics about cyber-attacks facing government organizations and the public sector over the past year.

**Table 5.65 2022 Trends in Public Sector Cyber Attacks**

| | |
|---|---|
| **Number of Incidents** | 2,792 incidents, 537 with confirmed data disclosures |
| **Top Attack Trends** | System Intrusion, Miscellaneous Errors and Basic Web Application Attacks represent 81% of breaches |
| **Threat Actors** | External (78%), Internal (22%) |
| **Actor Motives** | Financial (80%), Espionage (18%), Ideology (1%), Grudge (1%) |
| **Data Compromised** | Personal (46%), Credentials (34%), Other (28%), Internal (28%) |
| **Suggested Protective Controls** | Security Awareness and Skills Training, Access Control Management, Account Management |

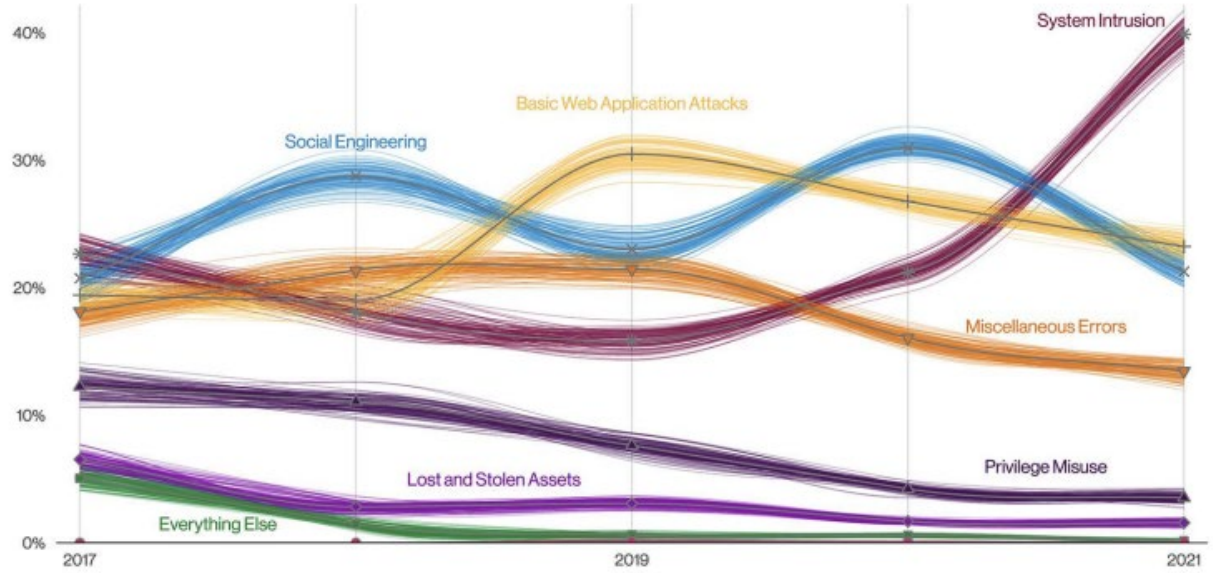
Source: Verizon Data Breach Investigations Report, 2022

**Figure 5.43 Patterns Over Time in Cyber Incidents by Type**




Source: Verizon Data Breach Investigations Report, 2022

**Figure 5.44 Patterns Over Time in Data Breaches by Type**




Source: Verizon Data Breach Investigations Report, 2022

Ryan Truskey, the deputy chief information security officer for the South Carolina Law Enforcement Division, reports that in South Carolina, government, health care, and financial institution are the biggest targets for cybercriminals. Further, the Law Division says municipalities are often seen as easy targets.

WBTW local news reported that in January 2021, Georgetown County experienced a major infrastructure breach using what was mistaken as a legitimate email but impacted online systems like email and GIS. Attackers demanded a large amount of cryptocurrency as ransom, which officials refused, opting instead to rebuild its system entirely. Unfortunately, stolen data including social security numbers of some employees was later posted by DoppelPaymer, a ransomware gang.

Later that year, in May 2021, the Colonial Pipeline, which transports 45% of all fuel consumed on the East Coast, had to temporarily halt all pipeline operations following a successful attack, leading to a massive panic at the pumps in South Carolina as people rushed to fill up their vehicles.

## PROBABILITY OF FUTURE OCCURRENCE

There is always a possibility for both intentional and un-intentional cyber disruptions. Cyber attacks occur daily, but most have negligible impacts at the local or county level. It is difficult to quantify an exact probability or severity of a disruption due to the limited information available and the many unknown factors. The intent of an intentional disruptor could range from something as minor as leaving a message to a major issue with sensitive data collection. While large scale cyber-attacks targeting the Pickens County are less likely, human errors and phishing attempts are common. Data breaches impacting the information of residents of Pickens County 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: 2 – Possible***

## CLIMATE CHANGE

Climate change is not expected to have any impact on a potential cyberterrorism incident.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | People's sensitive information may be at risk. Additionally, disruptions may interrupt normal routines of cadets, students, faculty, or staff, or interfere with their ability to complete their work. Injuries or fatalities could potentially result from a major cyber terrorist attack against critical infrastructure. |
| Responders | A cyber-attack on electronic safety equipment or systems could increase call volume, block systems, or otherwise hinder emergency operations. Law enforcement may help with initial investigation if a malicious cyber incident occurs. |
| 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 | Most attacks affect only data and computer systems, however these critical facilities and infrastructure dependent on these systems may be impacted. Sabotage of utilities and infrastructure from a major cyber terrorist attack could potentially result in system failures that damage property on a scale equal with natural disasters. |
| Environment | Unlikely to have impacts on the environment. A major attack could theoretically result in a hazardous materials release. |
| Economic Condition of the Jurisdiction | 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. Physical damage to utilities or network infrastructure could result in costly repairs. Incidents like ransom attacks could cost tens of thousands of dollars to recover data and fix systems. |
| 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. Public confidence may be impacted by media interpretation and reporting of an event. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

The environment of information sharing, and the amount of sensitive information make counties prime targets for cyber criminals. People's personal information is at risk and a successful attack can cost agencies both money and their reputation and can lead to legal action, depending on what type of information is released.

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.

Cyber-attacks can have a significant cumulative economic impact. A 2020 report from McAfee, "The Hidden Costs of Cybercrime," estimated that the average annual cost of cybercrime globally has reached $1 trillion, due to financial costs, opportunity costs, system downtime, reduced efficiency, brand damage

and loss of trust, intellectual property theft, incident response costs, outside assistance costs, cyber risk insurance, and damage to employee morale.

### *ENVIRONMENT*

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.

## CHANGES IN DEVELOPMENT

Increased development will not necessarily lead to increased incidents of cyberattack. However, increased population puts more records at risk in the event of a cyberattack.

## KEY ISSUES

- Implementing a data backup plan can limit the possibility for data loss and reduce vulnerability to ransomware attacks.
- Training municipal staff about cyber security and how to identify potential phishing scams can reduce vulnerability to a cyber-attack.
- The South Carolina Cyber Coordination Center is a key component to the SC CIC Program providing real time intelligence and coordination during cyber incident response efforts. The SC CIC program is an opt-in program that offers free services like training and system audit. Jurisdiction should participate in the program to help protect themselves from future attacks.

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes cyber security threat risk by jurisdiction. Cyber security threat risk does not vary significantly by jurisdiction.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 2 | 3 | 4 | 4 | 3 | 3.0 | H |
| Clemson | 2 | 3 | 4 | 4 | 3 | 3.0 | H |
| Easley | 2 | 3 | 4 | 4 | 3 | 3.0 | H |
| Liberty | 2 | 3 | 4 | 4 | 3 | 3.0 | H |
| Norris | 2 | 3 | 4 | 4 | 3 | 3.0 | H |
| Pickens | 2 | 3 | 4 | 4 | 3 | 3.0 | H |
| Six Mile | 2 | 3 | 4 | 4 | 3 | 3.0 | H |
| Unincorporated Pickens County | 2 | 3 | 4 | 4 | 3 | 3.0 | H |

# 5.15 DISRUPTION OF UTILITY SYSTEMS

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Disruption of Utility Systems | Possible | Critical | Large | Less than 6 hrs | More than 1 week | 3.1 |

## HAZARD BACKGROUND

Utilities refer not only to electricity, natural gas, water, wastewater, and telecommunication services, but the infrastructure required to provide service to communities. Similar to disruption of transportation, disruption of utility services can be caused by hazards and contribute to other emergencies.

Utilities are networked systems, meaning there are nodes and links. Nodes can be substations, pumping stations, switching offices, treatment stations, or others. Links are simply the pipes or lines that run between nodes and carry the electricity, water, wastewater, natural gas, or signals. The distributed nature of utility systems makes them vulnerable to a variety of hazards.

### Electrical Utilities

Electrical utilities are subject to outages due to severe weather, maintenance, accidents, and demand exceeding capabilities. Severe weather is the most common reason customers may lose power. For example, lightning can cause outages by striking electrical equipment directly or by hitting trees, which can then fall onto power lines. Ice storms are another hazard that can cause disruptions. When ice builds up on power lines it may become too heavy for the lines or the poles and cause the lines or poles to fall.

Similarly, ice on trees becomes too heavy for the branches or the entire tree to remain standing, and they can then fall onto lines, knocking them out and causing an electricity outage. Trees also become a hazard in high wind events, such as those from tornadoes, hurricanes, severe storms, or downbursts. Again, the strong wind can blow branches or trees onto the lines, or strong winds can cause the lines to touch, creating a short circuit. Flood hazards can also present challenges for electrical utilities. When electrical equipment comes into contact with water, it can become severely damaged, so in the event of riverine or flash flooding, technicians may shut off power to that node to prevent irreparable damage.

Other causes of electrical outages are accidents and high demand. Vehicles may crash into poles and break them, resulting in broken lines. Construction accidents can cut or short out power lines, resulting in loss of service to some residents. Occasionally, during times of high usage, like extreme heat or cold events, demand can exceed supply, causing some customers to experience blackouts. Routine maintenance can also cause electrical outages, but unlike most causes, it is known about before the service interruption.

### Natural Gas Systems

Adverse weather events can also pose a threat to natural gas systems. Flooding does not usually affect the pipelines, as they are pressurized, but can cause problems for compressor stations, which run on electrical power. Earthquakes, landslides, erosion, and other small ground movements however can cause distribution and transmission pipes above and below ground to break. Furthermore, tornadoes and other high wind events can uproot or rupture natural gas pipelines.

### Water Utilities

Potable water distribution systems face similar hazards as natural gas pipelines. Pipes are not normally affected by floods, but are subject to rupture from earthquakes, landslides, erosion, and ground settlement. Construction accidents can also damage water distribution pipes. However, water treatment plants are frequently located in flood prone areas because they need a fresh water source. During times of riverine or flash flooding, untreated water can inundate the plant limiting its ability to treat the drinking water. The

result of flooding is then raw or inadequately treated water entering the distribution system. Earthquakes may also damage a treatment plant and power outages can prevent pumps from operating. Water systems that rely on wells are also threatened by floods, as the flood waters contaminate the well heads. Water mains may also rupture during times of extreme cold due to frost action.

Another threat to water systems is contamination or pollution of the water. This can be from a deliberate act or an accident. This is different than an outage as water is still distributed to residents, however, the water quality can pose a threat to the health and wellbeing of the community. Contamination of potable water sources may result in a boil advisory or an avoidance advisory, depending on the type of contamination. Individuals who do not heed the advisory, or consume water before the advisory is issued, may become ill. Businesses, such as restaurants, depend on clean water, and may have to close during times of contamination, and thus face an economic loss. Contamination may also occur when the domestic water system's source is not adequately analyzed for possible contaminants and complications and is not adequately treated before distribution, such as the case in Flint, Michigan.

**Wastewater Treatment**

Wastewater treatment plants and their sewer lines are another utility that are threatened by a variety of hazards. To facilitate collection, wastewater treatment plants are commonly located in geographic lows, making flooding the primary hazard of concern, whether the treatment plant is in a floodplain or not. When a wastewater treatment facility becomes flooded it may cause the plant to shut down partially or completely, or it may cause the release of untreated or partially treated water. Additionally, power outages can contribute to the release of untreated or partially treated water by shutting down treatment plants and lift stations. Flooding can also cause sewer lines to backup and overflow. Like water and natural gas utility systems, wastewater treatment facilities and sewer lines are threatened by earthquakes, landslides, and erosion. Also similar to potable water distribution systems, frost action may lead to the rupture of sewer pipes.

**Telecommunication Utilities**

Telecommunication utilities provide telephone, radio, and television services. These utilities tend to be less hazard prone than others for many reasons. Flooding can cause outages; however, most telecommunication facilities are located outside of flood-prone areas to avoid this hazard. Most facilities are also located away from landslide prone areas, reducing the risk to that particular hazard. Broadcast radio and television antennas and cellular towers in hilly areas are an exception, and still threatened by landslides, as they are constructed along geographic highs to provide service to the greatest area possible. Significant landslides also pose a hazard to telecommunication cables that are buried in the ground, as do larger earthquakes, but copper, fiber-optic, and coaxial cables usually have enough flexibility to withstand minor ground movement. Like electricity utilities, telecommunication utilities also can have above ground lines that are subjected to hazards such as wind and ice. However, telecommunication cables are less likely to short circuit if they happen to come into contact with each other because they have a lower voltage than electrical lines. Facilities without a backup power source may also be susceptible to power outages.

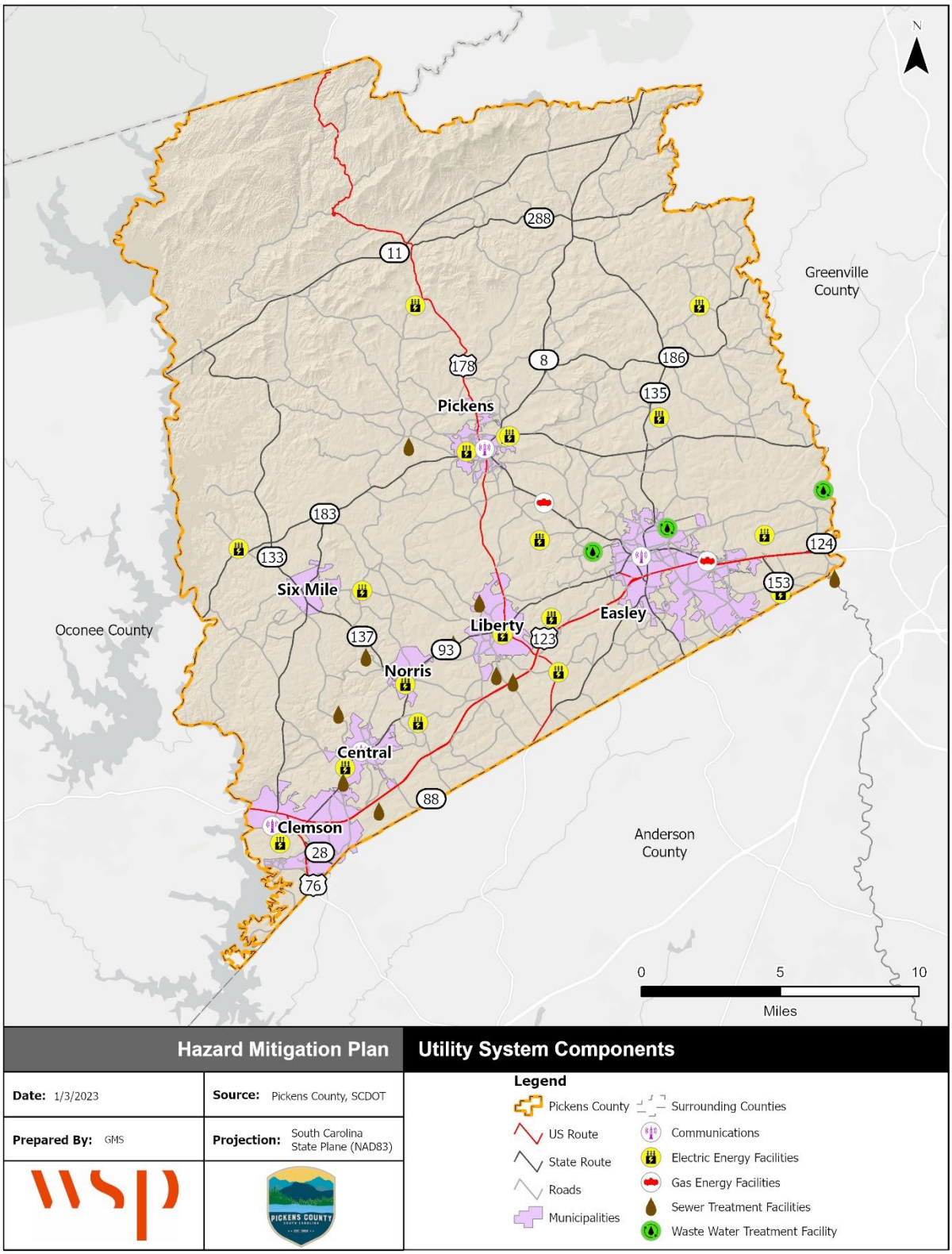
***Warning Time: 4 – Less than 6 hours***

***Duration: 4 – More than one week***

## LOCATION

Pickens County is home to many utility systems, each of which consists of a variety of facilities and their specific distribution network. Figure 5-44 shows the location of many of these facilities.

**Figure 5.45 Utility System Facilities**



Among these facilities are 16 electrical power facilities owned by Duke Energy and several electric cooperatives as well as 2 gas energy facilities. There are also three wastewater treatment plants and 10 additional sewer treatment facilities. Communications facilities include three AM radio towers, corresponding to WCCP in Clemson, WTBI in Pickens, and WELP in Easley, and two FM radio towers for WSBF in Clemson, and WLWZ in Easley. These radio stations, as well as television stations located in neighboring areas, can provide a vital link to the community during an emergency, allowing authorities to disseminate information to as many people as possible in a short as possible time frame.

## EXTENT

The severity of utility disruption and damage is difficult to quantify, as it depends on the location of the problem, the amount of redundancy in the system, and the ability of the system to cope with the losses. Disruptions can be minor, like a downed powerline limiting electricity to a few households for a short amount of time. However, even power outages for only a few hours can cause significant disruptions in people's routine activities. Telecommunication disruptions may also be generally minor, however, in the case of an emergency, if telecommunication utility systems such as landline and cellular telephones, experience an outage, it can prevent residents of Pickens County without a way to call for help in an emergency.

Other types of disruptions can be more severe. For example, when natural gas lines fail, there is the potential for explosions or fires, which can injure or kill individuals and destroy property. While most explosions and fires are limited to one structure, on September 9, 2010, a massive natural gas explosion and subsequent fire in San Bruno, California, killed eight people, injured more than 50, destroyed 38 houses, and damaged another 120. Catastrophes of this severity are unusual, as the more common danger to residents experiencing a natural gas utility failure is the inability to heat homes during cold weather.

Water utility outages also have the potential for serious consequences. If there is a problem resulting in disruption with one of the six drinking water treatment plants, the 28 water storage facilities, or any of the distribution lines serving Pickens County, fire hydrants may not have enough water to help fight fires, resulting in more damage than normal from structural fires.

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

The previous Pickens County hazard mitigation plan noted three past events. In 2010, a tornado hit the City of Easley, and caused power and gas outages and a few minor gas leaks. Additionally, during the winter storm that occurred January 10-11, 2011, Blue Ridge Electric reported that 71 of their customers in Pickens County lost electricity. A boil advisory was issued for three Clemson neighborhoods on October 27, 2016, due to low pressure in the distribution system caused by a water line tie-in (Cumberbatch, 2016).

The NCEI database recorded several incidents of utility disruptions, primarily damaged power lines, in association with a range of storm events. Around 143 events have reported some type of utility disruption between 1993 and 2022. These disruptions have been caused by severe weather events, like thunderstorms, tornados, winter weather, and flood-related events. Below are a few NCEI narratives that describe utility disruption caused by storm events.

**January 3, 1999** – A shallow cold arctic airmass in place ahead of a developing storm system in the southern plains set the stage for a significant ice storm for most of the Upstate during the evening of the 2nd. Patchy sleet began during the late morning and became more widespread and heavier during the afternoon - mixing at times with freezing rain. Sleet accumulated to nearly one inch across the foothills before changing to freezing rain in the early evening. Freezing rain continued through the evening, heavy at times and accumulated to damaging levels. Downed trees and power lines caused widespread power outages, totaling 160,000 across the Upstate. Much of the damage to homes was due to ice damming and to a lesser extent, fallen trees.

**July 24, 2000** – A cluster of slow-moving thunderstorms produced excessive rain in Easley. Several roads had to be closed due to high water and downed trees. The storms became severe briefly over Liberty and downed many trees in the Whispering Pines subdivision. Roads were blocked and impassable, live wires were downed, and power connections were ripped from houses.

**April 22, 2005** - This tornado touched down just northwest of Pickens, where 3 barns were destroyed near the intersection of Gravley Rd and Artie Rd. Numerous trees were blown down from the intersection of Red Hill and Reece Mill roads east to highway 178. The tornado continued an intermittent ENE track, snapping off and uprooting numerous trees along an 8-mile path before lifting west of Dacusville. At least one tree fell on a house, and at least one car was damaged. Newspaper reported thousands of power outages across the county.

**Feb 24, 2016** - Very strong west/northwest winds developed across the portions of the foothills and Piedmont during the afternoon in the wake of a cold front. Numerous trees were blown down across the area, some of which fell on and took down power lines, resulting in scattered power outages. Some minor roof damage was also reported.

**September 11, 2017** – As Tropical Storm Irma moved north/northwest across the Florida Panhandle and southwest Georgia, strong winds developed over western portions of Upstate South Carolina. Although gusts only occasionally exceeded 50 mph in these areas, the prolonged nature of the event, combined with saturated soils resulting from heavy rainfall resulted in many trees falling on roads, power lines, vehicles, and structures. Many were without power for a day or more.

**October 29, 2020** – Tropical Storm Zeta moved quickly from near the mouth of the Mississippi River to the southern Appalachians during the night of the 28th into the morning of the 29th. This resulted in frequent wind gusts of 35 to 50 mph, with occasional gusts as high as 60 mph across upstate South Carolina throughout the morning. Numerous trees were blown down across the area, with hundreds of downed trees reported in some counties. Multiple trees fell on and damaged structures and vehicles throughout the area and power outages numbered in the hundreds of thousands.

**May 28, 2021 –** Multiple sources reported trees, large limbs, and power poles broken across southern Pickens County, primarily in Norris and Easley. One tree fell on and damaged a home on Chastain Rd in Norris. A screened porch was also damaged closer to Pickens. A line of thunderstorms moved from northeast Georgia across upstate South Carolina during the evening. Several areas of damaging wind gusts were reported.

## PROBABILITY OF FUTURE OCCURRENCE

Severe disruptions that cause widespread outages or even loss of life are not common occurrences and are unlikely to occur in Pickens County. Small-scale disruptions like power outages from downed trees can occur more regularly. Based on the NCEI events 143 disruptions have occurred over the 29-year period (1993-2022), or an annualized average of just under 5 minor disruptions a year.

***Probability: 2 – Possible***

## CLIMATE CHANGE

As storm events become more frequent and more intense, associated utility disruptions may increase.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Utility disruptions can cause inconveniences due to lack of access of power and water which can interrupt regular activities. More severe consequences include contaminated drinking water, limited air conditioning and heat, and inability to use at home medical devices that require electricity. Exposed |

| Category | Consequences |
|---|---|
| | powerlines and damage to natural gas systems could pose more severe threat to human life. |
| Responders | Disruption to telecommunication utility systems, such as landline and cellular telephones, can prevent residents from calling for help in an emergency. Disruptions to water utility systems could impact water access for firefighting. |
| Continuity of Operations (including Continued Delivery of Services) | Many critical services rely on utilities like Wi-Fi, telephones, and water to continue operations. Depending on the extent of disruptions, continuity of operations would likely be slowed down. |
| Property, Facilities and Infrastructure | Damage to powerlines and other utilities from weather events or by an intentional actor could cause power outages and other disruptions. Watermain breaks can flood properties. |
| Environment | Fallen trees can damage powerlines and other utilities and cause power outages. Contaminated wastewater can enter groundwater or surface water sources and could pollute nearby waters and habitats. |
| Economic Condition of the Jurisdiction | Businesses, such as restaurants, depend on clean water, and may have to close during times of contamination, and thus face an economic loss. Most businesses cannot operate without electricity. Lack of water can have economic consequences too. If restaurants or businesses cannot adequately sanitize their facilities, they will have to temporarily close or risk the health of customers. Businesses that depend on water cooled machinery can also experience an economic loss if their machinery overheats or they shut the equipment down to prevent overheating. Businesses also face the potential for productivity losses if telephone or internet services are not functioning, which may result in economic losses. |
| Public Confidence in the Jurisdiction's Governance | If utilities and services are disrupted for extended periods of time people may lose confidence in ability to access critical services. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Utility system disruptions can have a range of impacts on people and those most vulnerable to disruptions often vary based on the level of dependence of a utility. When the power goes out, it can be more than just an inconvenience. People dependent upon electricity powered home medical devices may not have backup power sources, and therefore, are of the highest risk during a power outage. Additionally, during periods of extreme heat or extreme cold the health of young children, the elderly, and individuals with certain medical conditions can be placed in jeopardy without air conditioning or heat. If there is no electricity, refrigerators will not keep food from spoiling after a few short hours, so an unsafe food supply becomes a threat. Most businesses cannot operate without electricity, so there is a potential for economic losses as well. Even traffic lights fail to operate creating a danger on the roadways. If a power outage is caused by downed power lines, the lines themselves are extremely dangerous.

If telecommunication utility systems, such as landline and cellular telephones, experience an outage, it can leave residents of Pickens County without a way to call for help in an emergency.

The disruption of wastewater utilities can be a health hazard as well. Untreated or inadequately treated wastewater that is released from any of the local sewage treatment facilities or sewer lines can contaminate the immediate area, seep into the groundwater, or enter surficial waterways. If the wastewater enters

groundwater or surface water, the contamination can spread widely, and drinking water sources may become unsafe and recreational areas may have to be closed to prevent inadvertent exposure.

### *PROPERTY*

Disruptions to utility systems are likely caused by physical damage to the utility itself, for example blown down power lines, watermain breaks, or flood inundated electrical equipment. Vulnerable utilities include tall powerlines or telecommunication towers exposed to high winds or surrounded by trees could fall o or pull-down structures. Pumpstation and electrical equipment in repetitively flooded areas may also be vulnerable to water damage.

It is less likely that utility disruptions cause structural damage to other properties or structures. However, disruptions to water or natural gas systems could cause structural damage to property and have the potential for serious consequences. If there is a problem resulting in disruption with one of the six drinking water treatment plants, the 28 water storage facilities, or any of the distribution lines serving Pickens County, fire hydrants may not have enough water to help fight fires, resulting in more damage than normal from structural fires. Similarly, a water main break can create localized flooding problems which can cause property damage of varying degrees.

### *ENVIRONMENT*

It is common for trees to fall on power lines and other elevated utilities. Untreated or inadequately treated wastewater that is released from any of the 18 local sewage treatment facilities or sewer lines can contaminate the immediate area, seep into the groundwater, or enter surficial waterways.

## CHANGES IN DEVELOPMENT

Increased development may expand utilities to areas in need of access. New utility infrastructure will increase the number of utilities exposed to potential disruptions.

## KEY ISSUES

- Above ground utilities, like powerlines and some electrical and telecommunication towers can be damaged by fallen trees and branches during weather events with lightning, ice, and strong wind. Regular tree trimming and maintenance can reduce risk of outages.
- People that rely on at home medical equipment are vulnerable to power outages and may need assistance if outages are prolonged.
- Electrical utilities in repetitively flooded areas are vulnerable during heavy rain or flood events and may want to be examined for relocation or elevation.

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes the risk of disruption of utility systems by jurisdiction.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 2 | 3 | 4 | 4 | 4 | 3.1 | H |
| Clemson | 2 | 3 | 4 | 4 | 4 | 3.1 | H |
| Easley | 2 | 3 | 4 | 4 | 4 | 3.1 | H |
| Liberty | 2 | 3 | 4 | 4 | 4 | 3.1 | H |
| Norris | 2 | 3 | 4 | 4 | 4 | 3.1 | H |
| Pickens | 2 | 3 | 4 | 4 | 4 | 3.1 | H |
| Six Mile | 2 | 3 | 4 | 4 | 4 | 3.1 | H |
| Unincorporated Pickens County | 2 | 3 | 4 | 4 | 4 | 3.1 | H |

# 5.16 HAZARDOUS MATERIALS INCIDENT

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Hazardous Materials Incident | Likely | Critical | Small | Less than 6 hrs | Less than 24 hrs | 2.8 |

## HAZARD BACKGROUND

A hazardous substance is any substance that may cause harm to persons, property, or the environment when released to soil, water, or air. Chemicals are manufactured and used in increasing types and quantities. Each year over 1,000 new synthetic chemicals are introduced and as many as 500,000 products pose physical or health hazards and can be defined as "hazardous chemicals". Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive.

A hazardous material incident can include spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing a hazardous material into the environment. 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. For example, flooding and hurricane events can lead to hazardous spills by causing flooded junkyards, disturbed cemeteries, deceased livestock, floating propane tanks, uncontrolled fertilizer spills, and a variety of other environmental pollutants that are of widespread toxicologic concern. The release of hazardous materials can greatly complicate or even eclipse the response to the natural hazards disaster that caused the spill. Similarly, the natural hazard event may hinder response efforts to address the hazardous material incident.

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. Hazardous material incidents generally affect a localized area.

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

### *FIXED HAZARDOUS MATERIALS INCIDENT*

A fixed hazardous materials incident is the release of chemical substances or mixtures during production or handling at a fixed facility. Hazardous materials releases can be accidental or intentional, as with a terror attack.

Fixed facilities with hazardous materials can include industrial, commercial, and federal facilities. The Emergency Planning and Community Right-to-Know Act (EPCRA) created several methods for tracking facilities with hazardous materials. Section 313 of the EPCRA created the Toxics Release Inventory (TRI). The TRI tracks toxic chemical releases and pollution prevention activities reported by industrial and federal facilities. TRI data is made publicly available by the U.S. Environmental Protection Agency (EPA). Section 312 of the EPCRA mandated additional reporting of hazard materials by businesses and organizations with quantities of hazardous materials over a certain threshold. Tier II reports must be submitted annually, and help local fire departments, Local Emergency Planning Committees (LEPC) and State Emergency Response Commissions (SERCs) plan for and respond to chemical emergencies.

### *TRANSPORTATION HAZARDOUS MATERIALS INCIDENT*

A transportation hazardous materials incident is the accidental release of chemical substances or mixtures during transport. Transportation Hazardous Materials Incidents in Pickens County can occur during highway or rail 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. Additionally, 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: 4 – Less than six hours***

***Duration: 2 – Less than 24 hours***

## LOCATION

The Toxics Release Inventory (TRI) Program run by the 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 11 sites as of 2021. All 11 sites are located within Liberty, Easley, and Central. There are 45 different chemicals reported at these sites. These sites detailed reporting hazardous materials in Pickens County by sector in Table 5-66.

**Table 5.66 Toxic Release Inventory Facilities, Pickens County**

| Facility Name | Sector |
|---|---|
| BASF Corporation/Clemson Site | Chemicals |
| Champion Aerospace LLC. | Transportation Equipment |
| Cornell Dubilier Marketing Inc. | Computers and Electronic Products |
| Danfoss Power Solutions (US) Co | Machinery |

| Facility Name | Sector |
|---|---|
| Imperial Die Casting | Primary Metals |
| Ortec Inc | Chemicals |
| Palmetto Plating Co Inc | Fabricated Metals |
| Reliable Automatic Sprinkler Co | Machinery |
| Shaw Industries/Plant 8T | Chemicals |
| St Jude Medical Cardiology Div Inc. | Computers and Electronic Products |
| Wilbert Plastic Services | Plastics and Rubber |

Source: EPA Toxic Release Inventory

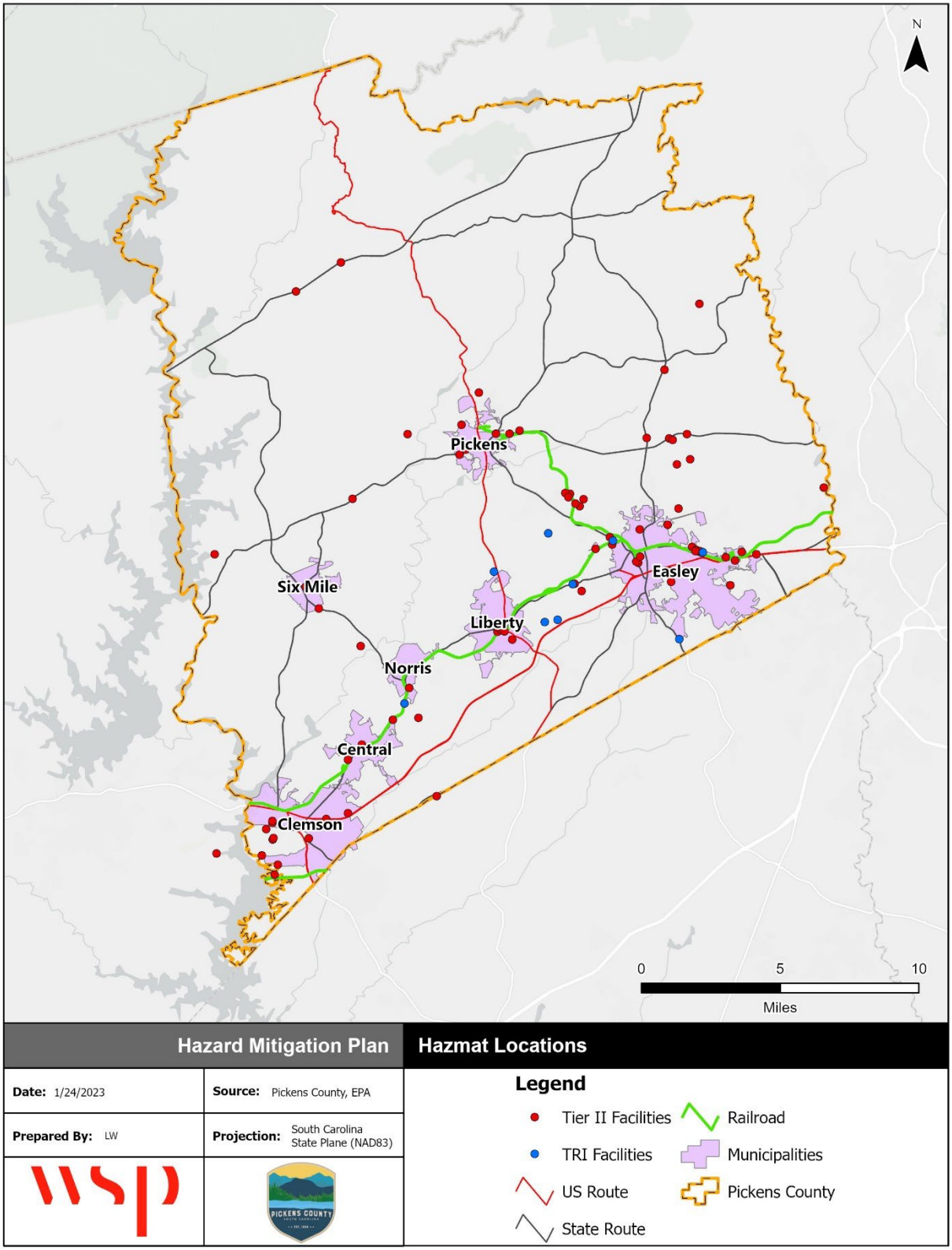
In addition to the EPA TRI sites, there are 152 Tier II Facilities that reported hazardous materials storage in Pickens County in 2020.

In transit, hazardous materials generally follow major transportation routes, including roads and railroads, creating a risk area immediately adjacent to these routes. All the area's roads have the potential for hazardous material incidents, particularly interstate highways, U.S. highways, and State highways, including SC-8, SC-11, SC-133 SC-186, SC-135, US 76, US 123, and US 178. Railroad lines may also transport hazardous materials, including the freight line run by Pickens Railway.

The EPA TRI sites and Tier II facilities as well as the major transportation route and rail lines in the planning area are shown in Figure 5-45.

***Spatial Extent: 2 – Small***

**Figure 5.46 Hazardous Materials Facilities and Transportation Routes, Pickens County**




Source: EPA Toxics Release Inventory; Pickens County

## 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 any of the following conditions:

- 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
- the release of a bulk quantity (over 199 gallons or 882 pounds) of a hazardous material

Prior to 2002, however, a hazardous materials "serious incident" was defined as an incident meeting one of the following criteria:

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

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

The USDOT's PHMSA maintains a database of reported hazardous materials incidents since 1989, which are listed in Table 5-67. According to PHMSA records, there were 26 recorded releases in the planning area from 1989 to 2021. Of these events, nine were flagged as serious incidents. In total, these events caused $785,774 in damages.

**Table 5.67 PHMSA Recorded Hazardous Materials Incidents, 1990-2021**

| Report Number | Date | Hazard Class | Mode of Transport/ Route | Cause of Failure | Total Damages | Serious? |
|---|---|---|---|---|---|---|
| I-1990010692 | 1/2/1990 | 8 | Highway | -- | $200 | No |
| I-1993100633 | 9/22/1993 | 8 | Highway | -- | $0 | No |
| I-1994100873 | 9/27/1994 | 6.1 | Highway | Dropped | $0 | No |
| I-1995110759 | 11/11/1995 | 2.1 | Highway | Improper Preparation for Transportation; Rollover Accident; Vehicular Crash or Accident Damage | $36,007 | Yes |
| I-1999060004 | 5/19/1999 | 8 | Highway | Over-pressurized | $0 | No |
| I-1999081914 | 8/2/1999 | 3 | Highway | Rollover Accident; Vehicular Crash or Accident Damage | $281,176 | Yes |
| I-1999081914 | 8/2/1999 | 3 | Highway | Rollover Accident; Vehicular Crash or Accident Damage | $281,176 | Yes |
| I-1999091735 | 9/3/1999 | 8 | Highway | -- | $10 | No |
| I-2000041045 | 4/7/2000 | 6.1 | Highway | -- | $5,750 | No |
| I-2000080525 | 6/13/2000 | 9 | Highway | -- | $0 | No |
| I-2003020996 | 2/10/2003 | 2.1 | Highway | Rollover Accident; Vehicular Crash or Accident Damage | $5,000 | No |

| Report Number | Date | Hazard Class | Mode of Transport/ Route | Cause of Failure | Total Damages | Serious? |
|---|---|---|---|---|---|---|
| I-2004120570 | 8/25/2004 | 8 | Highway | Impact with Sharp or Protruding Object (e.g., nails) | $5 | No |
| E-2007100196 | 9/14/2007 | 3 | Highway | -- | $4,800 | Yes |
| E-2008090053 | 8/19/2008 | 5.2 | Highway | Impact with Sharp or Protruding Object (e.g., nails) | $0 | No |
| X-2010060403 | 6/10/2010 | 9 | Rail | Derailment | 1,000 | Yes |
| X-2010060403 | 6/10/2010 | 9 | Rail | Derailment | 1,000 | Yes |
| X-2010060403 | 6/10/2010 | 3 | Rail | Derailment | 1,000 | Yes |
| X-2010060403 | 6/10/2010 | 3 | Rail | Derailment | 1,000 | Yes |
| X-2010060403 | 6/10/2010 | 9 | Rail | Derailment | 1,000 | Yes |
| E-2010110294 | 7/30/2010 | 3 | Highway | Human Error | $0 | No |
| E-2012100429 | 10/24/2012 | 3 | Highway | -- | $2,550 | No |
| E-2020050211 | 4/15/2020 | 8 | Highway | Rollover Accident | $150,000 | No |
| E-2020110639 | 11/25/2020 | 3 | Highway | -- | $0 | No |
| E-2021080590 | 7/1/2021 | 3 | Highway | -- | $1,500 | No |
| E-2021080427 | 7/16/2021 | 3 | Highway | Overfilled | $12,600 | No |

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 and Combustible Liquids) and Class 8 (Corrosives). Figure 5.48 describes all nine hazard classes.

**Figure 5.47 Hazardous Materials Classes**




Source: U.S. Department of Transportation

The following narratives highlight some of the potential damages caused by a hazardous material incident:

**November 11, 1995:** Service personnel was making a U-turn. Asme tank overturned. Service valve hit side of truck bed and opened. When serviceman attempted to stop leak, a flash fire occurred, and serviceman was burnt, and service truck was destroyed by the fire.

**April 7, 2000: S**aw blade that was tied up to the inside of the trailer came loose. Saw blade rolled and edge punctured drum, causing approximately two gallons of loss. Though a pallet was used for dunnage, the saw blade wedged between the pallet and wall. City of Easley fire and police department were on the scene to prevent any contamination. SWs environmental first response were also called to aid in the cleanup.

**June 10, 2010:** (A)GATX 31731 was involved in a multi-car mainline derailment resulting in the car coming to rest on its side. Approximately 10 gallons of material was released through the pressure relief device. Evacuation figures are from the Pickens County Emergency Management Agency. An initial evacuation included 436 residences and lasted approximately 7 hours. The evacuation was reduced to approximately 35 residences and maintained for an additional 7 hours. A secondary precautionary evacuation of about 100 residents in the immediate area was initiated during clean-up operations involving two other higher hazard materials lasting about 4 hours.

**July 16, 2021:** The Kenan Transport, LLC driver was attempting to deliver diesel fuel into the customer's storage tank. During the course of the delivery, the driver overfilled the storage tank. This allowed approximately 35 gallons of diesel fuel to be released. VLS Environmental responded to the scene and handled the remediation.

## PROBABILITY OF FUTURE OCCURRENCE

Based on historical occurrences recorded by PHMSA, there have been 25 incidents of hazardous materials release, nine of which were considered serious, in the 22-year period from 1999 through 2021. Using historical occurrences as an indication of future probability, the planning area averages 1.1 hazardous materials incidents per year, which equates to over a 100% annual chance of a hazardous materials incident. There is a 41 percent annual probability of a serious incident occurring.

***Probability: 3 – Likely***

## CLIMATE CHANGE

Climate change is not expected to have any impact on a chemical hazard spill.

## CONSEQUENCE ANALYSIS

| 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. Evacuation may be necessary. 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. Responders must have personal protective equipment and follow proper protocols for response and decontamination based on the type of material released. |
| 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. While facilities that store or produce chemicals and routes used for their transport are the highest priority, many hazardous chemicals are stored in smaller quantities in residential and commercial buildings and could cause localized harm. Transportation systems may be affected if a route is closed due to a spill. If a gas pipeline is the site/source of an incident, utility service may be interrupted for a prolonged time. |

| Category | Consequences |
|---|---|
| Environment | Consequences depend on the type of material released and the location of the event. Possible ecological impacts include loss of wildlife, loss of habitat, and degradation of air and/or water quality. Impacts from contamination may be long lasting, including destruction of crops or vegetation, contamination of habitats, displacement of animals. |
| Economic Condition of the Jurisdiction | Clean up, remediation, and/or litigation costs may apply. Long-term economic damage is unlikely. Costs associated with lost business, delayed deliveries, and property damage may also be incurred. Economic effects from major transportation corridor closures could be significant. |
| Public Confidence in the Jurisdiction's Governance | A hazardous materials incident may affect public confidence if the environmental or health impacts are enduring. Because of the dangers associated with many chemicals and the level of control that humans have over chemical incidents compared to natural hazards, public confidence could be damaged. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Hazardous materials incidents can cause injuries, hospitalizations, and even fatalities 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 to allow for detailed analysis of this risk.

### *PROPERTY*

The impact 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, but there is a chance they may be impacted.

GIS analysis was used evaluate vulnerability to chemical hazards by identifying building points in proximity to fixed sites and transportation routes. A 0.5-mile buffer area was established around fixed facilities and major transportation routes to delineate areas where immediate (primary) impacts could be felt. Building points within these buffer areas were considered exposed to chemical hazards. For fixed sites, TRI and Tier II facility locations were used. For transportation routes, U.S. highways, State highways, and rail lines were used. These areas and their surrounding buffer zones are shown in Figure 5.49. As can be seen on the map, these buffer zones cover most of Central, Clemson, Liberty, Norris, Pickens, and Six Mile, and over half of Easley.

Primary exposure to hazardous materials fixed sites is summarized by occupancy in Table 5-68. Primary exposure to transportation routes is divided into roadway exposure and rail exposure, summarized by occupancy in Table 5-69 and Table 5-70, respectively.

**Table 5.68 Exposure of Improved Property to Hazardous Materials Fixed Sites**

| Occupancy | Estimated Building Count | Estimated Total Value (Structure & Contents) |
|---|---|---|
| | 0.5-Mile Buffer | |
| Agriculture | 19 | $1,161,965 |
| Commercial | 1,021 | $508,824,578 |
| Education | 16 | $9,442,735 |
| Government | 2 | $146 |
| Industrial | 448 | $85,213,227 |
| Religious | 21 | $7,819,735 |
| Residential | 10,566 | $2,013,503,040 |
| **Total** | **12,093** | **$2,625,965,426** |

Source: GIS analysis, EPA TRI Explorer, Pickens County

**Table 5.69 Exposure of Improved Property to Hazardous Materials Road Transportation**

| Occupancy | Estimated Building Count | Estimated Total Value (Structure & Contents) |
|---|---|---|
| | 0.5-Mile Buffer | |
| Agriculture | 116 | $17,231,302 |
| Commercial | 1,549 | $1,419,780,204 |
| Education | 22 | $21,934,344 |
| Government | 11 | $7,418,830 |
| Industrial | 1,136 | $480,926,546 |
| Religious | 36 | $46,353,465 |
| Residential | 24,376 | $7,914,926,302 |
| **Total** | **27,246** | **$9,908,570,993** |

Source: GIS analysis, EPA TRI Explorer, Pickens County

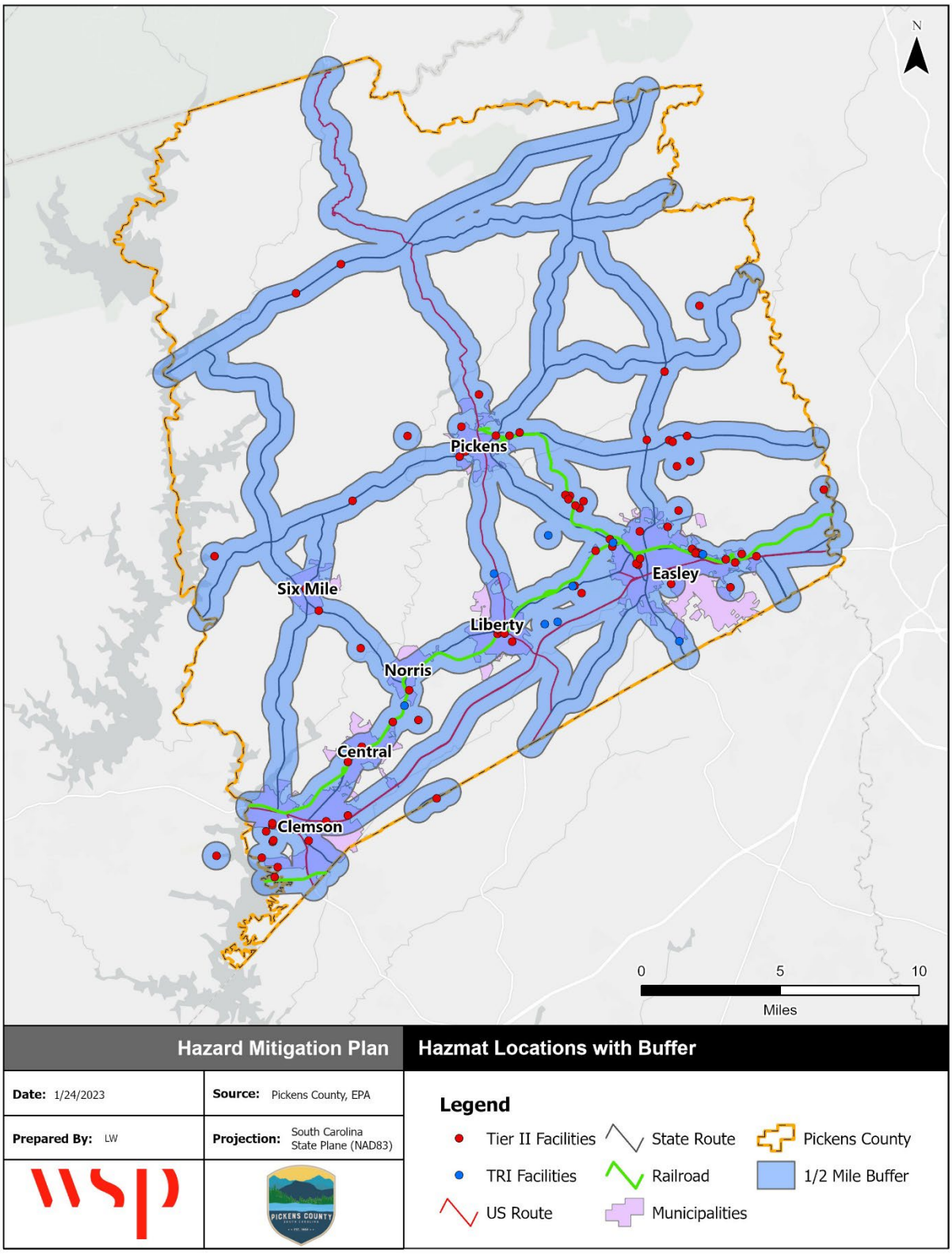
**Table 5.70 Exposure of Improved Property to Hazardous Materials Rail Transportation**

| Occupancy | Estimated Building Count | Estimated Total Value (Structure & Contents) |
|---|---|---|
| | 0.5-Mile Buffer | |
| Agriculture | 18 | $1,156,000 |
| Commercial | 947 | $968,972,929 |
| Education | 15 | $18,956,210 |
| Government | 1 | $0 |
| Industrial | 463 | $172,870,051 |
| Religious | 21 | $23,149,133 |
| Residential | 9,711 | $2,916,667,529 |
| **Total** | **11,176** | **$4,101,771,852** |

Source: GIS analysis, EPA TRI Explorer, Pickens County

Countywide, there are 46,443 buildings valued at approximately $17.5 billion. About 26 percent of buildings in the property inventory (15 percent of value) is exposed to fixed facility hazardous materials impacts, 59 percent of buildings (and 57 percent of value) are exposed to road-related impacts, and 24 percent of buildings (23 percent of value) are exposed to rail-related impacts.

**Figure 5.48 Hazardous Materials Fixed Sites and Buffer Zones**



*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 hazards contaminate the groundwater and eventually the municipal water supply, or they migrate to a major waterway or aquifer. Impacts on wildlife and natural resources can also be significant.

## CHANGES IN DEVELOPMENT

While hazardous material sites are occasionally located near incompatible uses such as residential development, increases in risk can be mitigated through land use planning and zoning practices to direct the development of future hazardous materials facilities away from existing residential uses and discourage new residential development near existing hazardous materials sites and transport routes.

## KEY ISSUES

- Hazardous materials incidents are highly likely to occur. Serious impacts—including injury or fatality, bulk release, evacuations, or road closures—are likely.
- Major highways pass through all participating jurisdictions. The presence of these major thoroughfares raises the likelihood of a transportation based hazardous materials incident, including spills or rollover accidents like those that have happened in the planning area in the past. Approximately 80% of past transportation related spills in the planning area have occurred on highways and 20% have occurred on rail.

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes hazardous materials incident risk by jurisdiction. Given the presence of major transportation routes through all jurisdictions, risk is does not vary considerably throughout the planning area.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 3 | 3 | 2 | 4 | 2 | 2.8 | M |
| Clemson | 3 | 3 | 2 | 4 | 2 | 2.8 | M |
| Easley | 3 | 3 | 2 | 4 | 2 | 2.8 | M |
| Liberty | 3 | 3 | 2 | 4 | 2 | 2.8 | M |
| Norris | 3 | 3 | 2 | 4 | 2 | 2.8 | M |
| Pickens | 3 | 3 | 2 | 4 | 2 | 2.8 | M |
| Six Mile | 3 | 3 | 2 | 4 | 2 | 2.8 | M |
| Unincorporated Pickens County | 3 | 3 | 2 | 4 | 2 | 2.8 | M |

# 5.17 PUBLIC HEALTH THREAT

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Public Health Threat | Possible | Critical | Large | More than 24 hrs | More than 1 week | 2.8 |

## HAZARD DESCRIPTION

Public health threats can take many forms—disease epidemics, large-scale incidents of food or water contamination, or extended periods without adequate water and sewer services.

As defined by the Mayo Clinic, infectious diseases are "disorders caused by organisms — such as bacteria, viruses, fungi or parasites… Some infectious diseases can be passed from person to person. Some are transmitted by insects or other animals. And you may get others by consuming contaminated food or water or being exposed to organisms in the environment." The impacts of infectious disease can range from the mild effects of the common cold to the extreme lethality of the pneumonic plague.

The public health system in the United States was developed in large part as a response to the often urgent need to respond to or prevent outbreaks of infectious disease. prevent outbreaks of communicable diseases. Through public health methods of disease reporting, vaccinations, vector control, and effective treatments, most communicable diseases are well controlled in the United States and Pickens County. However, control systems can fail and when people come together from locations outside of the county, state, and the country, outbreaks can occur.

The following provides a summary description of some of the more significant potential infectious diseases of public health concern in the United States:

**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.

**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. 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 November 2022, there had been over 98 million cases of COVID-19 reported in the United States. 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.

**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 2021, the CDC reported 7,882 new tuberculosis cases in the United States.

**St. Louis Encephalitis** – In the United States, the leading type of epidemic flaviviral Encephalitis is St. Louis encephalitis (SLE), which is transmitted by mosquitoes that become infected by feeding on birds infected with the virus. SLE is the most common mosquito-transmitted pathogen in the United States. 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. Environmental issues addressed in this profile focus on air and water pollution because contamination of those media can have widespread impacts on public health and devastating consequences. Particular issues of primary concern associated with sources of air and water pollution change over time depending on recent industrial activity, economic development, enforcement of environmental regulations, new scientific information on adverse health effects of particular contaminants or concentrations, and other factors. 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.

**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.

**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.

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.

**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 and public health emergencies can occur anywhere in the planning area, especially, in the case of diseases transmitted from person-to-person, 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 or coronavirus pandemic or other major disease outbreak can lead to high levels of illness, death, social disruption, and economic loss. As was seen during the COVID-19 pandemic, impacts can 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.

Table 5-71 describes the World Health Organization's six main phases to a pandemic flu as part of their planning guidance.

***Impact: 3 – Critical***

**Table 5.71 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

### *INFLUENZA AND CORONAVIRUS PANDEMICS*

Since the early 1900s, five lethal pandemics have swept the globe: Spanish Flu of 1918-1919; Asian Flu of 1957-1958; Hong Kong Flu of 1968-1969; Swine Flu of 2009-2010; and the ongoing COVID-19 pandemic. 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. As of November 2022, the COVID-19 virus has caused 1,075,779 deaths in the U.S. These historic pandemics are further defined in the following paragraphs along with several "pandemic scares".

**Spanish Flu (H1N1 virus) of 1918-1919**

Beginning in March 1918, when World War I was in its fourth year, the Spanish Flu swept the world in three waves during a two-year period, rivalling the war itself as the greatest killer in human history.

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 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 from 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.

**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, 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-ongoing**

During the update of this plan, COVID-19 has been an ongoing pandemic. 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.

As of November 30, 2022, according to the WHO Coronavirus Dashboard, there were over 639.1 million cases worldwide resulting in over 6.6 million deaths. The United States has accounted for over 98.4 million cases and an estimated 1,075,779 deaths. In Pickens County, there have been 39,586 cases and 658 deaths due to COVID-19.

### *OTHER INFECTIOUS DISEASE OUTBREAKS*

**Meningitis, 1996-1997**

During 1996 and 1997, 213,658 cases of meningitis were reported, with 21,830 deaths, in Africa. In October 2015 there was a multi-state outbreak of fungal meningitis linked to tainted steroid injections which resulted in three cases in South Carolina.

**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 2015, 95-percent of confirmed Lyme Disease cases were reported from 14 states: Connecticut, Delaware, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and Wisconsin. Lyme disease is the most commonly reported vector-borne illness in the United States. In 2015, it was the sixth most common nationally notifiable disease. However, this disease does not occur nationwide and is concentrated heavily in the northeast and upper Midwest.

**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.

**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 in 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; however, none were reported to be acquired through presumed local mosquito-borne transmission.

**Ebola, 2014-2016**

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 died 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 a pandemic will occur or what its impact will be. 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 a virus could 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.

Given the record of past events with known or possible impacts in Pickens County or across the State of South Carolina, the probability of future occurrences is considered possible (between 1 and 10 percent annual chance).

***Probability: 2 – Possible***

## CLIMATE CHANGE

According to the U.S. Global Change Research Program, the influences of climate change on infectious disease include the threats of temperature extremes and precipitation changes and their connections to insects. Climate and weather can also affect water and food quality in particular areas, with implications for public health.

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. Ticks are also well-known disease vectors, carrying pathogens such as Lyme disease, anaplasmosis, Ehrlichiosis, Powassan virus, and Babesiosis.

The two major concerns associated with warmer and wetter conditions are that the mosquito species already present 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 the region if the climate becomes more suitable for them, bringing with them diseases such as Jamestown Canyon virus, Chikungunya, and Dengue Fever.

If these predictions come true, communities must contend with the human health impacts related to the increased prevalence of infectious diseases. Public health officials will need to focus on spreading information and enacting pest and disease reduction.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | Exposure to emerging diseases will vary based on the type of threat and its potential transmission routes. Vaccinations are the best means of preventing transmission and infection. Public health information will be disseminated via the media to provide other preventive measures to limit or avoid exposure. |
| Responders | Responders can expect an increase in workload and should practice a higher level of precaution toward exposure. |
| Continuity of Operations (including Continued Delivery of Services) | Continuity of operations may be impacted if individuals in key roles are unable to perform their normal duties. Plans are in place to coordinate response and maintain operations, but a large-scale event could still interrupt normal operations. |
| Property, Facilities and Infrastructure | No direct impacts are expected to the built environment. Hospitals and emergency services would likely see increased demand. |
| Environment | Impacts will depend on the particular disease vector and whether the disease is transmittable to animal or plant life, or if it can be distributed through the water or food supply. |
| Economic Condition of the Jurisdiction | Local economy and finances may be adversely affected, possibly for an extended period of time, especially if shutdowns are required directly by the government or indirectly as a result of employee absence. Large scale events may need to be cancelled if an outbreak is large enough or has the potential to spread quickly and easily. |
| Public Confidence in the Jurisdiction's Governance | Public confidence in government and nongovernmental organizations may be impacted. The level of confidence the public possesses is based upon societal expectations, media influence, and past experience following other outbreaks. An effective response to the outbreak can help to guide public confidence toward a favorable level. Collaboration with media outlets can also assist in keeping the public informed and helping to protect them from exposure. |

## VULNERABILITY ASSESSMENT

### *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 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. The recent COVID-19 pandemic also posed greater risk to 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 an infectious 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.

## CHANGES IN DEVELOPMENT

No changes in development are expected that would significantly affect the incidence of pandemic.

## KEY ISSUES

- Infectious disease response may require substantial coordination across jurisdictions and levels of government.
- Vaccination is considered the best method to prevent disease and/or protect against infection. Large-scale vaccination efforts will require public education and awareness campaigns in addition to significant coordination to acquire and administer vaccines.

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes pandemic risk by jurisdiction. Pandemic hazard risk does not vary substantially by jurisdiction.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 2 | 3 | 4 | 1 | 4 | 2.8 | M |
| Clemson | 2 | 3 | 4 | 1 | 4 | 2.8 | M |

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Easley | 2 | 3 | 4 | 1 | 4 | 2.8 | M |
| Liberty | 2 | 3 | 4 | 1 | 4 | 2.8 | M |
| Norris | 2 | 3 | 4 | 1 | 4 | 2.8 | M |
| Pickens | 2 | 3 | 4 | 1 | 4 | 2.8 | M |
| Six Mile | 2 | 3 | 4 | 1 | 4 | 2.8 | M |
| Unincorporated Pickens County | 2 | 3 | 4 | 1 | 4 | 2.8 | M |

# 5.18 RADIOLOGICAL INCIDENT

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Radiological Incident | Unlikely | Critical | Moderate | Less than 6 hrs | More than 1 week | 2.6 |

## HAZARD BACKGROUND

A nuclear or radiological incident is an occurrence resulting in the release of radiological material. Often, this type of incident results from damage to the reactor of a nuclear power plant, but other places such as university and medical laboratories and medical treatment facilities also contain radio nuclides. In addition, the U.S. Department of Energy occasionally transports radioactive material through the United States on railways or over roads. Any of these sources has the potential to become a radiological hazard. The release could affect the natural environment as well as the health and safety of anyone in its path.

Radiological emergencies at nuclear power plants are divided into classifications. Table 5-72 shows these classifications, as well as descriptions of each.

**Table 5.72 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. |

Source: U.S. Nuclear Regulatory Commission

Nuclear power plants produce approximately 20% of the electrical power in the United States. Each facility is closely regulated and monitored, but the potential for accidents or acts of terrorism still exist. Nuclear incidents are a rare occurrence. Many incidents are well known due to their large-scale impacts and serious effects on people and the environment, but these incidents are not common. Nuclear incidents can occur with very little warning. If radiation does leave a nuclear power plant site, the impacts may last years.

***Warning Time: 4 – Less than 6 hours***

***Duration: 4 – More than one week***

## LOCATION

There are no nuclear power facilities within Pickens County, however, the Oconee Nuclear Station is located on the western side of Lake Keowee in Oconee County, just outside of the Pickens County border. Figure 5-49 shows the 10-mile radius buffer around this station. In addition to this nuclear station, there are two radiological waste generators within Pickens County.

Electric utilities, and local, state, and federal governments have emergency response plans in case there were to be a radiological incident. These plans use two "emergency planning zones", one within a 10-mile radius of the nuclear power plant, the other usually within a 50-mile radius. Within the first zone, it is possible that people will become ill or develop diseases from direct radiation exposure. The second zone defines the limit of where radioactive materials could contaminate water, food crops, or livestock.

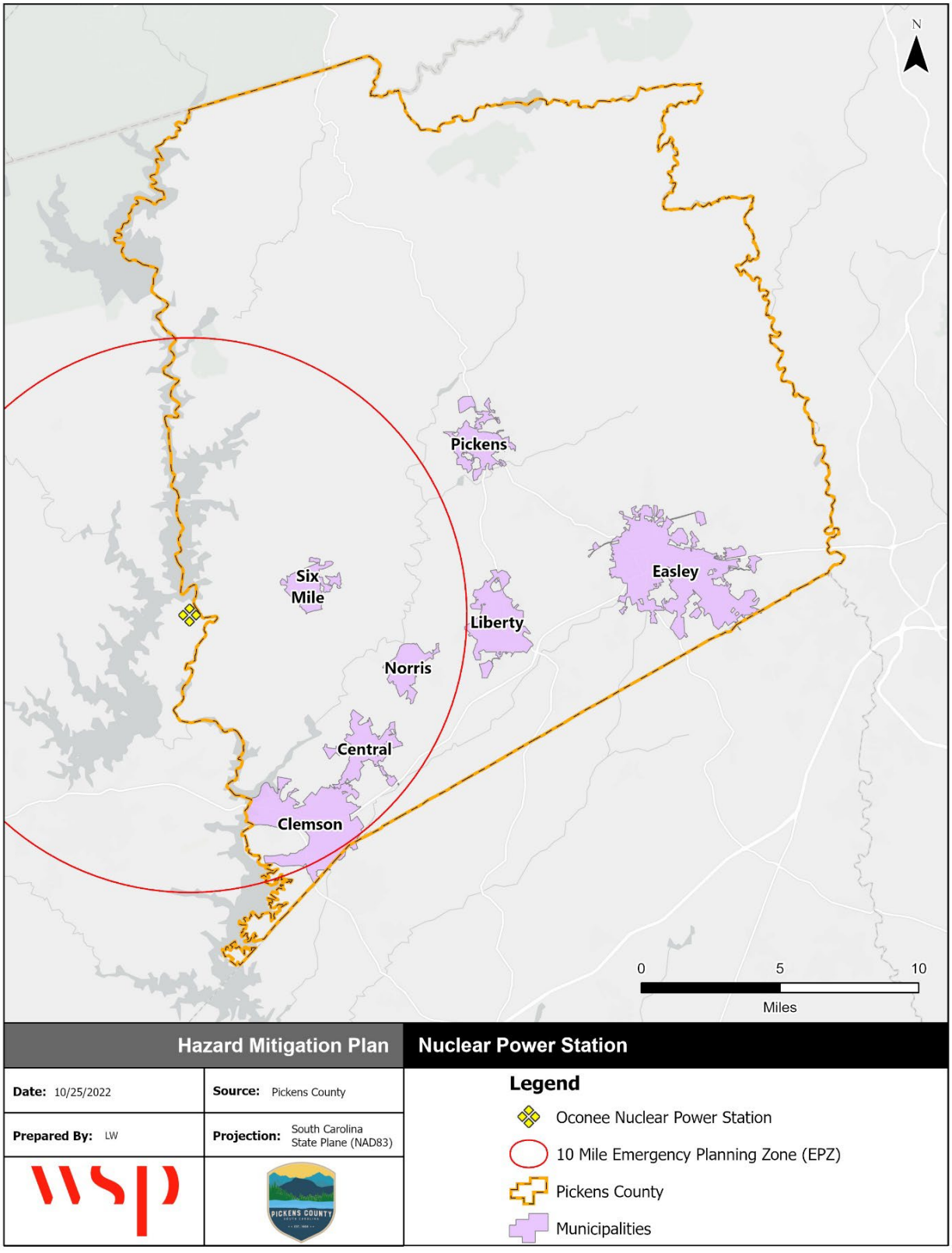
The Nuclear Regulatory Commission defines two emergency planning zones around nuclear plants:

- **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 at highest risk of exposure to or inhalation of 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. This is the designated evacuation radius recommended by the Nuclear Regulatory Commission and residents within this zone would be expected to evacuate in the event of an emergency. Other actions, such as sheltering 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 chain 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 5-49 shows the location of Oconee Nuclear Station with the EPZ. Six Mile, Norris, Clemson, and Central are all within the EPZ. All of Pickens County is within the plant's IPZ. However, the southwestern portion of the county is located within the EPZ and is at highest risk to a nuclear incident.

***Spatial Extent: 3 – Moderate***

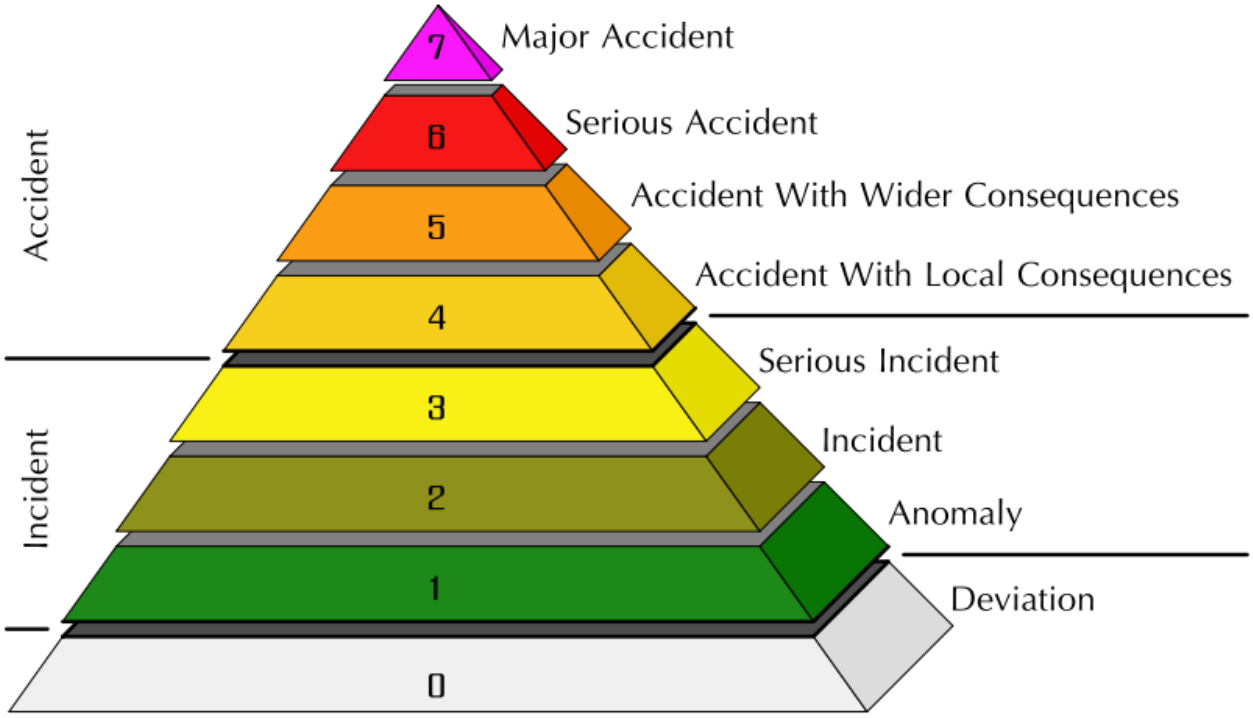
**Figure 5.49 Oconee Nuclear Station in Relation to Planning Area**




Source: U.S. Nuclear Regulatory Commission

## 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.




Source: International Atomic Energy Association

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

Though there have been incidences of nuclear reactor failures around the country, particularly at nuclear power plants, there have been no such occurrences at Oconee Nuclear Station. There have been several smaller scale notifiable events, as summarized in Table 5-73.

**Table 5.73 Notifiable Events at Oconee Nuclear Station, 1980-2020**

| Date | Retrieved From | Classification | Plant | Description |
|---|---|---|---|---|
| 2/16/1980 | Licensee Event Report | N/A | Oconee Unit 1 | High pressure service water pump inoperable |
| 12/28/1997 | Licensee Event Report | Site Area Emergency | Oconee Unit 1 | Steam generator leak results in technical specification unit shutdown due to inadequate process control |
| 1/27/1998 | Licensee Event Report | Site Area Emergency | Oconee Unit 1 | Non-Isolable weld leak on pressurizer surge line drain pipe causes shutdown |
| 12/19/2000 | Licensee Event Report | N/A | Oconee 2, Oconee 3 | TS 3.0.3 Shutdown Initiated Due to Control Room Cooling Chillers |
| 9/2/2005 | Preliminary Notification Report | Notification of Unusual Event | Oconee Unit 3 | Reactor trip with Emergency Core Cooling System (ECCS) initiation |

| Date | Retrieved From | Classification | Plant | Description |
|---|---|---|---|---|
| 10/2/2013 | Preliminary Notification Report | Notification of Unusual Event | Oconee Unit 1 | Shutdown due to Reactor Coolant System (Rcs) pressure boundary leakage |
| 11/12/2013 | Preliminary Notification Report | Notification of Unusual Event | Oconee Unit 1 | Shutdown due to Reactor Coolant System (Rcs) pressure boundary leakage |
| 1/8/2011 | Licensee Event Report | N/A | Oconee Unit 1 | Inoperable emergency feedwater flowpath results in a condition prohibited by the technical specifications |
| 3/8/2016 | Preliminary Notification Report | Notification of Unusual Event | Oconee Unit 1 | Shutdown greater than 48 hours due to fire/explosion in the main transformer |
| 10/19/2018 | Licensee Event Report | N/A | Oconee Unit 1 | Loss of Condenser Vacuum Results in a Main Turbine Trip and a Manual Reactor Trip |
| 7/24/2019 | Licensee Event Report | N/A | Oconee Unit 1 | Unit 1 core flooding System loss of safety function |

Source: U.S. Nuclear Regulatory Commission
Note: Preliminary Notification Reports (http://www.nrc.gov/reading-rm/doc-collections/event-status/prelim-notice/): These are brief descriptions, generated by NRC regions when needed, of matters that are of significant safety or safeguards concern or have high public interest. PNs are used to promptly inform the Commissioners and others in NRC and Agreement States with new and current information.
Licensee Event Reports (https://lersearch.inl.gov/Entry.aspx): Commercial nuclear reactor licensees are required to report certain event information per 10 CFR 50.73.

## PROBABILITY OF FUTURE OCCURRENCE

Radiological hazards are highly unpredictable. Nuclear reactors present the possibility of catastrophic damages, yet the operation of nuclear power plants is highly regulated and historical precedence suggests an incident is unlikely.

***Probability: 1 – Unlikely***

## CLIMATE CHANGE

Climate change is not expected to have any impact on a potential nuclear power plant incident.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | High levels of radiation could cause serious illness or death. Those living and working closest to the nuclear plant would face the greatest risk of exposure to radiation, which can cause acute and chronic health risks. Most of the public would be at risk through ingestion of contaminated crops, livestock, water, and other products which can cause internal contamination if ionizing radiation is released in the body. |
| Responders | Responders face potential for heightened exposure to radiation, which could cause severe chronic illness and death. Responders will need to operate in personal protective equipment and limit their outdoor exposure. Proper decontamination would be necessary. |

| Category | Consequences |
|---|---|
| Continuity of Operations (including Continued Delivery of Services) | An incident at the nuclear plant could interrupt power generation and cause power shortages. However, regular operations would not likely be affected. |
| Property, Facilities and Infrastructure | The plant itself could be damaged by a radiological incident. Nearby property and facilities could be affected by contamination. Buildings and infrastructure in the IPZ would not likely be affected. Checkpoints may be set up on highways and airports to monitor contamination. |
| Environment | Water supplies, food crops, and livestock within 50 miles of the nuclear plant could be contaminated by radioactive material in the event of a major incident. |
| Economic Condition of the Jurisdiction | The local economy could be affected if a radiological incident caused contamination of nearby areas. Property values and economic activity could decline as a result. EPZ areas could be evacuated and locked down. Travel and visitation within the IPZ may be limited to prevent spread of contamination. |
| 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. The public will be extremely concerned about their health and safety. Public confidence can also be affected by false alarms. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

People within the 10-mile EPZ are at risk of direct exposure to radioactive material. People within the 50-mile EPZ are at risk of exposure through ingestion of contaminated food and water. Low levels of radiation are not considered harmful, but a high exposure to radiation can cause serious illness or death.

People within the 50-mile IPZ are at risk of exposure through ingestion of contaminated food and water. 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 nuclear plant itself but would not cause direct property damage outside the station, especially with the distance between the reactor and the planning area. 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. These impacts are lessened the further an area is from the plant site.

## CHANGES IN DEVELOPMENT

Increased development will not increase the detrimental impacts of a radiological impact. However, increased development in close proximity to radiological sites will increase exposure in the event of an incident.

## KEY ISSUES

- Southwestern Pickens County is within the 10-mile radius of Oconee Nuclear Station. In the event of an incident, the population in this area would be most at risk. The entire planning area is within a 50-mile radius of the power plant – impacting food and water supplies.

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes nuclear power plant incident risk by jurisdiction. Impact will vary based on distance from the power plant, with impacts most severe in the EPZ and lessening with distance in the IPZ. Catastrophic impacts could occur within the EPZ.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 1 | 4 | 3 | 4 | 4 | 2.9 | M |
| Clemson | 1 | 4 | 3 | 4 | 4 | 2.9 | M |
| Easley | 1 | 3 | 3 | 4 | 4 | 2.6 | M |
| Liberty | 1 | 3 | 3 | 4 | 4 | 2.6 | M |
| Norris | 1 | 4 | 3 | 4 | 4 | 2.9 | M |
| Pickens | 1 | 3 | 3 | 4 | 4 | 2.6 | M |
| Six Mile | 1 | 4 | 3 | 4 | 4 | 2.9 | M |
| Unincorporated Pickens County | 1 | 4 | 3 | 4 | 4 | 2.9 | M |

# 5.19 URBAN FIRE

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Urban Fire | Highly Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 3.0 |

## HAZARD BACKGROUND

Urban fires primarily occur in cities and towns as opposed to wildfires which typically occur in open spaces. Urban fires may be vehicular fires, such as in aircraft, recreational vehicles, or motor vehicles, or they can be structural fires, and take place in a single-family dwelling, mobile home, apartment, duplex, business, church, motel, hotel, or a shed.

The South Carolina Office of State Fire Marshal lists several common causes of urban fires. Hazards within and near homes are frequent causes of fires. These hazards can include the burning of trash, candles, children playing with matches or lighters, smoking, heating systems, electrical systems, Christmas trees, fireplace inserts, and cooking. Industrial accidents, lightning, earthquakes, and other natural hazards may cause urban fires. Fires can also be lit intentionally as acts of arson, murder, or suicide.

During the 1980s South Carolina was one of the states with the most fire related fatalities in the United States. To decrease the high number of fatalities, a statewide public education campaign was launched. Fire-related deaths has decreased since the campaign was enacted. As of November 2022, 75 fires in South Carolina have resulted in fatalities and 84 people have died. In 2022 the most common cause of fire incidents was electrical, heating, smoking, cooking, vehicle crashes, and incendiary fires.

The South Carolina State Fire Incident Reporting System (FIRS) is used to collect information submitted by local fire departments regarding emergency responses. This information is then analyzed and used to determine characteristics of fire problem areas. Reporting to FIRS is required by South Carolina Code of Regulations 71-8300.5. providing data to the State and the US Fire Administration (USFA) allows fire departments to apply for and receive grant funding, improve budget and resource allocations, recruit and retain fire service personnel, and create assessments to reduce risks in their communities. As of 2020 reporting, 12 fire departments in Pickens County submitted reports: Dacusville, Norris Fire Department, Pumpkintown, Six Mile Town, Vineyards, Clemson University, Easley, Liberty, Pickens City, Crosswell, Shady Grove, and Pickens.

***Warning Time: 4 – Less than 6 hours***

***Duration: 1 – Less than 6 hours***

## LOCATION

An urban fire could occur anywhere where a vehicle or structure can ignite. As defined by the National Fire Protection Agency (NFPA), a structure fire is defined as "any fire inside, on, under, or touching a structure." This definition includes any mobile property used as a fixed structure, such as manufactured homes and portable buildings.

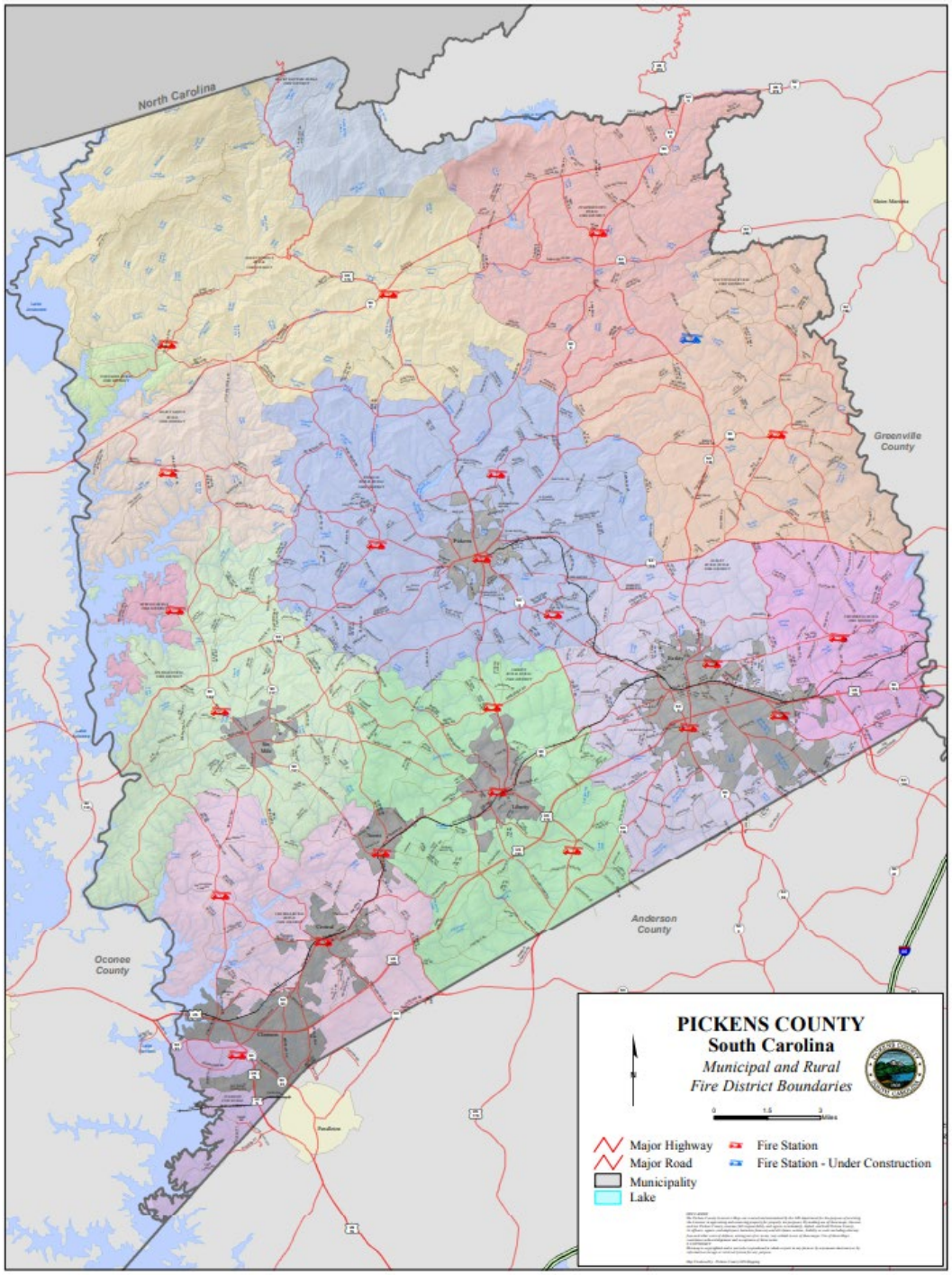
Urban and rural communities face some distinct challenges. Urban communities tend to have diverse demographics that include more vulnerable populations like older adults, people with disabilities, and people living in poverty. City fire departments may also have challenges with limited resources stretched across a variety of activities like addressing crime. Additionally, intentional fire rates and arson fire rates tend to be the highest in cities. In rural communities, the distance between communities and between residents within those communities present additional challenges. The National Fire Protection Association also reports that fire death rates in rural areas are very high. Heating is a common cause of residential structure fires and death in rural areas. Fixed heaters like wood stoves, are involved in most rural residential

fires. Additionally, damaged electrical equipment is often the source of fire in barns and other farm buildings.

Pickens County is divided into designated Fire Districts. Figure 5-50 below shows a map of the County's fire district boundaries, major roads and highways, and fire stations.

***Spatial Extent: 2 – Small***

**Figure 5.50 Pickens County Fire Districts**




Source: Pickens County Fire Department

## EXTENT

Urban fires can impact a single structure or spread to adjacent or nearby entities. Fires can be isolated incidents with no injuries and minimal property damage or cause fatalities and ruin property and infrastructure. Each urban fire has the potential to cause serious injury or death and may cause damage costing several thousand to a few million dollars. A variety of factors will determine the extent of damage to the individual structure. Damage can range from minor to substantial with damages far exceeding the value of the structure. Factors include:

- Structure type and age
- Building codes addressing fire prevention, detection, and extinguishments
- Density of development
- Presence of flammable substances
- Fire department response speed
- Firefighting technology
- Training of local fire management officials and fire fighters
- Public information about common fire hazards and use of smoke alarms
- Notification techniques and procedures
- Water pressure and availability

***Impact: 3 – Critical***

## HISTORICAL OCCURRENCES

The South Carolina State Fire Department produces annual reports that summarize fire statistics for the state. Table 5-74 below provides urban fire statistics for Pickens County from the 2018, 2019, and 2020 (most recent report) State Fire Department's annual reports. The annual reports also present any fires with fire losses greater than $1 million, both property and content combined. Between 2018 and 2020 Pickens has had two fires with losses greater than a million dollars. On March 20th Easley fire department responded to a fire for a property classified as "motor vehicle or boat sales, services, repair" and resulted in $1.5 million in losses. Another fire incident with large property loss occurred on July 22, 2020 – Liberty fire department responded to a fire for a "1 to 2 family dwelling" which resulted in $1 million in losses.

**Table 5.74 Urban Fire Incidents in Pickens County, 2018 – 2020**

| | Structure Fires | Vehicle Fires | Other Fires | Total Fires | Civilian Fire Injuries/Deaths | Property Losses* |
|---|---|---|---|---|---|---|
| 2018 | 206 | 91 | 207 | 504 | 1/2 | -- |
| 2019 | 191 | 76 | 219 | 486 | 2/1 | -- |
| 2020 | 162 | 84 | 118 | 364 | 2/0 | $3,925,173 |
| **Total** | **559** | **251** | **544** | **1,354** | **5/3** | **$3,925,173** |

Source: South Carolina Fire State Annual Data Report, 2018,2019, 2020
*No property lost data available for 2018 or 2019

South Carolina FIRS provides access to a public data dashboard that summarizes fire incidents entered into the National FIRS database. Table 5-75 provides information for reporting jurisdictions in Pickens County for 2022 (updated June 2022).

Based on SCFIRS reporting, 211 fires have occurred in Pickens County in 2022 which have resulted in over $1.59 million in losses. In 2021 there were three fatalities in Pickens County, an 89-year-old male died in an RV or other residential vehicle due to an electrical cause; a 51- year-old male died in a single-family dwelling due to a heating issue; and 58-year-old women died in a mobile home due to and incendiary cause. As of November 2022, there has been one fatal fire in Pickens County in 2022. A 60-year-old man died in an apartment, however, the cause is still under investigation.

**Table 5.75 Urban Fire FIRS Reporting Statistics for Pickens County, 2022**

| Jurisdiction | Number of Fires | Total Fire Loss | Total Property Saved |
|---|---|---|---|
| Central Volunteer | 6 | $100 | $174,900 |
| Easley | 16 | $14,000 | $184,000 |
| Liberty | 3 | $0 | $0 |
| Norris Fire Department | 4 | $0 | $0 |
| Pickens | 50 | $0 | $0 |
| Pickens City | 27 | $1,000 | $157,250 |
| Clemson University | 5 | $270,950 | $9,487,510 |
| Liberty | 26 | $66,500 | $72,500 |
| Dacusville | 32 | $1,243,700 | $1,219,100 |
| Holly Springs | 4 | $0 | $0 |
| Keowee Springs | 21 | $0 | $0 |
| Pumpkintown | 7 | $0 | $0 |
| Shady Grove | 9 | $0 | $0 |
| Vineyards | 1 | $0 | $0 |
| **Total** | **211** | **$1,596,250** | **$11,295,260** |

Source: South Carolina FIRS Public Data Dashboard, last updated June 2022

## PROBABILITY OF FUTURE OCCURRENCE

Between 2018 and 2022, Pickens County has reported 1,565 urban fires, 211 of which have occurred just in 2022. This number is likely higher as data for 2021 has not been provided. Based on this data, the average number of fires over four years is over 391 per year. Urban fires are a common occurrence in Pickens County and based on the data it very likely they will occur in the future. Large costly fires and fatal fires are less likely to occur, however, both types of events have occurred in the past five years.

***Probability: 4 – Highly Likely***

## CLIMATE CHANGE

Urban fires are less dependent on climate and weather conditions that wildfires, however periods of drought and dry conditions can influence the spread of structural or vehicle fires. Similarly, droughts could impact the amount of water available to fight fires (although proper planning should ensure sufficient water allocation for such emergencies). Additionally, warmer, drier climate could increase the frequency of wildfires which would limit the resources available to respond to urban fires.

## CONSEQUENCE ANALYSIS

| Category | Consequences |
|---|---|
| Public | People can be injured and killed in urban fires. Smoke and air pollution can cause serious health problems, including asthma attacks and pneumonia, and can worsen chronic heart and lung diseases. Vulnerable populations include children, the elderly, and people with respiratory and cardiovascular problems. Even healthy citizens may experience symptoms such as sore throats and itchy eyes. Damage or loss of property and other assets can be costly and cause extreme stress. |
| Responders | Urban fires are a significant threat to the health and safety of the emergency services, both while fighting the fire and from aftereffects from smoke inhalation and heat stroke. Fires may impede ability to respond if roads or structures are damaged. |
| Continuity of Operations (including | Urban fire events can result in a loss of power, and damage to other facilities in the community which may impact operations. Downed trees, power lines and |

| Category | Consequences |
|---|---|
| Continued Delivery of Services) | damaged road conditions may prevent access to critical facilities and/or emergency equipment. |
| Property, Facilities and Infrastructure | Damage to buildings and facilities, is possible. Infrastructure, including roadways, communication networks and facilities, power lines, utilities, and water distribution systems, may also be damaged. New homes constructed without considering community wildland fire planning can create neighborhoods with limited accessibility and flammable buildings and landscaping. |
| Environment | Urban fires can release debris and cause pollution around the incident location. Chemicals released in the fire and used to put out the fire may impact localized air quality or pollute local waterways. |
| Economic Condition of the Jurisdiction | Economic consequences related to this hazard include result in lost wages due to temporarily or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property. |
| Public Confidence in the Jurisdiction's Governance | If public property like schools or other frequented community facilities are the source of the fire, public confidence may be impacted and building integrity may be questioned. |

## VULNERABILITY ASSESSMENT

### *PEOPLE*

Any person could be impacted by urban fire in Pickens County. In the past five years the County has experienced over five injuries and seven deaths due to urban fires. In addition to health and safety people can be impacted by loss of property, wages, and personal assets from such events.

The Fire Safe South Carolina Community Risk Reduction Program (Fire Safe SC) developed a risk assessment tool to determine the risk level for each fire district. Based on the Fire Safe SC risk assessment, the likelihood of dying in a fire event is associated with three broad factors: housing characteristics, socioeconomic issues, and human factors. A description of these vulnerability factors is listed in Table 5-76.

Using statewide census tract data, the Fire Safe SC department gathered data for various categories (listed in Table 5-76) for each vulnerability dimension. The upper, middle, and lower thirds of the data in each category were identified and assigned a score (3 = upper, 2 = middle, 1 = lower). Then, scores from each category by census tract were added to show an overall dimension score. Once calculated, ArcGIS was used to combine census tracts within the fire district boundaries to create a risk map. The fire districts in Pickens County are displayed in the risk map in Figure 5-51 and overall risk scores for each fire district are listed in Table 5-77. High risk areas are shown in red, medium risk in yellow, and low risk in green.

**Table 5.76 Urban Fire Risk and Vulnerability Factors**

| Housing Risk Factors | Socioeconomic Risk Factors | Human Factor Risk |
|---|---|---|
| **Rural** – more likely to be further away from resources. | **Poverty** - Individuals under the federal poverty line, (approx. $12,800 for one person, $26,800 for a family of four) not able to protect their homes with resources. | **Disability**- Those with a disability, including mobility, visual, auditory, and cognitive, may be unable to respond to a fire. |

| Housing Risk Factors | Socioeconomic Risk Factors | Human Factor Risk |
|---|---|---|
| **Mobile homes** - more likely to have a fatality than other kinds of structures in our state. | **Unemployment** - Individuals are more likely to not have steady employment, and thus, no income | **Persons over 65** - These persons are more likely to be retired, have limited income, and prone to medical conditions that impair their ability to respond to a fire. |
| **Living alone** - victims killed in fires are more likely to be alone when a fire happens. | **Undereducated population** - Adults more likely to not have completed high school and may not understand traditional safety messaging. | **Persons over 75**- These persons are more prone to medical conditions that impair their ability to respond to a fire. |
| **No proper heat source** – Homes without a proper heating source (electricity, propane, etc.) are more likely to have a fire. | **Low income** - Families are more likely to have lower income and be unable to protect their homes with resources. | **Smoking** - Individuals who smoke are more likely to be involved in a fire started by unattended smoking materials. |
| **Homes more than 10 years old** – at risk for not having working smoke alarms | **Inequality** - There is a gap between those who have wealth and resources and those who do not. | **Binge drinking** - Individuals who consume significant amounts of alcohol may be unable to respond to a fire. |

Source: Fire Safe South Carolina Risk Assessment and Data Tool

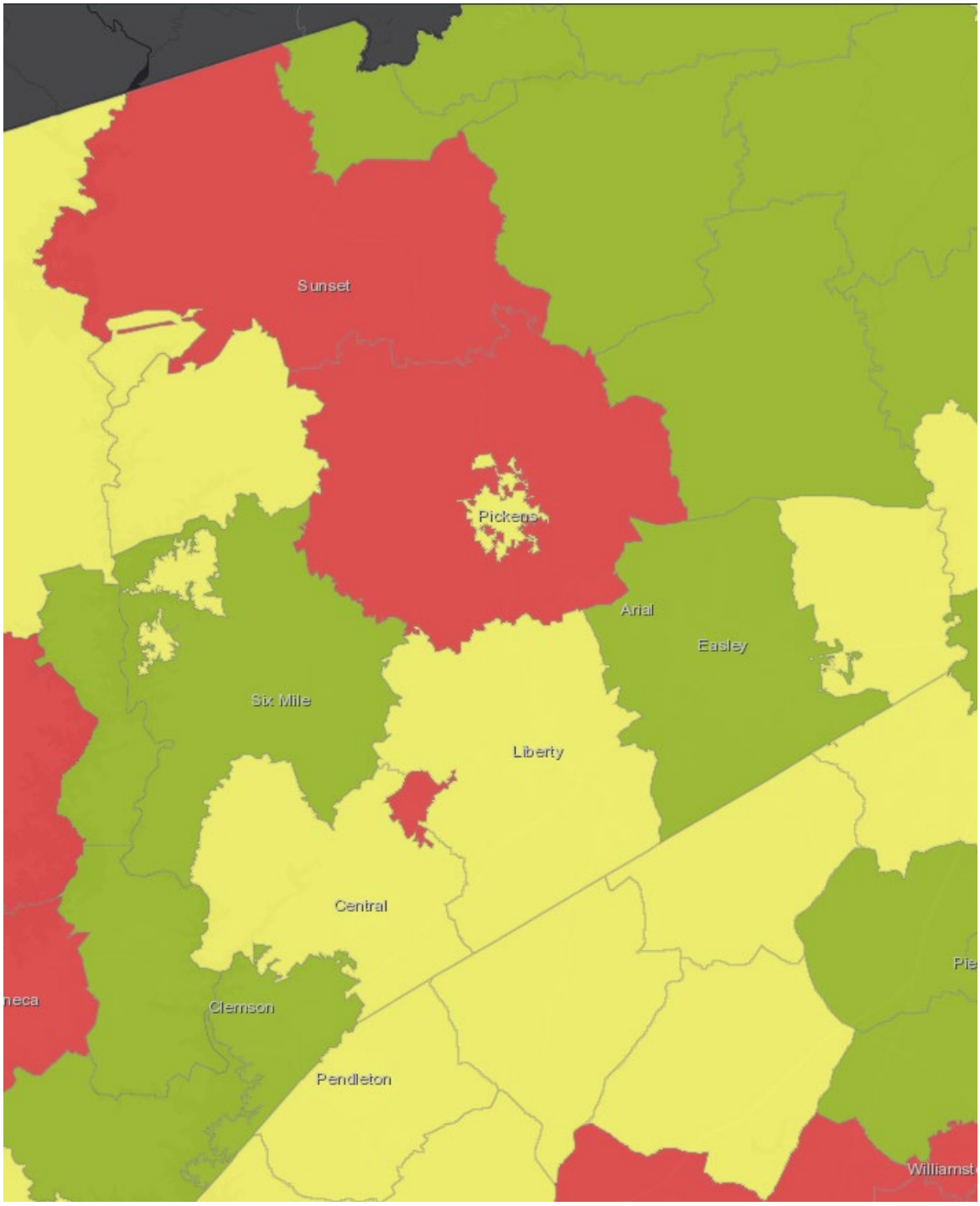
Fire districts with highest overall risk in Pickens County include Norris Fire Department, Pickens, and Holly Springs. Based on the vulnerability breakdown in Table 5-77, these three districts tend to have higher housing vulnerability and human factor vulnerability. Housing vulnerability for these three districts includes higher rates of mobile homes, people living alone, older homes, and homes without a proper heating source. Human factor vulnerability for these districts includes a larger population of older adults over the age of 65, people living with a disability, and higher rates of binge drinking. Other fire districts with high socioeconomic and human risk include Pickens City, Keowee Springs, Shady Grove, Clemson University, and Vineyards.

**Table 5.77 Pickens County Fire District Risk Rating**

| Jurisdiction | Total Risk | Housing Risk | Socioeconomic Risk | Human Factor Risk |
|---|---|---|---|---|
| Central Volunteer | **Medium** | Medium | Medium | Medium |
| Easley | **Low** | Medium | Low | Low |
| Liberty | **Medium** | High | High | Medium |
| Norris Fire Department | **High** | High | Medium | High |
| Pickens | **High** | High | Medium | High |
| Pickens City | **Medium** | Low | Medium | High |
| Clemson University | **Low** | Low | High | Low |
| Liberty | **Medium** | High | High | Medium |
| Six Mile | **Low** | Low | Medium | Low |
| Crosswell | **Medium** | High | Medium | Low |
| Dacusville | **Low** | Low | Low | Medium |
| Holly Springs | **High** | High | Medium | High |
| Keowee Springs | **Medium** | Low | High | High |
| Pumpkintown | **Low** | Low | Low | Medium |
| Rocky Bottom | **Low** | Low | Low | Medium |
| Shady Grove | **Medium** | Low | Medium | High |
| Vineyards | **Medium** | Low | Medium | High |

Source: Fire Safe South Carolina Risk Assessment and Data Tool

**Figure 5.51 Pickens County Fire District Total Risk Rating**




Source: Fire Safe South Carolina Risk Assessment and Data Tool

### *PROPERTY*

Between 2018 and 2022 Pickens County has reported 1,565 urban fires. In 2020 and 2022 fires in the County have resulted in over $5.2 million in property losses. Mobile homes, homes in the rural parts of the county, older homes, and household without a proper heat source are most vulnerable. Fire districts with the highest housing vulnerability include Liberty, Norris Fire Department, Pickens, Liberty and Holly Springs.

Urban fires may also result in physical damage to facilities and equipment, loss of health and medical facilities and supplies, and even lost wages due to temporarily or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property. Additionally, loss of property and livestock have an extreme emotional and economic impact on residents in the local area.

### *ENVIRONMENT*

Urban fires can release debris and cause pollution around the incident location. Chemicals released in the fire and used to put out the fire may impact localized air quality or pollute local waterways. Trees and other urban greenery in close proximity to the fire may be burned or damaged if the fire spreads past a specific structure.

## CHANGES IN DEVELOPMENT

Urban fire occurs primarily in cities or towns with the potential to rapidly spread to adjoining structures. Development and growth would increase the number of structures potentially exposed to urban fire. As density increases and structures are closer together the potential for fires to rapidly spread is possible. Development would also result in population growth which increases the likelihood of occurrences as most urban fires are started by humans. Emergency response and firefighting capacity would likely need to increase to keep up with increased development.

New development in more rural areas, particularly those on the outskirts of established towns and cities may expand into the Wildland Urban Interface and be at higher risk of wildfires.

## KEY ISSUES

- In South Carolina the top four causes of fatal fires in 2022 have been electrical, smoking, heating, and cooking related incidents. 88% of these fires have occurred in homes.
- Around 72% of 2022 urban fire fatalities have been people over the age of 50, where 38% are over 70 years old.
- The South Carolina Fire Risk tool found that the Pickens fire district, the Holly Spring fire district, and the Norris Fire Department district have the highest risk of urban fire. Primarily due to housing vulnerability like higher rates of mobile homes and lack of proper heat source, and higher rates of older adults and people living with disabilities. These fire departments and vulnerable populations may be prioritized in the mitigation action plan and resource allocation.
- Steps to address urban fire should include public education about the top fire causes and how to prevent them, additional outreach to the older adults and those that live alone about fire safety. Materials about proper fire alarms and other safety equipment, particularly those with disabilities, should be emphasized.

## HAZARD SUMMARY BY JURISDICTION

The following table summarizes urban fire risk by jurisdiction.

| Jurisdiction | Probability | Impact | Spatial Extent | Warning Time | Duration | Score | Priority |
|---|---|---|---|---|---|---|---|
| Central | 4 | 3 | 2 | 4 | 1 | 3.0 | H |
| Clemson | 4 | 3 | 2 | 4 | 1 | 3.0 | H |
| Easley | 4 | 3 | 2 | 4 | 1 | 3.0 | H |
| Liberty | 4 | 3 | 2 | 4 | 1 | 3.0 | H |
| Norris | 4 | 3 | 2 | 4 | 1 | 3.0 | H |
| Pickens | 4 | 3 | 2 | 4 | 1 | 3.0 | H |
| Six Mile | 4 | 3 | 2 | 4 | 1 | 3.0 | H |
| Unincorporated Pickens County | 4 | 3 | 2 | 4 | 1 | 3.0 | H |

# 5.20 CONCLUSIONS ON HAZARD RISK

## PRIORITY RISK INDEX

As discussed in Section 5.2, the Priority Risk Index was used to rate each hazard on a set of risk criteria and determine an overall standardized score for each hazard. The conclusions drawn from this process are summarized below.

Table 5-78 summarizes the degree of risk assigned to each identified hazard using the PRI method.

**Table 5.78 Summary of PRI Results**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| **Dam/Levee Failure** | Possible | Critical | Small | More than 24 hrs | Less than 1 week | 2.3 |
| **Drought** | Highly Likely | Limited | Large | More than 24 hrs | More than 1 week | 3.1 |
| **Earthquake** | Possible | Minor | Moderate | Less than 6 hrs | Less than 6 hrs | 2.0 |
| **Extreme Heat** | Likely | Minor | Large | More than 24 hrs | Less than 1 week | 2.7 |
| **Flood** | Highly Likely | Critical | Small | 6 to 12 hours | Less than 1 week | 3.1 |
| **Hurricane/Tropical Storm** | Likely | Limited | Large | More than 24 hrs | Less than 24 hrs | 2.6 |
| **Severe Storm (Thunderstorm Wind, Hail, Lightning)** | Highly Likely | Minor | Large | 6 to 12 hrs | Less than 6 hrs | 2.7 |
| **Tornado** | Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 2.7 |
| **Wildfire** | Likely | Limited | Moderate | Less than 6 hrs | Less than 1 week | 2.8 |
| **Winter/Ice Storm** | Likely | Limited | Large | More than 24 hrs | Less than 1 week | 2.7 |
| **Technological & Human-Caused Hazards** | | | | | | |
| **Cyber Security Threat** | Possible | Critical | Large | Less than 6 hrs | Less than 1 week | 3.0 |
| **Disruption of Utility Systems** | Possible | Critical | Large | Less than 6 hrs | More than 1 week | 3.1 |
| **Hazardous Materials Incident** | Likely | Critical | Small | Less than 6 hrs | Less than 24 hrs | 2.8 |
| **Public Health Threat** | Possible | Critical | Large | More than 24 hrs | More than 1 week | 2.8 |
| **Radiological Threat** | Unlikely | Critical | Moderate | Less than 6 hrs | More than 1 week | 2.6 |
| **Urban Fire** | Highly Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 3.0 |

The results from the PRI have been classified into three categories based on the assigned risk value which are summarized in Table 5-79:

- **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 minimal. This is not a priority hazard.

**Table 5.79 Summary of Hazard Risk Classification**

| | |
|---|---|
| **High Risk (≥ 3.0)** | Drought<br>Flood<br>Cyber Security<br>Disruption of Utility Systems<br>Urban Fire |
| **Moderate Risk (2.0 – 2.9)** | Hurricane & Tropical Storm<br>Dam/Levee Failure<br>Earthquake<br>Extreme Heat<br>Severe Storm (Thunderstorm Wind, Hail, Lightning)<br>Tornado<br>Wildfire<br>Winter/Ice Storm<br>Hazardous Materials Incident<br>Public Health Threat<br>Radiological Incident |
| **Low Risk (< 2.0)** | n/a |

# 6 CAPABILITY ASSESSMENT

This section discusses the capability of the Pickens County planning area to implement hazard mitigation activities. It consists of the following subsections:

- 6.1 Overview
- 6.2 Capability Assessment Findings
- 6.3 Conclusions on Local Capability

## 6.1 OVERVIEW

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

The capability assessment completed for the Pickens County planning area serves as a critical planning step toward developing an effective mitigation strategy. Coupled with the risk assessment, the capability assessment helps identify and target effective goals, objectives, and mitigation actions that are realistically achievable under given local conditions.

To facilitate the inventory and analysis of local government capabilities within the planning area, individual meetings were held with HMPC members from each jurisdiction to review a variety of "capability indicators" such as existing local plans, policies, programs, or ordinances that contribute to and/or hinder the region's ability to implement hazard mitigation actions. Other indicators included information related to the region's fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes, and existing education and outreach programs that can be used to promote mitigation.

In addition to requesting HMPC input, the planning team reexamined data from the 2018 plan and conducted a review of plans, policies, and ordinances in order to identify changes in capability over the past five years.

At a minimum, the capability assessment findings provide an extensive and consolidated inventory of existing local plans, ordinances, programs, and resources in place or under development. With this information, inferences can be made about the overall effect on hazard loss reduction in each community.

## 6.2 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this plan to provide insight into the relevant capacity of Pickens County and its incorporated municipalities to implement hazard mitigation activities. Information is based upon input provided by community representatives on the HMPC as well as research conducted by the planning consultant.

## 6.2.1 PLANNING AND REGULATORY CAPABILITY

Planning and regulatory capability is based on the implementation of plans, ordinances, and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, development, and redevelopment in a responsible manner, while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning. Regulatory capability also includes the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built, as well as protecting environmental, historic, and cultural resources in the community. Although some conflicts can arise, these planning initiatives generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision-making process.

This assessment provides a general overview of the key planning and regulatory tools or programs in place or under development for the Pickens County planning area. This information will help identify opportunities to address gaps, weaknesses, or conflicts with other initiatives and integrate the implementation of this plan with existing planning mechanisms where appropriate.

Table 6.3, at the end of this section, summarizes the communities' relevant local plans, ordinances, and programs already in place or under development 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 plus sign (+) indicates that a jurisdiction is covered for that item under a version implemented by Pickens County. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Hazard Mitigation Plan.

Table 6.3 also summarizes the communities' other capabilities – administrative and technical capabilities and fiscal capabilities.

### 6.2.1.1 PLANS AND ORDINANCES

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. Mitigation is interconnected with all other phases and is an essential component of effective preparedness, response, and recovery. Opportunities to reduce potential losses through mitigation practices are most often implemented before a disaster event, such as through the elevation of flood-prone structures or by regular enforcement of policies that regulate development. However, mitigation opportunities can also be identified during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane. Furthermore, incorporating mitigation during the long-term recovery and redevelopment process following a disaster event is what enables a community to become more resilient.

The implementation of hazard mitigation activities also 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 may not be designed as such.

The following list defines some of the different plans and ordinances available to Pickens County and its incorporated jurisdictions to implement hazard mitigation.

#### HAZARD MITIGATION PLAN

A hazard mitigation plan is a community's blueprint for how it intends to reduce the impact of natural, and in some cases human-caused, hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

All participating jurisdictions in this multi-jurisdictional planning effort have previously been covered by the 2018 Pickens County Hazard Mitigation Plan and continue to be covered under this update – making each community eligible for the associated hazard mitigation funding mechanisms.

## COMPREHENSIVE/LAND USE PLAN

A comprehensive land use plan, or general plan, establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically, a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions. Regular updates of comprehensive plans are important for guiding the growth and development of a community. The County's plan, One Pickens County Comprehensive Plan, was updated and adopted in 2022.

The comprehensive plan focuses on "Character Areas" instead of traditional future land use categories. It is used to identify places and areas that show a common style, development and land use pattern. Character Areas designations indicate the types of land uses that are compatible with the area and the infrastructure existing and expected to support that type of development.

Several elements outlined in the comprehensive plan relate to hazard mitigation planning and foster resilience for the planning area. The Natural Resources and Community Facilities elements in particular include objectives and policies that support hazard mitigation planning. Below are a few of the relevant objective and policies:

- Prepare to meet the water needs for future residents and businesses by developing a conservation plan and investigating new water sources
- Encourage water conservation measures
- Reduce erosion and improve water quality in our watersheds
- Promote parks and open space in private development
- Provide leadership in the development of a countywide water plan to be adopted by each water district and supplier to Pickens County in order to prepare for future supply and demand as well as natural and manmade disasters.

## ZONING ORDINANCE

Zoning represents the primary means by which land use is controlled by local governments. Pickens County's Code of Ordinances includes zoning code provisions 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.

The County also maintains a Fire Prevention and Protection Ordinance which regulates and protects at risk portions of Pickens County.

## UNIFIED DEVELOPMENT STANDARDS ORDINANCE

Pickens County also has a Unified Development Ordinance (UDO) which combines traditional zoning and subdivision regulations with other desired city regulations. The Unified Development Standards Ordinance (UDSO) was first adopted in 1992, and then last revised in 2019, and is applicable in all unincorporated areas of Pickens County. The principal purposes of this ordinance are:

- To implement the recommendations of Pickens County's Comprehensive Plan;
- To protect land values through sound and responsible development practices;
- To conserve and ensure access to the county's natural and scenic resources for future generations to enjoy;

- To secure the safety of residents from the hazards of development not in harmony with existing and planned improvements;
- To enhance the development process and improve the siting of new development; and
- To protect and preserve the character of existing neighborhoods and subdivisions.

To meet these goals the UDSO dictates a variety of standards, such as lot and building standards, use standards, subdivision standards, performance standards, and buffers.

## BUILDING CODES, PERMITTING, AND INSPECTIONS

Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community. All of the jurisdictions have a building code in place based on the International Building Code. Pickens County and the incorporated jurisdictions employ the 2021 International Building Code (IBC) and International Residential Code (IRC) among other codes.

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). 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 expectation 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. Pickens County has a BCEGS rating of 9. The County could improve this rating by implementing more rigorous inspections and code enforcement procedures.

## 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. Capital improvement plans can also address problems within hazardous areas; for example, a jurisdiction might obligate money to address site-specific drainage related problems. The Pickens County Finance Department maintains a capital improvement program that is updated every five years.

## EMERGENCY OPERATIONS PLAN

An emergency operations plan (EOP) outlines the responsibilities of different departments and how resources will be deployed during and following an emergency or disaster. Pickens County maintains an emergency operations plan (updated 2021) through the county Emergency Management Agency. The EOP plan includes the municipalities covered in this plan.

The Pickens County Emergency Operations Plan also establishes and emergency support function (ESF) for long-term recovery and mitigation which enacts post-disaster mitigation policies and procedures. The purpose of these procedures is to support municipal governments, nongovernmental organizations, and private sector entities in enabling post-disaster mitigation and recovery. These procedures are outlined under ESF-14: Economic Stabilization, Community Recovery & Mitigation. Tasks related to recovery are outlined below:

*As soon as a disaster is evident and recovery services are essential for the preservation of life and health, the Emergency Management Director will coordinate recovery operations from the county EOC.*

*A. Donated Resources Group*

1. *The Donated Resource Coordinator and officials of the Donated Resources Group will meet in the EOC and analyze the recovery situation and outline the actions to be undertaken (see Appendix 2).*
2. *Designate responsibility for the handling of food, clothing, water, shelter, counseling, and other essential needs.*
3. *Identify the Local Reception Center (LRC) that will receive and store relief supplies.*
4. *Designate a LRC Supervisor and the necessary personnel to supervise the distribution of supplies as follows:*
    a) *Record keeping of incoming supplies*
    b) *Sorting and distribution*
    c) *Vehicles for delivery of supplies*
    d) *Loading and unloading personnel*
    e) *Locate a forklift to use for unloading supplies*
5. *Request refrigerated trailers for ice and perishable food storage.*
6. *Request water buffaloes for emergency water supply as soon as a crisis is identified. (non- potable)*
7. *Utilize county fire stations as distribution centers (see Appendix 3).*
8. *Designate facilities to use as food serving centers if needed.*
9. *All donations of relief supplies are to be referred to the Donated Resources Coordinator at the Pickens County EOC.*
10. *Arrange for computers to be set up to track recovery supplies, needs, distribution, etc.*
11. *The Donated Resources Group will have a representative in the EOC during the initial stages of the operation. The Disaster Recovery Coordinator will determine service length.*
12. *The County Emergency Management Communications Officer will coordinate communications from the Pickens County EOC.*
13. *The Donated Resources Group will meet at 7:00 A.M. each day at the EOC to brief the next operational period.*

B. *Public Works Group*

1. *The Roads and Bridges Director and representatives of the various public works groups will meet in the EOC and analyze the recovery situation and outline the actions to be undertaken.*
2. *Designate areas of responsibility for road and highway clearance of trees and debris, road and bridge maintenance, debris pickup and removal, debris dump and burning sites, garbage disposal sites and waterway clearance.*
3. *Review additional resource needs.*
4. *Designate critical facilities and systems for priority restoration (see Appendix 4).*
5. *All recovery assistance requests for equipment and supplies are to be requested through the Roads and Bridges Coordinator in the EOC.*
6. *The Roads and Bridges group will meet each morning at 7:00 A.M. in the EOC to brief the next operational period.*

C. *Public Service Group*

1. *The Public Service Coordinator and representatives of the various utility groups will meet in the EOC to analyze the utility situation and outline the actions to be undertaken.*
2. *Designate areas of responsibility for water, sewage, electric and natural gas restoration.*
3. *Designate critical facilities for priority restoration.*
4. *Review additional resources needs.*
5. *Survey priority facilities listings for emergency power generators (see Appendix 5).*
6. *All recovery assistance requests for equipment and supplies are to be requested through the Recovery Coordinator in the EOC.*
7. *The Public Services group will meet at 7:00 A.M. each day at the EOC to brief next operational period*

D. *Law Enforcement Group*

1. *The Law Enforcement Coordinator and representatives of the various law enforcement groups will meet in the EOC at the beginning of the recovery operations to review the situation and outline the actions to be undertaken.*
2. *Identify areas that require security patrols.*
3. *Outline restricted areas and re-entry restrictions.*
4. *Requests for additional manpower will be made to the EOC Manager. In turn, the requests are to be routed through the SC Emergency Management Division EOC. Any deviation from this procedure will delay assistance for additional resources.*
5. *The Law Enforcement Group Supervisors will meet at 7:00 A.M. each day at the EOC to review the situation.*

E. *Resource Group*

1. *The Resource Coordinator will organize his staff in the EOC and coordinate the available county resources and requests for additional outside assistance.*
2. *Will coordinate commercial enterprises offering assistance to county government in its recovery.*
3. *At 7:00 A.M. each day a status report on the resource situation will be submitted to the Disaster Recovery Coordinator.*

F. *Communications*

1. *The EM Communications Coordinator is to make every effort to correct any disruptions within the EOC Communications System that may develop from a major occurrence.*
2. *County portable radios are to be provided to priority EOC support services that have no means of communicating with the EOC.*
3. *An extra rechargeable battery is to be supplied for all portable radios essential for emergency support of the EOC.*
4. *At 7:00 A.M. each day of operations, Communications will supply a communications status report to the EM Director.*

G. *Public Information Group*

1. *The Public Information Officer and staff are to issue directives to the general public as soon as information is available concerning the disaster situation and instructions for the safety and welfare of the general public.*

2. *Coordinate emergency directives for release to the general public from the various EOC Emergency Services; i.e. Law Enforcement, Emergency Welfare, EMS and Hospital, Roads and Bridges, Public Service, DHEC, etc.*
3. *Coordinate with the State EOC Public Information Coordinator for directives from state government and FEMA.*
4. *Provide the local media and visiting media with current conditions as required to avoid the spread of rumors.*
5. *At 7:00 A.M. each day of operations, the PIO Lead will supply a situation report of the previous day's releases and news media briefings.*

## 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.

Pickens has a Stormwater Ordinance #392 which was adopted in 2007 and applies throughout unincorporated Pickens County. The plan's purpose is:

*Protect, maintain, and enhance the environment of Pickens County and the public health, safety and the general welfare by establishing minimum requirements and procedures to control the adverse effects of increased stormwater runoff associated with both future land development and existing developed land within the County.*

This ordinance covers a variety of requirements, including land disturbance permits, stormwater management plans, and sediment and erosion control plans.

### 6.2.1.2 *FLOODPLAIN MANAGEMENT*

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

## FLOODPLAIN PREVENTION ORDINANCE

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 be protected from damage by a 1-percent-annual-chance flood event, and that new development in the floodplain not exacerbate existing flood problems or increase damage to other properties.

The County's Flood Damage Prevention Ordinance # 399 was adopted in 2008 and applies to all regions within the jurisdiction of Pickens County in the special flood hazard area, as identified by FEMA. The purpose of this ordinance is:

*To protect human life and health, minimize property damage, and encourage appropriate construction practices to minimize public and private losses due to flood conditions by requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction. Uses of the floodplain which are dangerous to health, safety, and property due to water or*

*erosion hazards, or which increase flood heights, velocities, or erosion are restricted or prohibited. These provisions attempt to control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of flood waters, and control filling, grading, dredging and other development which may increase flood damage or erosion. Additionally, the ordinance prevents or regulates the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.*

The Flood Damage Prevention Ordinance gives both general and specific standards for different types of constructions and facilities, as well as for different flooding hazards.

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

Table 6.1 provides NFIP policy and claim information for each participating jurisdiction in the Pickens County planning area.

Pickens County and all but one of the incorporated jurisdictions participate in the NFIP and will continue to comply with all required provisions of the program. Floodplain management is managed through Pickens County's Floodplain Management Program, zoning ordinances, and building code restrictions. The County and jurisdictions coordinate with SCEMD and FEMA to maintain maps and regulations related to Special Flood Hazard Areas within their jurisdictional boundaries and, through a consistent monitoring process, will implement 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 active participation in the Community Rating System (CRS). The CRS is an incentive-based program that encourages communities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP. Each of the CRS mitigation activities is assigned a point value. As a community earns points and reaches identified thresholds, they can apply for an improved CRS class. Class ratings, which range from 9 to 1 and increase on 500-point increments, are tied to flood insurance premium reductions. Every class improvement earns a 5 percent discount for NFIP policyholders, with a starting discount of 5 percent for Class 9 communities and a maximum possible discount of 45 percent for Class 1 communities.

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years, based on community comments intended to make the CRS more user friendly, and extensive technical assistance available for communities who request it. Pickens County has participated in the CRS since 2015 and is currently a Class 9.

**Table 6.1 NFIP Policy and Claim Information**

| Jurisdiction | Initial FIRM Date | Current Effective Map Date | NFIP Policies in Force | Insurance in Force | Written Premium in Force | Closed Losses | Total Payments |
|---|---|---|---|---|---|---|---|
| Pickens County | 07/19/82 | 12/21/17 | 55 | $ 16,128,400 | $37,283 | 22 | $346,283 |
| Central | 04/16/08 | 04/16/08 | 1 | $350,000 | $600 | 0 | $0 |
| Clemson | 02/17/88 | 12/21/17 | 33 | $8,759,000 | $18,740 | 11 | $67,167 |
| Easley | 04/19/82 | 04/16/08 | 25 | $6,266,300 | $16,523 | 8 | $128,547 |
| Liberty | 06/25/76 | 12/21/17 | 0 | $0 | $0 | 0 | $0 |
| Norris | 04/16/08 | 04/16/08 | - | - | - | - | - |

| Jurisdiction | Initial FIRM Date | Current Effective Map Date | NFIP Policies in Force | Insurance in Force | Written Premium in Force | Closed Losses | Total Payments |
|---|---|---|---|---|---|---|---|
| Pickens | 06/25/76 | 12/21/17 | 4 | $1,426,000 | $3,021 | 4 | $27,219 |
| Six Mile | 04/16/08 | 12/21/17 | 0 | $0 | $0 | 0 | $0 |
| **Total** | - | - | **114** | **$32,929,700** | **$76,167** | **45** | **$569,216** |

Source: FEMA NFIP Policy Statistics via FEMA CIS, March 2023
Note: Norris is not currently a participant in the NFIP due to limited exposure to known flood risk.

### 6.2.2 ADMINISTRATIVE AND TECHNICAL CAPABILITY

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

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using geographic information systems (GIS) to analyze and assess community hazard vulnerability. An assessment of local capability to capture information on administrative and technical capability through the identification of available staff and personnel resources.

The County has several departments are key to carrying out actions that directly align with mitigation efforts and the hazards assessed in this plan. A few examples are listed below:

- Local Emergency Planning Committee – monitors hazardous materials in Pickens
- GIS Department – maintains spatial data, helps with map creation, and data sharing
- Information Technology Department – supports County departments to develop technical solutions to support County operations
- Parks, Recreation, Tourism – manages and supports County and regional parks which make up over hundreds of acres of open space
- Roads and Bridges department – maintain critical infrastructure in the County and prepare and respond to all inclement weather events and other emergencies

Table 6.3 provides a summary of the local capabilities for all participating communities regarding relevant staff and personnel resources.

Note that in multiple instances, one individual staff member fills multiple roles listed below. In these cases, these individuals may be overburdened during emergency events, disaster recovery, or planning process updates. Certain communities might contract out services where there is no in-house capacity. Specific areas for improvement might include employing additional planners with specific understanding of natural hazards and land use practices to mitigate the impacts of hazards as well as expanding individual communities' GIS capabilities and databases to identify hazard prone areas and build community-specific, detailed risk and vulnerability assessments.

### 6.2.3 FISCAL CAPABILITY

The ability of a local government to implement mitigation actions is often dependent on the amount of money available. This may take the form of outside grant funding awards or locally based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some

cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project such as the acquisition of flood-prone houses, which can require a substantial commitment from local, state, and federal funding sources.

The information collected from jurisdictions was used to capture information on fiscal capability through the identification of locally available financial resources. Table 6.3 provides a summary of the results for the planning area with regard to relevant fiscal resources. Jurisdictions with limited fiscal capability should seek opportunities to hire grant writers or resource development staff, create local funding sources such as stormwater utility fees, or seek alternate funding sources.

### 6.2.4 EDUCATION AND OUTREACH CAPABILITY

This type of local capability refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information. Examples include natural disaster or safety related school programs; participation in community programs such as Firewise or StormReady; and activities conducted as part of hazard awareness campaigns such as a Severe Weather Awareness Month. The following is a list of public outreach activities implemented in Pickens County:

- **Radio Amateur Civil Emergency Service (RACES)** – a group of amateur radio enthusiasts with similar interests, dedicated in providing emergency communications for public service, public safety, and commercial communications for local agencies. They also provide Skywarn communications for Pickens County and the National Weather Service in Greer, SC.
- **E-911** – E-911 Address and Information Department provides citizens with the most up-to-date, integrated public safety system on the market. This is accomplished by providing, maintaining and updating all of the numerous databases and providing the most current 911 equipment to our emergency personnel.
    - The Pickens County E-911 Office has an age-specific program available to the 2nd grade students of Pickens County School District, Boy/Girl Scouts, Daycare Programs, or any child related programs. The program introduces students to 911, teaches them how to recognize an emergency, how to summon help, and more.
- **CodeRED** – Allows residents to register their phone numbers and receive notifications about local hazards and emergencies.

Although this is not an exhaustive list, Pickens and incorporated jurisdictions have hazard and non-hazard related educational and outreach capacity. The communities can further capitalize on their existing capabilities, like school partnerships and non-profit agency relationships, and build new capability to educate the larger community on hazard risk and mitigation options.

### 6.2.5 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 it 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 current and future political climate for supporting and advancing future hazard mitigation strategies is strong to moderate in Pickens County, and most of the incorporated jurisdictions. There are several existing

ordinances that address natural hazards or are related to hazard mitigation such as flood damage prevention, soil erosion and sediment control, stormwater management, zoning, and subdivision.

Table 6.2 below summarizes the different government structures in each jurisdiction.

**Table 6.2 Jurisdictional Government Structure**

| Jurisdiction | Government Structure |
|---|---|
| Pickens County | County Administrator and a 6-member County Council, elected by district |
| City of Clemson | Mayor and 6-member City Council |
| City of Easley | Mayor and 6-member City Council |
| City of Liberty | Mayor and 6-member City Council |
| City Pickens | Mayor and 5-member City Council |
| Town of Central | Mayor and 6-member City Council |
| Town of Norris | Mayor and 4-member City Council |
| Town of Six Mile | Mayor and 4-member City Council |

## 6.2.6 COMMUNITY CAPABILITY MATRIX

**Error! Reference source not found.**Table 6.3 summarizes the communities' relevant capabilities. The following key is established for each capability category:

**Planning and Regulatory Capability:** A checkmark (✓) indicates that the given item is currently in place and being implemented. A star (★) indicates that the given item is currently being developed or updated. A plus sign (+) indicates that a jurisdiction is covered for that item under a version implemented by Pickens County.

**Administrative and Technical Capability:** A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill, a plus sign (+) indicates a Pickens County staff member or resource provides the specified knowledge, skill, or data for the jurisdiction.

**Fiscal Capability:** A checkmark (✓) indicates that the given fiscal resource has been previously used for hazard mitigation purposes. A star (★) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

Based upon the results summarized in the table below, jurisdictions in Pickens County have a range of planning and regulatory capability. Pickens County and Clemson have significant planning capability, while Central, Liberty, and Easley have moderate planning capability. Norris and Six Mile have limited capacity and depend closely on County assistance for mitigation activities. All municipalities could improve by integrating mitigation into long-term planning initiatives, improving building code enforcement and requesting BCEGS ratings, preparing economic development plans that incorporate economic resilience and recovery strategies, developing staff resources and expertise in GIS, engineering, and grant writing, and expanding fiscal resources for mitigation funding.

**Table 6.3 Community Capability Matrix**

| | Pickens County | Central | Clemson | Easley | Liberty | Norris | Pickens | Six Mile |
|---|---|---|---|---|---|---|---|---|
| **Relevant Plans, Ordinances, and Programs** | | | | | | | | |
| Hazard Mitigation Plan | ✓ | + | + | + | + | + | + | + |
| Comprehensive Plan (including land use) | ✓ | ✓ | ✓ | ✓ | ★ | + | ✓ | ✓ |
| Zoning Ordinance | ✓ | ✓ | ✓ | ✓ | ✓ | + | ✓ | ✓ |

| | Pickens County | Central | Clemson | Easley | Liberty | Norris | Pickens | Six Mile |
|---|---|---|---|---|---|---|---|---|
| Subdivision Ordinance | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Floodplain Ordinance | ✓ | ✓ | ✓ | ✓ | ✓ | + | ✓ | ✓ |
| Erosion, Sedimentation, and Pollution Control ordinance/program | ✓ | ✓ | ✓ | ✓ | ✓ | + | ✓ (under MS4) | + |
| Other Special Purpose Ordinance (stormwater, growth management, wildfire) | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Building Code | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Building Code Effectiveness Grading Schedule (BCEGS) Rating | 9/10 | 3 | | | | | 3 | + |
| Stormwater Management Program | ✓ | | ✓ | ✓ | ✓ | + | ✓ | + |
| Site Plan Review Requirements | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Capital Improvements Plan | ✓ | | ✓ | ✓ | ✓ | | ✓ | |
| Economic Development Plan | | | | ✓ | ✓ | | | |
| Local Emergency Operations Plan | ✓ | + | + | + | + | + | + | + |
| Flood Insurance Study or Other Engineering Study for Streams | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Other Special Plans | ✓ | | ✓ | ✓ | ✓ | | ✓ | |
| Elevation Certificates | ✓ | ✓ | ✓ | | ✓ | | | |
| **Relevant Staff/Personnel/Data Resources** | | | | | | | | |
| Planner/Engineer with knowledge of land development/land management practices | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Engineer/Professional trained in construction practices related to buildings and/or infrastructure | | ✓ | ✓ | ✓ | | | + | + |
| Planner/Engineer with an understanding of natural hazards | ✓ | | ✓ | ✓ | ✓ | | + | |
| Scientist familiar with the hazards of the community | ✓ | | ✓ | | | | | |
| Floodplain Manager | ✓ | ✓ | ✓ | ✓ | ✓ | | + | ✓ |
| Emergency Manager | ✓ | | | | | | + | + |
| Personnel skilled in GIS | | | ✓ | | | | | |
| Land Surveyor | | | | | | | | |
| Grant Writer | | | ✓ | | ✓ | | ✓ | |
| Public Information Officer | | ✓ | | ✓ | | | | + |
| Warning Systems | ✓ | + | ✓ | + | | | + | + |
| GIS data: flood zones/hazard areas | | | ✓ | | | | | |
| GIS data: critical facilities | | | ✓ | | | | | |
| GIS data: current and/or future land use | | | ✓ | | | | | |
| GIS data: building footprints | | | ✓ | | | | | |
| **Relevant Fiscal Resources** | | | | | | | | |
| Community Development Block Grants | | | ✓ | | | ✓ | ✓ | |
| Capital Improvement Programming | | | ✓ | ✓ | ★ | | ✓ | |
| Special Purpose Taxes (or taxing districts) | | | | | | | | |
| Water, sewer, gas, or electric service fees | | | | | | | | |
| Stormwater utility fees | | | ✓ | ✓ | ★ | | | |
| Development impact fees | | | ✓ | ✓ | | | | |

| | Pickens County | Central | Clemson | Easley | Liberty | Norris | Pickens | Six Mile |
|---|---|---|---|---|---|---|---|---|
| General obligation bonds and/or revenue bonds | | | | | ★ | | | |
| Withhold spending in hazard prone areas | | | | | | | | |
| Other sources | ✓ | | ✓ | | | | ✓ | |

## 6.3 CONCLUSIONS ON LOCAL CAPABILITY

As previously discussed, one of the reasons for conducting a capability assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. The participating jurisdictions can use this capability assessment as part of the basis for new mitigation actions to expand on and improve existing capabilities.

The overall capability to implement hazard mitigation actions varies among the participating jurisdictions. For planning and regulatory capability, the jurisdictions range from limited to moderate to high. A strength across all jurisdictions is the presence of recently updated comprehensive plans. However, it is recommended that each jurisdiction, particularly Pickens County, further integrate the goals and strategies from this Hazard Mitigation Plan into their comprehensive plans. While several of the County's comprehensive plan elements are related to mitigation, there could be stronger alignment throughout the element goals and implementation strategies. Easley's comprehensive plan has integrated mitigation through its natural resources, resiliency, priority investment areas, and community facilities elements. Several communities have areas focused on redevelopment. Integrating mitigation goals into redevelopment plans can help protect areas intended for growth from future hazards.

An additional strength is almost all jurisdictions maintain a zoning and subdivision ordinance. Several of which include a fire prevention and protection ordinance and floodplain ordinance. Both regulatory tools directly support mitigation for the jurisdictions. However, the County's subdivision ordinance has not changed since the last HMP update and the floodplain ordinance does not include any higher regulatory standards. Both ordinances could be updated to reflect the goals and strategies in this plan. The County's EOP is updated regularly which supports thorough emergency preparedness across the region.

Fiscal capability varies, but most communities lack a diverse range of funding options for mitigation implementation. Clemson, Easley, and Liberty have stormwater utility fees or development impact fees that could be used to support mitigation. Several communities have applied for local grants or funding in the past to support capital improvements, but few have a capital improvements plan or program. A capital improvements plan or program, aligned with mitigation actions, could help implement future projects and plan for potential funding.

There is also some variation in the administrative and technical capability among the jurisdictions with Pickens County and the City of Clemson having greater staff and technical resources. Central, Easley, and Pickens have moderate administrative and technical capability, with Six Mile and Norris having limited resources and almost no in-house capacity. The County provides a substantial amount of administrative and technical support to Six Mile. The Town of Norris may need additional support to implement hazard mitigation activities. If the County is unable to provide the necessary support, some jurisdictions may need to contract out services where there is no in-house capacity. For example, the jurisdictions could outsource planners or engineers with specific understanding of natural hazards and land use practices to mitigate the impacts of hazards.

Education and outreach capability is limited for each jurisdiction, with most resources accessible on Pickens County's website. The other communities, particularly the larger cities, Easley, Clemson, and Liberty, could create their own webpage on their existing websites for community specific information and direct residents to information listed on the County's website. All communities can further increase their existing capabilities by forming school partnerships and finding opportunities to educate the larger community on hazard risk and mitigation options. Pickens County has a school education program that could serve as a model for the other communities. Additional outreach strategies include sharing information via radio programs and TV ads and posting information in churches and community centers. Further, jurisdictions can curate education and outreach opportunities for the communities' most vulnerable residents (elderly, people living alone, non-English speakers, renters, etc.).

The conclusions of the risk assessment and capability assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. All jurisdictions are capable of implementing hazard mitigation efforts to varying degrees, and while capability may vary, political support exists for all jurisdictions. Participating communities may refer to this assessment to identify gaps and opportunities to improve local capability to implement mitigation projects.

# 7 MITIGATION STRATEGY

**Requirement §201.6(c)(3): [The plan shall include]** a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the Pickens County Hazard Mitigation Plan. It describes how the participating jurisdictions met Step 6: Set Goals, Step 7: Review Possible Activities, and Step 8: Draft an Action Plan from the 10-step planning process. This section contains the following subsections:

- 7.1 Introduction
- 7.2 Goals and Objectives
- 7.3 Identification and Analysis of Mitigation Activities
- 7.4 Plan Update Requirement
- 7.5 Mitigation Action Plan

## 7.1 INTRODUCTION

Section 5 documents the hazards that threaten Pickens County and the associated vulnerability of structures, infrastructure, and critical facilities. Section 6 summarizes the capabilities of the participating jurisdictions to implement mitigation projects. Based on this understanding of risks, vulnerabilities, and capability, Section 7 describes the process followed by the HMPC to identify feasible mitigation actions to reduce exposure, vulnerability, and overall risk.

The intent of the Mitigation Strategy is to provide Pickens County with goals to serve as guiding principles for mitigation policy and project administration as well as an analysis of mitigation techniques available to meet those goals. It is designed to be comprehensive, strategic, and functional, in that it includes a thorough review of all possible mitigation alternatives, achieves multiple local objectives, is consistent with other long-term planning goals, and facilitates implementation of the identified actions.

The first step in designing the mitigation strategy is the identification of mitigation goals and objectives. Goals represent broad statements of intent and objectives provide measurable or concrete ways to achieve goals. Goals and objectives are realized through the implementation of specific mitigation actions.

The second step involves the identification and analysis of available mitigation alternatives that could achieve the identified goals and objectives. While an alternatives analysis was conducted by the HMPC in the development of this plan, continuous evaluation and consideration of alternatives is a process to be sustained through the implementation and maintenance of this plan. Alternative mitigation measures will continue to be considered as future capabilities change and opportunities arise.

The third and final step of the mitigation strategy is the selection and prioritization of mitigation actions for the participating jurisdictions. Selected actions are detailed in the Mitigation Action Plan.

## 7.2 GOALS AND OBJECTIVES

**Requirement §201.6(c)(3)(i): [The mitigation strategy section shall include a]** description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The intent of goal and objective setting is to guide the review of possible mitigation actions by defining intended outcomes and opportunities to achieve those outcomes. Goals are usually broad-based, long-term policy type statements that represent global visions and help define the benefits that the plan is trying to achieve. Objectives are more specific and measurable ways that each goal can be achieved.

### 7.2.1 GOAL SETTING

At the third planning meeting, held on February 16, 2023, the HMPC reviewed and discussed the goals and objectives from the 2017 plan. The committee was asked to consider whether the goals were still relevant and appropriate and if any changes were needed to address new priorities in the County. Another key consideration in evaluating these goals was to ensure that the goals of the Hazard Mitigation Plan align with other community planning efforts such as comprehensive and land use plans. These documents are important guides for future growth within the community, so the HMPC should strive to achieve consistency in the plans' goals.

The existing goals and objectives from the 2017 plan are as follows:

1. Reduce impact of hazards on the most vulnerable populations.
   - Identify vulnerable populations based on factors such as age, class or income level, race and ethnicity, or disability.
   - Provide education/equipment to vulnerable populations to increase preparedness and response to hazards.
2. Future mitigation and response plans will have the ability to include more specific mitigation actions or address more specifically the existing hazards.
   - Hazard analysis will be more comprehensive and precise.
   - County data will be readily available for use in hazard mitigation planning or other planning activities.
3. The community will have the capability to initiate and sustain emergency response operations during and after a hazard event.
   - Critical facilities will be functional during hazards.
   - Response functions will be coordinated.
   - Emergency managers and responders will have the ability to respond effectively to hazard events.
4. Reduce the impact of hazards on the general public and community.
   - Educate the general public on personal/household preparedness.
   - Perform preventative actions which reduce the impacts of hazard events.
5. Develop partnerships with organizations, resources, etc. within the community to compensate for limited resources, with the purpose of reducing risk in the community.
   - Programs developed with Clemson University could benefit the community, university, and students, providing valuable "real world" experience.
   - Community groups have resources and experience which can benefit the community.

The HMPC affirmed that goals remain relevant and appropriate to the County's continued priorities for mitigation. However, it was agreed that an additional goal related to natural resource protection should be added and that additional objectives could also be identified. The following changes were proposed during the HMPC's discussion:

- Combine Goal #1 and Goal #4, which both address reducing risk and vulnerability of the public, while maintaining objectives that highlight the need to plan specifically for vulnerable populations.

- Create a new Goal 4 and associated objectives to encourage the protection of natural resources that provide hazard risk reduction benefits.
- Add an objective to Goal 1 related to education of health risks associated with hazards.
- Add an objective to Goal 3 related to National Weather Service coordination.

The resulting goals and objectives approved by the HMPC are presented below.

### 7.2.2 RESULTING GOALS & OBJECTIVES

**Goal 1:** Reduce impact of hazards on the public and community, including vulnerable populations.

- Objective 1.1: Identify vulnerable populations based on factors such as age, class or income level, race and ethnicity, or disability.
- Objective 1.2: Provide education/equipment to the general public and vulnerable populations to increase preparedness and response to hazards.
- Objective 1.3: Educate the public on the health risks associated with natural and non-natural hazards.
- Objective 1.4: Perform preventative actions which reduce the impacts of hazard events.
- Objective 1.5: Protect existing and future buildings and infrastructure from the impacts of hazard events.

**Goal 2:** Future mitigation and response plans will have the ability to include more specific mitigation actions or address more specifically the existing hazards.

- Objective 2.1: Hazard analysis will be more comprehensive and precise.
- Objective 2.2: County data will be readily available for use in hazard mitigation planning or other planning activities.

**Goal 3:** The community will have the capability to initiate and sustain emergency response operations during and after a hazard event.

- Objective 3.1: Critical facilities will be functional during hazards.
- Objective 3.2: Response functions will be coordinated, and warnings will follow guidance from the regional National Weather Service office.
- Objective 3.3: Emergency managers and responders will have the ability to respond effectively to hazard events.

**Goal 4:** Protect natural resources that provide hazard risk reduction benefits.

- Objective 4.1: Maintain open space in known high hazard risk areas.
- Objective 4.2: Preserve and improve natural and beneficial floodplain functions and other environmental assets to reduce hazard risk and protect critical water resources.
- Objective 4.3: Provide education for erosion prevention and sediment control throughout the County.

**Goal 5:** Develop partnerships with organizations, resources, etc. within the community to compensate for limited resources, with the purpose of reducing risk in the community.

- Objective 5.1: Programs developed with Clemson University could benefit the community, university, and students, providing valuable “real world” experience.
- Objective 5.2: Community groups have resources and experience which can benefit the community.

# 7.3 IDENTIFICATION & ANALYSIS OF MITIGATION ALTERNATIVES

**Requirement §201.6(c)(3)(ii): [The mitigation strategy section shall include a]** section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

To develop a mitigation action plan, the HMPC began by evaluating ways to achieve the plan goals and objectives and opportunities to address risks, vulnerabilities, and problems identified through Section 5 Hazard Risk & Vulnerability Assessment. The HMPC considered a wide range of activities that could meet these criteria. Action alternatives were reviewed for each hazard and within each of the following mitigation categories, which are utilized as part of the CRS planning process but are also applicable to multi-hazard mitigation:

- Prevention
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information and Outreach

The HMPC was provided with examples of potential mitigation actions for each of the above categories and participating in a brainstorming discussion to develop additional action ideas. The HMPC was instructed to consider both existing and future buildings when considering possible actions to mitigate risk and vulnerability of property. The HMPC also considered which incomplete actions from the previous plan should be carried forward in this action plan.

Details on the range of mitigation alternatives considered by the HMPC are provided in Appendix D.

## *7.3.1 PRIORITIZATION PROCESS*

While a wide range of actions were considered during the brainstorming process, the HMPC sought to develop a concise mitigation action plan of carried forward and new mitigation actions most appropriate and feasible for the planning area. To accomplish this, the HMPC was provided with a set of criteria to assist in deciding why one action might be more important, more effective, or more likely to be implemented than another. These considerations for action prioritization, modified from the FEMA STAPLEE criteria. were as follows:

- **Socially Acceptable:** Is the action acceptable to the community? Does it have a greater impact on a certain segment of the population? Are the benefits fair? Does the action support underserved communities or socially vulnerable populations? Are the outcomes equitable?
- **Technically Feasible:** Is the action technically feasibly? Is it a long-term solution to the problem? Does it capitalize on existing planning mechanisms for implementation?
- **Administrative Resources:** Are there adequate staffing, funding and other capabilities to implement the project? Is there adequate additional capability to ensure ongoing maintenance?
- **Politically Supported:** Will there be adequate political and public support for the project? Does the project have a local champion to support implementation?
- **Legally Allowable:** Does the community have the legal authority to implement the action?

- **Economically Sound:** Can the action be funded locally? Will the action need to be funded by an outside entity, and has that funding been secured? How much will the project cost? Can the benefits be quantified, and do they outweigh the costs?
- **Environmentally Sound:** Does the action comply with environmental regulations? Does the action meet the community's environmental goals? Does the action impact land, water, endangered species, or other natural assets?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. While the criteria above helped the HMPC to evaluate the variety of benefits associated with each action, the HMPC also considered the benefit-cost analysis of actions in terms of:

- Ability of the action to address the problem;
- Contribution of the action to save life or property;
- Available technical and administrative resources for implementation; and
- Availability of funding and perceived cost-effectiveness.

These prioritization criteria were considered relevant to all identified hazard risks, vulnerabilities, and associated problems and were therefore applied uniformly in the evaluation and prioritization of all mitigation actions, regardless of the hazard and issue addressed.

The consideration of these criteria helped to prioritize and refine mitigation actions but did not constitute a full benefit-cost analysis. The cost-effectiveness of any mitigation alternative will be considered in greater detail by performing benefit-cost analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

Representatives for each jurisdiction assisted in the prioritization process by reviewing each action during community-level planning meetings. Based on this input and committee discussion, the HMPC ultimately assigned a subjective rating of high, medium, or low priority to each mitigation action. The priority for each mitigation action is provided in the Mitigation Action Plan.

The HMPC also assigned a feasibility rating to each action to account for the findings of the capability assessment and the general understanding of the assigned lead agency's capacity to implement each action.

## 7.4 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the HMPC evaluated mitigation actions identified in the previous plan to determine their current implementation status, including if an action was completed or, if not, whether it should be carried forward for future implementation or deleted from the mitigation action plan. The results of this evaluation are reflected in the updated mitigation action plan and in the summary of completed and deleted actions from the 2018 plan in Table 7.1. Note that the mitigation action plan in Section 7.5 presents only those actions currently being pursued for implementation, including new actions and actions carried forward from the 2018 plan.

**Table 7.1 Completed and Deleted Actions from the 2018 Plan**

| Action Description | Jurisdictions | 2023 Status | 2023 Implementation Comments |
|---|---|---|---|
| Work through schools, volunteer groups, senior groups, or home health organizations to provide information to vulnerable populations regarding resources available during hazard events | Pickens County, Norris, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Coordinate with schools, volunteer groups, senior groups, or home health organizations to provide first aid training to vulnerable populations | Pickens County, Norris, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Expand established programs or organizations to provide first aid kits to vulnerable households | Pickens County, Norris, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Outreach to vulnerable populations about locations of heating and cooling centers during extreme temperature events | All jurisdictions | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Conduct a feasibility study to determine if a zoning ordinance would promote community safety and hazard mitigation with regards to new development | Pickens County, Norris, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Use DHEC's dam failure inundation tool and the EAP of each dam to develop a countywide database of high hazard dams | All jurisdictions | Completed | |
| Study and assess areas vulnerable to wildfire and causative factors. | All jurisdictions | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Complete a hazard vulnerability assessment and mitigation strategy for each critical facility. | Pickens County, Norris, Six Mile | Completed | |
| Develop an inventory of response assets and capabilities. | Pickens County, Norris, Six Mile | Completed | |
| Work with home health and other private entities to educate special needs individuals regarding self-sustaining practices or whom to communicate with during emergencies. | Pickens County, Norris, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |

| Action Description | Jurisdictions | 2023 Status | 2023 Implementation Comments |
|---|---|---|---|
| Identify safe storm shelters in communities and educate residents as to where to seek shelter. | Pickens County, Norris, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Conduct a commodity flow study on major roadways in the county. | Pickens County, Norris, Six Mile | Completed | |
| Partner with utility companies to remove dead trees or trim large branches located near utilities. | Pickens County, Norris, Six Mile | Completed | This is an established process. |
| Adopt and enforce building code provisions for earthquake construction to reduce risk. | All jurisdictions | Delete | This is part of the SC Code Book. |
| Conduct a study of seismic zone earthquake risk and soil investigation to determine level of risk to existing buildings and new construction. | All jurisdictions | Delete | No longer a priority. Earthquake risk reduction is in the SC Code Book. |
| Encourage financial resiliency planning for local residents. | All jurisdictions | Delete. | Economic crisis is no longer addressed through this plan. |
| Continue to implement and enforce floodplain development regulations. | All jurisdictions | Completed | This is an established function of the department. |
| Encourage at risk owners to purchase flood insurance. | All jurisdictions | Completed | This is an established function of the department. |
| Implement and maintain a drainage ditch inspection and cleanup program to reduce roadway flooding and washout. | All jurisdictions | Completed | |
| Implement a public campaign regarding hail danger and safety tips. | All jurisdictions | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Ensure public venues have proper plans in place to mitigate and respond to threats of terrorism. | All jurisdictions | Delete | Terrorism is no longer addressed through this plan. |
| Establish a See Something, Say Something educational campaign to encourage residents to be vigilant and report suspicious activity. | All jurisdictions | Delete | Crime is no longer addressed through this plan. |
| Implement and enforce building codes and standards appropriate for areas receiving high wind. | All jurisdictions | Completed | |
| Encourage residents to purchase appropriate and adequate insurance for hazards in their area. | All jurisdictions | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |

| Action Description | Jurisdictions | 2023 Status | 2023 Implementation Comments |
|---|---|---|---|
| Create an internship position at Pickens County Emergency Management. | Pickens County, Norris, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Seek grant funding for local police department and sheriff's department for early intervention programs in schools including school resource officers. | All jurisdictions | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Implement community education programs geared towards fostering positive relationships between law enforcement and the community including programs for youth, such as Explorers. | All jurisdictions | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Develop stormwater committee which regularly assesses existing stromwater plans, new development, recommend projects | All jurisdictions | Completed | |
| Establish a working relationship with public health, hospitals, and local healthcare agencies on emerging pathogens. | All jurisdictions | Completed | |
| Work with local epidemiologists and healthcare agencies on identifying health and disease trends. | All jurisdictions | Completed | |
| Establish a close working relationship with local, state, and federal law enforcement agencies with regard to terrorist threats. | All jurisdictions | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Establish agreement with neighboring jurisdictions to share resources during winter storm events. | All jurisdictions | Completed | |
| Encourage employers to adopt alternate scheduling options during winter storm events. | Pickens County, Central, Clemson, Liberty Norris, Pickens, Six Mile | Delete | This is an established ongoing duty that no longer requires a mitigation project to accomplish. |
| Implement an early intervention program in schools to foster financial literacy | Central, Clemson, Easley, Liberty, Pickens | Delete | Economic crisis is no longer addressed by this plan. |
| Educate the public and local business owners on train safety so that they understand the risks and what to do if they observe a potential hazard (e.g. malfunctioning railroad crossings, loose rails, etc.) | Easley | Delete | This will be addressed outside of the mitigation plan |
| Purchase unfilled sand bags. Store those bags at the public works facility and have them ready for distribution in the event of an emergency. | Pickens | Completed | |

| Action Description | Jurisdictions | 2023 Status | 2023 Implementation Comments |
|---|---|---|---|
| Purchase standby diesel generator for the City of Pickens Water Plant. | Pickens | Delete | The City received grant funding for this project, but the project required electrical upgrades that were not feasible. As a result, this project is no longer being pursued. |
| Purchase a crime scene investigation robot. | Pickens | Delete | No longer a priority action and this hazard is not identified in the plan update. |
| Purchase a canine police officer. | Pickens | Completed | |

# 7.5 MITIGATION ACTION PLAN

**Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include an]** action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

## 7.5.1 OVERVIEW

This section provides the updated mitigation action plan, which was developed to present the HMPC's recommendations for how the participating communities can reduce the risk and vulnerability of people, property, critical facilities and infrastructure, and other local assets from future hazard impacts.

Each mitigation action recommended for implementation is listed in the table below along with detail on the applicable jurisdictions, the hazards addressed, the goal and objective addressed, the priority rating, the lead agency responsible for implementation, potential funding sources for the action, a projected implementation timeline, and the 2023 implementation status for actions that were carried forward from the 2018 plan.

## 7.5.2 MITIGATION ACTION PLAN

The mitigation actions proposed by each of the participating jurisdictions are listed in the mitigation action plan in Table 7.3 below. Table 7.2 summarizes the total number of mitigation actions identified by each jurisdiction. Individual mitigation action plans by jurisdiction are also provided in each jurisdiction's annex.

**Table 7.2 Mitigation Action Summary**

| Jurisdiction | Mitigation Action Count |
|---|---|
| Pickens County | 58 |
| Central | 32 |
| Clemson | 36 |
| Easley | 35 |
| Liberty | 32 |
| Norris | 57 |
| Pickens | 37 |
| Six Mile | 56 |

**Table 7.3 Mitigation Action Plan**

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Identify vulnerable populations | 1.1 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County EMS Director | General Fund, Duke Energy | Long-Term | Prevention | Carry Forward |
| 2 | Coordinate with well-established programs or organizations to provide smoke detectors to vulnerable households | 1.2 | Urban Fire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Fire Departments | Red Cross | Long-Term | Emergency Services | Carry Forward |
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 6 | Develop and maintain a building inventory that contains information regarding location, type of structure, construction material, date of construction and modification, whether the building is consistent with current building codes, and other pertinent information | 2.2 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Long-Term | Prevention | Carry Forward |
| 7 | Establish specific mitigation strategies for extremely vulnerable structures identified during the development of the building inventory | 1.5 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Federal Grant Funds | Long-Term | Property Protection | Carry Forward |
| 8 | Develop a standardized, integrated database of utility distribution systems, utility facilities, critical facilities, county facilities, roads, streams/rivers, and other data deemed necessary | 2.2 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Ongoing | Prevention | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 10 | Increase training and capability of response teams and communication/integration with mutual aid assets. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Ongoing | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Educate public about wildfire dangers, and open burning safety, cigarette litter, and campfire safety. | 1.2 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Fire Chiefs, Other Emergency Services | General Fund | Long-Term | Public Information & Outreach | Carry Forward. Exercises are planned for March 2023 and September 2024. |
| 12 | Create buffer zones around structures in wildland-urban interface areas. | 1.5 | Wildfire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. |
| 13 | Educate public about the importance of weather radios and where to obtain them. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 14 | Consider the feasibility of adopting FireWise throughout the county. | 1.4 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County Emergency Services Director | SC Firefighters Association | Immediate | Prevention | Carry Forward |
| 15 | Remove dead trees or trim large branches located near structures. | 1.4 | Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund, Private Funds | Immediate | Prevention | Carry Forward |
| 16 | Coordinate between law enforcement agencies and railroad companies to increase notification and safety where statistics or assessment indicates a dangerous intersection of railroad and roadway. | 3.2 | Hazardous Materials | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Sheriff, Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 17 | Institute a standard warning system for dam failure. | 3.2 | Dam Failure | Low | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | 911 Funds | Short-Term | Emergency Services | Carry Forward |
| 18 | Coordinate with the USACE on EAP for dams in Pickens County. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | USACE | Long-Term | Prevention | Carry Forward |
| 19 | Serve as a repository for dam failure plans. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | General Fund | Long-Term | Prevention | Carry Forward |
| 20 | Provide information to the public regarding procedures to follow in the event of a dam failure. | 1.2 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, E-911 Coordinator | 911 Funds | Long-Term | Public Information & Outreach | Carry Forward |
| 21 | Educate about and encourage participation in the National Flood Insurance Program. | 1.2 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County Building Codes Department | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 22 | Training and equipment for the Swiftwater Rescue Team. | 3.3 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 23 | Create a FEMA Approved Debris Removal Plan to prepare Pickens County Public Works in planning and preparing for natural disasters. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Public Works Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 24 | Training and equipment for the Technical Rescue Team to respond to confined space and structural stability calls. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Educate public about severe weather and safety strategies. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Mayor of Norris, Mayor of Six Mile | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 26 | Strengthen the efforts of trained volunteers within the Storm Ready County program | 3.2 | Flood, Hurricane, Severe Storm, Tornado | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Emergency Services | Carry Forward |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 45 | Enroll the Town of Norris in the National Flood Insurance Program. | 1.4 | Flood | High | High | Pickens County, Norris | Pickens County EM Director, Mayor of Norris | General Fund | Immediate | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | Partner with Clemson University to create experiential or service-learning opportunities to meet identified needs within the community. | 5.1 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Clemson University EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 47 | Partner with community groups (Rotary, CERT, Red Cross, etc.) to meet identified needs within the community. | 5.2 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 51 | Mulch and establish riparian zone within City Parks to protect against park sedimentation | 4.2 | Flood | Low | Medium | Clemson | City of Clemson Parks and Recreation | General Fund | Short-Term | Natural Resource Protection | Carry Forward. Riparian zones have been established and parks department does mulch the areas however it is ongoing work. |
| 52 | Remove or trim trees and other vegetation from around roadways, powerlines, and neighborhood entrances. Relocate powerlines underground. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm, Wildfire | High | High | Clemson | City of Clemson Police, Fire, Public Works, Engineering, and Horticulture | General Fund | Long-Term | Property Protection | Carry Forward. Duke cleared power lines and residents can apply for funding to move lines underground. 40 people have signed up so far. |
| 53 | Enlarge culverts in flood prone areas and assist residents with cost of replacing culverts. | 1.5 | Flood | Medium | High | Clemson | City of Clemson Engineering and Stormwater | Local Funds, State Grant Funds, Federal Grant Funds | Long-Term | Structural Projects | Carry Forward. Some have been completed but some are still in progress |
| 54 | Identify homes in the floodplain and purchase and/or retrofit. | 1.5 | Flood | Medium | Medium | Clemson | City of Clemson Engineering, Parks and Recreation, Planning and Codes, and Stormwater | Federal Grant Funds | Long-Term | Property Protection | Carry Forward. One acquisition completed so far. |
| 55 | Provide training to first responders regarding train safety, so that they have better understanding of what materials are transported through the city, how to communicate in the event of an incident, what resources are available to them, and how to respond to incidents. | 3.3 | Hazardous Materials | Medium | High | Easley | City of Easley Fire Department | General Fund | Immediate | Emergency Services | Carry Forward. Ongoing and consistently done for highway and rail safety. |
| 56 | Conduct risk assessment to more closely identify areas of cyber vulnerabilities within the city which may cause hazard events (e.g., communication, water, sewage outages) | 2.2 | All Hazards | High | Medium | Easley | City of Easley, Easley Combined Utilities | General Fund | Long-Term | Prevention | Carry Forward. Actively working on implementation. |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 57 | Purchase a small bucket truck to trim limbs overhanging city streets. Purchase a new tractor and ditch bank cutting equipment. Implement a new vegetation removal policy. | 1.4 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | Pickens | City of Pickens Public Utilities Director | General Fund | Long-Term | Prevention | Carry Forward. No progress reported, but the City intends to pursue implementation in the future. |
| 58 | Purchase standby diesel generator for the City of Pickens water pump stations. | 3.1 | Dam Failure, Flood | Medium | High | Pickens | City of Pickens Public Utilities Director | General Fund | Long-Term | Property Protection | Carry Forward. In Progress. The City received grant funding for this project and installation of the generator is underway. |
| 59 | Purchase one mobile standby diesel generator for the City of Pickens sewer lift stations and electrical upgrades at these stations to allow connection to standby power. | 3.1 | All Hazards | Medium | Low | Pickens | City of Pickens Public Utilities Director | General Fund | Long-Term | Property Protection | Carry Forward. There are mobile generators available but electrical upgrades will still be pursued. |
| 60 | Buy out all downstream homes in the inundation zone. | 1.5 | Dam Failure | Low | Low | Pickens | City of Pickens Public Utilities Director | General Fund, Federal Grant Funds | Long-Term | Property Protection | Carry Forward. No acquisitions have occurred, but this is still a City priority should any property owners wish to participate. |
| 61 | Purchase a ladder truck. | 3.3 | Urban Fire | Medium | Low | Pickens | City of Pickens Fire Chief | General Fund, Private Grants | Long-Term | Emergency Services | Carry Forward. In Progress. Funds have been allocated and the City hopes to procure a truck by March 2023. |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 66 | Implement streambank stabilization and stream restoration along the Saluda River to repair unstable banks and reduce erosion and sedimentation that degrades natural floodplain functions and downstream reservoir capacity. | 4.2 | Flood, Drought | High | Low | Pickens County, City of Easley | Pickens County EM Director, Easley Combined Utilities, Save Our Saluda | Local Funds, State & Federal Grant Funds | Long-Term | Natural Resource Protection | New |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# 8 PLAN IMPLEMENTATION & MAINTENANCE

This section outlines the process for adoption, implementation, monitoring, and maintenance of the plan. This section contains the following subsections:

- 8.1 Adoption
- 8.2 Implementation and Integration
- 8.3 Monitoring, Evaluation, and Maintenance
- 8.4 Continued Public Involvement

## 8.1 ADOPTION

**Requirement §201.6(c)(5):** [The plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from all participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. Each participating jurisdiction will adopt the Hazard Mitigation Plan by passing a resolution. Copies of these adoption resolutions and FEMA's approval letter will be provided in Appendix A.

## 8.2 IMPLEMENTATION AND INTEGRATION

**Requirement §201.6(c)(4):** [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This section provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

### RESPONSIBILITY FOR IMPLEMENTATION OF GOALS AND ACTIVITIES

Once adopted, the plan must be implemented to be effective. Each jurisdiction participating in this plan is responsible for plan implementation within their jurisdiction. Every identified action in the mitigation action plan is assigned to a specific lead individual, agency, or department, including elected officials, officials appointed to head County or City departments, local staff, and partner or stakeholder organizations. While this plan contains many worthwhile actions, each participating jurisdiction will need to work with the assigned lead departments and agencies to decide which action(s) to undertake first. The priority assigned to the actions in the planning process and funding availability will affect that decision. Low or no-cost actions are often the easiest way to demonstrate progress toward successful plan implementation. The assigned implementation timeline provides a guide for plan participants to gage whether they are making adequate progress toward timely completion.

During the quarterly reviews described in Section 8.3.2, the HMPC will assess progress on each of the goals and activities in the plan. At that time, recommendations may be made to modify implementation timelines, funding resources, and responsible entities. On a regular basis, the priority standing of various activities

may also be changed. Some activities that are found not to be feasible may be deleted from the plan entirely and activities addressing problems unforeseen during plan development may be added.

Mitigation is most successful when it is integrated into the day-to-day functions and priorities of government. Implementation will be accomplished by adhering to the schedules identified for each action and through regular, thorough, and energetic efforts to network and highlight the multi-objective, win-win benefits of mitigation. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the costlier recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the participating jurisdictions will be positioned to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

## INCORPORATION INTO EXISTING PLANNING MECHANISMS

The HMPC intends to support all participating municipalities in incorporating the findings and recommendations of this hazard mitigation plan into other plans, such as a comprehensive plan, capital improvements plan, or emergency operations plan. It will be the responsibility of the Pickens County Emergency Management and local HMPC representatives to determine and pursue opportunities for integrating the requirements of this plan with other local planning documents. Pickens County Emergency Management and HMPC representatives will provide a copy of this plan and ensure that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the Hazard Mitigation Plan and will not contribute to increased hazard vulnerability in the planning area. Incorporating the hazard mitigation plan into existing planning mechanisms will build regulatory mitigation capability and can support the implementation of mitigation action plans.

In cases where the municipalities are participants in a county-wide planning process, Pickens County Emergency Management will act on behalf of the municipalities in advising for plan incorporation and integration. It should also be noted that due to the small size of some of the municipalities, municipal representatives of the HMPC are often the same person who participates in the update of other local planning documents. Therefore, these officials will carry forward the knowledge gained from participating in the hazard mitigation planning process into these other planning processes.

Since the 2018 plan was adopted, each jurisdiction has worked to integrate the hazard mitigation plan into other planning mechanisms where applicable and feasible. Each jurisdictions' plan integration efforts and opportunities are summarized below.

**Pickens County:** Planning is primarily the responsibility of the County Planning Commission and County staff. The Commission integrated hazard mitigation into the recent update of the Comprehensive Plan and into an update of the floodplain ordinance, which was revised based on SCDNR recommendations. Moving forward, the Commission will issue each planning committee and County Department a copy of the adopted hazard mitigation plan, and the Director of Emergency Management for Pickens County will explain to each planning committee the importance of incorporating hazard mitigation into every facet of planning. As the County maintains responsibility for the Town of Norris' and the Town of Six Mile's mitigation efforts, each Town's Mayor or their designee will participate in the County's planning efforts, with the responsibility of ensuring that mitigation actions directly affecting their Towns are incorporated into their planning efforts and reported back to their Town Councils.

**Central:** Planning is primarily the responsibility of a committee comprised of Department Heads, Fire Chief, Police Chief, and a representative for the County. The City maintains a Master Plan and local

ordinances, and the committee will be responsible to ensure that hazard mitigation actions be incorporated in their next Master Plan revision and ordinance updates. The committee will also work with the Parks and Recreation Department, to incorporate hazard mitigation into their less formal planning activities. Central's representatives to the HMPC from the Fire Department will be responsible for ensuring that each City department and committee receive a copy of the hazard mitigation plan and instructions that mitigation actions should be incorporated into other plans.

**Clemson:** The City Council and the Planning and Codes department are responsible to maintaining and updating the City's plans and ordinances. By participating in each of the planning meetings or designating an alternate, the Director of Planning and Codes will ensure that future revisions of the City's Comprehensive Plan, Land Development Regulations, Zoning Ordinances, Stormwater Management Plan, and the Floodplain Management Ordinances integrate goals, objectives, and actions of the hazard mitigation plan. The City's Director of Planning and Codes will also work closely with officials from Clemson University to ensure their Master Plan fully incorporates hazard mitigation actions. The Director of Planning will be responsible for ensuring that each City department and committee receives a copy of the hazard mitigation plan and for instructing each department and committee that mitigation actions should be incorporated into each plan, whenever possible.

**Easley:** The Town has multiple plans relevant to mitigation, each of which is the responsibility of different City entities. The Planning Commission will be responsible for ensuring that each City Department and Committee receives a copy of the hazard mitigation plan immediately following its adoption and will instruct those committees and departments that mitigation should be incorporated wherever possible. The Planning Commission will work to ensure that hazard mitigation actions are incorporated into the next revision of the Comprehensive Plans and Land Development Regulations The Director of the Recreation Department will be responsible for incorporating hazard mitigation actions into the City's Recreation Plans. The Director of Community Development will ensure that hazard mitigation actions, such as drought resistant landscaping, will be incorporated into the City's Landscaping Plans. The Building Official will be responsible for ensuring that building codes, stormwater management plans and floodplain management plans meet current standards and incorporate additional hazard mitigation actions as appropriate.

**Liberty:** The City's Planning Commission has worked to incorporate hazard mitigation actions and concepts into the new Comprehensive Plan, which is currently under development with support from the Appalachian Council of Governments. Moving forward, the Planning Commission will review the City's Land Use Plan and subdivision, zoning and floodplain ordinances to ensure they are up-to-date and incorporate hazard mitigation. The Planning Commission is charged with ensuring each City department and committee receives a copy of the Hazard Mitigation Plan immediately following its adoption and will explain how mitigation principles can be incorporated into other planning mechanisms.

**Norris:** The Town depends upon Pickens County for their plans and ordinances, and integration efforts are led by the County. See the Pickens County section above. The Mayor has supported County efforts by participating on the HMPC and reporting to the Town Council on progress that has been made. This process will continue moving forward.

**Pickens:** Planning is the responsibility of the Planning Commission, City Departments, and Pickens County Departments. The Planning Commission will be responsible for incorporating hazard mitigation ideas into the next revision of the City's Comprehensive Plan, Zoning Ordinances, and the Subdivision and Development regulations. The Planning Commission will also maintain primary responsibility for the Hazard Mitigation Plan for the City of Pickens. The Planning Commission will ensure each department and planning committee receives a copy of the hazard mitigation plan as soon as it is adopted, with the instructions to incorporate it into the planning efforts. The Director of the Recreation Department will be responsible for incorporating mitigation activities into the Parks and Recreation Plan and the Director of the Grounds Department will be responsible for ensuring that hazard mitigation ideas are incorporated into

the City's Landscape Plans. Buildings and Codes, Stormwater Management, and Floodplain Management regulations are handled by the County, and related integration efforts will continue to be led by the County.

**Six Mile:** The Town depends upon the County for many of their services. The Mayor has supported County efforts by participating on the HMPC and reporting to the Town Council on progress that has been made. This process will continue moving forward. See the Pickens County section above.

Other opportunities to integrate the requirements of this plan into other local planning mechanisms shall continue to be identified through quarterly meetings of the HMPC and through the five-year review process described herein. Although it is recognized that there are many possible benefits to integrating components of this plan into other local planning mechanisms, the development and maintenance of this stand-alone Hazard Mitigation Plan is deemed by the HMPC to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

## 8.3 MONITORING, EVALUATION, AND MAINTENANCE

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

### *8.3.1 ROLE OF HMPC IN IMPLEMENTATION, MONITORING AND MAINTENANCE*

With adoption of this plan, each jurisdiction, in coordination with Pickens County Emergency Management, will be responsible for the plan implementation and maintenance. As such, each jurisdiction agrees to continue its relationship with the HMPC and:

- Act as a forum for mitigation issues;
- Disseminate mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure mitigation remains a consideration for community decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended revisions to the local governing body; and
- Inform and solicit input from the public.

The HMPC's primary duty moving forward is to see the plan successfully carried out and report to each local governing body, Pickens County Emergency Management, SCEMD, and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about mitigation, passing concerns on to appropriate entities, and posting relevant information on local websites (and others as appropriate).

### *8.3.2 MAINTENANCE SCHEDULE*

Pickens County Emergency Management is responsible for initiating plan reviews. To monitor progress and evaluate the mitigation strategies identified in the action plan in between plan updates, the Emergency Management Director will reconvene the HMPC to review this plan quarterly and following a hazard event.

#### CRITERIA FOR QUARTERLY REVIEWS

To ensure regular monitoring and provide adequate information to support the five-year update evaluation process discussed above, the HMPC will convene for quarterly reviews. During these reviews, the HMPC

will discuss each action item identified in the plan, describe any progress toward implementation, and recommend any changes as appropriate. These

Additionally, the HMPC will monitor changes to exposure, vulnerability, and risk, which may support the HMPC in evaluating mitigation action outcomes and identifying necessary changes for inclusion in the five-year update.

## MAINTENANCE EVALUATION PROCESS

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the plan. Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan, including:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or further annexation).

Updates to this plan will:

- Consider the appropriateness of the goals for addressing current and expected conditions;
- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

To best evaluate any changes in vulnerability as a result of plan implementation, the HMPC will follow this process:

- The HMPC representatives from each jurisdiction will be responsible for tracking and reporting on their mitigation actions. Jurisdictional representatives should provide input on whether the action as implemented met the defined objectives and/or is likely to reduce vulnerabilities.
- If the action does not meet identified objectives, the jurisdictional representatives will determine what additional measures may be implemented and modify the plan accordingly.
- All monitoring and implementation information will be reported to the full HMPC, led by Pickens County Emergency Management, during quarterly meetings. An annual plan maintenance report may be drafted as deemed necessary.

Members of the HMPC and personnel from Emergency Management will continue to serve on committees and planning teams for the county in order to ensure the hazard mitigation plan is considered during all relevant county planning activities and incorporated whenever feasible.

## FIVE-YEAR UPDATE

In keeping with the requirements of DMA 2000, Pickens County Emergency Management will submit a five-year written update to SCEMD and FEMA Region 4, unless disaster or other circumstances require a change to this schedule. With this plan update anticipated to be fully approved and adopted in 2023, the next plan update for Pickens County will be completed in 2028.

During the five-year plan update process, changes will be made to the plan based on findings during quarterly reviews to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions for which implementation has not yet been pursued will also be reviewed during the monitoring

and update of this plan to determine feasibility of future implementation. Risk and vulnerability will also be re-evaluated based on current and expected future conditions.

Updating of the plan will be by written changes and submission to SCEMD and FEMA Region 4, as is appropriate and necessary, and as approved by local governing bodies. In keeping with the five-year update process, the HMPC or similar committee will convene public meetings to solicit public input on the plan and its routine maintenance and the final product will be adopted by local governing bodies.

## 8.4 CONTINUED PUBLIC INVOLVEMENT

**Requirement §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 to the overall success of the plan as it evolves and is implemented. The annual review process will provide an opportunity to solicit participation from new and existing stakeholders, publicize success stories from the plan implementation, and seek additional public comment.

In between annual reviews, other efforts to involve the public in the maintenance, evaluation, and revision process will also be made. HMPC meetings will be advertised on the Pickens County website and in municipal office buildings. HMPC membership will continue to include willing local citizen and stakeholder volunteers. Continued public and stakeholder involvement and input will also be sought through invitation to designated committee meetings, website postings, and press releases to local media, similar to the process used in the development of this plan. A copy of the plan will be kept on the Pickens County website to ensure public accessibility.

When the HMPC reconvenes for the five-year update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the HMPC will be responsible for coordinating the activities necessary to involve the greater public, including disseminating information through a variety of media channels detailing the plan update process. As part of this effort, public meetings will be held and public comments will be solicited on the plan update draft.

# A. UNINCORPORATED PICKENS COUNTY

## A.1 COMMUNITY PROFILE

### GEOGRAPHY

Pickens County is located on the northern border of South Carolina in the western part of the state. It is bordered by Oconee County to the west, Anderson County to the south, Greenville County to the east, and Transylvania County, North Carolina to the north. Per the U.S. Census Bureau, the county has 496.3 square miles of land area. Elevations range between 600 and 3,547 feet above sea level, and include Sassafras Mountain, the state's highest point, according to the U.S. Department of the Interior.

### POPULATION

Table A.1 provides population counts and growth estimates for the County and the State. Population statistics for the unincorporated county are estimated based on U.S. Census Bureau data for the overall county and the incorporated jurisdictions.

Based on these estimates, population in unincorporated Pickens County declined from 2010 to 2020, despite overall growth across the County. This decline may be due to annexations and movement of people to the incorporated jurisdictions, as well as the lack of population data for Clemson University in the 2010 Census.

**Table A.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Unincorporated Pickens County** | **78,679** | **69,990** | **-2,294** | **-3.2%** | **70,511** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

The median age in Pickens County is 36.4. Approximately 5.0 percent of the population is under 5 years old and 16.4 percent of the population is aged 65 years and over.

### HOUSING

Table A.2 details housing unit counts and other housing tenure statistics for Pickens County.

From 2010 to 2020 there has been an increase in housing units across the county, mirroring overall population growth. Over 88 percent of housing units are occupied, mostly by owner-occupants. Nearly a third of occupied housing units are renter-occupied. Renters can be particularly vulnerable to displacement if structures are damaged after a hazard event. Financial resources for repairs and recovery are often limited for renters and landlords which can limit the housing stock and displace households for extended periods. Conversely, homeowners may be more willing and able to make investments to protect their homes from hazard risks.

**Table A.2 Housing Tenure Statistics, 2021**

| Housing Characteristics | Pickens County |
|---|---|
| Housing Units (2010) | 50,854 |
| Housing Units (2020) | 54,939 |
| Housing Units Percent Change (2010-2020) | 8.0% |

| Housing Characteristics | Pickens County |
|---|---|
| Occupied Units, % (2021) | 88.4% |
| Owner-Occupied Units, % (2021) | 68.9% |
| Renter-Occupied Units, % (2021) | 31.1% |
| Median Home Value (2021) | $166,800 |
| Average Household Size | 2.49 |
| No Vehicle Available, % | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2017-2021 5-Year Estimates

Table A.3 and Table A.4 summarize housing units by type and age. Most housing units in Pickens County are single family homes. Approximately 18 percent of housing units in Pickens County are mobile homes. Mobile homes are more vulnerable to damage from wind and flood hazards.

The County's initial Flood Insurance Rate Map was identified on July 19, 1982. Roughly 36 percent of housing units in Pickens County were built prior to 1980, meaning these structures were built before the establishment of floodplain development standards.

**Table A.3 Housing Units by Type, 2021**

| Units in Structure | Pickens County | South Carolina |
|---|---|---|
| 1-unit, detached | 62.4% | 63.9% |
| 1-unit, attached | 1.4% | 3.2% |
| 2 units | 2.8% | 1.8% |
| 3 or 4 units | 2.2% | 2.7% |
| 5 to 9 units | 3.7% | 4.2% |
| 10 to 19 units | 5.4% | 3.3% |
| 20 or more units | 3.7% | 5.2% |
| Mobile home | 18.4% | 15.4% |
| Boat, RV, van, etc. | 0.2% | 0.1% |

Source: U.S. Census Bureau, American Community Survey 2017-2021 5-Year Estimates

**Table A.4 Housing Units by Age, 2021**

| Housing Year Built | Pickens County | South Carolina |
|---|---|---|
| Built 2020 or later | 0.3% | 0.3% |
| Built 2010 to 2019 | 9.7% | 11.6% |
| Built 2000 to 2009 | 15.8% | 18.6% |
| Built 1990 to 1999 | 21.8% | 18.4% |
| Built 1980 to 1989 | 15.8% | 15.4% |
| Built 1970 to 1979 | 13.7% | 13.9% |
| Built 1960 to 1969 | 8.4% | 8.5% |
| Built 1950 to 1959 | 7.1% | 6.4% |
| Built 1940 to 1949 | 2.5% | 2.8% |
| Built 1939 or earlier | 4.9% | 4.0% |

Source: U.S. Census Bureau, American Community Survey 2017-2021 5-Year Estimates

## ECONOMY

Table A.5 presents key economic statistics for Pickens County and the State of South Carolina. In Pickens County median household income and per capita income are lower than the state average and the percentage of individuals living below the poverty level is higher. However, the unemployment rate is slightly lower than the state average and a smaller percentage of the population is without health insurance.

**Table A.5 Economic Statistics, 2021**

| Economic Characteristics | Pickens County | South Carolina |
|---|---|---|
| Median Household Income | $53,188 | $58,234 |
| Per Capita Income | $29,218 | $32,823 |
| Unemployment Rate | 4.4% | 5.3% |
| % of Individuals Below Poverty Level | 17.2% | 14.5% |
| % Without Health Insurance | 9.1% | 10.5% |

Source: US Census Bureau; American Community Survey 2017-2021 5-Year Estimates

Table A.6 summarizes employment by industry across Pickens County and the State of South Carolina. The dominant employment sector in the County is educational services, and healthcare and social assistance. Compared to the State as a whole, Pickens County has a greater percentage of employment in construction; manufacturing; educational services, and healthcare and social assistance; and arts, entertainment, and recreation, and accommodation and food services. Pickens County has a smaller percentage of employment in retail trade; finance and insurance, and real estate and rental and leasing; professional, scientific, and management, and administrative and water management services; and public administration.

**Table A.6 Employment Statistics by Industry, 2021**

| Industry | Pickens County | South Carolina |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 0.3% | 0.9% |
| Construction | 7.8% | 7.0% |
| Manufacturing | 14.5% | 13.5% |
| Wholesale trade | 2.3% | 2.3% |
| Retail trade | 11.0% | 11.5% |
| Transportation and warehousing, and utilities | 4.5% | 5.4% |
| Information | 0.8% | 1.5% |
| Finance and insurance, and real estate and rental and leasing | 3.9% | 5.9% |
| Professional, scientific, and management, and administrative and waste management services | 8.4% | 10.7% |
| Educational services, and healthcare and social assistance | 26.5% | 22.1% |
| Arts, entertainment, and recreation, and accommodation and food services | 10.9% | 9.8% |
| Other services, except public administration | 5.5% | 5.0% |
| Public administration | 3.5% | 4.5% |

Source: US Census Bureau; American Community Survey 2017-2021 5-Year Estimates

## SOCIAL VULNERABILITY

Pickens County is fairly rural and communities in the western portion of the County may be hard to reach during a hazard event or may struggle to evacuate. The County tries to provide adequate assistance to more rural residents. County representatives also note that there is a significant homeless population throughout the County and jurisdictions. The exact number is hard to gage, as there is only one small shelter, and many people live in their cars or outside. These individuals are more vulnerable during hazard events.

## DEVELOPMENT TRENDS

Development is concentrated in the southern half of Pickens County, interspersed with pasture and open land as well as smaller areas of deciduous and evergreen forest. The north portion of the county is primarily deciduous forest with some evergreen stands scattered throughout (Fry et al.).

Most of the developed areas are dedicated to residential land uses, while Commercial, Agricultural, and joint Residential/Commercial properties take up small portion of the County's land area. The County's comprehensive plan provides character areas that lay out a vision and goals for the County in terms of future development and how various areas of the County should look, feel and operate in the future. There are 11-character areas displayed in Figure A.2. The southern half of the County is mostly planned for Residential Growth with some areas around the municipalities planned for Community Commercial Centers and Urban Residential. The northern half of the County will likely remain rural with area of recreational open space and agricultural preservation.

Figure A.1 shows a base map of Pickens County and Figure A.2 shows the County's future land use designations.

**Figure A.1 Base Map, Pickens County**

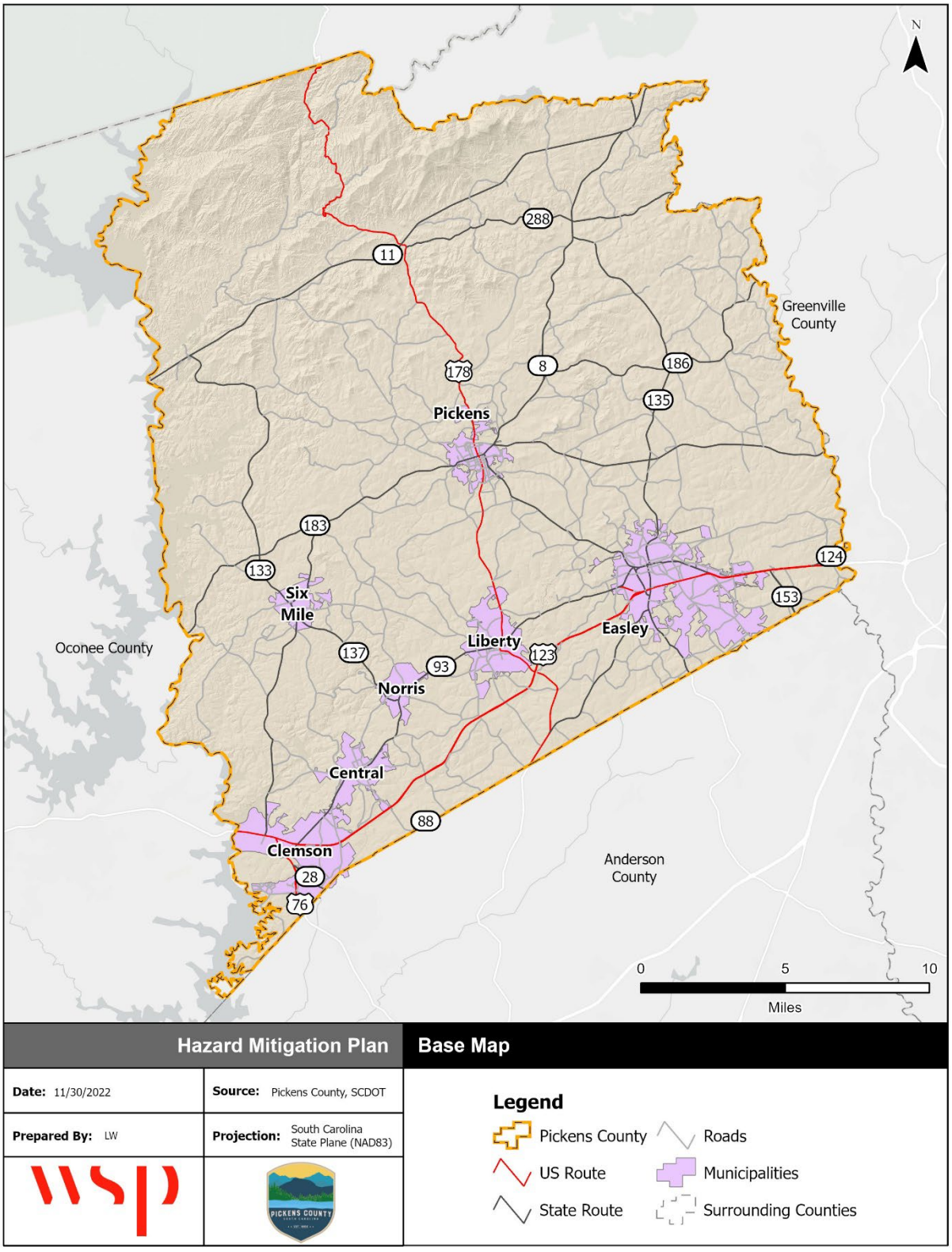
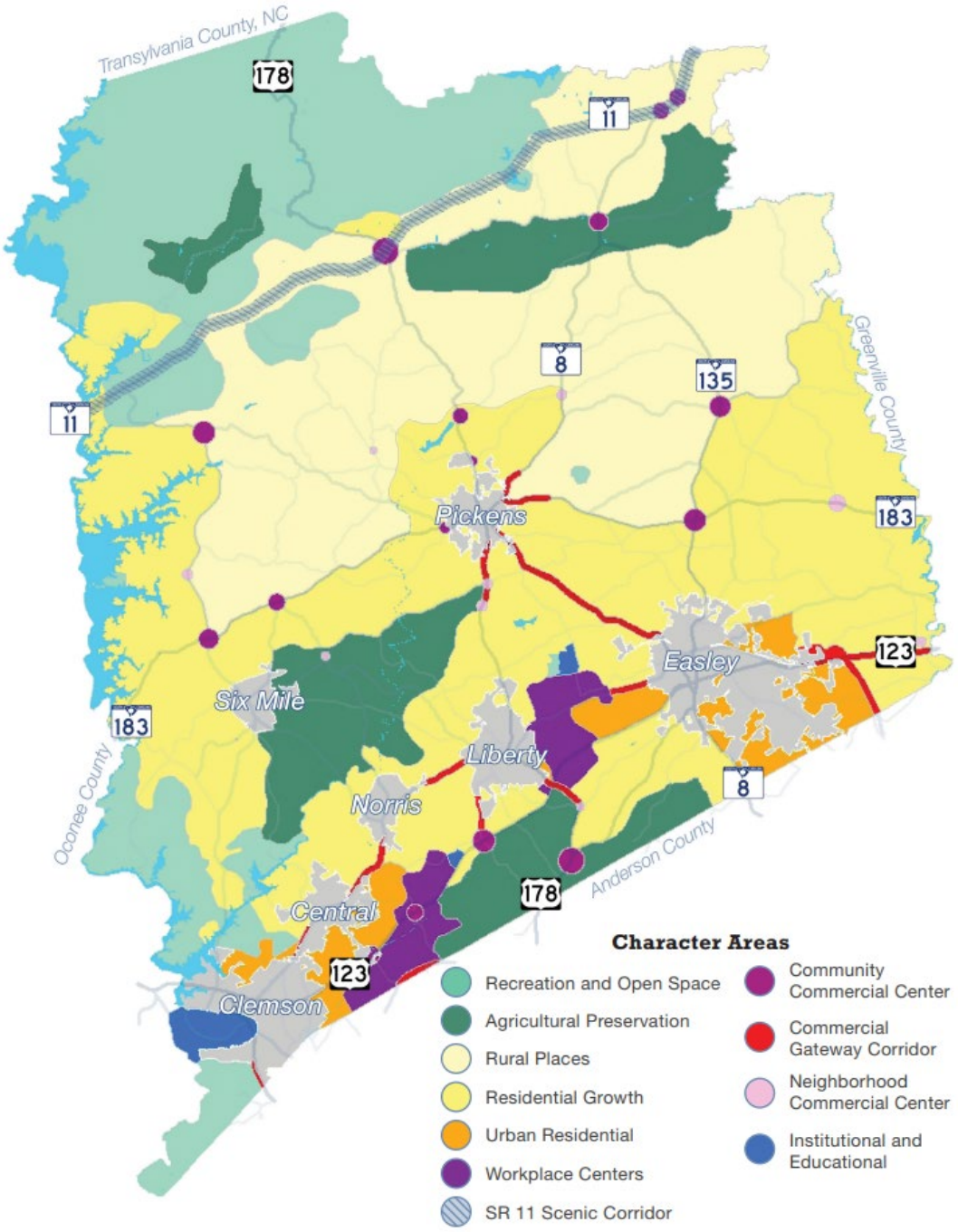


**Figure A.2 Future Land Use, Pickens County**




Source: One Pickens County Comprehensive Plan, 2022

## A.2 RISK ASSESSMENT

This section contains a summary of Pickens County's asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for Pickens County. Table A.7 summarizes building exposure by occupancy type, representing total property value at risk within the County's unincorporated areas.

**Table A.7 Building Exposure by Occupancy Type**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 285 | $16,488,705 | $16,488,705 | $32,977,410 |
| Commercial | 593 | $176,947,175 | $176,947,175 | $353,894,350 |
| Education | 3 | $912,005 | $912,005 | $1,824,010 |
| Government | 10 | $4,573,862 | $4,573,862 | $9,147,724 |
| Industrial | 1,257 | $193,825,909 | $290,738,864 | $484,564,773 |
| Religious | 33 | $10,517,496 | $10,517,496 | $21,034,992 |
| Residential | 25,810 | $6,226,855,804 | $3,113,427,902 | $9,340,283,706 |
| **Total** | **27,991** | **$6,630,120,956** | **$3,613,606,008** | **$10,243,726,964** |

Source: Pickens County GIS

Table A.8 summarizes critical facilities and infrastructure in the unincorporated county by facility type, and Table A.9 provides the full inventory of critical facilities and infrastructure in unincorporated Pickens County. Critical facilities and infrastructure were identified by Pickens County Emergency Management and County staff and are maintained in GIS.

**Table A.8 Critical Facility Summary**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 32 |
| Food, Water, Shelter | 4 |
| Health & Medical | 12 |
| Energy | 1 |
| Communications | 2 |
| Transportation | 0 |
| Hazardous Materials | 52 |
| **Total** | **103** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table A.9 Critical Facility Inventory**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Cateechee Sewer Treatment |
| Safety & Security | Central Fire #2 |
| Safety & Security | Central North Sewer Treatment |
| Safety & Security | Clemson University Police |
| Safety & Security | Clemson University Fire |
| Safety & Security | Clemson University Police |
| Safety & Security | Cramer Sewer Treatment |
| Safety & Security | Crosswell Fire |
| Safety & Security | Dacusville Fire |
| Safety & Security | Dacusville Rural #2 |
| Safety & Security | Georges Creek Sewer Treatment |
| Safety & Security | Hinkle Building |
| Safety & Security | Holly Springs Fire |
| Safety & Security | Liberty Rural #1 |

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Liberty Rural #2 |
| Safety & Security | Middle Regional Plant Sewer Treatment |
| Safety & Security | Owens Sewer Treatment |
| Safety & Security | Pickens County Detention |
| Safety & Security | Pickens Rural #1 |
| Safety & Security | Pickens Rural #2 |
| Safety & Security | Pickens Rural #3 |
| Safety & Security | Public Service Building |
| Safety & Security | Pumpkintown Fire |
| Safety & Security | Pumpkintown Rural #2 |
| Safety & Security | SC Army National Guard |
| Safety & Security | Shady Grove Fire |
| Safety & Security | Sheriff Sub-Station Code 12 |
| Safety & Security | Sherrif Sub-Station Code 7 |
| Safety & Security | Springs Fire |
| Safety & Security | Stockade Sewer Treatment |
| Safety & Security | Upper Regional Plant Sewer Treatment |
| Safety & Security | Vineyards Fire |
| Food, Water, Shelter | Bible Methodist Church |
| Food, Water, Shelter | City Greenville Water Intake |
| Food, Water, Shelter | Greenville Water Treatemnt |
| Food, Water, Shelter | Prison Farm |
| Health & Medical | April Valley #1 |
| Health & Medical | Central Rescue 2 |
| Health & Medical | Clemson University Ems |
| Health & Medical | Dacusville Ems |
| Health & Medical | Ems Administration |
| Health & Medical | Ems Main Office |
| Health & Medical | Harvey's Nursing Center |
| Health & Medical | Holly Springs Ems |
| Health & Medical | Home With A Heart |
| Health & Medical | Master Care, Inc. |
| Health & Medical | Pc Board Of Disabilities |
| Health & Medical | Six Mile Ems |
| Energy | Public Works |
| Communications | Radio Tower |
| Communications | Radio Tower |
| Hazardous Materials | Alice Manufacturing Company |
| Hazardous Materials | Alice Manufacturing Company-Arial Plant |
| Hazardous Materials | Alice Manufacturing Company-Ellison Plant |
| Hazardous Materials | Alice Manufacturing Company-Elljean |
| Hazardous Materials | Alice Manufacturing Company-Foster Plant |
| Hazardous Materials | Amerigas Propane, Lp |
| Hazardous Materials | Bellsouth-Walhalla Hwy |
| Hazardous Materials | Champion Aerospace, Inc. |
| Hazardous Materials | City Of Pickens Water Treatment Plant |
| Hazardous Materials | Clemson University Waste Water Treatment Plant |
| Hazardous Materials | Duke Power-Blue Ridge Ec Del 11 Substation |
| Hazardous Materials | Duke Power-Blue Ridge Ec Del 14 Substation |
| Hazardous Materials | Duke Power-Central Tie/Clemson Area Office |

| Facility Type | Facility Name |
|---|---|
| Hazardous Materials | Duke Power-Clemson Univ Sta 2 Substation |
| Hazardous Materials | Duke Power-Pickens Retail Substation |
| Hazardous Materials | Easley Combined Utilities - Don L Moore Wwtp |
| Hazardous Materials | Easley Combined Utilities - Golden Creek Wwtp |
| Hazardous Materials | Easley Custom Plastics |
| Hazardous Materials | Federal-Mogul Corporation |
| Hazardous Materials | Fran Tex Chemicals |
| Hazardous Materials | Freeman Gas & Elec Co Inc |
| Hazardous Materials | Greenville Water System-Keowee Plant - Adkins |
| Hazardous Materials | Hanes Dye & Finishing Company-Falcon Plant |
| Hazardous Materials | Imperial Die Casting Co. - Rcm Industries |
| Hazardous Materials | Kent Manufacturing Company |
| Hazardous Materials | King Asphalt Inc. (Plant 2) |
| Hazardous Materials | Laurens Electric Cooperative Inc - Powdersville Substation |
| Hazardous Materials | Markiv Automotive |
| Hazardous Materials | Mayfair Mills, Inc-Glenwood Division |
| Hazardous Materials | Milliken & Company - Pendleton Finishing Plant |
| Hazardous Materials | Morgan Concrete Company |
| Hazardous Materials | New Horizon Electric Cooperative - Central Substation |
| Hazardous Materials | New Horizon Electric Cooperative - Dacusville Substation |
| Hazardous Materials | New Horizon Electric Cooperative - Enon Substation |
| Hazardous Materials | New Horizon Electric Cooperative - Gap Hill Substation |
| Hazardous Materials | New Horizon Electric Cooperative - Liberty Substation |
| Hazardous Materials | New Horizon Electric Cooperative - Pickens Substation |
| Hazardous Materials | New Horizon Electric Cooperative - Powdersville Substation |
| Hazardous Materials | New Horizon Electric Cooperative - Six Mile Substation |
| Hazardous Materials | New Horizon Electric Cooperative, Inc - Crossroads Substation |
| Hazardous Materials | O'dell Oil Co., Inc-Spanglers Grocery |
| Hazardous Materials | Ortec, Inc |
| Hazardous Materials | Owt Industries, Inc - Ryobi |
| Hazardous Materials | Pendleton Asphalt Plant - Anderson County |
| Hazardous Materials | Pickens County Commerce Park |
| Hazardous Materials | Richmond Gear |
| Hazardous Materials | Saco Lowell, Inc |
| Hazardous Materials | Sc Department Of Transportation |
| Hazardous Materials | Shaw Industries Group, Inc |
| Hazardous Materials | Shaw Industries Group, Inc |
| Hazardous Materials | Southern Weaving Company-Easley Plant |
| Hazardous Materials | Sulzer Pumps |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table A.10 summarizes the PRI scores for unincorporated Pickens County for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table A.10 PRI Results, Unincorporated Pickens County**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Likely | Critical | Small | > 24 hrs | < 1 week | 2.6 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Highly Likely | Critical | Small | 6 to 12 hrs | < 1 week | 3.1 |
| Hurricane/Tropical Storm | Likely | Critical | Large | > 24 hrs | < 24 hrs | 2.9 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Catastrophic | Moderate | < 6 hrs | > 1 week | 2.9 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## *A.2.1 DAM/LEVEE FAILURE*

Table A.11 details the 36 high hazard dams reported within unincorporated Pickens County according to the SC DHEC Dam Inventory and the National Inventory of Dams. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

**Table A.11 Dam Inventory for Unincorporated Pickens County**

| Dam Name | NIDID | Height (ft.) | Storage (ac-ft) | Owner | Primary Purpose | Last EAP Revision |
|---|---|---|---|---|---|---|
| B F Finley Dam 1 | SC00693 | 30 | 199 | Private | Recreation | 4/7/2017 |
| B F Finley Dam 2 | SC00694 | 39 | 316 | Private | Recreation | 4/7/2017 |
| B Frank Finley Dam | SC00695 | 34 | 250 | Private | Recreation | 4/7/2017 |
| Big Rock Lake Dam | SC01378 | 30 | 67 | Private | Flood Risk Reduction | -- |
| Dam On Christine Drive | SC05010 | 26 | 172 | Not Listed | Irrigation | -- |
| Danny Cox Dam | SC02703 | 27 | 36 | Private | Fire Protection, Stock, Or Small Fish Pond | -- |
| Finleys Lake Dam | SC00697 | 48 | 174 | Private | Flood Risk Reduction | 4/18/2007 |
| Georges Creek WCD Dam 1a | SC00702 | 36 | 1721 | Private; Local Government | Flood Risk Reduction | 6/13/2019 |
| Gertrude Harris Dam | SC00703 | 24 | 72 | Private | Recreation | -- |

| Dam Name | NIDID | Height (ft.) | Storage (ac-ft) | Owner | Primary Purpose | Last EAP Revision |
|---|---|---|---|---|---|---|
| James Cushman Dam | SC02446 | 43 | 18 | Private | Recreation | -- |
| Jocassee | SC00529 | 385 | 1,160,298 | Public Utility | Hydroelectric | 12/21/2020 |
| Keasler Pond Dam | SC01373 | 33 | 68 | Private | Recreation | -- |
| Kings Sunset Nursery Dam | SC02765 | 28 | 90 | Private | Irrigation | -- |
| Lake Calton Dam | SC00698 | 39 | 129 | Private | Recreation | 2/8/2021 |
| Lake Diana Dam | SC00710 | 22 | 82 | Private | Recreation | -- |
| Lawrence Ledford Dam | SC00711 | 25 | 75 | Private | Recreation | -- |
| Mallard Cove (Forest Dr) | SC01296 | 23 | 48 | Private | Recreation | 6/22/1984 |
| Merritts Pond | SC00712 | 28 | 68 | Private | Recreation | -- |
| Nine Times Dam | SC02503 | 22 | 161 | Private | Recreation | 2/23/2017 |
| Oolenoy River WCD Dam 10 | SC01383 | 43 | 208 | Private; Local Government | Flood Risk Reduction | -- |
| Oolenoy River WCD Dam 9 | SC01384 | 66 | 322 | Private; Local Government | Flood Risk Reduction | -- |
| Oolenoy WCD Dam 40 | SC02452 | 60 | 2,600 | Local Government | Recreation | 6/12/2019 |
| Pickens City Reservoir Lake Dam | SC00715 | 24 | 789 | Local Government | Water Supply | 1/27/2017 |
| Pinnacle Lake Dam | SC00696 | 34 | 770 | State | Recreation | -- |
| Praters Creek Dam | SC01377 | 49 | 550 | Private | Flood Risk Reduction | -- |
| Spillway Dam - Keowee | SC00706 | 60 | 955,586 | Public Utility | Hydroelectric | 12/21/2020 |
| Stanley Mcjunkin Dam | SC02648 | 37 | 170 | Private | Debris Control | 6/12/2019 |
| Table Rock Reservoir Dam | SC00003 | 155 | 3,3112 | Local Government | Water Supply | 11/9/2015 |
| Tony Stiwinter Dam | SC02447 | 25 | 5 | Private | Recreation | 5/9/2017 |
| Twelve Mile Cr WCD Dam 12 | SC00716 | 32 | 174 | Private | Flood Risk Reduction | -- |
| Twelve Mile Creek WCD 54a | SC00700 | 36 | 3,282 | Private; Local Government | Flood Risk Reduction | 6/25/1995 |
| Twelve Mile Creek WCD Dam 16 | SC00699 | 42 | 2,299 | Private; Local Government | Flood Risk Reduction | -- |
| Twelve Mile Creek WCD Dam 22 | SC00701 | 41 | 1,800 | Private; Local Government | Flood Risk Reduction | -- |
| Twelve Mile Creek WCD Dam 5 | SC00714 | 49 | 399 | Private; Local Government | Flood Risk Reduction | -- |
| Twelve Mile Creek WCD Dam 8 | SC00717 | 44 | 207 | Private; Local Government | Flood Risk Reduction | -- |
| William Evatt Dam | SC01380 | 26 | 67 | Private | Recreation | -- |

Data was not available to estimate property exposure to failure of any high hazard dams. Table A.12 summarizes property exposure in the unincorporated county to flooding from failure of the Clemson Diversion Levee System. Another $120 million in estimated property value in the unincorporated county is also exposed to failure of the Town Creek Levee System.

**Table A.12 Property Exposure in Levee Protected Area**

| Occupancy | Estimated Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 3 | $5,455,584 | $5,455,584 | $10,911,168 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 1 | $12,000 | $18,000 | $30,000 |
| Religious | 0 | $0 | $0 | $0 |
| Residential | 26 | $12,279,337 | $6,139,669 | $18,419,006 |
| **Total** | **30** | **$17,746,921** | **$11,613,253** | **$29,360,174** |

Source: Pickens County GIS, USACE NLD

## A.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. The unincorporated County has a large amount of agricultural land, which is more vulnerable to the impacts of drought. Most of the county's 740 farms and 39,331 acres of cropland are likely located in unincorporated areas. This land and the market value of crops, last estimated at $6.6 million, are vulnerable to drought. Forested areas of the unincorporated county are also more vulnerable to drought and present an increased wildfire threat during and after periods of drought.

## A.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. The unincorporated County's entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 1,316 buildings in unincorporated Pickens County sustaining some level of damage amounting to $20.5 million.

## A.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Compared to countywide averages, the unincorporated County has fewer children under age 5 but a higher proportion of adults over age 65.

## A.2.5 FLOOD

Table A.13 details the acreage of Pickens County's total area by flood zone on the effective DFIRM. Per this assessment, 5.6 percent of unincorporated Pickens County falls within the SFHA.

**Table A.13 Flood Zone Acreage in Unincorporated Pickens County**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 16,392.2 | 5.4% |
| Floodway | 680.3 | 0.2% |
| Area with Reduced Risk due to Levee | 444.4 | 0.1% |
| 0.2% Annual Chance Flood Hazard | 121.3 | 0.0% |
| Unshaded X | 287,063.7 | 94.2% |
| **Total** | 304,701.7 | -- |
| **SFHA Total** | **17,072.5** | **5.6%** |

Source: FEMA Effective DFIRM

Figure A.3 reflects the effective mapped flood hazard zones for Pickens County, and Figure A.4 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Table A.14 provides the estimated losses for the 1% annual chance flood event in Pickens County. The total estimated damage value is based on damages to improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

**Table A.14 Estimated Building Damage and Content Loss for 1% Annual Chance Flood**

| Occupancy Type | Total Buildings with Loss | Total Value (Building & Contents) | Estimated Building Damage | Estimated Content Loss | Estimated Total Damage | Loss Ratio |
|---|---|---|---|---|---|---|
| Agriculture | 6 | $279,000 | $30,309 | $42,947 | $73,256 | 26% |
| Commercial | 9 | $701,960 | $45,474 | $133,600 | $179,074 | 26% |
| Educational | 0 | $0 | $0 | $0 | $0 | 0% |
| Government | 0 | $0 | $0 | $0 | $0 | 0% |
| Industrial | 18 | $2,076,115 | $134,520 | $367,449 | $501,969 | 24% |
| Religious | 0 | $0 | $0 | $0 | $0 | 0% |
| Residential | 97 | $44,888,006 | $9,183,449 | $3,920,795 | $13,104,244 | 29% |
| **Total** | **130** | **$47,945,081** | **$9,393,752** | **$4,464,791** | **$13,858,542** | **29%** |

Source: Hazus 6.0; Pickens County GIS

A count of people with high exposure to flooding was estimated based on the number of residential buildings with loss and Pickens County's average household size estimate of 2.45 people per household. There are approximately 238 people exposed to flood risk from the 1% annual chance flood event in unincorporated Pickens County.

There are no critical facilities in unincorporated Pickens County located in the SFHA.

In addition to mapped flood hazard areas, the following locations in unincorporated Pickens County have been reported to experience stormwater and localized flooding: Pike Road near Hartwell Lake, North Martin and Hunts Bridge Road, and the Hagood Mill area.

**Figure A.3 FEMA Flood Hazard Areas, Pickens County**

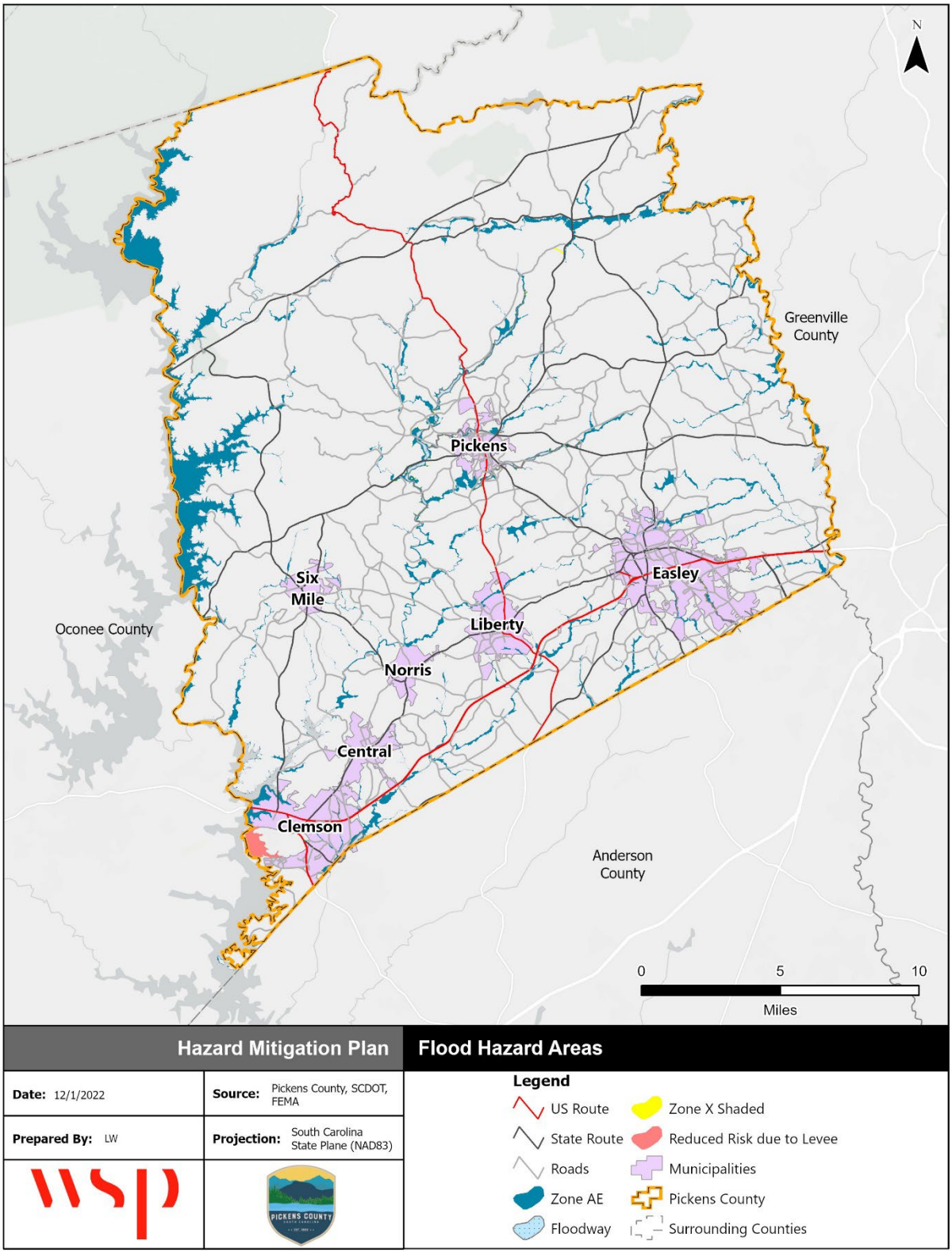
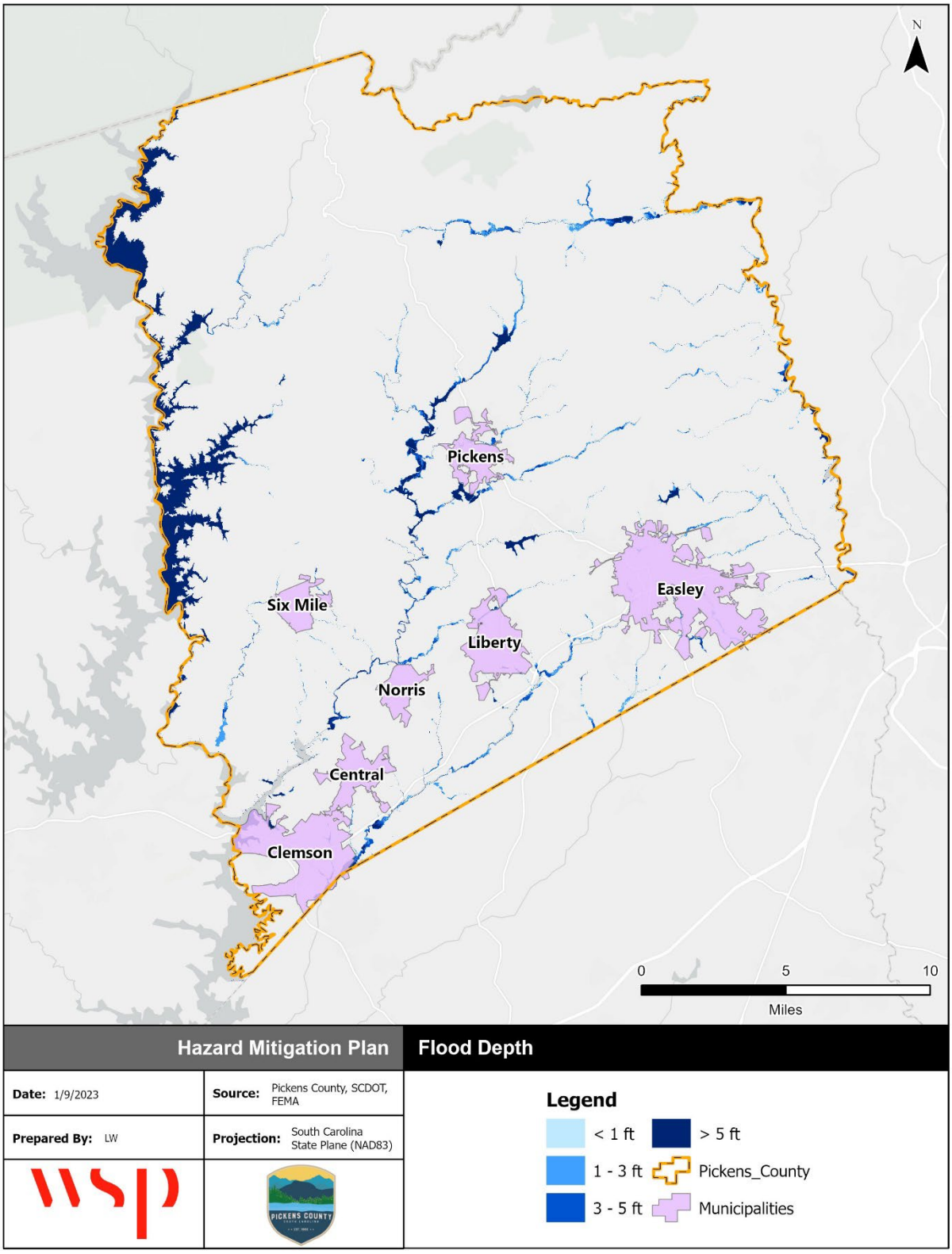


**Figure A.4 Flood Depth, 1%-Annual-Chance Flood Event, Pickens County**



## A.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. The unincorporated county's entire asset inventory is exposed to hurricane and tropical storm impacts. Mobile home units are particularly vulnerable to wind events such as hurricanes and tropical storms. In unincorporated Pickens County there are approximately 8,822 mobile home units which comprise nearly 29% of all housing units. This represents a significant vulnerability, especially for units that are not properly anchored to foundations.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For the unincorporated county, this equates to an estimated $615 thousand in damages and $2.05 million in damages, respectively.

## A.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. Forested areas of the county are vulnerable to wildfire risk from lightning. The built environment is vulnerable to urban fire risk from lightning as well as damage to electrical equipment. Agricultural lands and the entire building inventory are vulnerable to hail impacts.

## A.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados.

## A.2.9 WILDFIRE

Figure A.5 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table A.15 summarizes for unincorporated Pickens County the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table A.15 Building Counts and Values within WUIRI under -5, Unincorporated Pickens County**

| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 97 | 34% | $4,870,635 | $4,870,635 | $9,741,270 |
| Commercial | 397 | 67% | $95,315,215 | $95,315,215 | $190,630,430 |
| Education | 2 | 67% | $23,105 | $23,105 | $46,210 |
| Government | 6 | 60% | $2,537,328 | $2,537,328 | $5,074,656 |
| Industrial | 791 | 63% | $102,519,447 | $153,779,171 | $256,298,618 |
| Religious | 23 | 70% | $8,554,881 | $8,554,881 | $17,109,762 |
| Residential | 16,352 | 63% | $2,608,466,110 | $1,304,233,055 | $3,912,699,165 |
| **Total** | **17,668** | **63%** | **$2,822,286,721** | **$1,569,313,390** | **$4,391,600,111** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Pickens County's average household size estimate of 2.45 people per household. There are approximately 40,062 people exposed to wildfire risk in unincorporated Pickens County.

Table A.16 summarizes critical facility exposure to areas of moderate to high wildfire risk. Table A.17 provides the full inventory of vulnerable facilities and infrastructure.

**Table A.16 Critical Facility Exposure within WUIRI under -5, Unincorporated Pickens County**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 15 |
| Food, Water, Shelter | 2 |
| Health & Medical | 9 |
| Energy | 1 |
| Communications | 1 |
| Transportation | 0 |
| Hazardous Materials | 12 |
| **Total** | **40** |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

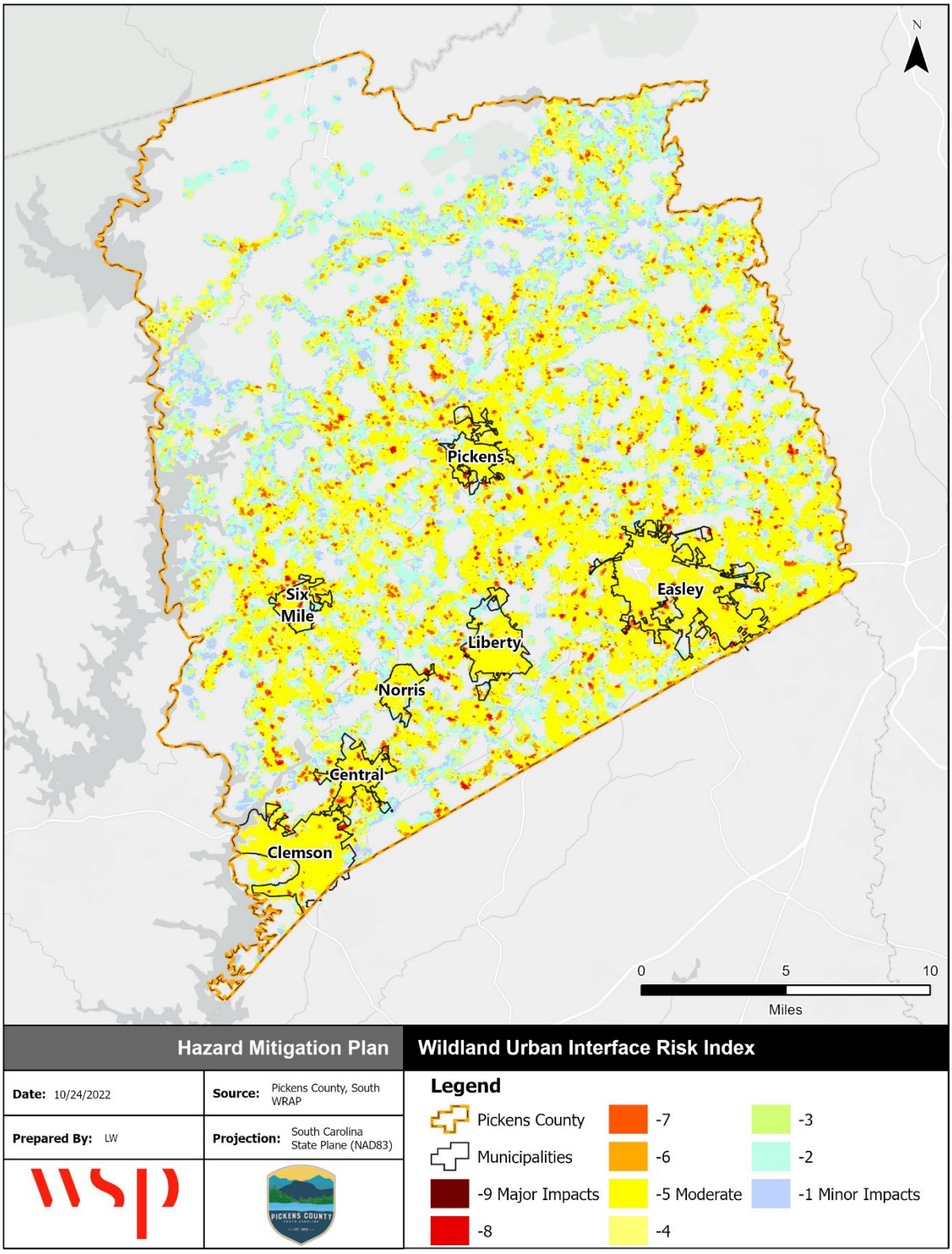
**Table A.17 Critical Facilities Exposed to WUIRI under -5, Unincorporated Pickens County**

| Facility Type | Facility Name |
|---|---|
| Communications | Radio Tower |
| Energy | Public Works |
| Food, Water, Shelter | Bible Methodist Church |
| Food, Water, Shelter | Prison Farm |
| Hazardous Materials | Amerigas Propane, LP |
| Hazardous Materials | Champion Aerospace, Inc. |
| Hazardous Materials | Easley Custom Plastics |
| Hazardous Materials | Federal-Mogul Corporation |
| Hazardous Materials | Fran Tex Chemicals |
| Hazardous Materials | Freeman Gas & Elec Co Inc |
| Hazardous Materials | Kent Manufacturing Company |
| Hazardous Materials | Markiv Automotive |
| Hazardous Materials | Ortec, INC |
| Hazardous Materials | OWT Industries, Inc - Ryobi |
| Hazardous Materials | Richmond Gear |
| Hazardous Materials | Shaw Industries Group, Inc |
| Health and Medical | Central Rescue 2 |
| Health and Medical | Clemson University Ems |
| Health and Medical | Ems Administration |
| Health and Medical | Ems Main Office |
| Health and Medical | Harvey's Nursing Center |
| Health and Medical | Holly Springs Ems |
| Health and Medical | Master Care, Inc. |
| Health and Medical | PC Board Of Disabilities |
| Health and Medical | Six Mile Ems |
| Safety and Security | Central Fire #2 |
| Safety and Security | Clemson University Police |
| Safety and Security | Clemson University Fire |
| Safety and Security | Crosswell Fire |
| Safety and Security | Hinkle Building |
| Safety and Security | Holly Springs Fire |

| Facility Type | Facility Name |
|---|---|
| Safety and Security | Liberty Rural #1 |
| Safety and Security | Liberty Rural #2 |
| Safety and Security | Pickens County Detention |
| Safety and Security | Pickens Rural #1 |
| Safety and Security | Pickens Rural #3 |
| Safety and Security | Public Service Building |
| Safety and Security | Pumpkintown Fire |
| Safety and Security | SC Army National Guard |
| Safety and Security | Sheriff Sub-Station Code 12 |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Figure A.5 WUI Risk Index, Pickens County**



### A.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms. The county has higher vulnerability due to a high proportion of adults over the age of 65.

## A.3 CAPABILITY ASSESSMENT

### A.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to unincorporated Pickens County were provided by the County's HMPC representatives, County staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

Pickens County has significant capability when it comes to implementing hazard mitigation initiatives. The County has substantial regulatory, administrative, and outreach capability that extends to unincorporated Pickens County ensuring that relevant planning policies and services reach these portions of the community.

As the County continues to update regulatory tools like zoning ordinances, the comprehensive plan, and other relevant documents, it should consider how unincorporated portions of the County impact future development and other land use decisions. It is also recommended that the County maintain substantial public outreach to residents that live in unincorporated areas, particularly those in more rural areas. The County may consider additional outreach strategies such as sharing information via radio programs and TV ads and posting information in churches and community centers.

### A.3.2 FLOODPLAIN MANAGEMENT

Pickens County joined the NFIP in July 1982 and had an initial FIRM dated July 19, 1982. Pickens County participates in the Community Rating System and is currently a Class 9 community, which provides a 5% reduction on flood insurance premiums. The following tables reflect NFIP policy and claims data for the County categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table A.18 NFIP Policy and Claims Data by Structure Type**

| Structure Type | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| Single Family | 51 | $29,238 | $14,806,000 | 21 | $346,282.65 |
| 2-4 Family | 0 | $0 | $0 | 0 | $0.00 |
| All Other Residential | 0 | $0 | $0 | 0 | $0.00 |
| Non Residential | 3 | $5,046 | $773,000 | 1 | $0.00 |
| **Total** | **54** | **$34,284** | **$15,579,000** | **22** | **$346,282.65** |

Source: FEMA Community Information System, accessed March 2023

**Table A.19 NFIP Policy and Claims Data by Flood Zone**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 11 | $7,498 | $2,093,000 | 3 | $152,208.94 |

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A Zones | 0 | $0 | $0 | 7 | $55,492.30 |
| B, C & X Zone | | | | | |
| Standard | 38 | $24,421 | $11,981,000 | 5 | $84,913.86 |
| Preferred | 5 | $2,365 | $1,505,000 | 7 | $53,667.55 |
| **Total** | **54** | **$34,284** | **$15,579,000** | **22** | **$346,282.65** |

Source: FEMA Community Information System, accessed March 2023

**Table A.20 NFIP Policy and Claims Data Pre-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 7 | $5,386 | $1,202,000 | 2 | $23,149.60 |
| A Zones | 0 | $0 | $0 | 7 | $55,492.30 |
| B, C & X Zone | 7 | $4,630 | $2,258,000 | 6 | $130,788.38 |
| Standard | 7 | $4,630 | $2,258,000 | 4 | $82,298.83 |
| Preferred | 0 | $0 | $0 | 2 | $48,489.55 |
| **Total** | **14** | **$10,016** | **$3,460,000** | **15** | **$209,430.28** |

Source: FEMA Community Information System, accessed March 2023

**Table A.21 NFIP Policy and Claims Data Post-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 4 | $2,112 | $891,000 | 1 | $129,059.34 |
| A Zones | 0 | $0 | $0 | 0 | $0.00 |
| B, C & X Zone | 36 | $22,156 | $11,228,000 | 6 | $7,793.03 |
| Standard | 31 | $19,791 | $9,723,000 | 1 | $2,615.03 |
| Preferred | 5 | $2,365 | $1,505,000 | 5 | $5,178.00 |
| **Total** | **40** | **$24,268** | **$12,119,000** | **7** | **$136,852.37** |

Source: FEMA Community Information System, accessed March 2023

## A.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Identify vulnerable populations | 1.1 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County EMS Director | General Fund, Duke Energy | Long-Term | Prevention | Carry Forward |
| 2 | Coordinate with well-established programs or organizations to provide smoke detectors to vulnerable households | 1.2 | Urban Fire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Fire Departments | Red Cross | Long-Term | Emergency Services | Carry Forward |
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 6 | Develop and maintain a building inventory that contains information regarding location, type of structure, construction material, date of construction and modification, whether the building is consistent with current building codes, and other pertinent information | 2.2 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Long-Term | Prevention | Carry Forward |
| 7 | Establish specific mitigation strategies for extremely vulnerable structures identified during the development of the building inventory | 1.5 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Federal Grant Funds | Long-Term | Property Protection | Carry Forward |
| 8 | Develop a standardized, integrated database of utility distribution systems, utility facilities, critical facilities, county facilities, roads, streams/rivers, and other data deemed necessary | 2.2 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Ongoing | Prevention | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 10 | Increase training and capability of response teams and communication/integration with mutual aid assets. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Ongoing | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Educate public about wildfire dangers, and open burning safety, cigarette litter, and campfire safety. | 1.2 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Fire Chiefs, Other Emergency Services | General Fund | Long-Term | Public Information & Outreach | Carry Forward. Exercises are planned for March 2023 and September 2024. |
| 12 | Create buffer zones around structures in wildland-urban interface areas. | 1.5 | Wildfire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. |
| 13 | Educate public about the importance of weather radios and where to obtain them. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 14 | Consider the feasibility of adopting FireWise throughout the county. | 1.4 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County Emergency Services Director | SC Firefighters Association | Immediate | Prevention | Carry Forward |
| 15 | Remove dead trees or trim large branches located near structures. | 1.4 | Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund, Private Funds | Immediate | Prevention | Carry Forward |
| 16 | Coordinate between law enforcement agencies and railroad companies to increase notification and safety where statistics or assessment indicates a dangerous intersection of railroad and roadway. | 3.2 | Hazardous Materials | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Sheriff, Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 17 | Institute a standard warning system for dam failure. | 3.2 | Dam Failure | Low | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | 911 Funds | Short-Term | Emergency Services | Carry Forward |
| 18 | Coordinate with the USACE on EAP for dams in Pickens County. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | USACE | Long-Term | Prevention | Carry Forward |
| 19 | Serve as a repository for dam failure plans. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | General Fund | Long-Term | Prevention | Carry Forward |
| 20 | Provide information to the public regarding procedures to follow in the event of a dam failure. | 1.2 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, E-911 Coordinator | 911 Funds | Long-Term | Public Information & Outreach | Carry Forward |
| 21 | Educate about and encourage participation in the National Flood Insurance Program. | 1.2 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County Building Codes Department | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 22 | Training and equipment for the Swiftwater Rescue Team. | 3.3 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 23 | Create a FEMA Approved Debris Removal Plan to prepare Pickens County Public Works in planning and preparing for natural disasters. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Public Works Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 24 | Training and equipment for the Technical Rescue Team to respond to confined space and structural stability calls. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Educate public about severe weather and safety strategies. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Mayor of Norris, Mayor of Six Mile | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 26 | Strengthen the efforts of trained volunteers within the Storm Ready County program | 3.2 | Flood, Hurricane, Severe Storm, Tornado | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Emergency Services | Carry Forward |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 45 | Enroll the Town of Norris in the National Flood Insurance Program. | 1.4 | Flood | High | High | Pickens County, Norris | Pickens County EM Director, Mayor of Norris | General Fund | Immediate | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | Partner with Clemson University to create experiential or service-learning opportunities to meet identified needs within the community. | 5.1 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Clemson University EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 47 | Partner with community groups (Rotary, CERT, Red Cross, etc.) to meet identified needs within the community. | 5.2 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 66 | Implement streambank stabilization and stream restoration along the Saluda River to repair unstable banks and reduce erosion and sedimentation that degrades natural floodplain functions and downstream reservoir capacity. | 4.2 | Flood, Drought | High | Low | Pickens County, City of Easley | Pickens County EM Director, Easley Combined Utilities, Save Our Saluda | Local Funds, State & Federal Grant Funds | Long-Term | Natural Resource Protection | New |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# B. TOWN OF CENTRAL

## B.1 COMMUNITY PROFILE

### GEOGRAPHY

The Town of Central is located in the southwest portion of Pickens County, immediately adjacent to the City of Clemson. The town occupies 2.4 square miles, and its elevation is 915 feet above mean sea level.

The Town was established in 1873 as the "Central Station" between Atlanta and Charlotte along the Atlantic and Richmond Air Line (later the Southern Railroad line). Central was formally incorporated as a town in 1875. Southern Railroad's repair operations were based in Central until the late 1890s, and industry in Central revolved around the railroad until that time. In the early 1900s the Issaquena Mill opened in Central, expanding local textile manufacturing, and Wesleyan College (now Southern Wesleyan University) began classes, leading to growth in Central until the Great Depression. Textile and railroad industry declined throughout the late 1900s, but Central began to grow as a college town in the 1990s, catering to Clemson University and Southern Wesleyan University (https://cityofcentral.org/about-us).

The railway remains significant to Central's geography, as it runs along the Main Street and State Route 93 corridor through downtown Central.

### POPULATION

Table B.1 provides population counts and growth estimates for Central, Pickens County, and the State.

Population in Central increased by nearly two percent from 2010 to 2020.

**Table B.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Central** | **5,159** | **5,247** | **88** | **1.7%** | **5,229** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

### HOUSING

Table B.2 details housing unit counts and other housing tenure statistics for Central.

From 2010 to 2020 there was an increase in housing units in Central at a greater rate than the County and exceeding the Town's rate of population growth over that time. Nearly 90 percent of housing units are occupied, and a very high proportion of occupants are renters. This is likely due to the prevalence of student housing for Clemson University and Southern Wesleyan University. Renters can be particularly vulnerable to displacement if structures are damaged after a hazard event. Financial resources for repairs and recovery are often limited for renters and landlords which can limit the housing stock and displace households for extended periods of time. Renters may also have less knowledge of the area and its hazard risks. This is especially true for student housing, where frequent turnover in tenants is expected.

**Table B.2 Housing Tenure Statistics, 2010-2020**

| Housing Characteristics | Central | Pickens County |
|---|---|---|
| Housing Units (2010) | 2,380 | 50,854 |
| Housing Units (2020) | 2,736 | 54,939 |

| Housing Characteristics | Central | Pickens County |
|---|---|---|
| Housing Units Percent Change (2010-2020) | 15.0% | 8.0% |
| Occupied Units, % (2020) | 89.4% | 88.3% |
| Owner-Occupied Units, % (2020) | 17.5% | 68.5% |
| Renter-Occupied Units, % (2020) | 82.5% | 31.5% |
| Median Home Value (2020) | $112,500 | $159,200 |
| Average Household Size | 2.05 | 2.45 |
| No Vehicle Available, % | 16.2% | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2016-2020 5-Year Estimates

Table B.3 and Table B.4 summarize housing units by type and age. Over half of the housing units in Central are in apartment buildings. A quarter of housing units are single family homes, and less than six percent of housing units in Central are mobile homes. Mobile homes are more vulnerable to damage from wind and flood hazards.

The Town of Central's initial Flood Insurance Rate Map was identified on April 16, 2008. Most housing units in Central were built prior to this time, with a boom of construction in the 1990s and 1980s, which means that most housing units in Central were built before the establishment of floodplain development standards.

**Table B.3 Housing Units by Type, 2020**

| Units in Structure | Central | Pickens County |
|---|---|---|
| 1-unit, detached | 25.4% | 62.8% |
| 1-unit, attached | 2.4% | 1.3% |
| 2 units | 6.3% | 2.6% |
| 3 or 4 units | 2.8% | 2.2% |
| 5 to 9 units | 13.8% | 3.9% |
| 10 to 19 units | 35.7% | 6.0% |
| 20 or more units | 7.9% | 2.9% |
| Mobile home | 5.8% | 18.0% |
| Boat, RV, van, etc. | 0.0% | 0.2% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

**Table B.4 Housing Units by Age, 2020**

| Housing Year Built | Central | Pickens County |
|---|---|---|
| Built 2014 or later | 3.1% | 5.0% |
| Built 2010 to 2013 | 2.0% | 4.3% |
| Built 2000 to 2009 | 9.2% | 16.0% |
| Built 1990 to 1999 | 38.0% | 21.9% |
| Built 1980 to 1989 | 17.7% | 15.8% |
| Built 1970 to 1979 | 9.1% | 14.5% |
| Built 1960 to 1969 | 6.8% | 7.7% |
| Built 1950 to 1959 | 3.0% | 7.3% |
| Built 1940 to 1949 | 0.1% | 2.6% |
| Built 1939 or earlier | 11.0% | 4.9% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

## ECONOMY

Table B.5 presents key economic statistics for Central and Pickens County. In Central, median household income and per capita income are lower than the county average and the percentage of individuals living

below the poverty level is higher. The unemployment rate is higher than the county average, but a smaller percentage of the population is without health insurance. These statistics may reflect the large student population in Central.

**Table B.5 Economic Statistics, 2020**

| Economic Characteristics | Central | Pickens County |
|---|---|---|
| Median Household Income | $31,233 | $51,032 |
| Per Capita Income | $16,977 | $28,382 |
| Unemployment Rate | 10.7% | 5.0% |
| % of Individuals Below Poverty Level | 34.9% | 16.4% |
| % Without Health Insurance | 8.0% | 8.6% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates

Table B.6 summarizes employment by industry in Central and across Pickens County. The dominant employment sector in Central is educational services, and healthcare and social assistance followed by arts, entertainment, and recreation, and accommodation and food services. Both of these industries are among the top four industries by employment in the County.

**Table B.6 Employment Statistics by Industry, 2020**

| Industry | Central | Pickens County |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 2.1% | 0.5% |
| Construction | 7.7% | 7.9% |
| Manufacturing | 9.1% | 14.6% |
| Wholesale trade | 0.9% | 2.4% |
| Retail trade | 10.7% | 10.5% |
| Transportation and warehousing, and utilities | 4.4% | 5.0% |
| Information | 1.5% | 0.8% |
| Finance and insurance, and real estate and rental and leasing | 1.4% | 4.0% |
| Professional, scientific, and management, and administrative and waste management services | 5.1% | 8.6% |
| Educational services, and healthcare and social assistance | 34.1% | 27.2% |
| Arts, entertainment, and recreation, and accommodation and food services | 18.1% | 10.4% |
| Other services, except public administration | 3.3% | 5.3% |
| Public administration | 1.7% | 2.9% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates

## SOCIAL VULNERABILITY

There is a large college student population in Town that spills over from Clemson. These residents are typically renters and only live in Town for a few years, so they are less likely to know about hazard risks in the area. This population may also lack their own vehicles which could make evacuations more difficult.

There is a 24-hour nursing facility in Central that houses about 70 people in the Town. These residents may require additional support during an emergency response and are likely more vulnerable to some hazard events like extreme heat.

The Social Vulnerability Index (SVI) Map, Figure 3.9 in Section 3.8, indicates that the City of Clemson has relatively low social vulnerability with SVI scores between 0 and 0.25.

## DEVELOPMENT TRENDS

There has been a large amount of residential development recently, with about 400 or more new houses built over the last five years. That trend is expected to continue, and at least that much development is

expected over the next five years. Future land use is primarily focused on residential uses particularly in the central portions of the Town, with public and institutional uses in the east and multi-family residential and commercial land uses in the southern portions of the Town. Areas of potential growth and development include areas contiguous to the Town by either land or water, and areas located along a major corridor leading into the Town. Most of the potential growth areas are comprised of large parcels with few landowners that could be easily annexed by the Town.

Figure B.1 shows a base map of Central and Figure B.2 shows the Town's future land use designations.

**Figure B.1 Base Map, Central**

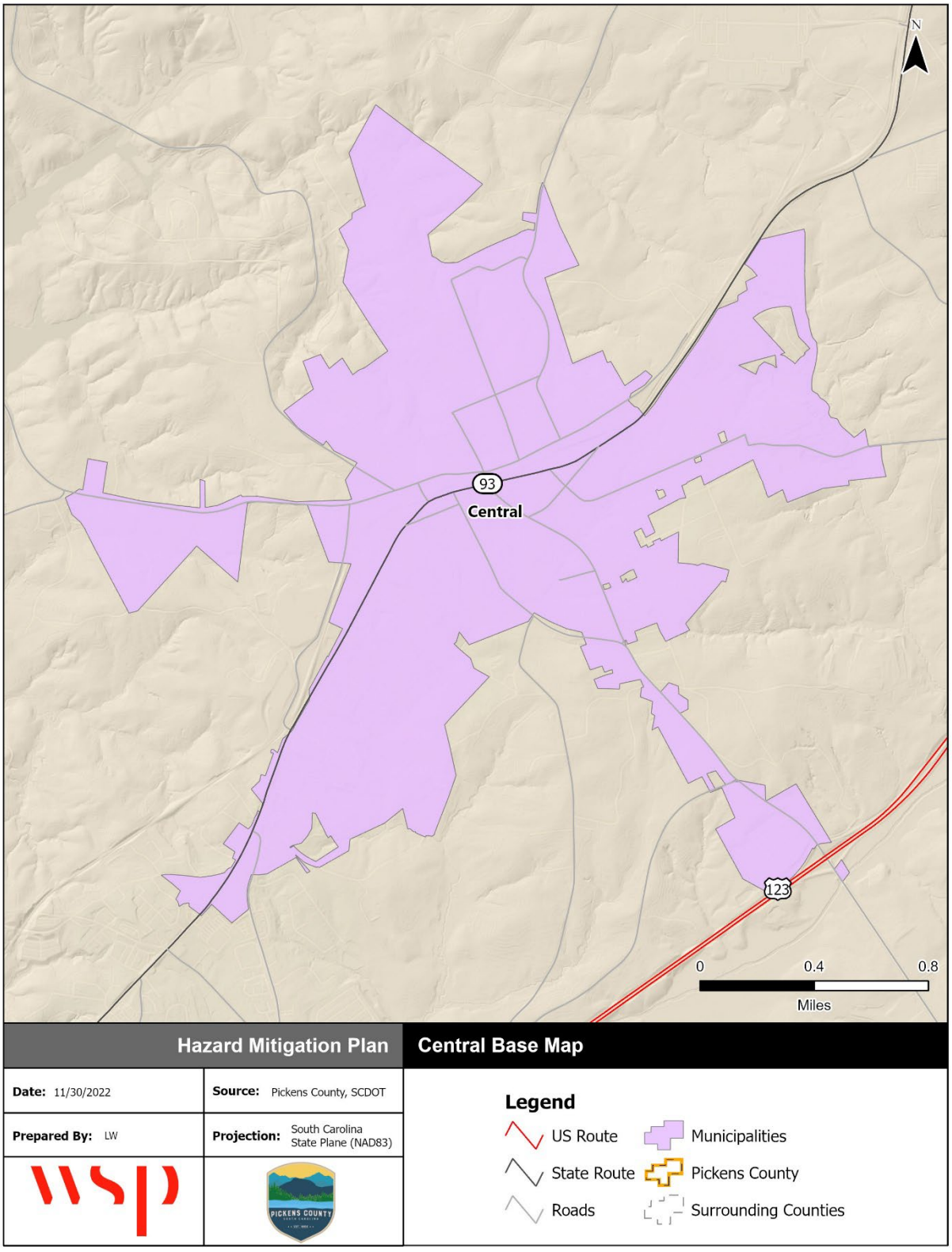
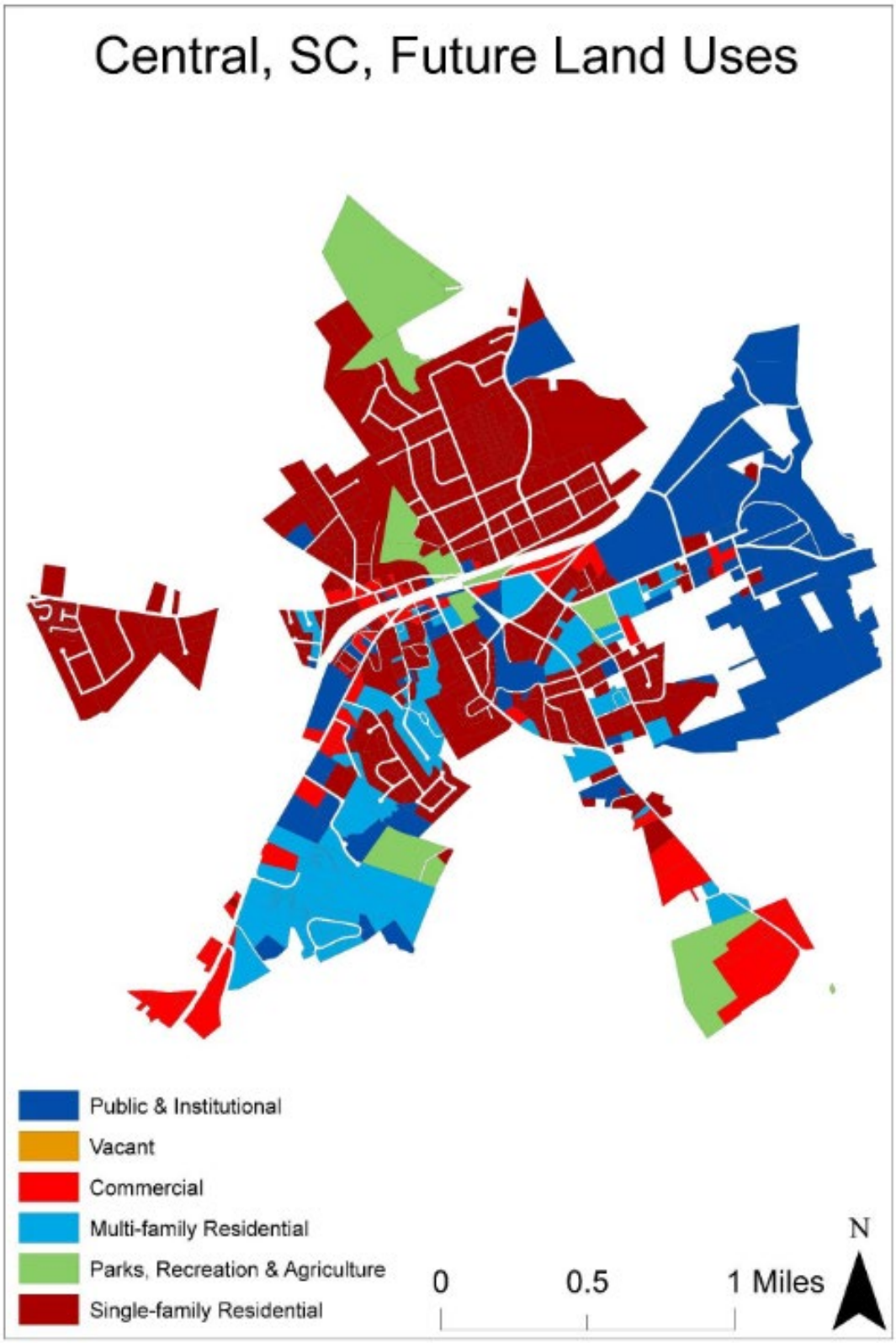


**Figure B.2 Future Land Use, Central**




Source: Central SC, Comprehensive Plan, March 2022

# B.2 RISK ASSESSMENT

This section contains a summary of Central's asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for the Town of Central. Table B.7 summarizes building exposure by occupancy type, representing total property value at risk within the Town limits.

**Table B.7 Building Exposure by Occupancy Type, Central**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 1 | $1,000 | $1,000 | $2,000 |
| Commercial | 70 | $27,881,420 | $27,881,420 | $55,762,839 |
| Education | 3 | $308,682 | $308,682 | $617,364 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 35 | $3,762,201 | $5,643,302 | $9,405,503 |
| Religious | 2 | $642,309 | $642,309 | $1,284,618 |
| Residential | 1,204 | $669,945,852 | $334,972,926 | $1,004,918,778 |
| **Total** | **1,315** | **$702,541,463** | **$369,449,638** | **$1,071,991,101** |

Source: Pickens County GIS

The spatial distribution of the property inventory is shown by building count in Figure B.3 and by building value in Figure B.4.

**Figure B.3 Building Count by Census Block, Central**

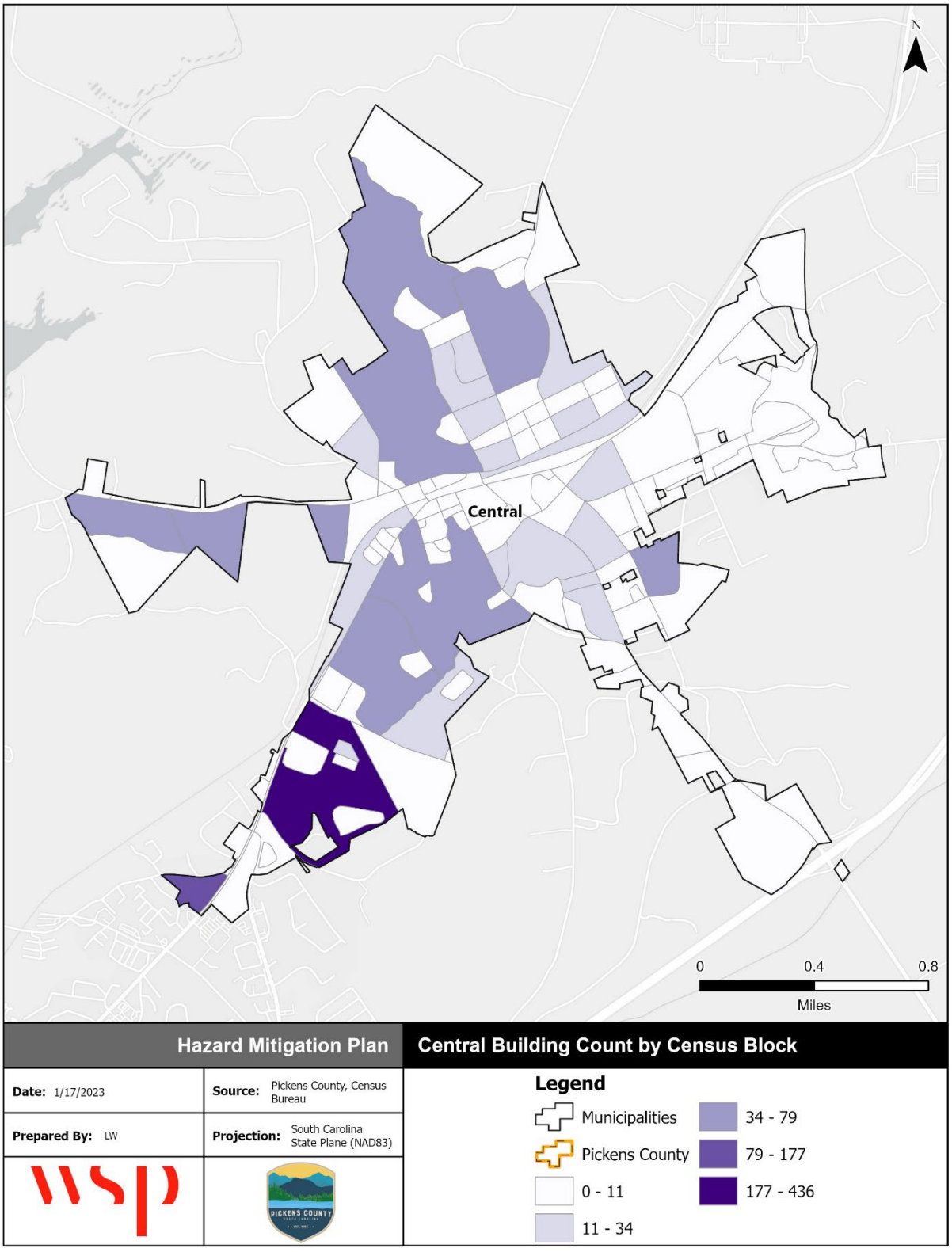


**Figure B.4 Building Value by Census Block, Central**

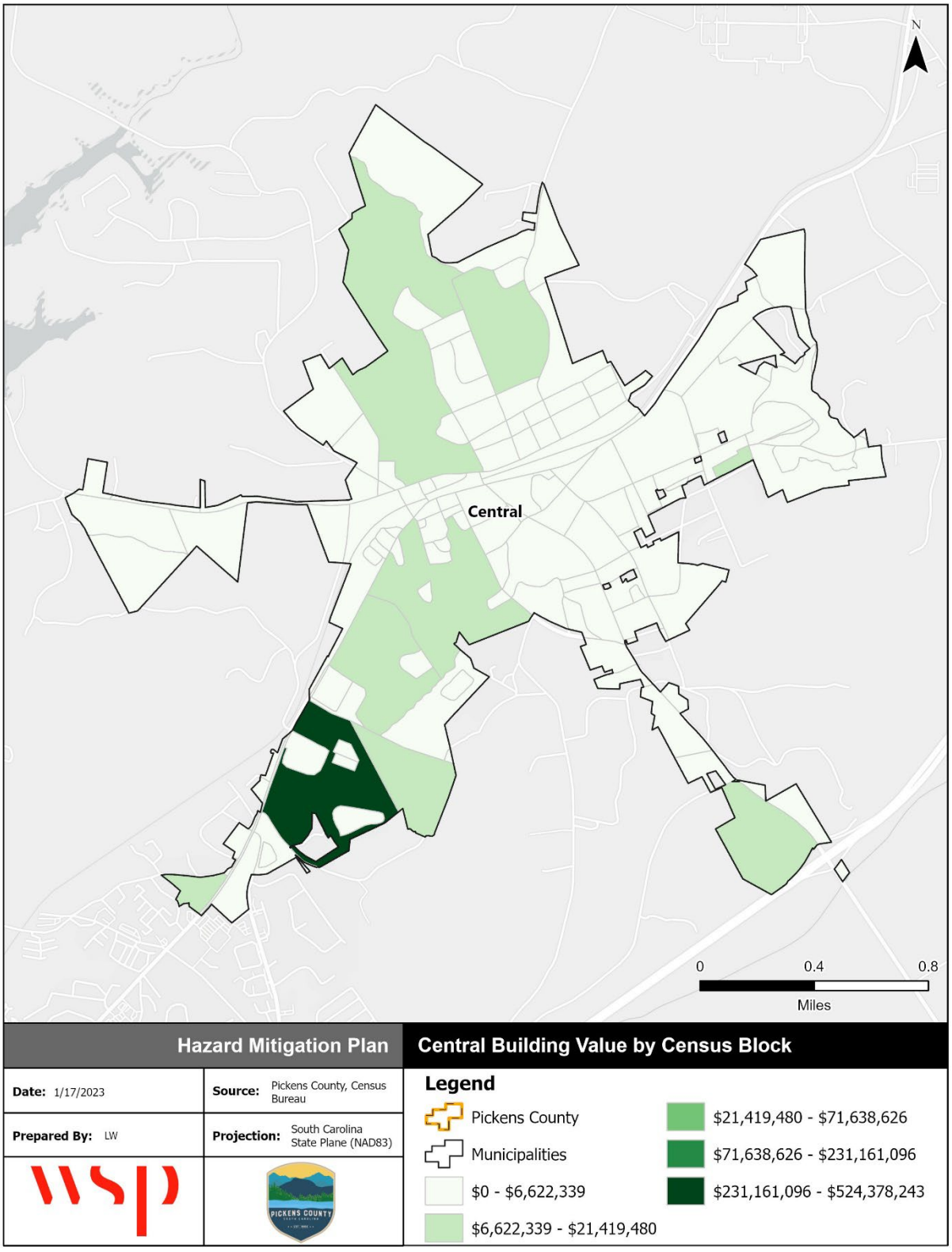


Table B.8 summarizes critical facilities and infrastructure in Central by facility type, and Table B.9 provides the full inventory of critical facilities and infrastructure in Central. Critical facilities and infrastructure were identified by Pickens County Emergency Management and County staff and are maintained in GIS.

**Table B.8 Critical Facility Summary, Central**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 5 |
| Food, Water, Shelter | 1 |
| Health & Medical | 2 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 2 |
| **Total** | **10** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table B.9 Critical Facility Inventory, Central**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Central City Police |
| Safety & Security | Central City Town Hall |
| Safety & Security | Central Fire # 1 |
| Safety & Security | Central Magistrate |
| Safety & Security | Central South Sewer Treatment |
| Food, Water, Shelter | Southern Wesleyan University |
| Health & Medical | Central EMS |
| Health & Medical | Central Rescue |
| Hazardous Materials | Bellsouth-Werner Street |
| Hazardous Materials | Central Textiles, Inc |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table B.10 summarizes the PRI scores for Central for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table B.10 PRI Results, Central**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Possible | Limited | Small | > 24 hrs | < 1 week | 2.0 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Likely | Critical | Small | 6 to 12 hrs | < 1 week | 2.8 |
| Hurricane/Tropical Storm | Likely | Limited | Large | > 24 hrs | < 24 hrs | 2.6 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Catastrophic | Moderate | < 6 hrs | > 1 week | 2.9 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## B.2.1 DAM/LEVEE FAILURE

There are no high hazard dams located within the town limits of Central. It is possible that upstream dams could impact Central. Town staff reported vulnerability to flooding from Hartwell Lake if the Keowee Dam were to fail. Data was not available to estimate property exposure to failure of any high hazard dams. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

There are no areas protected by levees or vulnerable to levee failure within the town limits of Central.

## B.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. All of Central's population is vulnerable to low water levels and water supply restrictions.

## B.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. Central's entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 62 buildings in Central sustaining some level of damage amounting to $2.1 million.

## B.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Compared to countywide averages, Central has a larger proportion of children under age 5 but a smaller proportion of adults over age 65.

## B.2.5 FLOOD

Table B.11 details the acreage of Central's total area by flood zone on the effective DFIRM. Per this assessment, only 0.2 percent of Central falls within the SFHA.

**Table B.11 Flood Zone Acreage in Central**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 4.3 | 0.2% |
| Floodway | 0.0 | 0.0% |
| 0.2% Annual Chance Flood Hazard | 0.0 | 0.0% |
| Unshaded X | 1,767.6 | 99.8% |
| Total | 1,771.9 | -- |
| **SFHA Total** | **4.3** | **0.2%** |

Source: FEMA Effective DFIRM

Figure B.5 reflects the effective mapped flood hazard zones for Central, and Figure B.6 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Potential flood damages were estimated through a Level 2 analysis in Hazus 6.0 using 2022 building data and tax parcel data. Per this assessment, there are no buildings in Central that are expected to sustain damages from the 1%-annual-chance flood event. As a result, the population considered vulnerable to flooding based on their residence location is also estimated to be zero.

There are no critical facilities in Central located in the SFHA.

Outside of mapped flood hazard areas, staff reported that stormwater flooding is not a major concern. The lake occasionally backs up but has never come across the bridge to Central.

**Figure B.5 FEMA Flood Hazard Areas, Central**

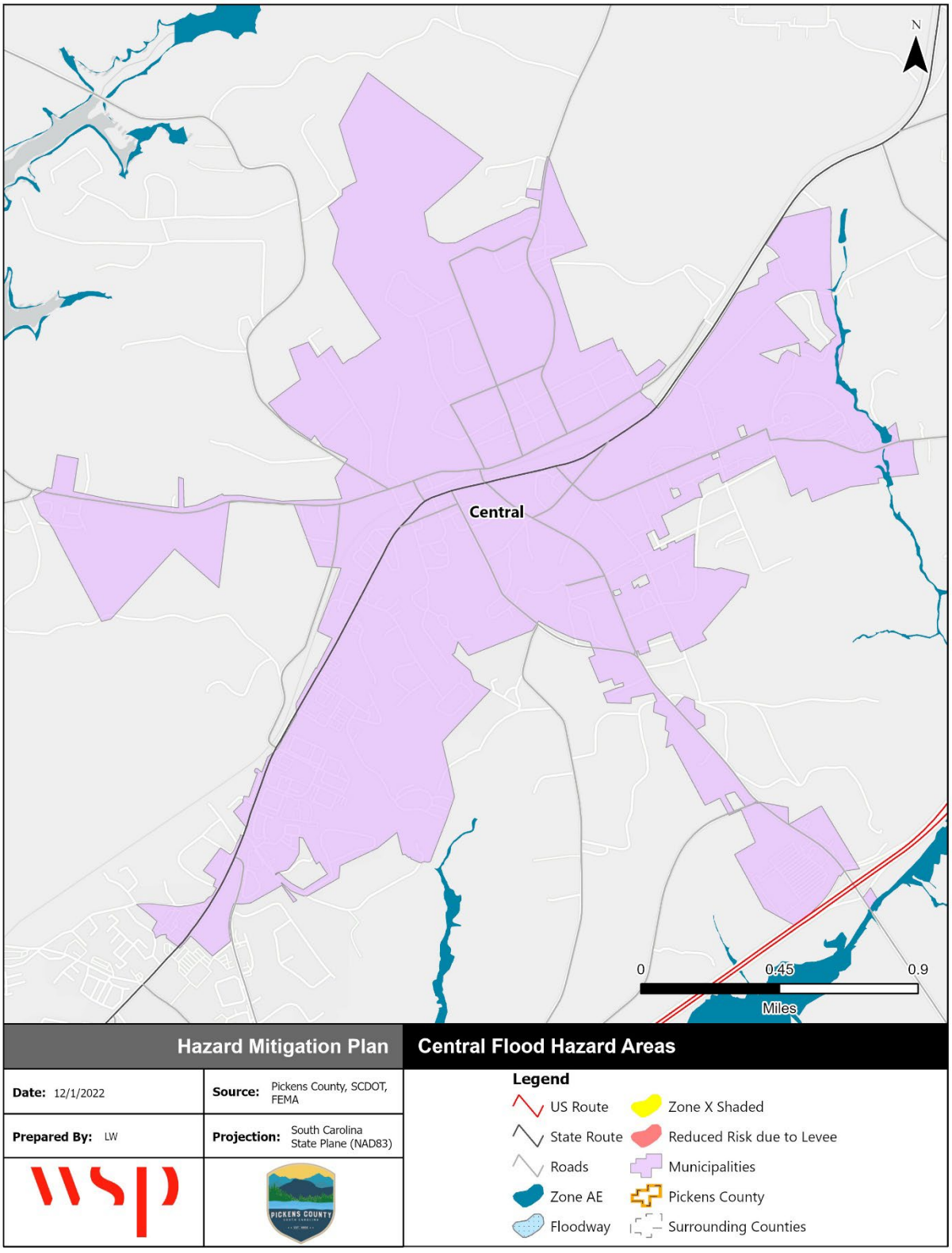
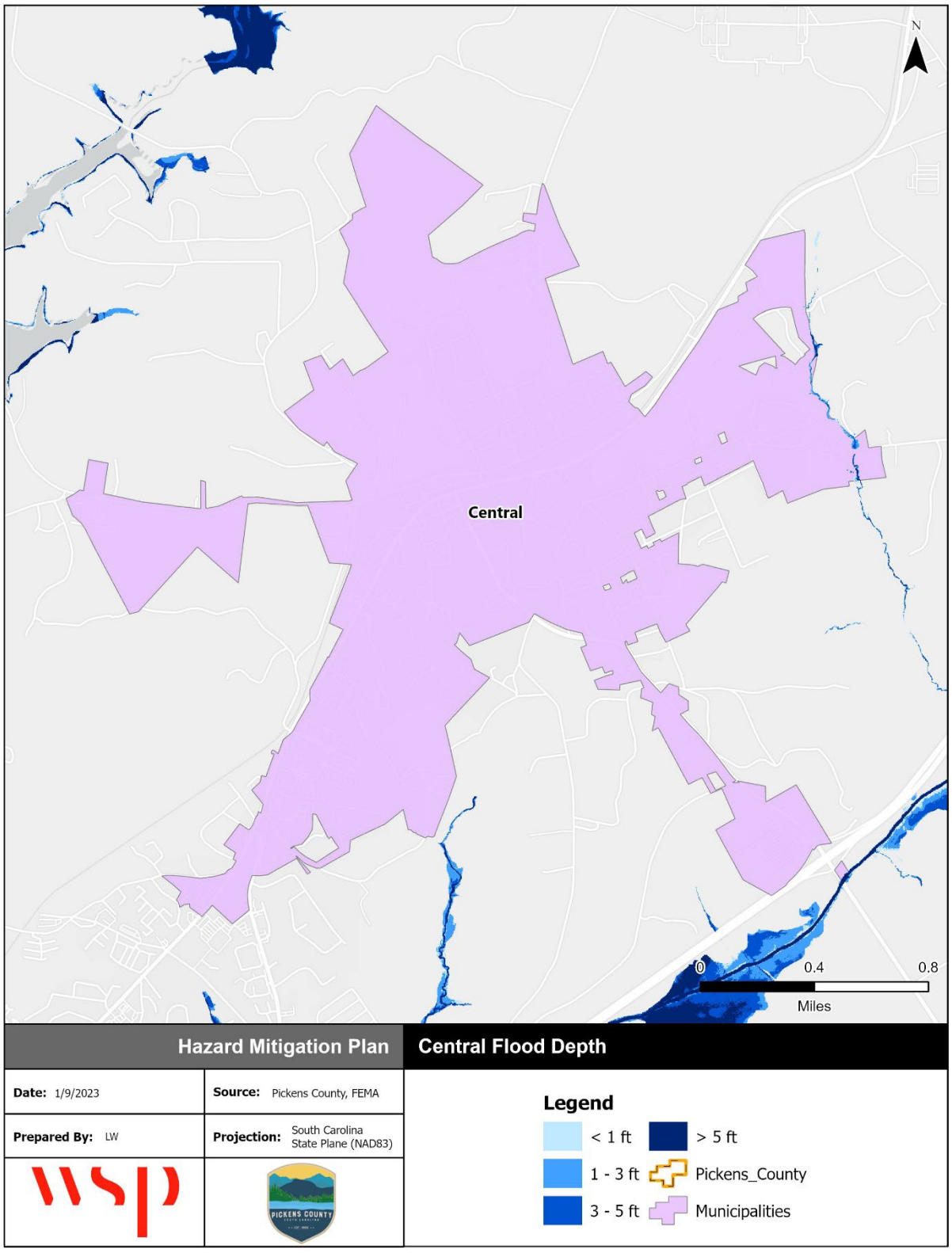


**Figure B.6 Flood Depth, 1%-Annual-Chance Flood Event, Central**



## B.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. Central's entire asset inventory is exposed to hurricane and tropical storm impacts. Mobile home units are particularly vulnerable to wind events such as hurricanes and tropical storms. In Central, there are approximately 158 mobile home units which comprise less than 6% of all housing units. This represents a minor vulnerability for Central but is critical for units that are not properly anchored to foundations.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For Central, this equates to an estimated $64 thousand in damages and $214 thousand in damages, respectively.

## B.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. The built environment is vulnerable to urban fire risk and damage to electrical equipment from lightning as well as hail impacts. Severe storm is a priority hazard for the Town.

## B.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados. Town staff noted that the tornado in 2020 had major impacts in Central and is a priority hazard.

## B.2.9 WILDFIRE

Figure B.7 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table B.12 summarizes for Central the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table B.12 Building Counts and Values within WUIRI under -5, Central**

| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 0 | 0% | $0 | $0 | $0 |
| Commercial | 61 | 87% | $10,681,013 | $10,681,013 | $21,362,025 |
| Education | 3 | 100% | $308,682 | $308,682 | $617,364 |
| Government | 0 | N/A | $0 | $0 | $0 |
| Industrial | 30 | 86% | $1,985,070 | $2,977,605 | $4,962,675 |
| Religious | 2 | 100% | $642,309 | $642,309 | $1,284,618 |
| Residential | 1,184 | 98% | $666,733,457 | $333,366,728 | $1,000,100,185 |
| **Total** | **1,280** | **97%** | **$680,350,530** | **$347,976,337** | **$1,028,326,867** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Central's average household size estimate of 2.05 people per household. There are approximately 2,427 people exposed to wildfire risk in Central.

Table B.13 summarizes critical facility exposure to areas of moderate to high wildfire risk. Table B.14 provides the full inventory of vulnerable facilities and infrastructure.

**Table B.13 Critical Facility Exposure within WUIRI under -5, Central**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 4 |
| Food, Water, Shelter | 1 |
| Health & Medical | 2 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 2 |
| **Total** | **9** |

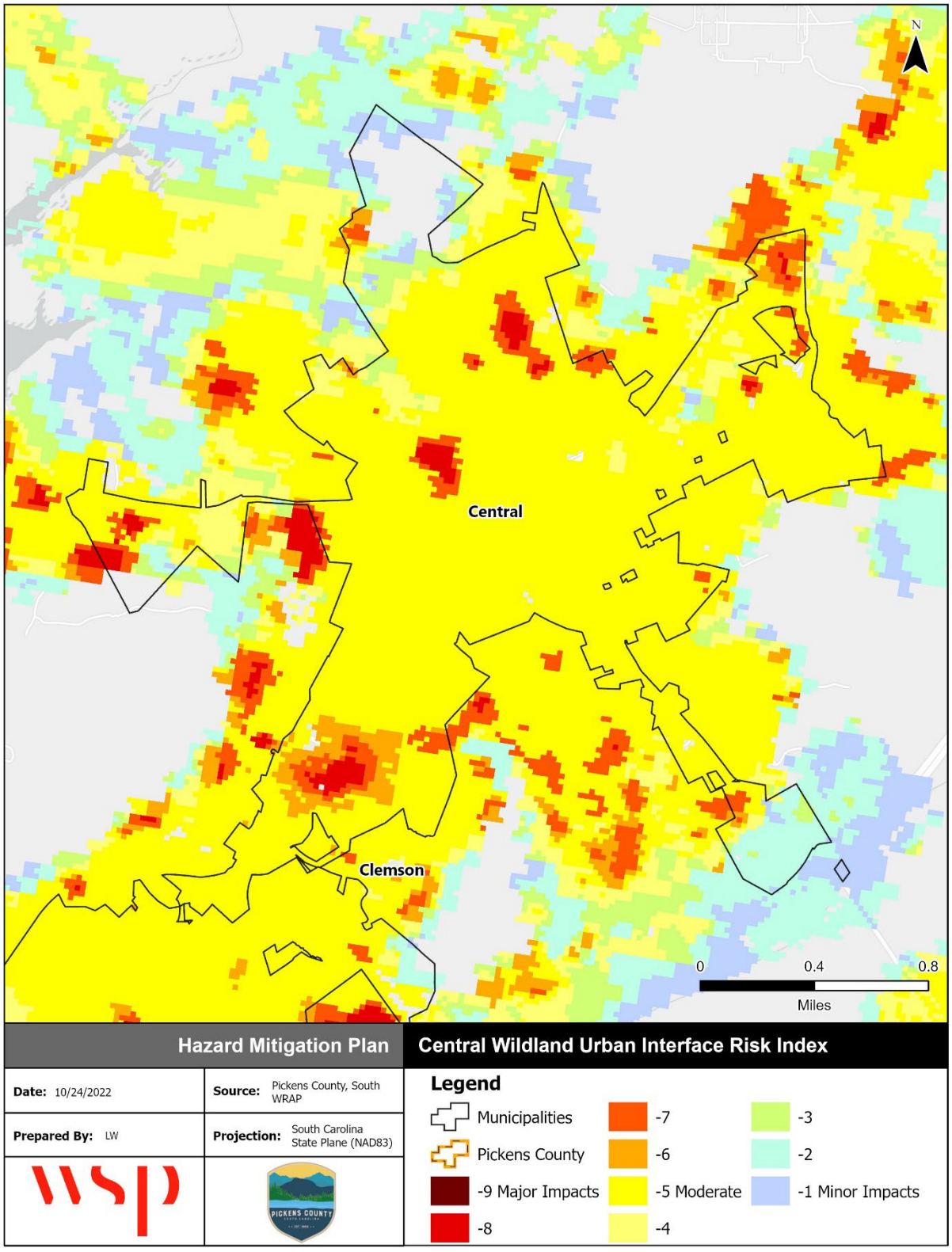
Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Table B.14 Critical Facilities Exposed to WUIRI under -5, Central**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Central City Police |
| Safety & Security | Central City Town Hall |
| Safety & Security | Central Fire #1 |
| Safety & Security | Central Magistrate |
| Food, Water, Shelter | Southern Wesleyan University |
| Health & Medical | Central Ems |
| Health & Medical | Central Rescue |
| Hazardous Materials | Bellsouth-Werner Street |
| Hazardous Materials | Central Textiles, Inc |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Figure B.7 WUI Risk Index, Central**



### B.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms. The county has higher vulnerability due to a high proportion of children under the age of 5.

## B.3 CAPABILITY ASSESSMENT

### B.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to the Town of Central were provided by the Town's HMPC representatives, Town staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

The Town of Central has strong regulatory capability with several relevant planning tools including an updated comprehensive plan, a recently updated zoning and subdivision ordinance, a floodplain ordinance, and other mitigation-related special purpose ordinances. Central does not have a stormwater management program but has recently hired a stormwater manager and may establish a program in the future. The Town's comprehensive plan includes several elements like the land use element, natural resources element, and resiliency element, that directly support this hazard mitigation plan. The Resiliency element identifies primary hazards of concern and outlines initial mitigation goals. There is opportunity to expand the goals and policies under the Resiliency element and include mitigation actions and recommendations from this plan.

The Town has limited technical and administrative capability and very little fiscal capability. To support gaps in these capabilities, the Town could work with neighboring communities to collaborate on GIS mapping and data sharing as well as emergency and more specific hazard mitigation needs. As the Town develops a mitigation strategy it should consider administrative capacity and opportunities to collaborate with community organizations and other jurisdictions. Most of the Town's previous mitigation actions were carried out by the County, so maintaining close collaboration between the Town and County is important for implementation.

### B.3.2 FLOODPLAIN MANAGEMENT

The Town of Central joined the NFIP in May 2008 and had an initial FIRM dated April 16, 2008. The following tables reflect NFIP policy and claims data for the Town categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table B.15 NFIP Policy and Claims Data by Structure Type**

| Structure Type | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| Single Family | 1 | $600 | $350,000 | 0 | $0 |
| 2-4 Family | 0 | $0 | $0 | 0 | $0 |
| All Other Residential | 0 | $0 | $0 | 0 | $0 |
| Non Residential | 0 | $0 | $0 | 0 | $0 |
| **Total** | **1** | **$600** | **$350,000** | **0** | **$0** |

Source: FEMA Community Information System, accessed March 2023

**Table B.16 NFIP Policy and Claims Data by Flood Zone**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 0 | $0 | $0 | 0 | $0 |
| A Zones | 0 | $0 | $0 | 0 | $0 |
| | | | | | |
| Standard | 1 | $600 | $350,000 | 0 | $0 |
| Preferred | 0 | $0 | $0 | 0 | $0 |
| **Total** | **1** | **$600** | **$350,000** | **0** | **$0** |

Source: FEMA Community Information System, accessed March 2023

**Table B.17 NFIP Policy and Claims Data Pre-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 0 | $0 | $0 | 0 | $0 |
| A Zones | 0 | $0 | $0 | 0 | $0 |
| B, C & X Zone | | | | | |
| Standard | 1 | $600 | $350,000 | 0 | $0 |
| Preferred | 0 | $0 | $0 | 0 | $0 |
| **Total** | **1** | **$600** | **$350,000** | **0** | **$0** |

Source: FEMA Community Information System, accessed March 2023

**Table B.18 NFIP Policy and Claims Data Post-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 0 | $0 | $0 | 0 | $0 |
| A Zones | 0 | $0 | $0 | 0 | $0 |
| B, C & X Zone | | | | | |
| Standard | 0 | $0 | $0 | 0 | $0 |
| Preferred | 0 | $0 | $0 | 0 | $0 |
| **Total** | **0** | **$0** | **$0** | **0** | **$0** |

Source: FEMA Community Information System, accessed March 2023

## B.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# C. CITY OF CLEMSON

## C.1 COMMUNITY PROFILE

### GEOGRAPHY

The City of Clemson is the second largest city in Pickens County and is located in the southwest corner of the County along Lake Hartwell. The City has 7.4 square miles of land area. The City of Clemson is home to Clemson University and its large population of students. Clemson University is not part of the City of Clemson's jurisdiction but is considered part of the City for the purpose of this plan.

First settled in 1872 as a railroad stop to serve the agricultural community, particularly the Fort Hill Plantation, Clemson was originally called Calhoun. The Town of Calhoun was officially incorporated in 1937 but changed its name five years later to Clemson. The establishment of Clemson College in 1889 caused the center of the city to shift away from railroad towards the college. After World War II, the college and town both began to grow rapidly, in large part due to the GI-Bill (City of Clemson).

### POPULATION

Table C.1 provides population counts and growth estimates for Clemson, Pickens County, and the State.

Population in Clemson increased by over 27 percent from 2010 to 2020, far exceeding average growth across the county and the state.

**Table C.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Clemson** | **13,905** | **17,681** | **3,776** | **27.2%** | **17,238** |
| **Clemson University Census Designated Place (CDP)** | **-** | **7,311** | **-** | **-** | **5,409** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

Data for Clemson University CDP not available prior to 2020; ACS data for Clemson University CDP has a high margin of error and related estimates may not be statistically significant.

The median age is 24.8 in Clemson and 19.3 in Clemson University. An estimated 11.6% of the population in Clemson is aged 65 years and over.

### HOUSING

Table C.2 details housing unit counts and other housing tenure statistics for Clemson. Housing unit estimates from Census data were not statistically significant for Clemson University.

From 2010 to 2020 there was an increase in housing units in Clemson at a greater rate than the County. Nearly 90 percent of housing units are occupied, and a high proportion of occupants are renters, which is likely due to the prevalence of student housing. Renters can be particularly vulnerable to displacement if structures are damaged after a hazard event. Financial resources for repairs and recovery are often limited for renters and landlords which can limit the housing stock and displace households for extended periods of time. Renters may also have less knowledge of the area and its hazard risks. This is especially true for student housing, where frequent turnover in tenants is expected.

**Table C.2 Housing Tenure Statistics, 2010-2020**

| Housing Characteristics | Clemson | Pickens County |
|---|---|---|
| Housing Units (2010) | 6,853 | 50,854 |
| Housing Units (2020) | 7,801 | 54,939 |
| Housing Units Percent Change (2010-2020) | 13.8% | 8.0% |
| Occupied Units, % (2020) | 89.3% | 88.3% |
| Owner-Occupied Units, % (2020) | 39.8% | 68.5% |
| Renter-Occupied Units, % (2020) | 60.2% | 31.5% |
| Median Home Value (2020) | $267,000 | $159,200 |
| Average Household Size | 2.41 | 2.45 |
| No Vehicle Available, % | 5.5% | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2016-2020 5-Year Estimates
Data for Clemson University CDP not available prior to 2020.

Table C.3 and Table C.4 summarize housing units by type and age. About half of the housing units in Clemson are single-family homes or townhomes and half are in apartment buildings. Of the apartment units, most are in large buildings of 10 or more units. Only 1.5 percent of housing units in Clemson are mobile homes.

Clemson has a consistent spread of housing built between 1970 and 2010 and a recent boom in development since 2014. The City of Clemson's initial Flood Insurance Rate Map was identified on February 17, 1988. About 34 percent of units in Clemson were built prior to 1980, which means that these housing units were built before the establishment of floodplain development standards.

**Table C.3 Housing Units by Type, 2020**

| Units in Structure | Clemson | Pickens County |
|---|---|---|
| 1-unit, detached | 43.2% | 62.8% |
| 1-unit, attached | 4.4% | 1.3% |
| 2 units | 7.9% | 2.6% |
| 3 or 4 units | 7.6% | 2.2% |
| 5 to 9 units | 7.0% | 3.9% |
| 10 to 19 units | 17.8% | 6.0% |
| 20 or more units | 10.7% | 2.9% |
| Mobile home | 1.4% | 18.0% |
| Boat, RV, van, etc. | 0.0% | 0.2% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

**Table C.4 Housing Units by Age, 2020**

| Housing Year Built | Clemson | Pickens County |
|---|---|---|
| Built 2014 or later | 10.4% | 5.0% |
| Built 2010 to 2013 | 4.9% | 4.3% |
| Built 2000 to 2009 | 18.1% | 16.0% |
| Built 1990 to 1999 | 16.9% | 21.9% |
| Built 1980 to 1989 | 15.2% | 15.8% |
| Built 1970 to 1979 | 16.0% | 14.5% |
| Built 1960 to 1969 | 4.4% | 7.7% |
| Built 1950 to 1959 | 11.1% | 7.3% |
| Built 1940 to 1949 | 2.0% | 2.6% |
| Built 1939 or earlier | 1.0% | 4.9% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

## ECONOMY

Table C.5 presents key economic statistics for Clemson, Clemson University, and Pickens County. In Clemson, median household income is lower than the county average and the percentage of individuals living below the poverty level is higher, but per capita income is higher. The unemployment rate in Clemson is lower than the county average, but a smaller percentage of the population is without health insurance. In Clemson University, per capita income is a fraction of the county average, unemployment is six times higher, and over 70 percent of the population is considered living below the poverty level. These statistics are indicative of the large student population.

**Table C.5 Economic Statistics, 2020**

| Economic Characteristics | Clemson | Clemson University CDP | Pickens County |
|---|---|---|---|
| Median Household Income | $46,075 | - | $51,032 |
| Per Capita Income | $32,106 | $3,680 | $28,382 |
| Unemployment Rate | 4.2% | 31.1% | 5.0% |
| % of Individuals Below Poverty Level | 37.1% | 70.6% | 16.4% |
| % Without Health Insurance | 5.3% | 2.4% | 8.6% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates

Table C.6 summarizes employment by industry in Clemson, Clemson University, and across Pickens County. The primary employer in the City of Clemson is Clemson University and most industries within the city are related to the growth of the University. Census statistics illustrate this, as the dominant employment sector in Clemson and Clemson University is educational services, and healthcare and social assistance followed by arts, entertainment, and recreation, and accommodation and food services. Clemson also has 11 percent of residents employed in manufacturing.

**Table C.6 Employment Statistics by Industry, 2020**

| Industry | Clemson | Clemson University CDP | Pickens County |
|---|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 0.8% | 0.0% | 0.5% |
| Construction | 1.1% | 0.0% | 7.9% |
| Manufacturing | 11.0% | 0.4% | 14.6% |
| Wholesale trade | 0.2% | 0.0% | 2.4% |
| Retail trade | 9.3% | 5.4% | 10.5% |
| Transportation and warehousing, and utilities | 1.8% | 0.0% | 5.0% |
| Information | 0.8% | 0.0% | 0.8% |
| Finance and insurance, and real estate and rental and leasing | 2.9% | 0.0% | 4.0% |
| Professional, scientific, and management, and administrative and waste management services | 7.8% | 2.2% | 8.6% |
| Educational services, and healthcare and social assistance | 46.6% | 73.8% | 27.2% |
| Arts, entertainment, and recreation, and accommodation and food services | 11.9% | 17.7% | 10.4% |
| Other services, except public administration | 4.6% | 0.0% | 5.3% |
| Public administration | 1.1% | 0.5% | 2.9% |

Source: US Census Bureau; American Community Survey 2015-2019 5-Year Estimates

## SOCIAL VULNERABILITY

The large college student population in Clemson has increased vulnerability to hazard risks. These residents are typically renters and only live in the City for a few years, so they are less likely to know about hazard risks in the area. This population may also lack their own vehicles which could make evacuations more difficult. There are also a growing number of retirees and people in need of assisted living. Older adults and students both tend to lack independent transportation. Evacuation for a hazard event could be difficult.

The Social Vulnerability Index (SVI) Map, in Section 3.8 of the HMP indicates that the City of Clemson has relatively low social vulnerability with SVI scores between 0 and 0.25.

## DEVELOPMENT TRENDS

New development in Clemson is primarily construction of college housing and new retail establishments. Much of the land within the City has already been developed. Established land uses including traditional neighborhoods, the Downtown, and commercial corridors along U.S. Highway 123, College Avenue, and S.C. Highway 93 have evolved and matured over time and have been incorporated in the Future Land Use Map. Most of the future land use has been dedicated to low and medium density residential uses. Current brownfield and infill sites, and a few greenfield sites have been identified as areas of potential growth. These parcels are located throughout the City with a larger area of contiguous land sited in the Southern part of Clemson. Based on the City's comprehensive plan and Future Land Use Map, some of these vacant areas along with commercial parcels have been sited as areas for redevelopment and commercial growth.

Figure C.1 shows a base map of Clemson and Figure C.2 shows the City's future land use designations.

**Figure C.1 Base Map, Clemson**

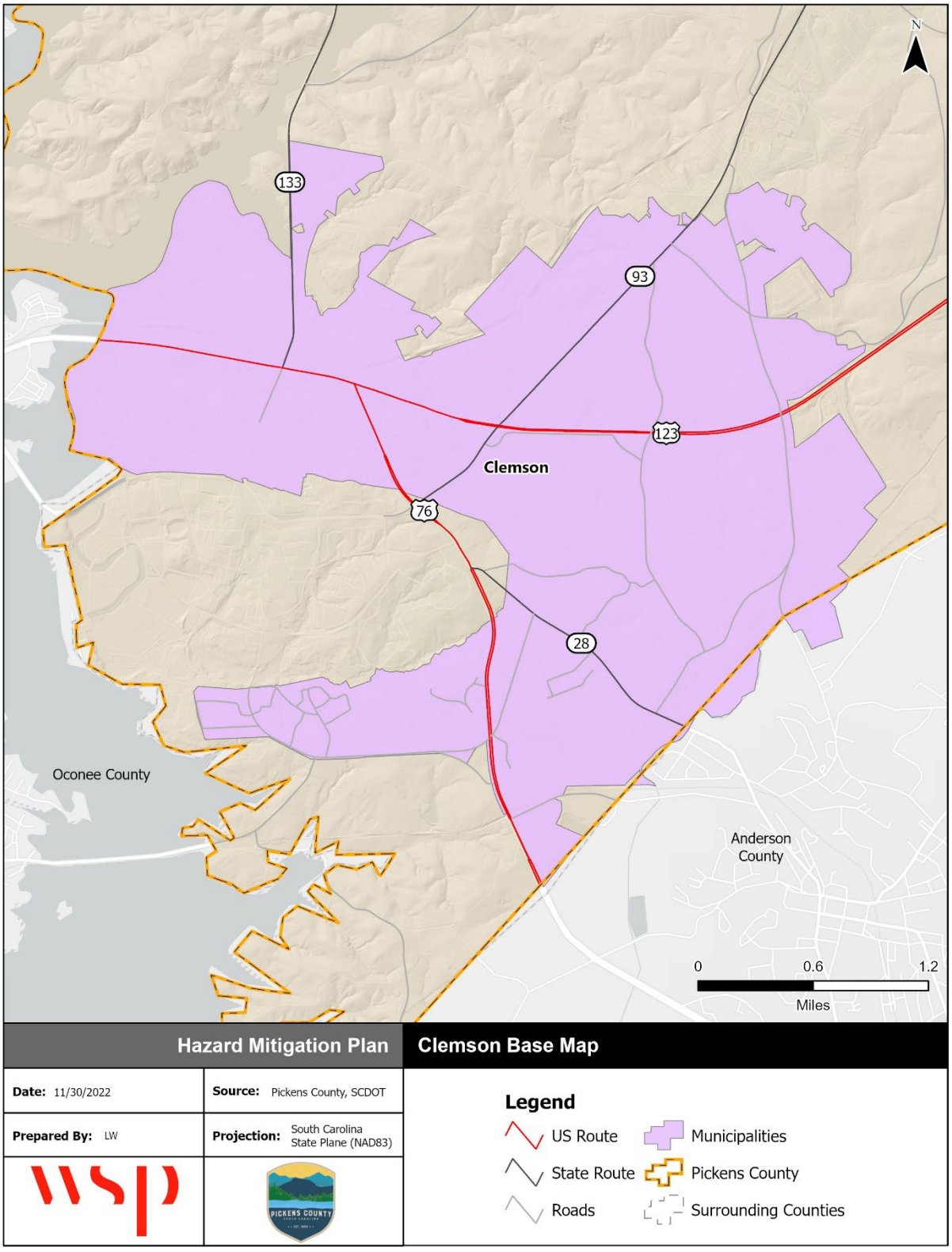
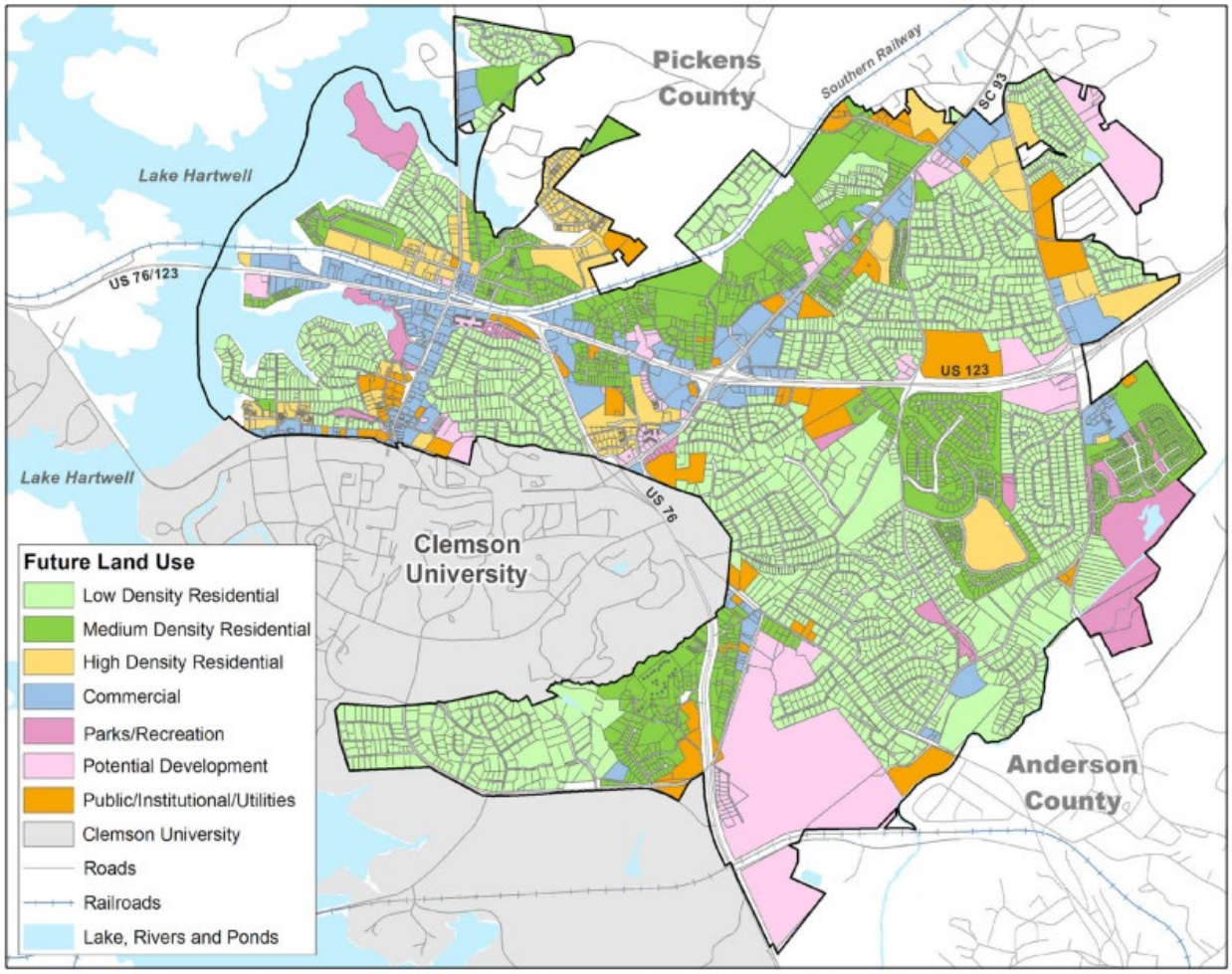


**Figure C.2 Future Land Use, Clemson**




Source: The City of Clemson Comprehensive Plan 2024

# C.2 RISK ASSESSMENT

This section contains a summary of Clemson's asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for the City of Clemson. Table C.7 summarizes building exposure by occupancy type, representing total property value at risk within the City limits.

**Table C.7 Building Exposure by Occupancy Type, Clemson**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 1 | $2,000 | $2,000 | $4,000 |
| Commercial | 282 | $221,764,482 | $221,764,482 | $443,528,965 |
| Education | 4 | $577,062 | $577,062 | $1,154,124 |
| Government | 0 | $0 | $0 | $0 |

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Industrial | 17 | $1,411,730 | $2,117,595 | $3,529,325 |
| Religious | 3 | $7,214,876 | $7,214,876 | $14,429,751 |
| Residential | 4,508 | $1,502,260,971 | $751,130,486 | $2,253,391,457 |
| **Total** | **4,815** | **$1,733,231,121** | **$982,806,500** | **$2,716,037,621** |

Source: Pickens County GIS

The spatial distribution of the property inventory is shown by building count in Figure C.3 and by building value in Figure C.4.

**Figure C.3 Building Count by Census Block, Clemson**

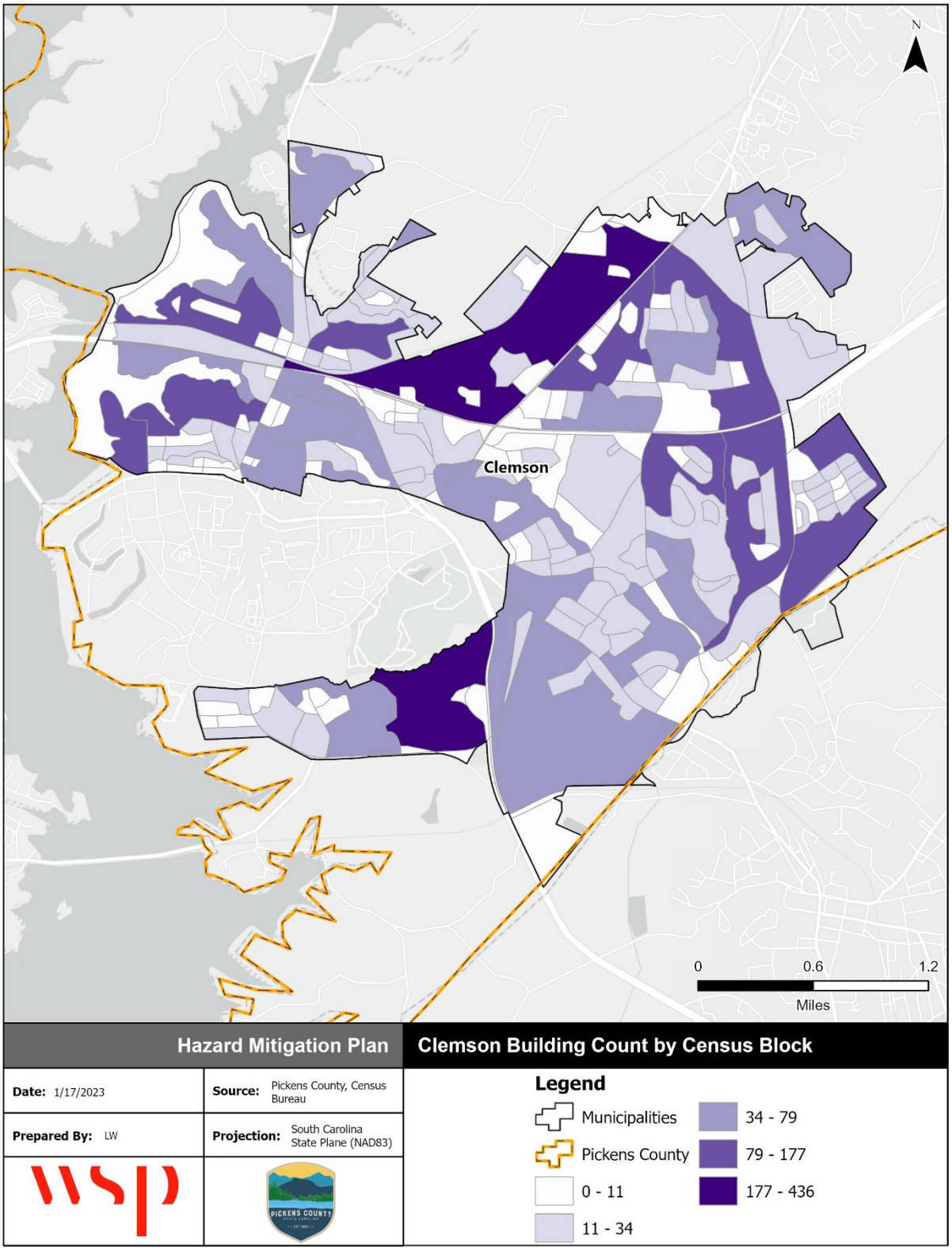


**Figure C.4 Building Value by Census Block, Clemson**

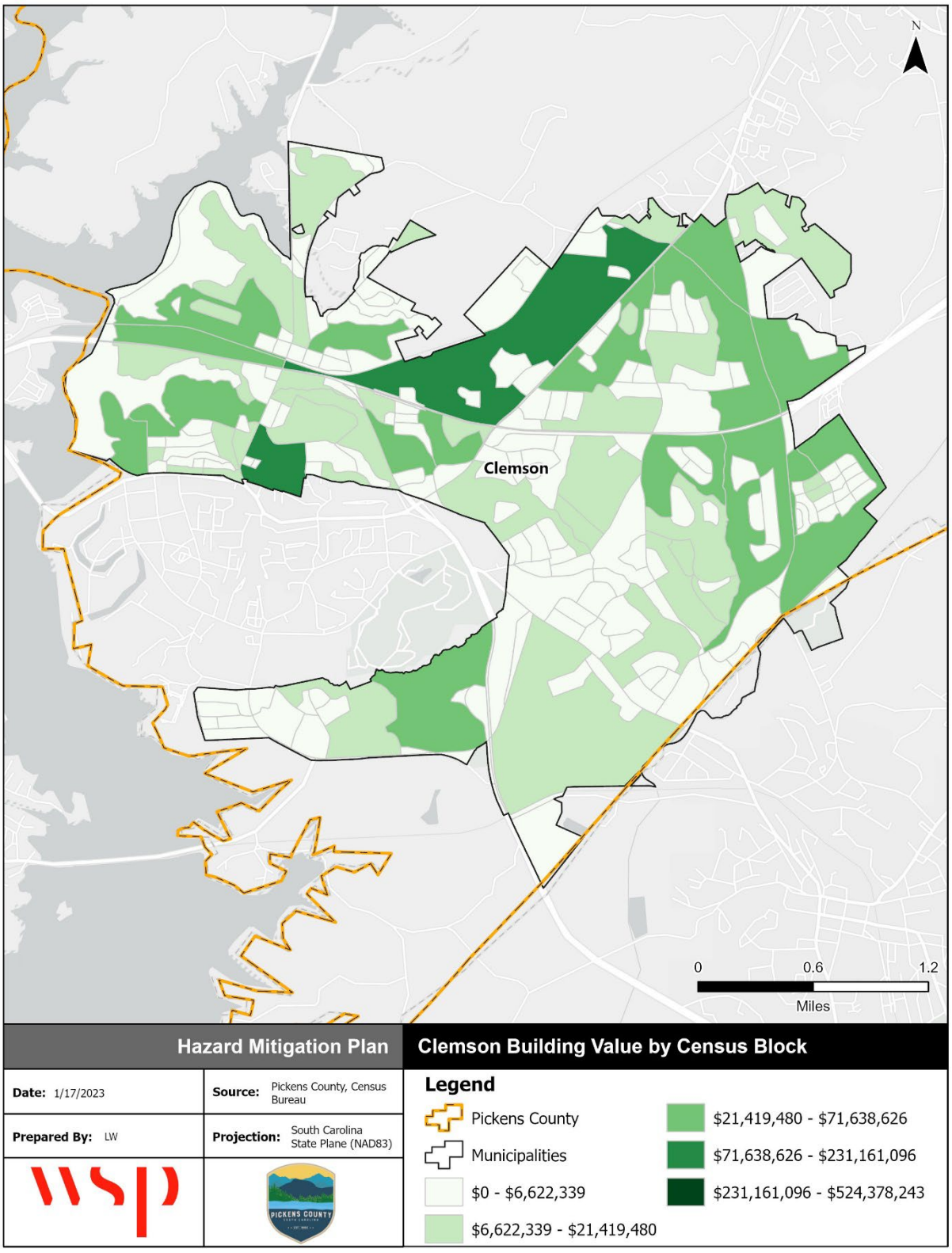


Table C.8 summarizes critical facilities and infrastructure in Clemson by facility type, and Table C.9 provides the full inventory of critical facilities and infrastructure in Clemson. Critical facilities and infrastructure were identified by Pickens County Emergency Management and County staff and are maintained in GIS.

**Table C.8 Critical Facility Summary, Clemson**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 3 |
| Food, Water, Shelter | 0 |
| Health & Medical | 1 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 3 |
| **Total** | **7** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table C.9 Critical Facility Inventory, Clemson**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Clemson Police |
| Safety & Security | Clemson City Town Hall |
| Safety & Security | Clemson City #2 |
| Health & Medical | Clemson Downs |
| Hazardous Materials | Bell South - Keith Street |
| Hazardous Materials | City of Clemson Maintenance Facility |
| Hazardous Materials | O'Dell Oil Co., Inc-Hickory Pointe |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table C.10 summarizes the PRI scores for Clemson for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table C.10 PRI Results, Clemson**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Likely | Critical | Small | > 24 hrs | < 1 week | 2.6 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Highly Likely | Critical | Moderate | 6 to 12 hrs | < 1 week | 3.3 |
| Hurricane/Tropical Storm | Likely | Limited | Large | > 24 hrs | < 24 hrs | 2.6 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Catastrophic | Moderate | < 6 hrs | > 1 week | 2.9 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## C.2.1 DAM/LEVEE FAILURE

There are no high hazard dams located in Clemson; however, according to the SC DHEC Dam Inventory and the National Inventory of Dams, there are seven upstream dams that indicate Clemson as the nearest downstream location. These dams are detailed in Table C.11. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

**Table C.11 Dams Upstream of Clemson**

| Dam Name | NIDID | Height (ft.) | Storage (ac-ft) | Owner | Upstream Distance | Last EAP Revision |
|---|---|---|---|---|---|---|
| Saddle Dike No. 1 | SC00529S001 | 35 | 1,160,298 | Duke Energy | 20 mi. | 12/21/2020 |
| Saddle Dike No. 2 | SC00529S002 | 25 | 1,160,298 | Duke Energy | 20 mi. | 12/21/2020 |
| Jocassee Spillway | SC00529S003 | 64 | 1,160,298 | Duke Energy | 20 mi. | 12/21/2020 |
| Keowee Dam | SC00706 | 170 | 955,586 | Duke Energy | 11 mi. | 12/21/2020 |
| Clemson Upper Diversion Dam | SC02753 | 75 | 3,438,700 | Federal Government | -- | 7/14/2022 |
| Clemson Lower Diversion Dam | SC02754 | 75 | 3,438,700 | Federal Government | -- | 7/14/2022 |
| Clemson Lower Diversion Dam – Saddle Dike | SC02754S001 | 30 | 3,438,700 | Federal Government | -- | 7/14/2022 |

Data was not available to estimate property exposure to failure of any high hazard dams.

None of Clemson's asset inventory falls within the area protected by the Clemson Diversion Levee System.

## C.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. Impacts most likely to affect Clemson are related to low water levels and water usage restrictions.

## C.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. Clemson's entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 226 buildings in unincorporated Pickens County sustaining some level of damage amounting to $5.4 million.

## C.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Compared to countywide averages, Clemson has a smaller proportion of children under age 5 and adults over age 65.

## C.2.5 FLOOD

Table C.12 details the acreage of Clemson's total area by flood zone on the effective DFIRM. Per this assessment, 11.2 percent of Clemson falls within the SFHA.

**Table C.12 Flood Zone Acreage in Clemson**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 494.8 | 9.7% |
| Floodway | 76.3 | 1.5% |
| Area with Reduced Risk due to Levee | 3.5 | 0.1% |
| 0.2% Annual Chance Flood Hazard | 12.5 | 0.2% |
| Unshaded X | 4,515.2 | 88.5% |
| **Total** | 5,102.3 | -- |
| **SFHA Total** | **571.1** | **11.2%** |

Source: FEMA Effective DFIRM

Figure C.5 reflects the effective mapped flood hazard zones for Pickens County, and Figure C.6 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Table C.13 provides the estimated losses for the 1% annual chance flood event in Clemson. The total estimated damage value is based on damages to improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

**Table C.13 Estimated Building Damage and Content Loss for 1% Annual Chance Flood**

| Occupancy Type | Total Buildings with Loss | Total Value (Building & Contents) | Estimated Building Damage | Estimated Content Loss | Estimated Total Damage | Loss Ratio |
|---|---|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 | $0 | 0% |
| Commercial | 0 | $0 | $0 | $0 | $0 | 0% |
| Educational | 0 | $0 | $0 | $0 | $0 | 0% |
| Government | 0 | $0 | $0 | $0 | $0 | 0% |
| Industrial | 0 | $0 | $0 | $0 | $0 | 0% |

| Occupancy Type | Total Buildings with Loss | Total Value (Building & Contents) | Estimated Building Damage | Estimated Content Loss | Estimated Total Damage | Loss Ratio |
|---|---|---|---|---|---|---|
| Religious | 0 | $0 | $0 | $0 | $0 | 0% |
| Residential | 27 | $6,370,740 | $1,366,034 | $735,909 | $2,101,944 | 33% |
| **Total** | **27** | **$6,370,740** | **$1,366,034** | **$735,909** | **$2,101,944** | **33%** |

Source: Hazus 6.0; Pickens County GIS

A count of people with high exposure to flooding was estimated based on the number of residential buildings with loss and Clemson's average household size estimate of 2.41 people per household. There are approximately 65 people exposed to flood risk from the 1% annual chance flood event in Clemson.

There are no critical facilities in Clemson located in the SFHA.

In addition to mapped flood hazard areas, Clemson staff reported that stormwater and localized flooding issues occur at Shaftsbury Road and the Riggs Drive Neighborhood. These flooding issues are typically due to tributary flooding from Eighteen Mile Creek and Rock Creek. Clemson is worried about inflow and infiltration issues with Rock Creek flooding. Riggs Drive flooding is not mapped, but the City has used flood risk mapping prepared by First Street Foundation, which accurately represents the risk in this area.

Regarding past events, Clemson staff report that the City has experienced numerous rain events exceeding the 500-year recurrence interval.

**Figure C.5 FEMA Flood Hazard Areas, Clemson**

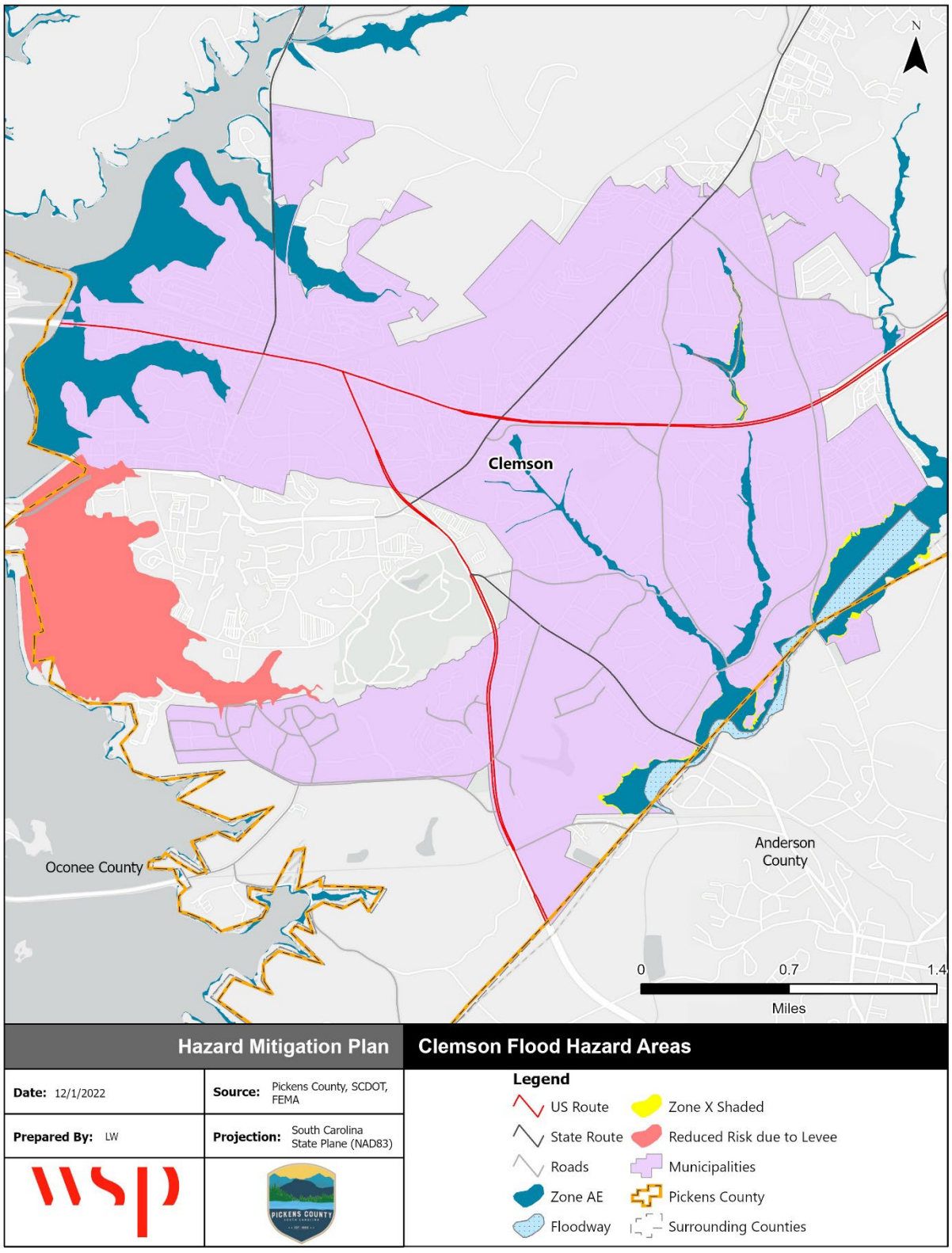
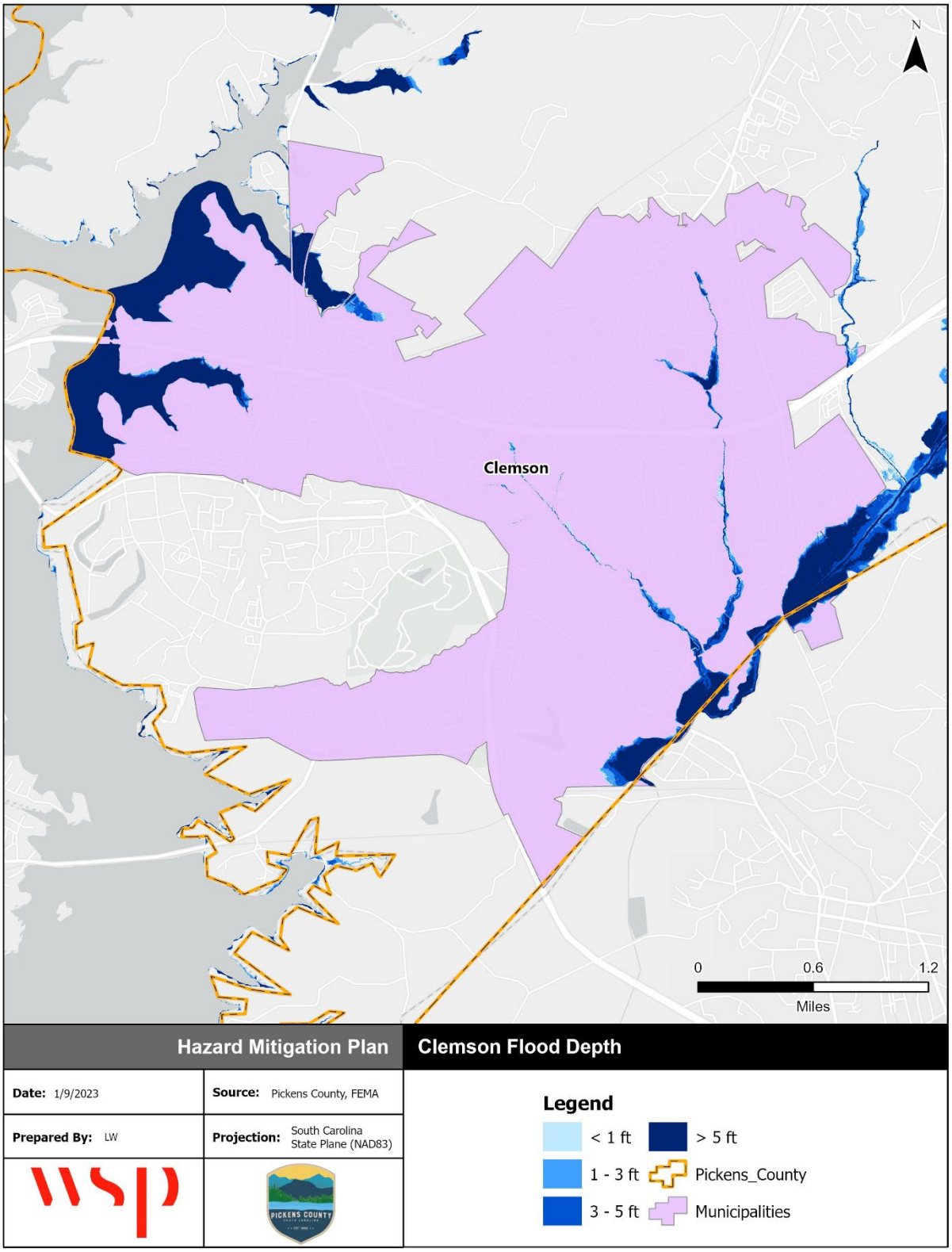


**Figure C.6 Flood Depth, 1%-Annual-Chance Flood Event, Clemson**



## C.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. Clemson's entire asset inventory is exposed to hurricane and tropical storm impacts. A recent hurricane caused power outages, which shut down pump stations. The City had to use back up generators to turn them back on.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For Clemson, this equates to an estimated $163 thousand in damages and $543 thousand in damages, respectively.

## C.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. The built environment is vulnerable to urban fire risk and damage to electrical equipment from lightning.

## C.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados.

## C.2.9 WILDFIRE

Figure C.7 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table C.14 summarizes for Clemson the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table C.14 Building Counts and Values within WUIRI under -5, Clemson**

| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 1 | 100% | $2,000 | $2,000 | $4,000 |
| Commercial | 269 | 95% | $211,958,520 | $211,958,520 | $423,917,041 |
| Education | 4 | 100% | $577,062 | $577,062 | $1,154,124 |
| Government | 0 | N/A | $0 | $0 | $0 |
| Industrial | 15 | 88% | $1,371,492 | $2,057,238 | $3,428,730 |
| Religious | 1 | 33% | $5,203,201 | $5,203,201 | $10,406,401 |
| Residential | 3,934 | 87% | $1,335,520,484 | $667,760,242 | $2,003,280,726 |
| **Total** | **4,224** | **88%** | **$1,554,632,759** | **$887,558,263** | **$2,442,191,022** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Clemson's average household size estimate of 2.41 people per household. There are approximately 9,481 people exposed to wildfire risk in Clemson.

Table C.15 summarizes critical facility exposure to areas of moderate to high wildfire risk. Table C.16 provides the full inventory of vulnerable facilities and infrastructure.

**Table C.15 Critical Facility Exposure within WUIRI under -5, Clemson**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 3 |
| Food, Water, Shelter | 0 |
| Health & Medical | 1 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 1 |
| **Total** | **5** |

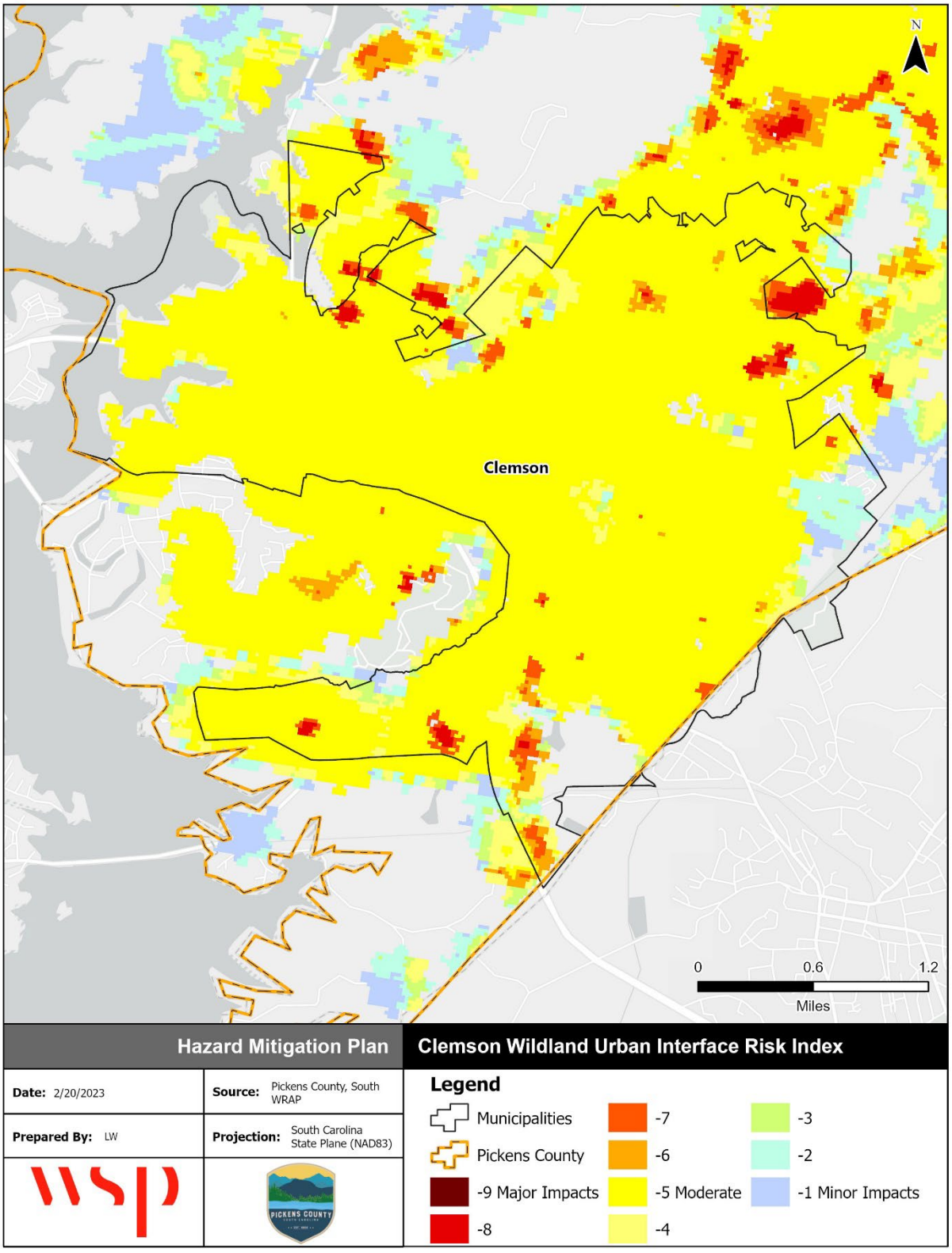
Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Table C.16 Critical Facilities Exposed to WUIRI under -5, Clemson**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Clemson Police |
| Safety & Security | Clemson City Town Hall |
| Safety & Security | Clemson City #2 |
| Health & Medical | Clemson Downs |
| Hazardous Materials | Bell South - Keith Street |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Figure C.7 WUI Risk Index, Clemson**



### C.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms. Clemson has lower vulnerability in this regard.

## C.3 CAPABILITY ASSESSMENT

### C.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to the City of Clemson were provided by the City's HMPC representatives, City staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

The City of Clemson has strong regulatory capability as the City maintains several relevant plans and programs. Clemson's comprehensive plan is updated regularly, and recently, there have been major updates to the City's ordinance in regard to the following: land development regulations, subdivision design, stormwater management, and zoning regulations. The City's comprehensive plan and Future Land Use Map, indicate vacant and brownfields that have been sited as areas for redevelopment and commercial growth. If any of these areas are within floodplains, the City may want to consider leaving the land as open space or planned for land uses like parks that could mitigate flood and not create new challenges.

Clemson also has substantial technical and administrative resources including personnel well versed in hazard mitigation, GIS and other related topics, and has access to critical GIS data. The City has an emergency warning system, and a siren warning system for the Oconee Nuclear Station. The Clemson also coordinates with Pickens County and Clemson University for local emergency alerts.

Clemson has implemented a few projects furthering the City's ongoing hazard mitigation efforts, particularly around flood mitigation. The City has completed a stream realignment project to protect downstream properties, and a culvert replacement project for road protection.

Communication can be a challenge for emergency alerts and notifications. Particularly visitors from out of town are not registered with the University system and do not receive alerts. The City does not have its own communication system, but does have push notifications through MyCivic app. Cell phone alerts are the primary way to notify people in the community. The Clemson may want to consider other methods of communicating emergency information targeted at both City residents and visitors.

Clemson has moderate to strong fiscal capabilities as the City has experience applying for funding and managing grants for activities related to hazard mitigation. Clemson has received CDBG funding, although not specifically for hazard mitigation. The City also has plans to pursue grants for recovery and prevention projects from the State's resiliency office and from NRCS Emergency Watershed Protection Program. The city does have someone on staff who can assist with grant writing. In addition to grants, Clemson has impact fees and a stormwater fee which helps fund CIP projects. The City should consider including mitigation actions from this plan update in its CIP.

## C.3.2 FLOODPLAIN MANAGEMENT

The City of Clemson joined the NFIP in February 1988 and had an initial FIRM dated February 17, 1988. The following tables reflect NFIP policy and claims data for the City categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table C.17 NFIP Policy and Claims Data by Structure Type**

| Structure Type | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| Single Family | 33 | $18,740 | $8,759,000 | 11 | $67,167.34 |
| 2-4 Family | 0 | $0 | $0 | 0 | $0 |
| All Other Residential | 0 | $0 | $0 | 0 | $0 |
| Non Residential | 0 | $0 | $0 | 0 | $0 |
| **Total** | **33** | **$18,740** | **$8,759,000** | **11** | **$67,167.34** |

Source: FEMA Community Information System, accessed March 2023

**Table C.18 NFIP Policy and Claims Data by Flood Zone**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 9 | $7,674 | $2,148,000 | 4 | $42,551.99 |
| A Zones | 0 | $0 | $0 | 0 | $0 |
| B, C & X Zone | | | | | |
| Standard | 23 | $10,559 | $6,261,000 | 1 | $18,883.20 |
| Preferred | 1 | $507 | $350,000 | 6 | $5,732.15 |
| **Total** | **33** | **$18,740** | **$8,759,000** | **11** | **$67,167.34** |

Source: FEMA Community Information System, accessed March 2023

**Table C.19 NFIP Policy and Claims Data Pre-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 3 | $4,007 | $673,000 | 3 | $37,481.81 |
| A Zones | 0 | $0 | $0 | 0 | $0 |
| B, C & X Zone | | | | | |
| Standard | 15 | $7,175 | $4,155,000 | 1 | $18,883.20 |
| Preferred | 0 | $0 | $0 | 5 | $5,732.15 |
| **Total** | **18** | **$11,182** | **$4,828,000** | **9** | **$62,097.16** |

Source: FEMA Community Information System, accessed March 2023

**Table C.20 NFIP Policy and Claims Data Post-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 6 | $3,667 | $1,475,000 | 1 | $5,070.18 |
| A Zones | 0 | $0 | $0 | 0 | $0 |
| B, C & X Zone | | | | | |
| Standard | 8 | $3,891 | $2,106,000 | 0 | $0 |
| Preferred | 1 | $507 | $350,000 | 1 | $0 |
| **Total** | **15** | **$7,558** | **$3,931,000** | **2** | **$5,070.18** |

Source: FEMA Community Information System, accessed March 2023

## C.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 51 | Mulch and establish riparian zone within City Parks to protect against park sedimentation | 4.2 | Flood | Low | Medium | Clemson | City of Clemson Parks and Recreation | General Fund | Short-Term | Natural Resource Protection | Carry Forward. Riparian zones have been established and parks department does mulch the areas however it is ongoing work. |
| 52 | Remove or trim trees and other vegetation from around roadways, powerlines, and neighborhood entrances. Relocate powerlines underground. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm, Wildfire | High | High | Clemson | City of Clemson Police, Fire, Public Works, Engineering, and Horticulture | General Fund | Long-Term | Property Protection | Carry Forward. Duke cleared power lines and residents can apply for funding to move lines underground. 40 people have signed up so far. |
| 53 | Enlarge culverts in flood prone areas and assist residents with cost of replacing culverts. | 1.5 | Flood | Medium | High | Clemson | City of Clemson Engineering and Stormwater | Local Funds, State Grant Funds, Federal Grant Funds | Long-Term | Structural Projects | Carry Forward. Some have been completed but some are still in progress |
| 54 | Identify homes in the floodplain and purchase and/or retrofit. | 1.5 | Flood | Medium | Medium | Clemson | City of Clemson Engineering, Parks and Recreation, Planning and Codes, and Stormwater | Federal Grant Funds | Long-Term | Property Protection | Carry Forward. One acquisition completed so far. |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# D. CITY OF EASLEY

## D.1 COMMUNITY PROFILE

### GEOGRAPHY

The City of Easley is the largest city in Pickens County. It is located along Highway 123 in the southeastern part of the county. Easley is west of the City of Greenville in Greenville County. The City has 12.4 square miles of land area and is at an elevation of 1,079 feet above sea level. A small portion of Easley extends into Anderson County.

Easley was first surveyed in 1873, after the Charlotte-to-Atlanta Airline Railroad finished laying track through what was to become the town. The railroad allowed the textile industry to develop in Pickens County and Easley. Easley was known for textiles, with Alice Manufacturing being headquartered in the City and eight large textile facilities in the Easley area. As the textile industry declined, Easley began to witness a downturn in the economy. In recent years, the City has begun to invest in multi-family dwelling and food service growth with substantial success. Additionally, the City recently invested in "The Doodle Trail," a multi-use trail connecting Easley to the City of Pickens, which has proven to boost the local economy. The City has experienced redevelopment in recent years, and continued growth and redevelopment are expected.

### POPULATION

Table D.1 provides population counts and growth estimates for Easley, Pickens County, and the State.

Population in Easley increased by nearly 15 percent from 2010 to 2020, exceeding average growth across the county and the state.

**Table D.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Easley** | **19,993** | **22,921** | **2,928** | **14.6%** | **22,643** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

### HOUSING

Table D.2 details housing unit counts and other housing tenure statistics for Easley.

From 2010 to 2020 there was an increase in housing units in Easley at a greater rate than the County and exceeding the City's rate of population growth over that time. Over 90 percent of housing units are occupied, and nearly a third of occupants are renters. Renters can be particularly vulnerable to displacement if structures are damaged after a hazard event. Financial resources for repairs and recovery are often limited for renters and landlords which can limit the housing stock and displace households for extended periods of time. Renters may also have less knowledge of the area and its hazard risks. Conversely, homeowners may be more willing and able to make investments to protect their homes from hazard risks.

**Table D.2 Housing Tenure Statistics, 2010-2020**

| Housing Characteristics | Easley | Pickens County |
|---|---|---|
| Housing Units (2010) | 8,926 | 50,854 |
| Housing Units (2020) | 9,945 | 54,939 |

| Housing Characteristics | Easley | Pickens County |
|---|---|---|
| Housing Units Percent Change (2010-2020) | 11.4% | 8.0% |
| Occupied Units, % (2020) | 90.8% | 88.3% |
| Owner-Occupied Units, % (2020) | 68.4% | 68.5% |
| Renter-Occupied Units, % (2020) | 31.6% | 31.5% |
| Median Home Value (2020) | $176,000 | $159,200 |
| Average Household Size | 2.32 | 2.45 |
| No Vehicle Available, % | 11.0% | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2016-2020 5-Year Estimates

Table D.3 and Table D.4 summarize housing units by type and age. Nearly three-quarters of the housing units in Easley are detached single family homes. There are also a variety of sizes of apartment buildings in the City. Just four percent of housing units in Easley are mobile homes, which are more vulnerable to damage from wind and flood hazards.

The City of Easley's initial Flood Insurance Rate Map was identified on April 19, 1982. Nearly 43 percent of housing units in Easley were built prior to this time, which means these housing units were built before the establishment of floodplain development standards. The City had a subsequent boom of housing development in the 1990s and 2000s.

**Table D.3 Housing Units by Type, 2020**

| Units in Structure | Easley | Pickens County |
|---|---|---|
| 1-unit, detached | 74.8% | 62.8% |
| 1-unit, attached | 0.6% | 1.3% |
| 2 units | 1.3% | 2.6% |
| 3 or 4 units | 2.6% | 2.2% |
| 5 to 9 units | 8.8% | 3.9% |
| 10 to 19 units | 3.5% | 6.0% |
| 20 or more units | 4.2% | 2.9% |
| Mobile home | 4.1% | 18.0% |
| Boat, RV, van, etc. | 0.1% | 0.2% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

**Table D.4 Housing Units by Age, 2020**

| Housing Year Built | Easley | Pickens County |
|---|---|---|
| Built 2014 or later | 5.7% | 5.0% |
| Built 2010 to 2013 | 2.4% | 4.3% |
| Built 2000 to 2009 | 12.3% | 16.0% |
| Built 1990 to 1999 | 22.2% | 21.9% |
| Built 1980 to 1989 | 14.6% | 15.8% |
| Built 1970 to 1979 | 14.5% | 14.5% |
| Built 1960 to 1969 | 9.3% | 7.7% |
| Built 1950 to 1959 | 10.8% | 7.3% |
| Built 1940 to 1949 | 2.2% | 2.6% |
| Built 1939 or earlier | 6.0% | 4.9% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

## ECONOMY

Table D.5 presents key economic statistics for Easley and Pickens County. In Easley, compared to the county averages, median household income and per capita income are higher, unemployment is lower, the

percentage of individuals living below the poverty level is lower, and the percentage of individuals without health insurance is lower.

**Table D.5 Economic Statistics, 2020**

| Economic Characteristics | Easley | Pickens County |
|---|---|---|
| Median Household Income | $55,655 | $51,032 |
| Per Capita Income | $38,617 | $28,382 |
| Unemployment Rate | 4.1% | 5.0% |
| % of Individuals Below Poverty Level | 10.5% | 16.4% |
| % Without Health Insurance | 7.9% | 8.6% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates

Table D.6 summarizes employment by industry in Easley and across Pickens County. The dominant employment sectors in Easley are educational services, and healthcare and social assistance followed by manufacturing and retail trade. These industries are also the top three industries by employment across the County.

**Table D.6 Employment Statistics by Industry, 2020**

| Industry | Easley | Pickens County |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 0.0% | 0.5% |
| Construction | 7.6% | 7.9% |
| Manufacturing | 17.1% | 14.6% |
| Wholesale trade | 3.8% | 2.4% |
| Retail trade | 13.0% | 10.5% |
| Transportation and warehousing, and utilities | 5.1% | 5.0% |
| Information | 1.2% | 0.8% |
| Finance and insurance, and real estate and rental and leasing | 5.0% | 4.0% |
| Professional, scientific, and management, and administrative and waste management services | 8.0% | 8.6% |
| Educational services, and healthcare and social assistance | 24.1% | 27.2% |
| Arts, entertainment, and recreation, and accommodation and food services | 7.7% | 10.4% |
| Other services, except public administration | 4.9% | 5.3% |
| Public administration | 2.5% | 2.9% |

Source: US Census Bureau; American Community Survey 2015-2019 5-Year Estimates

## SOCIAL VULNERABILITY

The City of Easley has an aging population that mirrors similar trends across the County. The City has also observed increased health challenges, particularly increasing rates of chronic obesity and illegal drug use and overdose. Aging populations tend to be vulnerable to hazards as older individuals may have limited mobility, may be isolated from emergency services or from community members that can provide assistance, and rely on medical care or assistance that can be interrupted by a range of hazards. Similarly, people living with health challenges may have difficulty accessing the services they needed when a hazard event occurs, and increased obstacles when responding to and recovering from hazardous events.

Easley also has a higher percentage of residents who receive food stamps, as compared to the County and the other jurisdictions. This indicates there are more people who are economically disadvantaged and would require more assistance in recovering from a hazard event.

CDC SVI ratings show low to medium social vulnerability with highest rates of vulnerability in the western part of the City.

## DEVELOPMENT TRENDS

The City of Easley has experience historic growth over the past few years, largely due to annexation. Additionally, population density has significantly increased across the City. Most growth and development in the City is occurring as redevelopment of parcels or as annexations of land into the city boundaries. The City's Future Land Use plan includes some areas that are currently outside the city's boundaries but are anticipated to be annexed as they are developed. Such plans for future development are already taking place. In 2019, the City developed the Highway 153 Extension Master Plan for the 1200 acres study area that is currently located outside the City's boundaries. This area is included in the Future Land Use Map as a guide for the growth and improvement. The majority of future land use is allocated to existing residential uses with commercial parcels located throughout the City.

Figure D.1 shows a base map of Easley and Figure D.2 shows the City's future land use designations.

**Figure D.1 Base Map, Easley**

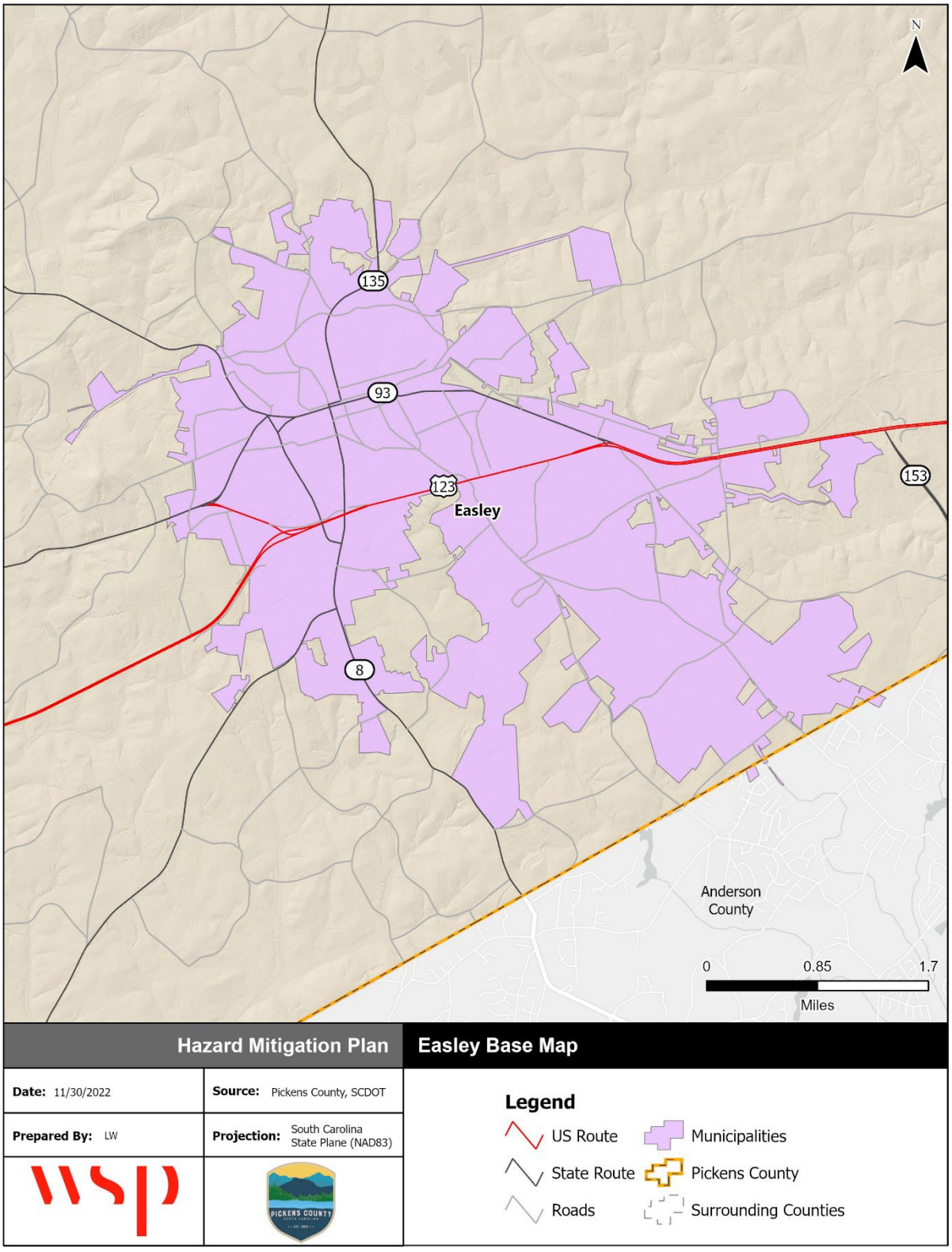
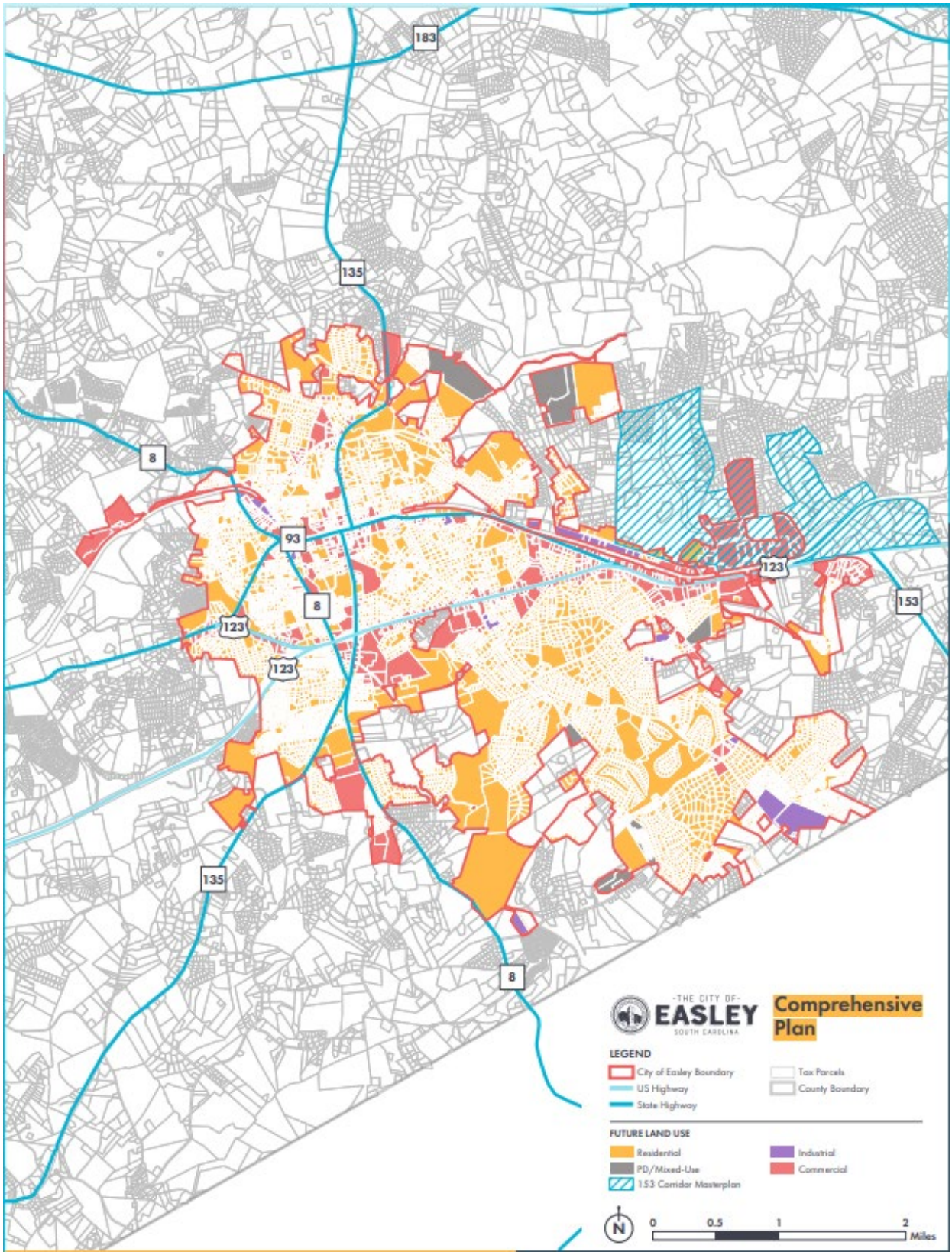


**Figure D.2 Future Land Use, Easley**




Source: City of Easley, SC Comprehensive Plan, 2022

# D.2 RISK ASSESSMENT

This section contains a summary of Easley's asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for the City of Easley. Table D.7 summarizes building exposure by occupancy type, representing total property value at risk within the City limits.

**Table D.7 Building Exposure by Occupancy Type, Easley**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 3 | $54,600 | $54,600 | $109,200 |
| Commercial | 557 | $297,548,727 | $297,548,727 | $595,097,455 |
| Education | 6 | $5,381,319 | $5,381,319 | $10,762,638 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 181 | $28,021,579 | $42,032,369 | $70,053,948 |
| Religious | 10 | $7,106,023 | $7,106,023 | $14,212,046 |
| Residential | 8,141 | $1,362,864,048 | $681,432,024 | $2,044,296,072 |
| **Total** | **8,898** | **$1,700,976,296** | **$1,033,555,062** | **$2,734,531,358** |

Source: Pickens County GIS

The spatial distribution of the property inventory is shown by building count in Figure D.3 and by building value in Figure D.4.

**Figure D.3 Building Count by Census Block, Easley**

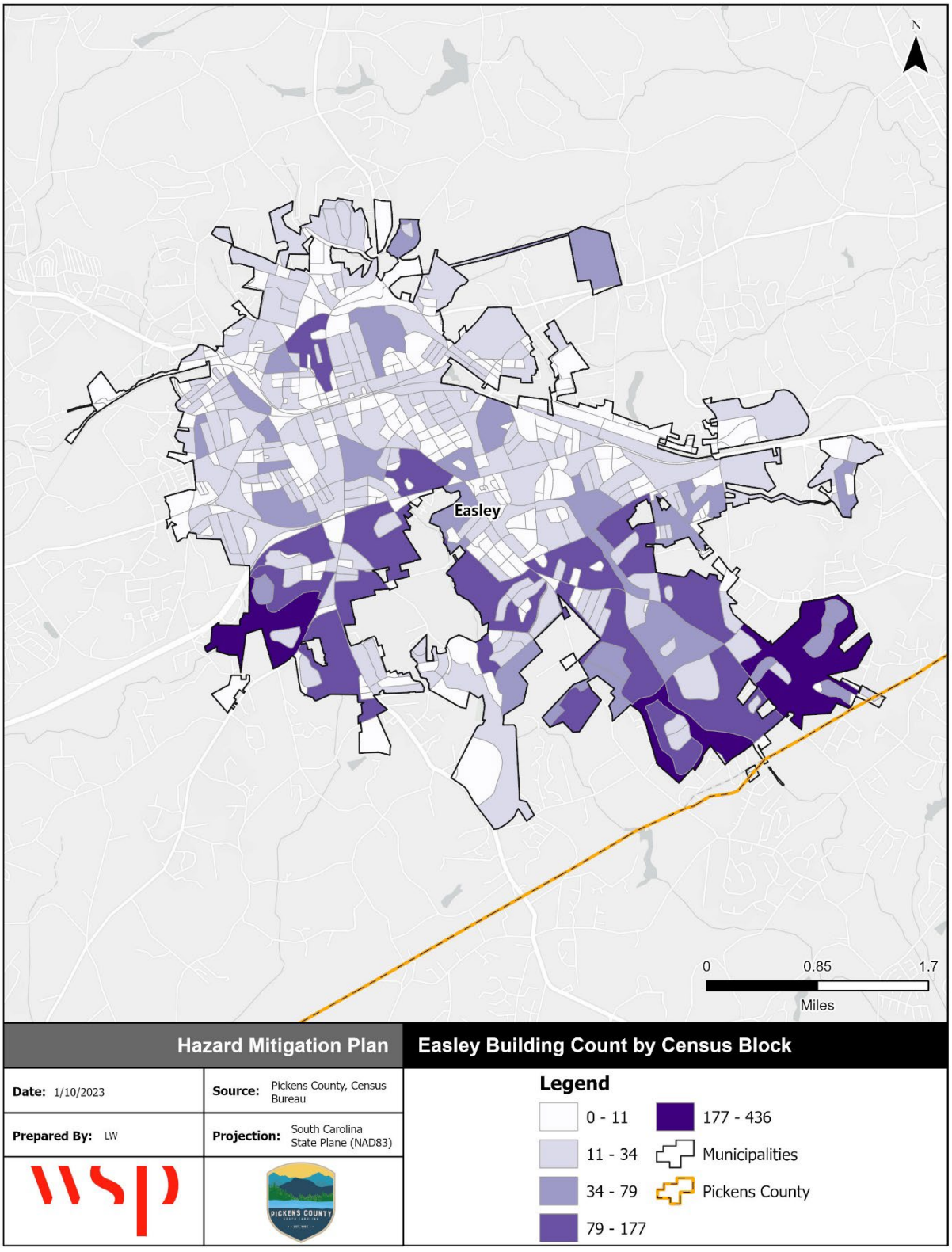


**Figure D.4 Building Value by Census Block, Easley**

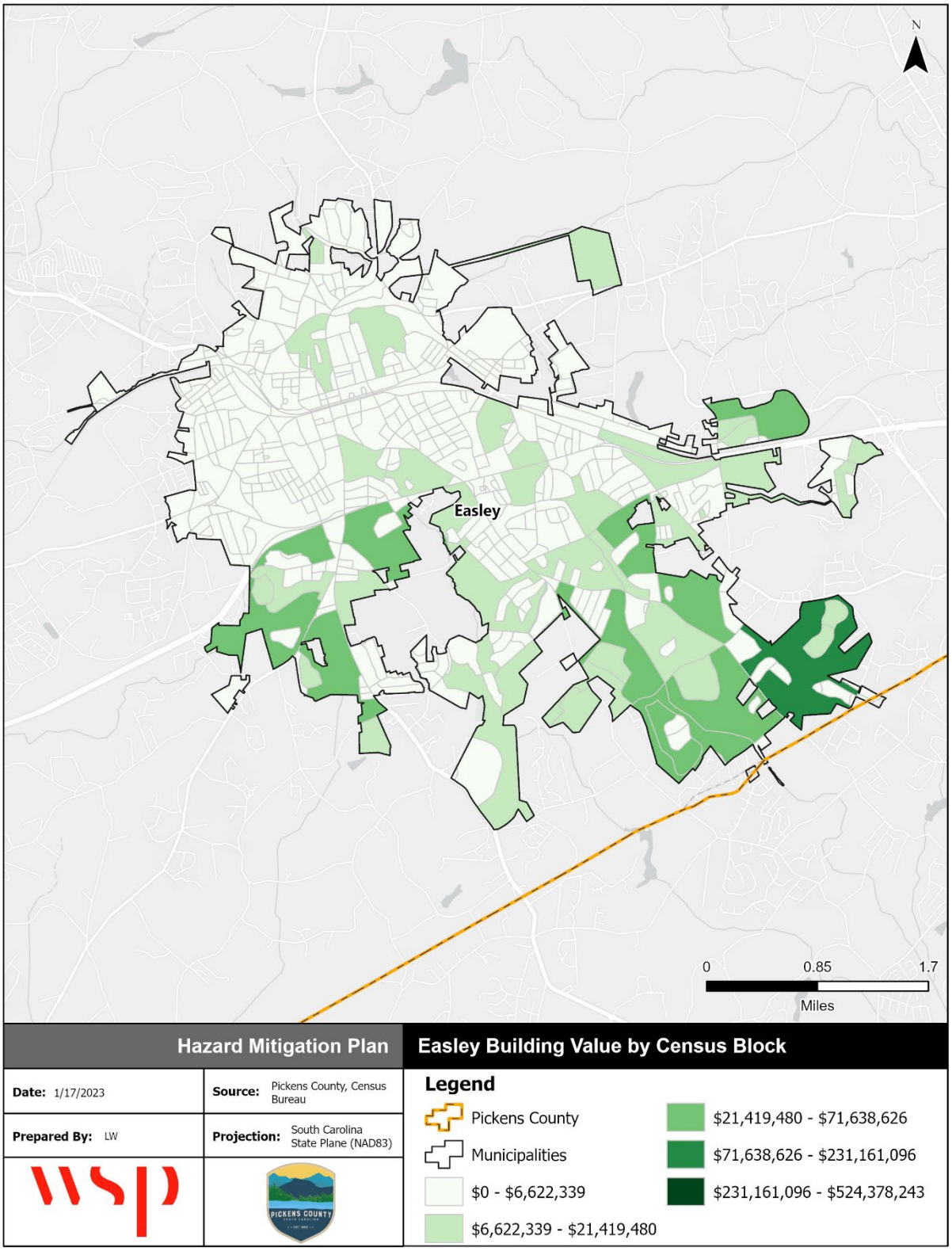


Table D.8 summarizes critical facilities and infrastructure in Easley by facility type, and Table D.9 provides the full inventory of critical facilities and infrastructure in Easley. Critical facilities and infrastructure were identified by Pickens County Emergency Management and City staff and are maintained in GIS.

**Table D.8 Critical Facility Summary, Easley**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 9 |
| Food, Water, Shelter | 2 |
| Health & Medical | 19 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 11 |
| **Total** | **41** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table D.9 Critical Facility Inventory, Easley**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Baptist Med Ctr Nursing Care |
| Safety & Security | Easley City Police |
| Safety & Security | Easley City Town Hall |
| Safety & Security | Easley Fire #1 |
| Safety & Security | Easley Fire #2 |
| Safety & Security | Easley Fire #3 |
| Safety & Security | Easley Fire 5-4 |
| Safety & Security | Pickens Cdc |
| Safety & Security | Sherrif Sub-Station Code 8 |
| Food, Water, Shelter | Easley Church Of God |
| Food, Water, Shelter | Easley First United |
| Health & Medical | Blue Ridge Living Center |
| Health & Medical | Countryside Healthcare Center |
| Health & Medical | Countryside Park |
| Health & Medical | Easley Ems |
| Health & Medical | Easley Ems 2 |
| Health & Medical | Easley Living Center |
| Health & Medical | Easley Rescue |
| Health & Medical | Easley Retirement Center |
| Health & Medical | Maggie Manor |
| Health & Medical | Magnolias Of Easley |
| Health & Medical | Nursing Home |
| Health & Medical | Nursing Home |
| Health & Medical | PC Board Of Disabilities |
| Health & Medical | PC Board Of Disabilities |
| Health & Medical | PC Board Of Disabilities |
| Health & Medical | Presbyterian Home Of SC |
| Health & Medical | Prisma Health Baptist Hospital |
| Health & Medical | The Willows Of Easley |
| Health & Medical | West End Retirement |
| Hazardous Materials | Bell South - South First Street |
| Hazardous Materials | City Of Easly Public Works |
| Hazardous Materials | Dodge's Store #877 |
| Hazardous Materials | Easley Combined Utilities - George's Creek Wwtp |

| Facility Type | Facility Name |
|---|---|
| Hazardous Materials | Home Depot Usa Inc #6918 |
| Hazardous Materials | Palmetto Plating Co., Inc. |
| Hazardous Materials | Plez U Food Store |
| Hazardous Materials | Rjm Manufacturing |
| Hazardous Materials | Speedway #0606 |
| Hazardous Materials | Sunoco Service Station |
| Hazardous Materials | Synergy Gas Of Easley |
| Hazardous Materials | Bell South - South First Street |
| Hazardous Materials | City Of Easly Public Works |
| Hazardous Materials | Dodge's Store #877 |
| Hazardous Materials | Easley Combined Utilities - George's Creek Wwtp |
| Hazardous Materials | Home Depot Usa Inc #6918 |
| Hazardous Materials | Palmetto Plating Co., Inc. |
| Hazardous Materials | Plez U Food Store |
| Hazardous Materials | Rjm Manufacturing |
| Hazardous Materials | Speedway #0606 |
| Hazardous Materials | Sunoco Service Station |
| Hazardous Materials | Synergy Gas Of Easley |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table D.10 summarizes the PRI scores for Easley for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table D.10 PRI Results, Easley**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Likely | Critical | Small | > 24 hrs | < 1 week | 2.6 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Highly Likely | Critical | Small | 6 to 12 hrs | < 1 week | 3.1 |
| Hurricane/Tropical Storm | Likely | Limited | Large | > 24 hrs | < 24 hrs | 2.6 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Critical | Moderate | < 6 hrs | > 1 week | 2.6 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## D.2.1 DAM/LEVEE FAILURE

Table D.11 details the one high hazard dam located within Easley according to the SC DHEC Dam Inventory and the National Inventory of Dams. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

**Table D.11 Dam Inventory for Easley**

| Dam Name | NIDID | Height (ft.) | Storage (ac-ft) | Owner | Primary Purpose | Last EAP Revision |
|---|---|---|---|---|---|---|
| Loyds Pond Dam | SC01396 | 41 | 280 | Private | Recreation | -- |

Data was not available to estimate property exposure to failure of any high hazard dams. There is no levee failure exposure in Easley.

## D.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. Impacts most likely to affect Easley are related to low water levels and water usage restrictions. Ongoing issues with sedimentation in Saluda Lake, which is a public water supply source for Easley, could exacerbate drought risks by limiting reservoir capacity.

## D.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. Easley's entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 418 buildings in Easley sustaining some level of damage amounting to $5.5 million.

## D.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Compared to county averages, Easley has a larger proportion of both children under age 5 and adults over age 65, indicating higher vulnerability.

## D.2.5 FLOOD

Table D.12 details the acreage of Easley's total area by flood zone on the effective DFIRM. Per this assessment, 3.4 percent of Easley falls within the SFHA.

**Table D.12 Flood Zone Acreage in Easley**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 209.4 | 2.6% |
| Floodway | 58.8 | 0.7% |
| 0.2% Annual Chance Flood Hazard | 24.9 | 0.3% |
| Unshaded X | 7,682.6 | 96.3% |
| **Total** | 7,975.7 | -- |
| **SFHA Total** | **268.2** | **3.4%** |

Source: FEMA Effective DFIRM

Figure D.5 reflects the effective mapped flood hazard zones for Easley, and Figure D.6 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Table D.13 provides the estimated losses for the 1% annual chance flood event in Easley. The total estimated damage value is based on damages to improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

**Table D.13 Estimated Building Damage and Content Loss for 1% Annual Chance Flood**

| Occupancy Type | Total Buildings with Loss | Total Value (Building & Contents) | Estimated Building Damage | Estimated Content Loss | Estimated Total Damage | Loss Ratio |
|---|---|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 | $0 | 0% |
| Commercial | 7 | $3,138,286 | $462,527 | $934,969 | $1,397,496 | 45% |
| Educational | 0 | $0 | $0 | $0 | $0 | 0% |
| Government | 0 | $0 | $0 | $0 | $0 | 0% |
| Industrial | 2 | $1,010,100 | $47,050 | $83,515 | $130,565 | 13% |
| Religious | 0 | $0 | $0 | $0 | $0 | 0% |
| Residential | 56 | $11,791,097 | $1,307,193 | $666,363 | $1,973,556 | 17% |
| **Total** | **65** | **$15,939,483** | **$1,816,770** | **$1,684,847** | **$3,501,617** | **22%** |

Source: Hazus 6.0; Pickens County GIS

A count of people with high exposure to flooding was estimated based on the number of residential buildings with loss and Easley's average household size estimate of 2.32 people per household. There are approximately 129 people exposed to flood risk from the 1% annual chance flood event in Easley.

There is one critical facility in Easley located in the SFHA. This facility is listed in Table D.14 along with its flood zone and estimated flood depth from the 1%-annual-chance flood.

**Table D.14 Critical Facilities Exposed to Special Flood Hazard Areas**

| Facility Type | Facility Name | Flood Zone | 1%-Annual Chance Flood Depth (NAVD FT) |
|---|---|---|---|
| Health and Medical | Nursing Home | AE | 2.47 |

Source: Hazus 6.0; Pickens County GIS

**Figure D.5 FEMA Flood Hazard Areas, Easley**

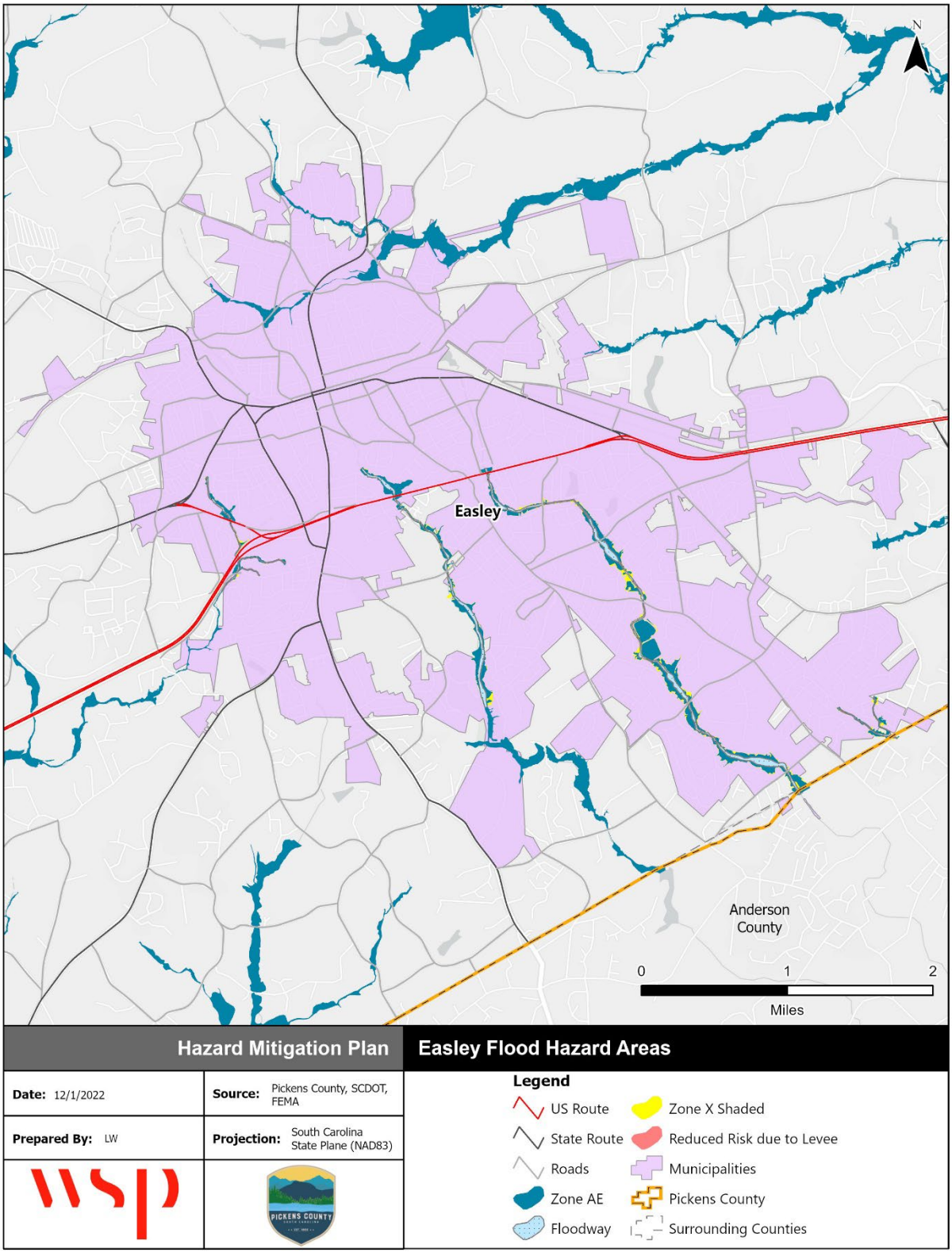
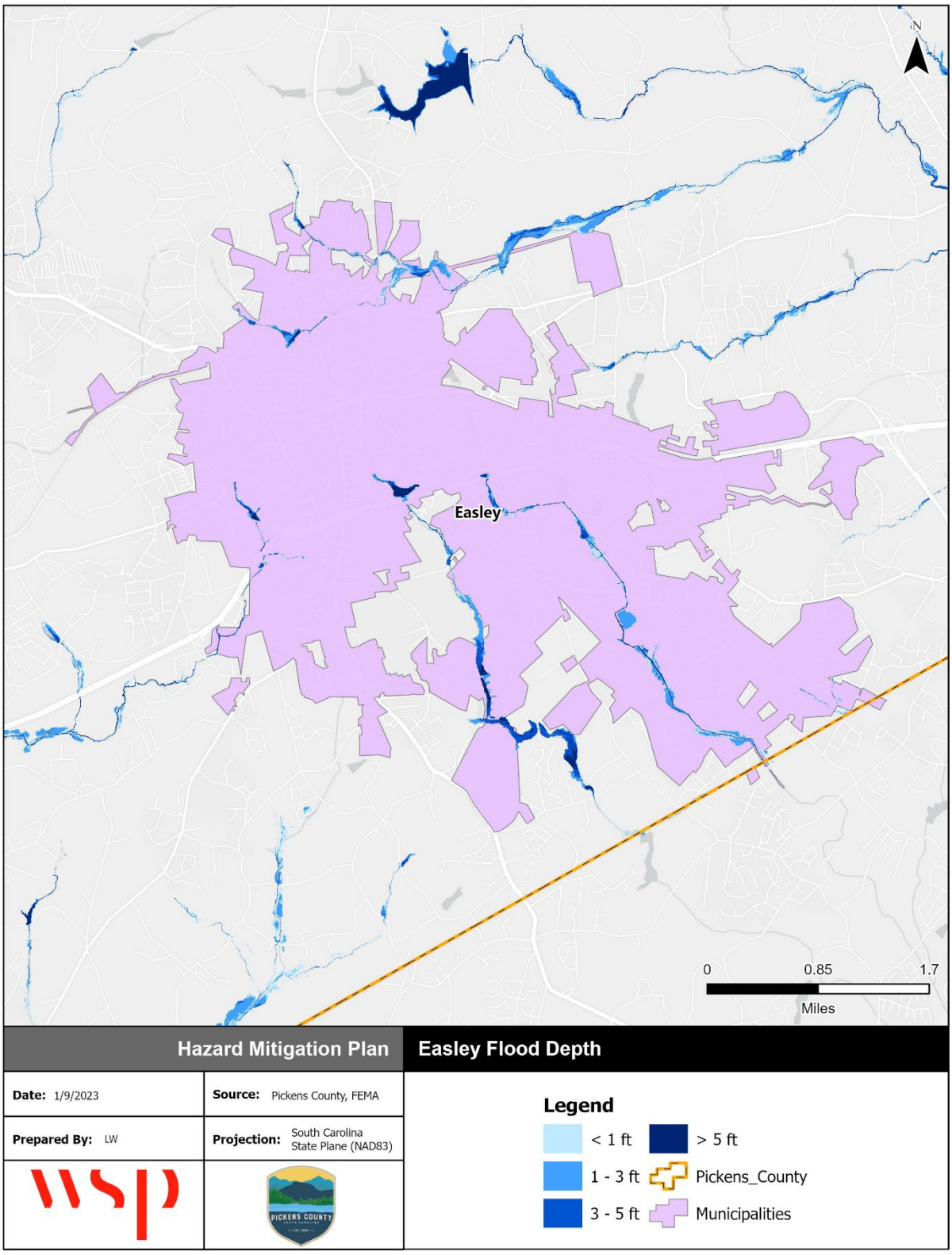


**Figure D.6 Flood Depth, 1%-Annual-Chance Flood Event, Easley**



## D.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. Easley's entire asset inventory is exposed to hurricane and tropical storm impacts. Mobile home units are particularly vulnerable to wind events such as hurricanes and tropical storms. In Easley, there are approximately 405 mobile home units which comprise about 4% of all housing units. This represents a minor vulnerability for Easley but is critical for units that are not properly anchored to foundations.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For Easley, this equates to an estimated $164 thousand in damages and $547 thousand in damages, respectively.

## D.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. The built environment is vulnerable to urban fire risk and damage to electrical equipment from lightning.

## D.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados.

## D.2.9 WILDFIRE

Figure D.7 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table D.15 summarizes for Easley the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table D.15 Building Counts and Values within WUIRI under -5, Easley**

| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 3 | 100% | $54,600 | $54,600 | $109,200 |
| Commercial | 390 | 70% | $184,141,438 | $184,141,438 | $368,282,877 |
| Education | 4 | 67% | $3,531,690 | $3,531,690 | $7,063,380 |
| Government | 0 | N/A | $0 | $0 | $0 |
| Industrial | 124 | 69% | $18,020,351 | $27,030,527 | $45,050,878 |
| Religious | 5 | 50% | $2,594,777 | $2,594,777 | $5,189,554 |
| Residential | 7,122 | 87% | $1,223,728,818 | $611,864,409 | $1,835,593,227 |
| **Total** | **7,648** | **86%** | **$1,432,071,674** | **$829,217,441** | **$2,261,289,115** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Easley's average household size estimate of 2.32 people per household. There are approximately 21,996 people exposed to wildfire risk in Easley.

Table D.16 summarizes critical facility exposure to areas of moderate to high wildfire risk. Table D.17 provides the full inventory of vulnerable facilities and infrastructure.

**Table D.16 Critical Facility Exposure within WUIRI under -5, Easley**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 8 |
| Food, Water, Shelter | 0 |
| Health & Medical | 15 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 5 |
| **Total** | **28** |

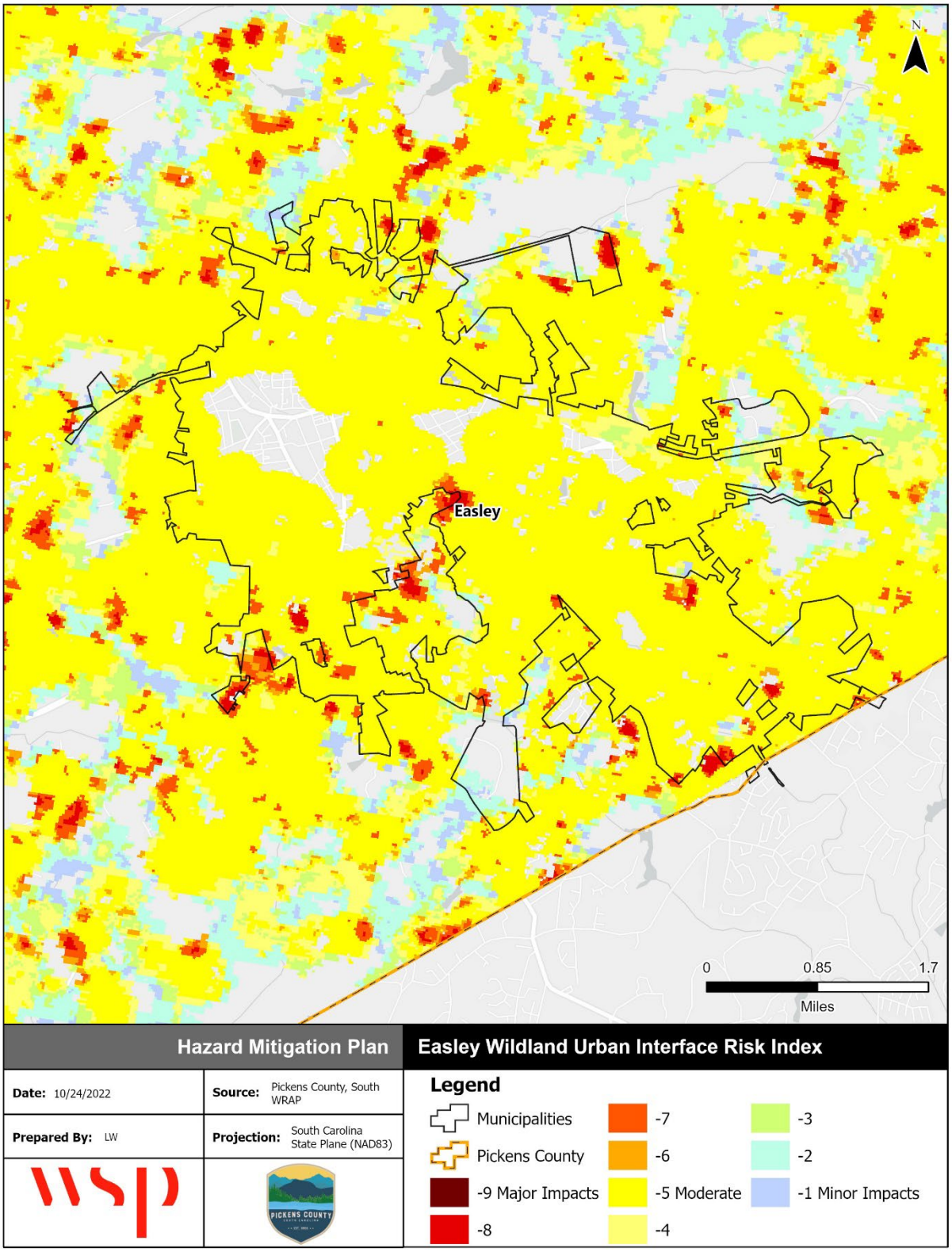
Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Table D.17 Critical Facilities Exposed to WUIRI under -5, Easley**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Baptist Med Ctr Nursing Care |
| Safety & Security | Easley City Town Hall |
| Safety & Security | Easley Fire #1 |
| Safety & Security | Easley Fire #2 |
| Safety & Security | Easley Fire #3 |
| Safety & Security | Easley Fire 5-4 |
| Safety & Security | Pickens Cdc |
| Safety & Security | Sherrif Sub-Station Code 8 |
| Health & Medical | Blue Ridge Living Center |
| Health & Medical | Countryside Healthcare Center |
| Health & Medical | Countryside Park |
| Health & Medical | Easley Ems |
| Health & Medical | Easley Living Center |
| Health & Medical | Easley Rescue |
| Health & Medical | Easley Retirement Center |
| Health & Medical | Magnolias Of Easley |
| Health & Medical | Nursing Home |
| Health & Medical | Nursing Home |
| Health & Medical | Pc Board Of Disabilities |
| Health & Medical | Pc Board Of Disabilities |
| Health & Medical | Presbyterian Home Of Sc |
| Health & Medical | Prisma Health Baptist Hospital |
| Health & Medical | The Willows Of Easley |
| Hazardous Materials | City Of Easly Public Works |
| Hazardous Materials | Home Depot Usa Inc #6918 |
| Hazardous Materials | Plez U Food Store |
| Hazardous Materials | Speedway #0606 |
| Hazardous Materials | Sunoco Service Station |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Figure D.7 WUI Risk Index, Easley**



### D.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms. Easley has higher vulnerability than the County average in this regard.

## D.3 CAPABILITY ASSESSMENT

### D.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to the City of Easley were provided by the City's HMPC representatives, City staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

The City of Easley recently updated its comprehensive plan and will begin to review and update the City's land use plan, zoning ordinance, and subdivision ordinance. As the City undergoes this review it should reference this plan and integrate mitigation goals and strategies where applicable.

The City has implemented several culvert improvements due to significant stormwater challenges and completed redundancy work at fire stations. The city collects stormwater fees and recently passed an impact fee that will allocate a percentage of funds to various City departments. This provides significant funding capability for the City. It is recommended that the City include flood mitigation and other hazard mitigation activities in the City's CIP and other related programs to continue to support mitigation efforts.

Additionally, all Easley City departments participate in hazard preparedness and outreach. City staff indicated that several departments are very active on social media. While this is an effective way to reach the community, the City should also consider alternative methods of public outreach as the City has an older population that often does not receive important information over social media. The City may consider posting flyers in community buildings or mailing them to households across the City.

### D.3.2 FLOODPLAIN MANAGEMENT

The City of Easley joined the NFIP in July 1982 and had an initial FIRM dated April 19, 1982. The following tables reflect NFIP policy and claims data for the City categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table D.18 NFIP Policy and Claims Data by Structure Type**

| Structure Type | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| Single Family | 23 | $14,707 | $5,266,300 | 8 | $128,546.69 |
| 2-4 Family | 0 | $0 | $0 | 0 | $0 |
| All Other Residential | 0 | $0 | $0 | 0 | $0 |
| Non Residential | 2 | $1,816 | $1,000,000 | 0 | $0 |
| **Total** | **25** | **$16,523** | **$6,266,300** | **8** | **$128,546.69** |

Source: FEMA Community Information System, accessed March 2023

**Table D.19 NFIP Policy and Claims Data by Flood Zone**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 16 | $11,291 | $3,932,000 | 3 | $13,717.25 |
| A Zones | 0 | $0 | | 1 | $3,402.38 |
| B, C & X Zone | | | | | |
| Standard | 8 | $5,039 | $2,306,300 | 3 | $99,544.70 |
| Preferred | 1 | $193 | $28,000 | 1 | $11,882.36 |
| **Total** | **25** | **$16,523** | **$6,266,300** | **8** | **$128,546.69** |

Source: FEMA Community Information System, accessed March 2023

**Table D.20 NFIP Policy and Claims Data Pre-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 5 | $4,414 | $871,000 | 0 | $0 |
| A Zones | 0 | $0 | $0 | 1 | $3,402.38 |
| B, C & X Zone | | | | | |
| Standard | 1 | $580 | $350,000 | 0 | $0 |
| Preferred | 1 | $193 | $28,000 | 1 | $11,882.36 |
| **Total** | **7** | **$5,187** | **$1,249,000** | **2** | **$15,284.74** |

Source: FEMA Community Information System, accessed March 2023

**Table D.21 NFIP Policy and Claims Data Post-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 11 | $6,877 | $3,061,000 | 3 | $13,717.25 |
| A Zones | 0 | $0 | $0 | 0 | $0 |
| B, C & X Zone | | | | | |
| Standard | 7 | $4,459 | $1,956,300 | 3 | $99,544.70 |
| Preferred | 0 | $0 | $0 | 0 | $0 |
| **Total** | **18** | **$11,336** | **$5,017,300** | **6** | **$113,261.95** |

Source: FEMA Community Information System, accessed March 2023

## D.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 55 | Provide training to first responders regarding train safety, so that they have better understanding of what materials are transported through the city, how to communicate in the event of an incident, what resources are available to them, and how to respond to incidents. | 3.3 | Hazardous Materials | Medium | High | Easley | City of Easley Fire Department | General Fund | Immediate | Emergency Services | Carry Forward. Ongoing and consistently done for highway and rail safety. |
| 56 | Conduct risk assessment to more closely identify areas of cyber vulnerabilities within the city which may cause hazard events (e.g., communication, water, sewage outages) | 2.2 | All Hazards | High | Medium | Easley | City of Easley, Easley Combined Utilities | General Fund | Long-Term | Prevention | Carry Forward. Actively working on implementation. |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 66 | Implement streambank stabilization and stream restoration along the Saluda River to repair unstable banks and reduce erosion and sedimentation that degrades natural floodplain functions and downstream reservoir capacity. | 4.2 | Flood, Drought | High | Low | Pickens County, City of Easley | Pickens County EM Director, Easley Combined Utilities, Save Our Saluda | Local Funds, State & Federal Grant Funds | Long-Term | Natural Resource Protection | New |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# E.CITY OF LIBERTY

## E.1 COMMUNITY PROFILE

### GEOGRAPHY

Liberty is in the south-central part of Pickens County, along Highway 93, between Norris and Easley. It occupies 4.45 square miles at an elevation of 1,020 feet above sea level.

Originally part of the Cherokee hunting grounds, white settlers first came to the area in large numbers in the 1780s. By 1800, the area was called Liberty Springs. Prior to the civil war, most residents in the area were subsistence farmers. Liberty became an official town in 1876 after the Charlotte-Atlanta Airline Railway was completed and ran through town. In 1901, the Liberty Mill cotton mill opened in Liberty, followed in 1905 by Calumet Mill cotton mill, later renamed the Maplecroft Mill. The mills remained a critical part of the town and its economy until the 1990s saw local textile manufacturing decline in the face of foreign competition (City of Liberty).

### POPULATION

Table E.1 provides population counts and growth estimates for Liberty, Pickens County, and the State.

Population in Liberty increased by about three percent from 2010 to 2020. This change lagged the overall growth across the county and the state.

**Table E.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Liberty** | **3,269** | **3,366** | **97** | **3.0%** | **3,349** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

### HOUSING

Table E.2 details housing unit counts and other housing tenure statistics for Liberty. Data from the 2010 Census was not available for Liberty.

Nearly 96 percent of housing units in Liberty are occupied, suggesting there is a lack of housing choice and availability. Nearly 80 of occupants are owners. Owner-occupants are more likely to be willing and able to invest in property protection and other mitigation measures for their homes. Owners typically have more longevity in the area and are therefore more likely to be aware of the areas hazard risks and vulnerabilities.

**Table E.2 Housing Tenure Statistics, 2020**

| Housing Characteristics | Liberty | Pickens County |
|---|---|---|
| Housing Units (2020) | 1,468 | 54,939 |
| Occupied Units, % (2020) | 95.8% | 88.3% |
| Owner-Occupied Units, % (2020) | 79.3% | 68.5% |
| Renter-Occupied Units, % (2020) | 20.7% | 31.5% |
| Median Home Value (2020) | $106,400 | $159,200 |
| Average Household Size | 2.25 | 2.45 |
| No Vehicle Available, % | 1.1% | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2016-2020 5-Year Estimates

Table E.3 and Table E.4 summarize housing units by type and age. Over 80 percent of the housing units in Liberty are single family detached homes. Mobile homes make up the next largest percentage of housing units, at 10 percent. Mobile homes are more vulnerable to damage from wind and flood hazards.

The City of Liberty's initial Flood Insurance Rate Map was identified on June 25, 1976. Most than a quarter of housing units in Liberty were built in the 1970s and may or may not have been built before the establishment of floodplain development standards. Another large proportion of housing units in Liberty were built before 1940. Minimal housing development has occurred since 2010.

**Table E.3 Housing Units by Type, 2020**

| Units in Structure | Liberty | Pickens County |
|---|---|---|
| 1-unit, detached | 82.2% | 62.8% |
| 1-unit, attached | 3.6% | 1.3% |
| 2 units | 0.0% | 2.6% |
| 3 or 4 units | 3.0% | 2.2% |
| 5 to 9 units | 0.0% | 3.9% |
| 10 to 19 units | 0.0% | 6.0% |
| 20 or more units | 1.2% | 2.9% |
| Mobile home | 10.0% | 18.0% |
| Boat, RV, van, etc. | 0.0% | 0.2% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

**Table E.4 Housing Units by Age, 2020**

| Housing Year Built | Liberty | Pickens County |
|---|---|---|
| Built 2014 or later | 1.2% | 5.0% |
| Built 2010 to 2013 | 0.7% | 4.3% |
| Built 2000 to 2009 | 9.3% | 16.0% |
| Built 1990 to 1999 | 14.1% | 21.9% |
| Built 1980 to 1989 | 12.1% | 15.8% |
| Built 1970 to 1979 | 27.0% | 14.5% |
| Built 1960 to 1969 | 8.4% | 7.7% |
| Built 1950 to 1959 | 3.2% | 7.3% |
| Built 1940 to 1949 | 6.9% | 2.6% |
| Built 1939 or earlier | 17.2% | 4.9% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

## ECONOMY

Table E.5 presents key economic statistics for Liberty and Pickens County. In Liberty, median household income is lower than the county average and the unemployment rate is higher. The percentage of individuals living below the poverty level is lower than the county average.

**Table E.5 Economic Statistics, 2020**

| Economic Characteristics | Liberty | Pickens County |
|---|---|---|
| Median Household Income | $50,521 | $51,032 |
| Per Capita Income | $32,482 | $28,382 |
| Unemployment Rate | 7.3% | 5.0% |
| % of Individuals Below Poverty Level | 7.2% | 16.4% |
| % Without Health Insurance | 8.7% | 8.6% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates

Table E.6 summarizes employment by industry in Liberty and across Pickens County. The dominant employment sectors in Liberty are educational services, and healthcare and social assistance followed by retail trade.

**Table E.6 Employment Statistics by Industry, 2020**

| Industry | Liberty | Pickens County |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 0.0% | 0.5% |
| Construction | 2.0% | 7.9% |
| Manufacturing | 10.8% | 14.6% |
| Wholesale trade | 1.0% | 2.4% |
| Retail trade | 18.0% | 10.5% |
| Transportation and warehousing, and utilities | 12.0% | 5.0% |
| Information | 0.0% | 0.8% |
| Finance and insurance, and real estate and rental and leasing | 5.6% | 4.0% |
| Professional, scientific, and management, and administrative and waste management services | 12.8% | 8.6% |
| Educational services, and healthcare and social assistance | 24.2% | 27.2% |
| Arts, entertainment, and recreation, and accommodation and food services | 10.7% | 10.4% |
| Other services, except public administration | 0.5% | 5.3% |
| Public administration | 2.3% | 2.9% |

Source: US Census Bureau; American Community Survey 2015-2019 5-Year Estimates

## SOCIAL VULNERABILITY

Based on the CDC SVI results, Section 3.8, Liberty has low to medium social vulnerability. The City does have a larger population of African American and Hispanic residents, some of whom may speak English as a second language. As the CDC indicates these marginalized groups can experience inequality that results in disproportionate and increased risk and vulnerability. Like many smaller cities, Liberty also has an aging population. Around 17.6 percent of the population is 65 years or older. Older individuals may have limited mobility and residents that live alone may be isolated from emergency services or from community members that can provide assistance.

## DEVELOPMENT TRENDS

New development in Liberty has been relatively minimal over the past few years, however, the City is expecting increased development in the coming year. An influx of residential building is expected just north of the airport with plans for a two-phased development bringing between 200-400 new homes. Development is also planned for parcels off of Rice's Creek Road. The City has plans to pursue aggressive annexation, particularly for commercial growth. Additionally, there are plans for a new municipal complex which will house City Hall and all administrative functions as well as police and the City courts. Other areas targeted for growth and redevelopment are brownfield sites and areas of old industrial buildings and uses. Liberty has a Brownfield Plan which explores options for future development like affordable housing, recreational facilities, a hub for multi-use paths to connect destinations, and industrial use.

Figure E.1 shows a base map of Liberty and Figure E.2 shows the City's future land use designations. The future land use map is from the City's comprehensive plan which was developed in 2003. Future land use goals have changed and will be updated when a new comprehensive plan is developed.

**Figure E.1 Base Map, Liberty**

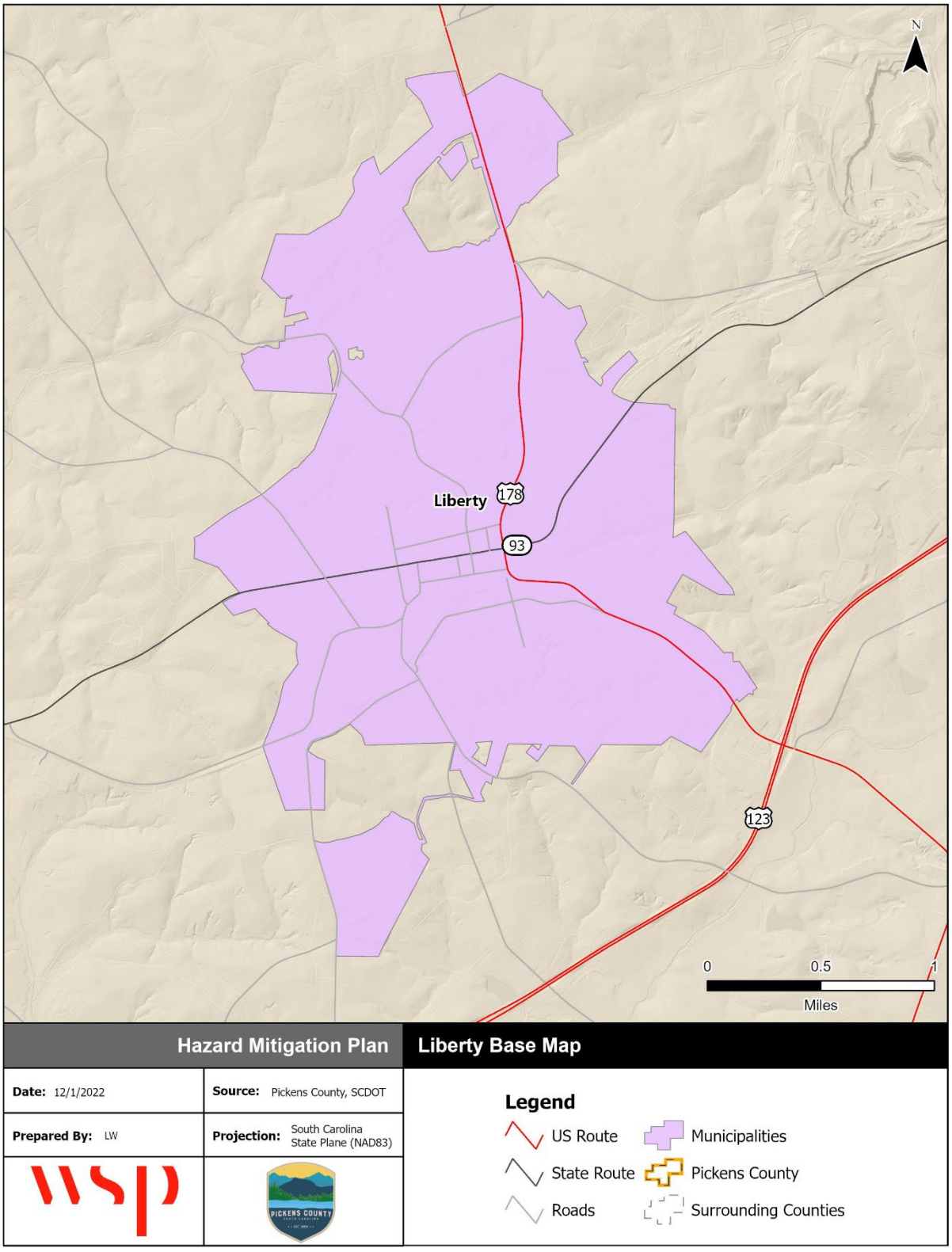
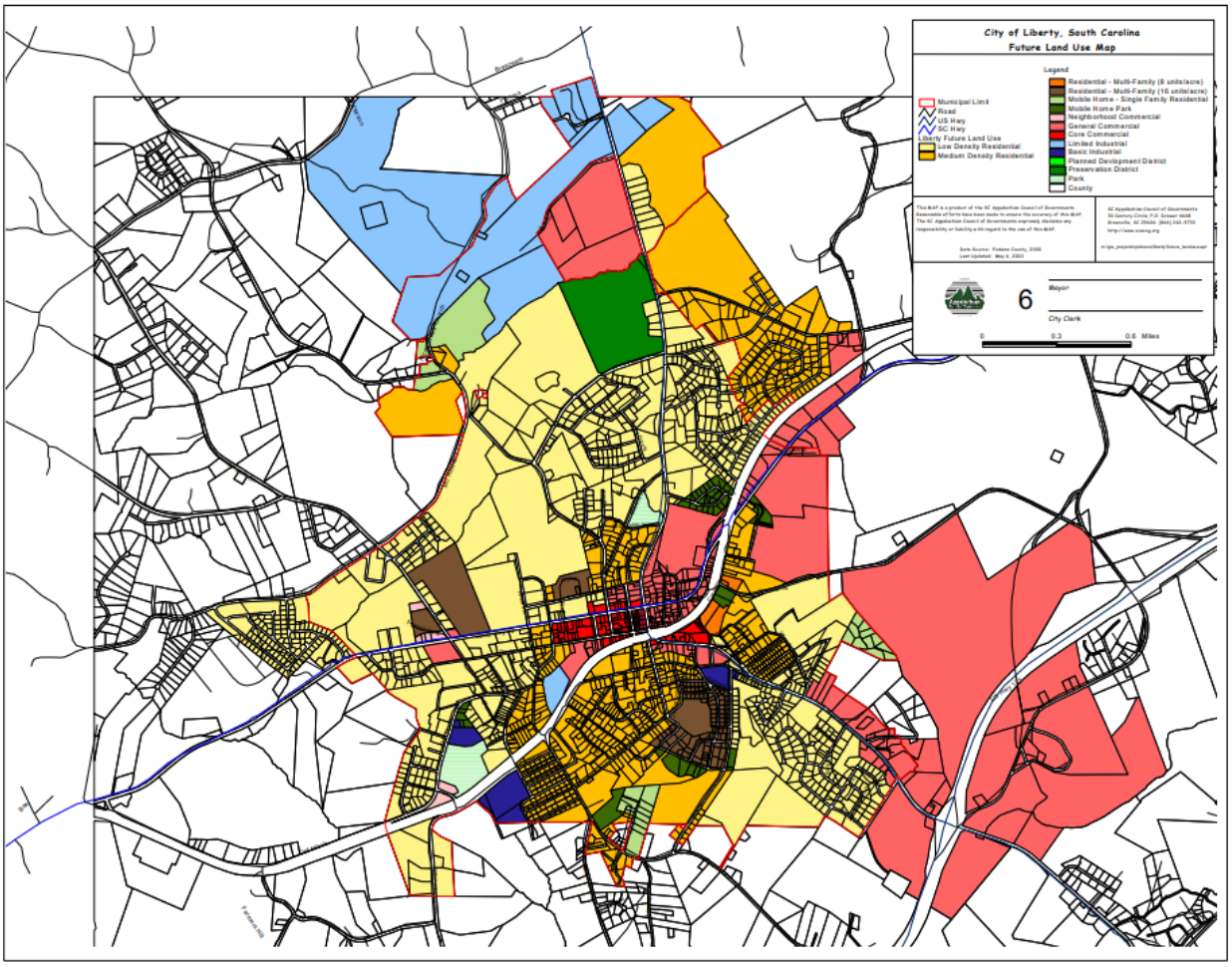


**Figure E.2 Future Land Use, Liberty**




Source: City of Liberty, SC Comprehensive Plan, 2023

# E.2 RISK ASSESSMENT

This section contains a summary of Liberty's asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for the City of Liberty. Table E.7 summarizes building exposure by occupancy type, representing total property value at risk within the City limits.

**Table E.7 Building Exposure by Occupancy Type, Liberty**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 2 | $82,500 | $82,500 | $165,000 |
| Commercial | 92 | $21,114,710 | $21,114,710 | $42,229,419 |
| Education | 3 | $357,421 | $357,421 | $714,842 |
| Government | 1 | $0 | $0 | $0 |
| Industrial | 34 | $2,803,054 | $4,204,582 | $7,007,636 |
| Religious | 2 | $515,222 | $515,222 | $1,030,444 |

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Residential | 1,269 | $134,727,523 | $67,363,762 | $202,091,285 |
| **Total** | **1,403** | **$159,600,430** | **$93,638,196** | **$253,238,626** |

Source: Pickens County GIS

The spatial distribution of the property inventory is shown by building count in Figure E.3 and by building value in Figure E.4Figure D.4.

**Figure E.3 Building Count by Census Block, Liberty**

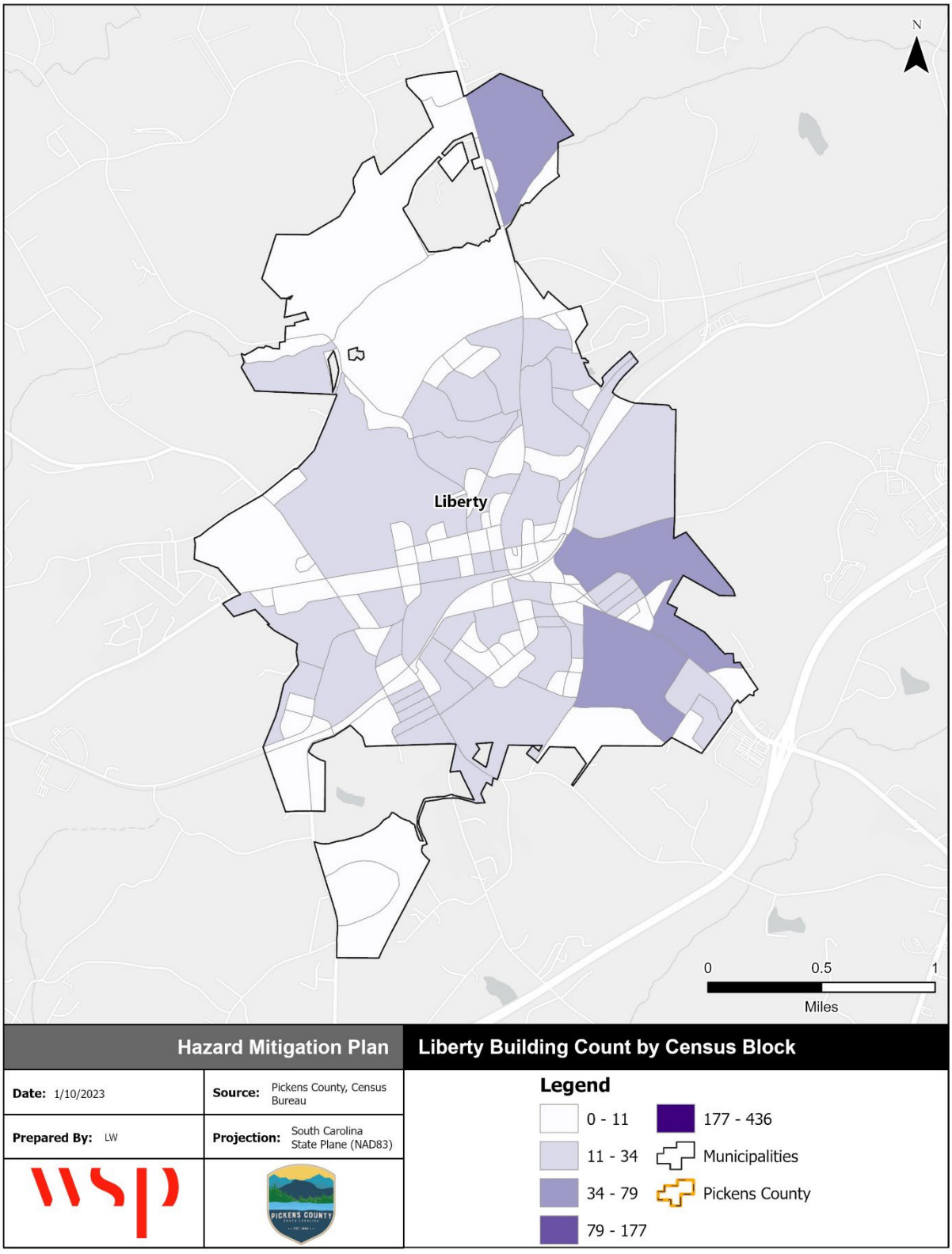


**Figure E.4 Building Value by Census Block, Liberty**

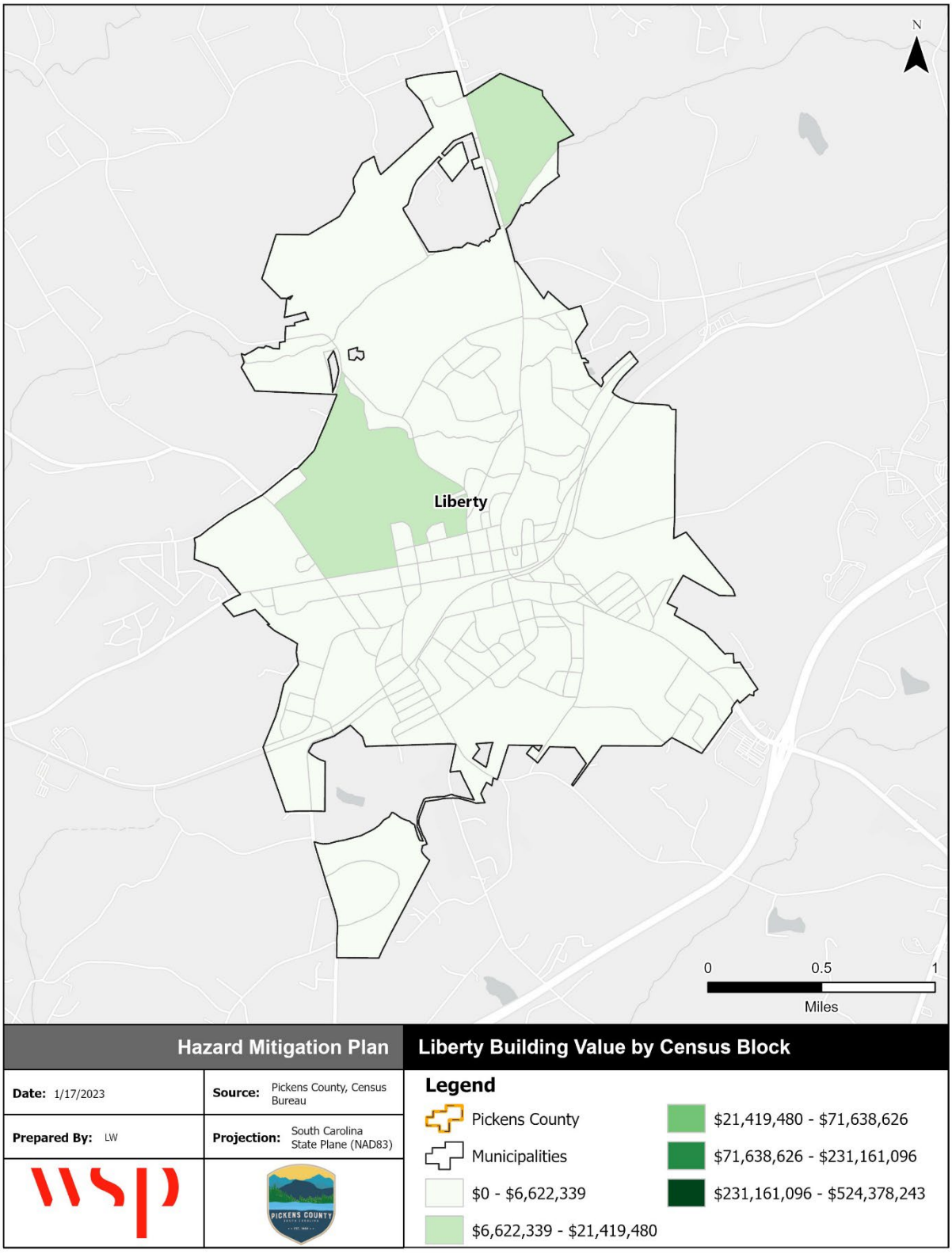


Table E.8 summarizes critical facilities and infrastructure in Liberty by facility type, and Table E.9 provides the full inventory of critical facilities and infrastructure in Liberty. Critical facilities and infrastructure were identified by Pickens County Emergency Management and City staff and are maintained in GIS.

**Table E.8 Critical Facility Summary, Liberty**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 7 |
| Food, Water, Shelter | 0 |
| Health & Medical | 2 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 1 |
| Hazardous Materials | 7 |
| **Total** | **17** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table E.9 Critical Facility Inventory, Liberty**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Liberty City Police |
| Safety & Security | Liberty City Police |
| Safety & Security | Liberty City Town Hall |
| Safety & Security | Liberty Fire |
| Safety & Security | Liberty Magistrate |
| Safety & Security | Roper Sewer Treatment |
| Safety & Security | Sherrif Sub-Station Code 11 |
| Health & Medical | Liberty EMS |
| Health & Medical | Liberty Rescue |
| Hazardous Materials | Cornell Dubilier Marketing, Inc |
| Hazardous Materials | Cornell Dubilier Peak Generator Site |
| Hazardous Materials | Duke Power-Liberty Retail Substation |
| Hazardous Materials | Flexi-Wall Systems |
| Hazardous Materials | Liberty Denim, LLC-Liberty Plant #2 |
| Hazardous Materials | Liberty Denim, LLC-Plant #1 |
| Hazardous Materials | Lindsay Oil Company Inc - Liberty |
| Transportation | Pickens County Airport |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table E.10 summarizes the PRI scores for Liberty for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table E.10 PRI Results, Liberty**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Possible | Limited | Small | > 24 hrs | < 1 week | 2.0 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Likely | Critical | Small | 6 to 12 hrs | < 1 week | 2.8 |
| Hurricane/Tropical Storm | Likely | Limited | Large | > 24 hrs | < 24 hrs | 2.6 |

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Critical | Moderate | < 6 hrs | > 1 week | 2.6 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## E.2.1 DAM/LEVEE FAILURE

There are no high hazard dams located within the city limits of Liberty. It is possible that upstream dams could impact Liberty. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

Data was not available to estimate property exposure to failure of any high hazard dams. There is no levee failure exposure in Liberty.

## E.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. Impacts most likely to affect Liberty are related to low water levels and water usage restrictions. Drinking water for Liberty is sourced from Lake Keowee. Any water level or quality challenges impacting the lake could be exacerbated during times of drought.

## E.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. Liberty's entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 66 buildings in Liberty sustaining some level of damage amounting to $506,470.

## E.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Compared to county averages, Liberty has a larger proportion of adults over age 65, indicating higher vulnerability.

## E.2.5 FLOOD

Table E.11 details the acreage of Liberty's total area by flood zone on the effective DFIRM. Per this assessment, 2.7 percent of Liberty falls within the SFHA.

**Table E.11 Flood Zone Acreage in Liberty**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 76.1 | 2.7% |
| Floodway | 0.0 | 0.0% |
| 0.2% Annual Chance Flood Hazard | 0.0 | 0.0% |
| Unshaded X | 2,779.4 | 97.3% |
| **Total** | **2,855.5** | **--** |
| **SFHA Total** | **76.1** | **2.7%** |

Source: FEMA Effective DFIRM

Figure E.5 reflects the effective mapped flood hazard zones for Liberty, and Figure E.6 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Table E.12 provides the estimated losses for the 1% annual chance flood event in Liberty. The total estimated damage value is based on damages to improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

**Table E.12 Estimated Building Damage and Content Loss for 1% Annual Chance Flood**

| Occupancy Type | Total Buildings with Loss | Total Value (Building & Contents) | Estimated Building Damage | Estimated Content Loss | Estimated Total Damage | Loss Ratio |
|---|---|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 | $0 | 0% |
| Commercial | 0 | $0 | $0 | $0 | $0 | 0% |
| Educational | 0 | $0 | $0 | $0 | $0 | 0% |
| Government | 0 | $0 | $0 | $0 | $0 | 0% |
| Industrial | 0 | $0 | $0 | $0 | $0 | 0% |
| Religious | 0 | $0 | $0 | $0 | $0 | 0% |
| Residential | 5 | $562,908 | $108,106 | $59,589 | $167,695 | 30% |
| **Total** | **5** | **$562,908** | **$108,106** | **$59,589** | **$167,695** | **30%** |

Source: Hazus 6.0; Pickens County GIS

A count of people with high exposure to flooding was estimated based on the number of residential buildings with loss and Liberty's average household size estimate of 2.25 people per household. There are approximately 11 people exposed to flood risk from the 1% annual chance flood event in Liberty.

There are no critical facilities in Liberty located in the SFHA.

**Figure E.5 FEMA Flood Hazard Areas, Liberty**

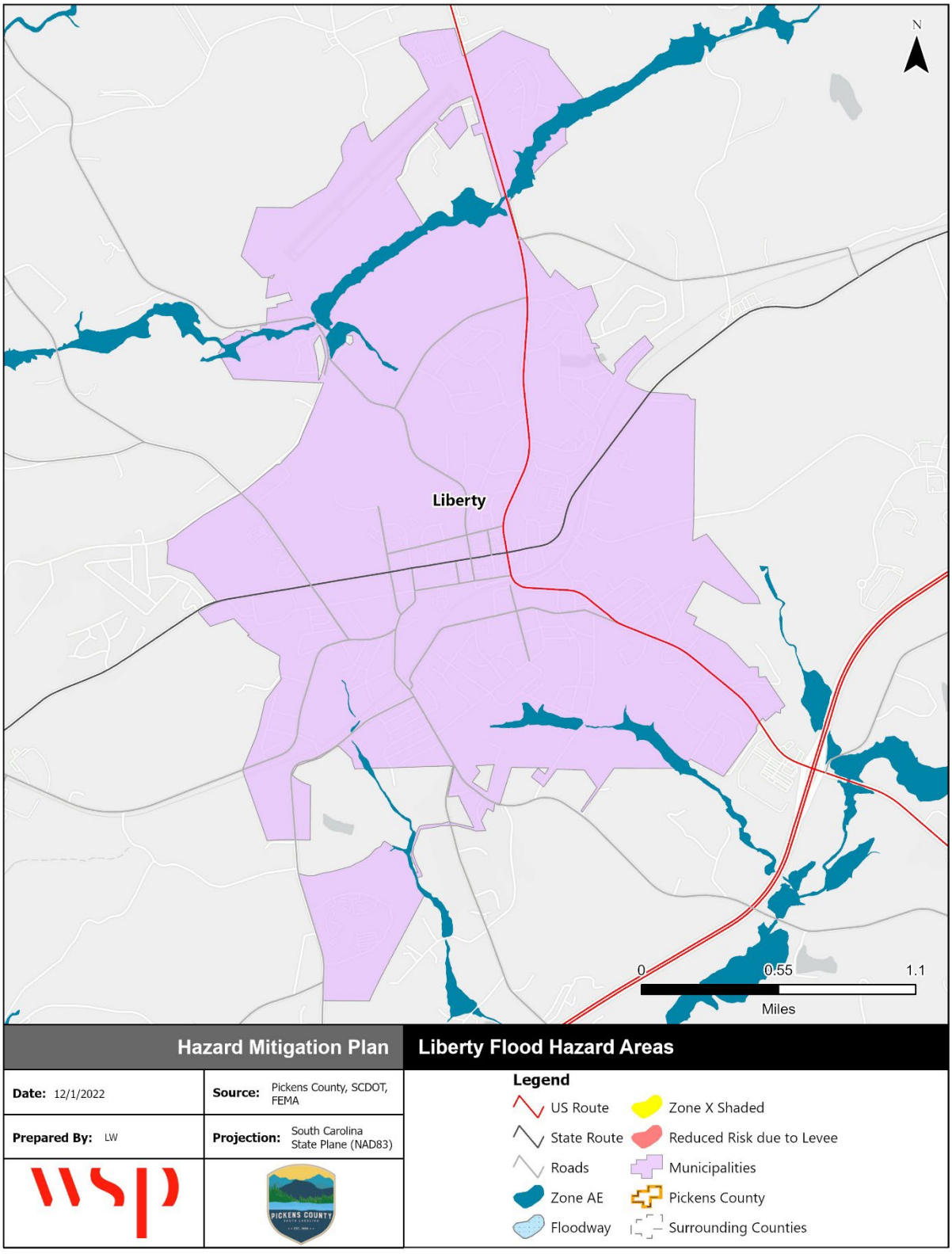
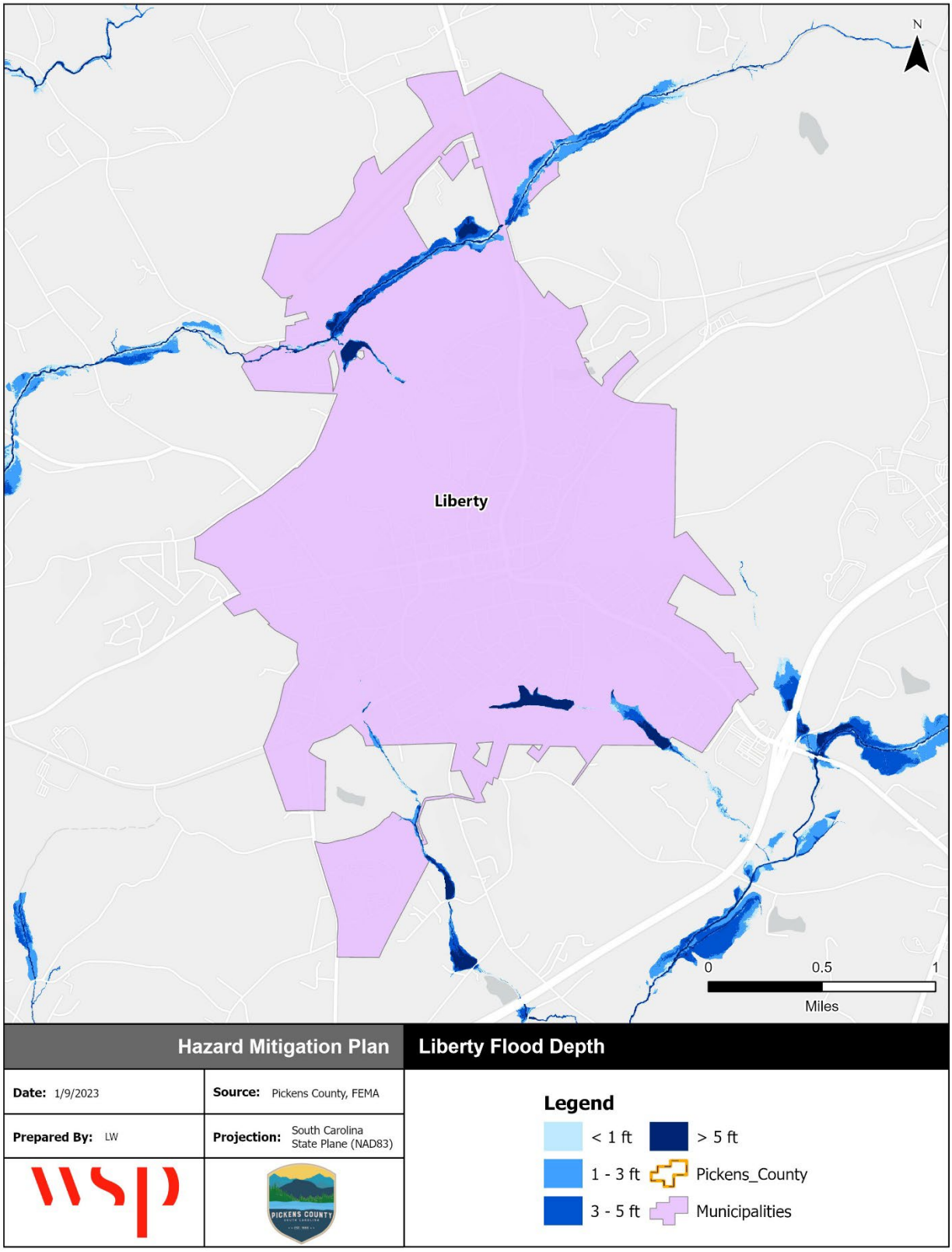


**Figure E.6 Flood Depth, 1%-Annual-Chance Flood Event, Liberty**



## E.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. Liberty's entire asset inventory is exposed to hurricane and tropical storm impacts. Mobile home units are particularly vulnerable to wind events such as hurricanes and tropical storms. In Liberty, there are approximately 122 mobile home units which comprise about 9% of all housing units. This represents a minor vulnerability for Liberty but is critical for units that are not properly anchored to foundations.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For Liberty, this equates to an estimated $15,000 in damages and $50,000 in damages, respectively.

## E.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. The built environment is vulnerable to urban fire risk and damage to electrical equipment from lightning.

## E.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados.

## E.2.9 WILDFIRE

Figure E.7 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table E.13 summarizes for Liberty the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table E.13 Building Counts and Values within WUIRI under -5, Liberty**

| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 2 | 100% | $82,500 | $82,500 | $165,000 |
| Commercial | 90 | 98% | $20,725,660 | $20,725,660 | $41,451,320 |
| Education | 2 | 67% | $357,420 | $357,420 | $714,840 |
| Government | 1 | 100% | $0 | $0 | $0 |
| Industrial | 30 | 88% | $1,936,581 | $2,904,872 | $4,841,453 |
| Religious | 2 | 100% | $515,222 | $515,222 | $1,030,444 |
| Residential | 1,211 | 95% | $124,630,988 | $62,315,494 | $186,946,482 |
| **Total** | **1,338** | **95%** | **$148,248,371** | **$86,901,168** | **$235,149,539** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Liberty's average household size estimate of 2.25 people per household. There are approximately 2,725 people exposed to wildfire risk in Liberty.

Table E.14 summarizes critical facility exposure to areas of moderate to high wildfire risk. Table E.15 provides the full inventory of vulnerable facilities and infrastructure.

**Table E.14 Critical Facility Exposure within WUIRI under -5, Liberty**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 8 |
| Food, Water, Shelter | 0 |
| Health & Medical | 15 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 5 |
| **Total** | **28** |

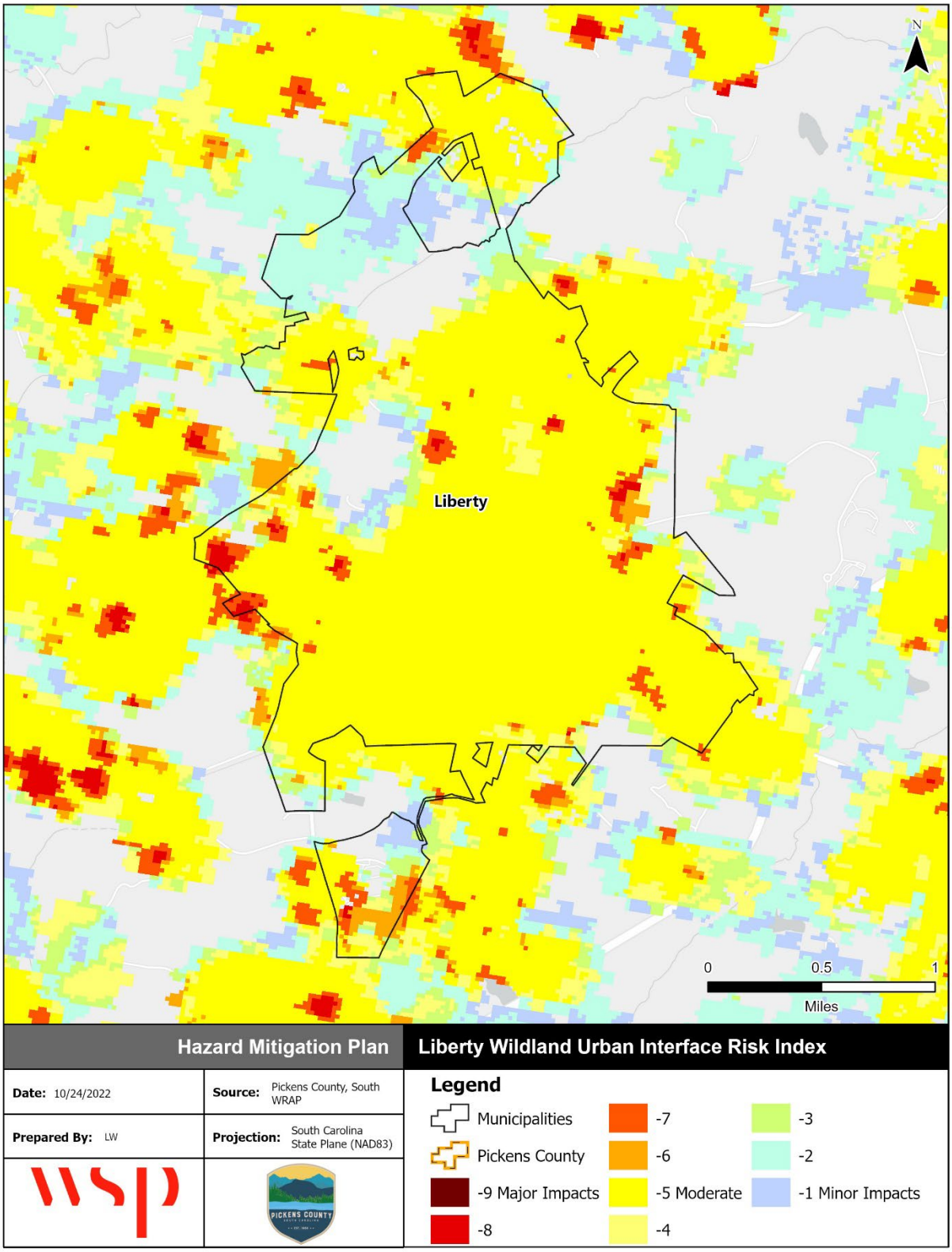
Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Table E.15 Critical Facilities Exposed to WUIRI under -5, Liberty**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Liberty City Police |
| Safety & Security | Liberty City Police |
| Safety & Security | Liberty City Town Hall |
| Safety & Security | Liberty Fire |
| Safety & Security | Liberty Magistrate |
| Safety & Security | Sherrif Sub-Station Code 11 |
| Health & Medical | Liberty EMS |
| Health & Medical | Liberty Rescue |
| Hazardous Materials | Flexi-Wall Systems |
| Hazardous Materials | Liberty Denim, Llc-Plant #1 |
| Transportation | Pickens County Airport |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Figure E.7 WUI Risk Index, Liberty**



### E.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms. Liberty has higher vulnerability than the County average in this regard.

## E.3 CAPABILITY ASSESSMENT

### E.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to the City of Liberty were provided by the City's HMPC representatives, City staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

The City of Liberty has strong regulatory capability and maintains key plans and ordinances useful for mitigation implementation. However, the City's current comprehensive plan is from 2003 and likely does not reflect the same vision and goals developed 20 years ago. The City is in the process of developing an updated comprehensive plan that will better capture the City's current and future goals. It is recommended that findings and actions from this plan are integrated into various elements of the new comprehensive plan update to ensure new development and policies integrate mitigation across the City.

Liberty is currently covered by the Pickens County EOP, but would like to develop a City EOP. A local EOP may help the Liberty better prepare for and respond to City emergencies and cater the plan to Liberty's unique resources and processes. However, it is recommended that the City continues to coordinate with the County and surrounding communities on emergency operations, and integrate relevant portions of the County EOP as emergency operations often require coordination across jurisdictions.

Liberty has several fiscal resources and tools to financially support mitigation related actions, including the addition of a new grants specialist on staff and a Capital Improvements Program (CIP). Additionally, the City has a sewer service fee which can help support grant matching funds, and is interested in exploring the use of revenue bonds. The City should reference this plan as it explores CIP projects and mitigation grant funding.

When it comes to outreach and public education, Staff indicated that the City's website and social media accounts are used to share information. However, with a larger population of aging adults the City may want to explore additional ways to share hazard information like email, flyers, mailers, and in person events.

### E.3.2 FLOODPLAIN MANAGEMENT

The City of Liberty joined the NFIP in June 1976 and had an initial FIRM dated June 25, 1976. The City of Liberty does not have any recorded claims data.

## E.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# F. TOWN OF NORRIS

## F.1 COMMUNITY PROFILE

### GEOGRAPHY

Norris is a small town in southern Pickens County, between Central and Liberty. The town covers 1.884 square miles at an elevation of 1,001 feet above sea level.

The Town of Norris begins with the establishment of the Town of Cateechee by Colonel Daniel Keating Norris who invested in building the first cotton mill in Pickens County. The mill's construction began with construction of a dam on the Twelve Mile River. Colonel Norris named the mill after himself, and the Norris Cotton Mill was established in 1896. The mill led to growth in the surrounding area, including a large number of lumber mills.

### POPULATION

Table F.1 provides population counts and growth estimates for Norris, Pickens County, and the State. Population in Norris declined by nearly 9 percent, which is the largest population decline across the county over this period.

**Table F.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Norris** | **813** | **741** | **-72** | **-8.9%** | **727** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

### HOUSING

Table F.2 details housing unit counts and other housing tenure statistics for Norris. From 2010 to 2020 there was a decrease in housing units in Norris. Only 74 percent of housing units are occupied, and nearly 80 percent of occupants are owners. Homeowners may be more aware of their area's hazard risks and more willing and able to make investments to protect their homes from hazard risks.

Median home value in Norris is significantly lower than the county average, which could reflect the large percentage of mobile homes in Norris. This lower median home value may equate to a lower exposure value in Norris, but if a hazard event causes property damages, residents may struggle to afford alternate housing.

**Table F.2 Housing Tenure Statistics, 2010-2020**

| Housing Characteristics | Norris | Pickens County |
|---|---|---|
| Housing Units (2010) | 406 | 50,854 |
| Housing Units (2020) | 365 | 54,939 |
| Housing Units Percent Change (2010-2020) | -10.1% | 8.0% |
| Occupied Units, % (2020) | 74.0% | 88.3% |
| Owner-Occupied Units, % (2020) | 79.3% | 68.5% |
| Renter-Occupied Units, % (2020) | 20.7% | 31.5% |
| Median Home Value (2020) | $99,700 | $159,200 |
| Average Household Size | 2.81 | 2.45 |
| No Vehicle Available, % | 5.9% | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2016-2020 5-Year Estimates

Note that due to the Town's small population size and housing unit count, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

Table F.3 and Table F.4 summarize housing units by type and age. Nearly three-quarters of the housing units in Norris are detached single family homes, and most of the remainder are mobile homes, which are more vulnerable to damage from wind and flood hazards.

The housing stock in Norris is older than the county average, with over 42 percent of housing built between 1950 and 1970 and another 25 percent built between 1970 and 1990.

**Table F.3 Housing Units by Type, 2020**

| Units in Structure | Norris | Pickens County |
|---|---|---|
| 1-unit, detached | 74.5% | 62.8% |
| 1-unit, attached | 0.0% | 1.3% |
| 2 units | 1.1% | 2.6% |
| 3 or 4 units | 0.0% | 2.2% |
| 5 to 9 units | 0.0% | 3.9% |
| 10 to 19 units | 0.5% | 6.0% |
| 20 or more units | 0.8% | 2.9% |
| Mobile home | 23.0% | 18.0% |
| Boat, RV, van, etc. | 0.0% | 0.2% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates
Note that due to the Town's small population size and housing unit count, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

**Table F.4 Housing Units by Age, 2020**

| Housing Year Built | Norris | Pickens County |
|---|---|---|
| Built 2014 or later | 2.7% | 5.0% |
| Built 2010 to 2013 | 2.5% | 4.3% |
| Built 2000 to 2009 | 9.0% | 16.0% |
| Built 1990 to 1999 | 7.4% | 21.9% |
| Built 1980 to 1989 | 14.0% | 15.8% |
| Built 1970 to 1979 | 11.0% | 14.5% |
| Built 1960 to 1969 | 21.1% | 7.7% |
| Built 1950 to 1959 | 21.4% | 7.3% |
| Built 1940 to 1949 | 5.5% | 2.6% |
| Built 1939 or earlier | 5.5% | 4.9% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates
Note that due to the Town's small population size and housing unit count, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

## ECONOMY

Table F.5 presents key economic statistics for Norris and Pickens County.

**Table F.5 Economic Statistics, 2020**

| Economic Characteristics | Norris | Pickens County |
|---|---|---|
| Median Household Income | $51,786 | $51,032 |
| Per Capita Income | $20,676 | $28,382 |
| Unemployment Rate | 3.0% | 5.0% |
| % of Individuals Below Poverty Level | 19.0% | 16.4% |
| % Without Health Insurance | 7.9% | 8.6% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates

Note that due to the Town's small population size, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

Table F.6 summarizes employment by industry in Norris and across Pickens County. The dominant employment sectors in Norris are educational services, and healthcare and social assistance followed by arts, entertainment, and recreation, and accommodation and food services.

**Table F.6 Employment Statistics by Industry, 2020**

| Industry | Norris | Pickens County |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 0.3% | 0.5% |
| Construction | 14.6% | 7.9% |
| Manufacturing | 12.8% | 14.6% |
| Wholesale trade | 0.0% | 2.4% |
| Retail trade | 6.9% | 10.5% |
| Transportation and warehousing, and utilities | 4.9% | 5.0% |
| Information | 0.0% | 0.8% |
| Finance and insurance, and real estate and rental and leasing | 1.7% | 4.0% |
| Professional, scientific, and management, and administrative and waste management services | 7.6% | 8.6% |
| Educational services, and healthcare and social assistance | 20.5% | 27.2% |
| Arts, entertainment, and recreation, and accommodation and food services | 17.4% | 10.4% |
| Other services, except public administration | 6.9% | 5.3% |
| Public administration | 6.3% | 2.9% |

Source: US Census Bureau; American Community Survey 2015-2019 5-Year Estimates
Note that due to the Town's small population size, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

## SOCIAL VULNERABILITY

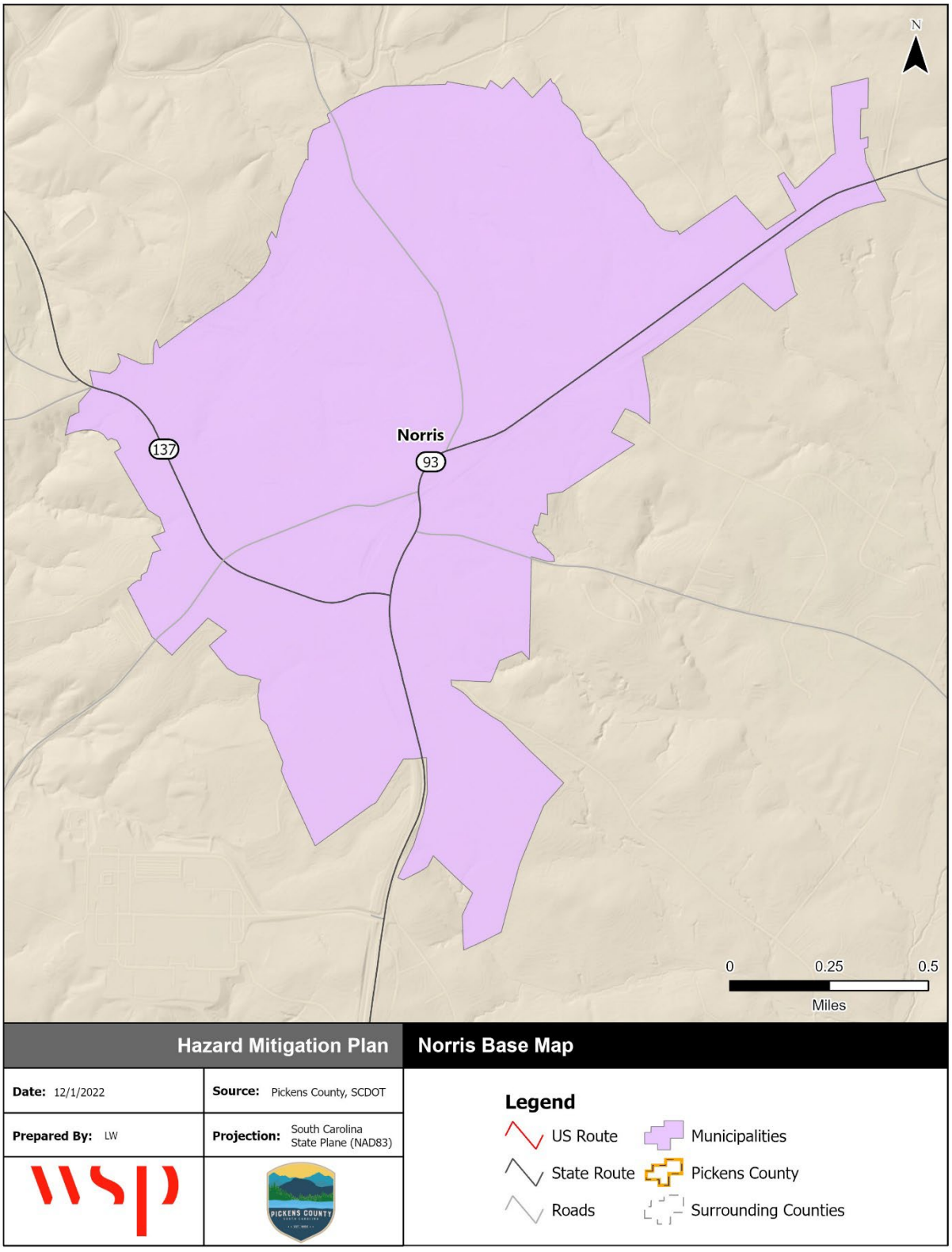
The CDC SVI results (Section 3.8) indicate medium to high social vulnerability ratings. The Town has an aging population – almost 22 percent of the Town's population is over the age of 65. Older individuals may have limited mobility and residents that live alone may be isolated from emergency services or from community members that can provide assistance.

Mobile homes make up over 22 percent of housing units in Norris. Mobile home units can be more vulnerable to certain hazards, such as tornadoes and windstorms, especially if they are not properly secured with tie downs. Additionally, over 15 percent of the Town's population has an income below poverty level. Low-income residents are less likely to have the income or assets necessary to prepare for a possible disaster or to recover after a disaster.

## DEVELOPMENT TRENDS

There has not been any significant development over the past five years and no new development is expected in the next five years. Norris has primarily residential uses in and around the Town. Figure F.1 shows a base map of Norris.

**Figure F.1 Base Map, Norris**



# F.2 RISK ASSESSMENT

This section contains a summary of Norris's asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for the Town of Norris. Table F.7 summarizes building exposure by occupancy type, representing total property value at risk within the Town limits.

**Table F.7 Building Exposure by Occupancy Type, Norris**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 3 | $88,500 | $88,500 | $177,000 |
| Commercial | 11 | $1,544,846 | $1,544,846 | $3,089,692 |
| Education | 0 | $0 | $0 | $0 |
| Government | 0 | $0 | $0 | $0 |
| Industrial | 22 | $1,801,005 | $2,701,508 | $4,502,513 |
| Religious | 1 | $74,992 | $74,992 | $149,984 |
| Residential | 289 | $28,510,619 | $14,255,310 | $42,765,929 |
| **Total** | **326** | **$32,019,962** | **$18,665,155** | **$50,685,117** |

Source: Pickens County GIS

The spatial distribution of the property inventory is shown by building count in Figure F.2 and by building value in Figure F.3Figure E.4Figure D.4.

**Figure F.2 Building Count by Census Block, Norris**

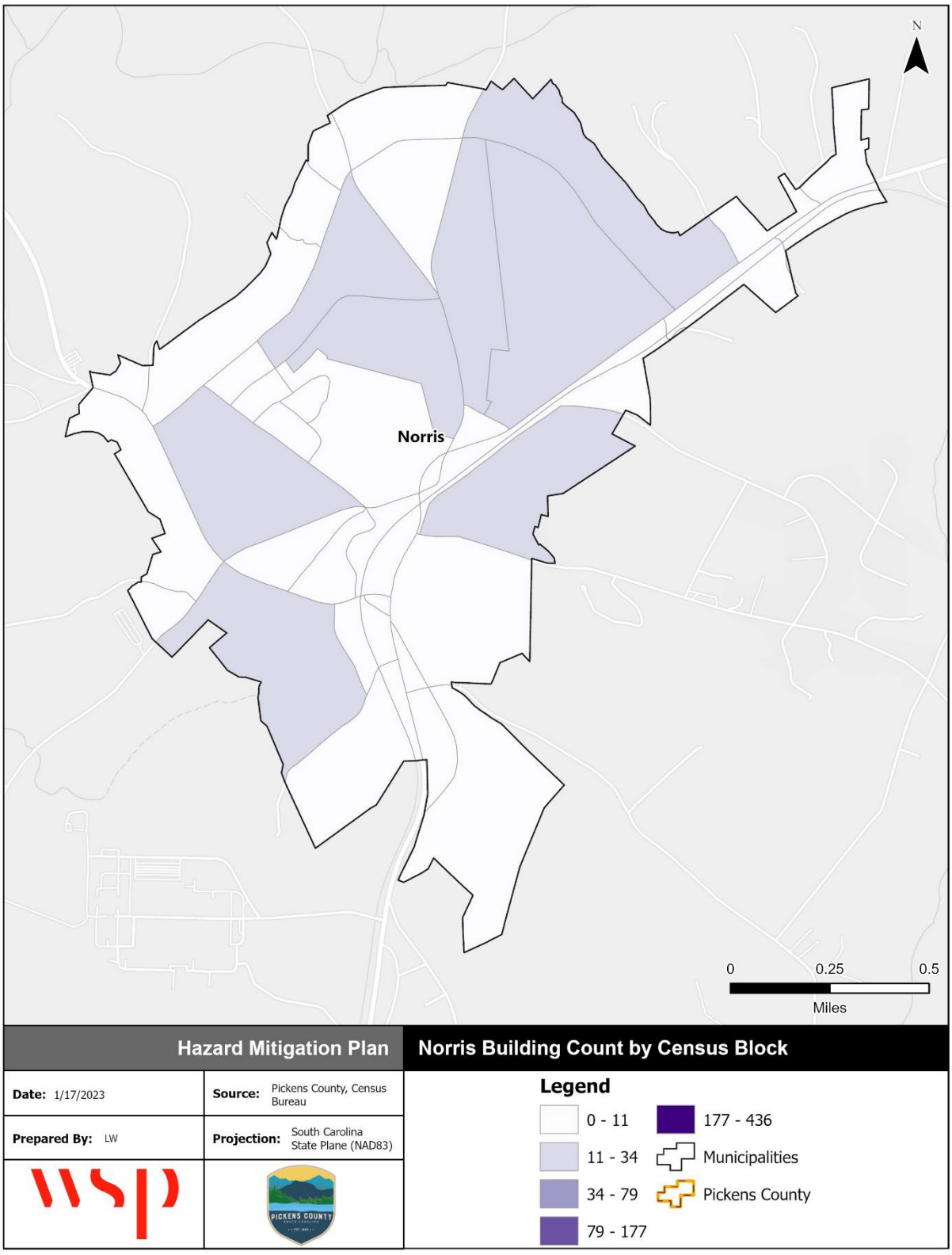


**Figure F.3 Building Value by Census Block, Norris**

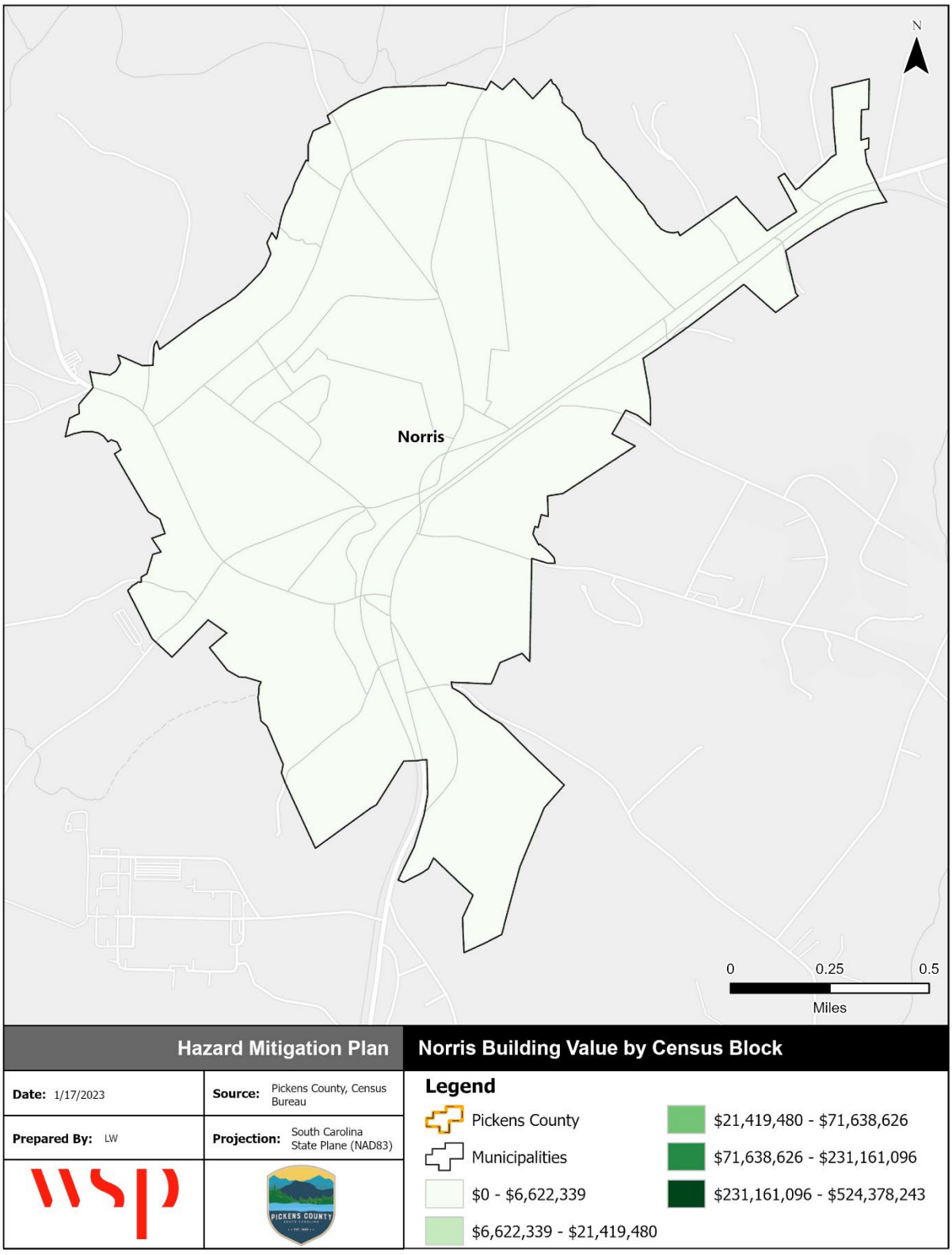


Table F.8 summarizes critical facilities and infrastructure in Norris by facility type, and Table F.9 provides the full inventory of critical facilities and infrastructure in Norris. Critical facilities and infrastructure were identified by Pickens County Emergency Management and City staff and are maintained in GIS.

**Table F.8 Critical Facility Summary, Norris**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 2 |
| Food, Water, Shelter | 0 |
| Health & Medical | 0 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 1 |
| **Total** | **3** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table F.9 Critical Facility Inventory, Norris**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Duke Power-Norris Retail Substation |
| Safety & Security | Norris City Town Hall |
| Hazardous Materials | Norris Fire |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table F.10 summarizes the PRI scores for Norris for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table F.10 PRI Results, Norris**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Likely | Critical | Small | > 24 hrs | < 1 week | 2.6 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Possible | Critical | Small | 6 to 12 hrs | < 1 week | 2.5 |
| Hurricane/Tropical Storm | Likely | Critical | Large | > 24 hrs | < 24 hrs | 2.9 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Catastrophic | Moderate | < 6 hrs | > 1 week | 2.9 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## F.2.1 DAM/LEVEE FAILURE

There are no high hazard dams located within the town limits of Norris. It is possible that upstream dams could impact Norris. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

Data was not available to estimate property exposure to failure of any high hazard dams. There is no levee failure exposure in Norris.

## F.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. Impacts most likely to affect Norris are related to low water levels and water usage restrictions.

## F.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. Norris' entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 15 buildings in Norris sustaining some level of damage amounting to $101,370.

## F.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Compared to county averages, Norris has a larger proportion of adults over age 65, indicating higher vulnerability.

## F.2.5 FLOOD

Table F.11 details the acreage of Norris' total area by flood zone on the effective DFIRM. Per this assessment, 0.4 percent of Norris falls within the SFHA.

**Table F.11 Flood Zone Acreage in Norris**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 4.8 | 0.4% |
| Floodway | 0.0 | 0.0% |
| 0.2% Annual Chance Flood Hazard | 0.0 | 0.0% |
| Unshaded X | 1,200.7 | 99.6% |
| **Total** | **1,205.6** | **--** |
| **SFHA Total** | **4.8** | **0.4%** |

Source: FEMA Effective DFIRM

Figure F.4 reflects the effective mapped flood hazard zones for Norris, and Figure F.5 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Potential flood damages were estimated through a Level 2 analysis in Hazus 6.0 using 2022 building data and tax parcel data. Per this assessment, there are no buildings in Norris that are expected to sustain damages

from the 1%-annual-chance flood event. As a result, the population considered vulnerable to flooding based on their residence location is also estimated to be zero.

There are no critical facilities in Norris located in the SFHA.

**Figure F.4 FEMA Flood Hazard Areas, Norris**

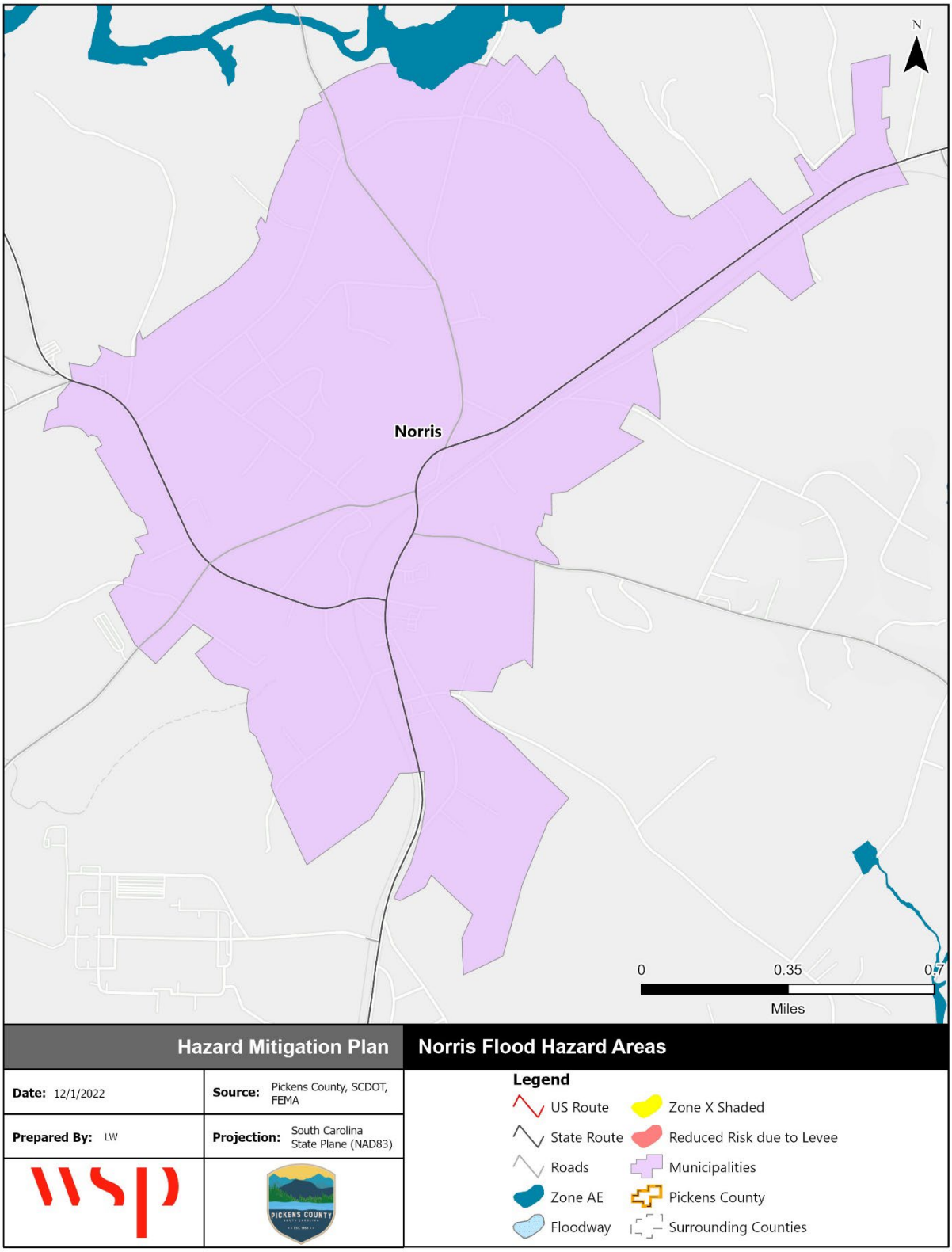
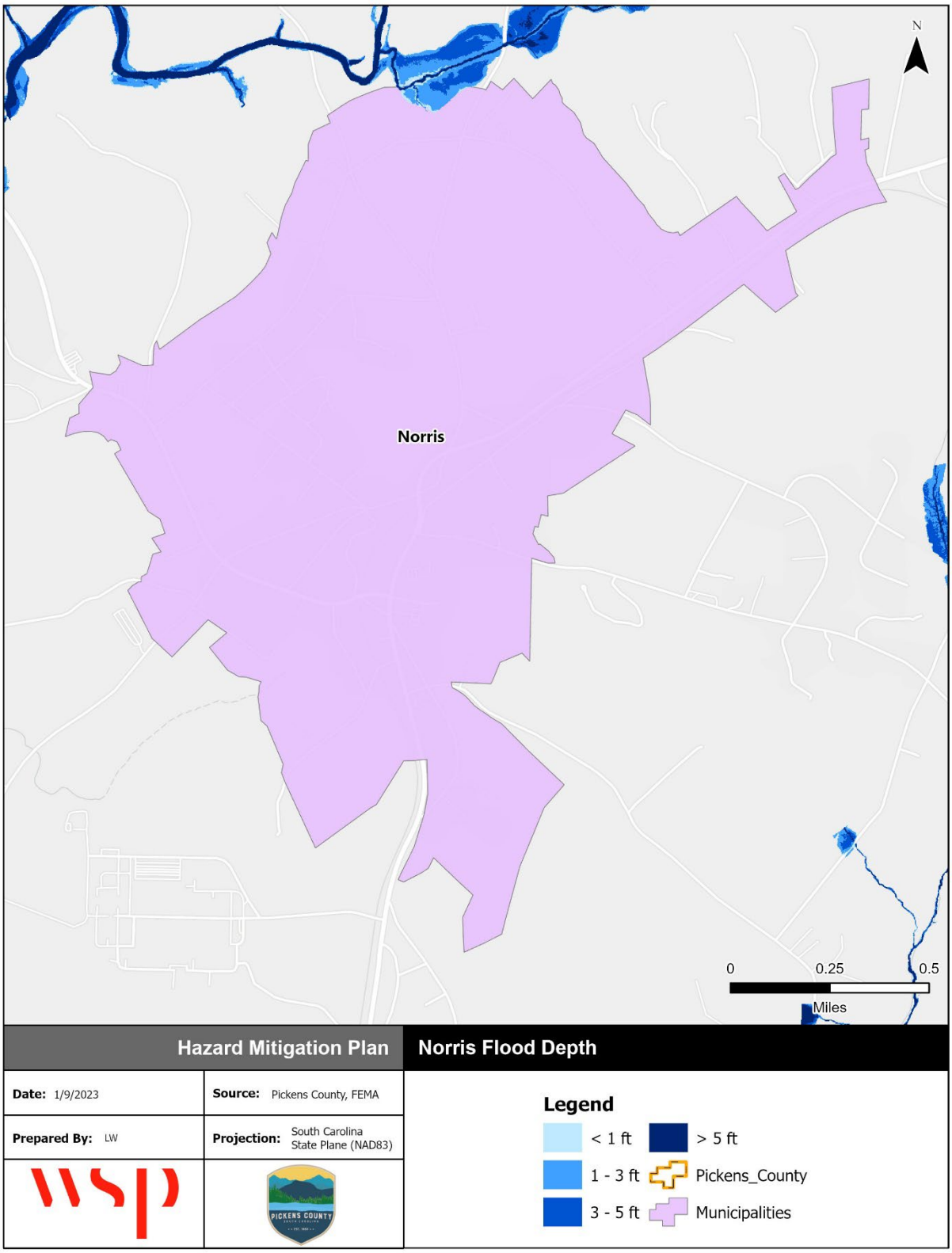


**Figure F.5 Flood Depth, 1%-Annual-Chance Flood Event, Norris**



## F.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. Norris' entire asset inventory is exposed to hurricane and tropical storm impacts. Mobile home units are particularly vulnerable to wind events such as hurricanes and tropical storms. In Norris, there are approximately 79 mobile home units which comprise about 22.4 percent of all housing units. This represents a moderate vulnerability for Norris but is critical for units that are not properly anchored to foundations.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For Norris, this equates to an estimated $3,000 in damages and $10,000 in damages, respectively.

## F.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. The built environment is vulnerable to urban fire risk and damage to electrical equipment from lightning.

## F.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados.

## F.2.9 WILDFIRE

Figure F.6 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table F.12 summarizes for Norris the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table F.12 Building Counts and Values within WUIRI under -5, Norris**

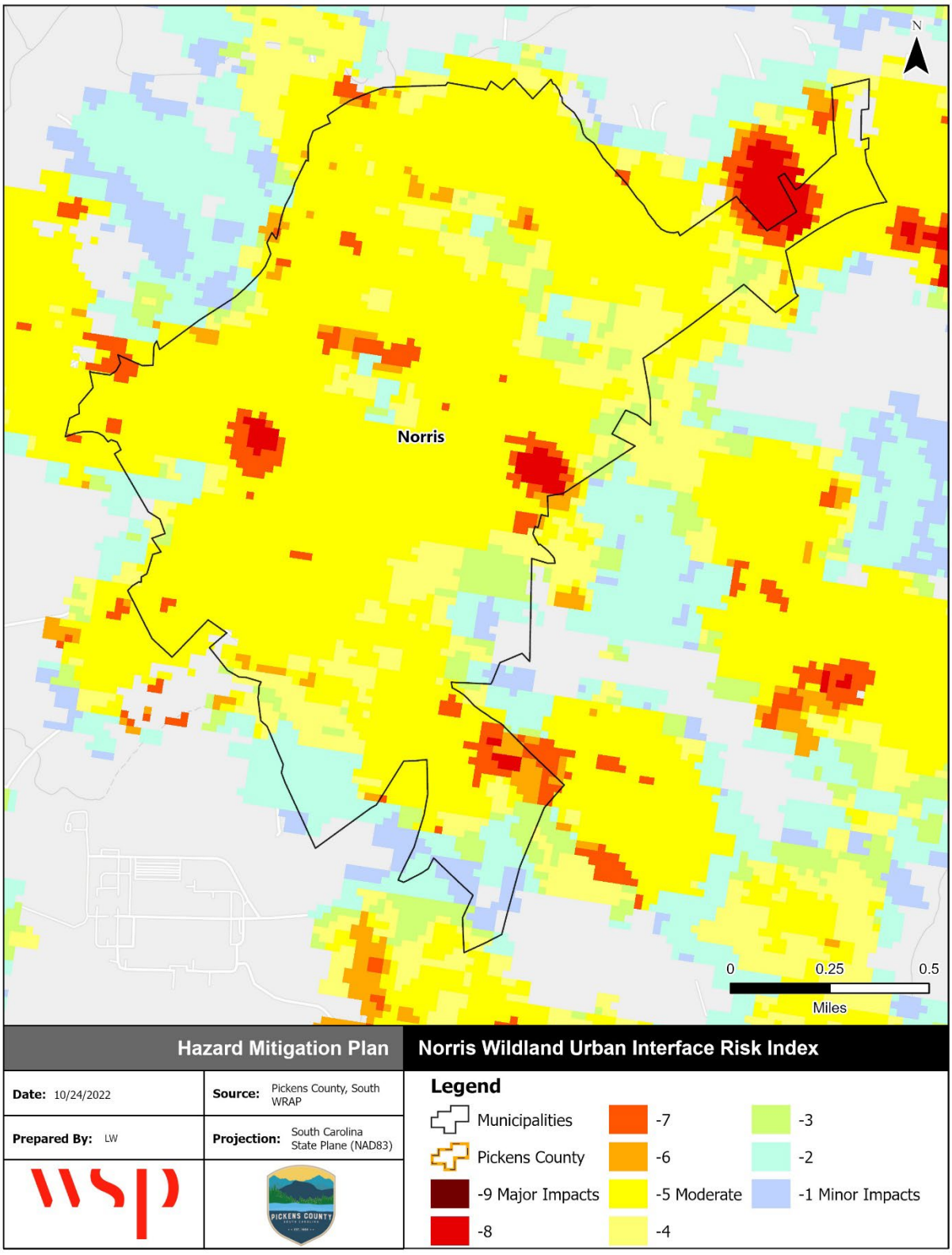
| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 1 | 33% | $31,500 | $31,500 | $63,000 |
| Commercial | 9 | 82% | $1,321,846 | $1,321,846 | $2,643,692 |
| Education | 0 | N/A | $0 | $0 | $0 |
| Government | 0 | N/A | $0 | $0 | $0 |
| Industrial | 20 | 91% | $1,669,005 | $2,503,508 | $4,172,513 |
| Religious | 1 | 100% | $74,992 | $74,992 | $149,984 |
| Residential | 256 | 89% | $23,773,034 | $11,886,517 | $35,659,551 |
| **Total** | **287** | **88%** | **$26,870,377** | **$15,818,363** | **$42,688,740** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Norris' average household size estimate of 2.81 people per household. There are approximately 3,403 people exposed to wildfire risk in Norris.

There are no critical facilities exposed to moderate to high wildfire risk.

**Figure F.6 WUI Risk Index, Norris**



### F.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms. Norris has higher vulnerability than the County average in this regard.

## F.3 CAPABILITY ASSESSMENT

### F.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to the Town of Norris were provided by the Town's HMPC representatives, Town staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

As a small Town, Norris has limited capability for mitigation implementation. The Town relies on the County for regulatory support and does not have staff capacity to manage relevant technical tools or data. The Town has received CDBG funding in the past and may have the capability to apply for future funding opportunities.

To support gaps in these capabilities, the Town could work with neighboring communities to collaborate on GIS mapping and data sharing as well as emergency and more specific hazard mitigation needs. As the Town develops a mitigation strategy it should consider administrative capacity and opportunities to collaborate with community organizations and other jurisdictions. Most of the Town's previous mitigation actions were carried out by the County, so maintaining close collaboration between the Town and County is important for implementation.

With limited staff and administrative capability, the Town could consider using social media for public outreach and education about hazard mitigation. Short messages can be shared across multiple platforms and reach residents across that Town. Flyers and hard copies of key information may also be useful in Town common space or buildings frequented residents.

### F.3.2 FLOODPLAIN MANAGEMENT

The Town of Norris does not participate in the NFIP. The Town does have an initial FIRM dated April 16, 2008.

## F.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Identify vulnerable populations | 1.1 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County EMS Director | General Fund, Duke Energy | Long-Term | Prevention | Carry Forward |
| 2 | Coordinate with well-established programs or organizations to provide smoke detectors to vulnerable households | 1.2 | Urban Fire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Fire Departments | Red Cross | Long-Term | Emergency Services | Carry Forward |
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 6 | Develop and maintain a building inventory that contains information regarding location, type of structure, construction material, date of construction and modification, whether the building is consistent with current building codes, and other pertinent information | 2.2 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Long-Term | Prevention | Carry Forward |
| 7 | Establish specific mitigation strategies for extremely vulnerable structures identified during the development of the building inventory | 1.5 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Federal Grant Funds | Long-Term | Property Protection | Carry Forward |
| 8 | Develop a standardized, integrated database of utility distribution systems, utility facilities, critical facilities, county facilities, roads, streams/rivers, and other data deemed necessary | 2.2 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Ongoing | Prevention | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 10 | Increase training and capability of response teams and communication/integration with mutual aid assets. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Ongoing | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Educate public about wildfire dangers, and open burning safety, cigarette litter, and campfire safety. | 1.2 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Fire Chiefs, Other Emergency Services | General Fund | Long-Term | Public Information & Outreach | Carry Forward. Exercises are planned for March 2023 and September 2024. |
| 12 | Create buffer zones around structures in wildland-urban interface areas. | 1.5 | Wildfire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. |
| 13 | Educate public about the importance of weather radios and where to obtain them. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 14 | Consider the feasibility of adopting FireWise throughout the county. | 1.4 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County Emergency Services Director | SC Firefighters Association | Immediate | Prevention | Carry Forward |
| 15 | Remove dead trees or trim large branches located near structures. | 1.4 | Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund, Private Funds | Immediate | Prevention | Carry Forward |
| 16 | Coordinate between law enforcement agencies and railroad companies to increase notification and safety where statistics or assessment indicates a dangerous intersection of railroad and roadway. | 3.2 | Hazardous Materials | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Sheriff, Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 17 | Institute a standard warning system for dam failure. | 3.2 | Dam Failure | Low | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | 911 Funds | Short-Term | Emergency Services | Carry Forward |
| 18 | Coordinate with the USACE on EAP for dams in Pickens County. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | USACE | Long-Term | Prevention | Carry Forward |
| 19 | Serve as a repository for dam failure plans. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | General Fund | Long-Term | Prevention | Carry Forward |
| 20 | Provide information to the public regarding procedures to follow in the event of a dam failure. | 1.2 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, E-911 Coordinator | 911 Funds | Long-Term | Public Information & Outreach | Carry Forward |
| 21 | Educate about and encourage participation in the National Flood Insurance Program. | 1.2 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County Building Codes Department | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 22 | Training and equipment for the Swiftwater Rescue Team. | 3.3 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 23 | Create a FEMA Approved Debris Removal Plan to prepare Pickens County Public Works in planning and preparing for natural disasters. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Public Works Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 24 | Training and equipment for the Technical Rescue Team to respond to confined space and structural stability calls. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Educate public about severe weather and safety strategies. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Mayor of Norris, Mayor of Six Mile | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 26 | Strengthen the efforts of trained volunteers within the Storm Ready County program | 3.2 | Flood, Hurricane, Severe Storm, Tornado | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Emergency Services | Carry Forward |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 45 | Enroll the Town of Norris in the National Flood Insurance Program. | 1.4 | Flood | High | High | Pickens County, Norris | Pickens County EM Director, Mayor of Norris | General Fund | Immediate | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | Partner with Clemson University to create experiential or service-learning opportunities to meet identified needs within the community. | 5.1 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Clemson University EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 47 | Partner with community groups (Rotary, CERT, Red Cross, etc.) to meet identified needs within the community. | 5.2 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# G. CITY OF PICKENS

## G.1 COMMUNITY PROFILE

### GEOGRAPHY

The City of Pickens is in the central part of Pickens County and is the County Seat. It occupies 2.83 square miles of land at an elevation of 1,093 feet above sea level.

Originally part of the Cherokee lands, the first white settlers to the Pickens area were Scottish-Irish. The town of Pickens was founded in 1868 and named after General Andrew Pickens, who served in the Revolutionary War. A short-line railroad was built in 1898 between Pickens and Easley (City of Pickens).

### POPULATION

Table G.1 provides population counts and growth estimates for the City of Pickens, Pickens County, and the State. Population in Pickens increased by over eight percent from 2010 to 2020, which was slightly below the county and state averages.

**Table G.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Pickens** | **3,126** | **3,388** | **262** | **8.4%** | **3,326** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey 2017-2021 5-Year Estimates

### HOUSING

Table G.2 details housing unit counts and other housing tenure statistics for Pickens. Data from the 2010 Census was not available for Pickens.

About 84 percent of housing units are occupied, by a nearly even split of owners and renters. Renters can be particularly vulnerable to displacement if structures are damaged after a hazard event. Financial resources for repairs and recovery are often limited for renters and landlords which can limit the housing stock and displace households for extended periods of time. Renters may also have less knowledge of the area and its hazard risks. Conversely, homeowners may be more willing and able to make investments to protect their homes from hazard risks.

**Table G.2 Housing Tenure Statistics, 2010-2020**

| Housing Characteristics | Pickens | Pickens County |
|---|---|---|
| Housing Units (2020) | 1,583 | 54,939 |
| Occupied Units, % (2020) | 83.9% | 88.3% |
| Owner-Occupied Units, % (2020) | 50.2% | 68.5% |
| Renter-Occupied Units, % (2020) | 49.8% | 31.5% |
| Median Home Value (2020) | $118,500 | $159,200 |
| Average Household Size | 2.20 | 2.45 |
| No Vehicle Available, % | 13.0% | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2016-2020 5-Year Estimates

Table G.3 and Table G.4 summarize housing units by type and age. About 68 percent of the housing units in Pickens are detached single family homes. The next most common housing type is mobile homes, which

are more vulnerable to damage from wind and flood hazards. Pickens also has a mix of multi-family unit buildings.

The City of Pickens' initial Flood Insurance Rate Map was identified on June 25, 1976. Nearly half of housing units in Pickens were built prior to 1970, which means these housing units were built before the establishment of floodplain development standards. The City experienced consistent development from 1970 to 2000 but has had limited development since 2010.

**Table G.3 Housing Units by Type, 2020**

| Units in Structure | Pickens | Pickens County |
|---|---|---|
| 1-unit, detached | 67.9% | 62.8% |
| 1-unit, attached | 0.0% | 1.3% |
| 2 units | 6.7% | 2.6% |
| 3 or 4 units | 0.0% | 2.2% |
| 5 to 9 units | 5.9% | 3.9% |
| 10 to 19 units | 9.2% | 6.0% |
| 20 or more units | 0.0% | 2.9% |
| Mobile home | 10.2% | 18.0% |
| Boat, RV, van, etc. | 0.0% | 0.2% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

**Table G.4 Housing Units by Age, 2020**

| Housing Year Built | Pickens | Pickens County |
|---|---|---|
| Built 2014 or later | 0.0% | 5.0% |
| Built 2010 to 2013 | 2.7% | 4.3% |
| Built 2000 to 2009 | 7.6% | 16.0% |
| Built 1990 to 1999 | 15.5% | 21.9% |
| Built 1980 to 1989 | 13.3% | 15.8% |
| Built 1970 to 1979 | 12.1% | 14.5% |
| Built 1960 to 1969 | 8.5% | 7.7% |
| Built 1950 to 1959 | 20.3% | 7.3% |
| Built 1940 to 1949 | 6.4% | 2.6% |
| Built 1939 or earlier | 13.5% | 4.9% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates

## ECONOMY

Table G.5 presents key economic statistics for Pickens and Pickens County. In Pickens, compared to the county averages, median household income and per capita income are lower, unemployment is slightly higher, and the percentage of individuals without health insurance is higher.

**Table G.5 Economic Statistics, 2020**

| Economic Characteristics | Pickens | Pickens County |
|---|---|---|
| Median Household Income | $41,726 | $51,032 |
| Per Capita Income | $20,046 | $28,382 |
| Unemployment Rate | 5.6% | 5.0% |
| % of Individuals Below Poverty Level | 15.4% | 16.4% |
| % Without Health Insurance | 10.3% | 8.6% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates

Table G.6 summarizes employment by industry in Pickens and across Pickens County. The dominant employment sectors in Pickens are manufacturing and construction, both of which make up a larger share of in employment in Pickens than in the county overall.

**Table G.6 Employment Statistics by Industry, 2020**

| Industry | Pickens | Pickens County |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 0.0% | 0.5% |
| Construction | 13.5% | 7.9% |
| Manufacturing | 16.8% | 14.6% |
| Wholesale trade | 4.2% | 2.4% |
| Retail trade | 9.1% | 10.5% |
| Transportation and warehousing, and utilities | 4.0% | 5.0% |
| Information | 0.0% | 0.8% |
| Finance and insurance, and real estate and rental and leasing | 8.6% | 4.0% |
| Professional, scientific, and management, and administrative and waste management services | 9.2% | 8.6% |
| Educational services, and healthcare and social assistance | 9.2% | 27.2% |
| Arts, entertainment, and recreation, and accommodation and food services | 12.4% | 10.4% |
| Other services, except public administration | 4.6% | 5.3% |
| Public administration | 8.4% | 2.9% |

Source: US Census Bureau; American Community Survey 2015-2019 5-Year Estimates

## SOCIAL VULNERABILITY

The CDC SVI results (Section 3.8) indicate low to medium social vulnerability ratings in the City of Pickens with some small portions of medium to high vulnerability in the eastern part of the City. Mobile homes make up almost 14 percent of housing units in the City of Pickens. Mobile home units can be more vulnerable to certain hazards, such as tornadoes and windstorms, especially if they are not properly secured with tie downs. Of the total occupied housing units in the City, approximately 17.5 percent of householders have no vehicle available to them, which could cause difficulty in the event of an evacuation.

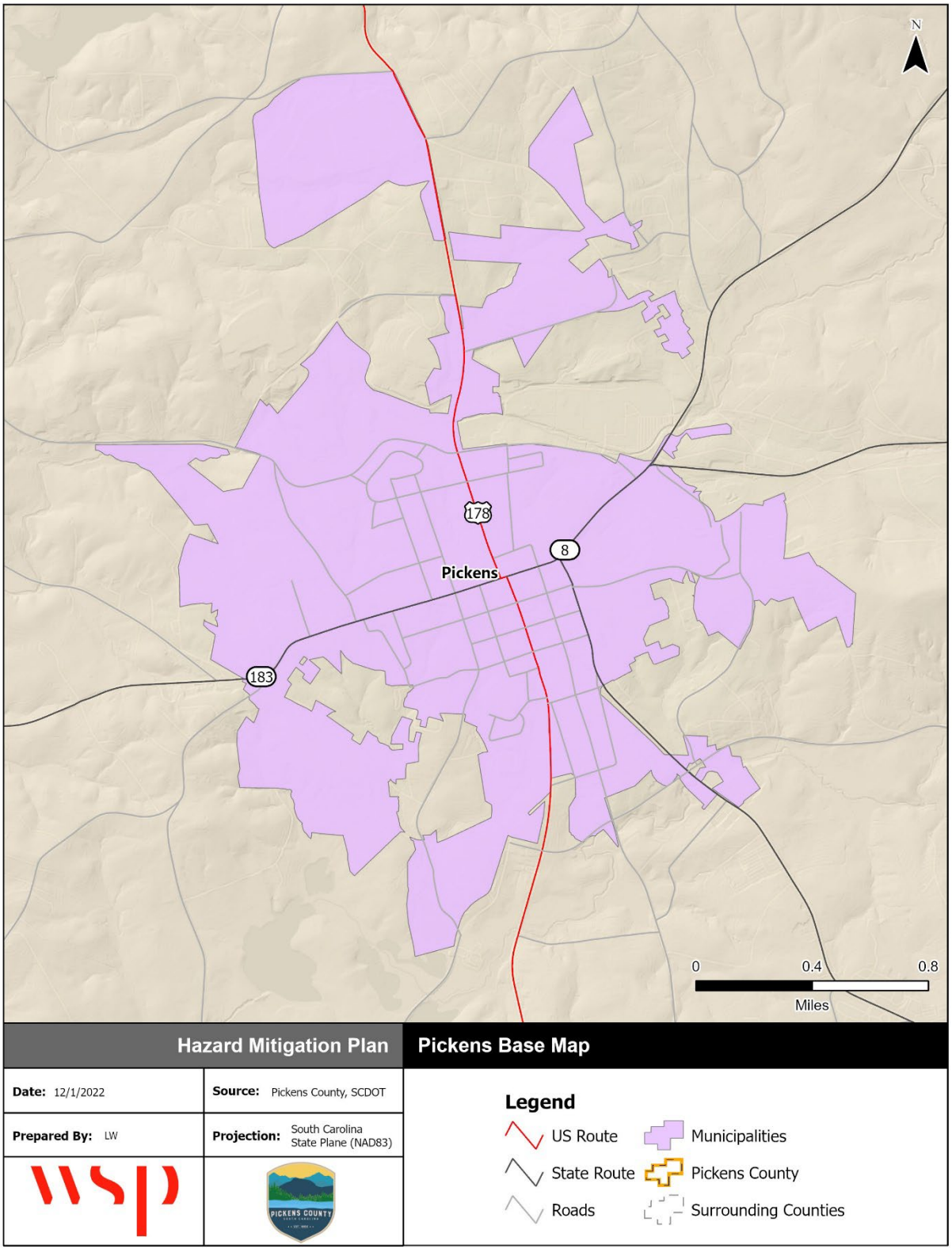
Additionally, over 14 percent of the City's population has an income below poverty level. Low-income residents are less likely to have the income or assets necessary to prepare for a possible disaster or to recover after a disaster. There is a homeless shelter just outside of the City limits and individuals lacking adequate housing may reside in the City. People experiencing homelessness are particularly vulnerable during natural disasters and are often subject to discrimination during recovery.

## DEVELOPMENT TRENDS

The City of Pickens has not had major development over the past five years. Some residential and commercial projects have been occurred, including a moderate sized multi-family building. The City does expect to see further growth in the coming years. The County's comprehensive plan includes the City of Pickens. The City has other plans that specifically detail the development goals of Pickens. The City's Neighborhood Revitalization plan, focused on the neighborhood just south of Main Street, and the Downtown Master Plan focus on walkability and connectivity and increased access to the City's existing amenities.

Figure G.1 shows a base map of Pickens.

**Figure G.1 – Base Map, Pickens**



# G.2 RISK ASSESSMENT

This section contains a summary of Pickens' asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for the City of Pickens. Table G.7 summarizes building exposure by occupancy type, representing total property value at risk within the City limits.

**Table G.7 Building Exposure by Occupancy Type, Pickens**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 174 | $70,770,025 | $70,770,025 | $141,540,051 |
| Education | 3 | $3,430,683 | $3,430,683 | $6,861,366 |
| Government | 1 | $0 | $0 | $0 |
| Industrial | 55 | $2,560,372 | $3,840,558 | $6,400,930 |
| Religious | 1 | $2,139,981 | $2,139,981 | $4,279,962 |
| Residential | 1,152 | $127,073,002 | $63,536,501 | $190,609,503 |
| **Total** | **1,386** | **$205,974,063** | **$143,717,748** | **$349,691,811** |

Source: Pickens County GIS

The spatial distribution of the property inventory is shown by building count in Figure G.2 and by building value in Figure G.3.

**Figure G.2 Building Count by Census Block, Pickens**

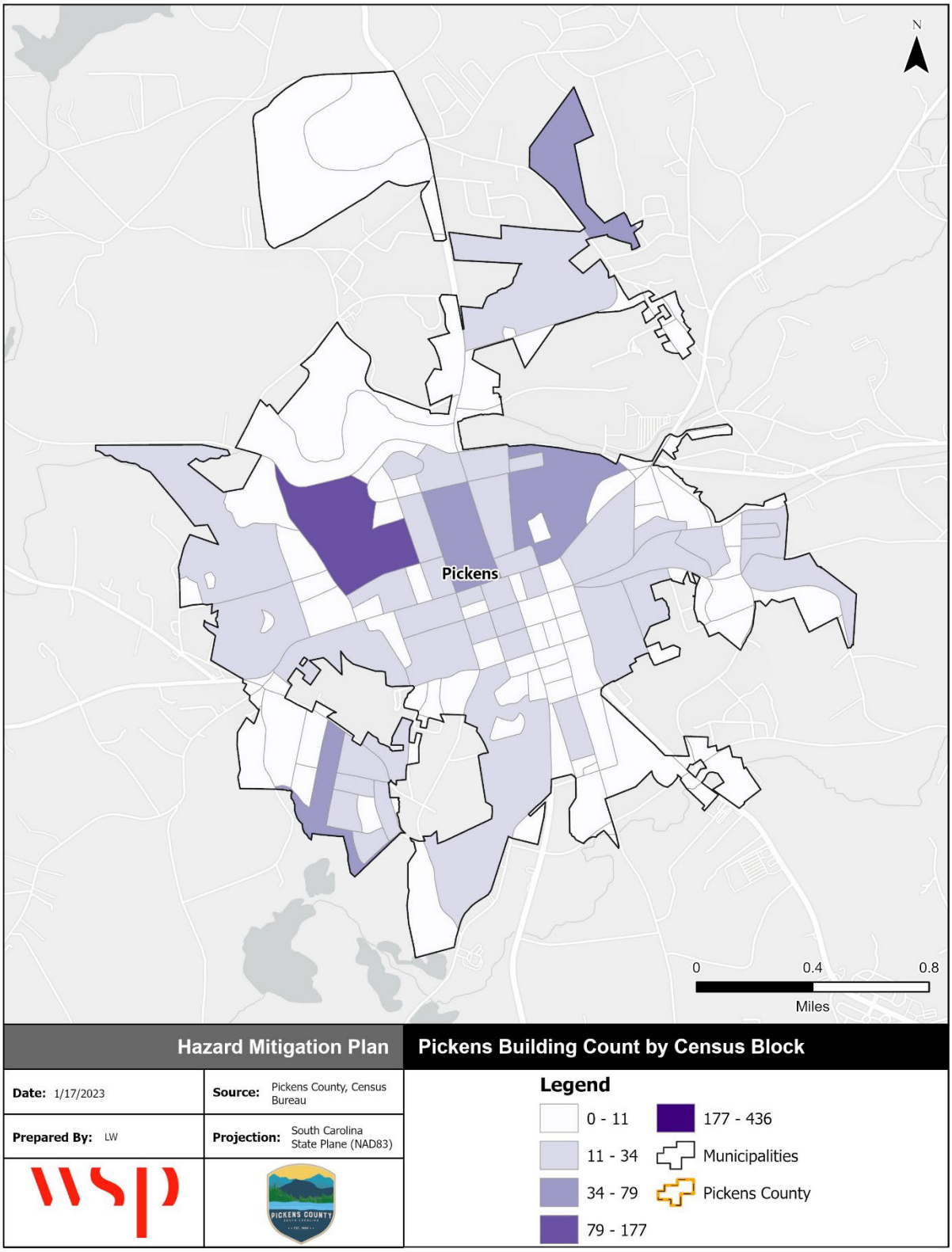


**Figure G.3 Building Value by Census Block, Pickens**

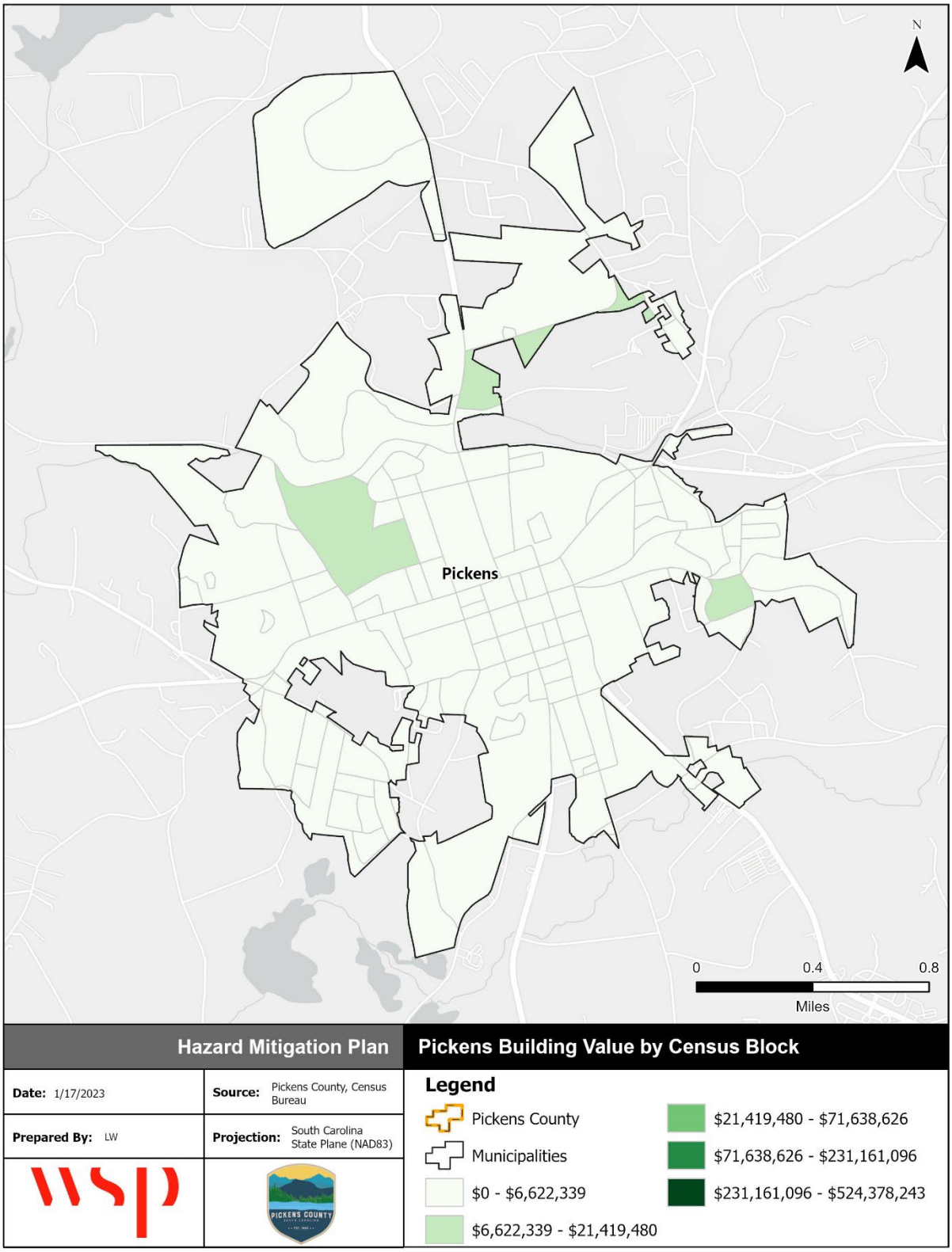


Table G.8 summarizes critical facilities and infrastructure in Pickens by facility type, and Table G.9 provides the full inventory of critical facilities and infrastructure in Pickens. Critical facilities and infrastructure were identified by Pickens County Emergency Management and City staff and are maintained in GIS.

**Table G.8 Critical Facility Summary, Pickens**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 6 |
| Food, Water, Shelter | 2 |
| Health & Medical | 6 |
| Energy | 1 |
| Communications | 2 |
| Transportation | 0 |
| Hazardous Materials | 4 |
| **Total** | **21** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table G.9 Critical Facility Inventory, Pickens**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Pickens City |
| Safety & Security | Pickens City Police |
| Safety & Security | Pickens City Town Hall |
| Safety & Security | Pickens County Administration |
| Safety & Security | Pickens County Courthouse |
| Safety & Security | Pickens County LEC |
| Health & Medical | Anmed Health Cannon Hospital |
| Health & Medical | Health Department |
| Health & Medical | Laurel Hill Living Center |
| Health & Medical | Pickens Ems |
| Health & Medical | Pickens Rescue |
| Health & Medical | Rosemond Nursing Center |
| Hazardous Materials | Bellsouth - Cedar Rock Street |
| Hazardous Materials | Blue Ridge Electric Cooperative, Inc - Pickens |
| Hazardous Materials | Central Textiles, Inc - Pickens Division |
| Hazardous Materials | Lindsay Oil Company Inc - Pickens |
| Food, Water, Shelter | Pickens County High School |
| Food, Water, Shelter | Pickens Middle |
| Communications | Pickens County Schools Technology Hub |
| Communications | Radio Tower |
| Energy | Lindsay Oil Co. |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table G.10 summarizes the PRI scores for Pickens for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table G.10 PRI Results, Pickens**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Possible | Limited | Small | > 24 hrs | < 1 week | 2.0 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Highly Likely | Critical | Small | 6 to 12 hrs | < 1 week | 3.1 |
| Hurricane/Tropical Storm | Likely | Limited | Large | > 24 hrs | < 24 hrs | 2.6 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Critical | Moderate | < 6 hrs | > 1 week | 2.6 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## G.2.1 DAM/LEVEE FAILURE

There are no high hazard dams located within the city limits of Pickens. It is possible that upstream dams could impact Pickens. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

Data was not available to estimate property exposure to failure of any high hazard dams. There is no levee failure exposure in Pickens.

## G.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. Impacts most likely to affect Pickens are related to low water levels and water usage restrictions. Drinking water for Pickens is sourced from Twelve Mile Creek. Any water level or quality challenges impacting the creek could be exacerbated during times of drought.

## G.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. Pickens's entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 65 buildings in Pickens sustaining some level of damage amounting to $699,383.

## G.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Pickens has a moderate a larger proportion of adults over age 65 and children under 5, indicating higher vulnerability.

## G.2.5 FLOOD

Table G.11 details the acreage of Pickens' total area by flood zone on the effective DFIRM. Per this assessment, 4.6 percent of Pickens falls within the SFHA.

**Table G.11 Flood Zone Acreage in Pickens**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 40.4 | 2.2% |
| Floodway | 44.4 | 2.4% |
| 0.2% Annual Chance Flood Hazard | 4.7 | 0.3% |
| Unshaded X | 1,734.7 | 95.1% |
| **Total** | **1,824.3** | **--** |
| **SFHA Total** | **84.8** | **4.6%** |

Source: FEMA Effective DFIRM

Figure G.4 reflects the effective mapped flood hazard zones for Pickens, and Figure G.5 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Table G.12 provides the estimated losses for the 1% annual chance flood event in Pickens. The total estimated damage value is based on damages to improved building value and contents value. Land value is not included in any of the loss estimates as generally land is not subject to loss from floods.

**Table G.12 Estimated Building Damage and Content Loss for 1% Annual Chance Flood**

| Occupancy Type | Total Buildings with Loss | Total Value (Building & Contents) | Estimated Building Damage | Estimated Content Loss | Estimated Total Damage | Loss Ratio |
|---|---|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 | $0 | 0% |
| Commercial | 0 | $0 | $0 | $0 | $0 | 0% |
| Educational | 0 | $0 | $0 | $0 | $0 | 0% |
| Government | 0 | $0 | $0 | $0 | $0 | 0% |
| Industrial | 0 | $0 | $0 | $0 | $0 | 0% |
| Religious | 0 | $0 | $0 | $0 | $0 | 0% |
| Residential | 1 | $244,940 | $26,727 | $9,754 | $36,481 | 15% |
| **Total** | **1** | **$244,940** | **$26,727** | **$9,754** | **$36,481** | **15%** |

Source: Hazus 6.0; Pickens County GIS

A count of people with high exposure to flooding was estimated based on the number of residential buildings with loss and Pickens' average household size estimate of 2.20 people per household. There are approximately 2 people exposed to flood risk from the 1% annual chance flood event in Pickens.

There are no critical facilities in Pickens located in the SFHA.

**Figure G.4 FEMA Flood Hazard Areas, Pickens**

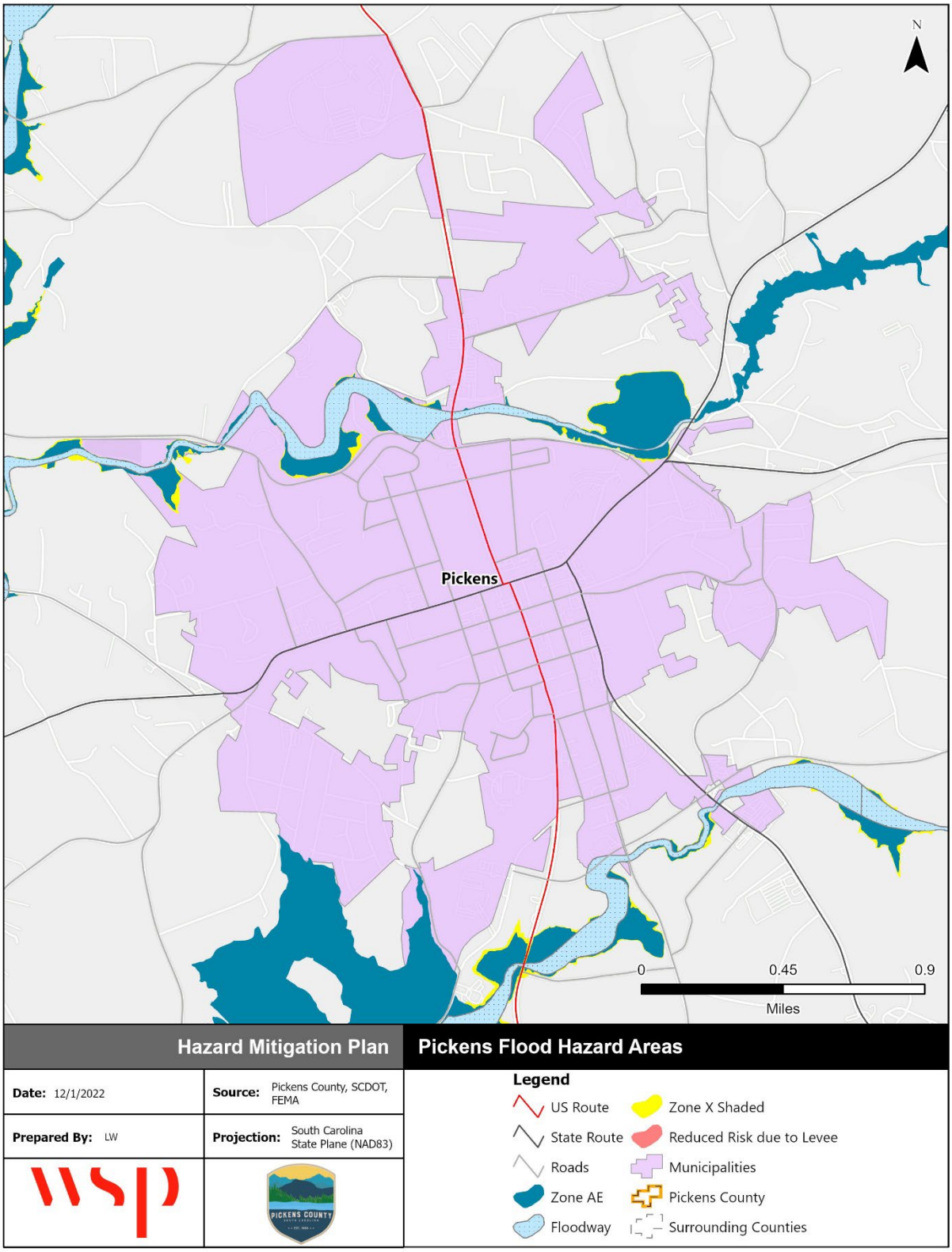
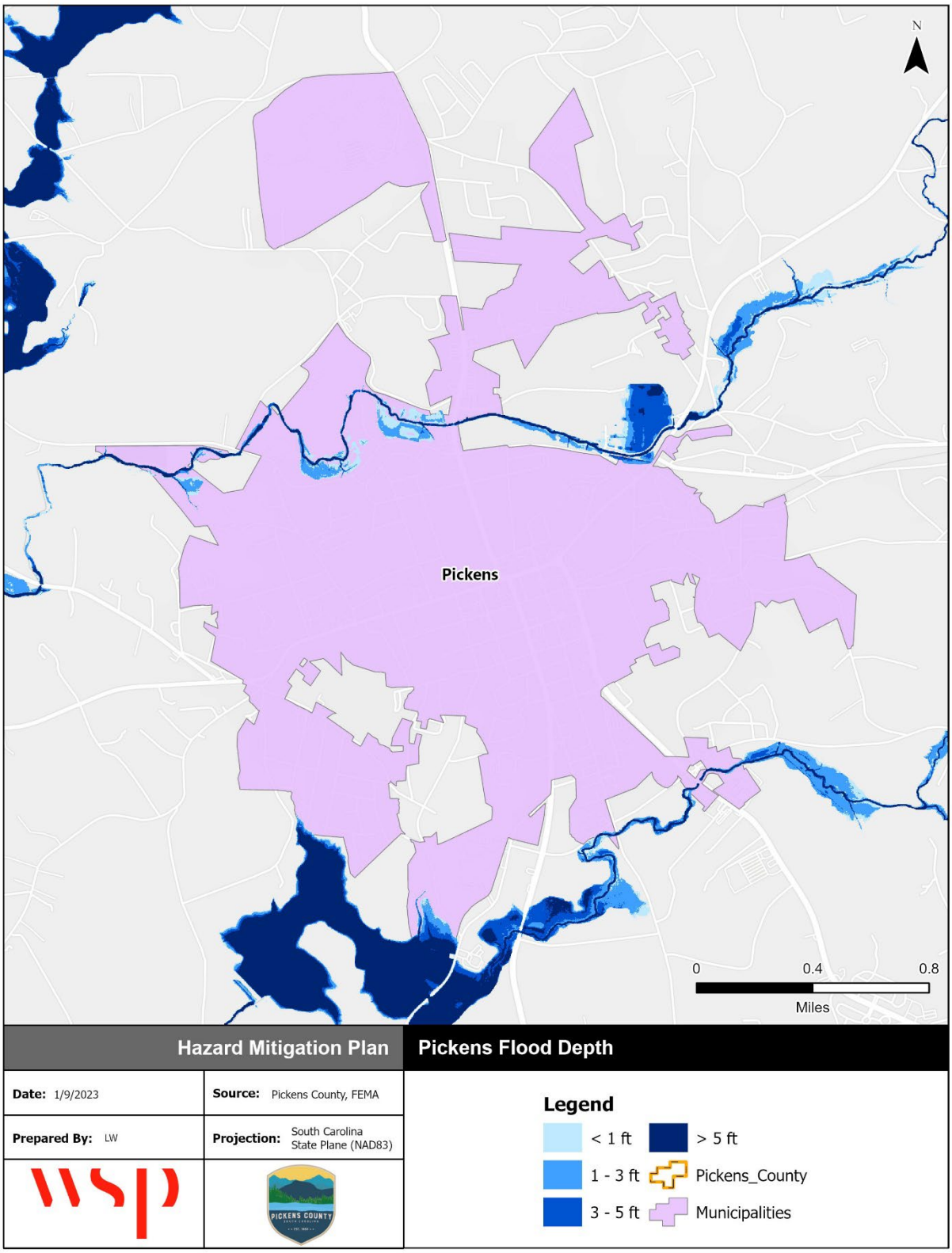


**Figure G.5 Flood Depth, 1%-Annual-Chance Flood Event, Pickens**



## G.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. Pickens' entire asset inventory is exposed to hurricane and tropical storm impacts. Mobile home units are particularly vulnerable to wind events such as hurricanes and tropical storms. In Pickens, there are approximately 223 mobile home units which comprise about 13.9% of all housing units. This represents a minor vulnerability for Pickens but is critical for units that are not properly anchored to foundations.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For Pickens, this equates to an estimated $20,981 in damages and $69,938 in damages, respectively.

## G.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. The built environment is vulnerable to urban fire risk and damage to electrical equipment from lightning.

## G.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados.

## G.2.9 WILDFIRE

Figure G.6 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table G.13 summarizes for Pickens the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table G.13 Building Counts and Values within WUIRI under -5, Pickens**

| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 0 | N/A | $0 | $0 | $0 |
| Commercial | 170 | 98% | $64,893,070 | $64,893,070 | $129,786,141 |
| Education | 3 | 100% | $3,430,683 | $3,430,683 | $6,861,366 |
| Government | 0 | 0% | $0 | $0 | $0 |
| Industrial | 51 | 93% | $2,375,193 | $3,562,789 | $5,937,982 |
| Religious | 1 | 100% | $2,139,981 | $2,139,981 | $4,279,962 |
| Residential | 1,124 | 98% | $123,246,666 | $61,623,333 | $184,869,999 |
| **Total** | **1,349** | **97%** | **$196,085,593** | **$135,649,856** | **$331,735,449** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Pickens' average household size estimate of 2.20 people per household. There are approximately 2,473 people exposed to wildfire risk in Pickens.

Table G.14 summarizes critical facility exposure to areas of moderate to high wildfire risk. Table G.15 provides the full inventory of vulnerable facilities and infrastructure.

**Table G.14 Critical Facility Exposure within WUIRI under -5, Pickens**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 5 |
| Food, Water, Shelter | 0 |
| Health & Medical | 5 |
| Energy | 1 |
| Communications | 2 |
| Transportation | 0 |
| Hazardous Materials | 1 |
| **Total** | **14** |

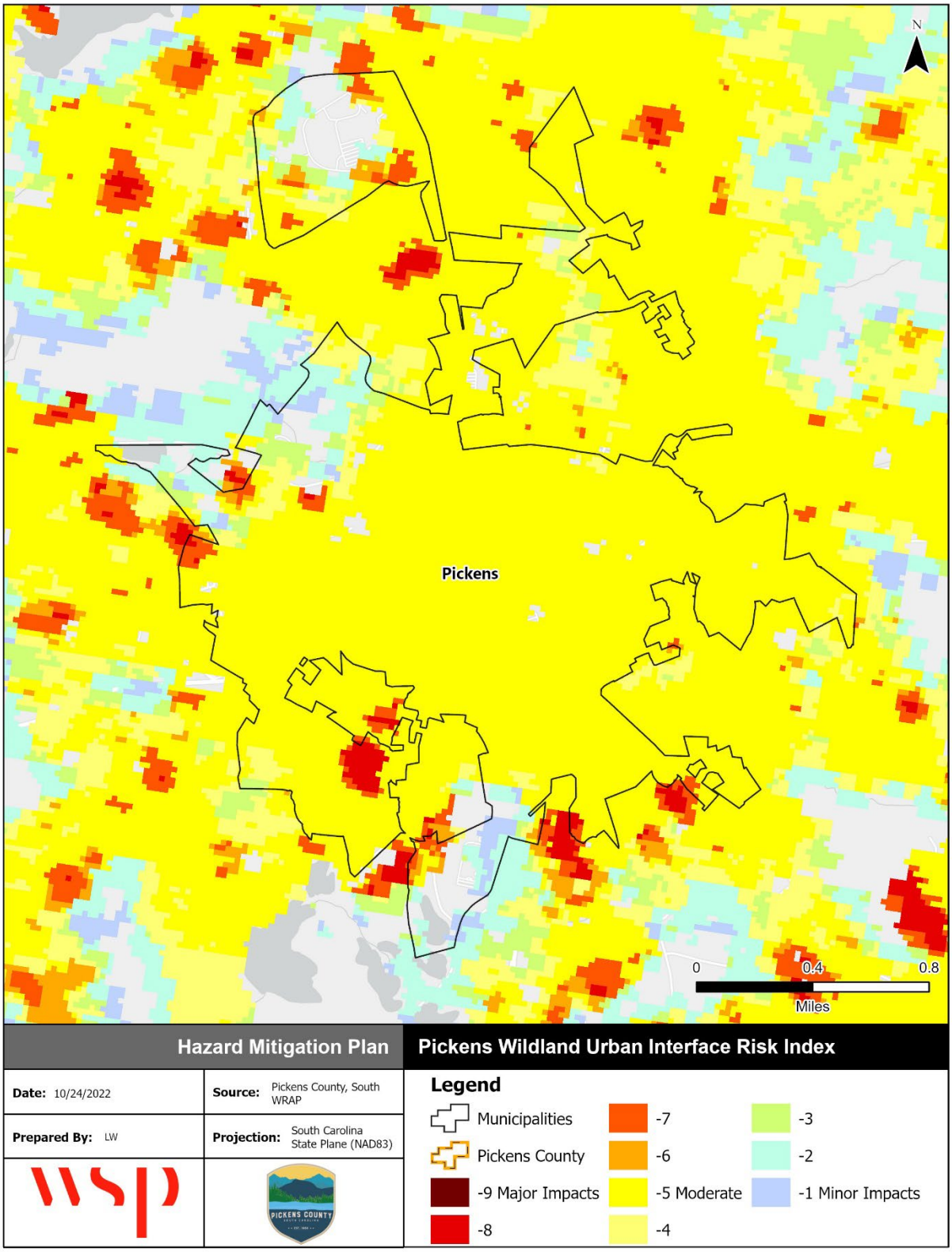
Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Table G.15 Critical Facilities Exposed to WUIRI under -5, Pickens**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Pickens City |
| Safety & Security | Pickens City Police |
| Safety & Security | Pickens City Town Hall |
| Safety & Security | Pickens County Courthouse |
| Safety & Security | Pickens County LEC |
| Health & Medical | Anmed Health Cannon Hospital |
| Health & Medical | Laurel Hill Living Center |
| Health & Medical | Pickens Ems |
| Health & Medical | Pickens Rescue |
| Health & Medical | Rosemond Nursing Center |
| Hazardous Materials | Bellsouth - Cedar Rock Street |
| Energy | Lindsay Oil Co. |
| Communications | Pickens County Schools Technology Hub |
| Communications | Radio Tower |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Figure G.6 WUI Risk Index, Pickens**



### G.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms.

## G.3 CAPABILITY ASSESSMENT

### G.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to the City of Pickens were provided by the City's HMPC representatives, City staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

Many of the City's regulatory and planning capabilities are covered by the County. Pickens County supports the City as the City's Floodplain Administrator and through managing stormwater, building permits, and building inspections. The County's EOP also serves the City's emergency operation needs. Similarly, the County provides administrative and technical capacity for the City, like administering the Reverse 911 service for residents. As the Town develops a mitigation strategy it should consider administrative capacity and opportunities to collaborate with community organizations and other jurisdictions. Additionally, the City should continue to closely collaborate with the County on plan development to ensure regulations support the City's mitigation needs and goals.

Fiscal resources include a grant writer and capital improvement programing. The City has also received CDBG funding in the past. The City should reference this plan as it explores CIP projects and mitigation grant funding.

To increase public outreach and access to hazard mitigation information, it is also recommended that the City link and share information from the County's website on the City of Pickens website. Residents will be able to access key hazard mitigation information and understand how the County supports the City in mitigation implementation.

### G.3.2 FLOODPLAIN MANAGEMENT

The City of Pickens joined the NFIP in June 1976 and had an initial FIRM dated June 25, 1976. The following tables reflect NFIP policy and claims data for the County categorized by structure type, flood zone, Pre-FIRM and Post-FIRM.

**Table G.16 NFIP Policy and Claims Data by Structure Type**

| Structure Type | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| Single Family | 2 | $1,026 | $490,000 | 2 | $27,219.04 |
| 2-4 Family | 0 | $0 | $0 | 0 | $0 |
| All Other Residential | 0 | $0 | $0 | 0 | $0 |
| Non Residential | 2 | $1,995 | $936,000 | 2 | $0 |
| **Total** | **4** | **$3,021** | **$1,426,000** | **4** | **$27,219.04** |

Source: FEMA Community Information System, accessed March 2023

**Table G.17 NFIP Policy and Claims Data by Flood Zone**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 2 | $1,995 | $936,000 | 2 | $0 |
| A Zones | 0 | $0 | $0 | 2 | $27,219.04 |
| B, C & X Zone | | | | | |
| Standard | 2 | $1,026 | $490,000 | 0 | $0 |
| Preferred | 0 | $0 | $0 | 0 | $0 |
| **Total** | **4** | **$3,021** | **$1,426,000** | **4** | **$27,219.04** |

Source: FEMA Community Information System, accessed March 2023

**Table G.18 NFIP Policy and Claims Data Pre-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 2 | $1,995 | $936,000 | 2 | $180 |
| A Zones | 0 | $0 | $0 | 1 | $600 |
| B, C & X Zone | | | | | |
| Standard | 2 | $1,026 | $490,000 | 0 | $0 |
| Preferred | 0 | $0 | $0 | 0 | $0 |
| **Total** | **4** | **$3,021** | **$1,426,000** | **3** | **$780** |

Source: FEMA Community Information System, accessed March 2023

**Table G.19 NFIP Policy and Claims Data Post-FIRM**

| Flood Zone | Number of Policies in Force | Total Premium | Insurance in Force | Number of Closed Paid Losses | Total of Closed Paid Losses |
|---|---|---|---|---|---|
| A01-30 & AE Zones | 0 | $0 | $0 | 0 | $0 |
| A Zones | 0 | $0 | $0 | 1 | $7,535.34 |
| B, C & X Zone | | | | | |
| Standard | 0 | $0 | $0 | 0 | $0 |
| Preferred | 0 | $0 | $0 | 0 | $0 |
| **Total** | **0** | **$0** | **$0** | **1** | **$7,535.34** |

Source: FEMA Community Information System, accessed March 2023

## G.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 57 | Purchase a small bucket truck to trim limbs overhanging city streets. Purchase a new tractor and ditch bank cutting equipment. Implement a new vegetation removal policy. | 1.4 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | Pickens | City of Pickens Public Utilities Director | General Fund | Long-Term | Prevention | Carry Forward. No progress reported, but the City intends to pursue implementation in the future. |
| 58 | Purchase standby diesel generator for the City of Pickens water pump stations. | 3.1 | Dam Failure, Flood | Medium | High | Pickens | City of Pickens Public Utilities Director | General Fund | Long-Term | Property Protection | Carry Forward. In Progress. The City received grant funding for this project and installation of the generator is underway. |
| 59 | Purchase one mobile standby diesel generator for the City of Pickens sewer lift stations and electrical upgrades at these stations to allow connection to standby power. | 3.1 | All Hazards | Medium | Low | Pickens | City of Pickens Public Utilities Director | General Fund | Long-Term | Property Protection | Carry Forward. There are mobile generators available but electrical upgrades will still be pursued. |
| 60 | Buy out all downstream homes in the inundation zone. | 1.5 | Dam Failure | Low | Low | Pickens | City of Pickens Public Utilities Director | General Fund, Federal Grant Funds | Long-Term | Property Protection | Carry Forward. No acquisitions have occurred, but this is still a City priority should any property owners wish to participate. |
| 61 | Purchase a ladder truck. | 3.3 | Urban Fire | Medium | Low | Pickens | City of Pickens Fire Chief | General Fund, Private Grants | Long-Term | Emergency Services | Carry Forward. In Progress. Funds have been allocated and the City hopes to procure a truck by March 2023. |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# H. TOWN OF SIX MILE

## H.1 COMMUNITY PROFILE

### GEOGRAPHY

Six Mile is the smallest incorporated town in Pickens County. It is located in the western part of the County. Six Mile covers 1.8 square miles and has an average elevation of 1,024 feet above sea level.

Scotch-Irish, Dutch-German and English settlers began moving into the area that was to become Six Mile around 1800, due to the proximity of the Keowee Path. These pioneers cleared the land and planted crops, and by 1836 the area's first church was founded, followed by the first post-office in 1878. The town was incorporated in 1910 and more businesses began to open. Until World War II, Six Mile was primarily a farming community. After the war, textile mills opened to create additional avenues of revenue. (Town of Six Mile).

### POPULATION

Table H.1 provides population counts and growth estimates for Six Mile, Pickens County, and the State.

Population in Six Mile increased by over 12 percent from 2010 to 2020; exceeding the average increase across the county and the state.

**Table H.1 Population Counts, 2010-2020**

| Jurisdiction | 2010 Population | 2020 Population | Total Change 2010-2020 | % Change 2010-2020 | 2021 Population Estimate |
|---|---|---|---|---|---|
| **Six Mile** | **675** | **759** | **84** | **12.4%** | **1,185** |
| Pickens County | 119,224 | 131,404 | 12,180 | 10.2% | 129,617 |
| South Carolina | 4,625,364 | 5,091,517 | 493,061 | 10.7% | 5,078,903 |

Source: US Census Bureau Decennial Census 2010; Decennial Census 2020; American Community Survey (ACS) 2017-2021 5-Year Estimates
Note that due to the Town's small population size, the margin of error for ACS estimates is high and reported estimates may not be statistically significant.

### HOUSING

Table H.2 details housing unit counts and other housing tenure statistics for Six Mile.

From 2010 to 2020 there was an increase in housing units in Six Mile at a greater rate than the County and exceeding the City's rate of population growth over that time. Nearly 90 percent of housing units are occupied, and most occupants are owners. Compared to renters, homeowners may be more willing and able to make investments to protect their homes from hazard risks. Owners may also have more awareness of the hazard risks in their area.

**Table H.2 Housing Tenure Statistics, 2010-2020**

| Housing Characteristics | Six Mile | Pickens County |
|---|---|---|
| Housing Units (2010) | 284 | 50,854 |
| Housing Units (2020) | 361 | 54,939 |
| Housing Units Percent Change (2010-2020) | 27.1% | 8.0% |
| Occupied Units, % (2020) | 89.2% | 88.3% |
| Owner-Occupied Units, % (2020) | 78.9% | 68.5% |
| Renter-Occupied Units, % (2020) | 21.1% | 31.5% |
| Median Home Value (2020) | $258,700 | $159,200 |

| Housing Characteristics | Six Mile | Pickens County |
|---|---|---|
| Average Household Size | 2.98 | 2.45 |
| No Vehicle Available, % | 6.2% | 6.6% |

Source: U.S. Census Bureau 2010 Decennial Census, American Community Survey 2016-2020 5-Year Estimates

Table H.3 and Table H.4 summarize housing units by type and age. Over 82 percent of the housing units in Six Mile are detached single family homes. There are also a variety of sizes of multi-family buildings. About six percent of housing units in Six Mile are mobile homes, which are more vulnerable to damage from wind and flood hazards.

The Town of Six Mile's initial Flood Insurance Rate Map was identified on April 16, 2008. Over 41 percent of housing units in Six Mile were built since 2000. However, the remainder were built before the establishment of floodplain development standards.

**Table H.3 Housing Units by Type, 2020**

| Units in Structure | Six Mile | Pickens County |
|---|---|---|
| 1-unit, detached | 82.5% | 62.8% |
| 1-unit, attached | 1.4% | 1.3% |
| 2 units | 4.4% | 2.6% |
| 3 or 4 units | 0.0% | 2.2% |
| 5 to 9 units | 1.4% | 3.9% |
| 10 to 19 units | 0.0% | 6.0% |
| 20 or more units | 4.2% | 2.9% |
| Mobile home | 6.1% | 18.0% |
| Boat, RV, van, etc. | 0.0% | 0.2% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates
Note that due to the Town's small population size and housing unit count, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

**Table H.4 Housing Units by Age, 2020**

| Housing Year Built | Six Mile | Pickens County |
|---|---|---|
| Built 2014 or later | 5.0% | 5.0% |
| Built 2010 to 2013 | 4.2% | 4.3% |
| Built 2000 to 2009 | 32.1% | 16.0% |
| Built 1990 to 1999 | 16.1% | 21.9% |
| Built 1980 to 1989 | 5.3% | 15.8% |
| Built 1970 to 1979 | 9.7% | 14.5% |
| Built 1960 to 1969 | 8.0% | 7.7% |
| Built 1950 to 1959 | 3.9% | 7.3% |
| Built 1940 to 1949 | 3.0% | 2.6% |
| Built 1939 or earlier | 12.7% | 4.9% |

Source: U.S. Census Bureau, American Community Survey 2016-2020 5-Year Estimates
Note that due to the Town's small population size and housing unit count, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

## ECONOMY

Table H.5 presents key economic statistics for Six Mile and Pickens County. In Six Mile, compared to the county averages, median household income and per capita income are higher, and poverty rates are lower. However, there is a significant margin of error in these Census estimates so these figures should be viewed as an approximation only.

**Table H.5 Economic Statistics, 2020**

| Economic Characteristics | Six Mile | Pickens County |
|---|---|---|
| Median Household Income | $93,750 | $51,032 |
| Per Capita Income | $34,180 | $28,382 |
| Unemployment Rate | 8.7% | 5.0% |
| % of Individuals Below Poverty Level | 6.5% | 16.4% |
| % Without Health Insurance | 5.9% | 8.6% |

Source: US Census Bureau; American Community Survey 2016-2020 5-Year Estimates
Note that due to the Town's small population size, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

Table H.6 summarizes employment by industry in Six Mile and across Pickens County. The dominant employment sectors in Six Mile are educational services, and healthcare and social assistance followed by retail trade and transportation and warehousing, and utilities.

Six Mile is home to several "Mom and Pop" stores, as well as some larger chains. There is one industrial company within the town's limits, which employs fewer than ten people.

**Table H.6 Employment Statistics by Industry, 2020**

| Industry | Six Mile | Pickens County |
|---|---|---|
| Agriculture, forestry, fishing and hunting, and mining | 4.8% | 0.5% |
| Construction | 7.2% | 7.9% |
| Manufacturing | 10.5% | 14.6% |
| Wholesale trade | 0.5% | 2.4% |
| Retail trade | 11.9% | 10.5% |
| Transportation and warehousing, and utilities | 10.7% | 5.0% |
| Information | 0.5% | 0.8% |
| Finance and insurance, and real estate and rental and leasing | 3.6% | 4.0% |
| Professional, scientific, and management, and administrative and waste management services | 3.6% | 8.6% |
| Educational services, and healthcare and social assistance | 36.5% | 27.2% |
| Arts, entertainment, and recreation, and accommodation and food services | 8.4% | 10.4% |
| Other services, except public administration | 1.2% | 5.3% |
| Public administration | 0.7% | 2.9% |

Source: US Census Bureau; American Community Survey 2015-2019 5-Year Estimates
Note that due to the Town's small population size, the margin of error for Census estimates is high and reported estimates may not be statistically significant.

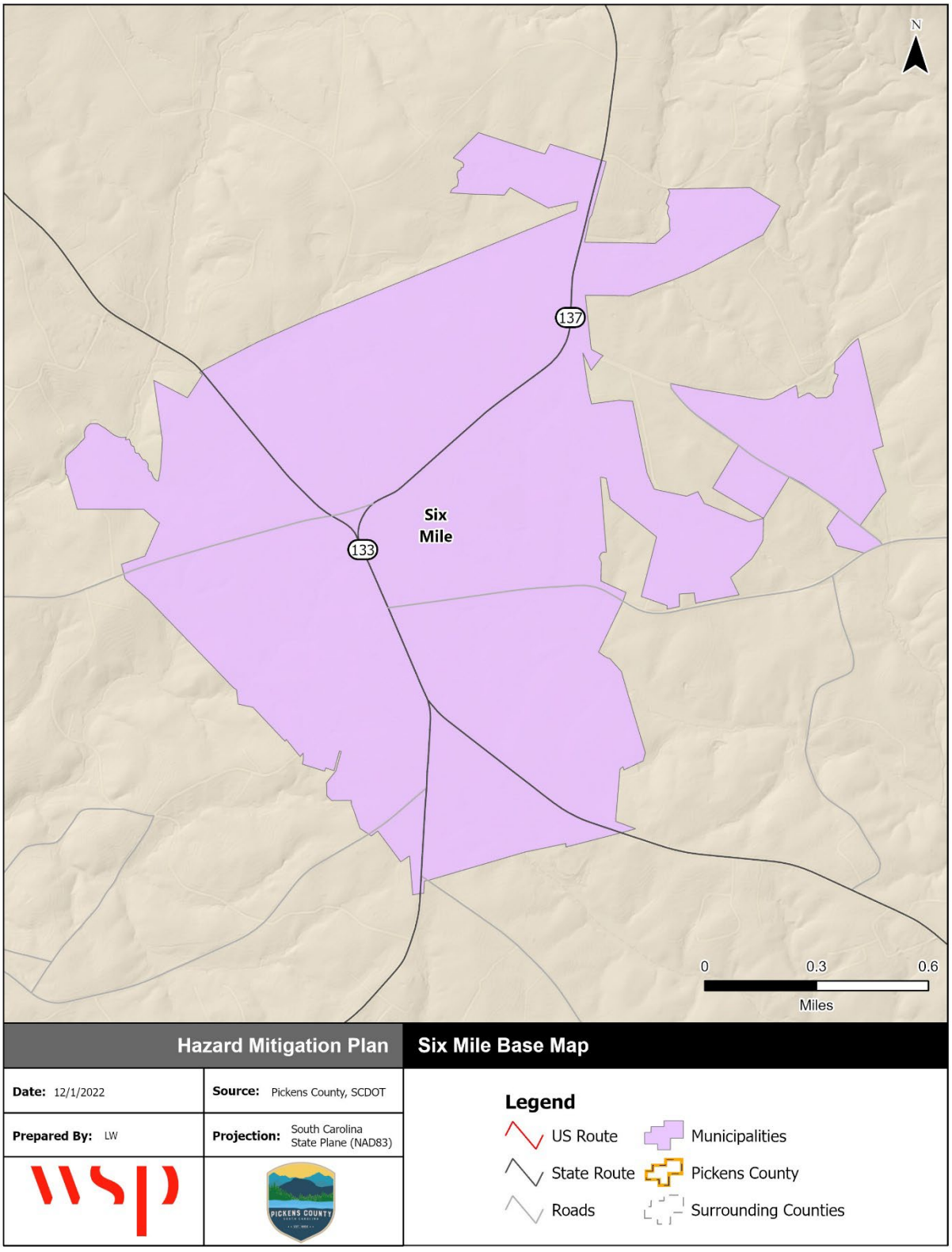
## SOCIAL VULNERABILITY

The CDC SVI results (Section 3.8) indicate that Six Mile has relatively low social vulnerability. A review of individual demographic indicators and census data shows low percentages of mobile homes, people living in poverty, and aging adults. Based on this data, residents in Six Mile may face fewer challenges during hazard response and recovery.

## DEVELOPMENT TRENDS

The Town of Six Mile has not had any significant development over the past five years. The Town, alongside the organization Upstate Forever, does have an easement to preserve green space for a children's nature trail. Figure H.1 shows a base map of Six Mile.

**Figure H.1 Base Map, Six Mile**



# H.2 RISK ASSESSMENT

This section contains a summary of Six Mile's asset inventory as well as hazard profile and vulnerability assessment findings.

## ASSET INVENTORY

The following tables provide the asset inventory for the Town of Six Mile. Table H.7 summarizes building exposure by occupancy type, representing total property value at risk within the Town limits.

**Table H.7 Building Exposure by Occupancy Type, Six Mile**

| Occupancy | Building Count | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|
| Agriculture | 0 | $0 | $0 | $0 |
| Commercial | 174 | $70,770,025 | $70,770,025 | $141,540,051 |
| Education | 3 | $3,430,683 | $3,430,683 | $6,861,366 |
| Government | 1 | $0 | $0 | $0 |
| Industrial | 55 | $2,560,372 | $3,840,558 | $6,400,930 |
| Religious | 1 | $2,139,981 | $2,139,981 | $4,279,962 |
| Residential | 1,152 | $127,073,002 | $63,536,501 | $190,609,503 |
| **Total** | **1,386** | **$205,974,063** | **$143,717,748** | **$349,691,811** |

Source: Pickens County GIS

The spatial distribution of the property inventory is shown by building count in Figure H.2 and by building value in Figure H.3Figure D.4.

**Figure H.2 Building Count by Census Block, Six Mile**

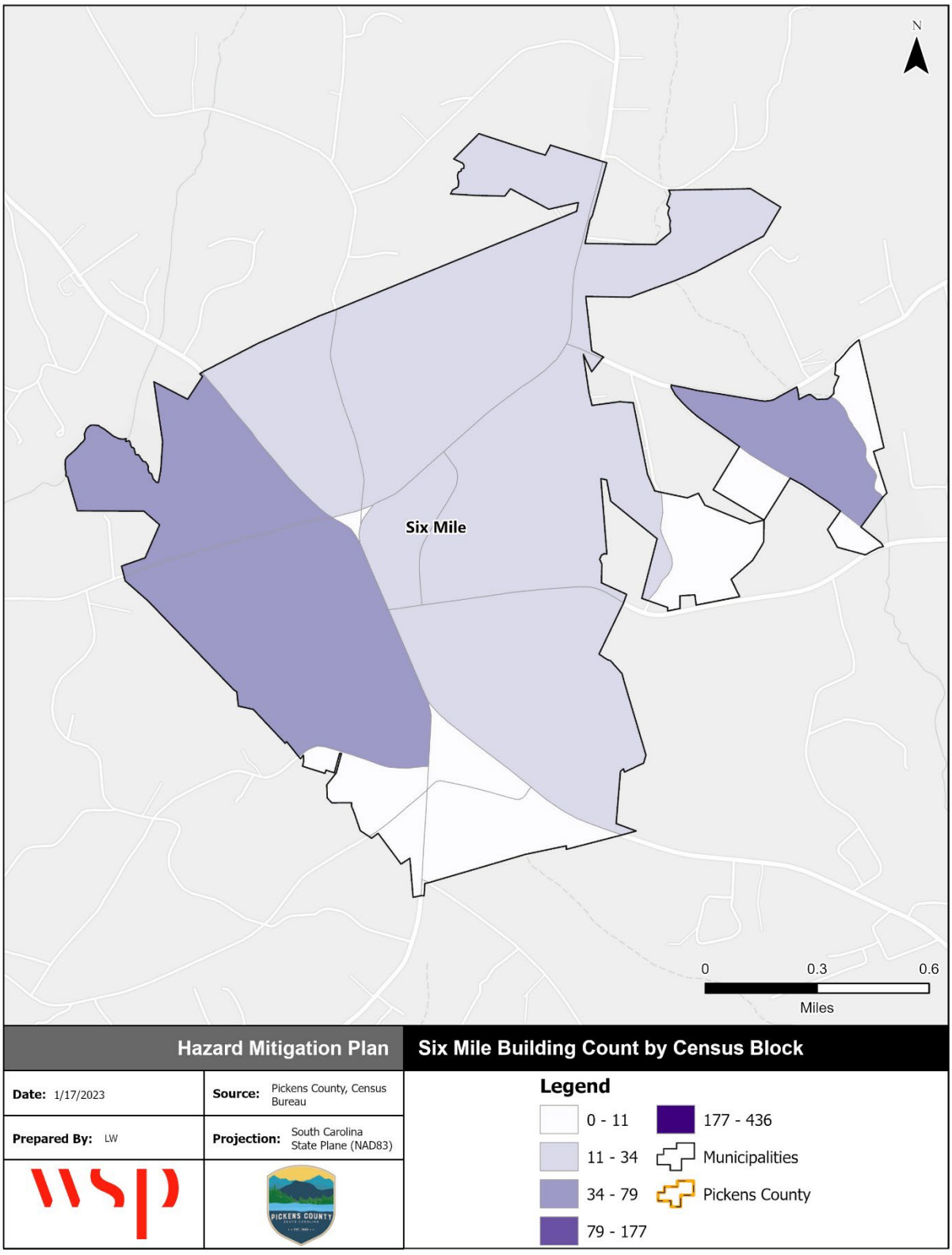


**Figure H.3 Building Value by Census Block, Six Mile**

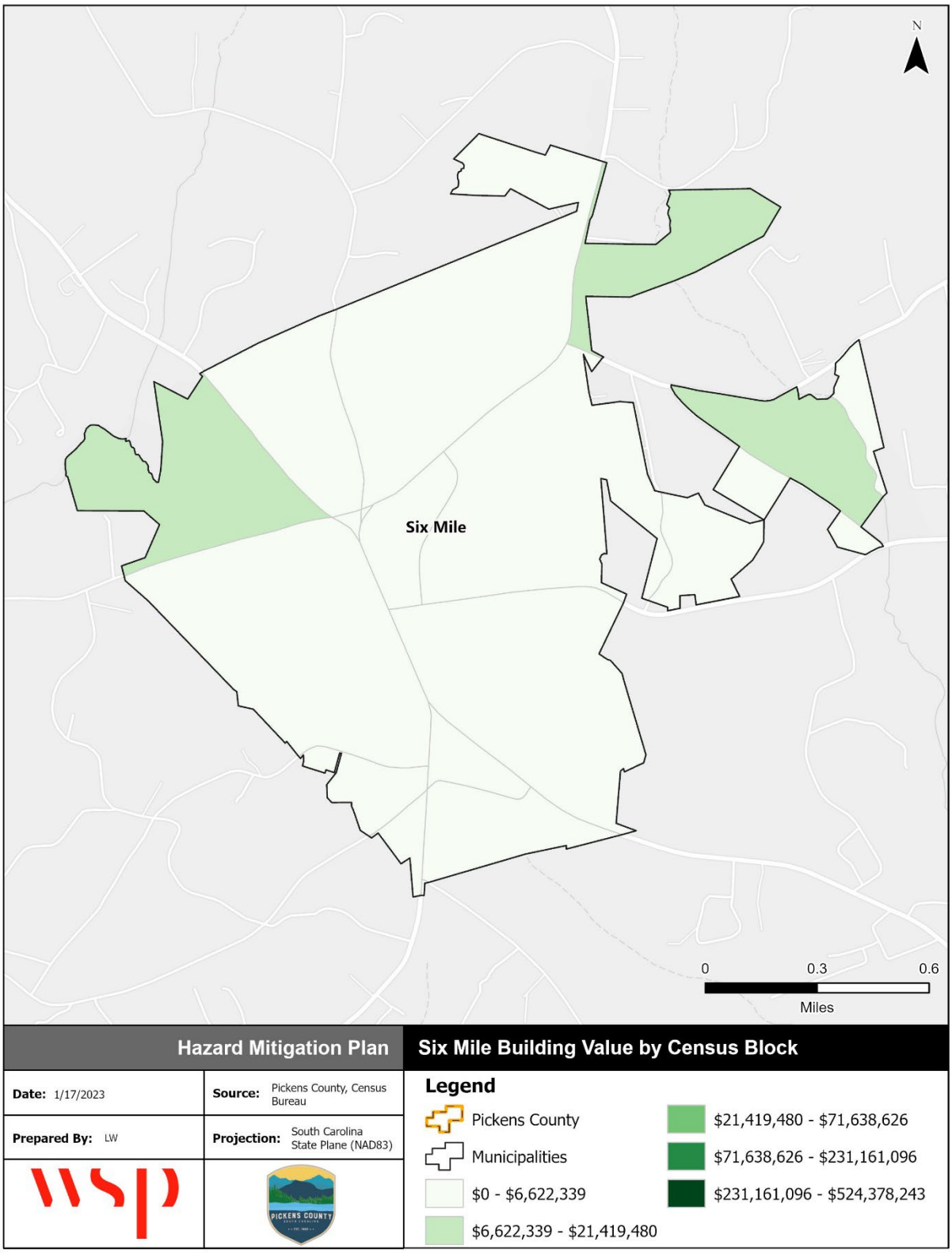


Table H.8 summarizes critical facilities and infrastructure in Six Mile by facility type, and Table H.9Table E.9 provides the full inventory of critical facilities and infrastructure in Six Mile. Critical facilities and infrastructure were identified by Pickens County Emergency Management and Town staff and are maintained in GIS.

**Table H.8 Critical Facility Summary, Six Mile**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 3 |
| Food, Water, Shelter | 0 |
| Health & Medical | 1 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 0 |
| **Total** | **4** |

Source: Pickens County GIS; Pickens County Emergency Management

**Table H.9 Critical Facility Inventory, Six Mile**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Sheriff Sub-Station Code 10 |
| Safety & Security | Six Mile City Town Hall |
| Safety & Security | Six Mile Fire |
| Health & Medical | Six Mile Retirement |

Source: Pickens County GIS; Pickens County Emergency Management

## RISK SUMMARY

Table H.10 summarizes the PRI scores for Six Mile for all hazards evaluated in this plan. More details on PRI ratings for each hazard can be found in Section 5 of the plan.

**Table H.10 PRI Results, Six Mile**

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Possible | Limited | Small | > 24 hrs | < 1 week | 2.0 |
| Drought | Highly Likely | Limited | Large | > 24 hrs | > 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | < 6 hrs | < 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | > 24 hrs | < 1 week | 2.7 |
| Flood | Likely | Critical | Small | 6 to 12 hrs | < 1 week | 2.8 |
| Hurricane/Tropical Storm | Likely | Limited | Large | > 24 hrs | < 24 hrs | 2.6 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | < 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | < 6 hrs | < 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | < 6 hrs | < 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | > 24 hrs | < 1 week | 2.7 |
| **Technological & Human Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | < 6 hrs | < 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | < 6 hrs | > 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | < 6 hrs | < 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | > 24 hrs | > 1 week | 2.8 |
| Radiological Threat | Unlikely | Catastrophic | Moderate | < 6 hrs | > 1 week | 2.9 |
| Urban Fire | Highly Likely | Critical | Small | < 6 hrs | < 6 hrs | 3.0 |

Community specific risk and vulnerability information for the natural hazards identified and profiled in this plan are detailed below.

## H.2.1 DAM/LEVEE FAILURE

There are no high hazard dams located within the town limits of Six Mile. It is unlikely that upstream dams could impact Six Mile. See Section 5.4 for a full inventory of dams in and upstream of Pickens County.

Data was not available to estimate property exposure to failure of any high hazard dams. There is no levee failure exposure in Six Mile.

## H.2.2 DROUGHT

Drought risk does not vary significantly by jurisdiction. Impacts most likely to affect Six Mile are related to low water levels and water usage restrictions. Drinking water for Six is sourced from Lake Keowee. Any water level or quality challenges impacting the lake could be exacerbated during times of drought.

## H.2.3 EARTHQUAKE

Earthquake risk does not vary significantly by jurisdiction. Six Mile's entire asset inventory is exposed to earthquake. Per the countywide Hazus lost estimates modeled for the Charleston earthquake event, only 4.7 percent of the building inventory would be expected to sustain any damages, which are estimated at only 0.2 percent of the total property value. This equates to approximately 15 buildings in Six Mile sustaining some level of damage amounting to $109,599.

## H.2.4 EXTREME HEAT

Extreme heat risk does not vary significantly by jurisdiction. The entire population is exposed to extreme heat. Young children and older adults are more vulnerable to heat. Compared to county averages, Six Mile does not have a large population of older adults are young children, however there are a few (~8%) of household with older adults that live alone. These households may be particularly vulnerable during extreme heat events.

## H.2.5 FLOOD

Table H.11 details the acreage of Six Mile's total area by flood zone on the effective DFIRM. Per this assessment, 1.3 percent of Six Mile falls within the SFHA.

**Table H.11 Flood Zone Acreage in Six Mile**

| Flood Zone | Acreage | Percent of Total (%) |
|---|---|---|
| AE | 17.1 | 1.3% |
| Floodway | 0.0 | 0.0% |
| 0.2% Annual Chance Flood Hazard | 0.0 | 0.0% |
| Unshaded X | 1,294.7 | 98.7% |
| **Total** | **1,311.8** | **--** |
| **SFHA Total** | **17.1** | **1.3%** |

Source: FEMA Effective DFIRM

Figure H.4 reflects the effective mapped flood hazard zones for Six Mile, and Figure H.5 displays the depth of flooding estimated to occur in these areas during the 1%-annual-chance flood event.

Potential flood damages were estimated through a Level 2 analysis in Hazus 6.0 using 2022 building data and tax parcel data. Per this assessment, there are no buildings in Six Mile that are expected to sustain damages from the 1%-annual-chance flood event. As a result, the population considered vulnerable to flooding based on their residence location is also estimated to be zero.

There are no critical facilities in Six Mile located in the SFHA.

**Figure H.4 FEMA Flood Hazard Areas, Six Mile**

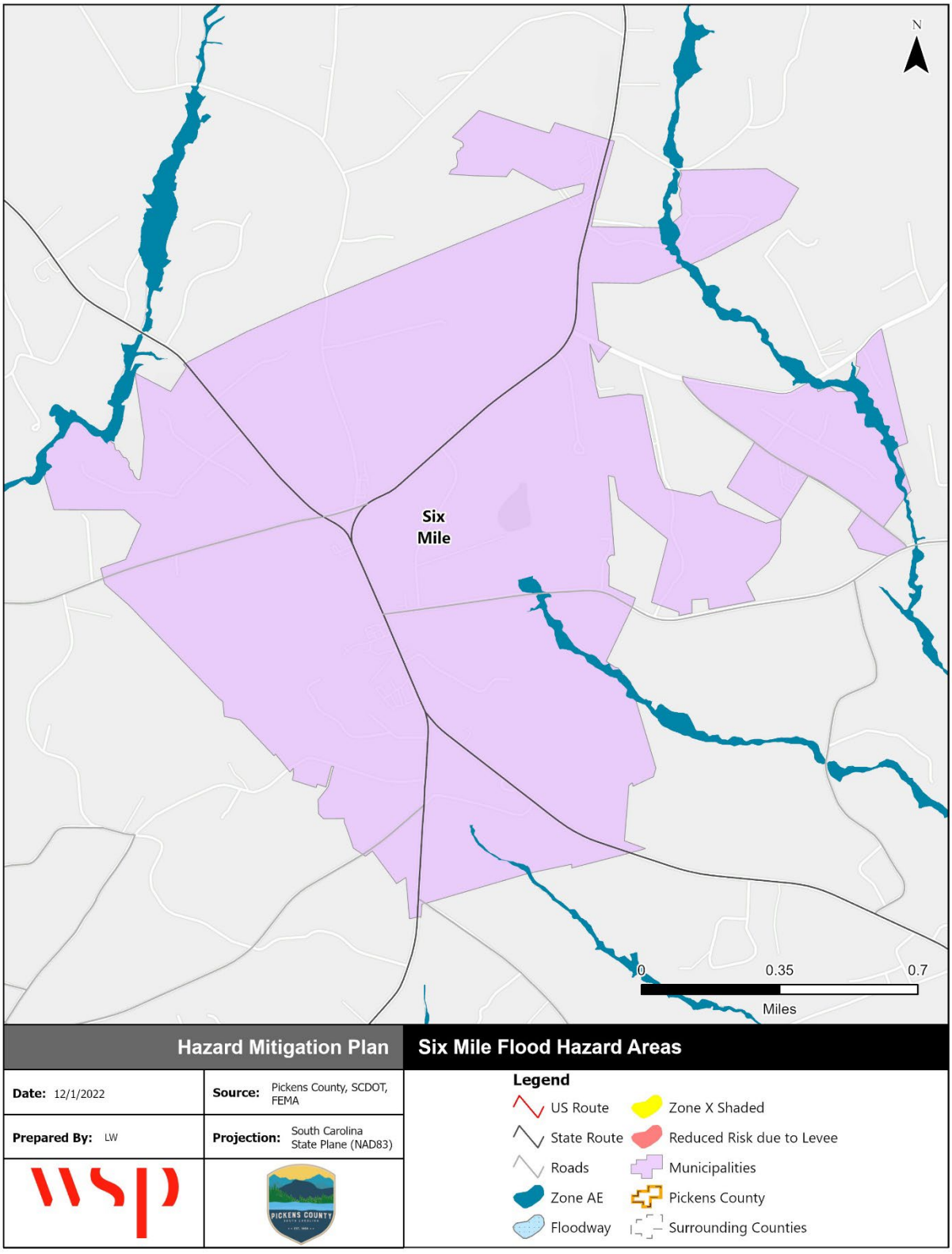
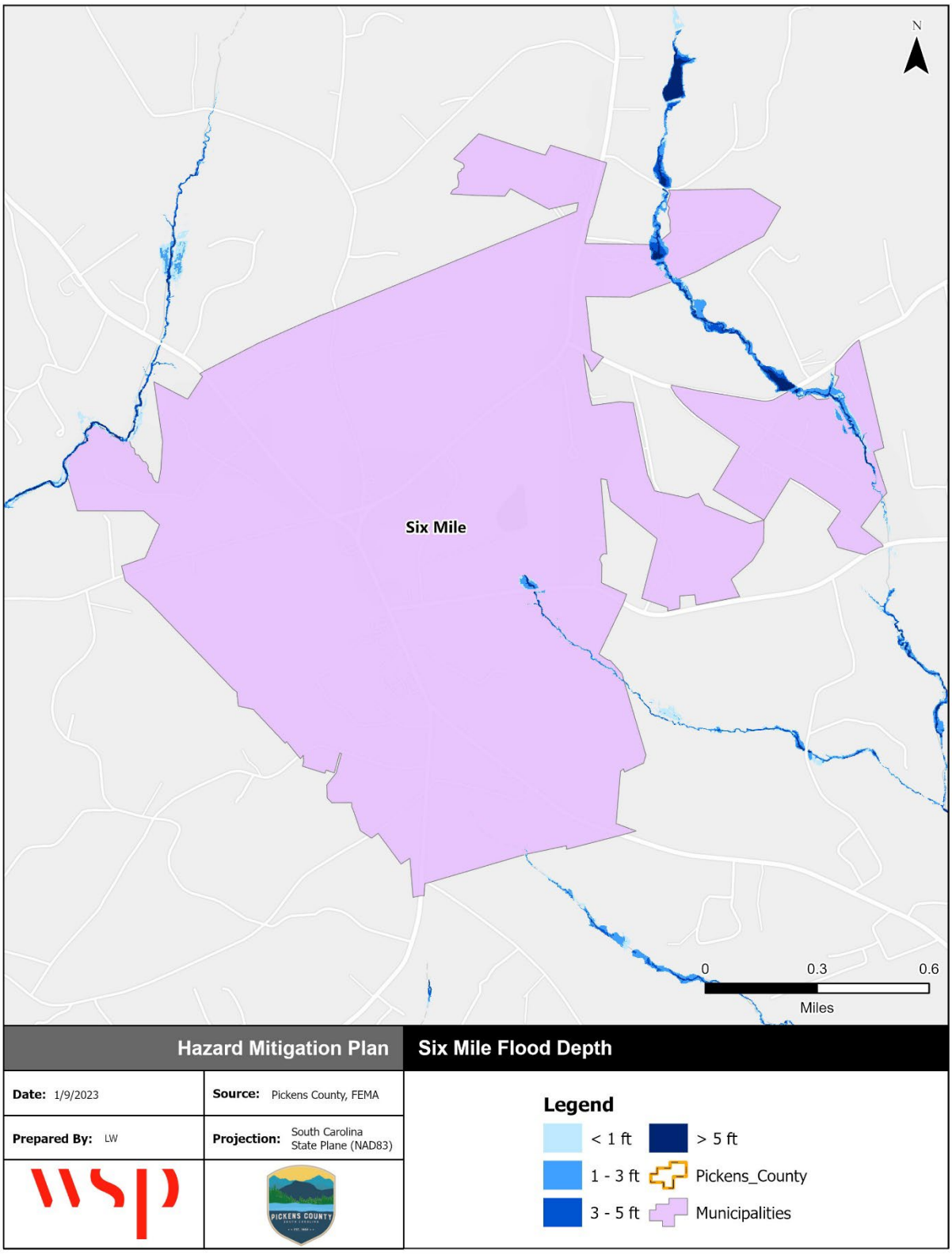


**Figure H.5 Flood Depth, 1%-Annual-Chance Flood Event, Six Mile**



## H.2.6 HURRICANE/TROPICAL STORM

Hurricane and tropical storm risk does not vary significantly by jurisdiction. Six Mile's entire asset inventory is exposed to hurricane and tropical storm impacts. Mobile home units are particularly vulnerable to wind events such as hurricanes and tropical storms. In Six Mile, there are approximately 23 mobile home units which comprise about 5% of all housing units. This represents a minor vulnerability for Six Mile but is critical for units that are not properly anchored to foundations.

Per the countywide Hazus lost estimates modeled for the 50-year hurricane wind event, property damages are estimated at 0.006 percent of the total building inventory. For the 100-year event, building damages are estimated at 0.02 percent of the total building inventory. For Six Mile, this equates to an estimated $5,717 in damages and $19,059 in damages, respectively.

## H.2.7 SEVERE STORM

Severe storm risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to severe storms. As with vulnerability to hurricane and tropical storm, mobile homes are particularly vulnerable to winds associate with severe storm. The built environment is vulnerable to urban fire risk and damage to electrical equipment from lightning.

## H.2.8 TORNADO

Tornado risk does not vary significantly by jurisdiction. The entire asset inventory is exposed to tornados.

## H.2.9 WILDFIRE

Figure H.6 depicts the Wildland Urban Interface Risk Index (WUIRI), which rates the potential impact of wildfire on homes and people. The WUIRI combines the WUI, which defines the locations where wildfire may occur, and fire intensity, which defines the potential extent or magnitude of wildfire. This index ranges from 0 to -9, where lower values are relatively more severe based on a combination of assets at risk and susceptibility to fire at different intensity levels. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

Using the WUIRI data from the Southern Wildfire Risk Assessment, a GIS analysis was performed to estimate the exposure of buildings most at risk to loss due to wildfire. Table H.12 summarizes for Six Mile the number of buildings and their total value that fall within areas rated -5 or less on the WUIRI, representing total exposure in areas of moderate to high wildfire risk.

**Table H.12 Building Counts and Values within WUIRI under -5, Six Mile**

| Occupancy | Estimated Building Count | % of Total | Structure Value | Estimated Content Value | Total Value |
|---|---|---|---|---|---|
| Agriculture | 1 | 50% | $8,000 | $8,000 | $16,000 |
| Commercial | 15 | 100% | $2,878,979 | $2,878,979 | $5,757,958 |
| Education | 0 | N/A | $0 | $0 | $0 |
| Government | 0 | N/A | $0 | $0 | $0 |
| Industrial | 10 | 100% | $799,131 | $1,198,697 | $1,997,828 |
| Religious | 1 | 100% | $406,682 | $406,682 | $813,364 |
| Residential | 233 | 83% | $44,972,652 | $22,486,326 | $67,458,978 |
| **Total** | **260** | **84%** | **$49,065,444** | **$26,978,684** | **$76,044,128** |

Source: GIS Analysis, Southern Wildfire Risk Assessment

A count of people with high exposure to wildfire was estimated based on the number of residential buildings exposed and Six Mile's average household size estimate of 2.98 people per household. There are approximately 694 people exposed to wildfire risk in Six Mile.

Table H.13 summarizes critical facility exposure to areas of moderate to high wildfire risk. Table H.14Table E.15 provides the full inventory of vulnerable facilities and infrastructure.

**Table H.13 Critical Facility Exposure within WUIRI under -5, Six Mile**

| Facility Type | Facility Count |
|---|---|
| Safety & Security | 3 |
| Food, Water, Shelter | 0 |
| Health & Medical | 0 |
| Energy | 0 |
| Communications | 0 |
| Transportation | 0 |
| Hazardous Materials | 0 |
| **Total** | **3** |

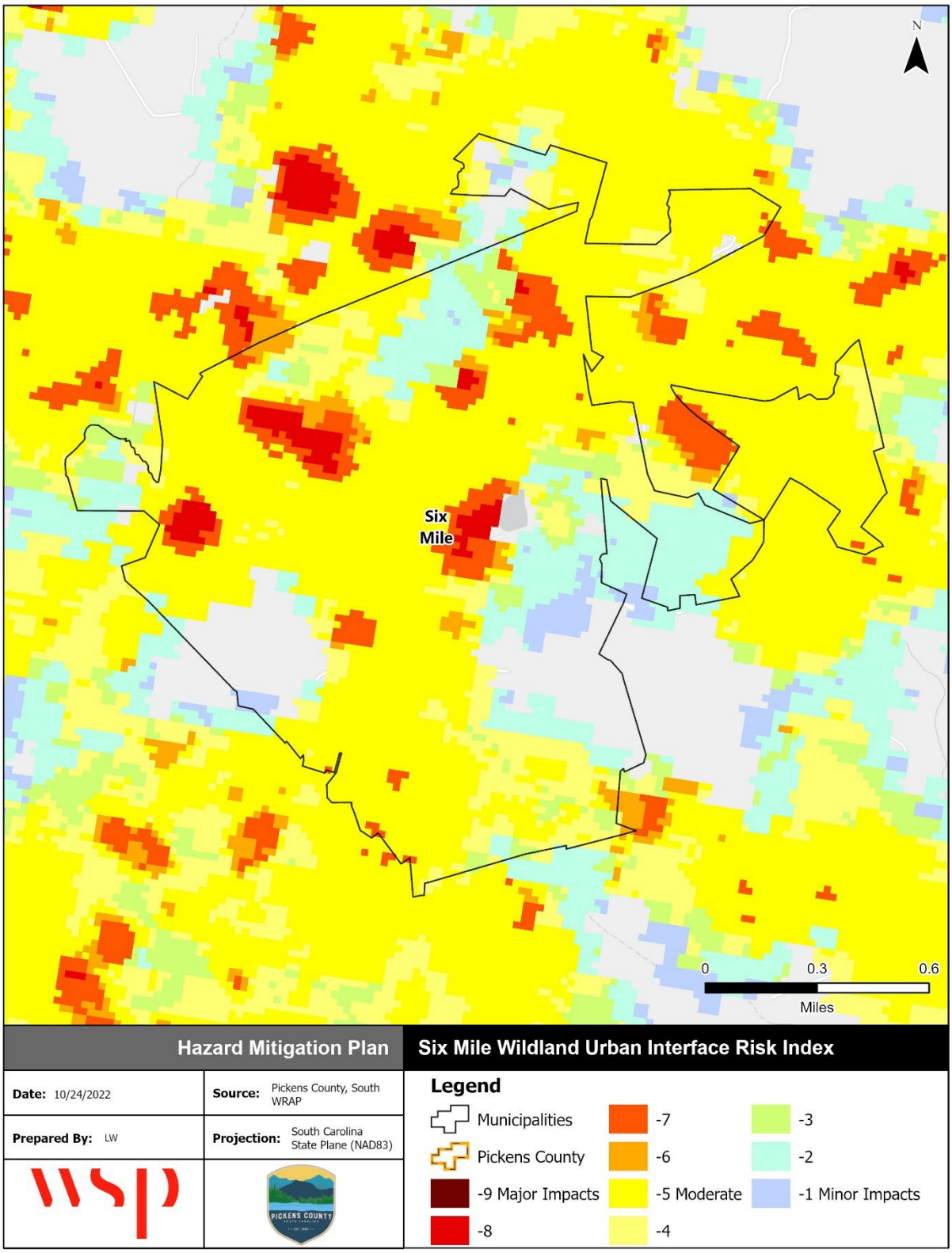
Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Table H.14 Critical Facilities Exposed to WUIRI under -5, Six Mile**

| Facility Type | Facility Name |
|---|---|
| Safety & Security | Sheriff Sub-Station Code 10 |
| Safety & Security | Six Mile City Town Hall |
| Safety & Security | Six Mile Fire |

Source: GIS Analysis, Pickens County GIS, Southern Wildfire Risk Assessment

**Figure H.6 WUI Risk Index, Six Mile**



### H.2.10 WINTER STORM

Winter and ice storm risk does not vary significantly by jurisdiction. The entire asset inventory is vulnerable to winter storm impacts. As with extreme heat, young children and older adults, as well as isolated individuals, as more vulnerable to extreme cold temperatures associated with winter and ice storms.

## H.3 CAPABILITY ASSESSMENT

### H.3.1 OVERALL CAPABILITY

Details on the tools and resources in place and available to the Town of Six Mile were provided by the Town's HMPC representatives, Town staff, and stakeholders. These capabilities are summarized in Section 6 Capability Assessment.

Many of the Town's regulatory and planning capabilities are covered by the County. Pickens County manages the Town's stormwater and building inspections. The County also provides administrative and technical capacity for Six Mile and oversees the Town's warning system and emergency management and provides local fire department support. As the Town develops a mitigation strategy it should consider administrative capacity and opportunities to collaborate with community organizations and other jurisdictions. Additionally, the Town should continue to closely collaborate with the County on plan development to ensure regulations support the Town's mitigation needs and goals.

Six Mile has limited fiscal capability and has not pursued outside funding for mitigation activities in the past. The Town should work with the County to explore future grant opportunities.

The Town's public outreach is also coordinated with the County. Six Mile has an established website that is easy to navigate. To increase public outreach and access to hazard mitigation information, it is recommended that the Town link and share information from the County's website on the Six Mile website. Residents will be able to access key hazard mitigation information.

### H.3.2 FLOODPLAIN MANAGEMENT

The Town of Six Mile joined the NFIP in May 2008 and had an initial FIRM dated April 16, 2008. The Town of Six Mile does not have any recorded claims data.

## H.4 MITIGATION STRATEGY

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Identify vulnerable populations | 1.1 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County EMS Director | General Fund, Duke Energy | Long-Term | Prevention | Carry Forward |
| 2 | Coordinate with well-established programs or organizations to provide smoke detectors to vulnerable households | 1.2 | Urban Fire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Fire Departments | Red Cross | Long-Term | Emergency Services | Carry Forward |
| 3 | Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses | 1.3 | Public Health Threat | High | High | All jurisdictions | Pickens County Sheriff | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 4 | Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events | 5.2 | Extreme Heat, Winter/Ice Storm | Medium | Medium | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross, Salvation Army | General Fund, Red Cross, Salvation Army, other nonprofit organizations | Immediate | Emergency Services | Carry Forward |
| 5 | Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them | 1.2 | Extreme Heat | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 6 | Develop and maintain a building inventory that contains information regarding location, type of structure, construction material, date of construction and modification, whether the building is consistent with current building codes, and other pertinent information | 2.2 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Long-Term | Prevention | Carry Forward |
| 7 | Establish specific mitigation strategies for extremely vulnerable structures identified during the development of the building inventory | 1.5 | Dam & Levee Failure, Earthquake, Flood, Hurricane, Severe Storm, Tornado, Urban Fire, Wildfire, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Federal Grant Funds | Long-Term | Property Protection | Carry Forward |
| 8 | Develop a standardized, integrated database of utility distribution systems, utility facilities, critical facilities, county facilities, roads, streams/rivers, and other data deemed necessary | 2.2 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County GIS Director | General Fund | Ongoing | Prevention | Carry Forward |
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | 1.5 | Flood, Hurricane, Severe Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward (Marked Completed by Roads & Bridges) |
| 10 | Increase training and capability of response teams and communication/integration with mutual aid assets. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Ongoing | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Educate public about wildfire dangers, and open burning safety, cigarette litter, and campfire safety. | 1.2 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Fire Chiefs, Other Emergency Services | General Fund | Long-Term | Public Information & Outreach | Carry Forward. Exercises are planned for March 2023 and September 2024. |
| 12 | Create buffer zones around structures in wildland-urban interface areas. | 1.5 | Wildfire | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. |
| 13 | Educate public about the importance of weather radios and where to obtain them. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 14 | Consider the feasibility of adopting FireWise throughout the county. | 1.4 | Wildfire | Medium | High | Pickens County, Norris, Six Mile | Pickens County Emergency Services Director | SC Firefighters Association | Immediate | Prevention | Carry Forward |
| 15 | Remove dead trees or trim large branches located near structures. | 1.4 | Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund, Private Funds | Immediate | Prevention | Carry Forward |
| 16 | Coordinate between law enforcement agencies and railroad companies to increase notification and safety where statistics or assessment indicates a dangerous intersection of railroad and roadway. | 3.2 | Hazardous Materials | Medium | Medium | Pickens County, Norris, Six Mile | Pickens County Sheriff, Pickens County EM Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 17 | Institute a standard warning system for dam failure. | 3.2 | Dam Failure | Low | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | 911 Funds | Short-Term | Emergency Services | Carry Forward |
| 18 | Coordinate with the USACE on EAP for dams in Pickens County. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | USACE | Long-Term | Prevention | Carry Forward |
| 19 | Serve as a repository for dam failure plans. | 3.3 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, USACE | General Fund | Long-Term | Prevention | Carry Forward |
| 20 | Provide information to the public regarding procedures to follow in the event of a dam failure. | 1.2 | Dam Failure | Low | High | Pickens County, Norris, Six Mile | Pickens County EM Director, E-911 Coordinator | 911 Funds | Long-Term | Public Information & Outreach | Carry Forward |
| 21 | Educate about and encourage participation in the National Flood Insurance Program. | 1.2 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County Building Codes Department | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 22 | Training and equipment for the Swiftwater Rescue Team. | 3.3 | Dam & Levee Failure, Flood | Medium | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 23 | Create a FEMA Approved Debris Removal Plan to prepare Pickens County Public Works in planning and preparing for natural disasters. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Pickens County Public Works Director | General Fund | Long-Term | Emergency Services | Carry Forward |
| 24 | Training and equipment for the Technical Rescue Team to respond to confined space and structural stability calls. | 3.3 | All Hazards | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | General Fund | Long-Term | Emergency Services | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Educate public about severe weather and safety strategies. | 1.2 | Flood, Hurricane, Severe Storm, Extreme Heat, Tornado, Winter/Ice Storm | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director, Mayor of Norris, Mayor of Six Mile | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 26 | Strengthen the efforts of trained volunteers within the Storm Ready County program | 3.2 | Flood, Hurricane, Severe Storm, Tornado | High | High | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Emergency Services | Carry Forward |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | 1.2 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director, Dam Owners | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 28 | Increase permeable surfaces and retention basins to encourage groundwater recharge | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Stormwater Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress. In Clemson, permeable surface cover has been incorporated into updates of land development. In Easley, Stormwater Department is working on this. |
| 29 | Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | 4.2 | Drought | Medium | Medium | All jurisdictions | Pickens County Planning Department | General Fund | Long-Term | Prevention | Carry Forward. In Progress |
| 30 | Create educational materials on cold weather tips for property owners. | 1.2 | Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director, Upstate SC Chapter of the Red Cross | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | 1.5 | Flood, Hurricane, Severe Storm | High | Low | All jurisdictions | Pickens County Roads and Bridges Department | General Fund | Long-Term | Structural Projects | Carry Forward |
| 32 | Encourage hail resistant building construction for property owners. | 1.5 | Severe Storm | High | Low | All jurisdictions | Pickens County Building Codes Department | General Fund, Private Funds | Immediate | Property Protection | Carry Forward |
| 33 | Continue to enforce and adopt, as necessary, new regulations on fixed facilities. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | General Fund | Long-Term | Prevention | Carry Forward |
| 34 | Continue to enforce and adopt, as necessary, new regulations for transportation agencies. | 1.4 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director, EPCRA | Hazardous Materials Emergency Preparedness Grant | Long-Term | Prevention | Carry Forward |
| 35 | Conduct a public education campaign regarding hazardous material accident safety covering shelter-in-place and evacuation. | 1.2 | Hazardous Materials | Medium | High | All jurisdictions | Pickens County EM Director | Hazardous Materials Emergency Preparedness Grant | Immediate | Public Information & Outreach | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | Establish an awareness campaign on utility shutoff, food safety during power outages, related to utility disruptions. | 1.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director, Fire District Chiefs, Pickens County Emergency Services Director | General Fund | Long-Term | Public Information & Outreach | Carry Forward |
| 37 | Install lightning detection system in outdoor areas and other areas of frequent outdoor recreation and the public high school athletic fields. | 3.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Long-Term | Emergency Services | Carry Forward |
| 38 | Establish an awareness campaign of the dangers of lightning and safety precautions to take. | 1.2 | Severe Storm | High | High | All jurisdictions | Pickens County EM Director | Operating Budget | Immediate | Public Information & Outreach | Carry Forward |
| 39 | Develop an education and outreach program to teach students about radiological hazards and safety measures. | 1.2 | Radiological Emergency | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 40 | Conduct a public education campaign for the public within the 50-mile buffer zone around the Oconee Nuclear Station to inform the public of the radiological hazards, what steps might be needed in the event of an emergency and where to obtain the latest information during an emergency. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director | Duke Energy | Long-Term | Public Information & Outreach | Carry Forward |
| 41 | Ensure electric and other utility lines are maintained, including the removal of dead trees and overhanging branches. | 1.4 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | High | All jurisdictions | Pickens County Roads and Bridges Department, SCDOT | General Fund | Immediate | Property Protection | Carry Forward |
| 42 | Conduct an educational campaign about the dangers of tornados and safety tips. | 1.2 | Tornado | Medium | High | All jurisdictions | Pickens County EM Director, Superintendent of Pickens County School District | General Fund | Immediate | Public Information & Outreach | Carry Forward |
| 43 | Establish a routine inspection program of urban/suburban fire vulnerable areas and perform routine maintenance to mitigate fire risk (e.g. remove/reduce accumulation of materials that could cause/contribute to urban/suburban fire, maintain access for firetrucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Urban Fire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 44 | Establish a routine inspection program of wildfire vulnerable areas and perform routine maintenance to mitigate wildfire (e.g. remove/reduce accumulation of materials that could cause/contribute to wildfire, maintain access for fire trucks to high risk areas, maintain/remove abandoned buildings, etc.). | 1.4 | Wildfire | Medium | Medium | All jurisdictions | Fire District Chiefs | Operating Budget | Long-Term | Prevention | Carry Forward |
| 46 | Partner with Clemson University to create experiential or service-learning opportunities to meet identified needs within the community. | 5.1 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director, Clemson University EM Director | General Fund | Long-Term | Prevention | Carry Forward |

| Action ID # | Description | Goal & Objective Addressed | Hazard(s) Addressed | Priority | Feasibility | Jurisdictions | Lead Agency/ Department | Potential Funding Sources | Timeframe | Mitigation Category | 2023 Implementation Status |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | Partner with community groups (Rotary, CERT, Red Cross, etc.) to meet identified needs within the community. | 5.2 | All Hazards | High | Medium | Pickens County, Norris, Six Mile | Pickens County EM Director | Local Emergency Management Performance Grant | Long-Term | Prevention | Carry Forward |
| 48 | Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC. | 3.3 | Dam & Levee Failure | Low | High | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 49 | Establish close working relationship with utility providers to prioritize reestablishing power to critical infrastructure and vulnerable populations. | 3.2 | Disruption of Utilities, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Long-Term | Prevention | Carry Forward |
| 50 | Establish a close working relationship with Oconee Nuclear Station to review safety and hazard information which the Nuclear Station distributes within the 10-mile buffer zone, to ensure consistent messages. | 1.2 | Radiological Emergency | Medium | Medium | All jurisdictions | Pickens County EM Director, Duke Energy | Duke Energy | Long-Term | Prevention | Carry Forward |
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | 3.1 | All Hazards | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | 1.5 | Flood | High | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Long-Term | Property Protection | New |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | 3.1 | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | Medium | High | All jurisdictions | Pickens County EM Director | Local Funds, State & Federal Grant Funds | Short-Term | Property Protection | New |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | 4.3 | Flood, Drought | High | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Natural Resource Protection | New |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | 4.2 | Flood, Drought | Medium | Low | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Natural Resource Protection | New |
| 68 | Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | 1.5 | Severe Storm | High | Medium | All jurisdictions | Pickens County EM Director, Pickens County Planning, City Planning Departments | General Fund | Short-Term | Prevention, Property Protection | New |
| 69 | Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | 4.1 | Wildfire | Medium | Medium | All jurisdictions | Pickens County EM Director | General Fund | Short-Term | Prevention, Property Protection | New |

# APPENDIX A PLAN ADOPTION

Placeholder

# APPENDIX B LOCAL MITIGATION PLAN REVIEW TOOL

## Cover Page

The Local Mitigation Plan Review Tool (PRT) demonstrates how the local mitigation plan meets the regulation in 44 CFR § 201.6 and offers states and FEMA Mitigation Planners an opportunity to provide feedback to the local governments, including special districts.

| Plan Information | |
|---|---|
| **Jurisdiction(s)** | Pickens County, Town of Central, City of Clemson, City of Easley, City of Liberty, Town of Norris, City of Pickens, Town of Six Mile |
| **Title of Plan** | Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan |
| **New Plan or Update** | Update |
| **Single- or Multi-Jurisdiction** | Multi-jurisdiction |
| **Date of Plan** | 4/7/2023 |
| **Local Point of Contact** | |
| **Title** | Denise Kwiatek, Director |
| **Agency** | Emergency Management |
| **Address** | 222 McDaniel Avenue, B-17, Pickens, SC 29671 |
| **Phone Number** | 864-898-5362 |
| **Email** | dkwiatek@co.pickens.sc.us |

| Additional Point of Contact | |
|---|---|
| **Title** | Abby Moore |
| **Agency** | WSP |
| **Address** | 4021 Stirrup Creek Drive, Suite 100, Durham, NC 27703 |
| **Phone Number** | 919-809-5409 |
| **Email** | abigail.moore@wsp.com |

| Review Information | |
|---|---|
| **State Review** | |
| **State Reviewer(s) and Title** | Click or tap here to enter text. |
| **State Review Date** | Click or tap to enter a date. |
| **FEMA Review** | |
| **FEMA Reviewer(s) and Title** | Click or tap here to enter text. |
| **Date Received in FEMA Region** | Click or tap to enter a date. |
| **Plan Not Approved** | Click or tap to enter a date. |
| **Plan Approvable Pending Adoption** | Click or tap to enter a date. |
| **Plan Approved** | Click or tap to enter a date. |

# Plan Review Checklist

## Element A: Planning Process

| Element A Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))** | | |
| A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved? | Section 2, p.10-19 | Choose an item. |
| A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process? | Section 1.3, p.4; Section 2.3, p.14-17 | Choose an item. |
| **A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))** | | |
| A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity? | Section 2.3, p.15; Section 2.5, p.19; Appendix C, p.C.38-C.41 | Choose an item. |
| **A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))** | | |
| A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan? | Section 2.4, p.17-18; Appendix C, p.C.22-C.37 | Choose an item. |
| **A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))** | | |
| A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document? | Section 2.2.1, p.12-13 | Choose an item. |
| **ELEMENT A REQUIRED REVISIONS** | | |
| **Required Revision:** Click or tap here to enter text. | | |

## Element B: Risk Assessment

| Element B Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))** | | |
| B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area? | Section 4, p.50-56 | Choose an item. |
| B1-b. Does the plan include information on the location of each identified hazard? | Sections 5.4-5.19, "Location" subheadings, p.70-245 | Choose an item. |
| B1-c. Does the plan describe the extent for each identified hazard? | Sections 5.4-5.19, "Extent" subheadings, p.70-245 | Choose an item. |
| B1-d. Does the plan include the history of previous hazard events for each identified hazard? | Sections 5.4-5.19, "Historical Occurrences" subheadings, p.70-245 | Choose an item. |
| B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature and sea levels), on the type, location and range of anticipated intensities of identified hazards? | Sections 5.4-5.19, "Probability of Future Occurrence" subheadings, p.70-245 | Choose an item. |
| B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area? | Sections 5.4-5.19, "Hazard Summary by Jurisdiction" subheadings, p.70-245; Annexes, p.285-465 | Choose an item. |
| **B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))** | | |
| B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards? | Section 5.3, p.64-69; Sections 5.4-5.19, "Vulnerability Assessment" subheadings, p.70-245; Annexes, p.285-465 | Choose an item. |

| Element B Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction? | Annexes, p.285-465 | Choose an item. |
| B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods? | Section 5.8, p.141 | Choose an item. |
| **ELEMENT B REQUIRED REVISIONS** | | |
| **Required Revision:** Click or tap here to enter text. | | |

## Element C: Mitigation Strategy

| Element C Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))** | | |
| C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations? | Section 6, p.248-261; Annexes, p.285-465 | Choose an item. |
| C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation? | Section 6, p.248-261; Annexes, p.285-465 | Choose an item. |
| **C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))** | | |
| C2-a. Does the plan contain a narrative description or a table/list of their participation activities? | Section 6.2.1.2, p.254-256 | Choose an item. |
| **C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))** | | |
| C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan? | Section 7.2, p.262-264 | Choose an item. |

| Element C Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement 44 CFR § 201.6(c)(3)(ii))** | | |
| C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment? | Section 7.3, p.265-278; Appendix D, p.D.1-D.18 | Choose an item. |
| C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment? | Section 7.5, p.271-278 | Choose an item. |
| **C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))** | | |
| C5-a. Does the plan describe the criteria used for prioritizing actions? | Section 7.3.1, p.265-266 | Choose an item. |
| C5-b. Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame? | Section 7.3.1, p.265-266 | Choose an item. |
| **ELEMENT C REQUIRED REVISIONS** | | |
| **Required Revision:**<br>Click or tap here to enter text. | | |

## Element D: Plan Maintenance

| Element D Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))** | | |
| D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved? | Section 8.4, p.284 | Choose an item. |

| Element D Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **D2. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))** | | |
| D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process? | Section 8.2, p.279-280; Section 8.3, p.282-284 | Choose an item. |
| D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible. | Section 8.3, p.282-284 | Choose an item. |
| D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process? | Section 8.3, p.283-284 | Choose an item. |
| **D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))** | | |
| D3-a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms? | Section 8.2, p.280-282 | Choose an item. |
| D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated? | Section 8.2, p.280-282 | Choose an item. |
| D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms? | Section 8.2, p.280-282 | Choose an item. |
| **ELEMENT D REQUIRED REVISIONS** | | |
| **Required Revision:**<br>Click or tap here to enter text. | | |

## Element E: Plan Update

| Element E Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))** | | |
| E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved? | Sections 5.4-5.19, "Changes in Development" subheadings, p.70-245; Annexes, p.285-465 | Choose an item. |
| **E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))** | | |
| E2-a. Does the plan describe how it was revised due to changes in community priorities? | Section 1.6, p.6-8; Section 7, p.262-278 | Choose an item. |
| E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan? | Section 7.4, p.266-270 | Choose an item. |
| E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms? | Section 8.2, p.280-282 | Choose an item. |
| **ELEMENT E REQUIRED REVISIONS** | | |
| **Required Revision:** Click or tap here to enter text. | | |

## Element F: Plan Adoption

| Element F Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))** | | |
| F1-a. Does the participant include documentation of adoption? | Appendix A | Choose an item. |
| **F2. For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))** | | |
| F2-a. Did each participant adopt the plan and provide documentation of that adoption? | Appendix A | Choose an item. |

| Element F Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **ELEMENT F REQUIRED REVISIONS** | | |
| **Required Revision:** Click or tap here to enter text. | | |

## Element G: High Hazard Potential Dams (Optional)

| HHPD Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **HHPD1. Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?** | | |
| HHPD1-a. Does the plan describe how the local government worked with local dam owners and/or the state dam safety agency? | Section 5.4, p. 70-89 | Choose an item. |
| HHPD1-b. Does the plan incorporate information shared by the state and/or local dam owners? | Section 5.4, p. 70-89 | Choose an item. |
| **HHPD2. Did the plan address HHPDs in the risk assessment?** | | |
| HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs? | Section 5.4, p.78-81, 84-89 | Choose an item. |
| HHPD2-b. Does the plan document the limitations and describe how to address deficiencies? | Section 5.4, p. 79, 84-85 | Choose an item. |
| **HHPD3. Did the plan include mitigation goals to reduce long-term vulnerabilities from HHPDs?** | | |
| HHPD3-a. Does the plan address how to reduce vulnerabilities to and from HHPDs as part of its own goals or with other long-term strategies? | Section 5.4, p.88-89 "Key Issues"; Section 7.5, p.272-287; Actions 6-7, 17-22, 27, 48, 58, 60 | Choose an item. |
| HHPD3-b. Does the plan link proposed actions to reducing long-term vulnerabilities that are consistent with its goals? | Section 7.5, p.272-287 "Goal & Objective Addressed"; Section 7.2, p.264 | Choose an item. |

| HHPD Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **HHPD4-a. Did the plan include actions that address HHPDs and prioritize mitigation actions to reduce vulnerabilities from HHPDs?** | | |
| HHPD4-a. Does the plan describe specific actions to address HHPDs? | Section 7.5, p.272-278; Actions 6-7, 17-22, 27, 48, 58, 60 | Choose an item. |
| HHPD4-b. Does the plan describe the criteria used to prioritize actions related to HHPDs? | Section 7.3, p.265-266 | Choose an item. |
| HHPD4-c. Does the plan identify the position, office, department or agency responsible for implementing and administering the action to mitigate hazards to or from HHPDs? | Section 7.5, p.272-278; Actions 6-7, 17-22, 27, 48, 58, 60 | Choose an item. |
| **HHPD Required Revisions** | | |
| **Required Revision:** Click or tap here to enter text. | | |

## Element H: Additional State Requirements (Optional)

| Element H Requirements | Location in Plan (section and/or page number) | Met / Not Met |
|---|---|---|
| **This space is for the State to include additional requirements** | | |
| Click or tap here to enter text. | Click or tap here to enter text. | Choose an item. |

# APPENDIX C PLANNING PROCESS DOCUMENTATION

## C.1 PLANNING STEP 1: ORGANIZE RESOURCES

### HMPC MEETING DATES, TOPICS, AND LOCATIONS

| Meeting Title | Meeting Topic | Meeting Date | Meeting Location |
|---|---|---|---|
| HMPC Mtg. #1 – Project Kickoff | 1) Introduction to DMA and CRS requirements and the planning process<br>2) Trends in disasters and justification for planning<br>3) Review of HMPC responsibilities and the project schedule.<br>4) Preliminary hazard identification | October 3, 2022 1:00 p.m. | Pickens County EOC, 255 McDaniel Ave B-17, Pickens, SC |
| HMPC Mtg. #2 | 1) Review draft Hazard Identification & Risk Assessment (HIRA)<br>2) Discuss asset inventory, risk, and vulnerability | January 5, 2023 11:00 a.m. | Microsoft Teams Meeting |
| HMPC Mtg. #3 | 1) Discuss goals & objectives<br>2) Review mitigation action plan requirements<br>3) Discuss local capability<br>4) Discuss new mitigation action alternatives | February 16, 2023 1:00 p.m. | Microsoft Teams Meeting |
| HMPC Mtg. #4 | 1) Review the draft Hazard Mitigation Plan<br>2) Solicit comments and feedback | March 21, 2023 3:00 p.m. | Pickens County EOC, 255 McDaniel Ave B-17, Pickens, SC |

## *HMPC MEETING 1 MINUTES AND ATTENDANCE*

**Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update**
Hazard Mitigation Planning Committee Meeting #1
Monday, October 3rd, 2022, 1:00 p.m.
Pickens County Emergency Operations Center, 222 McDaniel Avenue B-17, Pickens, SC 29671

David Stroud from WSP, the County's consultant, facilitated the meeting according to the following agenda:

- Trends in Disasters
  - Why Plan?
- Project Overview
- Disaster Mitigation Act (DMA) Planning Requirements
- Community Rating System (CRS) Requirements
  - CRS Program Overview
- Planning Process
  - Community Coordination
  - Public Outreach
  - Risk Assessment Update
- Project Schedule
- Next Steps

There were nineteen people in attendance, members of the HMPC:

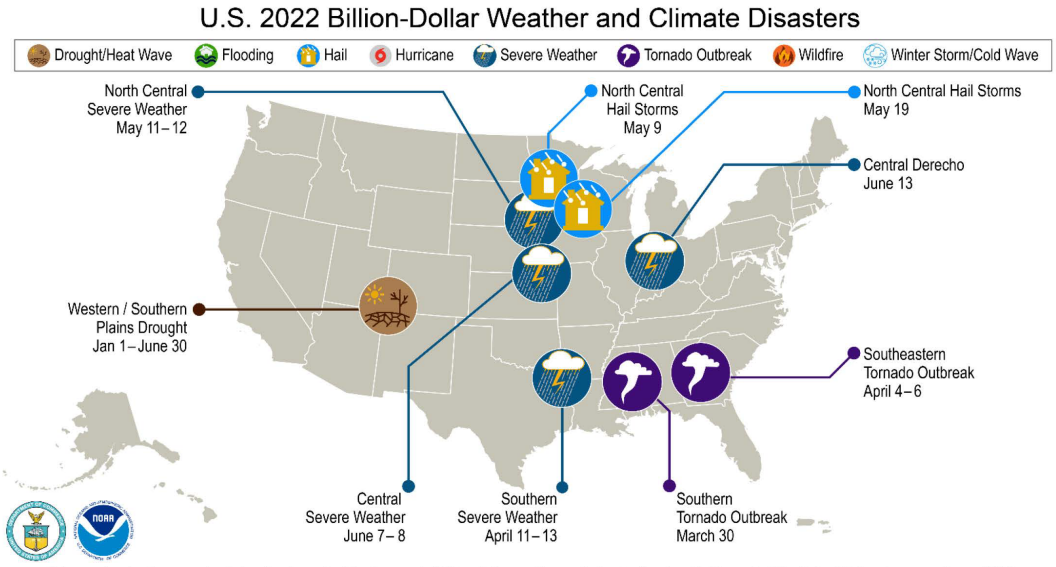
- Denise Kwiatek – Pickens County EM
- Alli Gantte, City of Clemson
- Isiah Reynolds, City of Central Fire
- Matthew Littleton, City of Easley
- John R. Ross, Greenville Water
- Shaun Brand, Prisma Health
- Mike Dunaway, Pickens County EMS
- Billy Gibson, Pickens County EMS
- Russell Holliday, Ortec Inc.
- Julie Capadali, United Way
- Karen Culley, United Way
- Chris Elrod, City of Pickens Fire
- Cindy Deckard, Pickens County Planning
- Charles Wright, New Spring Church
- Lance Estep, Appalachian Council of Governments
- Allison Fowler, Pickens County, Community Development/Tourism
- Sarah Custer, Clemson University, Emergency Manager
- Andrew Rzodkiewicz, Clemson University Emergency Management
- Matt Hennon, 5-point Church

The Pickens County Emergency Manger, Denise Kwiatek provided some safety information to start the meeting including identifying the fire exits from the EOC along with making sure all chairs and bags were pushed under the table to avoid trip hazards.

David Stroud with WSP began the presentation with why we plan in the first place. David discussed that Disaster Mitigation Act of 2000 which is part of federal legislation through the Code of Federal Regulations 44 CFR 201.6 and that an updated plan is required to receive FEMA pre- and post-disaster mitigation funding through the Hazard Mitigation Assistance funding programs. David went

1 Pickens County, SC HMP Update | HMPC Meeting 1

on to review some trends in disasters including that we now have more people in harm's way and greater exposure to risk (people, property and critical infrastructure). Below is a graphic showing the nine billion-dollar disaster and climate events so far in 2022. In 2021 there were eighteen-billion-dollar disaster and climate events in the US.




*This map denotes the approximate location for each of the **9 separate billion-dollar weather and climate disasters that impacted the United States January – June of 2022.***

Additional information was provided on the costliest disasters in both the US since 1980 and in South Carolina. Hurricane IRMA in 2017 resulted in approximately $57.5 billion in damage.

David also indicated why Hazard Mitigation should be a priority for Pickens County because the cost or response and recovery are increasing, many of the events are predictable and repetitive, and loss reductions activities work.

The next section of the presentation dealt with the project overview including looking at the four-phases of the Disaster Mitigation Act (DMA). The discussion included what is DMA and why is DMA important:

- Outlines the planning requirements that local governments must follow
- Provides continued eligibility for mitigation funds, pre- and post-disaster funding
- Guides mitigation activities in a coordinated & economical manner
- Integrates into other existing planning mechanisms
- Directs future development and informs wise planning and building
- Reduces losses and makes communities more disaster resistant

David explained that since Pickens County is enrolled in FEMA's Community Rating System (CRS) program, we would be trying to maximize CRS credit points under CRS Activity 510 Floodplain Management Planning. By doing so it could allow Pickens County to lower their CRS rating from a classification 9 to a classification 8 and a 10% reduction in flood insurance premiums for those properties in the Special Flood Hazard Area (SFHA).

The CRS program is a point-based program where credits are based on implantation of projects that go above and beyond the minimum requirements of the National Flood Insurance Program (NFIP). For every 500 points a community earns on its application translates into a five percent reduction in flood insurance premiums. The planning process will include a blended approach by

combing the four phases with DMA along with the more robust ten planning steps of the CRS. The graphic below shows the four-phases of DMA and the ten CRS planning steps dovetail into those four-phases.

| DMA Process | CRS Process |
|---|---|
| **Phase I – Organize Resources** | |
| §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 |

David went on to talk more in depth about the DMA and CRS planning processes including:

Phase 1: Organizing Resources which included the work that Pickens County Emergency Management did in establishing the Hazard Mitigation Planning Committee along with the need to reach out to additional stakeholders in a plan for public involvement.

Phase 2: Assessing Risks where the questions asked: Hazard Identification-Can it happen here? Vulnerability Assessment-What will be affected or impacted? And with a Capability Assessment-How can we implement mitigation?

The HMPC committee reviewed the natural and man-made or human-caused hazards from the 2018 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) against the 2018 South Carolina State Hazard Mitigation Plan to determine the new list of hazards for the 2023 MJHMP. There was a lot of discussion surrounding the decisions on the various hazards and a specific discussion around cyber security as a hospital and local community's data were recently held hostage by a cyber-attack. Temperature Extremes were included in both Winter/Ice Storm and Public Health. The final list of both nature and man-made/human-caused hazards: Dam and Levee Failure, Drought, Earthquake, Flooding, Hurricane/Tropical Storm, Severe Storm, Tornado/Windstorm, Wildfire, Winter/Ice Storm, Hazardous Materials, Public Health Threat, Radiological, Disruption of Utility Systems, Urban Fire and Cyber Security.

David provided the FEMA Lifelines and indicated that the critical facilities and infrastructure would be organized around these Lifelines. More data would be necessary for some of the lifelines such as transportation, communication, and historic resources. Cindy Deckard asked what kind of information would be needed for Historical Resources. David mentioned that name and address would most likely be all that was needed. Below is a graphic of the FEMA lifelines.




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The discussion of the DMA and CRS process continued with Phase 3 which includes reviewing the previous goals and objectives and updating them if necessary for this current update, review a comprehensive list of mitigation project alternatives to determine that the appropriate projects are selected for implementation, and drafting and action plan with both ongoing mitigation projects along with new selected projects.

Finally Phase 4 requires each jurisdiction to adopt the plan with a resolution and the requirement to meet at least annually to review the plan; however, it is encouraged to meet more often via a conference call (such as quarterly) as having the plan in front of the HMPC more often hopefully results in implemented projects and there is more available credit in the CRS program.

The next discussion focused on the project schedule and milestones. It is anticipated that the Hazard Identification and Risk Assessment Section of the plan will be finished in November and the next HMPC meeting would occur then. The 3rd HMPC mitigation strategy meeting would occur in January and the fourth and final HMPC meeting on the final draft plan would be in February.

David explained the public outreach strategy and that there would be a website developed which would be a one-stop shop for all information on hazard mitigation planning and this plan update. Each jurisdiction will be able to post this website link (shown below) on their website to get broader public support though the planning process. There will also be a link on the website and QR code for a public survey to find out more information on the hazards. Below is the website link which should be available by Friday, October 7th.

www.PickensCountyHMP.com

David explained that WSP would be setting up Community Kick off Meetings to discuss with each municipality their specific needs, capability, and status of existing mitigation projects along with ideas for new mitigation projects. WSP would like to have all of these meetings completed by the end of October.

As far as next steps, the HMPC members should begin looking at the existing mitigation projects and determine the status of each project as well as help with public engagement and getting the word out on both the HMP website and the public survey.

The meeting ended at 1:45 PM

Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update

Hazard Mitigation Planning Committee (HMPC) Meeting #1 – October 3, 2022, 1pm

| Name | Agency/Department/Organization | Email |
|---|---|---|
| DAVID STROUD | WSP | david.Stroud@WSP.com |
| Denise Kwiatek | PCEM | dkwiatek@co.Pickens.sc.us |
| Alli Gantte | City of Clemson | agantte@cityofclemson.org |
| Isaiah Reynolds | Central | IReynolds@co.pickens.sc.us |
| John R. Ross | Greenville Water | jross@greenvillewater.com |
| Matthew Littleton | City of Easley | mlittleton@easleyforward.org |
| Shaun Brandt | Prisma Health | shaun.brandt@prismahealth.org |
| Mike Dunaway | EMS | Mdunaway@co.pickens.sc.us |
| Billy Gibson | PCES | billyg@co.pickens.sc.us |
| Russell Holliday | Ortec Inc | RHolliday@Ortecinc.com |
| Julie Capaldi | United Way | jcapaldi@uwpickens.org |
| Karen Culley | United Way | Kculley@uwpickens.org |
| Chris Elrod | Pickens City | chriselrod@pickenscity.com |
| Cindy Deckard | Pickens County Planning | cdeckard@co.pickens.sc.us |

| Name | Agency/Department/Organization | Email |
|---|---|---|
| CHARLES WRIGHT | NEWSPRING CHURCH | CHARLES.WRIGHT@NEWSPRING.CC |
| LANCE ESTEP | ACOG | LANCE@SCACOG.ORG |
| Allison Fowler | Pickens County | afowler@co.pickens.sc.us |
| Sarah Custer | Clemson University | Sarahme@clemson.edu |
| Andrea Szabkiewicz | Clemson University | Aszabki@clemson.edu |
| MATT HELLMAN | 5 POINT CHURCH | MATT@5POINTCHURCH.COM |
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## HMPC MEETING 2 MINUTES AND ATTENDANCE

**Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update**
Hazard Mitigation Planning Committee Meeting #2
Thursday, January 5th, 2023, 11:00 a.m.
Microsoft Teams

David Stroud, Abby Moore, and Ranger Ruffins from WSP, the County's consultant, facilitated the meeting according to the following agenda:

- Where we are in the planning process
  - Step 4 and 5
- HIRA process & organization in the plan
- Hazard Identification
  - Major Disaster Declarations & past events
  - Hazards from the State and prior County plans
  - Asset Inventory
  - Hazard profiles: Risk & Vulnerability Assessment
- Next Steps

In addition to the consultant team, there were twelve people in attendance:

- Denise Kwiatek – Pickens County EM
- Alli Gantte, City of Clemson
- John R. Ross, Greenville Water
- Shaun Brand, Prisma Health
- Russell Holliday, Ortec Inc.
- Karen Culley, United Way
- Allison Fowler, Pickens County, Community Development/Tourism
- Sarah Custer, Clemson University, Emergency Manager
- Morgan Curry, AnMed Health
- Melise Ellison, Red Cross
- Melanie Ruhlman, Save our Saluda
- Michael Calvert, City of Liberty

### Where We Are in the Planning Process

David updated the HMPC on where WSP is in the 10-Step Planning Process. The planning process is currently at Steps 4 and 5 (Assess the Hazard and Assess the Problem). These steps comprise the Hazard Identification and Risk Assessment (HIRA). Abby noted that there are three key factors that are assessed to determine risk and a hazards potential impact – the hazard itself, vulnerability to a given hazard, and exposure. Once Steps 4 and 5 are complete, the information gathered in this process will factor into the remaining steps.




### Hazard Identification

Hazards were identified for initial review based on the list of hazards included in the 2018 Pickens County Plan, the 2018 South Carolina State Hazard Mitigation plan, major disaster declarations for the county, and HMPC input from the previous meeting. The full list of hazards profiled is as follows:

- Dam/Levee Failure
- Drought
- Wildfire
- Winter/Ice Storm

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- Earthquake
- Extreme Heat
- Flood
- Hurricane & Tropical Storm
- Severe Storm (Thunderstorm Wind, Hail & Lightning)
- Tornado
- Cyber Security Threat
- Disruption of Utility Systems
- Hazardous Materials
- Public Health Threat
- Radiological Incident
- Urban Fire

**Asset Inventory**

The asset inventory details what exists within the County that may be impacted by the various hazards profiled. Assets include buildings and critical facilities at risk in the planning area. 46,443 buildings have been identified. Critical facilities have been categorized by FEMA lifelines – 195 facilities and infrastructure points have been identified.

Abby asked HMPC members to share any final critical facilities that have not already been shared with the WSP team so they can be added to the asset inventory.

**Hazard Profiles**

The Hazard Profiles, presented by Abby and Ranger, summarized the results of the risk and vulnerability analyses of each of the hazards listed above. Abby reviewed the Priority Risk Index (PRI) methodology which rates each hazard on probability, impact, spatial extent, warning time, and duration. Each category is rated on a scale of 1-4 which provides a weighted sum prioritization that allows hazards to be compared like-for-like and rated high, moderate, or low priority. The hazard profiles were created using qualitative and quantitative data gathered from national, state, and local sources. Where applicable, WSP used FEMA's Hazus program to approximate the potential risk/loss Pickens County might face in the event of the hazards.

During the hazard identification review, Melanie explained that areas along the south Saluda River have been highly eroded and may cause significant challenges for the County. Melanie will follow up with the consulting team to provide more details on these issues. Erosion is not assessed as a standalone hazard, but additional information from Melanie will be included in the flood hazard section of the plan. Denise thanked Melanie and reminded the committee that any similar concerns should be noted in the plan as certain federal funding is only eligible for projects listed in the HMP's mitigation strategy.

Denise also suggested that the dam and levee failure rating for "probability" be adjusted – the current probability rating is "possible" but should be increased to "likely". Denise explained that most of the dams within the County are old and past dam failure incidents have been notable. Seven dams have been repaired in recent years, but additional maintenance and mitigation is needed. For similar reasons the State has reclassified many dams to high hazard. It was noted that none of the dams are suitable for removal at this time. The consulting team may also adjust the "spatial extent" rating based on inundation mapping. Denise will work with the WSP team to get inundation areas from DHEC. Denise also noted that DHEC is working vigilantly to obtain EAPs from dam owners.

The WSP team asked the HMPC to provide any repetitive loss data or existing repetitive loss mapping that may be available.

No hazards were rated low-risk. Five hazards (drought, flood, cyber security, disruption of utility systems, urban fire) were rated high risk, and the remaining 11 hazards were rated moderate risk. A summary table of the PRI results are below.

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Possible | Critical | Small | More than 24 hrs | Less than 1 week | 2.3 |
| Drought | Highly Likely | Limited | Large | More than 24 hrs | More than 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | Less than 6 hrs | Less than 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | More than 24 hrs | Less than 1 week | 2.4 |
| Flood | Highly Likely | Critical | Moderate | 6 to 12 hours | Less than 1 week | 3.3 |
| Hurricane & Tropical Storm | Likely | Limited | Large | More than 24 hrs | Less than 24 hrs | 2.6 |
| Severe Weather (Thunderstorm, Hail, Lightning) | Highly Likely | Minor | Large | 6 to 12 hrs | Less than 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | Less than 6 hrs | Less than 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | More than 24 hrs | Less than 1 week | 2.7 |
| **Technological & Human-Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | Less than 6 hrs | Less than 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | Less than 6 hrs | More than 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | Less than 6 hrs | Less than 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | More than 24 hrs | More than 1 week | 2.8 |
| Radiological Incident | Unlikely | Critical | Moderate | Less than 6 hrs | More than 1 week | 2.6 |
| Urban Fire | Highly Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 3.0 |

Detail on the hazard profile information reviewed for all hazards can be found in the attached presentation slides.

**Next Steps**

The HIRA draft will be posted for review by the end of next week (1/13). Ranger asked HMPC members to send any questions or comments to Abby - abigail.moore@wsp.com by Friday February 3rd. The HIRA will be available to download from the HMP website: www.PickensCountyHMP.com.

WSP staff will follow up with Melanie about Saluda River erosion information and will follow up with Denise about dam inundation data.

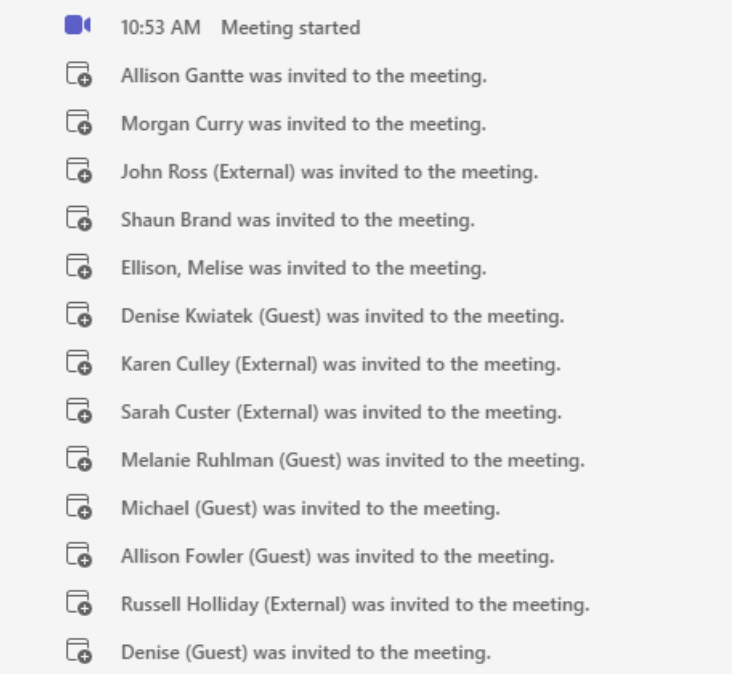
Staff also asked HMPC members to share any final critical facilities that should be added to the asset inventory and share any repetitive flooding data or maps that may be available.

Ranger noted that the HMP survey is still open and asked that another push on social media be made to generate more responses.

Survey link: https://forms.office.com/r/JpX6SzN6Vu

WSP staff will work with the HMPC to schedule the next meeting where we will review the findings from the capability assessment, discuss plan goals and objects, and review potential mitigation actions. As the HMPC reviews the draft HIRA members should begin looking thinking about any new strategies that should be included in the updated mitigation strategy.

The meeting ended at 12:26 PM


10:53 AM Meeting started
Allison Gantte was invited to the meeting.
Morgan Curry was invited to the meeting.
John Ross (External) was invited to the meeting.
Shaun Brand was invited to the meeting.
Ellison, Melise was invited to the meeting.
Denise Kwiatek (Guest) was invited to the meeting.
Karen Culley (External) was invited to the meeting.
Sarah Custer (External) was invited to the meeting.
Melanie Ruhlman (Guest) was invited to the meeting.
Michael (Guest) was invited to the meeting.
Allison Fowler (Guest) was invited to the meeting.
Russell Holliday (External) was invited to the meeting.
Denise (Guest) was invited to the meeting.

## HMPC MEETING 3 MINUTES AND ATTENDANCE

**Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update**
Hazard Mitigation Planning Committee Meeting #3
Thursday, February 16th, 2023, 1:00 p.m.
Microsoft Teams

David Stroud, Abby Moore, and Ranger Ruffins from WSP, the County's consultant, facilitated the meeting according to the following agenda:

- Where we are in the planning process
  - Step 6, 7 and 8
- Hazard Identification and Risk Assessment Recap
  - Updates to Draft HIRA
- Capability Assessment Update
- Mitigation Action Plan Update
  - Existing Actions
  - New Mitigation Ideas
- Next Steps

In addition to the consultant team, there were ten people in attendance:

- Denise Kwiatek – Pickens County EM
- Alli Gantte, City of Clemson
- Julie Capaldi, United Way of Pickens
- Trad Julian, Pickens County
- Billy Gibson, Pickens County
- Todd Steadman, Pickens County
- Shaun Brand, Prisma Health
- Russell Holliday, Ortec Inc.
- Morgan Curry, AnMed Health
- Melanie Ruhlman, Save our Saluda

### Where We Are in the Planning Process

David updated the HMPC on where we are in the 10-Step planning process. The planning process is currently at Steps 6, 7 and 8 – Set Goals, Review Possible Activities, and Draft an Action Plan, respectively. The information from Steps 4 and 5, the hazard identification and risk assessment, will factor into the next phase, so David provided a recap of the findings from these steps.

### Hazard Identification

Hazards were identified for initial review based on the list of hazards included in the 2018 Pickens County Plan, the 2018 South Carolina State Hazard Mitigation plan, major disaster declarations for the county, and HMPC input from the previous meeting. The full list of hazards profiled is as follows:

- Dam/Levee Failure
- Drought
- Earthquake
- Extreme Heat
- Flood
- Hurricane & Tropical Storm
- Severe Storm (Thunderstorm Wind, Hail & Lightning)
- Tornado
- Wildfire
- Winter/Ice Storm
- Cyber Security Threat
- Disruption of Utility Systems
- Hazardous Materials
- Public Health Threat
- Radiological Incident
- Urban Fire

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David reviewed the Priority Risk Index (PRI) methodology which rates each hazard on probability, impact, spatial extent, warning time, and duration and allows the hazards to be compared like-for-like and rated high, moderate, or low priority. A summary table of the PRI results are below.

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Possible | Critical | Small | More than 24 hrs | Less than 1 week | 2.3 |
| Drought | Highly Likely | Limited | Large | More than 24 hrs | More than 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | Less than 6 hrs | Less than 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | More than 24 hrs | Less than 1 week | 2.7 |
| Flood | Highly Likely | Critical | Small | 6 to 12 hours | Less than 1 week | 3.1 |
| Hurricane & Tropical Storm | Likely | Limited | Large | More than 24 hrs | Less than 24 hrs | 2.6 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | Less than 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | Less than 6 hrs | Less than 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | More than 24 hrs | Less than 1 week | 2.7 |
| **Technological & Human-Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | Less than 6 hrs | Less than 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | Less than 6 hrs | More than 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | Less than 6 hrs | Less than 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | More than 24 hrs | More than 1 week | 2.8 |
| Radiological Incident | Unlikely | Critical | Moderate | Less than 6 hrs | More than 1 week | 2.6 |
| Urban Fire | Highly Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 3.0 |

David also reviewed key takeaways from the HIRA process for a few hazards. Common themes for risk reduction included targeted outreach and assistance to vulnerable populations like aging and older adults and establishing protection and redundancy strategies for utilities. The key takeaways can be found at the end of each hazard profile, and many provide useful suggestions for possible mitigation actions. The hazards David reviewed can be found in the PowerPoint presentation (slides 9-11) and the draft HIRA.

### Capability Assessment Update

Abby provided an update on the capability assessment. A lot of information was gathered from the individual community meetings and will be summarized in the community annexes. Some overall strengths for the communities include the adoption of an updated comprehensive and zoning ordinance for each community. Both of which have plan elements that support mitigation efforts. Additionally, the county in particular has a wide range of education and outreach strategies to inform and warn the public about hazards and emergencies. Some capability improvements include establishing more direct mitigation action and policies in comprehensive plans and expanding the public outreach with more general methods like easily accessible information on community websites.

### Mitigation Goals

Abby reviewed the exiting goals and objectives from the previous plan noting that the goals are still relevant and could be carried forward for the plan update. Denise agreed that the existing goals and objective accurately reflect the ongoing efforts and goals of the County and agreed that they should be carried into the plan update.

David asked the HMPC if the objectives under each goal fully encompass all of the strategies and subjects the County wants to focus on. There was some discussion about expanding objectives under certain goals. Suggestions included:

- Goal number 5 could be expanded as more organizations in the community are looking for ways to be proactive about mitigation
- Greater focus on natural resources projection and protecting environmentally sensitive areas particularly for flood and wildfire mitigation
    - Discussed the potential to combine Goal 1 and 4 and ensure the goal includes providing support to vulnerable populations and then add a new goal focused on natural resource protection
- Add an objective under Goal 3 that includes more efficient warning messages to residents and aligns with National Weather Service's efforts to improve messaging
- The GIS team may be able to provide additional relevant objectives – Denise to follow up

The WSP Team will work to include some of this feedback and develop updated goals and objectives. The HMPC will also review the goals and objectives for any additional edits.

The existing goals and objectives from the 2018 plan are listed below.

**Goal 1: Reduce impact of hazards on the most vulnerable populations**

1. Identify vulnerable populations based on factors such as age, class or income level, race and ethnicity, or disability
2. Provide education/equipment to vulnerable populations to increase preparedness and response to hazards

**Goal 2: Future mitigation and response plans will have the ability to include more specific mitigation actions or address more specifically the existing hazards**

1. Hazard analysis will be more comprehensive and precise
2. County data will be readily available for use in hazard mitigation planning or other planning activities

**Goal 3: The community will have the capability to initiate and sustain emergency response operations during and after a hazard event**

1. Critical facilities will be functional during hazards
2. Response functions will be coordinated
3. Emergency managers and responders will have the ability to respond effectively to hazard events

**Goal 4: Reduce the impact of hazards on the general public and community**

1. Educate the general public on personal/household preparedness
2. Perform preventative actions which reduce the impacts of hazard events

**Goal 5: Develop partnerships with organizations, resources, etc. within the community to compensate for limited resources, with the purpose of reducing risk in the community**

1. Programs developed with Clemson University could benefit the community, university, and students, providing valuable "real world" experience
2. Community groups have resources and experience which can benefit the community

**Mitigation Action Plan Update**

Abby provided an overview of the existing mitigation actions. There are 61 actions carried forward from 2018 which include nine "all hazards" actions and one or more actions for each natural hazard. This meets FEMAs regulatory requirements which indicate that the plan must have at least one mitigation action for each hazard, and while "all hazards" actions can count as one project for each hazard, emergency services actions do not count toward this requirement. Abby also explained that the action plan should try to include mitigation action from each FEMA Mitigation Category to ensure a comprehensive and robust mitigation approach. The FEMA categories are as follows:

- Prevention
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services
- Public Education & Awareness

Abby also indicated that the FEMA categories least represented in the list of actions are property protection natural resource protection. The actions included under the prevention category could also be expanded to focus on preventing damage to future development through policy.

The WSP will send out a complete mitigation action plan with status updates for each mitigation action.

New Mitigation Action Ideas

Abby also discussed the FEMA Mitigation Ideas document that can provide ideas for potential new mitigation actions. The guide provides example mitigation actions for 16 natural hazards and actions are categorized into four of the following types: Local Planning & Regulations; Structure & Infrastructure Projects; Natural Systems Protection; and Education & Awareness Programs. Abby also provided the following examples for potential new actions:

Drought

- Encourage drought-tolerant landscaping such as xeriscaping

Extreme Heat

- Increase tree plantings around buildings and public rights-of-way to increase shade

- Encourage the use of cool roofs that reflect sunlight and heat away from a building

Flood

- Implement slope stabilization and vegetation to reduce erosion and associated flood impacts
- Protect critical facilities and infrastructure through elevation, floodproofing, and back up power systems

Severe Storm

- Install surge protection on critical electronic equipment
- Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits
- Bury overhead power lines

Wildfire

- Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems

Additional examples and recommendations are included in the PowerPoint on slide 20.

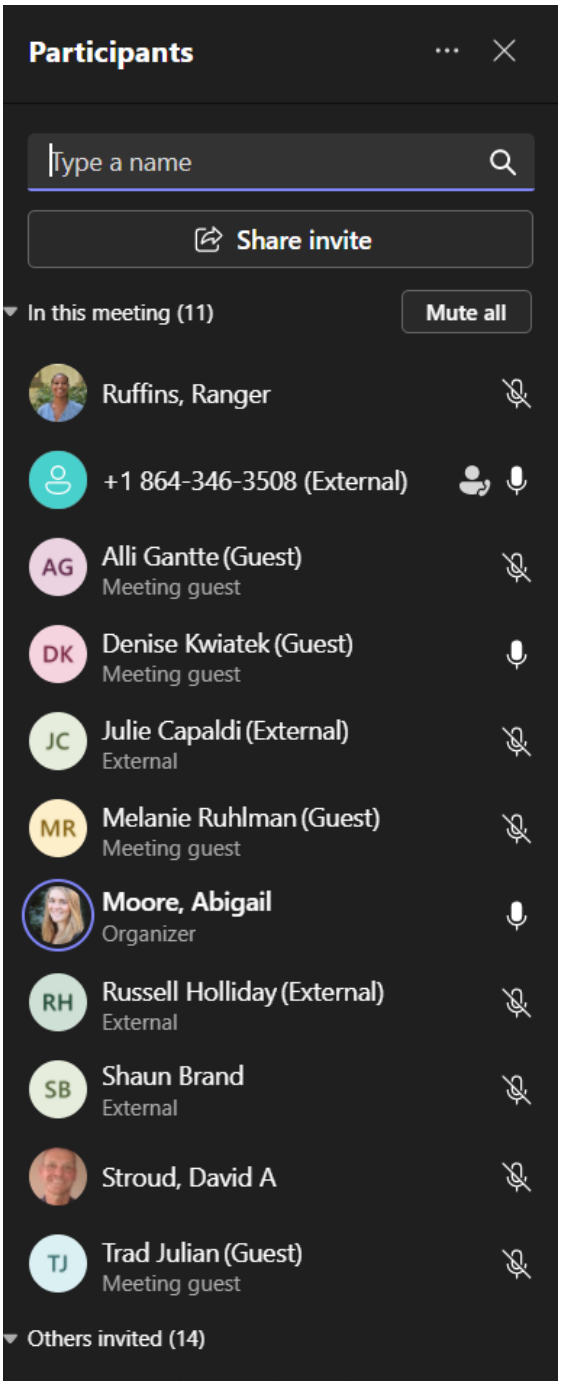
The HMPC discussed flood mitigation. While the County does have restriction on development within the floodplain, the County and several other communities do not implement higher regulatory standards. Abby asked if there were any higher regulatory flood regulations the County may want to consider. David provided some examples which included:

- Elevation of critical facilities located in the 0.2% annual chance floodplain (~1ft) which provide CRS credit.
- Channel and stream setbacks for development.
    - Melanie liked the idea and wondered if the County would consider adding riparian buffers or setbacks to the floodplain ordinance.
- Elevation of structures that have been repetitively flooded or structures located in known flood hazard areas

David also reminded the HMPC that if they have a "wish list" of projects/activities related to mitigation, now is a good time to add these projects to the mitigation action plan. Projects must be included in the HMP to be eligible for future federal funding (HMGP and BRIC) and it is easier to add project now rather than later.

**Next Steps**

- WSP will send an updated list of the current mitigation actions
- The HMPC should review the list of existing actions and information from this meeting and provide any additional actions to include in the mitigation strategy by **Friday March 3rd**
    - Ideas for new actions can be found in the draft HIRA key takeaways for each hazard, the examples provide in this meetings PowerPoint, the FEMA Mitigation Ideas resource guide, and the discussion from this meeting.
- WSP will provide a draft of updated goals and objectives based on the meeting discussion
    - The HMPC should review the plan goals and objectives and provide any comments or edits by **Friday March 3rd**
- WSP team asked the HMPC to promote the public survey to capture any final input to be included in the plan
    - https://forms.office.com/r/JpX6SzN6Vu
- WSP staff will work with the HMPC to schedule the next meeting where we will review the completed draft, discuss ongoing implementation and maintenance, and present the updated plan to the public


Participants
Type a name
Share invite
In this meeting (11)
Mute all
Ruffins, Ranger
+1 864-346-3508 (External)
AG
Alli Gantte (Guest)
Meeting guest
DK
Denise Kwiatek (Guest)
Meeting guest
JC
Julie Capaldi (External)
External
MR
Melanie Ruhlman (Guest)
Meeting guest
Moore, Abigail
Organizer
RH
Russell Holliday (External)
External
SB
Shaun Brand
External
Stroud, David A
TJ
Trad Julian (Guest)
Meeting guest
Others invited (14)

## *HMPC MEETING 4 MINUTES AND ATTENDANCE*

**Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update**
Hazard Mitigation Planning Committee Meeting #4
Tuesday, March 21st, 2023, 3:00 p.m.
Pickens County Emergency Operations Center, 222 McDaniel Avenue, B-17, Pickens, SC,

David Stroud and Abby Moore from WSP, the County's consultant, facilitated the meeting according to the following agenda:

- Where we are in the planning process
  - Steps 8 and 9
- Organization of the Plan
  - Updates to Draft HIRA
- Review of Key Plan Components
  - Planning Process
  - Hazards & Priority Risk Index
  - Goals & Objectives
  - Mitigation Actions
- Plan Implementation & Maintenance
- Next Steps

In addition to the consultant team, there were six people in attendance:

- Denise Kwiatek, Pickens County EM
- Ryan Hansome, Pickens County EM
- Paula Wagler, Pickens County EM
- Karen Culley, United Way
- Russell Holliday, Ortec Inc.
- Sarah Custer, Clemson University EM

**Where We Are in the Planning Process**
David updated the HMPC on where we are in the 10-Step planning process. The planning process is currently at Steps 8 – Draft an Action Plan, and Step 9 – Adopt the Plan.

**Plan Organization**
David reviewed each of the eight sections of the updated plan document. Section 1 Introduction provides an overview of the plan and the requirements met in its preparation. Section 2 Planning Process summarizes the 10 steps of the planning process, who was involved in the HMPC, and how the public and stakeholders were involved. Section 3 Community Profile provides a summary of the current conditions in the planning area. Section 4 Hazard Identification identifies the hazards relevant to Pickens County and Section 5 Hazard Risk & Vulnerability Assessment presents the detailed hazard profiles with risk and vulnerability information, an inventory of exposure and estimates of the potential impact of each hazard. Section 6 Capability Assessment reviews each jurisdiction's tools, resources, staff, and other capabilities to support mitigation project implementation. Section 7 Mitigation Strategy presents the updated goals and objectives, prioritization criteria for the mitigation action review, and the updated mitigation action plan. Section 8 Plan Implementation and Maintenance describes the procedures for monitoring and implementing the plan over the next five years and through the next plan update.

There are also five appendices with additional information on plan adoption, the plan review tool for state and federal review of the planning requirements, planning process documentation, a review of mitigation alternatives, and plan references.

Finally, each jurisdiction has a community annex, with local summary information on community profile, risk and vulnerability, capability, and mitigation strategy.

1 Pickens County, SC HMP Update | HMPC Meeting 4

Denise asked about the process moving forward for approval and adoption. David and Abby explained that the plan will be revised according to any HMPC or public feedback and then submitted to SCEMD for review. Once SCEMD approves the plan they will send it to FEMA for review and final approval. The County and communities can adopt the plan while FEMA reviews it. Denise indicated that in the past, SCEMD has had minimal comments and the County would like to move ahead with adoptions as soon as possible once SCEMD approves the plan and send it to FEMA for review.

**Key Plan Components**

David reviewed key steps in the planning process, including HMPC meetings, community data collection meetings, and public meetings. Public outreach efforts were also reviewed to demonstrate the ways the County and communities sought to encourage public input. David also reviewed the public survey, which unfortunately only had 5 responses. While broad conclusions could not be drawn from this small number of responses, the answers were reviewed to support the hazard identification and risk assessment as well as the mitigation strategy. Opinions on the most important mitigation categories align with what the County is already doing.

Abby reviewed the identified hazards and the Priority Risk Index (PRI) results. A summary table of the PRI results is below.

| Hazard | Probability | Impact | Spatial Extent | Warning Time | Duration | PRI Score |
|---|---|---|---|---|---|---|
| **Natural Hazards** | | | | | | |
| Dam/Levee Failure | Possible | Critical | Small | More than 24 hrs | Less than 1 week | 2.3 |
| Drought | Highly Likely | Limited | Large | More than 24 hrs | More than 1 week | 3.1 |
| Earthquake | Possible | Minor | Moderate | Less than 6 hrs | Less than 6 hrs | 2.0 |
| Extreme Heat | Likely | Minor | Large | More than 24 hrs | Less than 1 week | 2.7 |
| Flood | Highly Likely | Critical | Small | 6 to 12 hours | Less than 1 week | 3.1 |
| Hurricane & Tropical Storm | Likely | Limited | Large | More than 24 hrs | Less than 24 hrs | 2.6 |
| Severe Storm | Highly Likely | Minor | Large | 6 to 12 hrs | Less than 6 hrs | 2.7 |
| Tornado | Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 2.7 |
| Wildfire | Likely | Limited | Moderate | Less than 6 hrs | Less than 1 week | 2.8 |
| Winter/Ice Storm | Likely | Limited | Large | More than 24 hrs | Less than 1 week | 2.7 |
| **Technological & Human-Caused Hazards** | | | | | | |
| Cyber Security Threat | Possible | Critical | Large | Less than 6 hrs | Less than 1 week | 3.0 |
| Disruption of Utility Systems | Possible | Critical | Large | Less than 6 hrs | More than 1 week | 3.1 |
| Hazardous Materials Incident | Likely | Critical | Small | Less than 6 hrs | Less than 24 hrs | 2.8 |
| Public Health Threat | Possible | Critical | Large | More than 24 hrs | More than 1 week | 2.8 |
| Radiological Incident | Unlikely | Critical | Moderate | Less than 6 hrs | More than 1 week | 2.6 |
| Urban Fire | Highly Likely | Critical | Small | Less than 6 hrs | Less than 6 hrs | 3.0 |

**Mitigation Goals**

Abby reviewed the goals and objectives which were revised based on the HMPC's discussion at the third planning meeting and follow up feedback on the draft goals and objectives.

The resulting goals and objectives for the plan update are listed below.

**Goal 1:** Reduce impact of hazards on the public and community, including vulnerable populations.

- Objective 1.1: Identify vulnerable populations based on factors such as age, class or income level, race and ethnicity, or disability.
- Objective 1.2: Provide education/equipment to the general public and vulnerable populations to increase preparedness and response to hazards.
- Objective 1.3: Educate the public on the health risks associated with natural and non-natural hazards.
- Objective 1.4: Perform preventative actions which reduce the impacts of hazard events.
- Objective 1.5: Protect existing and future buildings and infrastructure from the impacts of hazard events.

**Goal 2:** Future mitigation and response plans will have the ability to include more specific mitigation actions or address more specifically the existing hazards.

- Objective 2.1: Hazard analysis will be more comprehensive and precise.
- Objective 2.2: County data will be readily available for use in hazard mitigation planning or other planning activities.

**Goal 3:** The community will have the capability to initiate and sustain emergency response operations during and after a hazard event.

- Objective 3.1: Critical facilities will be functional during hazards.

- Objective 3.2: Response functions will be coordinated, and warnings will follow guidance from the regional National Weather Service office.
- Objective 3.3: Emergency managers and responders will have the ability to respond effectively to hazard events.

**Goal 4:** Protect natural resources that provide hazard risk reduction benefits.

- Objective 4.1: Maintain open space in known high hazard risk areas.
- Objective 4.2: Preserve and improve natural and beneficial floodplain functions and other environmental assets to reduce hazard risk and protect critical water resources.
- Objective 4.3: Provide education for erosion prevention and sediment control throughout the County.

**Goal 5:** Develop partnerships with organizations, resources, etc. within the community to compensate for limited resources, with the purpose of reducing risk in the community.

- Objective 5.1: Programs developed with Clemson University could benefit the community, university, and students, providing valuable "real world" experience.
- Objective 5.2: Community groups have resources and experience which can benefit the community.

**Mitigation Action Plan Update**

Abby reviewed the number of existing mitigation actions by community and FEMA mitigation category. The FEMA mitigation categories are Prevention, Property Protection, Natural Resources Protection, Structural Projects, Emergency Services, and Public Information & Outreach. There are 61 actions carried forward from 2018 which include nine "all hazards" actions and one or more actions for each natural hazard. The action plan meets the FEMA regulatory requirement for at least one mitigation action for each hazard. The categories least represented in the list of actions are property protection and natural resource protection. The actions included under the prevention category could also be expanded to focus on preventing damage to future development through policy.

Abby also presented new mitigation action ideas that were discussed at the previous HMPC meeting to get the committee's final decision on whether or not to include each action. The HMPC decided to add the following new mitigation actions to the action plan:

| Action Description | Hazards Addressed | Jurisdictions |
|---|---|---|
| Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | All Hazards | All jurisdictions |
| Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | Flood | All jurisdictions |
| Retrofit critical facilities to protect against severe weather impacts. | Flood, Hurricane, Severe Storm, Tornado, Winter/Ice Storm | All jurisdictions |
| Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | Flood, Drought | All jurisdictions |
| Implement streambank stabilization and stream restoration along the Saluda River to repair unstable banks and reduce erosion and sedimentation that degrades natural floodplain functions and downstream reservoir capacity. | Flood, Drought | Pickens County |
| Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | Flood, Drought | All jurisdictions |
| Incorporate structural bracing, shutters, laminated glass, hail resistant roof covering, etc. into new buildings and retrofits | Severe Storm | All jurisdictions |
| Create defensible zones around power lines, oil and gas lines, and other critical infrastructure systems | Wildfire | All jurisdictions |

Denise noted a change that should be made in the draft plan regarding the actions that have been deleted. These actions should have the status comment revised because these actions are still a priority for the County but do not need to be included in the action plan to ensure their implementation. The status comment will be revised to the following: "This action is an established ongoing duty that no longer requires a mitigation project to accomplish."

**Next Steps**

The final public meeting will be held at 5pm following the HMPC meeting.

HMPC members are asked to review the plan and provide feedback by April 4th. Feedback will be incorporated into a final draft that will be sent to SCEMD for review.

Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update

Hazard Mitigation Planning Committee (HMPC) Meeting #4 – March 21, 2023, 3pm

| Name | Agency/Department/Organization | Email |
|---|---|---|
| DAVID STROUD | WSP | david.stroud@wsp.com |
| Abby Moore | WSP | abigail.moore@wsp.com |
| Karen Culley | UWPC | Kculley@uwpickens.org |
| Russell Holliday | Ortec Inc | RHolliday@ortecinc.com |
| Sarah Custer | Clemson Univ | Sarahmc@clemson.edu |
| Paula Swagler | PCEM | pauladw@co.pickens.sc.us |
| Ryan Hansome | PCEM | rhansome@co.pickens.sc.us |
| Denise Kwiatek | PCEM | dkwiatek@co.Pickens.sc.us |
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# C.2 PLANNING STEP 2: INVOLVE THE PUBLIC

## PUBLIC MEETING DATES, TOPICS, AND LOCATIONS

| Meeting Title | Meeting Topic | Meeting Date | Meeting Location |
|---|---|---|---|
| Public Meeting #1 | 4) Introduction to DMA and CRS planning process and justification for planning<br>5) Review of preliminary risk assessment information<br>6) Plan website and public survey overview | October 12, 2022 5:00 p.m. | Microsoft Teams |
| Public Meeting #2 | 3) Review Draft Hazard Mitigation Plan<br>4) Solicit comments and feedback | March 21, 2023 5:00 p.m. | Pickens County EOC, 222 McDaniel Ave B-17, Pickens, SC |

## PUBLIC MEETING 1 MINUTES, ATTENDANCE, AND OUTREACH

**Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update**
Hazard Mitigation Plan Public Meeting #1
Wednesday, October 12th, 2022, 5:00 p.m.
Microsoft Teams

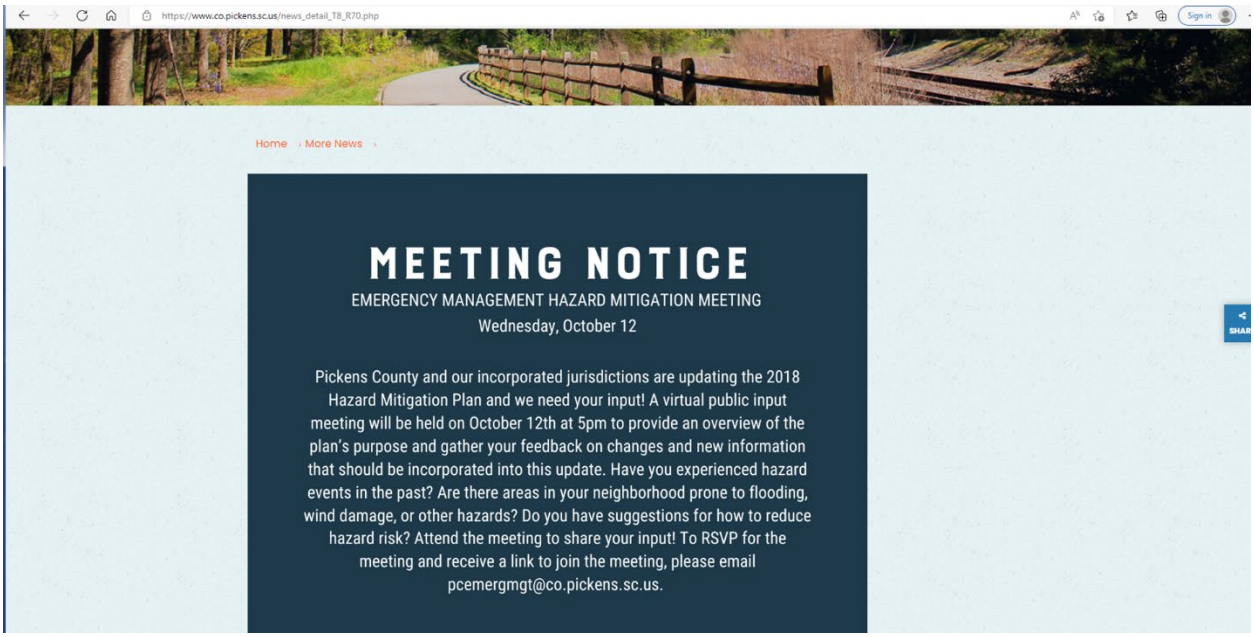
David Stroud from WSP, the County's consultant, facilitated the meeting according to the following agenda:

- Why Plan?
  - Trends in Disasters
- Project Overview
- Disaster Mitigation Act (DMA) Planning Requirements
- Community Rating System (CRS) Requirements
- Planning Process
- Public Outreach
- Questions

There were three people in attendance – the County's consultants, David Stroud and Ranger Ruffins, and one member of the HMPC, Denise Kwiatek. Two additional members of the public reached out and showed interest in joining the meeting but did not end up attending. Meeting materials were shared with the County to distribute to interested community members.

As no one was in attendance the meeting was ended at 5:30pm.

1 Pickens County, SC HMP Update | Public Meeting 1


Home › More News ›
MEETING NOTICE
EMERGENCY MANAGEMENT HAZARD MITIGATION MEETING
Wednesday, October 12
Pickens County and our incorporated jurisdictions are updating the 2018 Hazard Mitigation Plan and we need your input! A virtual public input meeting will be held on October 12th at 5pm to provide an overview of the plan's purpose and gather your feedback on changes and new information that should be incorporated into this update. Have you experienced hazard events in the past? Are there areas in your neighborhood prone to flooding, wind damage, or other hazards? Do you have suggestions for how to reduce hazard risk? Attend the meeting to share your input! To RSVP for the meeting and receive a link to join the meeting, please email pcemergmgt@co.pickens.sc.us.


Pickens County SC
October 7, 2022 ·
Pickens County Emergency Management is updating the 2018 Hazard Mitigation Plan and needs your input! Attend a virtual public input meeting at 5pm on October 12th to help the planning committee understand and mitigate hazard risk. Email pcemergmgt@co.pickens.sc.us to request the link to join the meeting.
7
7 comments 4 shares
Like
Comment
Share


pickenscountysc
Pickens County
MEETING NOTICE
EMERGENCY MANAGEMENT HAZARD MITIGATION MEETING
Wednesday, October 12
Pickens County and our incorporated jurisdictions are updating the 2018 Hazard Mitigation Plan and we need your input! A virtual public input meeting will be held on October 12th at 5pm to provide an overview of the plan's purpose and gather your feedback on changes and new information that should be incorporated into this update. Have you experienced hazard events in the past? Are there areas in your neighborhood prone to flooding, wind damage, or other hazards? Do you have suggestions for how to reduce hazard risk? Attend the meeting to share your input! To RSVP for the meeting and receive a link to join the meeting, please email pcemergmgt@co.pickens.sc.us.

ENVISION CLEMSON

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City News and Events

# Hazard Mitigation Plan Update

Event date: 10/12/2022 5:00 PM Export event

Pickens County and their incorporated jurisdictions are updating the 2018 Hazard Mitigation Plan and needs your input!

A virtual public input meeting will be held on October 12th at 5pm to provide an overview of the plan's purpose and gather your feedback on changes and new information that should be incorporated into this update.

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To RSVP for the meeting and receive a link to join the meeting, please email pcemergmgt@co.pickens.sc.us.


City of Clemson @CityofClemson · Oct 6
Hazard Mitigation Plan Update bit.ly/3RF40DN
PICKENS COUNTY
SOUTH CAROLINA
** EST. 1868 **
1
1


City of Clemson
4d ·
Pickens County is updating the 2018 Hazard Mitigation Plan and needs your input!
Attend a virtual public input meeting at 5pm on October 12th to help the planning committee understand and mitigate hazard risk.
Email pcemergmgt@co.pickens.sc.us for a link to join the meeting.
PICKENS COUNTY
SOUTH CAROLINA
** EST. 1868 **

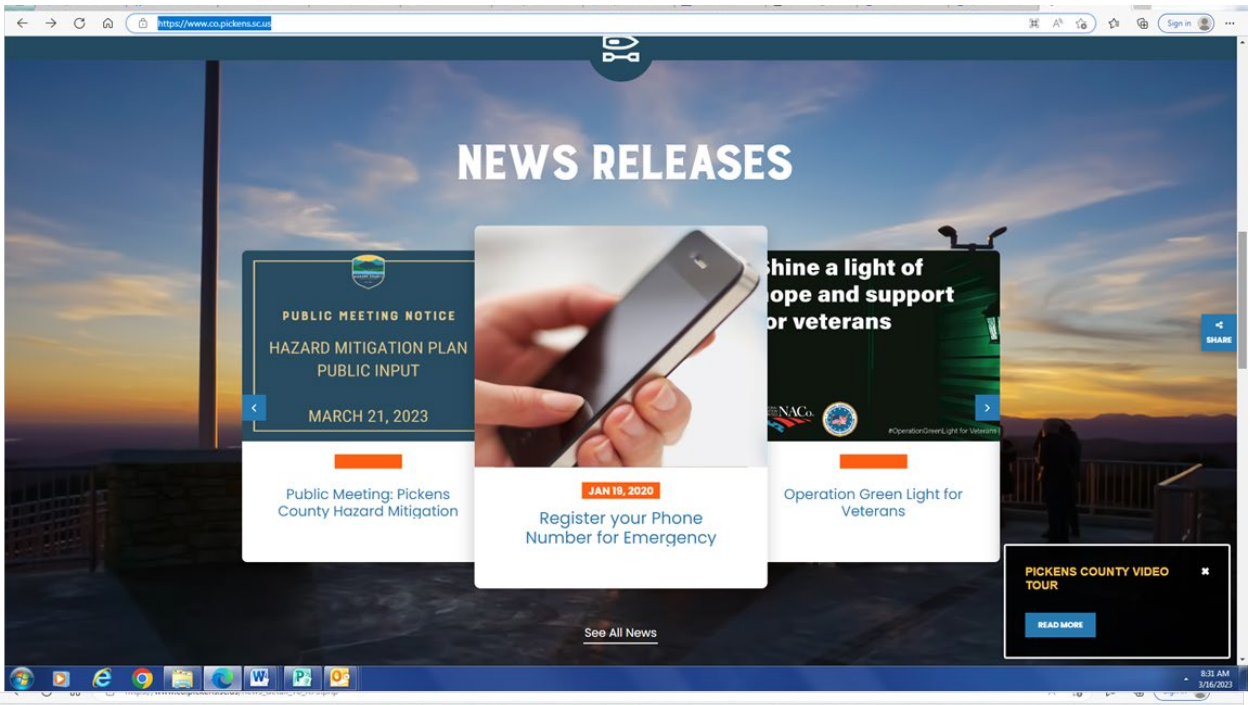
*PUBLIC MEETING 2 MINUTES, ATTENDANCE, AND OUTREACH*

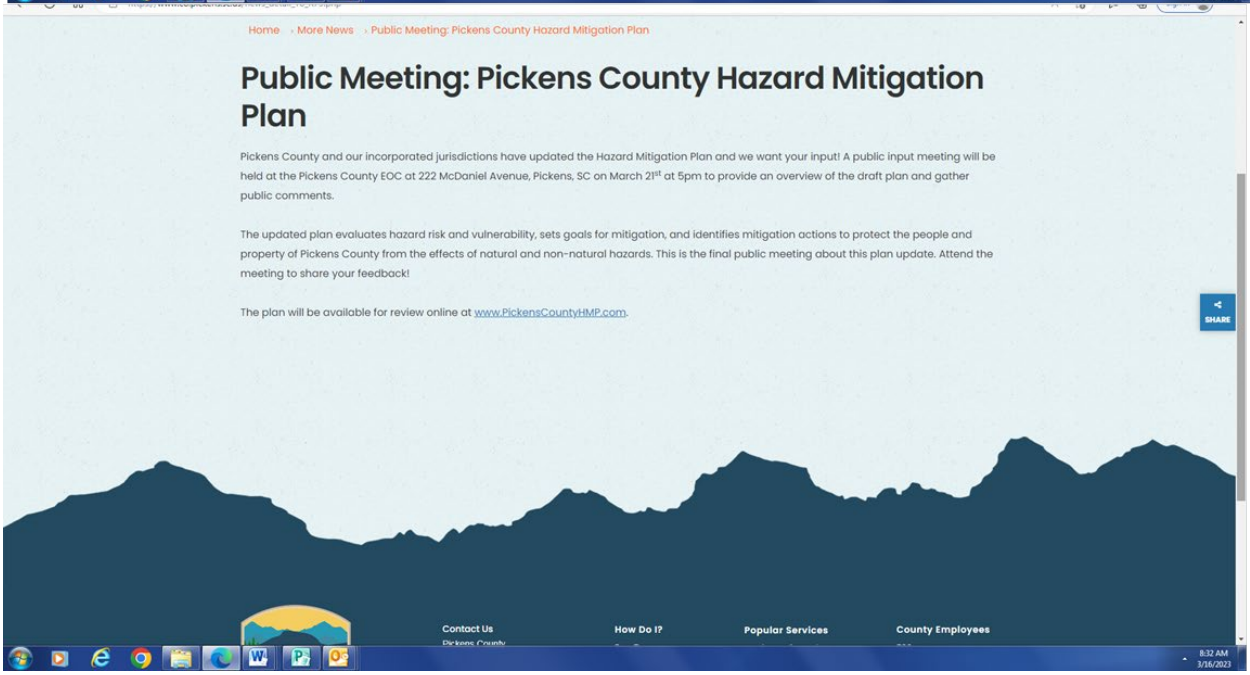
Pickens County, SC Multi-Jurisdictional Hazard Mitigation Plan Update

Public Meeting #2 – March 21, 2023, 5pm

| Name | Agency/Department/Organization | Email |
|---|---|---|
| Abby Moore | WSP | abigail.moore@wsp.com |
| David Strawn | WSP | david.strawn@wsp.com |
| Denise Kwiatek | PCEM | dkwiatek@co.Pickens.sc.us |

1


NEWS RELEASES
PUBLIC MEETING NOTICE
HAZARD MITIGATION PLAN
PUBLIC INPUT
MARCH 21, 2023
Public Meeting: Pickens County Hazard Mitigation
JAN 19, 2020
Register your Phone Number for Emergency
Operation Green Light for Veterans
See All News
PICKENS COUNTY VIDEO TOUR
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Public Meeting: Pickens County Hazard Mitigation Plan
Pickens County and our incorporated jurisdictions have updated the Hazard Mitigation Plan and we want your input! A public input meeting will be held at the Pickens County EOC at 222 McDaniel Avenue, Pickens, SC on March 21st at 5pm to provide an overview of the draft plan and gather public comments.
The updated plan evaluates hazard risk and vulnerability, sets goals for mitigation, and identifies mitigation actions to protect the people and property of Pickens County from the effects of natural and non-natural hazards. This is the final public meeting about this plan update. Attend the meeting to share your feedback!
The plan will be available for review online at www.PickensCountyHMP.com.
SHARE
Contact Us
How Do I?
Popular Services
County Employees

Pickens County SC

We have updated our Hazard Mitigation Plan, and we want your input on the draft plan. Attend the final public meeting at 5pm on Tuesday, March 21st at the Pickens County EOC (222 McDaniel Ave, Pickens).

https://www.co.pickens.sc.us/news_detail_T8_R75.php



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# PICKENS COUNTY PUBLIC MEETING

Pickens County and our incorporated jurisdictions have updated the Hazard Mitigation Plan and we want your input! A public input meeting will be held at the Pickens County EOC at 222 McDaniel Avenue, B-17, Pickens, SC on March 21st at 5pm to provide an overview of the draft plan and gather public comments.

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The plan will be available for review online at www.PickensCountyHMP.com.

TOWN of SIX MILE SOUTH CAROLINA

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## Contact Us

106 South Main Street
Six Mile, SC 29682

**Phone**:
(864) 868-2653

**Email**: rita_martin@sixmilesc.org

**Office Hours**:
Mon-Fri 8-5 PM

## Town News

### Updated Hazard Mitigation Plan

Pickens County and our incorporated jurisdictions have updated the Hazard Mitigation Plan and we want your input! A public input meeting will be held at the Pickens County EOC at 222 McDaniel Avenue, B-17, Pickens, SC on **March 21st at 5pm** to provide an overview of the draft plan and gather public comments.

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The plan will be available for review online at www.PickensCountyHMP.com.

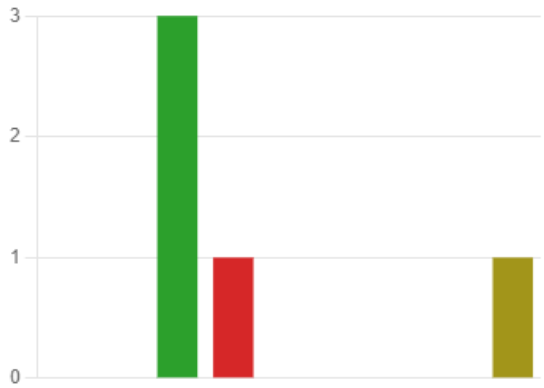
# OTHER PUBLIC OUTREACH EFFORTS

## *PUBLIC SURVEY*

1. Where do you live?

More Details

| | |
|---|---|
| Unincorporated Pickens County | 0 |
| Central | 0 |
| Clemson | 3 |
| Easley | 1 |
| Liberty | 0 |
| Norris | 0 |
| Pickens | 0 |
| Six Mile | 0 |
| Other | 1 |




2. Do you rent or own your home?

More Details

| | |
|---|---|
| Rent | 0 |
| Own | 4 |
| Other | 1 |



3. How prepared do you feel for a hazard event?

More Details

| | |
|---|---|
| Not at all prepared | 1 |
| Somewhat unprepared | 0 |
| Somewhat prepared | 4 |
| Very prepared | 0 |



4. Do you have a family emergency plan, an evacuation plan/route, and/or a shelter plan?

More Details

| | |
|---|---|
| Yes | 3 |
| No | 2 |



5. Describe any actions you have taken to lessen the impact of hazard risk for your family, home, or neighborhood (i.e emergency kit, drainage improvements, flood insurance, etc.).

4 Responses

| ID ↑ | Name | Responses |
|---|---|---|
| 1 | anonymous | emergency plans |
| 2 | anonymous | Bug out bag. Call tree. Specified locations based on emergency. |
| 3 | anonymous | Drainage improvements around home, emergency kit, increased home insurance to reflect natural impacts |
| 4 | anonymous | There is a drain dug in yard to keep water from flowing down hill |

6. Do you know where/how to get more information on hazard risk and preparedness?

More Details

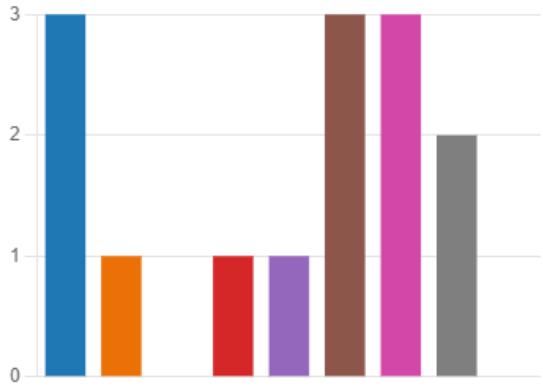
| | |
|---|---|
| Yes | 4 |
| No | 1 |



7. What is the best way for you to receive information about hazard events and/or how to make your family, home, and neighborhood more resilient to hazards? Please check all that apply.

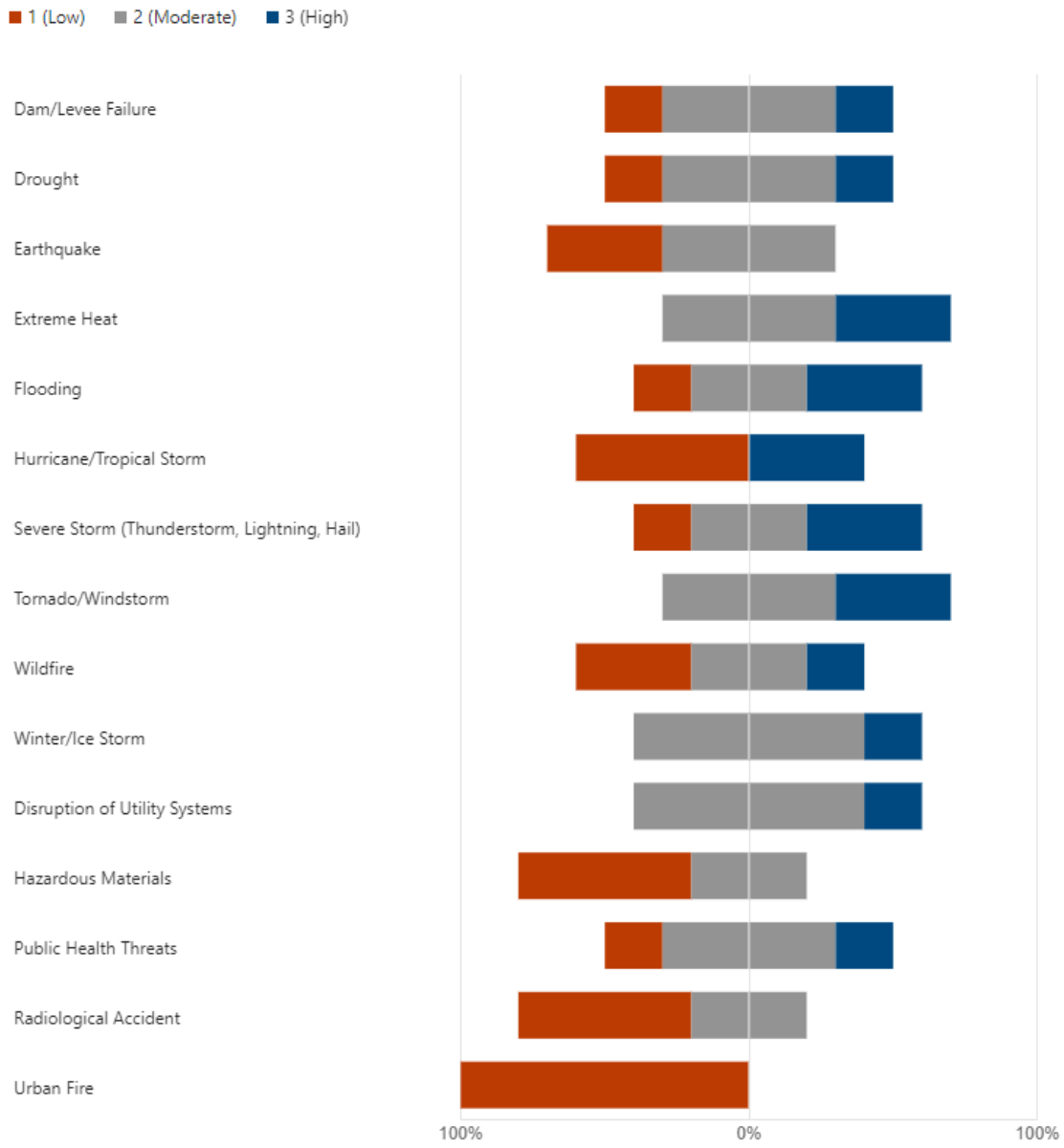
More Details

| | |
|---|---|
| Television News/Advertisements | 3 |
| Radio News/Advertisements | 1 |
| Print Media - newspaper, inform... | 0 |
| Public Library | 1 |
| County/City government website | 1 |
| County/City government social ... | 3 |
| Email | 3 |
| Text message | 2 |
| Other | 0 |



8. The hazards considered for inclusion in the Hazard Mitigation Plan are listed below. Please indicate the level of significance that you perceive for each hazard. Please rate these hazards 1 through 3 as follows: 1=low, 2=moderate, 3=high.

More Details



9. Have you experienced any of the above hazards in Pickens County? How were you affected?

4 Responses

| ID ↑ | Name | Responses |
|---|---|---|
| 1 | anonymous | winter/ice, tornado, hurricane effects |
| 2 | anonymous | Winter and summer storms. Downed trees. Loss of power. |
| 3 | anonymous | Sever Storm, heavy rain event |
| 4 | anonymous | No I haven't lived in Pickens. I base my answers on what I saw in News |

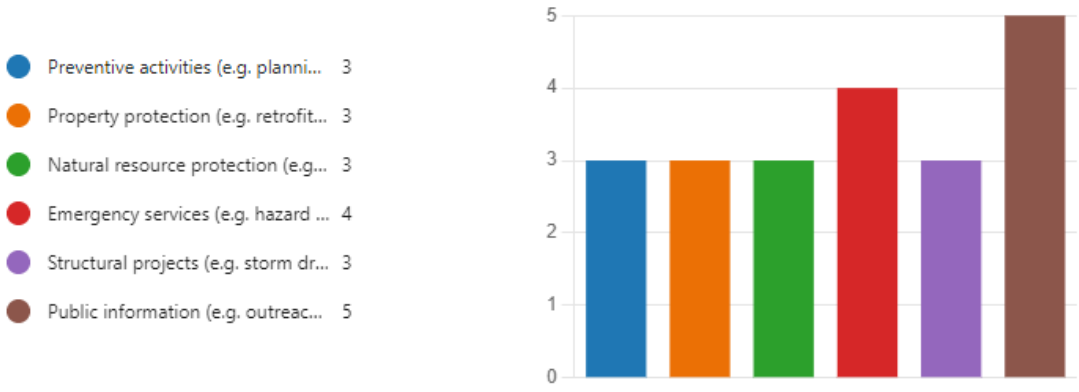
10. What vulnerabilities or risks should the planning team know about?

3 Responses

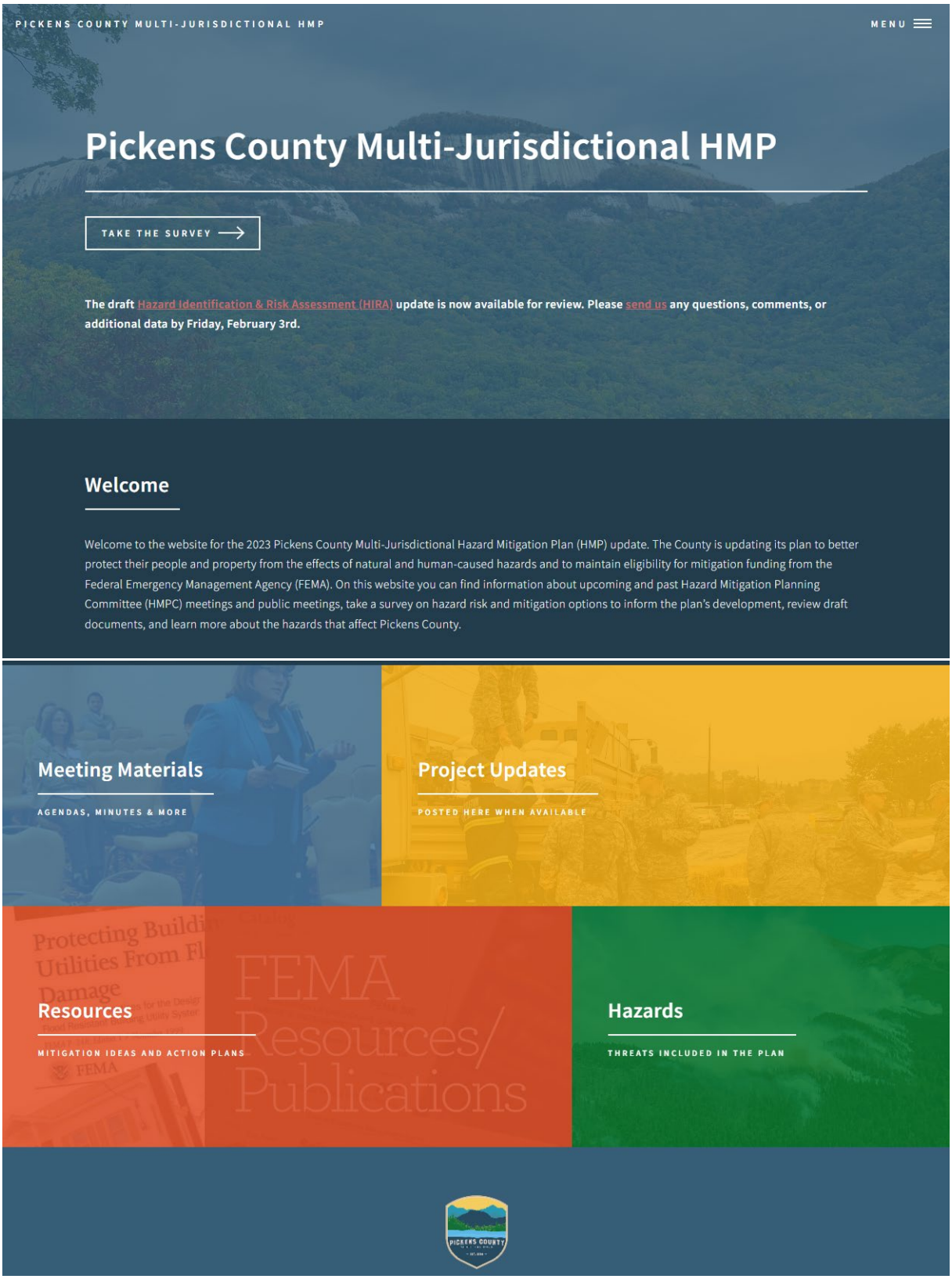
| ID ↑ | Name | Responses |
|---|---|---|
| 1 | anonymous | flood areas |
| 2 | anonymous | I think you are considering all the critical factors. Civil unrest is not on the list but it's a hard thing to plan around. |
| 3 | anonymous | Unsure |

11. Which categories of mitigation actions do you feel would be most effective?

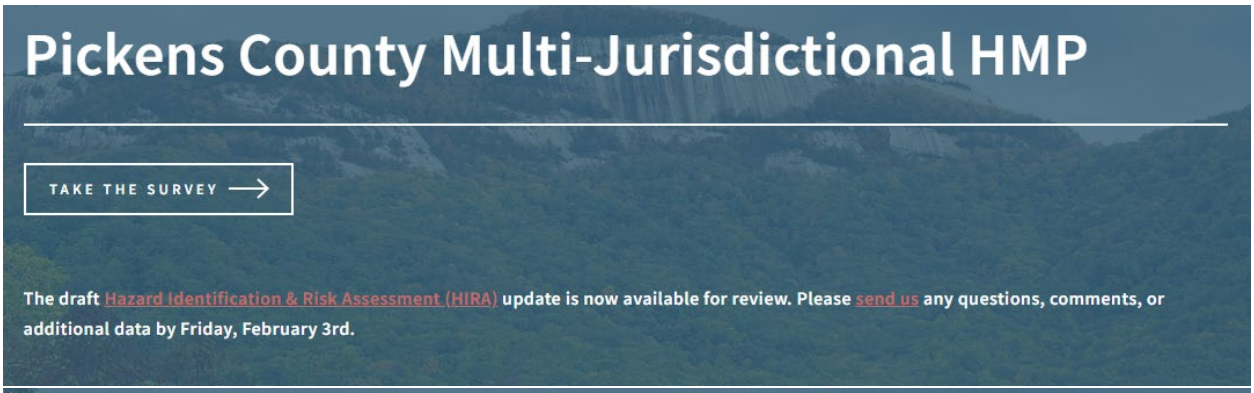
More Details



*PLAN WEBSITE*

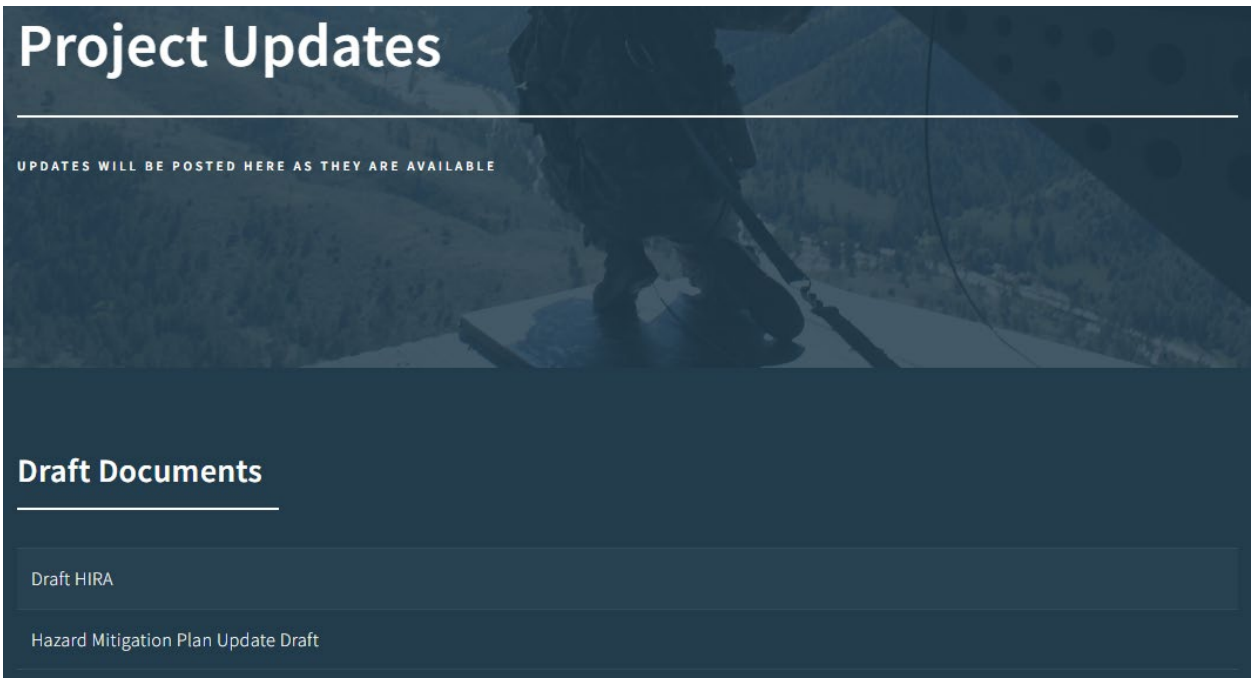


*DRAFT DOCUMENTS FOR PUBLIC REVIEW*









# C.3 PLANNING STEP 3: COORDINATE

## STAKEHOLDER LETTER

This planning step credits the incorporation of other agencies' plans and efforts into the development of the hazard mitigation plan. Other agencies and organizations must be contacted to determine if they have studies, plans and information pertinent to the plan, to determine if their programs or initiatives may affect the community's program, and to see if they could support the community's efforts. To incorporate stakeholder input into this plan, the County and the HMPC identified a variety of stakeholders and emailed a letter inviting each stakeholder to provide data or information relevant to the planning process, review draft plan documents, and provide feedback and comments. The email sent to stakeholders and the coordination letter that was attached are provided below. A list of the stakeholders who were contacted is provided on the following pages.

**Denise M. Kwiatek**

**From:** Denise M. Kwiatek
**Sent:** Monday, January 23, 2023 3:15 PM
**To:** Bill Marshall; Billy Gibson; Bobby Smith; Brad Bowen; Candice Shealey; Chuck Owens; Daniel Adams; David Holcomb; David Wasson; Dewana Davis; Jason Hunter; Jessica Artz; Jessica Stumpf; Jill Evans; Joel Ledbetter; John Shelton; Joshua Hawkins; Kelli Philips; Ken Porter; Kevin Shook; Laura Whittle; Lindsey McCoy; Maria Cox; Mike Bratcher; Natalie Kirkpatrick; Ray Cassell; Roy McClure; Scott Krein; Spencer Dalton; Stan Simpson; Valerie Anderson
**Subject:** Pickens County Multi-Jurisdictional Hazard Mitigation Plan
**Attachments:** STAKEHOLDERS LETTER.docx

Good Afternoon

We are sending out the attached letter to our Stakeholders as we are updating our Multi-Jurisdictional Hazard Mitigation Plan.

We encourage you to go to the website listed in the attached letter.

Thank you

PICKENS COUNTY

DENISE KWIATEK
EMERGENCY MANAGEMENT
DIRECTOR
222 MCDANIEL AVENUE, B-17
PICKENS, SC 29671
OFFICE: 864.898.5362
CELL: 864.320-4075
DKWIATEK@CO.PICKENS.SC.US
WWW.CO.PICKENS.SC.US

# PICKENS COUNTY EMERGENCY MANAGEMENT

January 23, 2023

RE: Pickens County Hazard Mitigation Plan Update

Pickens County and its incorporated jurisdictions are updating the 2018 Pickens County Hazard Mitigation Plan and we are seeking your input in the planning process. The purpose of the plan is to address hazard risks and vulnerabilities and identify achievable mitigation actions to make our community safer and more resilient to hazards. This planning process incorporates the four phases of the Disaster Mitigation Act (DMA) of 2000 as well as the 10 steps of Activity 510 Floodplain Management Planning of the National Flood Insurance Program's (NFIP) Community Rating System (CRS) Program.

Our objective in reaching out to other agencies and stakeholders is to coordinate with those who may bring additional information to the planning process regarding hazard risks and vulnerability issues within Pickens County. Any information, studies, etc. that may supplement the work of the established Hazard Mitigation Planning Committee (HMPC) would be welcomed. Additionally, we invite your input on our draft Hazard Identification & Risk Assessment, which can be found on our plan website: www.PickensCountyHMP.com. We will also be making the full draft plan available for review and comment on the plan website once it's completed.

If you have any questions, would like to submit data or information for the HMPC's consideration, or would like to receive a notice about opportunities to attend future planning meetings or review the draft plan, please contact the County's planning consultant for this project, Abby Moore with WSP, at abigail.moore@wsp.com.

We thank you for your support of this important planning process.

222 McDaniel Avenue – B-17 . Pickens, South Carolina 29671 . Telephone (864) 898-5945. Fax (864) 898-5947/5797

## STAKEHOLDER LIST

| FIRST NAME | LAST NAME | TITLE/DEPARTMENT/ORGANIZATION | EMAIL |
|---|---|---|---|
| *Non-Profit/Community Organizations* | | | |
| Jill | Evans | Pickens County Habitat for Humanity, Executive Director | JillEvans@PickensHabitat.org |
| *Educational Institutions* | | | |
| Brad | Bowen | Southern Wesleyen University, Director of Campus Safety | bbowen@swu.edu |
| Daniel | Adams | Tri-County Technical College, Easley Campus Director | easleycampus@tctc.edu |
| *Surrounding Communities* | | | |
| Jessica | Stumpf | Director, Greenville County Emergency Management | jstumpf@greenvillecounty.org |
| Joshua | Hawkins | Director, Anderson County Emergency Management | jdhawkins@andersonsheriff.com |
| Scott | Krien | Director, Oconee County Emergency Services | skrein@oconeesc.com |
| Kevin | Shook | Director, Transylvania County, NC Emergency Management | Kevin.shook@transylvaniacounty.org |
| *Federal Government* | | | |
| Roy | McClure | FEMA CRS Regional Coordinator | roy.mcclure@fema.dhs.gov |
| Jason | Hunter | FEMA Region IV, Chief, Floodplain Management & Insurance Branch | jason.hunter@fema.dhs.gov |
| Valerie | Anderson | FEMA Region IV, Natural Hazards Program Specialist | valerie.anderson@fema.dhs.gov |
| Dewana | Davis | FEMA Region IV, Insurance Specialist | dewana.davis@fema.dhs.gov |
| Mike | Bratcher | ISO/CRS Specialist | jbratcher@iso.com |
| David | Holcomb | ISO/CRS Specialist | jholcomb@iso.com |
| John | Shelton | USGS - South Carolina Office | jmshelto@usgs.gov |
| Kelli | Phillips | US Army Corps of Engineers Savannah District Emergency Management | kelli.a.phillips@usace.army.mil |
| Stan | Simpson | US Army Corps of Engineers Savannah District Water Management | Stanley.L.Simpson@usace.army.mil |
| *State Government* | | | |
| Candice | Shealey | State Hazard Mitigation Officer | mitigation@emd.sc.gov |
| Lindsey | McCoy | SCEMD Mitigation Manager | webalert@emd.sc.gov |
| Chuck | Owens | SC DHEC, Dam Safety Inspector | owensc2@dhec.sc.gov |
| Natalie | Kirkpatrick | SC DHEC Bureau of Environmental Health Services, Upstate Regional Office, Area Director | KIRKPANL@dhec.sc.gov |
| Ray | Cassell | SC Forestry Commission, Fire Management/LE Officer | rcassell@scfc.gov |

| FIRST NAME | LAST NAME | TITLE/DEPARTMENT/ORGANIZATION | EMAIL |
|---|---|---|---|
| Maria | Cox | Flood Mitigation Program State Coordinator | CoxM@dnr.sc.gov |
| Jessica | Artz | Flood Mitigation Program Mapping Specialist | ArtzJ@dnr.sc.gov |
| Laura | Whittle | Flood Mitigation Program NFIP Specialist | WhittleL@dnr.sc.gov |
| Bill | Marshall | SC Scenic Rivers Program | marshallb@dnr.sc.gov |
| *Business Community* | | | |
| Joel | Ledbetter | Easley Combined Utilities | jledbetter@easleyutilities.com |
| Ken | Porter | Fort Hill Natural Gas | ken.porter@fhnga.com |
| David | Wasson | Laurens Electric Cooperative | dwasson@laurenselectric.com |
| Spencer | Dalton | Blue Ridge Electric Cooperative | spencer.dalton@blueridge.coop |
| Bobby | Smith | New Horizon Electric Cooperative | info@nhe.coop |

## COMMUNITY MEETINGS

Meetings were held with representatives of each participating jurisdiction to coordinate with staff outside of the HMPC membership and gather key inputs on changes in the community, changes in local capabilities, progress toward mitigation action implementation, local stakeholders to coordinate with, and other information. Minutes from each of these meetings are provided below.

## CENTRAL COMMUNITY MEETING MINUTES

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

COMMUNITY MEETING – PICKENS COUNTY

November 7, 2022 – Meeting Minutes

Abby Moore and Ranger Ruffins, consultants for the plan update, facilitated the meeting. There were fourteen Pickens County staff members in attendance.

- Joey Aiken, County Building Official
- Allison Fowler, Community Tourism and Development Director
- Charles Wright, New Spring Church
- Denise Kwiatek, Emergency Management
- Chris Elrod, Fire Chief
- Melise Ellison, American Red Cross
- Jessica Varney, Collaboration Manager for Pickens
- Josh Young, School District of Pickens County
- Karen Culley, United Way of Pickens
- Lance Estep, Planning Director, Appalachian COG
- Michael Clark, Roads and Bridges Director
- Rodney Robinson, Engineering Director
- Roy Stoddard, Mayor of Town of Six Mile
- David Wilson – Emergency Preparedness Manager

**1 Risk Assessment Updates**

Hazard Event History

Abby asked about significant local impacts over the last five years. Staff reported a significant flooding event in 2020 that flooded several roads in the County and a tornado in 2020 that required a disaster declaration. In 2022 the County also experienced two tornados within a week of each other. The priority hazards include severe weather, flooding, and tornados.

High Risk Locations

Abby asked staff to note any known areas of risk like areas with repetitive/localized flooding or erosion. Staff noted that there around 34 high hazard dams in the County which are closely monitored when storms occurred.

Allison Fowler will touch base with the stormwater departments on any known problem areas and will follow up with the consulting team.

Asset Inventory

Denise clarified that the critical facilities list already shared with the consulting team is comprehensive. There is a spreadsheet of cultural and historic sites/resources in the County that has also been shared with the consulting team. Abby and Ranger will trim down the list to the most the important sites and will cross check the final list with Allison.

Development Changes

Abby asked staff to share any changes over the last five years and expected development or new critical facilities over the next five years. There have not been any notable developments in the County, however, there has been general growth throughout the County. Population has been increasing in Clemson and Easley with sustained growth around the University (2% annual growth in enrollment). The County did not note any expected developments or new critical facilities over the next five years.

Social Vulnerability

Pickens County is fairly rural and communities in the western portion of the County may be hard to reach during a hazard event or may struggle to evacuate. The County tries to provide adequate assistance to more rural residents.

Staff also noted a significant homeless population throughout the County and jurisdictions. The exact number is hard to gage, as there is only one small shelter and many people live in their cars or outside.

## 2 Local Capability Updates

Regulatory Tools

Abby asked staff to provide updates on changes to plans, policies, ordinances (recent or upcoming). The County provided updates on the following tools:

- The County's comprehensive plan was reviewed and updated in March 2022. There is no separate land use plan, land use is captured in the comprehensive plan.
- The subdivision ordinance has not changed since the last HMP update
- For floodplain management, there are no higher regulatory standards. The County's regulations are consistent with the state model.
- Consulting staff will check the County's CRS class.
- There have been no changes to the County's BSEGS rating – consulting staff will confirm if residential or commercial rating was reported in the last plan.
- The EOP is updated every year between April and June, however, no significant changes have occurred outside of Annex G which covers the nuclear plant
- There have not been any changes in warning notification since last HMP – all capabilities are still intact. The County has implemented a CodeRed reverse 911 notification system.
- Property protection and structural projects: raised roads (3-4), drainage and culvert improvements in response to 2020 flooding. County funded bridge repair.
- The County hopes to get generators for the EOC and dispatch center early next year

Administrative Resources

Abby asked staff to provide update on changes to staff, credentials, training, tools. Below is a list of key updates:

- Pickens County has key personnel (building official, inspectors)
- The County has a PIO officer and emergency management periodically provides updates on emergency events to share on website and social media
- The Building Official is the floodplain manager

Funding Resources:

The County received funding from National Resource Conservation Service for road and drainage improvements after 2020 flooding events. The County does not have impact fees for development projects. The County/residents are interested in pursuing HHPD grant funding for dam mitigation.

Partnerships and Stakeholders

County staff did not have additional stakeholders to add to the existing list.

## 3 Mitigation Strategy Updates

Status of Existing Actions

Abby reviewed the Pickens County mitigation actions. Crime and Economic Crisis were not identified as profiled hazards for this plan update, so staff decided to remove those mitigation actions. Some actions

were identified as "deferred" projects, these projects will be carried forward unless otherwise noted by County staff.

The table below provides status updates for the remaining County actions. The consulting staff ran out of time and was not able to finish reviewing the actions. The consulting team will share the list of strategies for Pickens County staff to review and add additional updates or comments on the remaining actions.

| Action | Status |
|---|---|
| Identify vulnerable populations | **Carry Forward** – Started creating a list |
| Work through schools, volunteer groups, senior groups, or home health organizations to provide information to vulnerable populations regarding household and personal hazard preparedness. | **Delete – Completed** |
| Work through schools, volunteer groups, senior groups, or home health organizations to provide information to vulnerable populations regarding resources available during hazard events. | **Carry Forward** |
| Coordinate with schools, volunteer groups, senior groups, or home health organizations to provide first aid training to vulnerable populations. | **Carry Forward** |
| Expand established programs or organizations to provide weather radios to vulnerable households. | **Carry Forward** |
| Expand established programs or organizations to provide first aid kits to vulnerable households. | **Delete – combined with similar action item** (action 3) |
| Coordinate with established programs or organizations to provide smoke detectors to vulnerable households. | **Carry Forward** – Red Cross has connected with fire departments |
| Outreach to vulnerable populations about locations of heating and cooling centers during extreme temperature events. | **Delete –** Centers are not frequently utilized |
| Establish a planning committee of social service organizations to identify and respond to at risk populations during extreme temperature events. | **Delete –** Similar to existing actions |
| Create educational materials on hot weather tips for vulnerable populations and awareness of resources available to them. | **Carry Forward** |
| Develop and maintain a building inventory that contains information regarding location, type of structure, construction material, date of construction and modification, whether the building is consistent with current building codes, and other pertinent information. | **Carry Forward** |
| Establish specific mitigation strategies for extremely vulnerable structures identified during the development of the building inventory. | **Carry Forward** |

| Action | Status |
|---|---|
| Develop a standardized, integrated database of utility distribution systems, utility facilities, critical facilities, county facilities, roads, streams/rivers, and other data deemed necessary. | **Carry Forward** – GIS team is currently working on this |
| Conduct a feasibility study to determine if a zoning ordinance would promote community safety and hazard mitigation with regards to new development. | **Delete** |
| Use DHEC's dam failure inundation tool and the EAP of each dam to develop a county-wide database of high hazard dams. | **Carry Forward** – County is currently creating a database and retrieving data from dam owners to implement into the CodeRed system |
| Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects. | **Carry Forward** – In progress |
| Study and assess areas vulnerable to wildfire and causative factors. | **Carry Forward** – Consider revising with more detail about how to track progress |
| Develop a specific definition of 'critical facilities'. | **Delete** – Completed |
| Complete a hazard and vulnerability assessment and mitigation strategy for each critical facility. | **Delete** – Completed. Completed a COOP in 2021 |
| Develop an inventory of response assets and capabilities. | **Delete** – Completed |
| Increase training and capability of response teams and communication/ integration with mutual aid assets. | **Delete** – Completed |
| Work with home health and other private entities to educate special needs individuals regarding self-sustaining practices or whom to communicate with during emergencies | **Delete** – Covered by similar actions |
| Increase training and capabilities by organizing and running training exercises to cover a variety of hazards (dam failure, hazmat, hurricane, winter storm, etc.). | **Delete** – Completed |
| Educate public about wildfire dangers, and open burning safety, cigarette litter, and campfire safety. | County to follow up on this action |
| Create buffer zones around structures in wildland-urban interface areas. | **Delete** |
| Develop a more effective fire condition notification system plan. | **Delete** – Completed |
| Identify safe storm shelters in communities and educate residents as to where to seek shelter. | **Delete** – Completed. Already an established process |
| Educate public about the importance of weather radios and where to obtain them. | **Carry Forward** |

| Action | Status |
|---|---|
| Consider the feasibility of adopting FireWise throughout the county. | **Carry Forward** |
| Remove dead trees or trim large branches located near structures. | **Delete** |
| Conduct a commodity flow study on major roadways in the county. | **Delete** – Completed five years ago and have received funding to complete in February |
| Coordinate between law enforcement agencies and railroad companies to increase notification and safety where statistics or assessment indicates a dangerous intersection of railroad and roadway. | **Delete** |
| Institute a standard warning system for dam failure. | **Delete** – Established process |
| Coordinate with the USACE on EAP for Dams in Pickens County | **Carry Forward** |
| Serve as a repository for dam failure plans. | **Carry Forward** |
| Provide information to the public regarding procedures to follow in the event of a dam failure. | **Carry Forward** |
| Educate about and encourage participation in the National Flood Insurance Program. | **Carry Forward** – Norris is not currently participating in the NFIP. |
| Work with homeowner of the repetitive loss property to relocate, abandon, or demolish structure. | **Delete** – Completed |
| Partner with utility companies to remove dead trees or trim large branches located near utilities. | **Delete** |
| Educate public about personal/household preparedness. | **Delete** – Completed |
| Training and equipment for the Swiftwater Rescue Team | **Carry Forward** |
| Create a FEMA Approved Debris Removal Plan to prepare Pickens County Public Works in planning and preparing for natural disasters. | **Carry Forward** |
| Training and equipment for the Technical Rescue Team to respond to confined space and structural stability calls | **Carry Forward** |
| Educate public about severe weather and safety strategies | **Carry Forward** |
| Strengthen the efforts of trained volunteers within the Storm Ready County program | **Delete** – No longer relevant. County works with NWS |

| Action | Status |
|---|---|
| Conduct a public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | **Delete** |
| Increase permeable surfaces and retention basins to encourage groundwater recharge | **Allison to follow up with status** |
| Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | **Carry Forward** |
| Adopt and enforce building code provisions for earthquake construction to reduce risk. | **Carry Forward** – Have not started yet |
| Conduct a study of seismic zone earthquake risk and soil investigation to determine level of risk to existing buildings and new construction. | **Carry Forward** – Have not started yet |
| Encourage financial resiliency planning for local residents. | **Carry Forward** |
| Create educational materials on cold weather tips for property owners. | **Delete** |
| Continue to implement and enforce floodplain development regulations. | **Carry Forward** |
| Encourage at risk owners to purchase flood insurance | **Carry Forward** |

Staff can pick up on page 190 to continue reviewing actions and provide status updates.

### 4 Open Discussion and Next Steps

Denise discussed that residents have shown interest in the high hazard potential dam funding and assistance provided by FEMA. She wanted to ensure the HMP update includes necessary information in the dam failure hazard assessment. Abby assured her that the plan identifies high hazard dams but will check for any additional requirements.

Abby also noted that the biggest challenge is getting dam inundation areas for mapping, but believes necessary data is available on the DHEC database.

Next steps and follow up items are list below:

- Allison will ask stormwater department for any known localized flooding locations or problem areas
- The consulting team will review the list of cultural and historic places and confirm final list of resources/places with Allison
- Consulting team will follow up to confirm BSEGS rating and classification (residential or commercial)
- Abby will send remaining mitigation actions to Allison, Denise, and Ryan to provide status updates

## CENTRAL COMMUNITY MEETING MINUTES

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

COMMUNITY MEETING – TOWN OF CENTRAL

November 11, 2022 – Meeting Minutes

Abby Moore, a consultant for the plan update, facilitated the meeting. There was one representative from the Town in attendance.

- Isaiah Reynolds, Fire Chief, Town of Central

**1 Risk Assessment Updates**

Hazard Event History

Abby asked about significant local impacts over the last five years. The tornado in 2020 started in Central and had major impacts everywhere in the County. Severe weather is a priority hazard for the Town.

The highest priority human-caused/technological hazard is the railway. There are three crossings in the Town, which presents a concern for both a traffic incident or a hazardous materials incident. The Town is also in the 10-mile EPZ of Oconee Nuclear Station.

Dam Failure is also a priority hazard for Central. The Town is vulnerable to dam failure flooding from Hartwell Lake if the Keowee Dam were to fail.

High Risk Locations

Abby asked if there are any known areas of risk like areas with repetitive/localized flooding or erosion. Areas around the railway and railroad crossing were already discussed. There are a few low lying spots, but stormwater flooding is not a major concern. The lake occasionally backs up but has never come across the bridge.

Asset Inventory

The County's list of critical facilities was reviewed to confirm that all facilities in Central are listed. Isaiah noted that the County has a sub-station in Central that could be added. The consulting team is working to get this data from Pickens County GIS.

Development Changes

Abby asked about any changes in development over the last five years and expected development or new critical facilities over the next five years. There has been lots of residential development throughout the Town; approximately 400+ houses in the last five years. At least that much additional development is expected in the next five years.

Social Vulnerability

Vulnerable populations were discussed. There is a 24-hour nursing facility that houses 70 people in the Town. There is also a large college student population that spills over from Clemson.

**2 Local Capability Updates**

Regulatory Tools

Abby asked for updates on changes to plans, policies, ordinances (recent or upcoming). Roy and Denise provided updates on the following tools:

- Land use and Comprehensive plan: No changes
- Zoning and Subdivision Ordinance: Zoning has changed in last two years.
- Floodplain Management Ordinance: No changes. Town uses the state model ordinance.

- Stormwater Management: No program. But there is a new Stormwater Manager position, so a program may be developed in the future.
- BCEGS rating: No change
- LEOP: No change
- Warning System and Emergency Management: Systems are run by the County.
- No structural projects, property protection projects, or critical facility protection projects. All critical facilities have generators.

Administrative Resources

Abby asked for updates on changes to staff, credentials, training, tools. Below is a list of key updates:

- Public Information is handled by the Assistant Administrator.
- A new Stormwater Manager position was created.

Funding Resources

Potential funding resources for mitigation were discussed. Abby will send table of potential resources for Town staff to confirm what has been or could be used in the Town.

Partnerships and Stakeholders

Abby asked for any potential stakeholders that could be included in the planning process. Central mainly coordinates with Pickens County and the County does all coordination with other outside stakeholders.

**3 Mitigation Strategy Updates**

Status of Existing Actions

Most of the Town's mitigation actions fall under County responsibility and were updated when the consulting staff met with the County. Central has not pursued implementation of any mitigation actions independently from the County. The Town does not have any mitigation projects to add to the action plan at this time.

**4 Open Discussion and Next Steps**

Isaiah will follow up on funding resources that the Town can use for mitigation.

## CLEMSON COMMUNITY MEETING MINUTES

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

COMMUNITY MEETING - CLEMSON

October 25, 2022 – Meeting Minutes

Abby Moore and Ranger Ruffins, consultants for the plan update, facilitated the meeting. There were thirteen City of Clemson staff members in attendance.

- Allison Gantte, City Administrator
- Art Holbrooks, City Planner
- Bryan Johnson, Fire Marshal
- Chief Jorge Campos, Clemson Police Chief
- Cody Lingefelt, Public Works Director
- Dustin Hayes, Utilities Director
- Jacob Peabody, Zoning and Codes Administrator
- Lowell Arwood, City IT Director
- Nathan Hinkle, City Engineer
- Sammy Grant, Clemson Area Transit
- Tyler Jones, GIS Analyst
- Stacey Blackwell, Building and Fire Official
- Patrick Brock, Clemson Fire and EMS

**1 Risk Assessment Updates**

Hazard Event History

Abby asked about significant local impacts over the last five years. Staff reported the following events:

- The City has experienced multiple 500+ year rain events.
- A hazardous spill occurred about four months ago.
- The City does get snow events, however, nothing out of the ordinary.
- Power outages did occur from a hurricane a few years ago and pump stations were shut down. The City had to use generators to turn them back on.

High Risk Locations

Abby asked staff to note any known areas of risk like areas with repetitive/localized flooding or erosion. Staff noted that the city has acquired a property at 431 and 437 Berkley with grant funding – demolition has not been completed yet but will happen.

Staff also noted that localized flooding occurs on Shaftsburry Rd and Riggs Drive Neighborhood. These flooding issues are typically due to tributary flooding from Eighteen Mile Creek and Rock Creek. Clemson is worried about I & I issues with Rock Creek floods. Riggs Drive is not mapped, but First Street Foundation accurately represented this risk. The City thinks the flood analysis is pretty spot on compared to what they have seen in person. Staff believes that the consulting team can probably access high-level versions of the maps.

It was also mentioned that Clemson has a program where they inspect all street culverts over 36'' before any named storms.

Asset Inventory

The critical facilities identified include public works, sewer treatment plants, booster pump stations, water ranks, large meters from water supply (regional supplier), and Clemson Area Transit (CAT) Facility.

Tyler said that he can put together a GIS layer of facilities to share with consulting staff.

Development Changes

Abby asked staff to share any changes over the last five years and expected development or new critical facilities over the next five years.

Over the last five years there have been several major multi-family developments, primarily student housing. A lot of this development has occurred downtown and on College St, Earl St, Cambridge Dr, and Tiger Blvd, and others. College enrollment has increased and will likely expand as the university's aim is to reach over 30,000 students. Sarah Custer is the college contact for the HMP and will have more information.

There has also been a large residential and commercial development (Patrick Square) which includes assisted living, as well as new independent and assisted living developments on Pershing Ave.

The City has doubled sewer treatment plant capacity in the last 5 years, located on 300 Cochran Rd (critical facility location).

Expected development includes a large development (Kadara) consisting of 1,400 residential units and around two million square feet for commercial development. This will be located on Old Stone Church Rd at the intersection of Anderson highway. Additional infrastructure projects are also planned but will need grant funding. The city does have a Capital Improvements Program (CIP) to support some infrastructure projects.

Social Vulnerability

There are a growing number of retirees and people in need of assisted living, as well as a lot of students. Both populations tend to lack independent transportation. Evacuation for a nuclear power plant event, or other hazard could be difficult.

Communication can be a challenge for emergency alerts and notifications. Particularly visitors from out of town are not registered with the university system and do not receive alerts. The City does not have its own communication system, but does have push notifications through MyCivic app. Cell phone alerts are the primary way to notify people in the community.

**2 Local Capability Updates**

Regulatory Tools

Abby asked Staff to provide updates on changes to plans, policies, ordinances (recent or upcoming). The city provided updates on the following tools:

- The City's comprehensive plan was reviewed and updated in 2019 and a complete rewrite will be done by 2024. There is no separate land use plan – captured in the comprehensive plan.
- There have been major updates to the City's ordinance in regard to the following: land development regulations, subdivision design, stormwater management, and zoning regulations
- For floodplain management, there are no higher regulatory standards. The City's regulations are consistent with the state model.
- Clemson is a CRS community.
- The city just went though the BCEGS audit but are waiting for their rating. They will update the consultants once audit results are received.
- Pickens County coordinates with Clemson University for local emergency alerts.
- Structural protection projects: Clemson completed a stream realignment to protect downstream properties. The project acquired open space land (no structures) with floodplain designation on it. Clemson also completed a culvert replacement project for road protection.
- The City has a siren warning system for the nuclear station.

Administrative Resources

Abby asked staff to provide update on changes to staff, credentials, training, tools. Below is a list of key updates:

- Clemson has key personnel (building official, inspectors)
- The Stormwater Manager and the Building Official are the floodplain managers
- Grant writing is done by the City Administrator, Allison Gantte
- There is no official PIO, but for emergencies it is the Fire Chief, otherwise it is handled by individual departments
- Clemson has current and future land use shapefiles which they will share with consultant

Funding Resources:

CDBG funding that Clemson has received is not targeted for mitigation work. Stormwater department is applying for a SCOR grant. The City can also apply for funding from NRCS Emergency Watershed Protection Program. This funding is for recovery and prevention and can be applied for after an event occurs. Clemson has impact fees and a stormwater fee which helps fund CIP projects.

## 3 Mitigation Strategy Updates

Status of Existing Actions

Abby reviewed the Clemson mitigation actions, however, she only asked for updates on the actions that Clemson is responsible for. The consulting team will work with the County and University to provide updates on the remaining actions. Allison Gantte noted that the City contracts with the University for the Fire Department.

Crime and Economic Crisis were not identified as profiled hazards for this plan update, so Clemson Staff decided to remove those mitigation actions. The table below provides status updates for the remaining actions Clemson is responsible for. The consulting team will share the list of strategies for Clemson staff to review and add any additional updates or comments.

City staff discussed a few new potential mitigation actions. Staff identified the need to designate specific locations for city shelters and acquire backup generators for shelter locations. They also discussed 911 redundancy noting that this system is 60% built out on a redundant network. Staff would like to explore opportunities for improved IT redundancy. Lowell Arwood will work with the consulting staff to determine any additional action items and provide information for the Cyber Disruptions hazard assessment.

| Action | Status |
|---|---|
| Mulch and establish riparian zone within City Parks to protect against park sedimentation | **Carry Forward** - Riparian zones have been established and parks department does mulch the areas however it is ongoing work.<br><br>Urban and Parks Land Management Department can be added to list of responsible departments. |
| Remove or trim trees and other vegetation from around roadways, powerlines, and neighborhood entrances. Relocate powerlines underground. | **Carry Forward** – Duke cleared power lines and residents can apply for funding to move lines underground. 40 people have signed up so far. |
| Enlarge culverts in flood prone areas and assist residents with cost of replacing culverts | **Carry Forward** – Some have been completed but some are still in progress |
| Identify homes in the floodplain and purchase and/or retrofit | **Carry Forward** – One acquisition completed so far. |

| | |
|---|---|
| Establish a close working relationship with owners of dams that are regulated by DHEC, USACE, and FERC | **Carry Forward** – No city owned dams, however, dam outside of jurisdiction that could impact Clemson |
| Increase permeable surfaces and retention basins to encourage groundwater recharge | **Carry Forward** – Permeable surface cover has been incorporated into updates of land development |

**4 Open Discussion and Next Steps**

GIS will provide shapefiles for critical facilities, existing land use, and future land use. The consulting team will connect with Lowell Arwood to discuss IT redundancy and information to include in the Cyber Disruption hazard profile.

## *EASLEY COMMUNITY MEETING MINUTES*

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

COMMUNITY MEETING – EASLEY

October 31, 2022 – Meeting Minutes

Abby Moore and Ranger Ruffins, consultants for the plan update, facilitated the meeting. There was one City of Easley staff member in attendance.

- Matthew Littleton, Fire Chief

**1 Risk Assessment Updates**

Hazard Event History

Abby asked about significant local impacts over the last five years. Staff reported that there haven't been any significant events of note that would not already be recorded in federal databases. Matthew did mention that City has experienced flooding and tornados in the past two years, noting that flooding, severe weather, and cyber security are the highest priority hazards.

High Risk Locations

Abby asked staff to note any known areas of risk like areas with repetitive/localized flooding or erosion. Matthew said there are no additional location not already shown on the FEMA flood maps, however, he can ask the Stormwater Management department for any problem site areas and locations.

Asset Inventory

Matthew pointed out that Crosswell and Dacusville fire stations are county stations but have Easley addressers.

There are two additional stations and a new city public works building (Operation and Maintenance Facility) located in the City. Matthew will follow up with addresses for these three facilities.

Development Changes

Abby asked staff to share any changes over the last five years and expected development or new critical facilities over the next five years.

Over last five years the City has built the new Fire Station 5-1 and the Public Works O&M Facility. Additionally, Matthew noted that the City has experience historic growth over the past few years, largely due to annexation. Population density has significantly increased across the City however, it seems to be slowing down based on the decreased frequency of building permits submitted each week.

Consulting staff can check with the County for mist up to date City boundary reflecting annexation.

Social Vulnerability

Matthew pointed out that the entire County has an aging population, which has been reflected in healthcare costs. He has also noticed challenges with increasing chronic obesity and illegal drug use/overdose. Consulting team can reach out to County on data to better examine these issues and other public health challenges.

**2 Local Capability Updates**

Regulatory Tools

Abby asked Staff to provide updates on changes to plans, policies, ordinances (recent or upcoming). The city provided updates on the following tools:

- Land Use Plan, zoning, and subdivision plan will be changing in next five years. All documents are currently under review.

    - Land use, zoning, and subdivision ordinance all fall under one document – Planned Development Regulation Ordinance. This ordinance does not include floodplain management ordinance (likely lumped in with stormwater plan – consulting staff can check that)
- CRS Community: Not sure, consulting staff will confirm
- Building official: Yes
- BCEGS rating: Not sure of status – Matthew and Abby to confirm
- Warning Systems: Managed by the County
- Structural projects: Several culvert improvements due to significant stormwater. However, no acquisitions or elevations.
- Critical facility protection/retrofits.: Have done redundancy work on fire stations
- PIO: Yes
- Outreach for hazard preparedness: Yes. All City departments are very active on social media.

Administrative Resources

Abby asked staff to provide update on changes to staff, credentials, training, tools. There have not been many significant staffing changes or trainings. However, the City is searching for a new Stormwater Manager who recently resigned and typically serves as the floodplain administrator.

Funding Resources:

The City does collect stormwater fees and recently passed an impact fee in January that allocates a percentage of funding to various departments.

The City does not have a designated grant writer, but rather each department handles their own grant application process.

Matthew was unsure if the City has ever received other outside mitigation funding, but will ask and follow up with consulting team.

Partnerships

Matthew noted that potential stakeholders to involve would be the City's utility providers listed below with the point of contact:

- Easley Combined Utilities – Joel Ledbetter, General Manager
- Fort Hill Natural Gas – Ken Porter, Director and CEO
- Duke Energy (may have a county contact)

**3 Mitigation Strategy Updates**

Status of Existing Actions

Abby reviewed the Easley mitigation actions, however, she only asked for updates on the actions that Easley is responsible for. The consulting team will work with the County to provide updates on the remaining actions.

Crime and Economic Crisis were not identified as profiled hazards for this plan update, so Easley Staff decided to remove those mitigation actions. The table below provides status updates for the remaining actions Easley is responsible for. The consulting team will share the list of strategies for Easley staff to review and add any additional updates or comments.

| Action | Status |
|---|---|
| Provide training to first responders regarding train safety, so that they have better understanding of what materials are transported through the city, how to communicate in the event of an incident, what resources are available to them, and how to respond to incidents. | **Carry Forward** – Ongoing and consistently done for highway and rail safety. |
| Educate the public and local business owners on train safety so that they understand the risks and what to do if they observe a potential hazard (e.g. malfunctioning railroad crossings, loose rails, etc.) | **TBD** – Follow County guidance |
| Conduct risk assessment to more closely identify areas of cyber vulnerabilities within the city which may cause hazard events (e.g. communication, water, sewage outages) | **Carry Forward** – Actively working on this action |
| Increase permeable surfaces and retention basins to encourage groundwater recharge. | **Carry Forward** – Continues to be an issue for the City. Stormwater Department is working on this. |
| Update landscaping around public lands and along roadways to include shade providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire. | **Carry Forward** – Actively working on this. Emergency Management slowly working on this from a FireWise perpective. |
| Adopt and enforce building code provisions for earthquake construction to reduce risk. | **Carry Forward** – Have not adopted earthquake-specific code. City has adopted 2018 IBC. |

**4 Open Discussion and Next Steps**

Matthew to follow up on the following items:

- Ask Stormwater Management Department for any problem site areas/ frequent flooding locations.
- Provide addressed for two fire stations located in Easley and new Operations and Maintenance Facility
- Confirm BCEGS status and rating
- Confirm if the City has received any mitigation grant funding in the past

Consulting staff to follow up on the following items

- Confirm CRS community status
- Send copy of City actions to review

## *LIBERTY COMMUNITY MEETING MINUTES*

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

### COMMUNITY MEETING – CITY OF LIBERTY

March 9, 2023 – Meeting Minutes

Abby Moore, a consultant for the plan update, facilitated the meeting. There was one representative from the City in attendance.

- Michael Calvert, City Administrator, City of Liberty

**1 Risk Assessment Updates**

Hazard Event History

There have not been any major hazard events to affect Liberty outside of what has already been reported for the County and wider region. Train derailment and associated hazard materials impacts are a concern. The City has a lot of woods near development that could pose a wildfire risk.

High Risk Locations

There are no specific locations of risk to note that aren't already identified by hazard mapping.

Development Changes

There has not been any significant development over the past five years, but a lot of development is expected in coming years. A development of 200 homes is planned for north of the airport, and a second phase may follow with an additional 200 homes. Development is also expected off of Rice's Creek Road. The City plans to pursue aggressive annexation, particularly for commercial growth. The City is planning to develop a new municipal complex which will house City Hall and all administrative functions as well as police and the City courts.

Social Vulnerability

Liberty has a larger African American population and Hispanic population, some of whom may speak English as a second language. The City also has an aging population, like many smaller towns.

**2 Local Capability Updates**

Updates to plans, policies, ordinances (recent or upcoming) and changes to administrative and fiscal resources that could support mitigation were discussed. The following updates were provided:

- The COG is working on Liberty's comprehensive plan update now
- Stormwater management is administered by the County
- BCEGS – the Community Development Director can provide this
- The City is covered by the County's EOP but would like to develop a City EOP
- The City uses its website and social media to relay county alerts to City residents
- The City has a Capital Improvements Program in place
- The City has a sewer service fee, which helps with grant matching funds
- There is some room for use of revenue bonds
- Building Services was brought in house recently
- Job-related trainings for City staff have increased
- There is a new grant specialist on staff

**3 Mitigation Strategy Updates**

The County is the lead agency for the Town of Liberty's mitigation actions and provided status updates for all actions in the previous plan. The City wants to add a generator project to the plan for backup power at Public Works and the temporary City Hall.

## NORRIS COMMUNITY MEETING MINUTES

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

### COMMUNITY MEETING – TOWN OF NORRIS

November 10, 2022 – Meeting Minutes

Abby Moore, a consultant for the plan update, facilitated the meeting. There were two representatives from the Town in attendance.

- Odell Williams, Mayor, Town of Norris
- Ann Clary, Town Clerk, Town of Norris

**1 Risk Assessment Updates**

Hazard Event History

Abby asked about significant local impacts over the last five years. Staff reported that there have not been any hazard events with significant local impacts in the last five years. Tornado is considered to be the highest priority hazard for the town.

High Risk Locations

Abby asked if there are any known areas of risk like areas with localized flooding or erosion. There are no specific locations of risk to note. There are no areas of flood risk in the Town, which is why the Town does not participate in the National Flood Insurance Program.

Asset Inventory

All important critical facilities are already listed in the exiting facilities list provided by the County.

Development Changes

Abby asked about any changes in development over the last five years and expected development or new critical facilities over the next five years. There has not been any significant development over the past five years and no new development is expected in the next five years. The Town is not planning any new facilities in this time.

Social Vulnerability

Staff did not note any distinct vulnerable populations.

**2 Local Capability Updates**

Abby asked for updates to plans, policies, ordinances (recent or upcoming) or changes to administrative or fiscal resources that could support mitigation. The following information was provided:

- The Town has considered pursuing a generator project for the Fire Department and the Town Hall. Abby noted that this will be added to the mitigation action plan so that the project can be eligible for federal mitigation grant funding.
- The Town has a website that can be used for public information.
- There were no changes to staff resources.
- The Town has used CDBG grant funds to get a fire truck.

**3 Mitigation Strategy Updates**

The County is the lead agency for the Town of Norris's mitigation actions and will provide status updates for all actions in the previous plan. The Town has not pursued any action implementation outside of the County's efforts in the last five years. Aside from the generator project noted above, the Town does not have any new mitigation actions to add to the plan at this time.

## PICKENS COMMUNITY MEETING MINUTES

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

COMMUNITY MEETING – CITY OF PICKENS

January 24, 2022 – Meeting Minutes

Abby Moore, a consultant for the plan update, facilitated the meeting. Chris Elrod, the City of Pickens Fire Chief, represented the City to provide plan update information.

**1 Risk Assessment Updates**

Hazard Event History

The most significant recent hazard event was flooding that occurred in February 2020.

The top priority for the department is civil disturbance. In terms of natural hazards, the highest priority hazards are thunderstorms, tornados, and other wind events, winter weather, and flash flooding.

High Risk Locations

Abby asked if there are any known areas of risk like areas with repetitive/localized flooding or erosion. Chris noted the area around 225 Pumpkintown Highway near the old Ryobi plant where flooding has been an issue.

Asset Inventory

Critical facilities provided by County EM were reviewed. Chris recommended adding the Technology Hub for Pickens County Schools, which is located in Pickens at 415 Ann Street, Pickens, SC.

Development Changes

There has not been any major development over the past five years. Recently a small commercial and multi-family project has been underway, which includes 60 new apartments. Linear growth is expected in coming years. There are no plans for new city buildings or infrastructure in the next five years.

The Town, alongside the organization Upstate Forever, has an easement to preserve green space for a children's nature trail. This land is higher elevation and is not within a floodplain. There is a small 5-acre pond on the land.

Social Vulnerability

There is a homeless shelter just outside City limits at 141 Cityview Circle, Pickens, SC, which serves a vulnerable population.

**2 Local Capability Updates**

Regulatory Tools

There have been minimal changes to local plans, policies, and ordinances (recent or upcoming). Pickens County supports the City as the City's Floodplain Administrator and through managing stormwater, building permits, and building inspections. The County's LEOP serves for County emergency operations.

Reverse 911 is still in place and is administered through the County.

The City has not undertaken any new structural mitigation since the last plan update. Drainage work has primarily been maintenance related. The City did demolish some dilapidated buildings with grant funding support, but this project was not flood related.

Administrative Resources

There have not been any major changes to staff, credentials, training, or tools. Public information is handled by the City Administrator. The city has lost some staff resources in recent years.

Funding Resources

The City has used CDBG and other grant funding in the past as well as some local funding sources. The City has applied for and received post-disaster funding, including Public Assistance and Hazard Mitigation Assistance grants.

Partnerships and Stakeholders

Abby asked for any potential stakeholders that could be included in the planning process. Upstate Forever was noted due to the ongoing green space project.

## 3 Mitigation Strategy Updates

Status of Existing Actions

Mitigation actions that Pickens has primary responsibility for were reviewed. The consulting team has already worked with the County to collect updates on County-led actions.

The table below provides status updates for the actions Pickens is responsible for.

| Action | Status |
|---|---|
| Purchase a small bucket truck to trim limbs overhanging city streets. Purchase a new tractor and ditch bank cutting equipment. Implement a new vegetation removal policy | **Carry Forward** – No progress reported, but the City intends to pursue implementation in the future. |
| Purchase unfilled sand bags. Store those bags at the public works facility and have them ready for distribution in the event of an emergency. | **Completed** |
| Purchase standby diesel generator for the City of Pickens Water Plant | **Delete** – The City received grant funding for this project, but the project required electrical upgrades that were not feasible. As a result, this project is no longer being pursued. |
| Purchase standby diesel generator for the City of Pickens water pump stations | **In Progress** – The City received grant funding for this project and installation of the generator is underway. |
| Purchase one mobile standby diesel generator for the City of Pickens sewer lift stations and electrical upgrades at these stations to allow connection to standby power | **Carry Forward** – There are mobile generators available but electrical upgrades will still be pursued. |
| Buy out all downstream homes in the inundation zone. | **Carry Forward** – No acquisitions have occurred, but this is still a City priority should any property owners wish to participate. |
| Purchase a crime scene investigation robot | **Delete** – No longer a priority action and this hazard is not identified in the plan update. |
| Purchase a canine police officer | **Completed** |
| Purchase a ladder truck | **In Progress** – Funds have been allocated and the City hopes to procure a truck by March 2023. |

| Action | Status |
|---|---|
| Seek grant funding for local police department and sheriff's department for early intervention programs in schools including school resource officers | **Completed** – There are School Resource Officers in every school now. |
| Implement community education programs geared towards fostering positive relationships between law enforcement and the community including programs for youth, such as Explorers | **Completed** – The City has partnered with Pickens Youth Academy, uses social media for outreach, and has established ongoing action related to this project. |
| Create public education campaign targeting at risk populations relative to the illicit drug epidemic targeted at reducing the number of users and overdoses. | **Completed** – The City works with Behavioral Health as an ongoing effort for this project. |
| Increase permeable surfaces and retention basins to encourage | **Carry Forward** – No progress was made on this project but it is still a priority for future implementation. |
| Update landscaping around public lands and along roadways to include shade-providing and drought resistant vegetation which serves as a windbreak, while maintaining proper buffers against wildfire | **Carry Forward** – No progress was made on this project but it is still a priority for future implementation. |
| Outreach to vulnerable populations about locations of heating and cooling centers during extreme temperature events. | **Completed** – The City supports the County when heating or cooling centers are designated. The City visits the senior citizens center to publicize this resource. |

**4 Open Discussion and Next Steps**

No other topics were discussed. Abby will revise the HMP asset inventory to include the Pickens Schools Technology Hub.

## SIX MILE COMMUNITY MEETING MINUTES

### PICKENS COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

COMMUNITY MEETING – TOWN OF SIX MILE

October 31, 2022 – Meeting Minutes

Abby Moore and Ranger Ruffins, consultants for the plan update, facilitated the meeting. There was one representative from the Town and one from the County in attendance.

- Roy Stoddard, Mayor, Town of Six Mile
- Denise Kwiatek, Pickens County Emergency Management Director

**1 Risk Assessment Updates**

Hazard Event History

Abby asked about significant local impacts over the last five years. The Pinnacle Mountain Fire of 2016 was a notable hazard.

The highest priority hazard is local flooding due to heavy rain and Roy expressed some concern about the Oconee Nuclear Station, about five miles west of Six Mile.

High Risk Locations

Abby asked if there are any known areas of risk like areas with repetitive/localized flooding or erosion. Other than the Oconee Nuclear Station EPZ, there are no specific locations of risk to note.

Asset Inventory

All important critical facilities are already listed in the exiting facilities list provided by the County.

Development Changes

Abby asked about any changes in development over the last five years and expected development or new critical facilities over the next five years.

There has not been any significant development over the past five years. The Town, alongside the organization Upstate Forever, has an easement to preserve green space for a children's nature trail. This land is higher elevation and is not within a floodplain. There is a small 5-acre pond on the land.

Social Vulnerability

Staff did not note any distinct vulnerable populations.

**2 Local Capability Updates**

Regulatory Tools

Abby asked for updates on changes to plans, policies, ordinances (recent or upcoming). Roy and Denise provided updates on the following tools:

- Land use and Comprehensive plan: No changes
- Zoning and Subdivision Ordinance: Will undergo an update in another five years. Zoning updates happen regularly.
- Floodplain Management Ordinance: No changes. Town uses the state model ordinance.
- Stormwater Management: Managed by the county
- BCEGS rating: Same as County
- Warning System and Emergency Management: Systems run by the County. Consulting staff will get updates on County call

- Structural Projects: No drainage projects, however, the Town is building a 8.5 acre community park with a pavilion (open space preservation)
- Property Protection: No acquisitions or elevations
- Critical Facility Protection: Taken over by the County
- Downtown Overlay Districts: Think this has been completed. Consulting staff will confirm.

Administrative Resources

Abby asked for updates on changes to staff, credentials, training, tools. Below is a list of key updates:

- Public education info is coordinated with the county. Denise mentioned that public outreach on hazard preparedness and mitigation hasn't been done in the last two and half to three years. However, there is a designated person at the County that does handle this.
- Building Official/Inspections: Managed by the county
- The County supports the Town with forestry and local fire department.

Funding Resources

The Town does not have an impact fee, stormwater fee, or CIP and has not received any outside mitigation grant funding. The Count has also never applied for funding on the Town's behalf.

Partnerships and Stakeholders

Abby asked for any potential stakeholders that could be included in the planning process. Upstate Forever was noted due to the ongoing green space project.

### 3 Mitigation Strategy Updates

Status of Existing Actions

The Town's mitigation actions fall under County responsibility and will be updated when the consulting staff meets with the County.

Based on capability discuss a potential action could be to utilize the County's public information resources to share information about hazard preparedness and mitigation.

### 4 Open Discussion and Next Steps

Consulting staff will review any outstanding updates/information with the County to ensure any additional Town resources and capabilities captured by the County are included in the plan.

# APPENDIX D MITIGATION ALTERNATIVES

**44 CFR Subsection D §201.6(c)(3)(ii):** [The mitigation strategy section shall include] a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

As part of the process of developing the mitigation action plan found in Section 7, the HMPC reviewed and considered a comprehensive range of mitigation options before selecting the actions identified for implementation. This section summarizes the range of mitigation measures evaluated and considered by the HMPC, including a review of the categories of mitigation measures outlined in the 2017 CRS Coordinator's Manual, a discussion of current local implementation and CRS credits earned by Pickens County for those measures, and a list of the specific mitigation projects considered and recommended for implementation.

Mitigation alternatives identified for implementation by the HMPC were evaluated and prioritized using the criteria discussed in Section 7 of this plan.

## D.1 CATEGORIES OF MITIGATION MEASURES CONSIDERED

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified planning goals. The HMPC was provided with the following list of mitigation categories which are utilized as part of the CRS planning process.

- Prevention
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services
- Public Information and Outreach

## D.2 ALTERNATIVE MITIGATION MEASURES PER CATEGORY

Note: CRS Credit Sections are based on the 2017 CRS Coordinator's Manual.

### *D.2.1 PREVENTATIVE AND REGULATORY MEASURES*

Preventative measures are designed to keep a problem from occurring or from getting worse. The objective of preventative measures is to ensure that future development is not exposed to damage from hazards and does not cause an increase in damages to other properties. Building, planning, and code enforcement offices usually administer preventative measures. Some examples of types of preventative measures include:

- Building codes
- Zoning regulations
- Comprehensive or land use plans
- Open space preservation

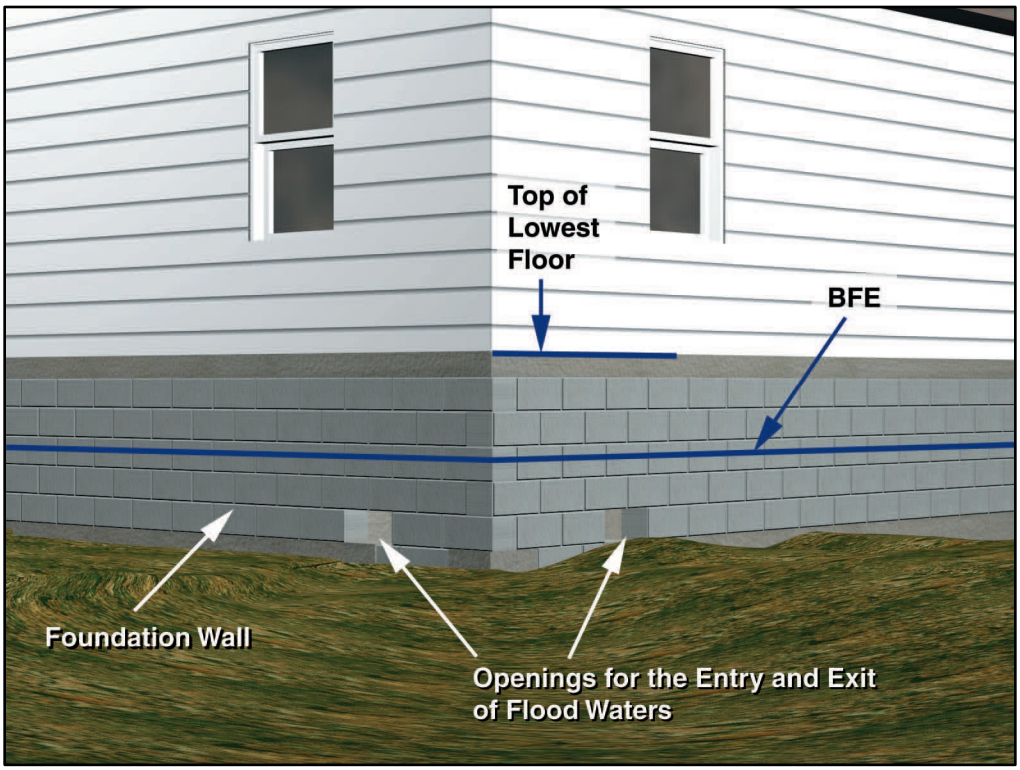
- Floodplain regulations
- Subdivision regulations
- Stormwater management regulations

### BUILDING CODES

Building codes provide one of the best methods for addressing the impact of natural hazards on structures. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 1-percent-annual-chance flood. This is shown in the figure below. Building codes can also mitigate against other hazards, such as seismic standards, anchoring for manufactured homes or fuel tanks, soil type and stability requirements, and wind bracing requirements.

Just as important as having code standards is the enforcement of the code. Adequate inspections are needed throughout construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly elevated and anchored requires site inspections at each step.

**Building Codes and Flood Elevations**




Source: FEMA Publication: Above the Flood: Elevating Your Flood prone House, 2000

ASCE 24 is a referenced standard in the International Building Code (IBC). Any building or structure that falls within the scope of the IBC that is proposed in a flood hazard area is to be designed in accordance with ASCE 24. Freeboard is required as a function of the nature of occupancy and the flood zone.

### COMPREHENSIVE OR LAND USE PLAN

Building codes provide guidance on how to build in hazardous areas. Planning and zoning activities direct development away from these areas, particularly floodplains and wetlands. They do this by designating land uses that are compatible with the natural conditions of land that is prone to flooding, such as open

space or recreation. Land use planning could also be used to direct new development away from areas with high wildfire risk or areas downstream from dams.

### OPEN SPACE PRESERVATION

Keeping the floodplain and other hazardous areas open and free from development can be the simplest approach to preventing damage to new development. Open space can be maintained in agricultural use or can serve as parks, greenway corridors, golf courses, and other recreation areas.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced, or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

Although there are some federal programs that can help acquire or reserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes.

### ZONING ORDINANCE

Zoning enables a community to designate what uses are acceptable on a given parcel. Zoning can ensure compatibility of land use with the land's level of suitability for development. Planning and zoning activities can also provide benefits by allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach. Zoning regulations describe what type of land use and specific activities are permitted in each district, and how to regulate how buildings, signs, parking, and other construction may be placed on a lot. Zoning regulations also provide procedures for rezoning and other planning applications. The zoning map and zoning regulations provide properties with certain rights to development.

### FLOODPLAIN REGULATIONS

A Flood Damage Prevention Ordinance sets development standards for Special Flood Hazard Areas (SFHAs). Communities participating in the National Flood Insurance Program (NFIP) are required to adopt a flood damage prevention ordinance that meets at least the minimum standards of the NFIP; however, a community can incorporate higher standards for increased protection. For example, communities can adopt higher regulatory freeboard requirements, cumulative substantial damage definitions, fill restrictions, and other standards.

Another important consideration in floodplain regulations is the protection of natural and beneficial functions and the preservation of natural barriers such as vegetation. Vegetation along a stream bank is extremely beneficial for the health of the stream. Trees and other plants have an extensive root system that strengthen stream banks and help prevent erosion. Vegetation that has sprouted up near streams should remain undisturbed unless removing it will significantly reduce a threat of flooding or further destruction of the stream channel.

### STORMWATER MANAGEMENT REGULATIONS

Stormwater runoff is increased when natural ground cover is replaced by urban development. Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality. There are three ways to prevent flooding problems caused by stormwater runoff:

1. Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties;
2. Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions; and
3. Set construction standards so buildings are protected from shallow water.

## REDUCING FUTURE FLOOD LOSSES

Zoning and comprehensive planning can work together to reduce future flood losses by directing development away from hazard prone areas. Creating or maintaining open space is the primary way to reduce future flood losses.

Planning for open space must also be supplemented with development regulations to ensure that stormwater runoff is managed, and that development is protected from flooding. Enforcement of the flood damage prevention ordinance and the flood protection elevation requirement provides an extra level of protection for buildings constructed in the planning area.

Stormwater management and the requirement that post-development runoff cannot exceed pre-development conditions is one way to prevent future flood losses. Retention and detention requirements also help to reduce future flood losses.

## *POTENTIAL CRS CREDIT*

The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on a community's Building Code Effectiveness Grading Schedule (BCEGS) classification and points are awarded for adopting the International Code series. The South Carolina Building Codes Council adopts mandatory codes to be enforced by all South Carolina municipalities. As of January 2023, Pickens County and its incorporated communities enforce the 2021 International Building Code with SC modifications.

CRS credits are available for regulations that encourage developers to preserve floodplains or other hazardous areas away from development. Pickens County currently receives credit for a 1-foot freeboard requirement, foundation protection, and a cumulative substantial improvement definition under Activity 430 – Higher Regulatory Standards. Pickens County also receives credit for Activity 450 – Stormwater Management for enforcing regulations for soil and erosion control and water quality. To increase credit and flood damage prevention, Pickens County could work with local land trusts to preserve land that includes the SFHA and receive credit for Activity 420 – Open Space Preservation. Preserving flood prone areas as open space is one of the highest priorities of the CRS program.

Several prevention actions considered by the HMPC are detailed below.

## *LOCAL IMPLEMENTATION ALTERNATIVES*

**Prevention Mitigation Options and Recommended Projects**

| Action # | Mitigation Action | Recommended? | Funding |
|---|---|---|---|
| 1 | Identify vulnerable populations | Yes. Identifying vulnerable populations will enable planning activities to mitigate vulnerability. | General Fund, Duke Energy |
| 6 | Develop and maintain a building inventory that contains information regarding location, type of structure, construction material, date of construction and modification, whether the building is consistent with current building codes, and other pertinent information | Yes. Improving the building inventory with additional attribute data will enable the identification of vulnerability and appropriate mitigation projects. | General Fund |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | Yes. Riparian buffers will protect against the impacts of future development on flood | General Fund |

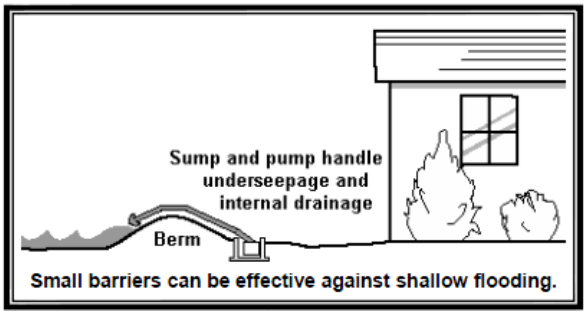
## D.2.2 PROPERTY PROTECTION MEASURES

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building;
- Modify the building (retrofit) so it can withstand the impacts of the hazard; and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency.

Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reaching a house.



Small barriers can be effective against shallow flooding.

There are five common methods to keep a flood from reaching and damaging a building:

- Erect a barrier between the building and the source of the flooding.
- Move the building out of the flood-prone area.
- Elevate the building above the flood level.
- Demolish the building.
- Replace the building with a new one that is elevated above the flood level.

The latter three approaches are the most effective types to consider for the planning area.


This low floodwall has landscaping to minimize the adverse impact on the property's appearance.

### BARRIERS

A flood protection barrier can be built of dirt or soil (a "berm") or concrete or steel (a "floodwall"). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier. Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained.


Small, wood frame buildings are the easiest to relocate

Source: Kennedy House Movers, Huntsville, AL

### RELOCATION

Moving a building out of a flood prone area to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

### BUILDING ELEVATION

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents. Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

### DEMOLITION

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is safer and more cost effective to demolish them and either replace them with new, flood protected structures, or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move—such as larger, slab foundation or masonry structures—and for dilapidated structures that are not cost-beneficial to protect.



Demolishing a repetitively flooded home

### PILOT RECONSTRUCTION

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood protection codes. FEMA funding programs refer to this approach as "pilot reconstruction." It is still a pilot program, and not a regularly funded option. Certain rules must be followed to qualify for federal funds for pilot reconstruction.

### RETROFITTING

An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. This strategy can mitigate flooding, hurricane, severe weather, and other hazards. There are two primary techniques for flood retrofitting, as described below.

- **Dry Floodproofing**
  Dry floodproofing means making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

  Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

- **Wet Floodproofing**
  The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

### INSURANCE

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures in the process. Insurance offers the advantage of protecting the property, so long as the policy is in force, without requiring human intervention for the measure to work.

- **Private Property**
  Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area. Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Contents coverage can be purchased separately. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. Most people don't realize that there is a 30-day waiting period to purchase a flood insurance policy and there are limits on coverage.
- **Public Property**
  Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

### *POTENTIAL CRS CREDIT*

The CRS provides the most credit points for acquisition and relocation under Activity 520, because this measure permanently removes insurable buildings from the floodplain. Pickens County could receive credit for Activity 520 – Acquisition and Relocation, for acquiring or relocating buildings from the SFHA.

The CRS also credits barriers and elevating existing buildings under Activity 530. The credit for Activity 530 is based on the combination of flood protection techniques used and the level of flood protection provided. Points are calculated for each protected building. Bonus points are provided for the protection of repetitive loss buildings and critical facilities. Pickens County could receive credit for Activity 360 – Flood Protection Assistance by providing advice and assistance to homeowners who may want to flood proof their home or business. Advice is provided both on property protection techniques and on financial assistance programs to help fund mitigation.

Flood insurance information for each community is provided in Section 6. There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that, among other topics, explain flood insurance to property owners. These efforts are discussed under Public Information and Outreach.

Property protection mitigation options considered by the HMPC are described below.

### *LOCAL IMPLEMENTATION ALTERNATIVES*

**Property Protection Mitigation Options and Recommended Projects**

| Action # | Mitigation Action | Recommended? | Funding |
|---|---|---|---|
| 7 | Establish specific mitigation strategies for extremely vulnerable structures identified during the development of the building inventory. | Yes. Mitigation actions can be identified on a case-by-case basis and tracked in a County building inventory. | Federal Grant Funds |

| Action # | Mitigation Action | Recommended? | Funding |
|---|---|---|---|
| 62 | Acquire and install backup generators for critical facilities to maintain continued operations during hazard events. | Yes. Critical facility protection is a priority and goal of this plan. | Local Funds, State & Federal Grant Funds |
| 63 | Pursue the acquisition or elevation of repetitive loss properties and properties in high-risk areas. | Yes. Properties in known high risk areas and with repeated losses will continue to be damaged without mitigation. | Local Funds, State & Federal Grant Funds |
| 64 | Retrofit critical facilities to protect against severe weather impacts. | Yes. Critical facility protection is a priority and goal of this plan. | Local Funds, State & Federal Grant Funds |

## *D.2.3 NATURAL RESOURCE PROTECTION*

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and stormwater in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. This section covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Six areas were reviewed:

- Wetland protection
- Erosion and sedimentation control
- Stream/River restoration
- Best management practices
- Dumping regulations
- Farmland protection

In general, a comprehensive natural resource protection plan can establish a complete set of standards, including the approaches, to protect, conserve and enhance natural resources. A comprehensive approach can integrate local planning and policy tools to achieve this aim, enable preservation of interconnected expanses of natural resource areas, and provide municipal officials, local developers and landowners a clearer understanding of the natural resources that need to be protected during the development review process. It also permits a municipality to more easily adapt its ordinances in order to address emerging environmental issues.

Comprehensive resource protection standards inherently conserve energy because they improve environmental conditions without the need for mechanical infrastructure that requires energy to operate. Vegetated floodplains reduce flooding and flood damage which requires reconstruction, and thus energy to reverse. Similarly, vegetated wetlands improve water quality and reduce runoff lowering energy

consumption used in water treatment plants. Riparian buffers and vegetated steep slopes reduce runoff and erosion thus improving water quality. Healthy forests and wooded areas also serve this function, and also create wind breaks, which reduce wind chill on houses and lower heating costs in winter. In summer, tall trees near buildings reduce the need for air condition through shading the structures and also release water from their leaves which cools the structure's surfaces.

However, comprehensive natural resource protection programs take time, resources, and technical expertise to complete, and they require a long-term commitment to educate municipal officials for successful implementation, administration, and ongoing public education.

### WETLAND PROTECTION



Wetlands are often found in floodplains and topographically depressed areas of a watershed. Many wetlands receive and store floodwaters, slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants.

### EROSION AND SEDIMENTATION CONTROL

Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil. Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

### STREAM/RIVER RESTORATION

There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, stream banks, and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings that resist erosion along stream banks. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

### BEST MANAGEMENT PRACTICES

Communities are required by state and federal regulations to monitor storm water drainage outfalls and control storm water runoff.

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA. Nonpoint source pollutants come from non-specific locations and harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas, and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

### DUMPING REGULATIONS

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many cities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "non-objectionable" materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how re-grading their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

### FARMLAND PROTECTION

Farmland protection is an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads, and other infrastructure. Urban sprawl occurs, which can lead to additional stormwater runoff and emergency management difficulties.

Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land.

### *POTENTIAL CRS CREDIT*

Activity 420 of the CRS provides credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as protected from development by ownership or local regulations.

Additionally, credit is available for Activity 540 – Drainage System Maintenance. Having a portion of the drainage system inspected regularly throughout the year and maintenance performed as needed earns a community credit. Communities can also get credit under this activity for providing a listing of problem sites that are inspected more frequently, and for implementing an ongoing Capital Improvements Program to address drainage issues at these problem sites.

### *LOCAL IMPLEMENTATION ALTERNATIVES*

**Natural Resource Protection Mitigation Options and Recommended Projects**

| Action # | Mitigation Action | Recommended? | Funding |
|---|---|---|---|
| 51 | Mulch and establish riparian zone within City Parks to protect against park sedimentation | Yes. This project will reduce erosion and sedimentation and protect floodplain functions. | General Fund |
| 65 | Encourage agricultural best management practices to reduce erosion and sedimentation, including cover crops, intercropping, ditch stabilization, and livestock exclusion. | Yes. Erosion and sedimentation is an ongoing issue that causes flooding, reduces water supply capacity, and harms water quality. | General Fund |
| 66 | Implement streambank stabilization and stream restoration along the Saluda River to repair unstable banks and reduce erosion and sedimentation that degrades natural floodplain functions and downstream reservoir capacity. | Yes. Erosion and sedimentation from farmland along the Saluda River is an ongoing issue that causes flooding, reduces water supply capacity, and harms water quality. | Local Funds, State & Federal Grant Funds |
| 67 | Adopt a riparian buffer requirement along water bodies to reduce erosion and sedimentation, protect natural floodplain functions from adjacent land uses, and reduce the need for dredging in downstream reservoirs. | Yes. Riparian buffers will protect against the impacts of future development on flood | General Fund |

## *D.2.4 EMERGENCY SERVICES MEASURES*

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. This section reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

### THREAT RECOGNITION

The first step in responding to a flood is to know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

The National Weather Service (NWS) is the prime agency for detecting meteorological threats. Severe weather warnings are transmitted through NOAA's Weather Radio System, Interactive NWS (iNWS) alerts, and FEMA's Integrated Public Alert & Warning System (IPAWS). Local emergency managers can then provide more site-specific and timely recognition after the NWS issues a watch or a warning. A flood threat

recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On smaller rivers and streams, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach can provide advance notice of potential local or flash flooding.

### WARNING

The next step in emergency response following threat recognition is to notify the public and staff of other agencies and critical facilities. More people can implement protection measures if warnings are early and include specific detail.

The NWS issues notices to the public using two levels of notification:

- Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.
- Warning: a flood, tornado, etc., has started or been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- CodeRED countywide mass telephone emergency communication system
- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should include a public information component.

### STORMREADY

The National Weather Service (NWS) established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather-related warnings for the public. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public
- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises

Being designated as an NWS StormReady community is a good measure of a community's emergency warning program for weather hazards. Pickens County is designated as StormReady.

### RESPONSE

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness)
- Closing streets or bridges (police or public works)
- Shutting off power to threatened areas (utility company)
- Passing out sand and sandbags (public works)
- Holding children at school or releasing children from school (school superintendent)
- Opening evacuation shelters (the American Red Cross)
- Monitoring water levels (public works)
- Establishing security and other protection measures (police)

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

### EVACUATION AND SHELTER

There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., disabled persons, prisoners, hospital patients, schoolchildren)

Those who cannot get out of harm's way need shelter. Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring in their pets, and the potential for an overcrowded facility.

### POST-DISASTER RECOVERY AND MITIGATION

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include providing safe drinking water, monitoring for diseases, vaccinating residents for tetanus and other diseases, clearing streets, and cleaning up debris and garbage. Additionally, there should be an effort to help prepare people and property for the next disaster, including:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work
- Evaluating damaged public facilities to identify mitigation that can be included during repairs
- Identifying other mitigation measures that can lessen the impact of the next disaster
- Acquiring substantially or repeatedly damaged properties from willing sellers
- Planning for long-term mitigation activities

- Applying for post-disaster mitigation funds

To formalize the incorporation of mitigation into post-disaster redevelopment, communities may adopt post-disaster redevelopment plans and ordinances. Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

### *POTENTIAL CRS CREDIT*

Weather watches and warnings are issued by NWS Offices, which have the local and county warning responsibility. Flood warnings are forecasts of coming floods, distributed to the public by the NOAA Weather Radio, commercial radio and television, and through local emergency agencies. The warning message tells the expected degree of flooding, the affected river, when and where flooding will begin, and the expected maximum river level at specific forecast points during flood crest.

Pickens County could receive credit for Activity 610 – Flood Warning Program for maintaining a program that provides timely identification of impending flood threats, disseminates warnings to appropriate floodplain residents, and coordinates flood response activities. CRS credits are based on the number and types of warning media that can reach the community's flood prone population. Depending on the location, communities can receive credit for the telephone calling system and more credits for additional measures, like telephone trees. Being designated as a StormReady community also provides credit. Additionally, CRS credit is available for post-disaster mitigation policies and procedures if they are incorporated into a flood mitigation plan or multi-hazard mitigation plan.

### *LOCAL IMPLEMENTATION ALTERNATIVES*

**Emergency Services Mitigation Options and Recommended Projects**

| Action # | Mitigation Action | Recommended | Funding |
|---|---|---|---|
| 10 | Increase training and capability of response teams and communication/integration with mutual aid assets. | Yes. This project will improve and expand response capability. | General Fund |
| 17 | Institute a standard warning system for dam failure. | Yes. Many dams have increased in hazard class. Emergency warnings will protect life safety. | 911 Funds |
| 22 | Training and equipment for the Swiftwater Rescue Team. | Yes. This project will improve response capability of existing resources. | General Fund |
| 26 | Strengthen the efforts of trained volunteers within the Storm Ready County program | Yes. This project will expand response capability. | Local Emergency Management Performance Grant |

## D.2.5 STRUCTURAL PROJECTS

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings.
- Many projects can be built without disrupting citizens' homes and businesses.
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures also have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

- Advantages
    - They may provide the greatest amount of protection for land area used
    - Because of land limitations, they may be the only practical solution in some circumstances
    - They can incorporate other benefits into structural project design, such as water supply and recreational uses
    - Regional detention may be more cost-efficient and effective than requiring numerous small detention basins
- Disadvantages
    - They can disturb the land and disrupt natural water flows, destroying wildlife habitat
    - They require regular maintenance
    - They are built to a certain flood protection level that can be exceeded by larger floods
    - They can create a false sense of security
    - They promote more intensive land use and development in the floodplain

### LEVEES AND FLOODWALLS

Probably the best-known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour.

### RESERVOIRS AND DETENTION

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, and then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply, which could also help provide drought mitigation.



Retention pond

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

#### DIVERSION

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

#### *POTENTIAL CRS CREDIT*

Structural flood control projects that provide flood protection to at least the level of the 1% annual chance flood and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS so as not to duplicate the larger premium reduction provided by removing properties from the mapped floodplain. Other flood control projects can be accepted by offering a 25-year flood protection.

#### *LOCAL IMPLEMENTATION ALTERNATIVES*

**Structural Projects Mitigation Options and Recommended Projects**

| Action # | Mitigation Action | Recommended? | Funding |
|---|---|---|---|
| 9 | Assess frequently flooded roadways throughout all jurisdictions of the county for roadway and drainage improvement projects | Yes. This action can tie into problem site maintenance and capital improvement planning to reduce localized stormwater flooding. | General Fund |
| 31 | Retrofit existing infrastructure susceptible to flooding to a flood resistant level. | Yes. Protection of critical facilities and infrastructure is a priority and goal of this plan. | General Fund |
| 53 | Enlarge culverts in flood prone areas and assist residents with cost of replacing culverts. | Yes. This effort can help address localized stormwater flooding. | Local Funds, State & Federal Grant Funds |

## *D.2.6 PUBLIC INFORMATION*

#### OUTREACH PROJECTS

Outreach projects are the first step in the process of orienting property owners to the hazards they face and to the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties.

Awareness of the hazard is not enough; people need to be told what they can do about the hazard. Thus, projects should include information on safety, health and property protection measures. Research has shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community. In the case of floods, they can be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

### LIBRARIES AND WEBSITES

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for floods or a website about floods for children.

### TECHNICAL ASSISTANCE

- **Hazard Information**
  Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Communities can easily provide map information from FEMA's FIRMs and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

  Some communities supplement what is shown on the FIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never flood.

- **Property Protection Assistance**
  While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track. Building or public works department staffs can provide the following types of assistance:

  - Visit properties and offer protection suggestions
  - Recommend or identify qualified or licensed contractors
  - Inspect homes for anchoring of roofing and the home to the foundation
  - Explain when building permits are needed for home improvements.

### PUBLIC INFORMATION PROGRAM

A Program for Public Information (PPI) is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A PPI consists of the following parts:

- The local flood hazard
- The property protection measures appropriate for the flood hazard
- Flood safety measures appropriate for the local situation
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies
- Goals for the community's public information program
- The outreach projects that will be done each year to reach the goals
- The process that will be followed to monitor and evaluate the projects

### *POTENTIAL CRS CREDIT*

Pickens County receives credit under Activity 330 – Outreach Projects as well as Activity 350 – Flood Protection Information. Credit is provided for targeted and general outreach projects and for making publications relating to floodplain management available in the reference section of the local library.

### *LOCAL IMPLEMENTATION ALTERNATIVES*

**Public Information and Outreach Mitigation Options and Recommended Projects**

| Action # | Mitigation Action | Recommended? | Funding |
|---|---|---|---|
| 13 | Educate public about the importance of weather radios and where to obtain them. | Yes. This project will improve all hazards awareness and preparedness. | General Fund |
| 25 | Educate public about severe weather and safety strategies. | Yes. This project will improve all hazards preparedness and encourage public action on personal safety during severe weather. | General Funds |
| 27 | Conduct public education specifically targeting the communities at highest risk of dam failure regarding dam failure notification and evacuation routes. | Yes. Many dams have increased in hazard class. Providing outreach to the public about dam failure procedures will increase awareness of the hazard and protect life safety. | 911 Funds |

# APPENDIX E REFERENCES


- Buis, Alan. Can Climate Affect Earthquakes, Or Are the Connections Shaky? October 29, 2019. https://climate.nasa.gov/news/2926/can-climate-affect-earthquakes-or-are-the-connections-shaky/
- City of Clemson Comprehensive Master Plan, 2019.
- City of Easley Comprehensive Plan, 2022.
- City of Pickens Downtown Master Plan, 2013.
- Chernet, Haregewoin Haile. 2013. The Impact of Climate Change on Dam Safety and Hydropower.
- Dai, Aiguo & National Center for Atmospheric Research Staff (Eds). Last modified 12 Dec 2019. "The Climate Data Guide: Palmer Drought Severity Index (PDSI)." Retrieved from https://climatedataguide.ucar.edu/climate-data/palmer-drought-severity-index-pdsi.
- Diffenbaugh, Noah S., Scherer, Martin, and Trapp, Robert J. Robust increases in severe thunderstorm environments in response to greenhouse forcing. Proceedings of the Natural Academy of Sciences of the United States of America. September 23, 2013. https://doi.org/10.1073/pnas.1307758110
- FEMA 386-1: Getting Started. September 2002.
- FEMA 386-2: Understanding Your Risks: Identifying Hazards and Estimating Losses. August 2001.
- FEMA 386-3: Developing the Mitigation Plan. April 2003.
- FEMA 386-4: Bringing the Plan to Life. August 2003.
- FEMA 386-5: Using Benefit-Cost Review in Mitigation Planning. May 2007.
- FEMA 386-6: Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning. May 2005.
- FEMA 386-7: Integrating Manmade Hazards into Mitigation Planning. September 2003.
- FEMA 386-8: Multijurisdictional Mitigation Planning. August 2006.
- FEMA 386-9: Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects. August 2008.
- FEMA. Local Mitigation Planning Handbook. March 2013.
- FEMA. Local Mitigation Planning Policy Guide. April 2022.
- FEMA. Local Mitigation Plan Review Guide. October 1, 2011.
- FEMA National Fire Incident Reporting System 5.0: Complete Reference Guide. January, 2008.
- FEMA Hazard Mitigation Assistance Unified Guidance. June 1, 2010.
- FEMA. Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials. March 1, 2013.
- FEMA. Disaster Declarations Summary, November 2022.
- FEMA. Mitigation Ideas. A Resource for Reducing Risk to Natural Hazards. January 2013.
- FEMA. Community Information System, 2023.
- FEMA. Pickens County and Incorporated Areas Flood Insurance Study. Revised December 21, 2017.
- James B. Elsner, Svetoslava C. Elsner, and Thomas H. Jagger. The increasing efficiency of tornadoes in the United States. Climate Dynamics/vol. 45 issue 3-4, pp 651-659.
- NASA. Severe thunderstorms and climate change. April 7, 2013. https://climate.nasa.gov/news/897/severe-thunderstorms-and-climate-change/
- National Climate Assessment, 2014.
- National Drought Mitigation Center, Drought Impact Reporter.
- National Integrated Drought Information System, U.S. Drought Portal.
- National Weather Service.
- NOAA, National Centers for Environmental Information, Storm Events Database.
- OnePickens County Comprehensive Plan.

- Pickens County Emergency Operations Plan, 2021.
- Pickens County Unified Development Standards Ordinance, 2019.
- South Carolina Fire Department
- South Carolina Department of Health and Environmental Control, Dam Inventory.
- Southern Wildfire Risk Assessment, 2022.
- U.S. Army Corps of Engineers, National Inventory of Dams.
- U.S. Census Bureau. American Community Survey 2016-2020 5-Year Estimates.
- U.S. Drought Monitor. October 25, 2022.
- U.S. Geological Survey Earthquake Hazards Program, Earthquake Catalog.
- U.S. Global Change Research Program, 2016: The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. http://dx.doi.org/10.7930/J0R49NQX
- USGCRP, 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp., doi: 10.7930/J0J964J6.
- VAISALA, National Lightning Detection Network.