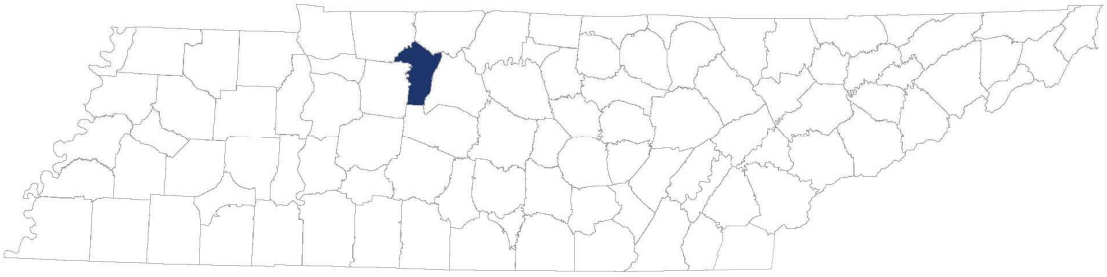
Cheatham County
Hazard Mitigation Plan

2022 Update



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Assistance Provided By:

Tennessee Emergency Management Agency
as part of the Tennessee Mitigation Initiative

Executive Summary

Over the past two decades, hazard mitigation has gained increased national attention due to the large number of natural disasters that have occurred throughout the U.S. and the rapid rise in costs associated with those disaster recoveries. It has become apparent that money spent mitigating potential impacts of a disaster event can result in substantial savings of life and property. With these benefit cost ratios being extremely advantageous, the Disaster Mitigation Act of 2000 was developed as U.S. Federal legislation that reinforces the importance of pre-disaster mitigation planning by calling for local governments to develop mitigation plans *(44 CFR 201)*.

The purpose of a local hazard mitigation plan is to identify the community's notable risks and specific vulnerabilities, and then to create and implement corresponding mitigation projects to address those areas of concern. This methodology helps reduce human, environmental, and economic costs from natural and man-made hazards through the creation of long-term mitigation initiatives.

The advantages of developing a local hazard mitigation plan are numerous and include improved post-disaster decision making, education on mitigation approaches, and an organizational method for prioritizing mitigation projects. Communities with a mitigation plan receive larger amounts of Federal and State funding to be used on mitigation projects and receive these funds faster than communities without a plan.

This 2022 update of the Cheatham County Hazard Mitigation Plan addresses Pre-Disaster Mitigation, Flood Mitigation Assistance, and Hazard Mitigation Grant Program requirements. To ensure success, each jurisdiction within the county participated in the preparation of the update, including:

- Cheatham County
- Town of Ashland City (County Seat)
- Town of Kingston Springs
- Town of Pegram
- City of Pleasant View

In reference to federal code title *44 CFR 201*, an updated hazard mitigation plan is required to be re-submitted to both TEMA (State) and FEMA (Federal) for review every five years. When the plan is deemed "approval pending adoption" by FEMA *(44 CFR 201.6(c)5)*, each of the participating jurisdictions will adopt the plan through a local resolution.

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1. The Planning Process

This chapter describes the planning process undertaken by Cheatham County in the preparation of this Hazard Mitigation Plan Update.

1.1 Purpose and Need, Authority and Statement of Problem

1.1.1 Purpose and Need

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 hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. The purpose of this Plan is to identify, assess, and mitigate risk to better protect the people and property of Cheatham County from the effects of natural and man-made hazards. This Plan documents the hazard mitigation planning process and identifies relevant hazards, vulnerabilities, and strategies the County and incorporated jurisdictions will use to decrease vulnerability and increase resiliency and sustainability.

This Plan demonstrates the participating communities' commitment to reducing risks from identified hazards and serves as a tool to help decision-makers direct mitigation activities and resources. This Plan will ensure the involved communities' continued eligibility for federal disaster assistance including the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP), Building Resistant Infrastructure and Communities (BRIC), and the Flood Mitigation Assistance Program (FMA).

1.1.2 Authority

This Hazard Mitigation Plan has been adopted by Cheatham County and all participating jurisdictions in accordance with the authority granted to local communities by the State of Tennessee. This Plan was updated in accordance with state and federal rules and regulations governing local hazard mitigation plans. The Plan shall be monitored and updated every five years to remain eligible for hazard mitigation grants. The following legislation was used for guidance:

- 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 the Disaster Mitigation Act of 2000 (DMA 2000) Public Law 106-390 of October 30, 2000, as implemented at 44 CFR 201.6 and 201.7 dated October 2011.
- Tennessee Code Annotated
  - **T.C.A. 58-2-106(b)(16)**
  - **T.C.A. 58-2-106(b)(1)**
  - **T.C.A. 58-2-103(a)(5)**

1.1.3 Statement of Problem

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. Unfortunately, this only partially reflects the cost of disasters because additional expenses incurred by insurance companies and non-

governmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be reduced or even eliminated.

The original Cheatham County Hazard Mitigation Plan was created and approved by FEMA in 2017. Per federal requirements stated in *44 CFR 201*, all local hazard mitigation plans are required to go through a FEMA approval process every five years to remain eligible for hazard mitigation grants. This plan will be re-evaluated and updated every five years to ensure local governments are continuing to assess the hazards and risks within their communities. Each plan will consider the above stated variables as well as the resources and capabilities within the jurisdictions to ensure mitigation projects are implemented that can reduce community vulnerabilities.

This plan update has been prepared to meet requirements set forth by FEMA and the Tennessee Emergency Management Agency (TEMA) to ensure Cheatham County is eligible for funding and technical assistance from state and federal hazard mitigation programs.

1.2 Local Methodology, Update Process, and Participation Summary

44 CFR Subsection D §201.6(b): An open public involvement process is essential to the development of an effective plan. In order 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 Subsection D §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.

This Hazard Mitigation Plan was developed under the guidance of a Hazard Mitigation Planning Committee (HMPC). The Committee included representatives of Cheatham County, Ashland City, Kingston Springs, Pegram, Pleasant View, state agencies, and other community members.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. This plan identifies activities that can be undertaken by both the public and the private sectors to reduce risk to safety, health and property caused by natural and man-made hazards.

1.2.1 Local Government Participation

The planning regulations and guidance stress that 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.

For the HMPC, "participation" meant the following:

- Providing facilities for meetings;
- Attending and participating in the HMPC meetings;
- Collecting and providing other requested data (as available);
- 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 the appropriate governing body.

The HMPC met all the above stated participation requirements. Cheatham County, Ashland City, Kingston Springs, Pegram, and Pleasant View participated in the 2022 Plan update, as well as reviewed and provided timely comments on all draft components of the Plan. A summary of past and current community participation is shown below in *Table 1*. All participants were invited to this committee via email. Those who did not originally respond were reached out to by the EMA director via phone.

Table 1 Multi-jurisdictional HMPC Participation

Jurisdiction	2017 Participation	2022 Participation
Cheatham County	X	X
Ashland City	X	X
City of Kingston Springs	X	X
City of Pelgram	X	X
City of Pleasant View	X	X

The HMPC for the 2022 plan update included key community representatives. *Table 2* details the HMPC members, meeting dates and committee member attendance. The EMA director invited individuals who represented regional and local agencies that have authority in regulating county/city development as well as respond to the identified hazards of prime concern. An email was sent out to key stakeholders on June 2, 2022 inviting them to the meeting and emphasizing the importance of attendance. The template used for this email is located in Appendix C. These partners include jurisdictional police, fire, public works, building/codes, health departments, the county school board, elected officials and electric utility companies. All committee members provided key information to recognize and mitigate hazards of prime community concern withing the whole county and its incorporated jurisdictions. One jurisdiction, Ashland City, was unable to attend the initial public meeting. A separate meeting was set up to review the public meeting notes and discuss jurisdiction specific information on July 14, 2022. A more detailed summary of HMPC meeting dates including topics discussed and meeting locations follows in *Table 3*. Meeting sign-in sheets are included in Appendix C.

Table 2 HMPC Members

Name	Title	Organization	Meeting Dates	
			6/21/2022	7/14/2022

Linda Nichols	Director	Cheatham Co. 911	X	
John Louallen	Mayor	Town of Pegram	X	
Tiffany Holder	Asst. Director	Cheatham County EMA	X	X
Edwin Hogan	Director	Cheatham County EMA	X	X
Mark Gains	Building Commissioner	Town of Pleasant View	X	
Jennifer Boyd	Admin. Assistant	Highway Dept.	X	
John Lawless	City Manager	Kingston Springs	X	
Kerry McCarver	Mayor	Cheatham County	X	
Kurt Sala	EHS Manager	A.O Smith	X	
Kim Kassander	Regional Planning Manager	TEMA	X	
Pete Griffin	District Coordinator	TEMA	X	
Cindy Burney	Assessor	Cheatham Co.	X	
Janice Weiss		Soil and Water Conservation	X	
Autumn Joanow	Middle Region Planner	TEMA	X	X
Allen Nicholson	Director	Ashland City Building and Codes		X
Gary Carpenter	Inspector	Ashland City Building and Codes		X

1.2.2 Planning Process

The planning Process for preparing the 2022 Cheatham County Hazard Mitigation Plan update was based upon guidance put forth by FEMA. This guidance proposed a structured four-phase process as follows:

1) Planning Process
2) Risk Assessment
3) Mitigation Strategy
4) Plan Maintenance

Phase I – Planning Process

Organize to Prepare the Plan

The planning process officially began with a meeting held on June 21, 2022 at 9 AM at the Cheatham County Emergency Operations Center (100 Public Square, Suite 90 Ashland City, TN 37015). The meeting covered the scope of hazard mitigation, the purpose of planning, eligible grants, risk assessments and vulnerabilities impacting the community. During the planning process, the committee communicated through face-to-face meetings, email, and telephone conversations. The neighboring communities were given an opportunity to be involved in the planning process with email invitations for the planning process, none attended.

Sign-in sheets from the meeting are included in Appendix C. The meeting date and topics discussed are summarized below in *Table 3*. This meeting was open to the public.

Table 3 Summary of HPMC Meetings

Meeting Number	Meeting Topic	Meeting Date	Meeting Location
Meeting #1	Introduction of HMPC Members	6/21/2022 09:00 AM	Cheatham County Emergency Operations Center
	Review of Hazard Mitigation		
	Review of the Hazard Mitigation Plan		
	Explanation of the Planning Process		
	Analyze the Hazard Risk Assessment		
	Assess County Vulnerabilities		
	Discuss County Growth		
	Discuss Grant Program Opportunities (HMGP, BRIC, FMA)		
	Reviewing 2016 Plan Goals (Discuss and Confirm)		
	Discuss grant eligible projects and actions		
	Discuss previews projects and actions		
	Discuss and update project list		
Meeting #2	Introduction of HMPC Members	7/14/2022 09:00 AM	Cheatham County Emergency Management Office
	Review of Hazard Mitigation		
	Review of the Hazard Mitigation Plan		
	Explanation of the Planning Process		
	Analyze the Hazard Risk Assessment		
	Assess County Vulnerabilities		
	Discuss County Growth		
	Discuss Grant Program Opportunities (HMGP, BRIC, FMA)		
	Reviewing 2016 Plan Goals (Discuss and Confirm)		
	Discuss grant eligible projects and actions		
	Discuss previews projects and actions		
	Discuss and review notes from meeting #1		
	Discuss and update project list		

Involve the Public

Early discussions established the significance of involving the public. The HMPC agreed to an approach using established public information mechanisms and resources within the community. Public involvement activities for this plan update included public notices, stakeholder and public meeting, and the collection of public and stakeholder comments on the draft plan. Due to the nature of the public meetings, neighboring communities, agencies, utilities, academia, and other interested parties were given the opportunity to participate. The formal public meeting for this project is summarized in *Table 4.*

Table 4 Summary of Public Meeting

Meeting Number	Meeting Topic	Meeting Date	Meeting Location
Meeting #1	Introduction of HMPC Members	6/21/2022 09:00 AM	Cheatham County Emergency Operations Center
	Review of Hazard Mitigation		
	Review of the Hazard Mitigation Plan		
	Explanation of the Planning Process		
	Analyze the Hazard Risk Assessment		
	Assess County Vulnerabilities		
	Discuss County Growth		
	Discuss Grant Program Opportunities (HMGP, BRIC, FMA)		
	Reviewing 2016 Plan Goals (Discuss and Confirm)		
	Discuss grant eligible projects and actions		
	Discuss previews projects and actions		
	Discuss and update project list		

A public notice was on June 14, 2022 on Facebook by Cheatham County Emergency Management inviting members of the public to attend the June 21st, 2022 meeting.) Documentation to support the public outreach efforts can be found in Appendix C.

Coordination

Early in the planning process, the committee determined that the risk assessment, mitigation strategy development, and plan approval would be greatly enhanced by inviting other local partners and state to participate in the process. Coordination involved contacting these agencies through email and phone conversations. All groups and agencies were advised on how to become involved in the plan development process and were solicited asking for their assistance and input. A summary of agencies and organizations is as follows:

- Tennessee Emergency Management Agency
- Cheatham County 911 Center
- Cheatham County EMA
- Cheatham County Highway Department
- A.O Smith Manufacturing
- Soil and Water Conservation District (USDA)

Coordination with other community planning efforts was also paramount to the success of this plan. Mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Cheatham County uses a variety of planning mechanisms such as land development regulations and ordinances to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs.

Table 5 identifies the existing planning mechanisms that were reviewed and how they were incorporated into the 2022 Hazard Mitigation Plan Update.

Table 5 Planning Mechanism Review

Existing Planning Mechanism	Reviewed? (Yes/No)	Method of Use in Hazard Mitigation Plan
State Hazard Mitigation Plan	Yes	Identifying hazards, assessing vulnerabilities, mitigation strategies
Local Emergency Operations Plan	Yes	Identify major capabilities
Community Data Profile	Yes	Development trends, capability assessment
Stormwater Ordinance	Yes	Capability assessment, mitigation strategies
Building and Zoning Codes and Ordinances	Yes	Different years of code regulations utilized in different jurisdictions
Land Use Maps	Yes	Assessing vulnerabilities, development trends, mitigation strategies
Critical Facilities Maps	Yes	Assessing vulnerabilities, mitigation strategies
NOAA Archives	Yes	Analyze weather data and trends
U.S Census Bureau	Yes	Analyze community demographic data and trends

These and other documents were reviewed and considered, as appropriate, during the collection of hazard identification, vulnerability assessment, and capability assessment. Data from these plans and ordinances were incorporated into the risk assessment and hazard vulnerability sections of the plan as appropriate. The data was also used in determining the capability of the community in being able to implement certain mitigation strategies.

Phase II – Risk Assessment

Identify the Hazard and Assess the Problem

The committee completed a comprehensive effort to identify/update, document, and profile all hazards that have, or could have, an impact on the community. The committee also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the committee could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process and the results are included in Chapter 2 Hazard Identification and Risk Assessment.

Phase III – Mitigation Strategy

Set Goals and Review Possible Activities

This meeting facilitated brainstorming and discussion sessions that described the purpose and process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 3 Mitigation Strategy.

Draft an Action Plan

A complete first draft of the plan was prepared based on input from the meeting regarding the risk assessment, various agencies were invited to comment on this draft. Public and agency comments

were integrated into the final draft for TEMA and FEMA Region IV to review and approve, contingent upon final adoption by Cheatham County.

Phase IV – Plan Maintenance

Adopt the Plan

To secure buy-in and officially implement the plan, the plan was reviewed and adopted by the appropriate governing bodies.

Implement, Evaluate and Revise the Plan

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. Chapter 4 Plan Integration and Maintenance discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

1.3 Plan Update

CFR Subchapter D §201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

The 2017 Cheatham County Multi-Jurisdictional Hazard Mitigation Plan contained a risk assessment of identified hazards for the County and a mitigation strategy to address the risks and vulnerabilities from these hazards. Since that time, progress has been made by both the County and incorporated jurisdictions on implementation of the mitigation strategy with seven completed actions and one in progress. The HMPC has met over the previous five years to monitor, implement, and update the plan. This chapter includes an overview of the approach to updating the plan and identifies new analyses and information included in this plan update.

1.3.1 The New Plan

The updated plan involved a comprehensive review and revision of each section of the 2017 plan and included an assessment of the success of the County and the incorporated jurisdictions in evaluating, monitoring, and implementing the mitigation strategy outlined in the 2017 plan. Only the information and data still valid from the 2017 plan was carried forward as applicable into this update. The following requirements were addressed during this plan update process:

- 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.
- The discussion on growth and development trends was enhanced utilizing 2020 Census data.
- Enhanced public outreach and agency coordination efforts

1.3.2 2017 HMP Strategy Status

Past Goals and Objectives Update

The following table is an updated summary of the goals and objectives from the 2016 Cheatham County Hazard Mitigation Plan. The revised 2022 goals and objectives can be found in Chapter 3 Mitigation Strategy.

Past Mitigation Actions Update

Of these 21 actions, 4 have been completed, 5 are in-progress, and 12 have not yet been started due to a variety of reasons such as changes in priorities, lack of funding, or changes to the projects themselves. 11 of these projects are still considered viable and will be carried forward or revised in this plan update. Details and the status of all previous 2017 actions are in *Table* 6.

le 6 Mitigation Action Progress Summary (2017 Plan)

me	Action Description	Responsible Dept.	Location	Current Status			2017 Plan Update		Funding Source				Priority Score	
				Complete	In-Progress	Not yet Started	Delete Action	Carry Forward or Revise	HMGP	BRIC[1]	FMA	Local		
rol	Data Collection and modeling of existing water and sewage systems	Public Works Dept.	County-wide			X		X	X	X		X	2.9	$3 $5
	Study areas prone to flooding related road closures and make improvements as necessary	Highway Dept.	County-wide			X		X	X	X	X	X	2.8	N
nts	Purchase large drainage structures to improve water flow and replace collapsed structures	Highway Dept.	County-wide			X		X	X	X		X	2.8	N
tes	Updated flood maps of region	Floodplain office	County-wide	X			X				X		2.8	N
nt	Enforce NFIP requirements for all new and existing structures in a floodplain	Building Department	County-wide		X			X				X	2.8	N
n	Relocate school bus garages and county highway dept.	Highway Dept.	County	X			X		X	X		X	2.6	>$
n	Buy 3 houses and 4 lots located behind the elementary school on Chestnut St.	Public Works Dept.	Ashland City			X		X	X	X		X	2.6	$
ate rol	Partnership to build berm to prevent flooding that affects electrical substation,	Highway Dept.	Ashland City		X		X					X	2.4	>$

[1] C previously referred to as PDM in the 2017 Hazard Mitigation Plan

	city sewer plant, and largest businesses in jurisdiction to road access and prevent property damage													
ity	Move city water intake approx. 1 mile from Little Marrowbone Creek to Cumberland River	Public Works Dept.	Ashland City			X		X	X	X		X	2.2	$
ity	Stormwater master plan – hydraulically identify and prioritize stream flow issues affecting life and property	Floodplain Offices	Ashland City	X			X					X		$1
rm/ High Winds														
ent	Enforce building codes on new and existing structures and update building codes based on best practice standards	Building Departments	County -wide		X			X				X	2.8	N
ety	Public-private partnership to create tornado safe rooms	County EM	Ashland City			X		X				X	2.6	$
ety	Creation of Tornado Safe rooms at schools	Board of Education	All schools			X		X	X	X		X	2.6	>$
n	Mitigate utility lines by moving them underground and to areas where they will not be disturbed by falling trees	Electrical Dept.	County-wide			X		X	X	X		X	2.2	N
on ng	Place a tornado warning siren on Ashland City Fire Dept. Station 1 (Court Street)	County EM / Ashland FD	Ashland City	X			X		X	X		X	2.0	N
on ng	Place a tornado warning siren at Two Rivers Dept.	County EM/ Ashland FD	County			X		X	X	X		X	2.0	N

	Station 1 (2005 Pathway Road)													
on ng	Place a tornado warning siren at 480 Thompson Park	County EM / Pegram FD	Pegram			X		X	X	X		X	2.0	N
on ng	Place a tornado warning siren on Kingston Springs Fire Dept. (Kingston Springs Road)	County EM / Kingston FD	Kingston Springs			X		X	X	X		X	2.0	N
on ng	Place a tornado warning siren at Pleasant View Fire Dep. (New Hope Rd)	County EM / Pleasant View FD	Pleasant View			X		X	X	X		X	2.0	N
s														
n	Provide and Distribute Pamphlets on how to stay safe in natural hazards	County EM	County-wide		X			X	X		X	X	2.8	N
on ng	Weather radios for all homes and businesses	County EM	County-wide		X			X	X	X		X	2.8	N

1.4 Plan Update

The Cheatham County Multi-Jurisdictional Hazard Mitigation Plan is organized as follows:

- Chapter 1 – Planning Process
- Chapter 2 – Hazard Identification and Risk Assessment
- Chapter 3 – Mitigation Strategy
- Chapter 4 – Plan Integration and Maintenance
- Appendix A – Community Assessment
- Appendix B – FEMA HAZUS
- Appendix C – Planning Documents
- Appendix D – References

Chapter 1 Planning Process provides an overview of the plan update process including the methodology used to update the plan and details regarding those who participated in the planning process. It also provides a community overview involving demographic data and community development.

Chapter 2 Hazard Identification and Risk Assessment is presented as three different elements: Hazard Identification, Risk Assessment, and a Vulnerability Assessment. Together, these elements serve to identify, analyze, and assess Cheatham County's overall risk to natural and technological hazards. The HRV builds on available historical data from previous occurrences, establishes hazard-by-hazard profiles, and culminates in a hazard risk priority or ranking based on conclusions about the frequency of occurrence, potential impact, spatial extent, warning time, and duration of each hazard. The HRV is designed to assist communities in seeking the most appropriate mitigation actions to pursue and implement by focusing their efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk.

Chapter 3 Mitigation Strategy consists of broad goal statements as well as specific mitigation actions for each jurisdiction participating in the planning process. This updated strategy provides the foundation for detailed mitigation action plans that link jurisdictionally specific mitigation actions to locally assigned implementation mechanisms and target completion dates. This chapter is designed to make the plan more functional through the identification of both Cheatham-term goals and near-term actions that will guide day-to-day decision-making and project implementation.

Chapter 4 Plan Integration and Maintenance includes the measures Cheatham County will take to ensure the plan's continuous implementation. The procedures also include the way the plan will be regularly monitored, reported upon, evaluated, and updated.

Appendix A includes a country travel snapshot for Cheatham County.

Appendix B includes a FEMA HAZUS for flooding in Cheatham County

Appendix C includes additional planning documentation such as meeting sign-in sheets and public notices published in local newspapers or social media outlets.

Appendix D lists the references used to compile this updated Plan including publications, web sites and other date sources.

1.5 Multi-Jurisdictional Special Considerations

Continued Compliance with the NFIP

Cheatham County and all the incorporated jurisdictions participate in FEMA's National Flood Insurance Program (NFIP). Each community enforces a flood damage prevention ordinance which regulates development within the Special Flood Hazard Area (SFHA). Additionally, as being members of FEMA's NFIP, each community requires Elevation Certificates on all new buildings and substantial improvements within the SFHA.

Natural Hazards

Most of the natural hazards identified in Section 2.1 have an impact on both the County and to the incorporated jurisdictions. The impacts differ the most with the severity within the rural and urban flooding hazard. Some storms have a larger impact on the County rather than the incorporated jurisdictions and vice versa. Therefore, the flooding section emphasizes the depth, duration, and timing of severe flooding events.

1.6 Adoption, Implementation, Monitoring, and Evaluation

1.6.1 Plan Adoption

44 CFR Subsection D §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, raise awareness of the plan, and formalize the plan's implementation. This plan will be adopted by the appropriate governing body for each participating community. Copies of the executed resolutions are shown below.

Note to Reviewer: Executed resolutions will be inserted when they become available.

1.6.2 Implementation

44 CFR Subsection D §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 section provides an overview of the overall strategy for plan implementation and maintenance.

Mitigation is most successful when it is incorporated 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 constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the community. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities. Although, Cheatham County is not at this point in implementing mitigation actions, this is a major goal and effort in the next five to ten years.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly 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 communities will be able 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.

Elected officials, officials appointed to head community departments and community staff are charged with implementation of various activities in the plan. Recommendations will be made to modify timeframes for completion of activities, funding resources, and responsible entities. On an annual basis, the priority standing of various activities may also be changed. Some activities that are found not to be achievable may be removed from the plan entirely and activities addressing problems unforeseen during plan development may be added.

Role of the Hazard Mitigation Planning Committee in Implementation, Monitoring, and Evaluation

With adoption of this plan, each participating jurisdiction will be responsible for the plan implementation and maintenance. The HMPC identified in Section 2 of this chapter will convene annually to ensure mitigation strategies are being implemented and in compliance with the NFIP. As such, Cheatham County agrees to continue its relationship with the HMPC and:

- Act as a forum for hazard mitigation issues;
- Disseminate mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard 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 County Commission and City Council; and
- Inform and solicit input from the public.

The primary duty is to see the plan successfully carried out and report to the County and City Executives, TEMA, FEMA, and the public on the status of plan implementation and mitigation opportunities.

Maintenance

Maintenance Schedule

The Cheatham County Emergency Management Agency is responsible for initiating plan reviews. To monitor progress and update the mitigation strategies identified in the action plan, Cheatham County will revisit this plan annually and following hazard events. The County will submit a five-year written update to TEMA and FEMA Region IV, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this plan update anticipated to be fully approved and adopted in 2022, the next plan update for the County will occur in 2027.

Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability because of failed or ineffective mitigation actions; and/or
- Increased vulnerability because of new development (and/or further annexation).

Updates to this plan will:

- 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.

Changes will be made to the plan during the update process 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 that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as is appropriate and necessary, and as approved by the HMPC. In keeping with the five-year update process, public meetings will be held to solicit public input on the plan and its routine maintenance. The final revised plan will be adopted by all participating jurisdictions.

1.7 Public Participation

Public involvement included press releases, stakeholder and public meetings, and the collection of public and stakeholder comments on the draft plan. The formal public meetings for this project are summarized in *Table 4* (Section 1.2.2) discussed early in this chapter. The HMPC meeting was open to the public, however no members of the public chose to attend the meeting.

A public notice was posted on the Cheatham County Emergency Management Facebook page on June 14th, 2022. Notices of the meeting were also posted at the Cheatham County Courthouse, Sycamore Square County Office building, and the Cheatham County EMA Office. Documentation to support the public outreach efforts can be found in Appendix C. Over the past five years, the community was kept involved in the planning process through the implementation of projects in the plan. However, there was no FEMA declared disaster during that time period which sparked minimal discussion on additions to the mitigation project list.

1.8 Community Data

1.8.1 Location

Located in the northern portion of middle Tennessee, Cheatham County is bordered by five other counties: Robertson, Davidson, Williamson, Dickson, and Montgomery. The county covers approximately 302 square miles. Cheatham County and its incorporated jurisdictions are characteristic of rural counties of Middle Tennessee in terms of architecture, landscape, culture, commerce, and education. The county seat, Ashland City, is approximately 20 miles from Nashville and 30 miles from Clarksville, the two largest neighboring cities to the county. The three other incorporated cities within Cheatham are: Pleasant View (to the north), Kingston Springs, (to the south), and Pegram (to the south).

Multiple main roadways travel through the county such as Interstates 24 and 40, US Highway 70, and State Highways 12, 41, 49, 155, 249. Two Rivers cut across Cheatham County: The Harpeth River and the Cumberland River. Cheatham Lake within the county is a vital part of the Cumberland River system. There are also several major creeks including Pond Creek which empties into the Harpeth River, and Sycamore Creek which empties into the Cumberland River.

The nearest international airport is BNA (approx. 27 miles) and the closest general airport is John C. Tune Airport (approx.17 miles). Cheatham County has a CSX mainline railroad that crosses the county running East to West. There is also a smaller railroad known as Nashville Western. This railroad currently runs from Nashville in Davidson County to Ashland City in Cheatham County.

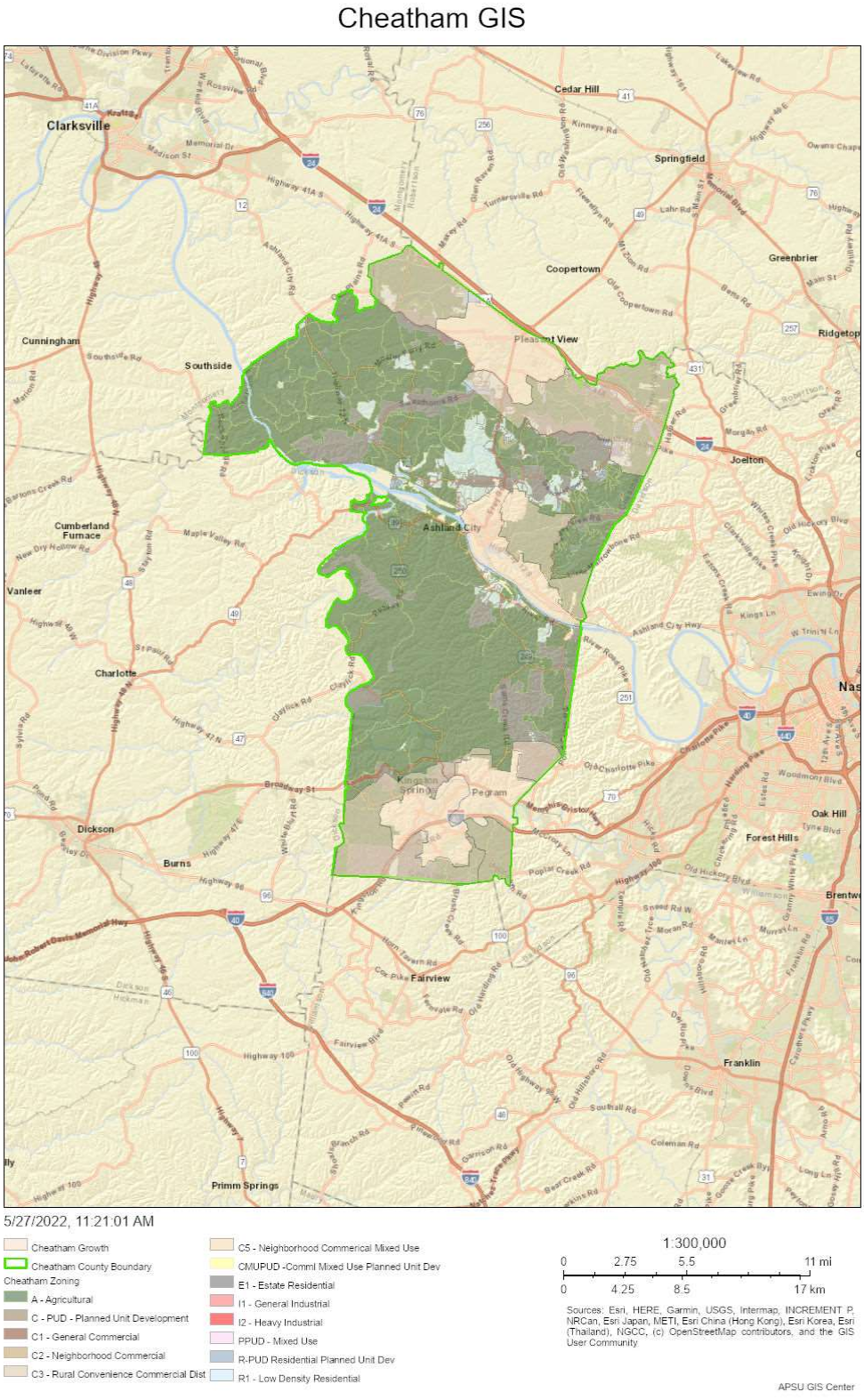


Figure 1 County Map (Source: APSU GIS Center)

1.8.2 Local Government

Cheatham County is governed by an elected County Mayor and Board of Commissioners (twelve members). The cities within Cheatham County are governed by an elected Mayor and City Council. Some governmental entities are consolidated such as the office of Economic and Community Development and the Regional Planning Commission.

1.8.3 Development and Growth

In similar fashion to the rest of Tennessee, Cheatham County, has been experiencing rapid growth over the past few years. The population of the county increased 5% between the 2010 and 2020 census and the amount of residential housing units increased by 7.2%, in the same period. The United States Census Bureau determined that the 2020 population was an estimated 41,072 individuals and 16,785 housing units were identified. Cheatham County has a focus on economic development through the Economic and Community Development board.

During the HMPC, members identified moderate growth within Pleasant View and Ashland City in the areas of residential, commercial, and industrial growth. Specific examples include a new distillery in Ashland City, as well as and industrial park along Highway 12 South. The committee did cite that residential growth was slowing but had been significant over the last 10 years, specifically in the Ashland City area. Multiple new residential developments were noted along: Arbor Loop, Peech Street, Skyview Drive, and Bell Street. Though no significant damage has occurred to these new areas of growth yet, severe rains or flooding of the Cumberland River would put them at risk, specifically the Industrial Park. Kingston Springs and Pegram have seen minimal growth in comparison to the more northern portions of the county.

1.8.4 Resources

Ashland City houses a 12-bed critical access hospital (Tri-Star Ashland City Medical Center), the only hospital within the county limits. The county is home to 2 full-time firefighters, 200 county volunteer firefighters, and 41 full time Law Enforcement officers. Pleasant View, Pegram, and Kingston Springs do not have full-time firefighters and are fully reliant on a volunteer force., however the county seat, Ashland City, does have full-time fire services under employment. During the HMPC meeting Kingston Springs and Ashland city were the only jurisdictions to identify a Public Information Officer (PIO), all other jurisdictions including the county do not have a PIO on staff or as a volunteer. Ashland City, unlike the county and other jurisdictions, has a staff grant writer to aid them in obtaining grant funding. Cheatham County School District facilities the learning of approximately 5,902 students via their system of 13 schools withing the region.

Cheatham is home to three radio stations and 5 tv networks and the main phone company in the area is AT&T. Residents in the county can either obtain internet via AT&T or Charter Communications. Communication resources, a vital component of emergency response and preparedness, is notably lacking in the more rural portions of Cheatham County. Between 2016 and 2020 only 90.3% of households had a computer and only 82.7% had broadband internet access according to the United States Census Bureau.

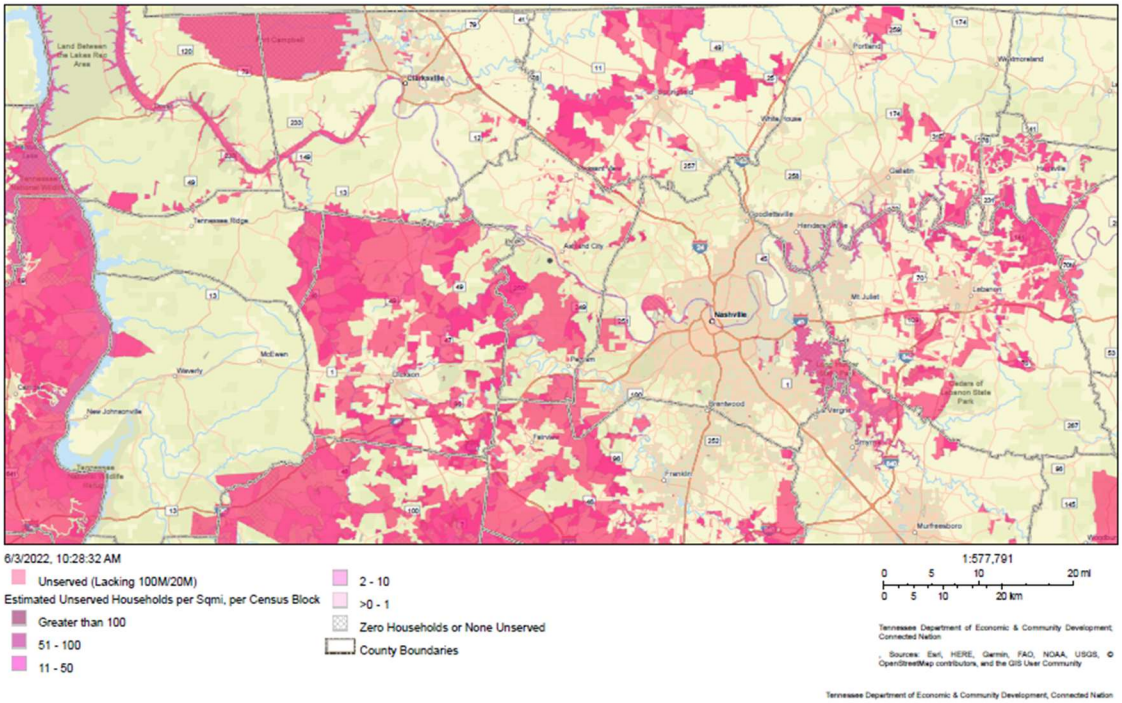


Figure 2 County Broadband Map Served/Unserved Areas (Source: TN Dept. of Economic and Community Development)

1.8.5 Demographics

Table 7 below illustrates the population data of the county according to the 2020 U.S Census. Other important demographics obtained via the U.S Census Bureau and County Health Rankings (RWJ Foundation) are presented in list form. Of the 41,072 residents living within Cheatham County:

- The median household income is $63,988
- 8.7% live below the national poverty line
- 83% live in rural areas
- 11% are confronted with food insecurity
- 11% of the under 65 years of age population live with a disability
- 11.7% of the under 65 population do not have health insurance
- Population as of 2010 was 19.1 people per square mile

Table 7 Population Data

Demographic	Percentage
Male	49.5%
Female	50.5%
Age	
Under 5	5.6%
Under 18	21.8%
Over 65	15.5%
Race/Ethnicity (one race)	
White (not Hispanic/Latino)	92.2%
Asian	0.4%
Black or African American	2.1%
American Indian or Alaskan Native	0.6%
Hispanic/ Latino	3.4%
Education	
High School Graduate or higher	86.6%
Bachelor's Degree or higher	20.5%

2. Hazard Identification and Risk Assessment

44 CFR Subsection D §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.

44 CFR Subsection D §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

The Cheatham County HMPC conducted a hazard identification analysis to determine the natural and man-made hazards that threaten the County. Existing hazard data from TEMA, FEMA, the National Oceanic and Atmospheric Administration (NOAA), and other sources were examined to assess 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.

To further focus on the list of identified hazards for this plan update, the HMPC researched past events that resulted in a federal and/or state emergency or disaster declaration in Cheatham County to identify known hazards. *Table 8* presents a list of all major disaster and emergency declarations that have occurred in Cheatham County since 1953. This tables present the foundation for identifying which hazards pose the greatest risk to the County.

Table 8 Presidential Disaster Declaration in Cheatham County (1953 - 2022) *

Declaration #	Date	Event Details	Individual Assistance	Public Assistance
459	3/22/1975	Severe Storms, Flooding	No	No
910	6/21/1991	Severe Storms, Flooding	No	No
1010	2/28/1994	Severe Winter Ice Storm, Flash Flooding	No	No
1167	3/7/1997	Heavy Rain, Tornados, Flooding, Hail, High Winds	No	No
1215	4/20/1998	Severe Storms, Tornados, Flooding	No	No
1275	5/12/1999	Severe Storms, Tornados, Flooding	No	Yes
1331	6/12/2000	Severe Storms, Tornados, Flooding	No	Yes
1464	5/8/2003	Severe Storms, Tornados, Flooding	Yes	Yes
3217	9/5/2005	Hurricane Katrina Evacuation	No	Yes
1634	4/5/2006	Severe Storms, Tornados	Yes	Yes
1909	5/4/2010	Severe Storm, Flooding, Straight-line Winds, Tornados	Yes	Yes
4171	4/11/2014	Severe Winter Storm	No	Yes
4427	4/17/2019	Severe Storms, Flooding, Landslides, Mudslides	No	Yes
4601	5/8/2021	Severe Storm, Tornados, Flooding	Yes	Yes
3576	12/13/2021	Severe Storm, Straight-line Winds, Tornados	No	No
4637	1/4/2022	Severe Storm, Straight-line Winds, Tornados	Yes	Yes

*COVID-19 Emergency Disasters Declarations (3473, 4514) excluded from table as not relevant to natural hazard discussion.

Table 9 documents the decisions made by the HMPC as it relates to those hazards that were to be re-evaluated and/or identified, analyzed, and addressed through the updating of the Countywide update summary. Hazards were either continued, deleted, or changed as noted.

Table 9 Overview of Updates to Chapter 2: Hazard Identification and Risk Assessment

Tennessee 2018 Mitigation Strategy	Cheatham County 2017 HMP	Status	Cheatham County 2022 HMP Update
Earthquakes	Earthquakes	Continued	Earthquakes
Wildfires	N/A	Not included	N/A
Geologic Hazard	N/A	Not included	N/A
Severe Weather (thunderstorms, lighting, hail)	Tornadoes/Severe Storms	Separated between Severe Storms and Tornadoes	Severe Weather (thunderstorms, wind, lighting, hail)
Tornadoes	Tornadoes/Severe Storms	Separated between Tornadoes and Severe Weather	Tornadoes
Flooding	Flooding	Continued	Flooding
Extreme Temperatures	Freezes/ Winter Storms	Extreme Temperature is documented in Winter Weather	Winter Weather
Drought	Drought	Continued	Drought
Wildfires	N/A	Not included	N/A
Infrastructure Incidences	N/A	Not included	N/A
Communicable Disease	N/A	Not included	N/A
Dam Failures	Dam Failure	Continued	Dam Failure
Hazardous Materials Release	N/A	Not included	N/A
Terrorism	N/A	Not included	N/A

Summary of Changes in the 2022 Plan Update:

- Tornadoes and Severe Storms are documented in separate sections.
- Severe Storms has been renamed Severe Weather and includes separate sections for wind events, lighting, and hail.
- Freezes/Winter Storms are now documented as Winter Weather.

The complete list of hazards to be addressed in this 2022 Plan Update includes the following:

- Tornadoes
- Severe Weather (thunderstorms, wind, lightning & hail)
- Earthquake
- Flooding (including 100-/500-year events)
- Winter Weather
- Drought
- Dam Failure

2.1 Hazard Identification

44 CFR Subsection D §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

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

(B): An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; and

(C): Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

To begin to assess Cheatham County's risk to natural hazards and identify the community's areas of highest vulnerability, the mitigation committee had to identify which hazards have or could impact the county. This hazard identification process began with researching previous hazard events that have occurred in Cheatham County. This consisted of going through newspaper articles, Cheatham County Emergency Management Agency records, recalling personal experiences from Emergency Management staff, and analyzing hazard events that could occur in the county by reviewing scientific studies and the State of Tennessee Hazard Mitigation Plan. The following hazards have been identified as hazards of concern by the Cheatham County hazard mitigation committee within the update process. This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002).

The hazards identified for inclusion in the Hazard Mitigation Plan 2022 Update are profiled and assessed individually in this chapter in the following format:

A. Hazard Identification

This section provides a description of the hazard followed by details specific to Cheatham County. Where available, this section also includes information on the hazard extent, seasonal patterns, speed of onset/duration, magnitude, and any secondary effects.

B. Hazard Profile

This section gauges the likelihood of future occurrences based on past events and existing data. The frequency is determined by the HMPG committee analyzing the events observed over several years. The likelihood of future occurrences is categorized into one of the classifications as follows:

- ***Highly Likely*** – Near 100 percent chance of occurrence within the next year
- ***Likely*** – Between 10 and 100 percent chance of occurrence within the next year (recurrence interval of 10 years or less)

- ***Occasional*** – Between 1 and 10 percent chance of occurrence within the next year (recurrence interval of 11 to 100 years)
- ***Unlikely*** – Less than 1 percent chance of occurrence within the next 100 years (recurrence interval of greater than every 100 years).

C. Vulnerability Assessment

The section inventories community assets exposed to hazard events and estimates potential losses. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on human, property, and business impacts. It is categorized into the following classifications:

- ***Low*** **-** The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- ***Moderate*** **-** Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- ***Medium*** **-** 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.
- ***High*** **-** Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- ***Severe*** **-** Very widespread with catastrophic impact.

D. Land Use & Development Trends

This section describes changes in development that have occurred in hazard prone areas and increased or decreased vulnerability since the last plan was approved.

E. Multi-Jurisdictional Differences

This section describes differences among the jurisdictions.

F. Summary

This section provides an overall summary of the hazard and its impact on the communities

2.1.1 Tornadoes

A. Hazard Identification

Tornadoes have the potential to produce winds in excess of 200 mph (EF5 on the Enhanced Fujita Scale) and can be very expansive – some in the Great Plains have exceeded two miles in width. Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis, better correlation between damage and wind speed. It is also more precise because it considers the materials affected and the construction of structures damaged by a tornado. *Table 10* shows the wind speeds associated with the enhanced Fujita scale ratings and the damage that could result at different levels of intensity.

Table 10 Enhanced Fujita Scale

EF Rating	3 Second Wind Gust (mph)	Estimated Damage
0	65-85	**Light Damage.** Small damage to roofs, gutters, siding, tree branches broker, shallow rooted trees overturned
1	86-110	**Moderate Damage**. Mobile homes damaged, exterior portions of homes damaged or lost (i.e., roofs, doors, windows)
2	111-135	**Considerable Damage**. Mobile homes destroyed, cars lifted, well-constructed home frames shifted, and their roofs torn off, light-object missiles generated, large trees uprooted or snapped
3	136-165	Severe Damage. Severe damage to large buildings, entire home stories destroyed, trees debarked, trains overturned, heavy vehicles lifted and thrown, structures with weaker foundations thrown
4	166-200	Devastating Damage. Well-constructed houses and whole frame houses leveled, cars thrown, small missiles generated
5	200+	Incredible Damage. Strong frame houses leveled off foundations and thrown, automobile sized missiles generated, high rises experience considerable damage and deformation

B. Hazard Profile

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

Although tornadoes can occur in most locations, most of the tornado activity in the United States exists in the Mid-West and Southeast. An exact season does not exist for tornadoes; however, most occur between early spring to middle summer (February – June). The rate of onset of tornado events is rapid, giving those in danger minimal time to seek shelter. The current average lead time according to NOAA is 13 minutes. A tornado can reach wind speeds of 40 mph to 250 mph and higher. Tornadoes paths, lengths, and widths can vary greatly. The following map illustrates the frequency of tornadoes in Tennessee. Much of middle Tennessee has a high risk for tornadoes with 13 placed within Cheatham County itself during the listed time frame.

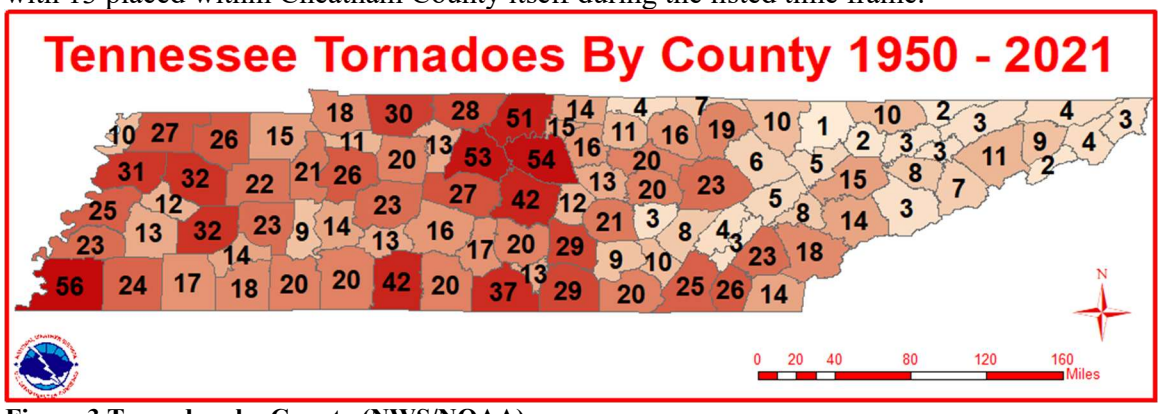


Figure 3 Tornadoes by County (NWS/NOAA)

Figure 4 illustrates the track of tornadoes through Cheatham County as recorded by the National Weather Service Nashville and the National Climatic Data Center and compiled into a visual database by Mississippi State University. *Table 5* provides a breakdown tornado frequency by hour in Cheatham County, tornadoes hit most commonly between 12pm and 4pm.

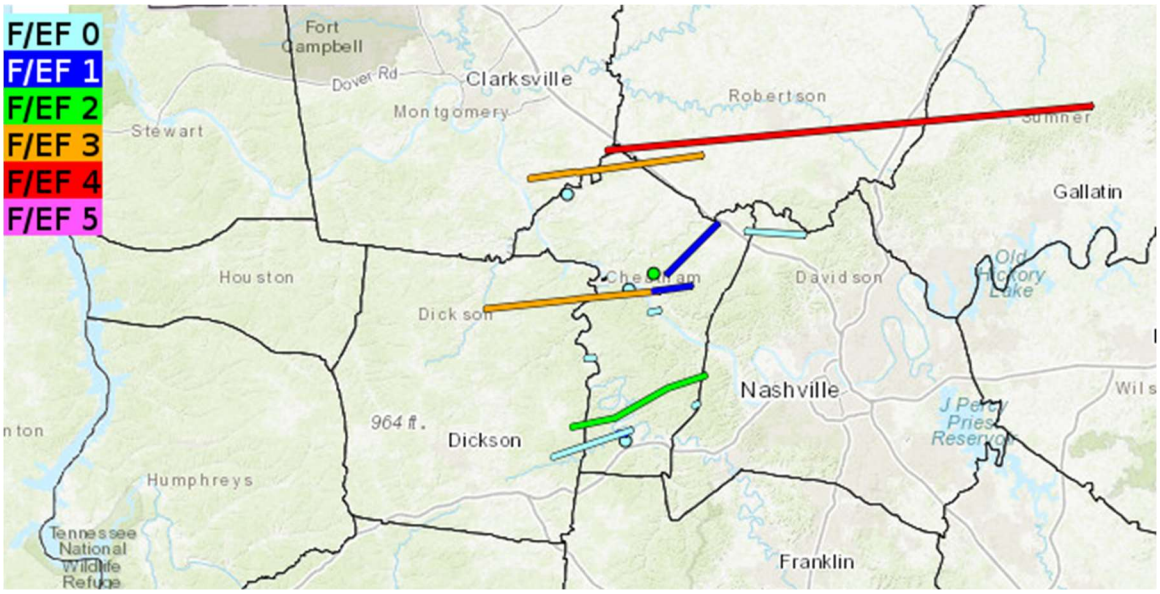


Figure 4 Tornado Tracks in Cheatham County (Source: NWS/MSState.edu)

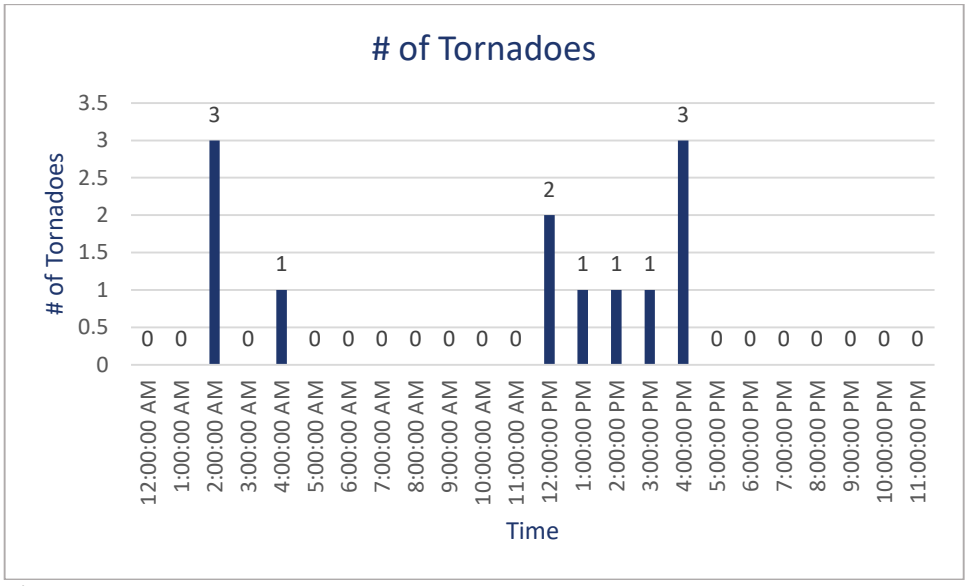


Figure 5 Tornado Frequency by Hour

Table 11 displays the tornado records for Cheatham County as recorded in the Storm Events Database by NOAA

Table 11 NOAA Recorded Tornado Events (1950 – 2022)

Location	Date	Magnitude (EF Scale)	Deaths	Injuries	Property Damages	Crop Damages
Countywide	4/7/1972	F2	0	0	250.0K	0.0K
Henrietta	5/18/1995	F0	0	0	5.0K	0.0K
Pegram	4/16/1998	F0	0	0	0.0K	0.0K
Kingston Springs	5/5/2003	F0	0	0	0.0K	0.0K
Ashland City	4/7/2006	F1	0	0	1.0M	0.0K
Ashland City	3/28/2009	EF1	0	0	100.0K	0.0K
Sulphur Springs	4/4/2011	EF0	0	0	2.0K	5.0K
Kingston Springs	3/2/2012	EF1	0	0	300.0K	2.0K
Craggie Hope	1/30/2013	EF0	0	0	25.0K	25.0K
Ashland City	1/30/2013	EF1	0	1	200.0K	50.0K
Pinnacle	5/4/2021	EF0	0	0	10.0K	0.0K
Bell Town	12/11/2021	EF2	0	1	1.5M	0.0K

The following narratives were obtained via the NOAA Storm Event Database. Only events resulting in injury, death, or expansive damage (greater than $200K property/crop damage) were included as expanded narratives.

April 7, 2006 – After traveling 5.89 miles this F1 tornado destroyed one home, thirteen homes had expansive damage, and nine other buildings were moderately damaged.

March 2, 2012 – Just south of Kingston Springs a EF1 tornado touched down and snapped/uprooted multiple trees, destroyed one barn, and resulted in minor home damage.

January 30, 2013 – Two tornadoes were tracked in Cheatham County on this day, an EF0 and EF1. The EF0 touched down north of Kingston Springs and resulted in minor damage. The EF1 tornado touched down in Ashland City resulting in injuries to one individual when their windows blew in due to the storm. This tornado along with coinciding straight-line winds resulted in damage to 46 building within the city limits.

December 11, 2021 – The EF2 tornado that traveled through Cheatham County was part of much larger storm system that did major damage across the mi-south. This tornado particularly resulted in damaged to multiple home, trees, and torn down multiple power poles.

Figure 6 Damage to home and car in SE Cheatham County following the Dec. 11, 2021, tornado outbreak. (Source: Cheatham County Exchange)

Frequency/Likelihood of Future Occurrence

Likely - The best available information to determine future probability of a tornado event is to review historic frequency. According to NOAA, 12 tornadoes occurred between 1950 and 2022. Therefore, the frequency is likely.

C. Vulnerability Assessment

Vulnerability— Medium

The entirety of Cheatham County can be considered at risk to a tornado. This includes the entire County population and all critical facilities, buildings (commercial and residential), and infrastructure. Tornadoes tracked in Tennessee predominantly travel in a northeasterly direction in the state. While all assets are considered at risk from this hazard, a particular tornado would only cause damages along its specific track.

Table 12 Risk Assessment (Tornadoes)

Jurisdiction/ Applicant	Impacts			Vulnerability *H+P+B=#; #/3=V*
	Human	*Property*	*Business*	
Cheatham County	4	4	3	3.67
Ashland City	4	5	4	4.33
Kingston Springs	4	4	3	3.67
Pegram	4	4	1	3
Pleasant View	4	5	4	4.33

Jurisdiction/ Applicant	Vulnerability	Probability	Risk *V+P=R*	
Cheatham County	3.67	2	**5.67**	**Medium**
Ashland City	4.33	2	**6.33**	**Medium**
Kingston Springs	3.67	2	**5.67**	**Medium**
Pegram	3	4	**7.0**	**High**
Pleasant View	4.33	2	**6.33**	**Medium**

Risk	
Low	**2-3.6**
Moderate	**3.7-5.2**
Medium	**5.3-6.8**
High	**6.9-8.4**
Severe	**8.5-10**

Human	
Risk of injuries and death from hazard	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Death's probable, injuries will likely be substantial

Business	
Amount of business damage	
1	Less than 3 businesses closed for only one day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top 10 local employer closed indefinitely

Property	
Amount of residential property damage	
1	Less than $500 in damages
2	$500 - $10,000 in damages
3	$10,000 – $500,00 in damages
4	$500,000 - $2,000,000 in damages
5	More than $2,000,000 in damages

Probability	
Probability of hazard occurring	
1	Less than once every 10 years
2	About once every 5 – 10 years
3	About once every 2 – 5 years
4	About once a year
5	More than once a year

D. Land Use and Development Trends

Cheatham County codes include proper wind strength and safety regulations that are consistent with state and federal regulations. While the adopted code provides adequate quality growth protection, older homes and mobile homes are highly susceptible to tornado events. There are

multiple mobile home areas in the county, but no one has ever done an official counted to see how vulnerable those areas are. Additionally, there are many incorporated jurisdictions that do not have building ordinances for the structures that reside in the area.

E. Multi-Jurisdictional Differences

All jurisdictions within Cheatham County are at equal risk for a tornado event, however historically a large portion of tornado events have taken place at or below the middle region of the county. It is also worth noting that given the large rural component of the county some tornadic events may have gone unreported.

F. Summary

The entirety of Cheatham County can be considered at risk to a tornado. This includes the entire County population and all critical facilities, buildings (commercial and residential), and infrastructure. While all assets are considered at risk from this hazard, a tornado would only cause damages along its specific track. The weakest tornadoes, EF0, can cause minor roof damage and strong tornadoes can destroy frame buildings and even badly damage steel reinforced concrete structures. Given the strength of the wind impact and construction techniques, buildings are vulnerable to direct impact, including potential destruction, from tornadoes and from wind borne debris that tornadoes turn into missiles. Structures made of light materials such as mobile homes are most susceptible to damage.

2.1.2 Severe Weather (Thunderstorms, Wind, Lighting, Hail)

A. Hazard Identification

Thunderstorms

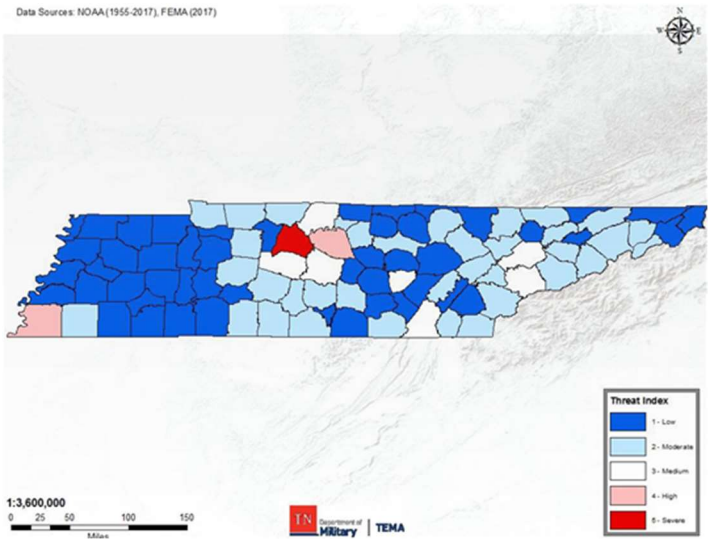
Thunderstorms result from the rapid upward movement of warm, moist air. They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew 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 can produce tornadoes and waterspouts.

Wind

The NCDC/NOAA divides wind events into several types including High Wind, Strong Wind, Thunderstorm Wind, and Tornadoes. For this risk assessment, the Wind hazard will include data from High Wind, Strong Wind and Thunderstorm Wind. *Figure 7* illustrates the average hazard score by county for wind risk. The wind speeds correspond with the assigned hazard scores with values ranging from 1 to 5 as shown in the table below. The highest risk areas are in Middle and East Tennessee. Cheatham County has an average hazard wind score of 1 with wind speeds less than 90 mph.



Hazard Score	Wind Speeds (mph)
1	<90
2	91-100
3	101-110
4	111-120
5	>121

Figure 7 Average Wind Risk (Tennessee Hazard Mitigation Plan 2018)

Hail

Hail is associated with thunderstorms that can also bring high winds and tornados. It forms when updrafts carry raindrops into extremely cold areas of the atmosphere where they freeze into ice. Hail falls when it becomes heavy enough to overcome the strength of the updraft and is pulled by gravity towards the earth. Hailstorms occur throughout the spring, summer, and fall in the region, but are more frequent in late spring and early summer. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 mph. Hail causes nearly $1 billion in damage to crops and property each year in the United States. *Table 13* provides an overview of the typical impacts to a community as related to hailstone size.

Table 13 TORRO Hail Index (Source: The Tornado and Storm Research Organization)

Scale	Description	Max Diameter (mm)	Typical Damage
H0	Pea	5-9	No damage
H1	Mothball	10-15	Slight general damage to crops and plants
H2	Marble	16-20	Significant damage to crops and vegetation
H3	Walnut	21-30	Severe damage to fruits and crops, damage to glass and plastic structures, wood and paint scored
H4	Pigeons Egg	31-40	Widespread glass damage, auto-body damage
H5	Golf Ball	41-50	Destruction of glass, damage to tiled roofs, significant risk of injuries

H6	Hens Egg	51-60	Grounded aircrafts dented; brick walls pitted
H7	Tennis Ball	61-75	Severe roof damage and risk of serious injury
H8	Softball	76-90	Severe damage to aircrafts
H9	Grapefruit	91-100	Extensive structural damage, risk of severe or fatal injuries to people caught in storm
H10	Melon	>100	Extensive structural damage, risk of severe or fatal injuries to people caught in storm

Lightning

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. 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. 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, and deaths and injuries to livestock and other animals. 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 more than $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.

B. Hazard Profile

The entirety of Cheatham County is at risk to severe weather. Thunderstorms are most likely in the spring and summer months and during the afternoon and evening hours, but they can occur year-round and at all hours. In terms of magnitude, the NWS defines thunderstorms in terms of severity. A severe thunderstorm produces winds greater than 57 miles per hour and/or hail greater than 1 inch in diameter and/or a tornado. The NWS chose these measures of severity as parameters more capable of producing considerable damage. Hail stones can vary in diameter and in Tennessee there have been records of hail of up to 2.75 inches.

Past Occurrences

Table 14 provides High Wind, Strong Wind, and Thunderstorm Wind data reported by NOAA since 1950 for Cheatham County. The following definitions come from the NOAA Storm Data Preparation document.

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

Table 14 NOAA Recorded Wind Events (1950 - 2022)

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
County Wide	9/8/1960	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	6/30/1966	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	5/2/1973	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	4/1/1974	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	6/25/1981	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	5/22/1982	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	7/21/1982	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	8/28/1983	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	8/28/1983	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	7/5/1985	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	7/26/1986	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	11/16/1988	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	5/26/1989	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	9/7/1990	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	3/27/1991	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	3/27/1991	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	4/9/1991	Thunderstorm Wind	0	0	0.0K	0.0K
County Wide	5/12/1992	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	9/1/1993	Thunderstorm Wind	0	0	0.5K	0.0K
Kingston Springs	5/14/1994	Thunderstorm Wind	0	0	0.5K	0.0K
Ashland	6/26/1994	Thunderstorm Wind	0	0	0.5K	0.0K
Kingston Springs	5/18/1995	Thunderstorm Wind	0	0	5.0K	0.0K
Thomasville	5/18/1995	Thunderstorm Wind	0	0	2.0K	0.0K
Ashland City	7/14/1995	Thunderstorm Wind	0	0	10.0K	0.0K
Countywide	4/20/1996	Thunderstorm Wind	0	0	1.0K	0.0K
Ashland City	5/27/1996	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	7/29/1996	Thunderstorm Wind	0	0	0.3K	0.0K
Countywide	9/27/1996	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	11/7/1996	Thunderstorm Wind	0	0	0.0K	0.0K
Southeast Section	1/4/1997	Thunderstorm Wind	0	0	0.0K	0.0K
Mt Zion	1/4/1997	Thunderstorm Wind	0	0	10.0K	0.0K
Pleasant View	5/26/1997	Thunderstorm Wind	0	0	1.0K	0.0K
Mt Zion	6/13/1997	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	6/13/1997	Thunderstorm Wind	0	0	1.0K	0.0K
Pleasant View	7/4/1997	Thunderstorm Wind	0	0	1.0K	0.0K
Henrietta	7/14/1997	Thunderstorm Wind	0	0	0.0K	0.0K
Pleasant View	7/14/1997	Thunderstorm Wind	0	0	0.0K	0.0K
Thomasville	7/14/1997	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	7/28/1997	Thunderstorm Wind	0	0	0.0K	0.0K

Ashland City	5/21/1998	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	1/17/1999	Thunderstorm Wind	0	0	0.0K	0.0K
Cheap Hill	1/17/1999	Thunderstorm Wind	0	0	0.0K	0.0K
Pleasant View	1/17/1999	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	5/5/1999	Thunderstorm Wind	0	0	10.0K	0.0K
Pleasant View	5/5/1999	Thunderstorm Wind	0	0	0.0K	0.0K
Kingston Springs	6/4/1999	Thunderstorm Wind	0	0	0.0K	0.0K
North Portion	8/12/1999	Thunderstorm Wind	0	0	0.0K	0.0K
Kingston Springs	2/13/2000	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	5/27/2000	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	7/12/2000	Thunderstorm Wind	0	0	0.0K	0.0K
Thomasville	8/5/2000	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	2/25/2001	Thunderstorm Wind	0	0	0.0K	0.0K
Henrietta	5/7/2001	Thunderstorm Wind	0	0	0.0K	0.0K
Cheatham (Zone)	6/4/2001	High Wind	0	0	0.0K	0.0K
Ashland City	6/21/2001	Thunderstorm Wind	0	0	0.0K	0.0K
North Portion	6/27/2001	Thunderstorm Wind	0	0	0.0K	0.0K
Countywide	11/24/2001	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	4/28/2002	Thunderstorm Wind	0	0	0.0K	0.0K
Pegram	6/25/2002	Thunderstorm Wind	0	0	0.0K	0.0K
Kingston Springs	7/10/2002	Thunderstorm Wind	0	0	0.0K	0.0K
Kingston Springs	5/15/2003	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	7/28/2003	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	3/20/2004	Thunderstorm Wind	0	0	0.0K	0.0K
Countywide	5/30/2004	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	5/30/2004	Thunderstorm Wind	0	0	0.0K	0.0K
Kingston Springs	6/13/2004	Thunderstorm Wind	0	0	0.0K	0.0K
Pegram	7/4/2004	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	1/13/2005	Thunderstorm Wind	0	0	0.0K	0.0K
Kingston Springs	5/19/2005	Thunderstorm Wind	0	0	0.0K	0.0K
Kingston Springs	5/19/2005	Thunderstorm Wind	0	0	0.0K	0.0K
Cheatham (Zone)	8/30/2005	Strong Wind	0	0	1.0K	0.0K
Countywide	11/15/2005	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	9/23/2006	Thunderstorm Wind	0	0	20.0K	0.0K
Cheatham (Zone)	1/29/2008	High Wind	0	0	25.0K	0.0K
Ashland City	6/16/2009	Thunderstorm Wind	0	0	100.0K	0.0K
Kingston Springs	6/17/2009	Thunderstorm Wind	0	0	50.0K	0.0K
Pleasant View	7/12/2009	Thunderstorm Wind	0	0	10.0K	0.0K
Oakplain	7/12/2009	Thunderstorm Wind	0	0	10.0K	0.0K
Kingston Springs	7/15/2009	Thunderstorm Wind	0	0	1.0K	0.0K
Ashland City	5/1/2010	Thunderstorm Wind	0	0	4.0K	0.0K

Craggie Hope	5/2/2010	Thunderstorm Wind	0	0	10.0K	0.0K
Lillamay	6/17/2010	Thunderstorm Wind	0	0	10.0K	0.0K
Pleasant View	8/12/2010	Thunderstorm Wind	0	0	40.0K	0.0K
Ashland City	4/4/2011	Thunderstorm Wind	0	0	10.0K	0.0K
Ashland City	4/4/2011	Thunderstorm Wind	0	0	125.0K	0.0K
Poplar Ridge	4/26/2011	Thunderstorm Wind	0	0	10.0K	0.0K
Poplar Ridge	5/25/2011	Thunderstorm Wind	0	0	10.0K	0.0K
Ashland City	5/25/2011	Thunderstorm Wind	0	0	0.0K	0.0K
Ashland City	6/15/2011	Thunderstorm Wind	0	0	10.0K	0.0K
Ashland City	1/23/2012	Thunderstorm Wind	0	0	5.0K	0.0K
Kingston Springs	3/2/2012	Thunderstorm Wind	0	0	150.0K	0.0K
Pinnacle	3/17/2012	Thunderstorm Wind	0	0	2.0K	0.0K
Lillamay	7/6/2012	Thunderstorm Wind	0	0	10.0K	0.0K
Mt Zion	7/19/2012	Thunderstorm Wind	0	0	40.0K	0.0K
Mt Zion	7/19/2012	Thunderstorm Wind	0	0	15.0K	0.0K
Ashland City	7/19/2012	Thunderstorm Wind	0	0	15.0K	0.0K
Chapmansboro	7/19/2012	Thunderstorm Wind	0	0	20.0K	0.0K
Pleasant View	8/16/2012	Thunderstorm Wind	0	0	1.0K	0.0K
Ashland City	1/30/2013	Thunderstorm Wind	0	0	50.0K	10.0K
Kingston Springs	1/30/2013	Thunderstorm Wind	0	0	2.0K	0.0K
Kingston Springs	1/30/2013	Thunderstorm Wind	0	0	20.0K	0.0K
Pleasant View	1/30/2013	Thunderstorm Wind	0	0	30.0K	0.0K
Neptune	3/18/2013	Thunderstorm Wind	0	0	5.0K	0.0K
Cheap Hill	3/18/2013	Thunderstorm Wind	0	0	5.0K	0.0K
Cheap Hill	4/27/2013	Thunderstorm Wind	0	0	2.0K	0.0K
Bearwallow	6/20/2013	Thunderstorm Wind	0	0	5.0K	0.0K
Bearwallow	8/8/2013	Thunderstorm Wind	0	0	1.0K	0.0K
Mt Zion	8/8/2013	Thunderstorm Wind	0	0	3.0K	0.0K
Cheatham (Zone)	10/31/2013	High Wind	0	0	10.0K	0.0K
Sycamore	12/21/2013	Thunderstorm Wind	0	0	2.0K	0.0K
Petway	12/21/2013	Thunderstorm Wind	0	0	10.0K	0.0K
Pleasant View	2/20/2014	Thunderstorm Wind	0	0	2.0K	0.0K
Lillamay	4/19/2015	Thunderstorm Wind	0	0	2.0K	0.0K
Sycamore	4/19/2015	Thunderstorm Wind	0	0	2.0K	0.0K
Poplar Ridge	6/8/2015	Thunderstorm Wind	0	0	3.0K	0.0K
Ashland City	7/2/2015	Thunderstorm Wind	0	0	10.0K	0.0K
Pleasant View	3/31/2016	Thunderstorm Wind	0	0	0.0K	0.0K
Pinnacle	4/27/2016	Thunderstorm Wind	0	0	1.0K	0.0K
Pinnacle	5/10/2016	Thunderstorm Wind	0	0	3.0K	0.0K
Pleasant View	6/15/2016	Thunderstorm Wind	0	0	1.0K	0.0K
Pinnacle	6/23/2016	Thunderstorm Wind	0	0	1.0K	0.0K

Ashland City	7/6/2016	Thunderstorm Wind	0	0	2.0K	0.0K
Lillamay	7/6/2016	Thunderstorm Wind	0	0	3.0K	0.0K
Fox Bluff	7/8/2016	Thunderstorm Wind	0	0	2.0K	0.0K
Chapmansboro	7/8/2016	Thunderstorm Wind	0	0	1.0K	0.0K
Kingston Springs	7/8/2016	Thunderstorm Wind	0	0	1.0K	0.0K
Kingston Springs	9/10/2016	Thunderstorm Wind	0	0	3.0K	0.0K
Griffintown	3/1/2017	Thunderstorm Wind	0	0	3.0K	0.0K
Petway	3/1/2017	Thunderstorm Wind	0	0	15.0K	0.0K
Gravelotte	3/1/2017	Thunderstorm Wind	0	0	15.0K	0.0K
Kingston Springs	3/9/2017	Thunderstorm Wind	0	0	3.0K	0.0K
Fox Bluff	11/18/2017	Thunderstorm Wind	0	0	5.0K	0.0K
Cheap Hill	11/18/2017	Thunderstorm Wind	0	0	3.0K	0.0K
Chapmansboro	11/18/2017	Thunderstorm Wind	0	0	2.0K	0.0K
Sycamore	11/18/2017	Thunderstorm Wind	0	0	3.0K	0.0K
Mt Zion	11/18/2017	Thunderstorm Wind	0	0	25.0K	0.0K
Pinnacle	11/18/2017	Thunderstorm Wind	0	0	1.0K	0.0K
Sycamore	4/3/2018	Thunderstorm Wind	0	0	1.0K	0.0K
Pinnacle	4/14/2018	Thunderstorm Wind	0	0	3.0K	0.0K
Cheatham (Zone)	5/29/2018	Strong Wind	0	0	5.0K	0.0K
Cheap Hill	7/5/2018	Thunderstorm Wind	0	0	15.0K	0.0K
Ashland City	8/30/2018	Thunderstorm Wind	0	0	3.0K	0.0K
Pleasant View	6/19/2019	Thunderstorm Wind	0	0	3.0K	0.0K
Sycamore	6/21/2019	Thunderstorm Wind	0	0	1.0K	0.0K
Kingston Springs	6/21/2019	Thunderstorm Wind	0	0	1.0K	0.0K
Pinnacle	6/22/2019	Thunderstorm Wind	0	0	1.0K	0.0K
Pegram	6/27/2019	Thunderstorm Wind	0	0	1.0K	0.0K
Ashland City	4/8/2020	Thunderstorm Wind	0	0	5.0K	0.0K
Ashland City	5/3/2020	Thunderstorm Wind	0	0	150.16K	0.0K
Ashland City	8/28/2020	Thunderstorm Wind	0	0	3.0K	0.0K
Kingston Springs	8/28/2020	Thunderstorm Wind	0	0	3.0K	0.0K
Pinnacle	6/21/2021	Thunderstorm Wind	0	0	1.0K	0.0K
Greenbrier	7/31/2021	Thunderstorm Wind	0	0	2.0K	0.0K
Cheap Hill	12/6/2021	Thunderstorm Wind	0	0	3.0K	0.0K
Craggie Hope	12/11/2021	Thunderstorm Wind	0	0	10.0K	0.0K
Chapmansboro	1/1/2022	Thunderstorm Wind	0	0	3.0K	0.0K

The following narratives were obtained via the NOAA Storm Event Database and included as expanded narratives.

June 16, 2009 – Six homes and seven businesses sustained damage during this event and many tree were downed across the county. An electric pole was downed causing road closures, a steeple of a local church and radios station tower were also downed causing the radio to go off air for a short period of time. Lastly a tree fell on a car in a local business parking lost that also hit the front porch of the business causing damage to two support beams.

April 4, 2011 – Areas south and west of Ashland City sustained high levels of damage, including: a destroyed barn, roof damage to businesses, and dozens of snapped trees. Speeds were estimated to reach between 80 – 90 mph. The White Bluff area experienced a few downed trees and associated house damage.

March 2, 2012 – This wind event and associated golf ball sized hail caused significant damage to roofs, windows, and siding in the Kingston springs area.

May 3, 2020 – Trees and power lines were downed across the county causing extensive power outages. Much of middle Tennessee was affected by this storm and its winds which caused power outages and damages across the area resulting approximately $16,671,521 in damages ($150.16K in Cheatham County). This storm was determined to be a derecho due to the long track and straight-line winds.

December 11, 2021 – A downburst wind blew multiple trees down in the areas of Parker Road and Craggie Hope Road. This occurred a little south of Kingston Springs were during the same storm line and EF-2 Tornado touched down.

Figure 8 Damage in the County following the large storm system Dec. 11, 2021 (Source: Fox 17 News Nashville)

Frequency/Likelihood of Future Occurrence (Wind)

Highly Likely - Based on a historical record of 156 wind events over a period of 72 years (1950-2022), the historic frequency calculates that there is a 100% chance of this type of event occurring each year.

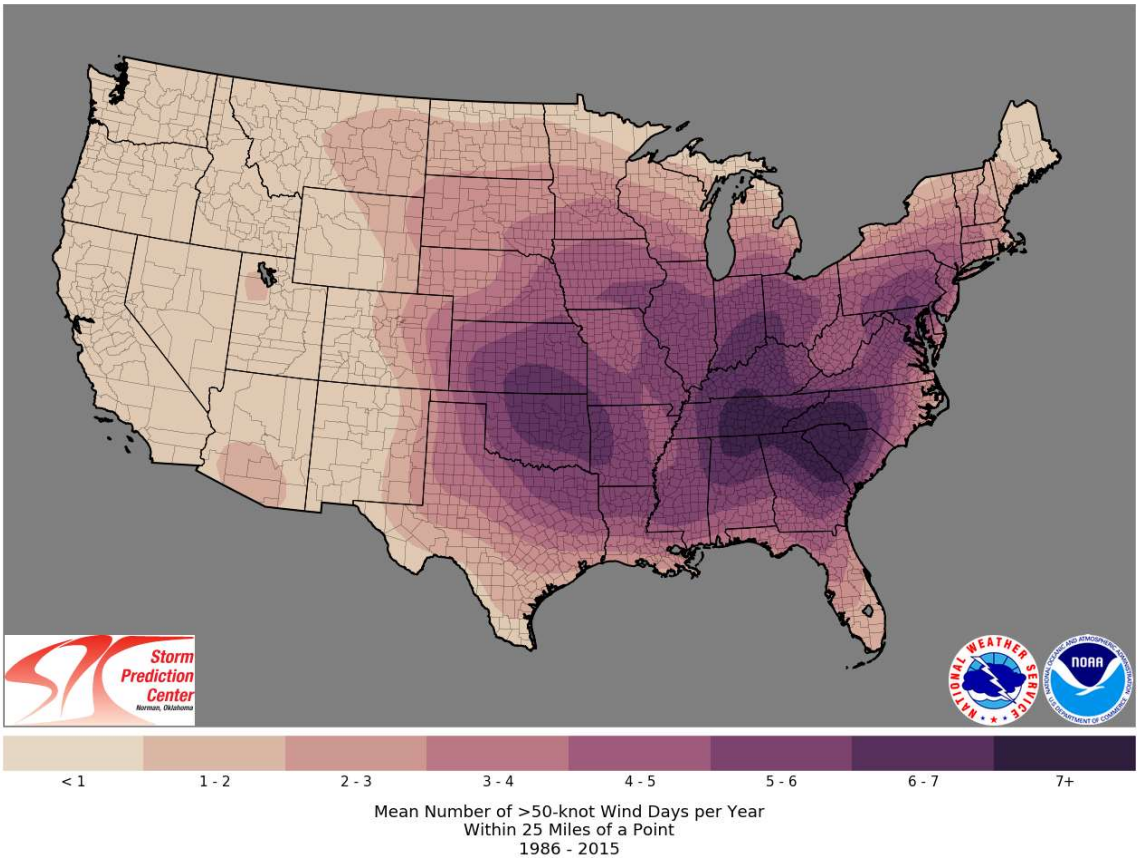


Figure 9 Mean Number of >50-knot Wind Days per Year (1986-2015) (source: NOAA)

Table 15 NOAA Recorded Hail Events (1950-2022)

Location	Date	Magnitude (inches)	Deaths	Injuries	Property Damages	Crop Damages
Cheatham County	5/22/1982	0.75	0	0	0.0K	0.0K
Cheatham County	4/8/1983	1.75	0	0	0.0K	0.0K
Cheatham County	4/8/1983	1.75	0	0	0.0K	0.0K
Cheatham County	5/6/1984	1.75	0	0	0.0K	0.0K
Cheatham County	7/5/1985	0.75	0	0	0.0K	0.0K
Cheatham County	5/9/1988	0.75	0	0	0.0K	0.0K
Cheatham County	5/20/1989	0.75	0	0	0.0K	0.0K
Ashland City	3/31/1993	0.75	0	0	0.0K	0.0K
Ashland City	4/15/1993	0.75	0	0	0.0K	0.0K
Pleasant View	2/27/1996	1.75	0	0	0.0K	0.0K
Pleasant View	4/20/1996	1.75	0	0	0.0K	0.0K
Chapmansboro	3/28/1997	0.75	0	0	0.0K	0.0K
Ashland City	3/28/1997	1	0	0	0.0K	0.0K
Ashland City	4/16/1998	2.75	0	0	50.0K	0.0K
Cheap Hill	1/17/1999	0.75	0	0	0.0K	0.0K
Henrietta	4/19/1999	1.5	0	0	0.0K	0.0K

Pegram	2/13/2000	0.75	0	0	0.0K	0.0K
Kingston Springs	3/25/2000	2.75	0	0	0.0K	0.0K
Kingston Springs	4/15/2001	0.75	0	0	0.0K	0.0K
Ashland City	4/6/2003	1	0	0	0.0K	0.0K
Ashland City	4/7/2006	4	0	0	0.0K	0.0K
Kingston Springs	4/7/2006	1	0	0	0.0K	0.0K
Lockertsville	3/28/2009	1	0	0	0.0K	0.0K
Greenbrier	3/28/2009	1	0	0	0.0K	0.0K
Lockertsville	3/28/2009	1	0	0	0.0K	0.0K
Kingston Springs	4/30/2009	0.88	0	0	0.0K	0.0K
Kingston Springs	5/2/2011	0.75	0	0	0.0K	0.0K
Kingston Springs	5/13/2011	1	0	0	0.0K	0.0K
Sycamore	3/14/2012	1	0	0	0.0K	0.0K
Bearwallow	3/14/2012	0.75	0	0	0.0K	0.0K
Ashland City	3/17/2012	0.88	0	0	0.0K	0.0K
Pinnacle	3/17/2012	1.25	0	0	0.0K	0.0K
Pleasant View	5/19/2012	0.88	0	0	0.0K	0.0K
Lockertsville	3/24/2013	1	0	0	0.0K	0.0K
Pinnacle	9/10/2013	0.88	0	0	0.0K	0.0K
Pleasant View	2/20/2014	1	0	0	0.0K	0.0K
Sycamore	2/20/2014	1	0	0	0.0K	0.0K
Ashland City	6/8/2015	1.75	0	0	5.0K	0.0K
Ashland City	6/8/2015	1.5	0	0	0.0K	0.0K
Oakplain	5/10/2016	1	0	0	0.0K	0.0K
Oakplain	5/10/2016	1	0	0	0.0K	0.0K
Pleasant View	5/10/2016	1.75	0	0	0.0K	0.0K
Kingston Springs	5/26/2016	0.75	0	0	0.0K	0.0K
Cheap Hill	2/7/2017	0.88	0	0	0.0K	0.0K
Pegram	4/23/2017	0.75	0	0	0.0K	0.0K
Kingston Springs	5/27/2017	1	0	0	0.0K	0.0K
Pleasant View	3/27/2021	0.88	0	0	0.0K	0.0K

The following narratives were obtained via the NOAA Storm Event Database and included as expanded narratives.

April 16, 1998 – Radio operators reported golf ball sized hail during this event however newspaper articles from the period report hail the size of baseballs. 35-50 homes were damaged due to the hail, regardless of if the hail was golf ball or baseball sized.

June 8, 2015 – Ping pong ball sized hail was reported in Ashland city as part of a larger storm system that affected large parts of middle Tennessee with associated hail and flooding.

April 23, 2017 – Hail up to the size of a dime was reported falling in Pegram supported by multiple social media reports similar to that shown in *Figure 10* below.

Figure 10 Video of Pegram Hail Event April 23, 2017 (Source: WSMV News 4 via Facebook)

Frequency/Likelihood of Future Occurrence

Likely - Based on a historical record of 47 hail events over a period of 72 years (1950 – 2022), the historic frequency calculates to a 10% - 100% chance of this type of event occurring each year.

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
Ashland City	6/10/2003	Lighting	0	0	0.0K	0.0K
Ashland City	6/24/2016	Lighting	0	0	250.0K	0.0K
Ashland City	7/7/2016	Lighting	0	0	250.0K	0.0K

The following narratives were obtained via the NOAA Storm Event Database and included as expanded narratives.

June 24, 2016 – A house on Annette Drive was struck by lighting and destroyed in the resulting fire.

July 7, 2016 – In similar fashion to the June 24 event a house in Annette Drive was destroyed in a fire resulting from a lightning strike.

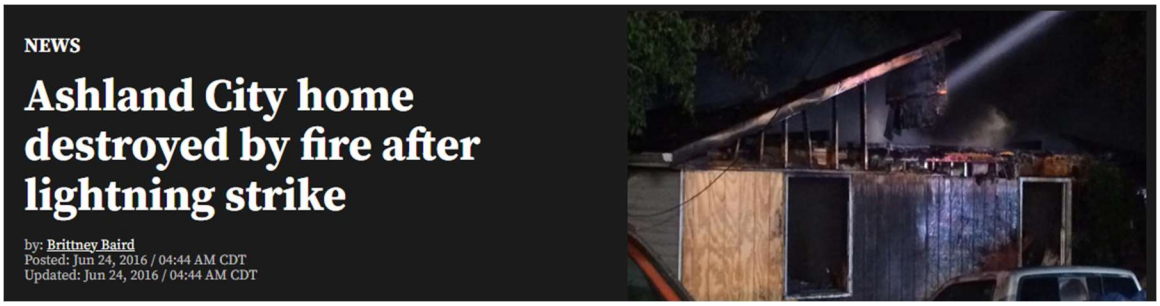


Figure 11 News Article for June 24, 2016, Lighting Associated House Fire (Source: WKRN)

Frequency/Likelihood of Future Occurrence

Occasional - Based on a historical record of 3 lighting events over a period of 72 years (1950 – 2022), the historic frequency calculates to a 1% - 10% chance of this type of event occurring each year.

C. Vulnerability Assessment

Vulnerability— Medium

Severe weather is not as spatially defined to any location in Cheatham County; therefore, the entire County is equally at risk to severe weather. The entirety of Cheatham County including all assets located within the County can be considered at risk to wind events. This includes the entire County population and all critical facilities, buildings (commercial and residential), and infrastructure.

Cheatham County uses a ranking system to determine each jurisdiction's vulnerability to severe weather (lightning, hail, wind) events. This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of a severe weather event occurring to calculate risk ranking for each jurisdiction.

Table 16 Risk Assessment (Severe Weather)

Jurisdiction/ Applicant	Impacts			Vulnerability *H+P+B=#; #/3=V*
	Human	*Property*	*Business*	
Cheatham County	3	3	3	3
Ashland City	4	5	3	4
Kingston Springs	3	4	2	3
Pegram	1	1	1	1
Pleasant View	3	3	2	2.67

Jurisdiction/ Applicant	Vulnerability	Probability	Risk *V+P=R*	
Cheatham County	3	4	**7.0**	**High**
Ashland City	4	3	**7.0**	**High**
Kingston Springs	3	2	**5.0**	**Moderate**
Pegram	1	1	**2.0**	**Low**
Pleasant View	2.67	3	**5.67**	**Medium**

Risk	
Low	**2-3.6**
Moderate	**3.7-5.2**
Medium	**5.3-6.8**
High	**6.9-8.4**
Severe	**8.5-10**

Human	Business

Risk of injuries and death from hazard	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Death's probable, injuries will likely be substantial

Amount of business damage	
1	Less than 3 businesses closed for only one day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top 10 local employer closed indefinitely

Property	
Amount of residential property damage	
1	Less than $500 in damages
2	$500 - $10,000 in damages
3	$10,000 – $500,00 in damages
4	$500,000 - $2,000,000 in damages
5	More than $2,000,000 in damages

Probability	
Probability of hazard occurring	
1	Less than once every 10 years
2	About once every 5 – 10 years
3	About once every 2 – 5 years
4	About once a year
5	More than once a year

D. Land Use & Development

Considering that the entire County is at risk to severe weather, increased development and population growth can reasonably translate to increased damages due to these types of events. The population in Cheatham County is expected to rise similarly to its surrounding counties and Tennessee overall. An increase in population will lead to an increase in the number of residential and commercial structures as well as new and/or improved infrastructure which in turn means an increase in the number and value of assets at risk to wind damage.

E. Multi-Jurisdictional Differences

The entirety of Cheatham County and the incorporated jurisdictions, including all assets located within can be considered equally at risk to severe weather events. This includes the entire population and all critical facilities, buildings (commercial and residential), and infrastructure.

F. Summary

Cheatham County is subject to severe weather hazards including thunderstorms, wind, lightning, and hail. Associated damages include impacts to utilities, residential and commercial buildings/property, and agricultural losses. High wind can cause trees to fall and potentially result in injuries or death and lightning can lead to house fires and serious injury. Hail can cause injury as well as severe property damage to homes and automobiles.

2.1.3 Earthquakes

A. Hazard Identification

An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves. The energy originates from a subsurface fault. A fault is a fracture or discontinuity in a volume of rock along tectonic plates. In the most general sense, the word earthquake is used to describe any event that generates seismic waves. Earthquakes are typically caused by the rupturing of geological faults. Occasionally, they are also caused by other events such as volcanic activity,

landslides, mine blasts, and nuclear tests. An earthquake's point of initial rupture is called its focus or hypocenter. The epicenter is the point at ground level directly above the hypocenter.

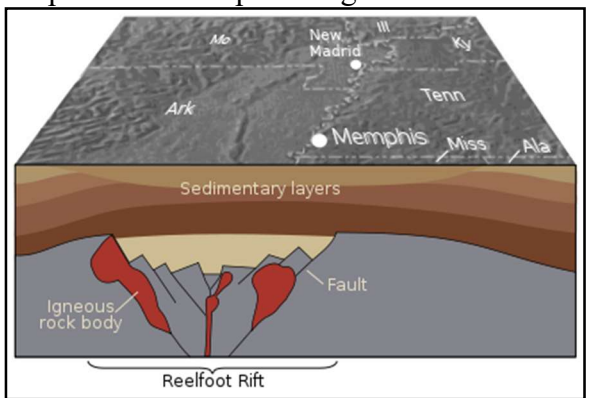


Figure 12 New Madrid Fault Line

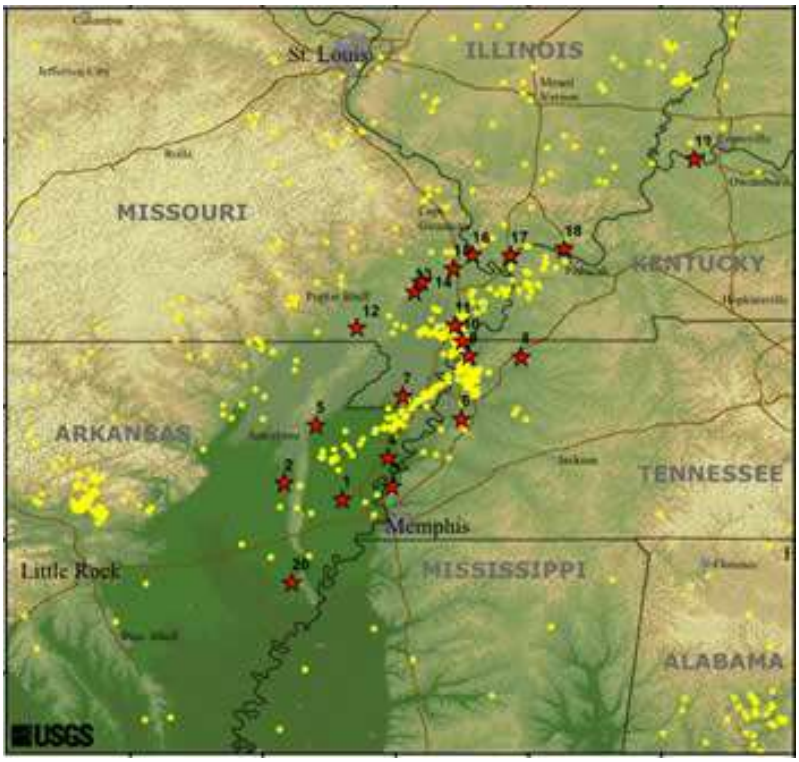


Figure 13 New Madrid Seismic Zone Earthquakes (Source: USGS)

B. Hazard Profile

At the Earth's surface, earthquakes manifest themselves by shaking and sometimes displacing the ground. The direct force of the earthquake will shake the ground and cause structures to collapse or become unstable. The shaking can also cause phenomena known as liquefaction. Liquefaction occurs when water saturated sediments are transformed by the earthquake’s force into a substance that behaves like a liquid. By undermining the foundations and base courses of infrastructure, liquefaction can destroy or significantly damage a structure. In addition to direct damage caused by an earthquake, it can cause several secondary hazards. When the epicenter of a large earthquake is located offshore, the seabed may be displaced sufficiently to cause a tsunami. Earthquakes can

also trigger landslides, and occasionally volcanic activity. The shallower an earthquake, the more damage to structures it causes, all else being equal.

Frequency/Likelihood of Future Occurrence

Unlikely –Cheatham County near the major intraplate (within a tectonic plate seismic zone known as the New Madrid Seismic Zone. The New Madrid Seismic Zone is an approximately 120-milelong fault system that stretches over five states including Western Tennessee.

Historically, the zone is known for producing four of the largest North American earthquakes in recorded history, all in which would have been felt inn Cheatham County. This includes the noted three-month period between December 1811 and February 1812 that had quakes reaching Richter Scale magnitudes into the 7.0 through 8.6 ranges.

Table 17 Richter Scale for Earthquakes (Source: USGS)

Richter Scale for Earthquakes		
Magnitudes	**Description**	**Typical Impacts**
Less than 2.0	Micro	Not felt.
2.0-2.9	Slight	Generally not felt, but recorded.
2.0-3.9	Minor	Often felt, but rarely causes damage.
4.0-4.9	Light	Noticeable shaking of indoor items, rattling noises. Significant damage unlikely.
5.0-5.9	Moderate	Can cause major damage to poorly constructed buildings over small regions. At most slight damage to well-designed buildings.
6.0-6.9	Strong	Can be destructive in areas up to about 100 miles across in populated areas.
7.0-7.9	Major	Can cause serious damage over larger areas.
8.0-8.9	Great	Can cause serious damage in areas several hundred miles across.
9.0-9.9	Epic	Devastating in areas several thousand miles across.

C. Vulnerability Assessment

Vulnerability - Low

According to a FEMA report filed in 2008, a serious earthquake in the NMSZ could result in the highest economic loss due to a natural disaster in U.S. history, causing widespread and catastrophic damage across a seven-state radius with most of the worst impacts taking place in Western Tennessee (including Cheatham County). Based on this report, a 7.7 magnitude quake in the NMSZ would result in thousands of fatalities, tens of thousands of damages to structures, and total disruption of vital infrastructure in Western Tennessee.

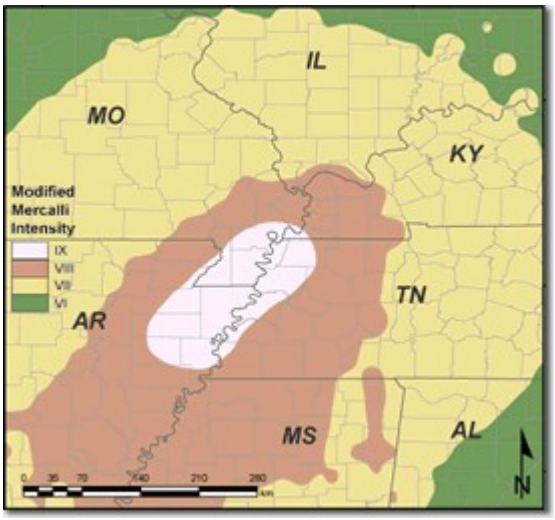


Figure 14 Hypothetical Levels of Shaking from M7.7 Earthquake (Source: USGS)

Intensity	Shaking	Description
VI	Strong	Felt by all, some heavy furniture moved, some fallen plaster, slight damage
VII	Very Strong	Damage negligible in well-built and structured buildings, slight to moderate in ordinary structures, considerable damage in poorly built structures, broken chimneys
VIII	Severe	Heavy furniture overturned, damage increased across structures, some experience partial collapse
IX	Violent	Building shifted off foundations, considerable damage across all structures. Increasing damage for less well-built structures.

Throughout the county many buildings and most infrastructure networks will be vulnerable to a quake. The risk of this is incredibly low but the nature of earthquakes is incredibly difficult to predict. There has been no recent activity with earthquakes in Cheatham County. However, the proximity to New Madrid, the committee found it essential to include this natural hazard on their plan. Following inclusion of this hazard it was found through analysis that the average risk to the county and its jurisdictions was low.

Table 18 Risk Assessments (Earthquakes)

Jurisdiction/ Applicant	Impacts			Vulnerability *H+P+B=#; #/3=V*
	Human	*Property*	*Business*	
Cheatham County	2	2	4	2.67
Ashland City	2	4	3	3
Kingston Springs	1	1	1	1
Pegram	1	1	1	1
Pleasant View	2	3	3	2.67

Jurisdiction/ Applicant	Vulnerability	Probability	Risk *V+P=R*	
Cheatham County	2.67	1	**3.67**	**Low**
Ashland City	3	1	**4.0**	**Moderate**
Kingston Springs	1	1	**2.0**	**Low**
Pegram	1	1	**2.0**	**Low**
Pleasant View	2.67	1	**3.67**	**Low**

Risk	
Low	**2-3.6**
Moderate	**3.7-5.2**
Medium	**5.3-6.8**
High	**6.9-8.4**
Severe	**8.5-10**

Human	
Risk of injuries and death from hazard	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Death's probable, injuries will likely be substantial

Business	
Amount of business damage	
1	Less than 3 businesses closed for only one day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top 10 local employer closed indefinitely

Property	
Amount of residential property damage	
1	Less than $500 in damages
2	$500 - $10,000 in damages
3	$10,000 – $500,00 in damages
4	$500,000 - $2,000,000 in damages
5	More than $2,000,000 in damages

Probability	
Probability of hazard occurring	
1	Less than once every 10 years
2	About once every 5 – 10 years
3	About once every 2 – 5 years
4	About once a year
5	More than once a year

D. Land Use & Development

To consider the potential impact of an earthquake to be negligible would be foolhardy, if simply based upon the premise that it has never happened in the past. Impact on the utility infrastructure for an earthquake event is unknown and could range from insignificant to catastrophic.

E. Multi-Jurisdictional Differences

Due to the nature of earthquakes, Cheatham County and all incorporated jurisdictions are equally susceptible to them.

F. Summary

There is concern that a large magnitude event grows more probable with each passing day. Such an event could directly affect more that 50 percent of the state's population. Such an event, on the New Madrid Fault, could result in a catastrophic disaster which would have the potential to trigger a national response on a larger scale than any recorded earthquake event in modern United States history. The state utilizes research and damage assessment information gathered by the Central United States Earthquake Consortium (CUSEC), the University of Memphis Center for Earthquake Research Information (CERI), the Mid- America Earthquake Center (MAE) and the United States Geological Survey (USGS) to assist in development of preparedness, response, and recovery plans to safeguard communities and citizens.

2.1.4 Flooding

A. Hazard Identification

Flooding events occur when excess water from rivers and other bodies of water overflow onto riverbanks and adjacent floodplains. In addition, lower lying regions can collect water from rainfall and poorly drained land can accumulate rainfall through ponding on the surface. Floods in

Cheatham County are usually caused by rainfall but may also be caused by snowmelt and man-made incidents.

The area adjacent to a channel is the floodplain, as shown in *Figure 16*. A floodplain is flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood, but which do not experience a strong current. Floodplains are made when floodwaters exceed the capacity of the main channel or escape the channel by eroding its banks. When this occurs, sediments (including rocks and debris) are deposited that gradually build up over time to create the floor of the floodplain. Floodplains generally contain unconsolidated sediments, often extending below the bed of the stream.

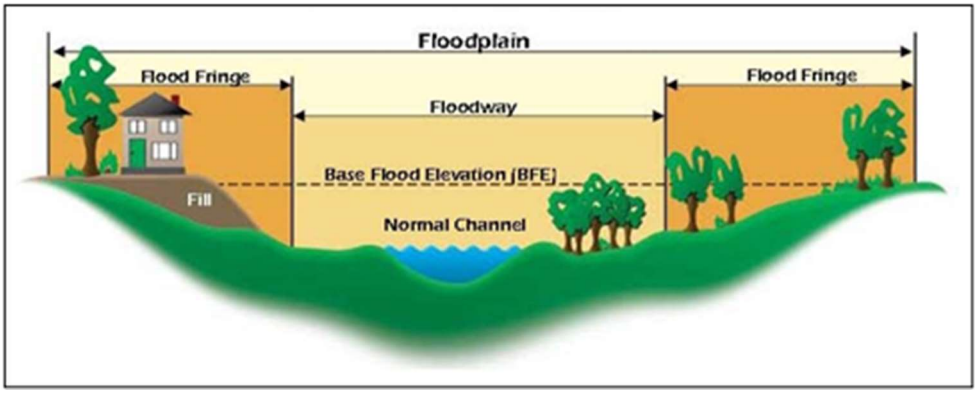


Figure 15 Characteristics of a Floodplain (Source: FEMA)

In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a 1% chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program (NFIP). The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Three general types of health hazards are common to flood events. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, bacteria, animal waste, and lawn, farm, and industrial chemicals. Pastures and areas where farm animals are kept, or 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. 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.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health

hazard, especially for small children and the elderly. Another health hazard occurs when 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 county water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of 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 puts a severe strain on people, especially the 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.

B. Hazard Profile

Riverine flooding occurs from inland water bodies such as streams and rivers. In Tennessee, flooding is highly dependent on precipitation amounts and is highly variable within the State.

HAZUS is a regional multi-hazard loss estimation model that was developed by FEMA and National Institute of Building Sciences (NIBS). The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state, and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

Table 19 Mapped Flood Insurance Zones

Flood Hazard Area	Description
HAZUS (100-yr)	Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Mandatory flood insurance purchase requirements and floodplain management standards apply.
HAZUS (500-yr)	500-year flood zone is a moderate flood hazard area and is an area between the limits of the base flood and the 0.2- percent-annual-chance (or 500-year) flood. Mandatory flood insurance is not required.
Non-highlighted Areas	Minimal risk areas outside the 1-percent and .2 percent-annual-chance floodplains.

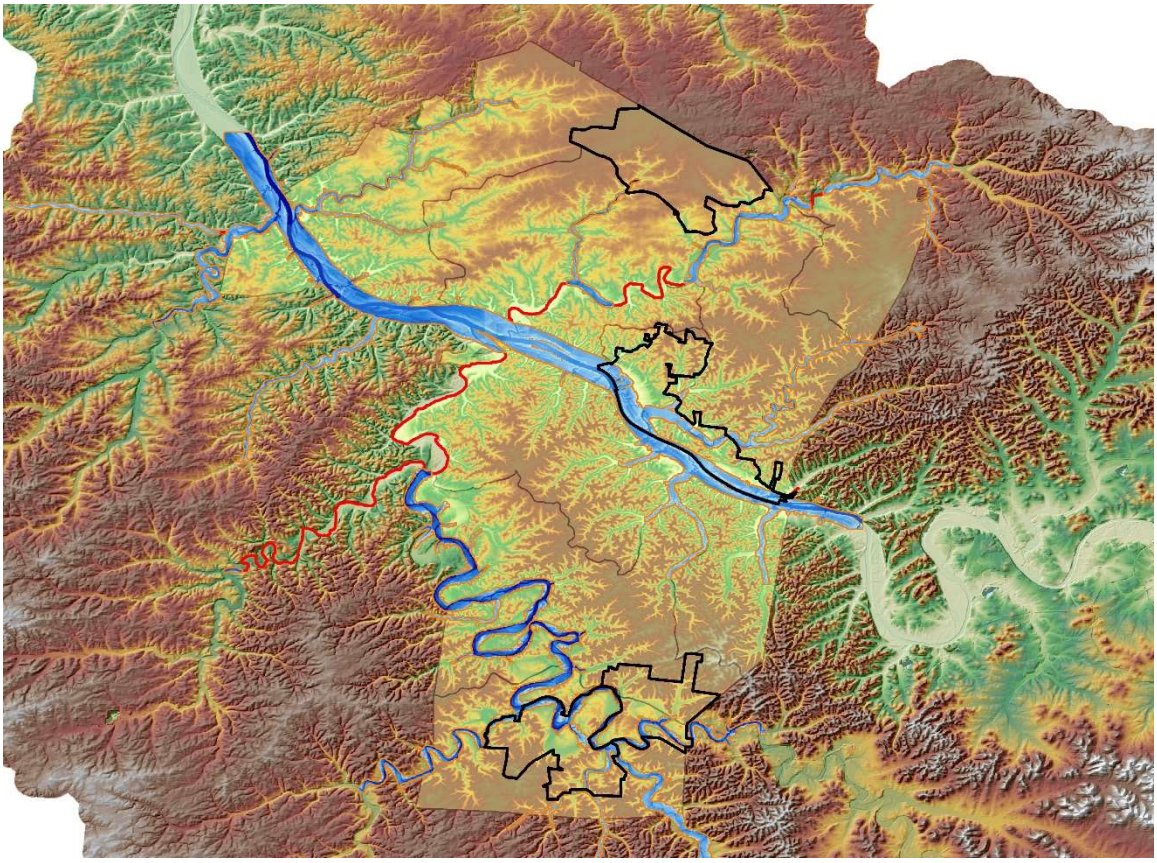


Figure 16 100-year Flood Map

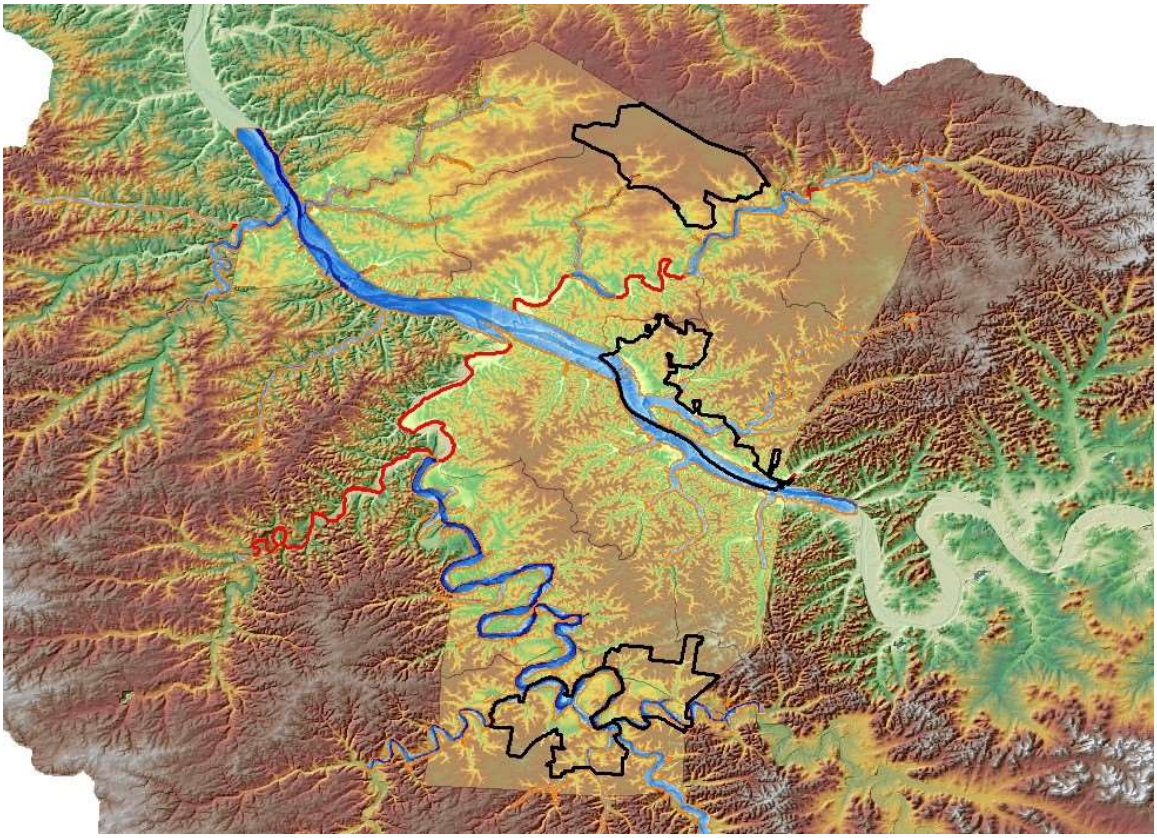


Figure 17 500-year Flood Map

Table 20 NFIP Summary of Participating Jurisdictions

Jurisdiction	NFIP	CID Number	Repetitive Loss	Severe Repetitive Loss
Cheatham County (Unincorporated)	Participating	470026	11	0
Ashland City	Participating	470027	5	1
Kingston Springs	Participating	470289	0	0
Pegram	Participating	470291	0	0
Pleasant View	Participating	470428	0	0

Table 21 NFIP Policy Data

NFIP Policy Data for Cheatham County			
Jurisdiction	**Policies In-Force**	**Insurance In-Force Whole $**	**Written Premium In-Force**
Cheatham County (Unincorporated)	251	$60,568,600	$209,015
Ashland City	175	$51,087,000	$204,984
Kingston Springs	33	$9,980,000	$22,919
Pegram	51	$15,152,700	$31,359
Pleasant View	4	$1,225,000	$1,676

Policies In-force: number of NFIP flood insurance policies
Insurance In-force whole $: value of building and contents insured by the NFIP

Written Premium In-force: total premiums paid for NFIP insurance policies

According to the National Flood Insurance Program, repetitive flood loss is defined as a facility or structure that has experienced two or more insurance claims of at least $1,000 in any given 10-year period since 1978. Within the NFIP, repetitive flood loss properties are usually considered the most vital structures to mitigate. The chart below provides a summary of repetitive losses for Cheatham County.

Table 22 NFIP Loss Data

NFIP Loss Data for Cheatham County					
Jurisdiction	**Total Losses**	**Closed Loses**	**Open Loses**	**CWOP Loses**	**Total Payments**
Cheatham County (Unincorporated)	390	390	0	390	$16,055,174
Ashland City	91	91	0	91	$7,086,143
Kingston Springs	8	8	0	8	$805,612
Pegram	42	42	0	42	$1,877,607
Pleasant View	0	0	0	0	0

Total Losses: number of flood insurance claims filled by policyholders
Closed Losses: number of flood insurance claims paid to policyholders
Open Losses: claims that are still being processed
CWOP Losses: claims that were "closed without payment"
Total Payments: total dollars paid to policyholders

Table 23 NOAA Reported Flooding Events (1950 - 2022)

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damage
Ashland City	12/16/1996	Flash Flood	0	0	0.0K	0.0K
Countywide	3/1/1997	Flash Flood	0	0	0.0K	0.0K
Countywide	3/2/1997	Flash Flood	0	0	0.0K	0.0K
Countywide	3/2/1997	Flash Flood	0	0	1.0M	0.0K
Countywide	3/2/1997	Flash Flood	0	0	50.0K	0.0K
Countywide	3/5/1997	Flash Flood	0	0	0.0K	0.0K
Ashland City	6/13/1997	Flash Flood	0	0	0.0K	0.0K
Countywide	4/16/1998	Flash Flood	0	0	0.0K	0.0K
Pleasant View	5/26/1998	Flash Flood	0	0	0.0K	0.0K
Pleasant View	6/10/1998	Flash Flood	0	0	0.0K	0.0K
Countywide	1/23/1999	Flash Flood	0	0	0.0K	0.0K
Pegram	5/25/2000	Flash Flood	0	0	100.0K	0.0K
Pegram	2/16/2001	Flash Flood	0	0	0.0K	0.0K
South Portion	11/29/2001	Flash Flood	0	0	0.0K	0.0K
Ashland City	1/24/2002	Flash Flood	0	0	0.0K	0.0K
Countywide	3/17/2002	Flash Flood	0	0	0.0K	0.0K
Cheatham (Zone)	3/17/2002	Flood	0	0	0.0K	0.0K
Ashland City	3/20/2002	Flash Flood	0	0	0.0K	0.0K
Countywide	5/7/2003	Flash Flood	0	0	0.0K	0.0K

Ashland City	6/15/2003	Flash Flood	0	0	0.0K	0.0K
Ashland City	12/7/2004	Flash Flood	0	0	1.0K	0.0K
Ashland City	4/2/2009	Flash Flood	0	0	1.0K	0.0K
Kingston Springs	5/9/2009	Flash Flood	0	0	25.0K	0.0K
Pleasant View	5/2/2010	Flood	0	0	12.5M	1.0K
Kingston Springs	4/27/2011	Flash Flood	0	0	1.0K	0.0K
Craggie Hope	4/27/2013	Flash Flood	0	0	0.0K	0.0K
Ashland City	2/2/2016	Flash Flood	0	0	20.0K	0.0K
Lockertsville	2/3/2016	Flood	0	0	5.0K	0.0K
Doddsville	7/7/2016	Flash Flood	0	0	10.0K	0.0K
Lillamay	7/2/2017	Flash Flood	0	0	0.0K	0.0K
Craggie Hope	8/31/2017	Flash Flood	0	0	0.0K	0.0K
Poplar Ridge	9/1/2017	Flash Flood	0	0	10.0K	0.0K
Shacklett	11/5/2018	Flash Flood	0	0	0.0K	0.0K
Pegram	2/6/2019	Flash Flood	1	0	99.43K	0.0K
Sulphur Springs	2/23/2019	Flash Flood	0	0	148.5K	0.0K
Craggie Hope	7/12/2020	Flash Flood	0	0	5.0K	0.0K
Lockertsville	2/28/2021	Flash Flood	0	0	0.0K	0.0K
Kingston Springs	3/27/2021	Flash Flood	0	0	213.72K	0.0K
Sulphur Springs	3/28/2021	Flood	1	0	0.0K	0.0K

The following narratives were obtained via the NOAA Storm Event Database. Only events resulting in injury, death, or expansive damage (greater than $200.0K property/crop damage) were included as expanded narratives.

March 2, 1997 – Widespread flooding occurred throughout the county resulting in damage to approximately 250 homes and businesses. Many roads were closed due to flooding and a bridge was washed out near Ashland City.

May 2, 2010 – This was a 500-year flood event resulting from rainfall accumulation in the Harpeth River System according to the Cheatham County Emergency Management Agency. The county saw approximately 17 inches of rainfall over a 3 day period in May 2010. This heavy rainfall event resulted in flood damage to 550 residential and commercial buildings and multiple state, county, and federal roads. The May 1-2 storm and subsequent flooding is one of the most expensive natural disasters to occur in Cheatham County.

Table 24 Record Flood (May 2010)

Location	New Record	Old Record	Date of Old Record	Flood Stage
Harpeth River (Kingston Springs)	38 Feet	33.2 Feet	January 7, 1946	20 Feet

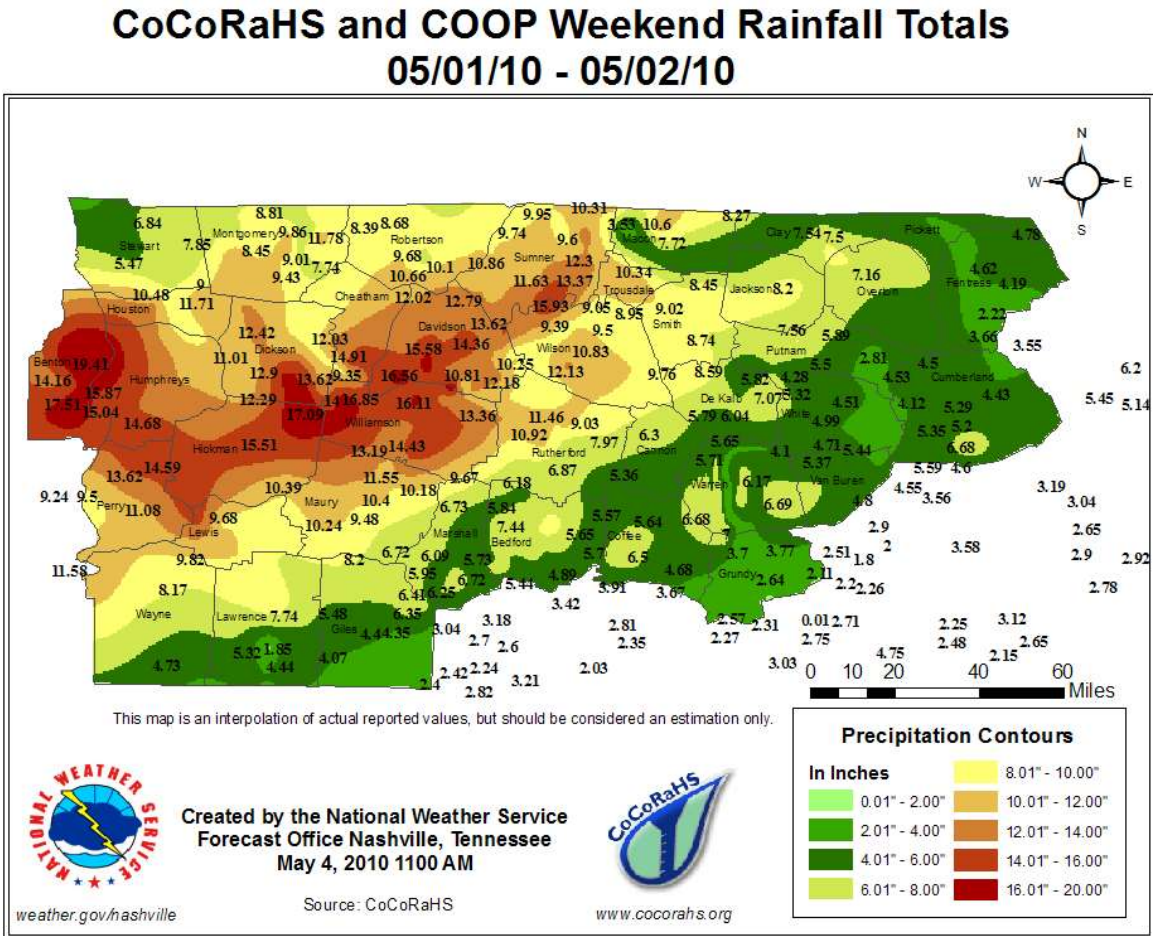


Figure 18 Middle TN Precipitation Estimates during the May 1-2 Flooding Event

February 6, 2019 – Massive Flooding occurred along Pond Creek Road creating an impassable situation in many areas as the road was underwater. This flood event resulted in the death of one 53-year-old individuals as they were swept away while walking a flooded bridge in their driveway. Another individual had to be rescued from the hood of their car at Pond Creek Road and Green Valley Drive.

March 27-28, 2021 – The Harpeth River in Kingston Springs again reached extremely high levels creating at 35.36 feet on March 28th just a few feet shy of the 2010 record. Multiple roads were flooded including West Kingston Springs Road, Highway 70, Pinnacle Hill Road, and Tennessee Waltz Parkway. One fatality is attributed to this event after a 65-year-old individual drowned after driving around high water barricades.

Figure 19 Flooding in Ashland City March 27-28, 2021 (Source: WKRN)

Frequency/Likelihood of Future Occurrence

Likely - By definition, the 100-year flood event is the flood that has a 1% chance in any given year of being equaled or exceeded. The 500-year flood event has a 0.2% chance of being equaled or exceeded in any given year. Based on a historical record of 39 flood events over a period of 77 years (1950 - 2022), the likelihood of a flood type event will occur semi-annually or annually.

C. Vulnerability Assessment

Vulnerability – Medium

During the HMPC meeting flooding was cited as a repetitive hazard in the county and jurisdictions. Discussion of commonly flood prone areas took place as did mention of improvements that have already been made to mitigate risk such as the almost complete Public-Private Partnership Berm and residential homes being elevated to the 500-year flood standard. Future projects were also discussed at this time and can be found in Section 3.4, the Mitigation Action Plan.

Cheatham County uses a ranking system to determine each jurisdiction's vulnerability to flooding events. This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of a flood event occurring to calculate a flood risk ranking for each jurisdiction. The average across jurisdiction provides an overall vulnerability assessment.

Table 25 Risk Assessment (Flooding)

Jurisdiction/ Applicant	Impacts	

	Human	*Property*	*Business*	**Vulnerability** *H+P+B=#; #/3=V*
Cheatham County	4	4	4	4
Ashland City	2	5	3	3.33
Kingston Springs	2	4	2	2.67
Pegram	5	4	3	4
Pleasant View	2	3	2	2.33

Jurisdiction/ Applicant	**Vulnerability**	**Probability**	**Risk** *V+P=R*	
Cheatham County	4	2	**6.0**	**Medium**
Ashland City	3.33	2	**5.33**	**Medium**
Kingston Springs	2.67	2	**4.67**	**Moderate**
Pegram	4	3	**7.0**	**High**
Pleasant View	2.33	3	**5.33**	**Medium**

Risk	
Low	**2-3.6**
Moderate	**3.7-5.2**
Medium	**5.3-6.8**
High	**6.9-8.4**
Severe	**8.5-10**

Human	
Risk of injuries and death from hazard	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Death's probable, injuries will likely be substantial

Business	
Amount of business damage	
1	Less than 3 businesses closed for only one day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top 10 local employer closed indefinitely

Property	
Amount of residential property damage	
1	Less than $500 in damages
2	$500 - $10,000 in damages
3	$10,000 – $500,00 in damages
4	$500,000 - $2,000,000 in damages
5	More than $2,000,000 in damages

Probability	
Probability of hazard occurring	
1	Less than once every 10 years
2	About once every 5 – 10 years
3	About once every 2 – 5 years
4	About once a year
5	More than once a year

HAZUS

Methodology

A Level I HAZUS analysis was completed using a probabilistic risk assessment for the 100-yr and 500-yr return periods. The Level I vulnerability assessment is presented below by return period.

Building Inventory (General Building Stock)

HAZUS estimates that there are 15,988 buildings in the region which have an aggregate total replacement value of $3,722 million. The tables below present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively.

Table 26 Building Exposure by Occupancy Type

Cheatham County (Study Region)		
Occupancy Type	**Exposure ($1000)**	**Percent Total**
Agricultural	12,043	0.3%
Commercial	308,733	8.3%
Education	55,042	1.5%
Government	20,401	0.5%
Industrial	253,335	6.8%
Religion	65,005	1.7%
Residential	3,007,026	80.8%
Total	3,721,585	100%

Table 27 Building Exposure by Occupancy Type for 100-yr Flood Scenario

100-year River Flood Scenario		
Occupancy Type	**Exposure ($1000)**	**Percent Total**
Agricultural	4,520	0.3%
Commercial	127,072	9.0%
Education	20,280	1.4%
Government	3,923	0.3%
Industrial	192,796	13.6%
Religion	22,233	1.6%
Residential	1,047,293	73.9%
Total	1,418,117	100%

Table 28 Building Exposure by Occupancy Type for 500-yr Flood Scenario

500-yr River Flood Scenario		
Occupancy Type	**Exposure ($1000)**	**Percent Total**
Agricultural	4,751	0.3%
Commercial	132,293	8.9%
Education	27,025	1.8%
Government	3,923	0.3%
Industrial	195,374	13.2%
Religion	23,714	1.6%
Residential	1,091,903	73.8%
Total	1,478,983	100%

Essential Facility Inventory

HAZUS indicates that there is one hospital in the region with a total capacity of twelve beds. There are seventeen schools, thirteen fire stations, four police station and one emergency operation center.

General Building Stock Damage

For the 100-year flood scenario, HAZUS estimates that about 590 buildings will be at least moderately damaged. This is over 28% of the total number of buildings in the scenario. There are an estimated 277 buildings that will be destroyed completely. *Table 29* below summarizes the expected damage by general occupancy type for the buildings in the County during a 100-yr flood scenario.

Table 29 Expected Building Damage by Occupancy for 100-yr Flood Scenario

% Damaged	1-10		11-20		21-30		31-40		41-50		>50%	
Occupancy	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	1	100	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	15	2	83	14	74	12	80	13	75	12	277	46
Total	**15**		**84**		**74**		**80**		**75**		**277**	

For the 500-year flood scenario, HAZUS estimates that about 693 buildings will be at least moderately damaged. This is over 21% of the total number of buildings in the scenario. There are an estimated 378 buildings that will be destroyed completely. *Table 30* below summarizes the expected damage by general occupancy type for the buildings in the County during a 500-yr flood scenario.

Table 30 Expected Building Damage by Occupancy for 500-yr Flood Scenario

% Damaged	1-10		11-20		21-30		31-40		41-50		>50%	
Occupancy	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Residential	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	14	2	72	10	69	10	79	11	95	13	378	53

Total	**14**	**72**	**69**	**79**	**95**	**378**

Essential Facility Damage

Table 31 and *Table 32* summarize the expected damage to essential facilities following a 100-yr and 500-yr flood, respectively. Both scenarios analyzed determine that on the day of the event all 12 beds in the local hospital would be available for use.

Table 31 Expected Damage to Essential Facilities 100-yr Flood Scenario

Classification	Total	Number of Facilities		
		At Least Moderate	At Least Substantial	Loss of Use
EOC	1	0	0	0
Fire Stations	13	0	0	0
Hospitals	1	0	0	0
Police Stations	4	0	0	0
Schools	17	0	0	0

Table 32 Expected Damage to Essential Facilities 500-yr Flood Scenario

Classification	Total	Number of Facilities		
		At Least Moderate	At Least Substantial	Loss of Use
EOC	1	0	0	0
Fire Stations	13	0	0	0
Hospitals	1	0	0	0
Police Stations	4	0	0	0
Schools	17	1	0	1

Debris Generation

100-year Scenario

The model estimates that a total of 16,978 tons of debris will be generated. Of the total amount, Finishes comprises 30% of the total, Structure comprises 36% of the total, and Foundation comprises 34%. If the debris tonnage is converted into an estimated number of truckloads, it will require 680 truckloads (@25 tons/truck) to remove the debris generated by the flood.

500-year Scenario

The model estimates that a total of 31,313 tons of debris will be generated. Of the total amount, Finishes comprises 27% of the total, Structure comprises 38% of the total, and Foundation comprises 35%. If the debris tonnage is converted into an estimated number of truckloads, it will require 853 truckloads (@25tons/truck) to remove the debris generated by the flood.

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those displaced people that will require accommodations in temporary public shelters.

100-year Scenario

The model estimates 1,125 households (or 3,375 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 354 people (out of a total population of 39,105) will seek temporary shelter in public shelters.

500-year Scenario

The model estimates 1,237 households (or 3,712 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 370 people (out of a total population of 39,105) will seek temporary shelter in public shelters

Building Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood. Total building-related losses were $256.17 million in the 100-year flood scenario and $305.98 million in the 500-yr flood scenario. *Table 33* and *Table 34* provide a summary of the losses associated with the building damage in each scenario

Table 33 Building Related Economic Loss Estimates for the 100-yr Flood Scenario ($ Millions)

Category	Area	Residential	Commercial	Industrial	Other	Total
Building Loss	Building	119.74	13.01	5.68	3.14	141.57
	Content	60.67	29.45	11.22	10.73	112.07
	Inventory	0.00	0.86	1.58	0.09	2.53
	Subtotal	180.41	43.32	18.48	13.96	256.17
Business Interruption	Income	0.62	20.03	0.19	3.39	24.22
	Relocation	25.96	4.05	0.17	1.51	31.69
	Rental Income	8.66	3.08	0.02	0.20	11.95
	Wage	1.45	20.01	0.32	13.10	34.88
	Subtotal	36.69	47.16	0.70	18.20	102.74
Total		**217.10**	**90.48**	**19.18**	**32.16**	**358.91**

Table 34 Building Related Economic Loss Estimates for the 100-yr Flood Scenario ($ Millions)

Category	Area	Residential	Commercial	Industrial	Other	Total
Build	Building	142.32	16.57	7.19	4.01	170.10

	Content	71.29	34.81	14.15	12.46	132.72
	Inventory	0.00	1.01	1.96	0.11	3.08
	Subtotal	213.61	52.39	23.30	16.59	305.89
Business Interruption	Income	0.71	23.15	0.24	3.96	28.06
	Relocation	29.50	4.69	0.21	1.75	36.14
	Rental Income	9.83	3.57	0.03	.22	13.65
	Wage	1.69	23.61	0.38	14.78	40.45
	Subtotal	41.73	55.02	.86	20.70	118.30
Total		**255.34**	**107.42**	**24.16**	**37.29**	**424.20**

D. Land Use and Development

All future development within the floodplain may be considered at risk. An increase in population will likely result in an increase in buildings and infrastructure. New development in unincorporated areas could potentially occur in areas prone to flooding and increase vulnerabilities and potential losses; however, most of the current land use regulations require the consideration of flooding during the development process.

E. Multi-Jurisdictional Differences

Flooding effects all jurisdictions differently, that is why it is important to document the depth, duration, and time that flooding occurred. These differences are documented in past occurrences to demonstrate the toll that flooding can take on both the rural and urban areas of the county. Due to the topography of Cheatham County with its rolling hills and deep valleys, flood events are prone to occur on the streams located within the county.

Roads that consistently flood in Cheatham County:

- Tennessee Waltz Parkway (Ashland City)
- Old Clarksville Pike (Harris Farm Subdivision)
- Chapmansboro Road
- Deerfield Drive
- Pond Creek Road
- Little Pond Creek Road
- Fairgrounds Road
- Goose Bay Road
- S. Harpeth Road
- Lakeside Drive
- Cumberland Drive
- Lockertsville Road
- Cedar Hill Road
- West Kingston Springs
- East Kingston Springs Road
- Lloyd Lane

- Link Avenue
- South Main Street
- Spring Street
- Spring Creek Crossing
- Highway 49
- Highway 12 S & Highway 12 N
- Highway 70

Waterways that are prone to flooding in Cheatham:

- Harpeth River System
- Spring Creek
- Stratton Lake Area

F. Summary

Severe flooding has the potential to inflict significant damage in Cheatham County. The total economic loss estimated for the 100-year riverine flood is $358.91 million. The total economic loss estimated for the 500-year riverine flood is $424.20 million. Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed by flood waters. 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

2.1.5 Winter Weather

A. Hazard Identification

A freeze occurs when temperatures are below 32 degrees Fahrenheit for an extended period, typically taking place overnight. These temperatures can damage agricultural crops, burst water pipes, and create layers of "black ice." Winter storms are events that can range from a few hours of moderate snow to blizzard-like circumstances that can affect driving conditions and impact communications, electricity, and other services. In Cheatham County, all jurisdictions are vulnerable to freezes and moderate winter storms in varying degrees, but not to the severity level seen in much of the northern U.S. Mean snowfall per year is from 6-12" annually average mean snowfall per year is below in *Figure 22.*

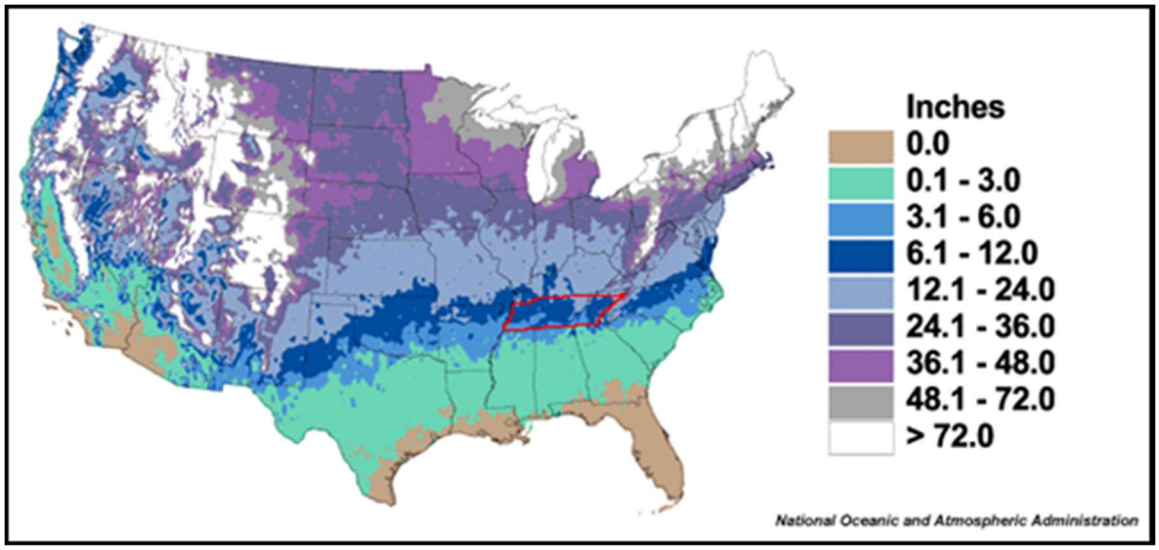


Figure 20 Average Snowfall per Year (Source: NOAA)

B. Hazard Profile

The following figure provides winter storm event information for Cheatham County. The threat index for Cheatham County is 2 (Moderate).

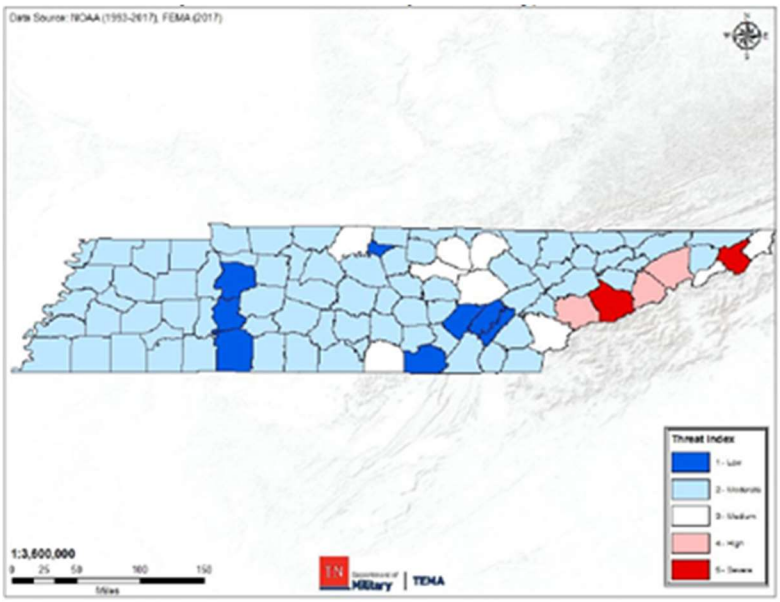


Figure 21 Hazard Probability Map (Winter Weather) (Source: 2018 Tennessee Hazard Mitigation Plan)

Threat Index	Hazard Score
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Based on NOAA's data, winter storms in Tennessee can cost up to $5,000,000 in property damage, and $5,000,000 in crop damage in 1 impact. The average winter storm event will cause $22,722 in property damage, $10,020 in crop damage, kill 0.01 people, and injure 0.04 people.

Table 35 NOAA Recorded Winter Weather Events (1950-2022)

Location	Date	Event Type	Deaths	Injuries	Property Damage	Crop Damages
Cheatham (Zone)	1/6/1996	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	1/6/1996	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	12/24/1998	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	12/4/2002	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	12/22/2004	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	3/7/2008	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	12/16/2008	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/7/2010	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/14/2010	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	12/24/2010	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/9/2011	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/20/2011	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/7/2011	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/9/2011	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/12/2012	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/15/2013	Winter Weather	0	0	5.0K	0.0K
Cheatham (Zone)	12/9/2013	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	3/2/2014	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	1/23/2015	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/16/2015	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	2/18/2015	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/20/2015	Winter Storm	0	0	50.0K	0.0K
Cheatham (Zone)	3/4/2015	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	1/21/2016	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	2/8/2016	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/10/2016	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/6/2017	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	3/11/2017	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/12/2018	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/15/2018	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	12/8/2018	Winter Weather	0	0	5.0K	0.0K
Cheatham (Zone)	1/19/2019	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/6/2020	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/6/2021	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	2/17/2021	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	1/2/2022	Winter Weather	0	0	0.0K	0.0K
Cheatham (Zone)	1/6/2022	Winter Storm	0	0	0.0K	0.0K
Cheatham (Zone)	1/16/2022	Winter Weather	0	0	0.0K	0.0K

The following narratives were obtained via the NOAA Storm Event Database. Only events resulting property/crop damage were included as expanded narratives.

January 15, 2013 – Freezing rain accumulated to approximately one-tenth an inch resulting in the doing of several trees at the intersection of Sams Creek Road and U.S. Highway 70.

February 20, 2015 – Snow and sleet precipitation accumulated to approximately half an inch in the afternoon and was followed by freezing rain of about a quarter of an inch. This additional accumulation resulted in multiple power lines and trees being downed. A gas pump awning near I-24 on Maxey Road collapsed due to the weight of the snow, ice, and sleet accumulation. According to the Ashland City Times, multiple schools were dealing with water damage from ice accumulating on roofs.

December 8, 2018 – Scattered power outages affected the northern most parts of Cheatham County due to snow accumulations of approximately one tenth an inch knocking down trees and power lines.

Figure 22 Winter Weather Dec. 8, 2018, Ashland City (Source: USA Today Network, Kelly Fisher)

Frequency/Likelihood of Future Occurrence

Occasional - The probability of Cheatham County and its municipalities experiencing an extreme winter weather event is difficult to predict but based on historical record of winter weather events since 1950, it can reasonably be assumed that this type of event can occur however infrequently; 38 events over a 72-year period. Therefore, the HMPC calculated that there is the occasional probability that this type of event will occur each year.

C. Vulnerability Assessment

Vulnerability - Medium

In the county, road traveling conditions, electrical lines, and agricultural functions are some of the most vulnerable features. Cheatham County uses a ranking system to determine each jurisdiction's vulnerability to freezes/winter storm events. This system is based off simple arithmetic which

analyzes potential impacts to determine vulnerabilities and then analyzes the probability of a freeze/winter storm event occurring to calculate a risk ranking for each jurisdiction and an overall average risk ranking for the entire county and included jurisdictions.

In evaluating the risk of winter storms, jurisdictions viewed incidents that impacted day-to-day business as opposed to all incidents indicated by the NOAA Storm Database. vulnerability and risk assessments are below.

Table 36 Risk Assessment (Winter Weather)

Jurisdiction/ Applicant	Impacts			Vulnerability *H+P+B=#; #/3=V*
	Human	*Property*	*Business*	
Cheatham County	2	2	3	2.33
Ashland City	4	5	3	4
Kingston Springs	1	1	1	1
Pegram	4	4	1	3
Pleasant View	2	3	2	2.33

Jurisdiction/ Applicant	Vulnerability	Probability	Risk *V+P=R*	
Cheatham County	2.33	3	**5.33**	**Medium**
Ashland City	4	3	**7.0**	**High**
Kingston Springs	1	4	**5.0**	**Moderate**
Pegram	3	4	**7.0**	**High**
Pleasant View	2.33	2	4.33	**Moderate**

Risk	
Low	**2-3.6**
Moderate	**3.7-5.2**
Medium	**5.3-6.8**
High	**6.9-8.4**
Severe	**8.5-10**

Human	
Risk of injuries and death from hazard	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Death's probable, injuries will likely be substantial

Business	
Amount of business damage	
1	Less than 3 businesses closed for only one day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top 10 local employer closed indefinitely

Property	
Amount of residential property damage	
1	Less than $500 in damages
2	$500 - $10,000 in damages
3	$10,000 – $500,00 in damages
4	$500,000 - $2,000,000 in damages
5	More than $2,000,000 in damages

Probability	
Probability of hazard occurring	
1	Less than once every 10 years
2	About once every 5 – 10 years
3	About once every 2 – 5 years
4	About once a year
5	More than once a year

D. Land Use and Development

Throughout the county many buildings and most infrastructure networks can be vulnerable to winter storm impacts. Many of these structures wouldn't receive direct impacts from winter storms

but they could receive indirect impacts such downed electrical lines that cut off electricity to the structures, frozen pipelines that crack, destroyed agriculture crops, and customers not being able to access travels to the structures due to ice covered roads.

E. Multi-Jurisdictional Differences

Due to the nature of winter conditions, Cheatham County and the incorporated jurisdictions are equally susceptible to winter weather conditions.

F. Summary

Cheatham County and the incorporated jurisdictions are equally vulnerable to winter weather. Extreme snow, ice or sleet can affect people's health and safety. Therefore, it is important to have proper measurements in place to prevent critical structure from being vulnerable to cut off electricity during below freezing temperatures.

2.1.6 Drought

A. Hazard Identification

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 droughts varies widely. There are cases when drought develops relatively quickly and lasts a very short 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 droughts are detailed below in *Table 37*.

Table 37 Drought Classification

Type	Details
Meteorological Drought	Meteorological Drought is based on the degree of dryness (rainfall deficit) and the length of the dry period.
Agricultural Drought	Agricultural Drought is based on the impacts to agriculture by factors such as rainfall deficits, soil water deficits, reduced ground water, or reservoir levels needed for irrigation.
Hydrological Drought	Hydrological Drought is based on the impact of rainfall deficits on the water supply such as stream flow, reservoir and lake levels, and ground water table decline.
Socioeconomic Drought	Socioeconomic drought is based on the impact of drought conditions (meteorological, agricultural, or hydrological drought) on supply and demand of some economic goods. Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related deficit in water supply.

B. Hazard Profile

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 droughts have been developed in the United States, depending on the discipline affected, the region being considered, and the application. Several indices developed by Wayne Palmer, as well as the Standardized Precipitation Index, are useful for describing the many scales of drought.

The **U.S. Drought Monitor** provides a summary of drought conditions across the United States and Puerto Rico. Often described as a blend of art and science, the 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 **Standardized Precipitation Index** (SPI) is a way of measuring drought that is different from the Palmer Drought Index (PDI). Like the PDI, this index is negative for drought, and positive for wet conditions. But the SPI is a probability index that considers only precipitation, while Palmer's indices are water balance indices that consider water supply (precipitation), demand (evapotranspiration) and loss (runoff).

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

According to the PDSI map shown in *Figure 25*, Middle Tennessee has a relatively low risk for drought hazard. However, drought cannot be confined to geographic or political boundaries and some areas may experience more severe drought events than what is shown on the map.

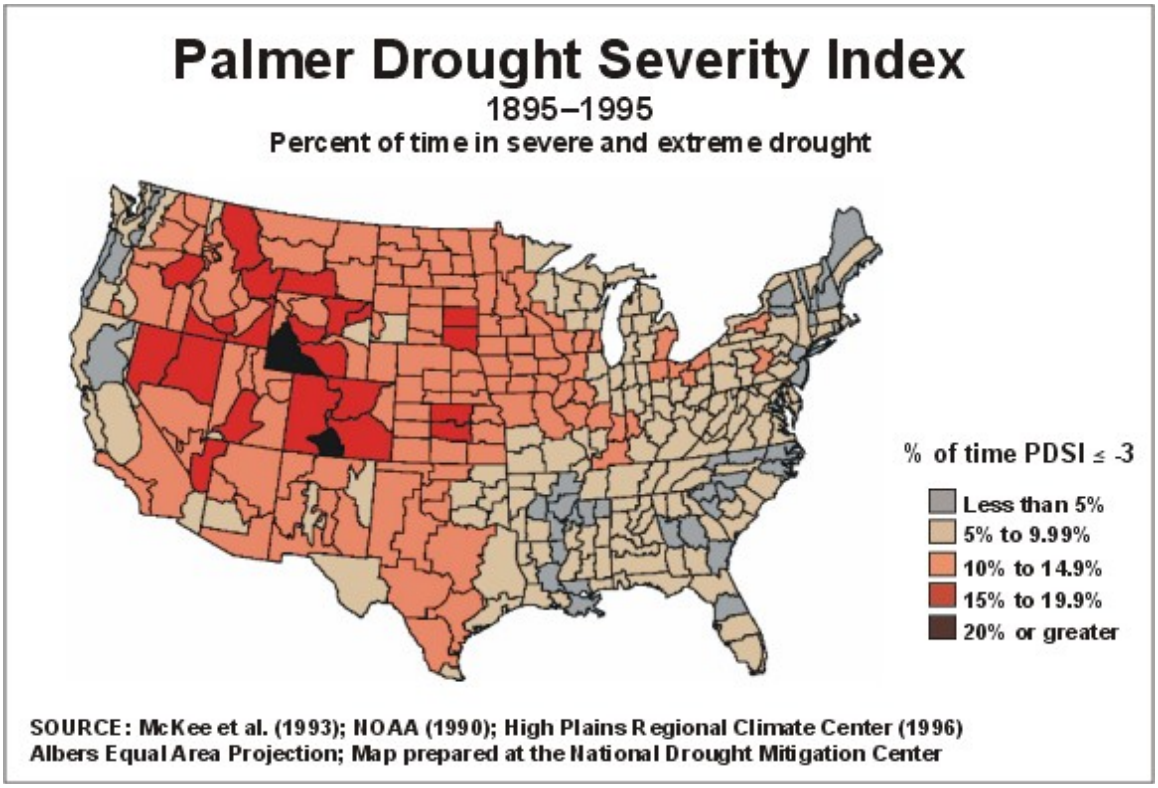


Figure 23 Palmer Drought Map

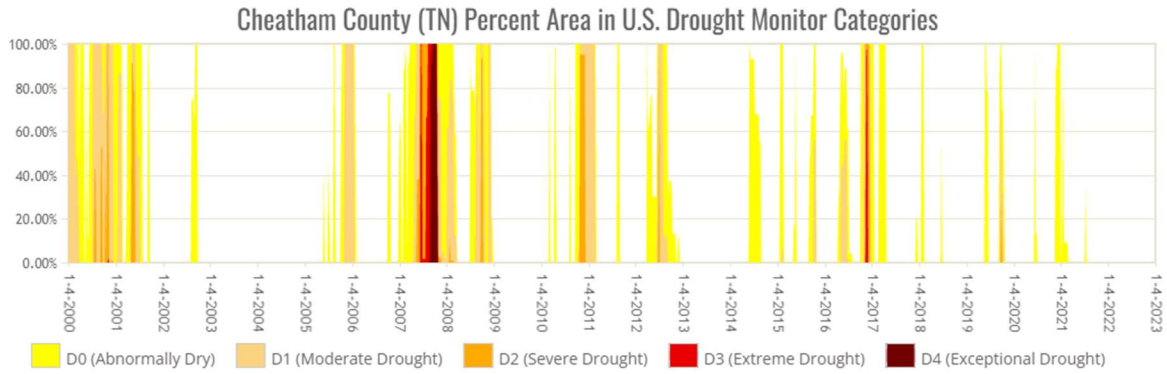


Figure 24 Drought Monitor Time Series (Source: National Drought Mitigation Center)

Figure 26 above illustrates drought conditions within Cheatham County between 2000 and 2022. According to the National Drought Mitigation Center the last period of Extreme Drought (D4) occurred in 2007. D4 (extreme drought) is categorized by browning grass, low lake levels, municipality water restrictions, and increased water prices. Whereas D0 (abnormally dry) conditions consist of hard ground and declining agriculture ponds and creeks. *Table 38* below lists times of drought as recorded by NOAA.

Table 38 NOAA Recorded Drought Events (1950-2022)

Location	Date	Deaths	Injuries	Property Damages	Crop Damages
Cheatham (Zone)	5/1/2007	0	0	0.0K	0.0K
Cheatham (Zone)	6/1/2007	0	0	0.0K	0.0K
Cheatham (Zone)	7/1/2007	0	0	0.0K	0.0K
Cheatham (Zone)	8/1/2007	0	0	0.0K	0.0K
Cheatham (Zone)	9/1/2007	0	0	0.0K	0.0K
Cheatham (Zone)	10/1/2007	0	0	0.0K	0.0K
Cheatham (Zone)	11/2/2010	0	0	0.0K	0.0K
Cheatham (Zone)	12/1/2010	0	0	0.0K	0.0K
Cheatham (Zone)	7/3/2012	0	0	0.0K	0.0K
Cheatham (Zone)	11/1/2016	0	0	0.0K	0.0K
Cheatham (Zone)	12/1/2016	0	0	0.0K	0.0K
Cheatham (Zone)	9/25/2019	0	0	0.0K	0.0K
Cheatham (Zone)	10/1/2019	0	0	0.0K	0.0K

Expanded narratives of a few select events are detailed below.

2007 – This drought event began in May of 2007 and lasted until approximately October of the same year. This drought event effected much of Middle Tennessee, including all surrounding counties: Robertson, Davidson, Williamson, Dickson, and Montgomery. Many reports of poor/low quality crops were made, dairy cows were producing 20% less milk, fish were dying by the thousands and numerous ponds, creeks, streams, and some wells were drying up. Tennessee crop losses in 2007 approximated around $750 million. Some counties/cities had to implement water restrictions at various points throughout the drought period.

Frequency/Likelihood of Future Occurrence

Occasional - The probability of Cheatham County and its municipalities experiencing a drought event can be difficult to quantify but based on historical record of 13 droughts since 2007, it can reasonably be assumed that this type of event has occurred every few years.

C. Vulnerability Assessment

Low **-** The occurrence and potential cost of damage to life and property is very minimal to nonexistent.

Cheatham County is vulnerable to drought however estimated potential losses are inherently difficult to calculate because drought tends to cause little damage to the built environment. Therefore, it is assumed that whereas all buildings and facilities in the planning area would technically be exposed to the drought hazard, there is no significant vulnerability to these buildings on a structural level. Potential drought losses can be calculated in terms of the value of agriculture in the County which is perhaps most vulnerable to drought. According to the USDA, the net income for agriculture is around $2.6 million. Population growth could contribute directly to this hazard, as an increased number of users pull from the available water supply within the region. Drought can also increase the County's vulnerability to wildfires. Dry, hot, and windy weather combined with dry vegetation and a spark -- either through human intent, accident, or lightning -- can start wildfire.

Table 39 Risk Assessment (Drought)

Jurisdiction/ Applicant	Impacts			Vulnerability *H+P+B=#; #/3=V*
	Human	*Property*	*Business*	
Cheatham County	1	1	2	1.33
Ashland City	2	4	2	2.67
Kingston Springs	1	1	1	1
Pegram	1	1	1	1
Pleasant View	1	2	2	1.67

Jurisdiction/ Applicant	Vulnerability	Probability	Risk *V+P=R*	
Cheatham County	1.33	2	**3.33**	**Low**
Ashland City	2.67	1	**3.67**	**Low**
Kingston Springs	1	1	**2.0**	**Low**
Pegram	1	1	**2.0**	**Low**
Pleasant View	1.67	1	**2.67**	**Low**

Risk	
Low	**2-3.6**
Moderate	**3.7-5.2**
Medium	**5.3-6.8**
High	**6.9-8.4**
Severe	**8.5-10**

Human	
Risk of injuries and death from hazard	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal

Business	
Amount of business damage	
1	Less than 3 businesses closed for only one day
2	More than 3 businesses closed for a week

3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Death's probable, injuries will likely be substantial

3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top 10 local employer closed indefinitely

Property	
Amount of residential property damage	
1	Less than $500 in damages
2	$500 - $10,000 in damages
3	$10,000 – $500,00 in damages
4	$500,000 - $2,000,000 in damages
5	More than $2,000,000 in damages

Probability	
Probability of hazard occurring	
1	Less than once every 10 years
2	About once every 5 – 10 years
3	About once every 2 – 5 years
4	About once a year
5	More than once a year

D. Land Use and Development

According to the National Drought Mitigation Center, how we use land affects our vulnerability to drought. In general, land use patterns that maintain the integrity of watersheds and that have a smaller paved footprint result in greater resilience in the face of drought. The projected increase in population will possibly result in an increase in buildings and infrastructure which leads to increased impervious area. An increase in population may also put increasing pressure on water and other natural resources, particularly during periods of drought. Therefore, future development could have an impact on drought vulnerability in Cheatham County.

E. Multi-Jurisdictional Differences

Due to the nature of drought, Cheatham County and the incorporated jurisdictions are equally susceptible to drought conditions.

F. Summary

Cheatham County and all incorporated jurisdictions are equally vulnerable to drought. The historic frequency calculates that there is a significant chance of this type of event occurring each year. Drought can affect people's health and safety. Examples of drought impacts on society include anxiety or depression about economic losses, conflicts when there is not enough water, reduced incomes, fewer recreational activities, higher incidents of heat stroke, and even loss of human life. Drought conditions can also provide a substantial increase in wildfire risk. As plants and trees wither and die from a lack of precipitation, increased insect infestations, and diseases—all of which are associated with drought—they become fuel for wildfires. Periods of drought can equate to more wildfires and more intense wildfires, which affect the economy, the environment, and society in many ways such as by destroying neighborhoods, crops, and habitats.

2.1.7 Dam Failure

A. Hazard Identification

A dam is a barrier across flowing water that obstructs, directs, or slows down the flow, often creating a reservoir, lake, or impoundments. Most dams have a section called a spillway or weir, over or through, which water flows, either intermittently or continuously. According to Tennessee

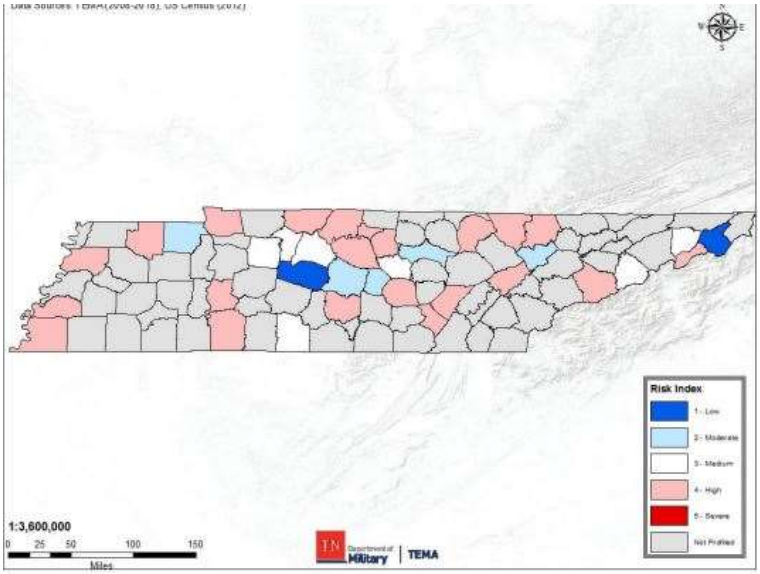
Safe Dams Program, a dam is a structure that is at least 20 feet high or can impound at least 30 acre-feet of water.

Dams fail in two ways, a controlled spillway release done to prevent full failure, or the partial or complete collapse of the dam itself. In each instance an overwhelming amount of water, and potentially debris, is released. Dam failures are rare, but when they occur can cause loss of life, and immense damage to infrastructure and the environment.

Common reasons for dam failure are the following:

- Sub-standard construction materials/techniques
- Spillway design error
- Geological instability caused by changes to water levels during filling or poor surveying
- Sliding of a mountain into the reservoir
- Poor maintenance, especially of outlet pipes (Extreme inflow)
- Human, computer, or design error
- Internal erosion, especially in earthen dams.
- Earthquakes

As illustrated below, Cheatham County is at Medium Risk for a dam failure event according to the 2018 Tennessee Hazard Mitigation Plan.



Threat Index	Hazard Score
Low	1
Moderate	2
Medium	3
High	4
Severe	5

Figure 25 Tennessee Dam Failure Hazard Risk (Source: 2018 Tennessee Hazard Mitigation Plan)

B. Hazard Profile

Dam failures can occur with little warning. Intense storms may produce a flood in a few hours or even minutes from upstream locations. A dam failure can occur within hours of the first signs of breaching. Although the floodwaters will drain, the area will be affected by flooding from the dam failure for days to weeks and the destruction will affect the area for years. Tennessee has a total of 1200 dams and levees within its borders with 660 of them being state regulated. Roughly 93% are earth dams that are less than 50 feet in height, 40 of these dams are made of concrete, and 37 of the state's dams are over 100 feet tall. 64% of the state's dams are privately owned, 15% locally,

12% by the state, 8% federally, and 1% public utility. Of those, 148 are considered a high-hazard potential with 207 a significant hazard, and 305 a low hazard. Most the State's high hazard potential dams are privately owned. Stratton Lake Dam was specifically identified as a hazard due to its proximity and topography as related to Ashland City, however due to the privately-owned nature of the dam little can be done to mitigate the risk without the private owner's involvement and cooperation.

Table 40 Privately Owned Dams (Source: National Inventory of Dams)

Dam Name	Risk	State-Regulated?	Purpose
Dilliard	High	No	Other
Stratton Lake	High	No	Other
Parks	Significant	No	Unknown
Craig Lake	Low	No	Fish & Wildlife Pond, Fire Protection Stock, Small Fishpond, Recreation
Golf Club	Low	Yes	Other
Tillis #1	Low	No	Fire Protection Stock, Small Fishpond
Half Moon Lake	Low	No	Recreation
Tillis #2	Low	No	Fire Protection Stock, Small Fishpond

The largest dam in the county is Cheatham dam located on the Cumberland River about 9 miles downstream from the county seat (Ashland City). Cheatham Lock and Dam was authorized by Congress in 1946 visa Public Law 525 as part of the Rivers and Harbors Act. The dam was established as a navigation project to enhance the development of the Cumberland River Basin. Public Law 396 authorized the Dam to include hydroelectric capabilities and began to produce power from this process sin 1959.

The lock chamber is 800-foot long and 110-foot wide. During normal lake levels, the lock will lift a boat 26-foot from the river below the dam to the lake above the dam. The lock releases over 17 million gallons of water each time is emptied.

Due to geological conditions in the area, the site selected for construction presented unique challenges on designing the project. This is the only lock in the Nashville District that was designed to flood; the lock walls had to be built according to the elevations of the surrounding land. Thus, create a design so that flood waters could flow over the structure with minimal damage when waters receded.

Figure 26 Cheatham Dam

The lock has been submerged on several occasions, but the historical record-breaking flood of May 2010 submerged the lock and operations building in water almost fifteen feet deep. This far exceeded the designed limits for the structure and caused the Nashville District to perform a complete electrical overhaul and hydraulic rehab of the lock. Temporary repairs and clean-up were made, and the lock was able to reopen to navigation traffic under restricted operation approximately 14 days after the waters receded. It was the middle of June 2010 before the lock returned to 24-hour operations.

Following the May 2010 flooding, the Army Corps of Engineers began a nearly $600 million rehabilitation effort on Kentucky's Wolf Creek Dam, a nearly mile-long structure located on the Cumberland River upstream from Nashville, designed to mitigate cascading flood events, including those that may affect the Cheatham Lock and Dam.

Representatives from the Corps of Engineers actively participated in the development of the 2016 Hazard Mitigation Plan in order to facilitate situational awareness for all members of the HMPC as related to dam safety and possible associated hazards (i.e., flooding). Though they were invented to the 2022 HMP 2022 Update meeting, no representatives from the U.S. Army Corps of Engineers chose to attend.

Dam failures are an infrequent occurrence. Most dam failures that have occurred in the state have involved small agricultural privately-owned dams. There have been no previous occurrences of dam failure in Cheatham County. This makes predicting future probability difficult. In Tennessee,

there are more than 1,200 dams and significant dam failures occur on an average of less than once every 40 years.

Frequency/Likelihood of Future Occurrence

Unlikely- Complete dam failure can be triggered by heavy rainfall, earthquakes, and flooding. With several areas in the county increasing in population and infrastructure (both public and private), this could lead to damage to a significant amount of infrastructure, property values, and commerce disruption.

C. Vulnerability Assessment

Vulnerability— Low

Throughout the county many buildings and infrastructure networks would be vulnerable to dam failure. The risk of this is incredibly low but the nature of mechanics of a dam failure is incredibly difficult to predict. Therefore, the committee found it essential to include this natural hazard on their plan even though the average risk analysis found the hazard to be ranked low risk.

Table 41 Risk Assessment (Dam Failure)

Jurisdiction/ Applicant	Impacts			Vulnerability *H+P+B=#; #/3=V*
	Human	*Property*	*Business*	
Cheatham County	4	5	5	4.67
Ashland City	4	5	5	4.67
Kingston Springs	1	1	1	1
Pegram	1	1	1	1
Pleasant View	1	1	1	1

Jurisdiction/ Applicant	Vulnerability	Probability	Risk *V+P=R*	
Cheatham County	4.67	1	**5.67**	**Medium**
Ashland City	4.67	2	**6.67**	**Medium**
Kingston Springs	1	1	**2.0**	**Low**
Pegram	1	1	**2.0**	**Low**
Pleasant View	1	1	**2.0**	**Low**

Risk	
Low	**2-3.6**
Moderate	**3.7-5.2**
Medium	**5.3-6.8**
High	**6.9-8.4**
Severe	**8.5-10**

Human	
Risk of injuries and death from hazard	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Death's probable, injuries will likely be substantial

Business	
Amount of business damage	
1	Less than 3 businesses closed for only one day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top 10 local employer closed indefinitely

Property	
Amount of residential property damage	
1	Less than $500 in damages
2	$500 - $10,000 in damages

Probability	
Probability of hazard occurring	
1	Less than once every 10 years
2	About once every 5 – 10 years

3	$10,000 – $500,00 in damages
4	$500,000 - $2,000,000 in damages
5	More than $2,000,000 in damages

3	About once every 2 – 5 years
4	About once a year
5	More than once a year

D. Land Use and Development

Under the Tennessee Safe Dams Act, a dam is defined as any structure that is at least 20 feet high or that can impound at least 30 acre-feet of water. Dams are assigned hazard potential categories that reflect the threat to life and property in the event of a failure. Safety inspections of dams are performed by Safe Dams staff in increments dependent upon their hazard potential category. Those categories and coinciding safety inspection timeline are as follows:

- High Hazard – one year
- Significant Hazard – two years
- Low Hazard – three years

The responsibility of building and maintaining a dam rests solely with the owner. As a dam owner, you are liable for the water stored behind your dam. A dam failure, resulting in an uncontrolled release of the reservoir, can have a devastating effect on people and property downstream. Additionally, a dam failure could mean loss of a vital resource to you. Therefore, proper construction, operation, maintenance, repair, and rehabilitation of a dam are key elements in preventing a failure, limiting your liability, and maintaining your water resource.

E. Multi-Jurisdictional Differences

Cheatham Dam is located in the middle of the county, four privately owned dams are located in the southern most port of the county, and four of the privately owned dams are located in the mid-northern portion of the county near Ashland City. Due to the spread-out nature of the dam locations all regions of Cheatham are at risk for this hazard. It is noteworthy that Dillard, a high hazard dam, is located south of Kingston Springs and Stratton Lake, a high hazard dam, is located with in Ashland City limits.

F. Summary

To improve public safety and resilience, the risk and consequences of dam failure must be lowered. Progress requires better planning for mitigating the effects of failures; increased regulatory oversight of the safety of dams; improving coordination and communication across governing agencies; and the development of tools, training, and technology. Dam failures not only risk public safety, they also can cost our economy millions of dollars in damages. Failure is not just limited to damage to the dam itself. It can result in the impairment of many other infrastructure systems, such as roads, bridges, and water systems. When a dam fails, resources must be devoted to the prevention and treatment of public health risks as well as the resulting structural consequences.

3. 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 Cheatham County and the incorporated jurisdictions Hazard Mitigation Plan Update.

3.1 Mitigation Strategy

The results of the planning process, the risk assessment, the goal setting, and the identification of mitigation actions led to the mitigation strategy and mitigation action plan for this HMP. Section 3.2 identifies the goals and objectives of this plan and Section 3.4 details the new mitigation action plan.

3.1.1 Continued Compliance with NFIP

Given the flood hazards in the planning area, an emphasis will be placed on continued compliance with the NFIP. The following steps will be taken by each participating community to meet or exceed the following minimum requirements as set by the NFIP:

- Issuing or denying floodplain development/building permits
- Inspecting all development to ensure compliance with the local ordinance
- Maintaining records of floodplain development
- Assisting in the preparation and revision of floodplain maps
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance and proper construction measures

3.2 Goals

Requirement §201.6(c)(3)(i): [The mitigation strategy section shall include a] description of mitigation goals to reduce or avoid vulnerabilities to the identified hazards.

Chapter 2 documents the various natural hazards and associated risks that threaten Cheatham County and the incorporated jurisdictions including the vulnerability to structures, infrastructure, and critical facilities. The intent of goal setting is to identify areas where improvements to existing capabilities (policies and programs) can be made so that community vulnerability is reduced. Goals are also necessary to guide the review of possible mitigation measures. Mitigation goals need to reflect community priorities and should be consistent with other plans in the community.

Goals are general guidelines that explain what is to be achieved. They are usually broad-based policy type statements, Cheatham term and represent global visions. Goals help define the benefits that the plan is trying to achieve.

3.2.1 Goal Setting Exercise

In 2016, the HMPC agreed upon the goals for their hazard mitigation plan. It was decided that the goals from the 2016 plan should be carried over into the 2022 plan. They still reflect the current hazards and current conditions in the community.

3.2.2 Resulting 2022 Plan Update Goals

At the end of the exercise, the HMPC agreed upon three general goals for planning efforts. Those goals are as follows:

Goal 1: Protect the Lives and health of citizens from the effects of natural hazards.

Goal 2: Emphasize mitigation planning to decrease vulnerability to new and existing structures.

Goal 3: Encourage public support and commitment to hazard mitigation, by communicating mitigation benefits.

3.3 Identification and Analysis of Mitigation Activities

In order to identify and select mitigation projects to support the mitigation goals, each hazard identified in Section 2.1 Hazard Identification was evaluated. The HMPC then analyzed viable mitigation options that supported the identified goals and objectives. The HMPC reviewed a PowerPoint presentation and handout covering potential mitigation actions for each of the hazards identified.

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.

The HMPC was also provided with FEMA's *Mitigation Ideas* guidance document dated January 2013 which provides example mitigation actions organized by natural hazard. The HMPC was instructed to consider both future and existing buildings in evaluating possible mitigation actions and to also consider including projects from other plans and studies within the community. A facilitated discussion then took place to examine and analyze the options. This discussion was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

3.3.1 Prioritization Process

The prioritization process was important as most mitigation projects represent a large investment of financial and personal resources. By evaluating each project's degree of feasibility and the level of costs versus benefits, Cheatham County was able to determine which projects should include based on need and available funding and time.

The HMPC used the SAFE-T method to prioritize these projects. This approach was adopted from the successful methodology used by other counties in FEMA Region 4. This rating system uses five variables to evaluate the overall feasibility and appropriateness of each project. *Figure 29* further explains this method.

Project Prioritization Method: SAFE-T			
	Variable	**Value**	**Description**
S	**Societal**: The public must support the overall implementation strategy and specified mitigation actions. The projects will be evaluated in terms of community acceptance and societal benefits.	1	Low community priority, few societal benefits
		2	Moderate community acceptance/priority
		3	High community acceptance/priority
A	**Administrative**: The projects will be evaluated for anticipated staffing and maintenance requirements to determine if the jurisdiction has the personnel and administrative capabilities necessary to implement the project or whether outside help will be needed.	1	High staffing, outside needed
		2	Some staffing, help may be needed
		3	Low staffing, no outside help needed
F	**Financial**: The projects will be evaluated on their general cost-effectiveness and whether additional outside funding will be required.	1	Somewhat cost-effective
		2	Moderately cost-effective
		3	Very cost-effective
E	**Environmental**: The projects will be evaluated for any immediate or long-term environmental impacts caused by their construction or operation.	1	Many environ. impacts, possibly long-term
		2	Some environ. Impacts, some possibly long-term
		3	Few, if any, environ. impacts
T	**Technical**: The projects will be evaluated on their ability to reduce losses in the long-term, whether there are secondary impacts, and whether the proposed project solves the associated problem or if additional components are necessary.	1	Other actions are needed or short-term fix
		2	Other actions may be needed for long-term fix
		3	Other actions not needed, long-term fix

Figure 27 SAFE-T Project Prioritization

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to a consensus and to prioritize recommended mitigation actions. The HMPC discussed the contribution of the action to saving lives or property as first and foremost, with additional consideration given to the benefit-cost aspect of a project; however, this was not a quantitative analysis. The team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

3.4 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.

The Mitigation Action Plan was developed to present the recommendations developed by the HMPC for how the communities can reduce the risk and vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Emphasis was placed on both future and existing development. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. It should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; and reprioritization due to funding availability and/or other criteria. Cheatham County and the incorporated jurisdictions are not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the community to mitigate the risks and vulnerabilities from identified hazards.

Table 42 Cheatham County Mitigation Actions and Projects

Mitigation Action Number	Action Description	Responsible Department	Current Status			Summary of Progress To-Date	Funding Sources				Priority Score	Estimated Cost	New or Existing Infrastructure
			Complete	In-progress	Not yet Started		HMGP	BRIC	FMA	Local			
Severe Weather (Severe Storm, Winter Storm, Tornadoes)													
1.1.1	Bury utility lines to mitigate risk from heavy winds, tornadoes, freezes and falling debris	Town of Kingston Springs			X	New Project, 3-5 year timeframe	X	X		X	12	1M per mile	Existing
1.1.2	Bury utility lines to mitigate risk from heavy winds, freezes and falling debris	Town of Pegram			X	New Project, 3-5 year timeframe	X	X		X	12	1M per mile	Existing
1.1.3	Bury utility lines to mitigate risk from heavy winds, freezes and falling debris	Town of Ashland City			X	New Project, 3-5 year timeframe	X	X		X	12	1M per mile	Existing
1.2.1	Replacement of traffic light cables to mast arms to mitigate risk from heavy winds, tornadoes, and falling debris.	Town of Kingston Springs			X	New Project, 1-3 year timeframe	X	X		X	12	20K each	Existing
1.2.2	Replacement of traffic light cables to mast arms to mitigate risk from heavy winds, tornadoes, and falling debris.	Town of Pegram			X	New Project, 1-3 year timeframe	X	X		X	12	20K each	Exiting
1.2.3	Replacement of traffic light cables to mast arms to mitigate risk from heavy winds, tornadoes, and falling debris.	City of Pleasant View			X	New Project, 1-3 year timeframe	X	X		X	12	20K each	Existing
1.2.4	Replacement of traffic light cables to mast arms to mitigate risk from heavy winds, tornadoes, and falling debris.	Town of Ashland City			X	New Project, 1-3 year timeframe	X	X		X	12	20K each	Existing
1.3.1	Generators & Transfer Switches at wastewater pump stations throughout the town	Town of Kingston Springs			X	New Project, 1-3 year timeframe	X	X		X	14	10K (each unit)	Existing

Mitigation Action Number	Action Description	Responsible Department	Current Status			Summary of Progress To-Date	Funding Sources				Priority Score	Estimated Cost	New or Existing Infrastructure
			Complete	In-progress	Not yet Started		HMGP	BRIC	FMA	Local			
1.3.2	Generators & Transfer Switches at wastewater pump stations throughout the town	Town of Pegram											
1.3.3	Generator & transfer switch at Main Sewage Treatment Center	Town of Pegram			X	New Project, 1-3 year timeframe	X	X		X	14	10K	Existing
1.3.4	Generator & transfer switch at Main Sewage Treatment Center	Town of Kingston Springs			X	New Project, 1-3 year timeframe	X	X		X	14	10K	Existing
1.3.5	Generator & transfer switch at Water Plant	Town of Pegram			X	New Project, 1-3 year timeframe	X	X		X	14	10K	Existing
1.3.6	Generator & transfer switch at Water Plant	Town of Kingston Springs			X	New Project, 1-3 year timeframe	X	X		X	14	10K	Existing
1.3.7	Generator needed at new Fire Station location	Cheatham County EMA			X	New Project 1-3 year timeframe	X	X		X	14	10K	New
1.3.8	Generator needed for Critical Infrastructure	Town of Ashland City			X	New Project, 1-3 year timeframe	X	X		X	14	10K	Both
1.4.1	Tornado Warning System (2 Sirens)	City of Pleasant View			X	New Project, 2-4 year timeframe	X	X		X	11	30K each	New
1.4.2	Tornado Warning System	Town of Kingston Springs			X	New Project, 1-3 year timeframe	X	X		X	11	30K each	Existing
1.4.3	Tornado Warning System	Town of Pegram			X	New Project, 1-3 year timeframe	X	X		X	11	30K each	Existing
1.4.4	Tornado Warning System	Town of Ashland City			X	New Project, 1-3 year timeframe	X	X		X	11	30K each	Existing
1.4.5	Tornado Warning System	Cheatham County EMA			X	New Project, 1-3 year timeframe	X	X		X	11	30K each	Existing
1.5.1	Windproof film on schools	Cheatham County School EMA			X	New Project 1-3 year timeframe	X	X		X	13	250K	Existing
1.5.2	Retrofit Schools for Tornado safety (Safe Rooms/Hardened Hallways)	Cheatham, County EMA			X	Carried Over from 2016 plan	X	X		X	13	$1M	Existing
1.5.3	Public-Private partnership to create tornado safe rooms	Ashland City			X	Carried Over from the 2016 plan	X	X		X	13	$1M	Both
1.6.1	Enforce building codes on new and existing structures and update building codes	Building Department			X	Carried Over from 2016 plan				X	13	N/A	New & Existing

Mitigation Action Number	Action Description	Responsible Department	Current Status			Summary of Progress To-Date	Funding Sources				Priority Score	Estimated Cost	New or Existing Infrastructure
			Complete	In-progress	Not yet Started		HMGP	BRIC	FMA	Local			
	as needed to reflect best practices												
Flooding													
2.1.1	Culverts and drainage structures throughout the county to improve water flow, mitigate flood risk, and replace collapsed structures	Cheatham County Highway Dept. / Cheatham County EMA			X	Carried Over from 2016 plan	X	X	X	X	10	N/A	Both
2.2.1	Study areas prone to flooding and inundation mapping of high risk dams	Cheatham County EMA			X	Carried over from 2016 plan	X	X	X	X	13	N/A	N/A
2.3.1	Enforce NFIP requirements for all new and existing structures in the floodplain	Building Department			X	Carried over from 2016 plan				X	9	N/A	New & Existing
2.4.1	Stormwater Mitigation (Identify and prioritize stream flow issues affecting life and property, make improvements as needed)	Town of Pegram			X	New Project, 2-4 year timeframe	X	X	X	X	11	N/A	New & Existing
2.4.2	Stormwater Mitigation (Identify and prioritize stream flow issues affecting life and property, make improvements as needed)	Town of Kingston Springs			X	New Project, 2-4 year timeframe	X	X	X	X	11	N/A	New & Existing
2.5.1	Property acquisition of repetitive loss and severe repetitive loss properties	Town of Ashland City			X	Carried over from 2016 plan, property acquisition as needed			X	X	12	N/A	Existing
2.6.1	Move the city water intake approximately 1 mile from Little	Town of Ashland City			X	Carried over from the 2016 plan	X	X		X	10	$3M	Existing

Mitigation Action Number	Action Description	Responsible Department	Current Status			Summary of Progress To-Date	Funding Sources				Priority Score	Estimated Cost	New or Existing Infrastructure
			Complete	In-progress	Not yet Started		HMGP	BRIC	FMA	Local			
	Marrowbone Creek to Cumberland River												
All Hazards													
3.1.1	Installment of two Mesonet Systems within the county to mitigation hazards and study storm patterns and risk	Cheatham County EMA			X	New Project, 3-5 year timeframe	X	X		X	14	$25,000 per Mesonet Unit	New
3.2.1	Weather radios to be distributed to all homes and businesses	Cheatham County EMA		X		Carried over from 2016 plan	X	X		X	15	Cost per Radio	New
3.3.1	Provide and distribute pamphlets on natural hazard safety and mitigation to the public	Cheatham County EMA		X		Carried over from 2016 plan, this is a continuous action the County performs throughout the year at social events and in office	X	X		X	12	15K	New & Existing

4. Plan Integration and Maintenance

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.

This section provides an overview of the overall strategy for plan integration and maintenance and outlines the method and schedule for monitoring, evaluating, and updating the plan. The section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

4.1 Integration into Local Planning Mechanism

An important implementation mechanism that is highly effective and low-cost is incorporation of the Hazard Mitigation Plan recommendations and their underlying principles into other plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- Building and Zoning Codes
- Emergency Management Plans
- Ordinances
- Flood/stormwater management plans
- Other plans, regulations, and practices with a mitigation focus

Those involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc., as appropriate. Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas;
- Attending other planning/program meetings;
- Participating in other planning processes; and
- Monitoring community budget meetings for other community program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community. Efforts should continuously be made to monitor the progress of mitigation actions implemented through other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this Hazard Mitigation Plan.

4.2 Monitoring, Evaluating, Updating

For the Hazard Mitigation Plan update review process, the Cheatham County Emergency Management Agency will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of the plan. The review of the Hazard Mitigation Plan will be conducted as follows:

- The Cheatham County Emergency Management Agency will be responsible for leading

the meeting to review the plan.

- Notices will be emailed to the members of the HMPC, federal, state, and local agencies, non-profit groups, local planning agencies, and representatives of business interests, neighboring communities, and others advising them of the date, time, and place for the review.
- Local City officials will be notified by email or phone call.
- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- A copy of the current plan will be available for public comment.
- After the review meeting, a status report will be developed outlining implementation of projects over the past year.

Criteria for Annual Reviews

The criteria recommended for annual reviews will include the following:

- Community growth or change in the past year.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether the event resulted in a presidential disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.
- The dates of hazard events descriptions.
- Documented damages due to the event.
- Closures of places of employment or schools and the number of days closed.
- Road or bridge closures due to the hazard and the length of time closed.
- Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the Hazard Mitigation Plan. Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

4.2.1 Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

Public Involvement Process for Annual Reviews

The public will be notified via the Cheatham County website or any other form of well publicized social platform (i.e., local newspaper, Facebook, Twitter).

Public Involvement for Five-year Update

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 develop a plan for public involvement and will be responsible for 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.

APPENDIX A

County Overview

CHEATHAM COUNTY

2020 COMMUNITY DATA PROFILE

QUICK FACTS

County Seat	Ashland City
Year Incorporated	1859
Land Area in Square Miles (County)	302
Water Area in Square Miles (County)	5
Latitude	N36° 16.45'
Longitude	W87° 03.85'
Elevation	438'
Market Region	Nashville
Distance From Nashville	15 miles
Distance From Clarksville	20 miles
Time Zone	Central
County Website	www.cheathamcountytn.gov
Additional Incorporated Cities within the County	Kingston Springs, Pegram, Pleasant View
Unincorporated Cities	Chapmansboro

COUNTY POPULATION

	County
2010 (Census)	39,105
2019 Population	41,947
2019 Median Age	41.1
2024 Population Projection	43,608
Annual Growth Rate (2019-2024 Projected)	0.78%

Source: ESRI

CLIMATE

Annual Average Temperature	58.1° F
Average High Temperature	70.9° F
Average Low Temperature	45.4° F
Annual Average Precipitation	50.09"
Annual Average Snowfall	2.2"
Prevailing Winds	Southerly
Mean Length of Freeze-Free Period (days)	180-220

COUNTY TAX STRUCTURE

LOCAL	County
Property Taxes (2019)	
• Rate per $100 value	$2.4766
• Rural (Special Fire Dist.)	$ 0.215
Ratio of Assessment	
• Residential and Farm	25%
• Commercial/Industrial	40%
• Personal (Equipment)	30%
Total Local Assessment (2018)	$816,101,717
Hotel-Motel Tax	5%
Motor Vehicle Tax Rate	$51.00

Source: Tennessee Comptroller of the Treasury, Division of Property Assessments
Source: County Technical Assistance Service, UTIPS

STATE

Sales Tax
- 4% tax on food and food ingredients
- 7% on all other tangible personal property unless specifically exempted

Local Sales Tax Rate
- 2.00% County

Local and State Sales Tax Collected (FY2019)
- $29,905,904

Income Tax
- **Personal:** 2% on Interest & Dividends for the 2019 tax year
- **Corporate Excise Tax:** 6.5% of Tennessee taxable income
- **Franchise Tax:** .25% of the greater of the Tennessee portion of net worth or the book value of real and tangible property in Tennessee. The minimum tax is $100
- **Unemployment Tax:** New employers is typically 2.7% (based on occupation) of first $7,000

Source: Tennessee Department of Revenue

EDUCATION

District Name	Cheatham County
Type of Public School System	County
District Grades Served	Pre-K-12
Number of Schools	13
Number of Classroom Teachers	415
Number of Administrators	19
Additional Teachers and Staff	68
Total Number of Students	5,902
GRADES (2018-2019)	
Pre-K-4	2,060
5-8	1,938
9-12	1,870
Riverside Academy K-12	34
Number of High School Graduates (2018-19)	408
Graduation Rate	91.1%
Educational Attainment with a Degree (Adults Age 25+)	29.2%

Source: Tennessee Department of Education

REGIONAL HIGHER EDUCATIONAL INSTITUTIONS (within 30 miles)

Graduates 2017-2018

• TN College of Applied Technology	Dickson	419
• Austin Peay State Univeristy	Clarksville	2,348
• Nashville State Community College	Dickson	1,283

(plus several in Nashville)

Source: National Center for Education Statistics

FastTrack Job Training Assistance Program Available	Yes

Source: Tennessee Department of Economic and Community Development

GOVERNMENT

GOVERNING BODY

Mayor and County Commissioners
Meets 3rd Monday at 6:00 p.m.
Cheatham County Courthouse

Fire Department	
• Full-time fire fighters in county	2
• County volunteers	200
• Fire stations in county	14
• County fire trucks	4239
Law Enforcement	
• Full-time police officers in county & sheriff	41
• County patrol cars	44
Insurance Rating	9
Zoning Regulations	Yes
Planning Commission	Yes
Industrial Development Corp.	Yes

TRANSPORTATION

AIR SERVICE

Nearest General Aviation	John C. Tune Airport
Location Identifier	JWN
Distance from City	17 miles
Runway Length	5,500 feet
Surface	Asphalt
Lighting	MIRL/PAPI
Fuel	100LL/Jet A
Repairs	Major
Storage	Hangar, Tie Down
Transportation	Taxi, Rental and Courtesy Car
Nearest Commercial Service	Nashville International Airport
Location Identifier	BNA
Distance from Ashland City	27 miles

BNA serves 440 flights daily in more than 50 nonstop markets. BNA is served by 14 airlines, including international carriers Air Canada, WestJet and soon British Airways. Starting May 2018, British Airways will fly nonstop between Nashville and London Heathrow.

HIGHWAYS

U.S. Highways	70
State Highways	12, 41, 49, 155,249
Nearest Interstate	Interstate 24 and 40

COMMON CARRIERS

Air Freight Companies	None
Motor Freight Companies	3
Terminal Facilities	None
Bus Services	
Inter-City	RTA in Pleasant View
Local	No
Carrier Service	No

RAILROADS SERVED BY

CSX Transportation and Nashville & Western

NAVIGABLE WATERWAYS

River	Cumberland
Channel Depth	9 feet
Nearest Port Facility	Nashville
Miles from Port	20

COMMUNICATIONS

Newspapers	The Ashland Times The Tennessean Exchange So. Cheatham Advocate
Telephone Companies	AT&T
Radio Stations	20 local, WQSV AM790
Television Networks	5
Cable Service Available	Yes
Channels	275 (31 basic service)
Provider	Charter Communications
Internet Service Available	Yes
Provider	AT&T and Charter Communications
Fiber Optics Available	Yes
Provider	Charter Business

COMMUNITY FACILITIES

Health Care	
Doctors	8
Dentists	4
Hospitals	1
Beds	8
Clinics	2
Nursing Homes	2
Beds	175
Retirement Homes	0
Beds	0
Residential Care/ Assisted Living	1
Beds	85

Recreation	
Libraries	1
Parks	4
Golf Courses (Public & Private)	1
Swimming Pools (Public & Private)	1
Country Clubs	0
Theaters	0
Bowling Alleys	0

Hotels & Motels	2
Rooms	47
Bed & Breakfasts	1

Religious Organizations	
Protestant	34
Catholic	1
Jehovah's Witness	1
Seventh Day Adventist	1
Latter Day Saints	0

Largest Meeting Room	
Capacity	100

Restaurants	20

Day Care Centers	11
Day Care Homes	7

Other
Ball fields, senior center, historic trail, camping, canoeing and boating.

FINANCIAL INSTITUTIONS

Type of Institution	# of Institutions	# of Branches	Deposits
Commercial Banks	4	10	$522,894,000
Savings Institutions	0		
Credit Unions	1	1	$6,701,984
Total	5	11	
Countywide Combined Deposits			$529,595,984

(Deposits for June 30, 2019)

Source: Federal Deposit Insurance Corporation and National Credit Union Administration

INDUSTRIAL SUPPORT SERVICES

Service	Location	Distance (Miles)
Tool & Die	Local	
Heat Treating	Nashville	20
Foundry	Nashville	20
Heavy Hardware	Nashville	20
Sheet Metal	Local	
Lubricants	Nashville	20
Welding Supplies	Nashville	20
Abrasives		

SELECTED ECONOMIC INDICATORS

2018 ANNUAL AVERAGES

Labor Force	County	Labor Market Area*
Civilian Labor Force	21,460	688,350
Employment	20,870	669,120
Unemployment	590	19,230
Unemployment Rate	2.7%	3.0%

* Labor Market Area is defined as **Cheatham**, Davidson, Dickson, Montgomery, Robertson and Williamson Counties in Tennessee.

2019 EMPLOYED POPULATION (AGE 16+) BY INDUSTRY

Agriculture/Mining	1.0%
Construction	12.3%
Manufacturing	12.5%
Wholesale Trade	2.6%
Retail Trade	9.0%
Transportation/Utilities	8.1%
Information	1.3%
Finance/Insurance/Real Estate	5.5%
Services	41.7%
Public Administration	5.9%

Source: ESRI

MANUFACTURING IN AREA (Annual Averages 2018)

Number of Units	44
Ann. Avg. Employment	2,275
Ann. Avg. Weekly Wage	$1,182

Source: Tennessee Department of Labor and Workforce Development

PER CAPITA PERSONAL INCOME

Year	2019
Amount	$26,985

Source: ESRI

MEDIAN HOUSEHOLD INCOME

Year	2019
Amount	$57,562

Source: ESRI

AVERAGE HOME SALES

Year	2018
Number of Homes Sold	624
Average Cost	$231,763

Source: Tennessee Housing Development Agency

RETAIL SALES

Year	2018
Amount	$ 352,581,228

Source: Tennessee Department of Revenue

NATURAL RESOURCES

Minerals: Limestone
Timber: Hardwoods (Oak and Poplar)

AGRICULTURAL

Crops: Tobacco, Hay, Corn, Soybean
Livestock: Cattle

2020 COMMUNITY DATA PROFILE

UTILITIES

GAS - ASHLAND CITY
Local Distributor: Piedmont Natural Gas Company
Phone: 615.734.0665
Website: www.piedmontng.com

GAS - KINGSTON SPRINGS
Local Distributor: Greater Dickson Gas Authority
Phone: 615.441.2830
Website: http://gdga.com/

GAS - PLEASANT VIEW
Local Distributor: Clarksville Gas & Water Company
Phone: 931.645.7400
Website: www.clarksvillegw.com/gas

WATER - ASHLAND CITY
Water Supplier: Ashland City Water Department
Phone: 615.792.4211
Website: www.ashlandcity.net

WATER - KINGSTON SPRINGS
Water Supplier: Second So. Cheatham Utility
Phone: 615.952.3094
Website: www.secondsouthcheatham.com

WATER - PLEASANT VIEW
Water Supplier: Pleasant View Utility District
Phone: 615.746.5315
Website: www.secondsouthcheatham.com

SEWER - ASHLAND CITY
Sewer Provider: Ashland City Sewer Department
Phone: 615.792.4211
Website: www.ashlandcity.net

SEWER - KINGSTON SPRINGS
Sewer Provider: Kingston Springs Wastewater
Phone: 615.746-5315
Website: www.kingstonsprings.net

SEWER - PLEASANT VIEW
Sewer Provider: Pleasant View Utility District
Phone: 615.746.5315
Website: www.pvudwater.com

ELECTRICITY
Source Company: Tennessee Valley Authority

LOCAL POWER COMPANIES
Electric Provider: Cumberland Electric Mem. Corp.
Phone: 615.792.5651
Website: www.cemc.org

Electric Provider: Dickson Electric Department
Phone: 615.446.9051
Website: www.dicksonelectric.com

MAJOR INDUSTRIAL MANUFACTURERS/DISTRIBUTION

Firm	Product or Service	Total Employees	Union	Phone Number
AO Smith Water Products Co.	Temperature control systems	1,500	None	615.792.4371
Trinity Marine Products	Barges & deck fittings	300	None	615.792.4320
Madison Mill, Inc.	Wood products and millwork	120	None	615.351.3079
Gate Precast Inc.	Precast concrete panels	110	None	615.792.4871
Caraustar Inc.	Fiberboard folding cartons	70	None	615.952.4300
Rogers Manufacturing Corp.	Trusses, wooded roof	50	None	615.792.8722
Lu, Inc.	Guardrail fabrication & installation	35	None	615.952.5501
Steele SaddleTree, LLC	Wooden saddle trees	30	None	615.792.7171
United Structural Systems, Inc.	Foundation/Structure repair	30	None	615.746.5225
International Paper Ashland City Sheet Plant	Chipboard boxes	25	None	615.792.9967
American Wire & Cable Co.	Electrical appliance wire	15	None	615.792.7831
Pioneer Log Systems, Inc.	Custom log home kits	15	None	615.952.5647
Pleasant View Manufacturing	Steel fabricating	15	None	615.746.5777
QC Industrial Solutions	Packaging distribution	15	None	615.247.8720

For information on industrial sites and available industrial buildings contact:

Robert T. Bibb
Executive Director
Middle TN Industrial Development Association
2108 Westwood Avenue
Nashville, Tennessee 37212
Phone: 615.269.5233
Fax: 615.269.5184
mtida@mtida.org
www.mtida.org

Jerome Terrell
Economic Dev. Director
Cheatham County Joint Economic & Community Development Board
108 North Main Street
Ashland City, TN 37015
Phone: 615.792.2379
Fax: 615.792.5001
jerometerrell@cheathamconnect.com
www.cheathamconnect.com

Kerry R. McCarver
County Mayor
100 Public Square, Suite 105
Ashland City, TN 37015
Phone: 615.792.4316
Fax: 615.792.2001
kerry.mccarver@cheathamcountytn.gov
www.cheathamcountytn.gov

MTIDA
MIDDLE TENNESSEE INDUSTRIAL DEVELOPMENT ASSOCIATION

MTIDA represents the Local Electric Power and Natural Gas Distributors located in the 40 county region of Middle Tennessee.

The information contained herein was obtained from sources we consider reliable. We can not be responsible, however, for errors or change in information.

CHEATHAM COUNTY, TENNESSEE

Updated June 2020

APPENDIX B

HAZUS Supplement (100-yr/500-yr)

Hazus: Flood Global Risk Report

Region Name:	Cheatham_County
Flood Scenario:	Cheatham_County_100yr_Flood
Print Date:	Wednesday, April 27, 2022

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Tennessee

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 307 square miles and contains 1,185 census blocks. The region contains over 15 thousand households and has a total population of 39,105 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 15,988 buildings in the region with a total building replacement value (excluding contents) of 3,722 million dollars. Approximately 93.14% of the buildings (and 80.80% of the building value) are associated with residential housing.

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Building Inventory

General Building Stock

Hazus estimates that there are 15,988 buildings in the region which have an aggregate total replacement value of 3,722 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	3,007,026	80.8%
Commercial	308,733	8.3%
Industrial	253,335	6.8%
Agricultural	12,043	0.3%
Religion	65,005	1.7%
Government	20,401	0.5%
Education	55,042	1.5%
Total	**3,721,585**	**100%**

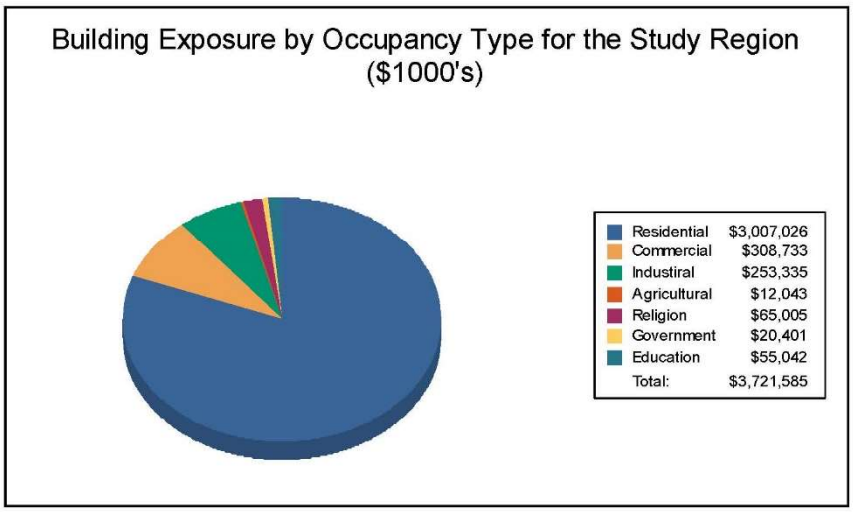

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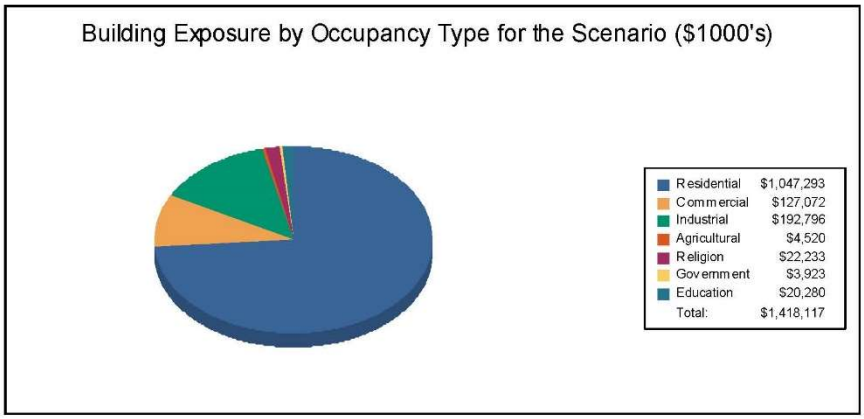
Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,047,293	73.9%
Commercial	127,072	9.0%
Industrial	192,796	13.6%
Agricultural	4,520	0.3%
Religion	22,233	1.6%
Government	3,923	0.3%
Education	20,280	1.4%
Total	**1,418,117**	**100%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 12 beds.
There are 17 schools, 13 fire stations, 4 police stations and 1 emergency operation center.

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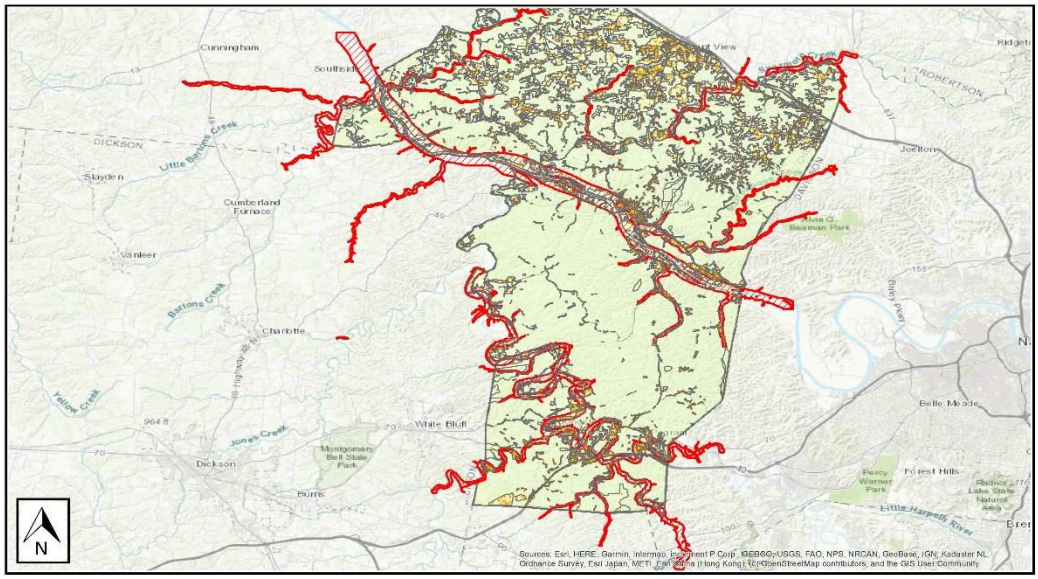
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Cheatham_County
Scenario Name:	Cheatham_County_100yr_Flood
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



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Building Damage

General Building Stock Damage

Hazus estimates that about 590 buildings will be at least moderately damaged. This is over 28% of the total number of buildings in the scenario. There are an estimated 277 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

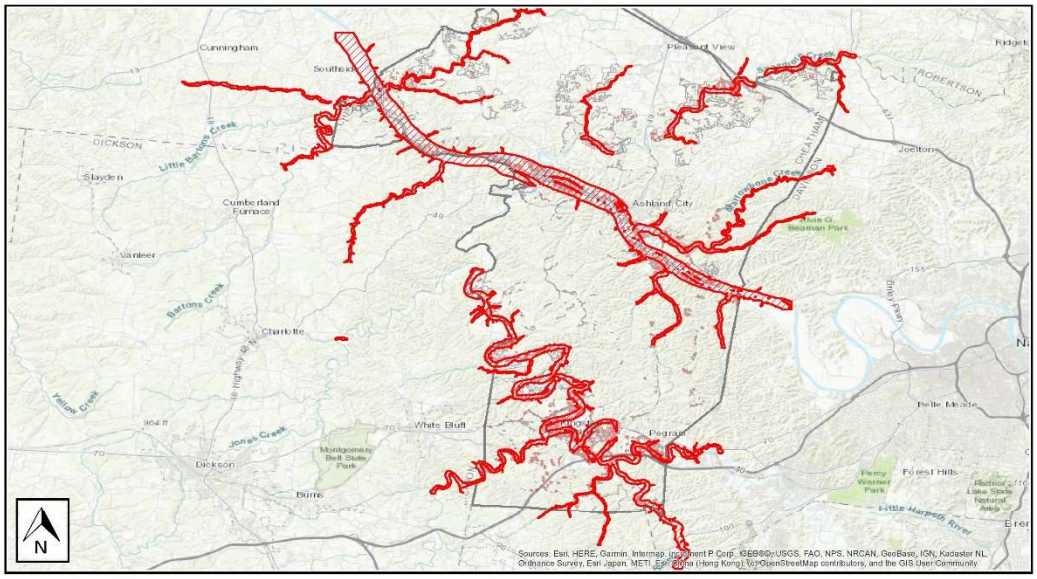

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Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	1	100	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	15	2	83	14	74	12	80	13	75	12	277	46
Total	**15**		**84**		**74**		**80**		**75**		**277**	

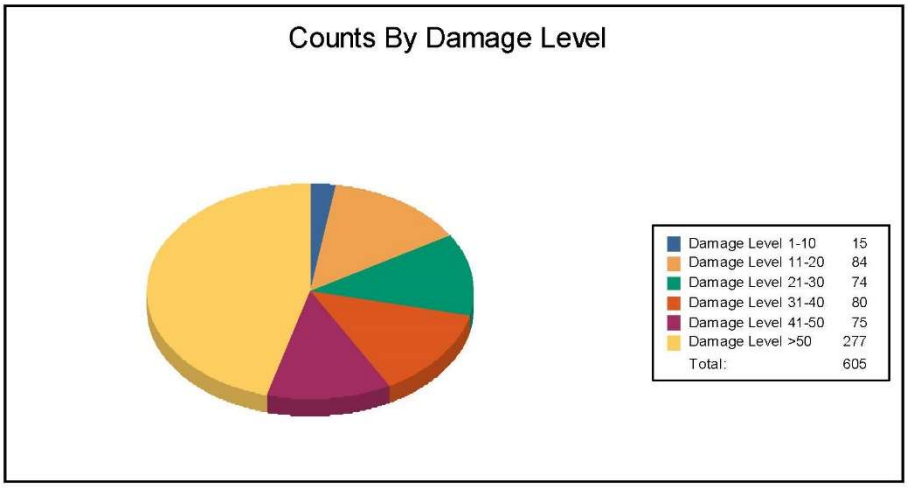

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	34	100
Masonry	0	0	2	12	2	12	4	24	1	6	8	47
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	15	3	81	14	74	13	78	14	75	13	239	43

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 12 hospital beds available for use. On the day of the scenario flood event, the model estimates that 12 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	13	0	0	0
Hospitals	1	0	0	0
Police Stations	4	0	0	0
Schools	17	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

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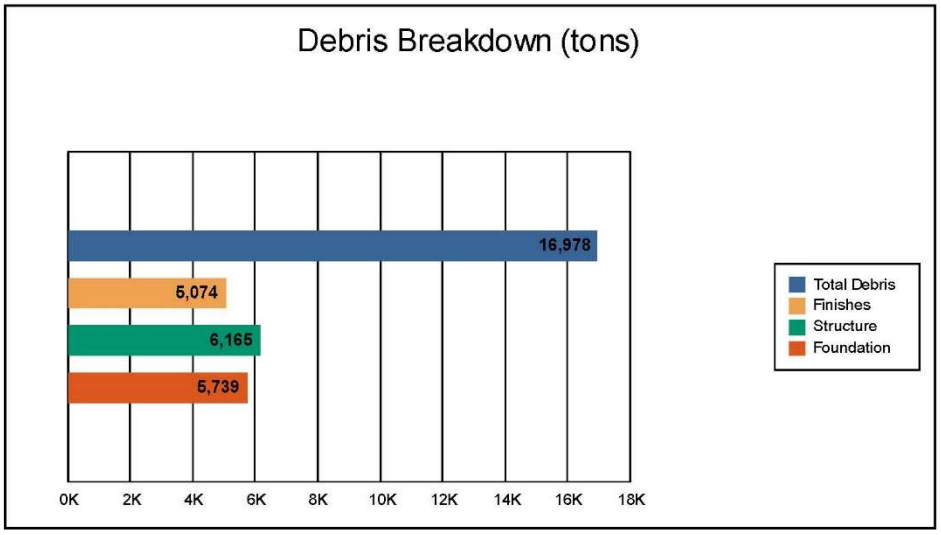
Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.



The model estimates that a total of 16,978 tons of debris will be generated. Of the total amount, Finishes comprises 30% of the total, Structure comprises 36% of the total, and Foundation comprises 34%. If the debris tonnage is converted into an estimated number of truckloads, it will require 680 truckloads (@25 tons/truck) to remove the debris generated by the flood.

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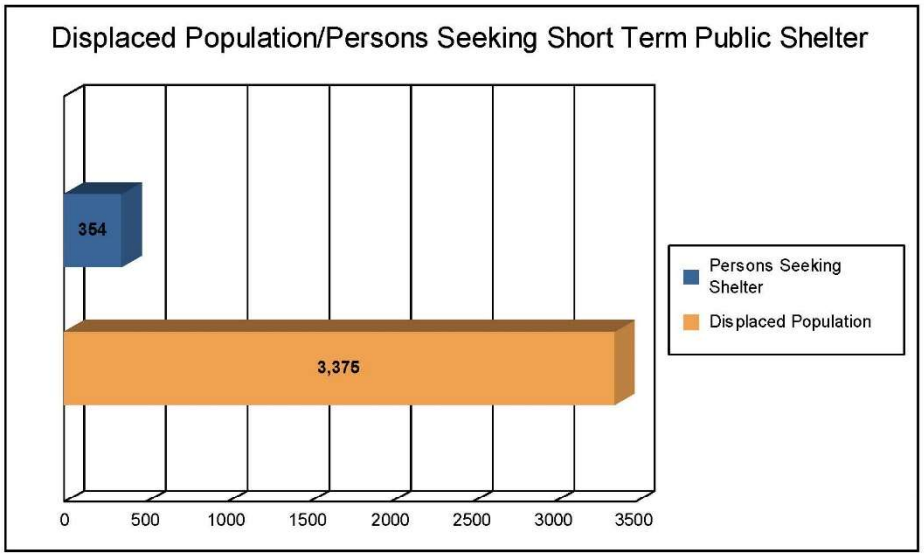
Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1,125 households (or 3,375 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 354 people (out of a total population of 39,105) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 358.91 million dollars, which represents 25.31 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 256.17 million dollars. 29% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 60.49% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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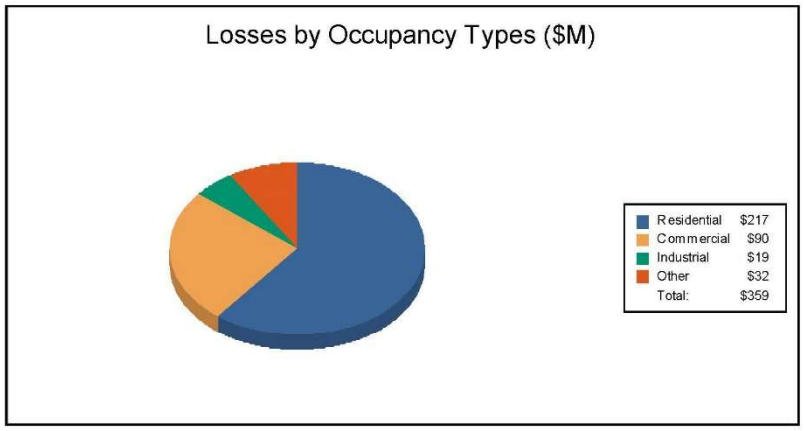
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	119.74	13.01	5.68	3.14	141.57
	Content	60.67	29.45	11.22	10.73	112.07
	Inventory	0.00	0.86	1.58	0.09	2.53
	Subtotal	**180.41**	**43.32**	**18.48**	**13.96**	**256.17**
Business Interruption						
	Income	0.62	20.03	0.19	3.39	24.22
	Relocation	25.96	4.05	0.17	1.51	31.69
	Rental Income	8.66	3.08	0.02	0.20	11.95
	Wage	1.45	20.01	0.32	13.10	34.88
	Subtotal	**36.69**	**47.16**	**0.70**	**18.20**	**102.74**
ALL	**Total**	**217.10**	**90.48**	**19.18**	**32.16**	**358.91**



Appendix A: County Listing for the Region

Tennessee
- Cheatham

Flood Global Risk Report Page 15 of 16

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Tennessee				
Cheatham	39,105	3,007,026	714,559	3,721,585
Total	**39,105**	**3,007,026**	**714,559**	**3,721,585**
Total Study Region	**39,105**	**3,007,026**	**714,559**	**3,721,585**

Hazus: Flood Global Risk Report

Region Name:	Cheatham_County
Flood Scenario:	Cheatham_County_500yr_Flood
Print Date:	Wednesday, April 27, 2022

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Tennessee

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 307 square miles and contains 1,185 census blocks. The region contains over 15 thousand households and has a total population of 39,105 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 15,988 buildings in the region with a total building replacement value (excluding contents) of 3,722 million dollars. Approximately 93.14% of the buildings (and 80.80% of the building value) are associated with residential housing.

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Building Inventory

General Building Stock

Hazus estimates that there are 15,988 buildings in the region which have an aggregate total replacement value of 3,722 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	3,007,026	80.8%
Commercial	308,733	8.3%
Industrial	253,335	6.8%
Agricultural	12,043	0.3%
Religion	65,005	1.7%
Government	20,401	0.5%
Education	55,042	1.5%
Total	**3,721,585**	**100%**

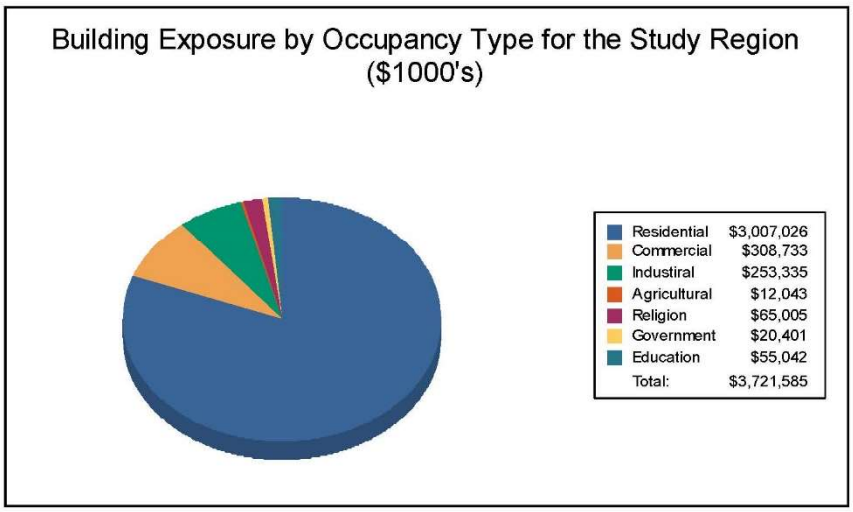

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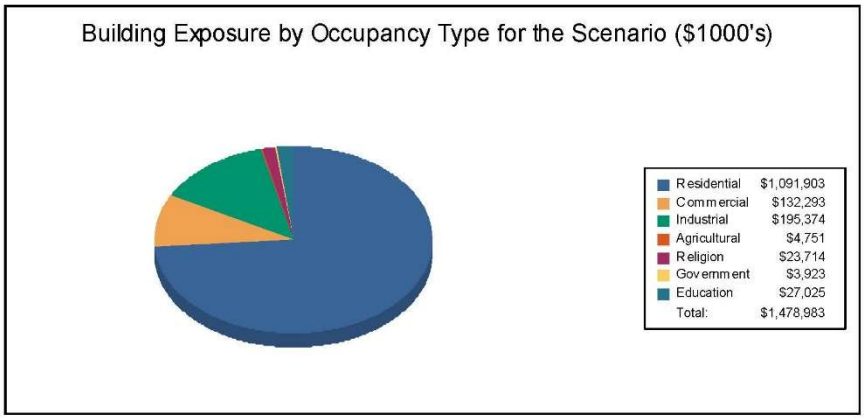
Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,091,903	73.8%
Commercial	132,293	8.9%
Industrial	195,374	13.2%
Agricultural	4,751	0.3%
Religion	23,714	1.6%
Government	3,923	0.3%
Education	27,025	1.8%
Total	**1,478,983**	**100%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 12 beds.
There are 17 schools, 13 fire stations, 4 police stations and 1 emergency operation center.

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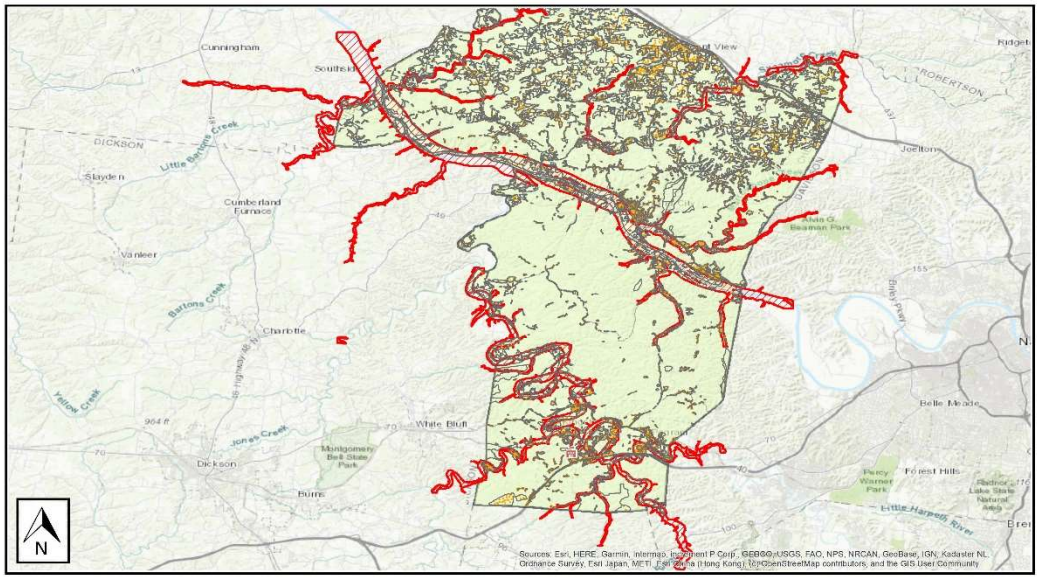
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Cheatham_County
Scenario Name:	Cheatham_County_500yr_Flood
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



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Building Damage

General Building Stock Damage

Hazus estimates that about 693 buildings will be at least moderately damaged. This is over 21% of the total number of buildings in the scenario. There are an estimated 378 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

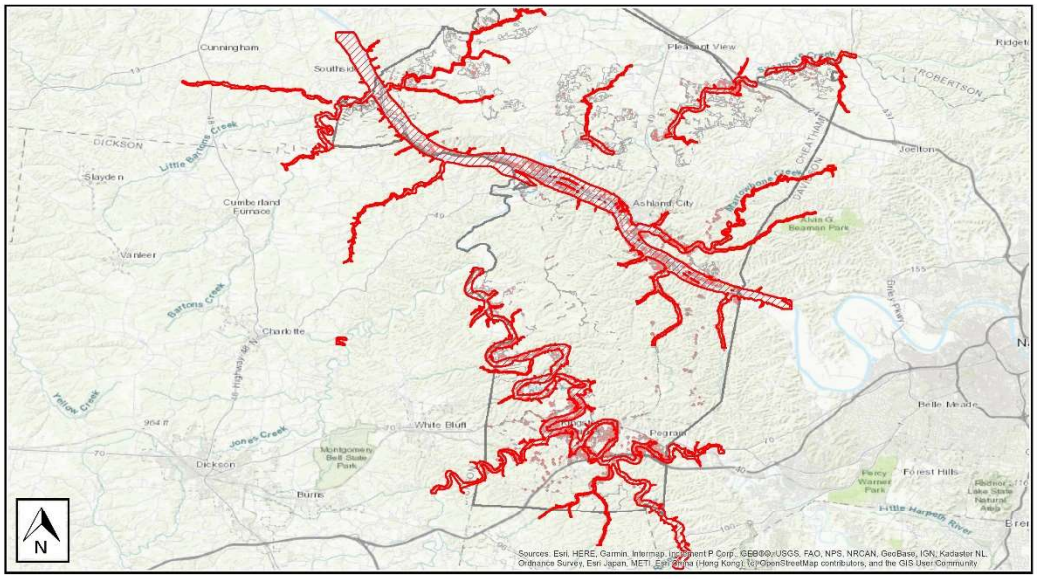

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Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	14	2	72	10	69	10	79	11	95	13	378	53
Total	**14**		**72**		**69**		**79**		**95**		**378**	

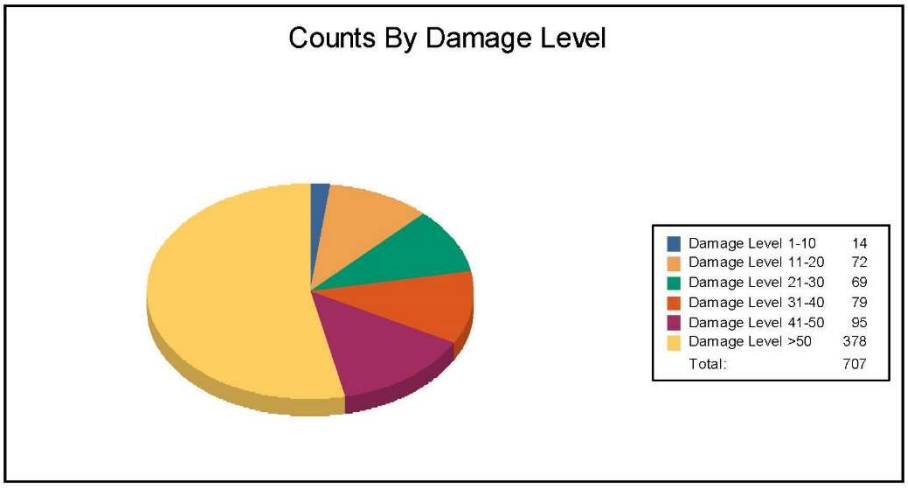

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	43	100
Masonry	0	0	2	10	1	5	1	5	2	10	15	71
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	14	2	70	11	69	11	79	12	93	14	324	50

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 12 hospital beds available for use. On the day of the scenario flood event, the model estimates that 12 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	13	0	0	0
Hospitals	1	0	0	0
Police Stations	4	0	0	0
Schools	17	1	0	1

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

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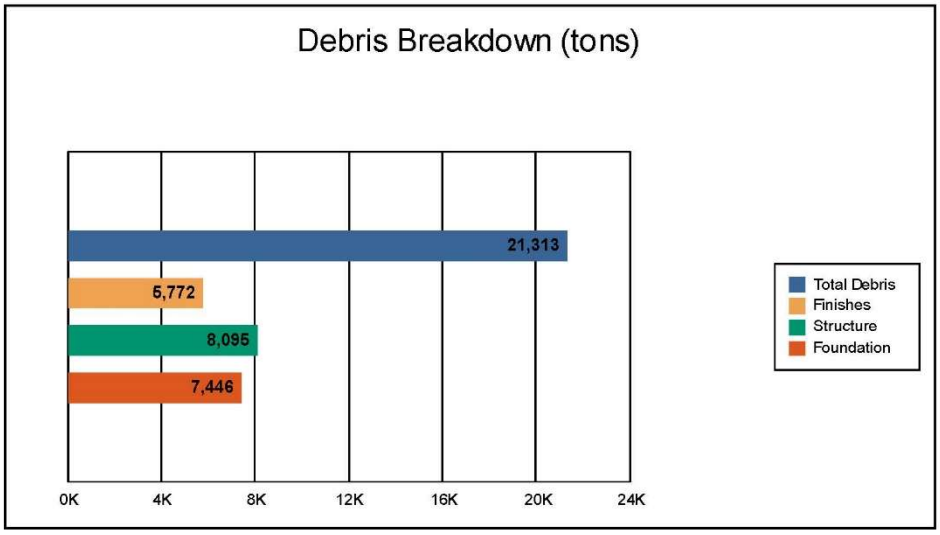
Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.



The model estimates that a total of 21,313 tons of debris will be generated. Of the total amount, Finishes comprises 27% of the total, Structure comprises 38% of the total, and Foundation comprises 35%. If the debris tonnage is converted into an estimated number of truckloads, it will require 853 truckloads (@25 tons/truck) to remove the debris generated by the flood.

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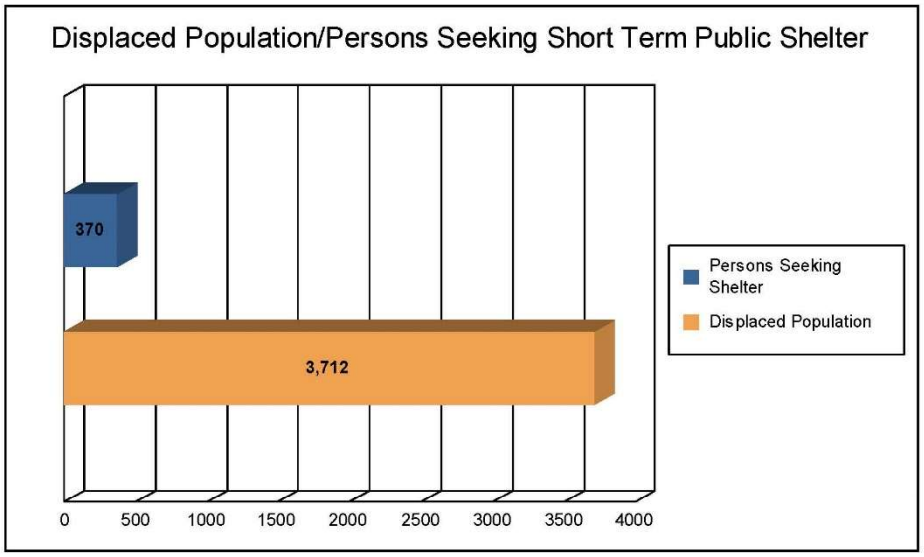
Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1,237 households (or 3,712 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 370 people (out of a total population of 39,105) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 424.20 million dollars, which represents 28.68 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 305.89 million dollars. 28% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 60.19% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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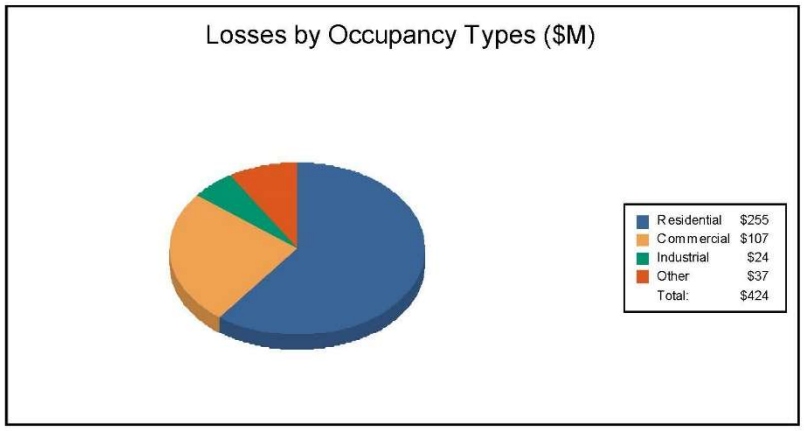
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	142.32	16.57	7.19	4.01	170.10
	Content	71.29	34.81	14.15	12.46	132.72
	Inventory	0.00	1.01	1.96	0.11	3.08
	Subtotal	**213.61**	**52.39**	**23.30**	**16.59**	**305.89**
Business Interruption						
	Income	0.71	23.15	0.24	3.96	28.06
	Relocation	29.50	4.69	0.21	1.75	36.14
	Rental Income	9.83	3.57	0.03	0.22	13.65
	Wage	1.69	23.61	0.38	14.78	40.45
	Subtotal	**41.73**	**55.02**	**0.86**	**20.70**	**118.30**
ALL	**Total**	**255.34**	**107.42**	**24.16**	**37.29**	**424.20**



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Appendix A: County Listing for the Region

Tennessee
- Cheatham

Flood Global Risk Report Page 15 of 16

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Tennessee				
Cheatham	39,105	3,007,026	714,559	3,721,585
Total	**39,105**	**3,007,026**	**714,559**	**3,721,585**
Total Study Region	**39,105**	**3,007,026**	**714,559**	**3,721,585**

APPENDIX C

Planning Documentation

Meeting Sign-In

Sign-In Sheet

Cheatham County Hazard Mitigation Planning
June 21, 2022

Name	Title	Department	Email address
Linda Nichols	Director	Cheatham Co. 911	linda.nichols@cheathamcountytn.gov
John Lawillen	MAYOR	Town of Pegram	John@JohnLawillen.com
Tiffany Holder	Asst Director	Cheatham Co EMA	tiffany.holder@Cheatham
Edwin Hogan	Director	Cheatham Co EMA	Edwin.hogan@ CountyTn.gov
Mark Gaias	Building Comm.	Town of P.V.	mgaias@Townofpleasantview.com
Jennifer Boyd	Admin. Assistant	Hwy Dept	jennifer.boyd@cchwy.com
JOHN LAWLESS	CITY MANAGER	KINGSTON SPRINGS	JLAWLESS@KINGSTONSPRINGSTN.GOV
KERRY R. McCarver	CHEATHAM Mayor	CHEATHAM Co	Kerry.McCarver@cheathamcounty.gov
Kurt Sala	EHS Manager	A.O. Smith	KJSala@hotwater.com
Kim Kassander	Regional Planning Manager	TEMA	Kimberly.Kassander@tn.gov
PETE GRIFFIN	District Coordinator	TEMA	Peter.Griffin@TN.GOV
Cindy Burney	Assessor	Cheatham Co.	Cindy.Burney@cot.tn.gov
Janice Weiss	Soil & Water Conservation		janice.weiss@usda.gov
Autumn Joanow	Middle Region Planner	TEMA	autumn.joanow@gmail.com

Sign In Sheet

Cheatham County Hazard Mitigation Planning Meeting #2

Date: 7-14-2022

Name	Title	Department	Email Address	Phone Numb
Autumn Joarow	Middle Region Planner	TEMA	autumn.joarow@tn.gov	
Allen Nicholson	Ashland City Building Codes Director		anicholson@ashlandcitytn.gov	615-792-6
Gary Carpenter	Inspector	Ashland City Bldg & Codes	gcarpenter@ashlandcitytn.gov	(615) 519-
Tiffany Holder	Asst Director	CC EMA	tiffany.holder@cheathamcountytn.gov	(615)
Edwin Hogan	Director	CC EMA	Edwin.hogan@cheathamcountytn.gov	(615

Page 1 of 1

Meeting Public Notice Copy

CHEATHAM COUNTY HAZARD MITIGATION PLANNING MEETING

DATE: TUESDAY JUNE 21, 2022

TIME: 9:00 AM

LOCATION: CHEATHAM COUNTY

EMERGENCY OPERATIONS CENTER

100 PUBLIC SQUARE, SUITE 90

ASHLAND CITY, TN 37015

(BASEMENT OF THE COURTHOUSE)

THIS MEETING IS OPEN TO THE PUBLIC.

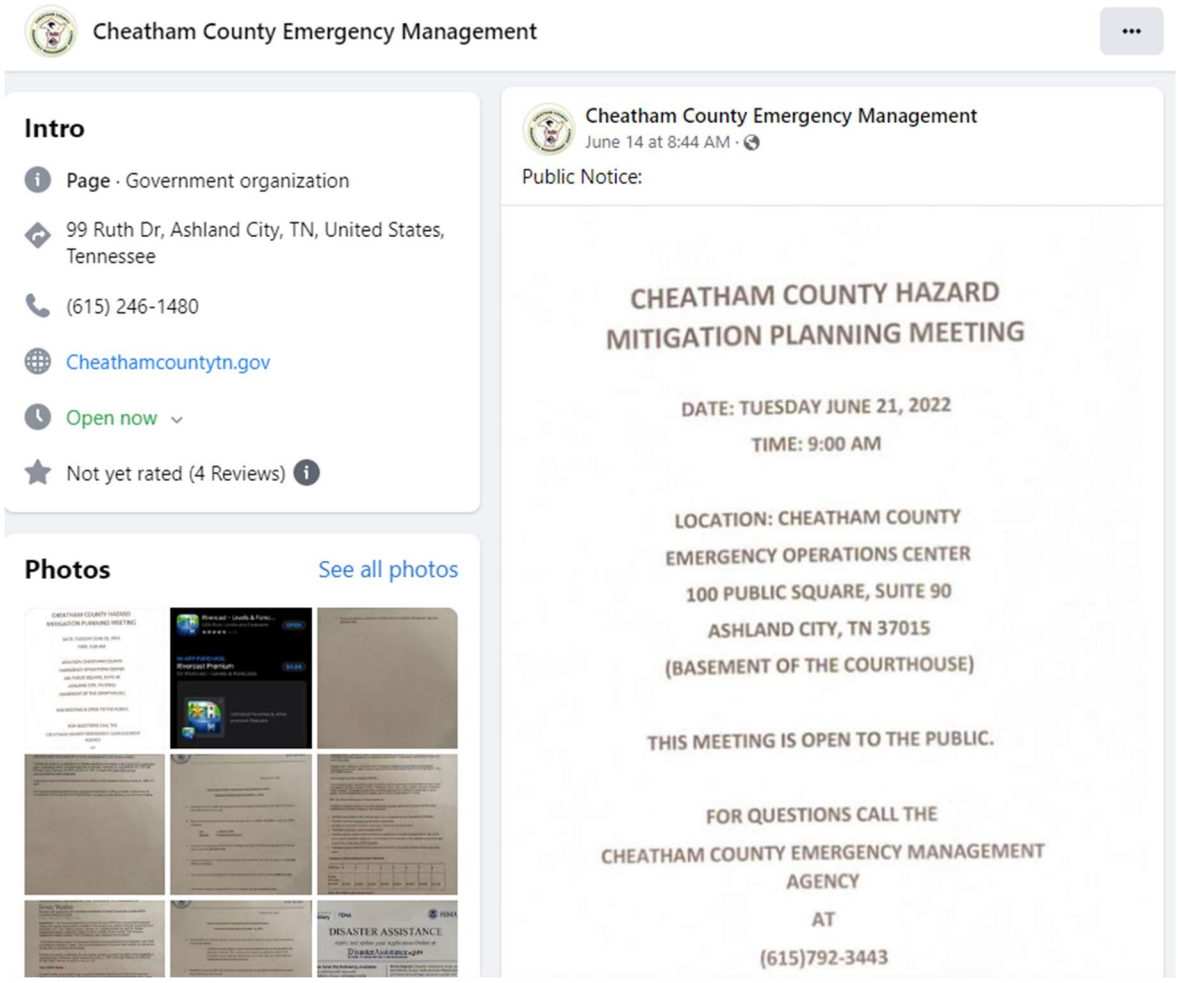
FOR QUESTIONS CALL THE

CHEATHAM COUNTY EMERGENCY MANAGEMENT AGENCY

AT

(615)792-3443

Facebook Public Notice



Email Template to Stakeholders

CHEATHAM COUNTY
EMERGENCY MANAGEMENT AGENCY

Director
EDWIN HOGAN
(615) 792-3443

June 2, 2022

Dear

It is time once again for the Cheatham County Emergency Management Agency to update our Multi-Jurisdictional Hazard Mitigation Plan (this includes the towns of Ashland City, Kingston Springs, Pegram, and Pleasant View). We will host our first meeting on June 21, 2022 in the county Emergency Operations Center 100 Public Square in Ashland City (basement of the courthouse). The meeting will take place at 9:00am. Please make sure someone from your department/town attends this important meeting. Without an updated Mitigation Plan, Cheatham County and the towns of Ashland City, Kingston Springs, Pegram, and Pleasant View will not be eligible to receive any mitigation grant funding.

We look forward to seeing you on June 21, 2022 at 9:00am in the EOC. If you have any questions, please call us at (615)792-3443.

Sincerely,

EMA Director

100 PUBLIC SQUARE • SUITE 90 • ASHLAND CITY, TN 37015

APPENDIX D

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