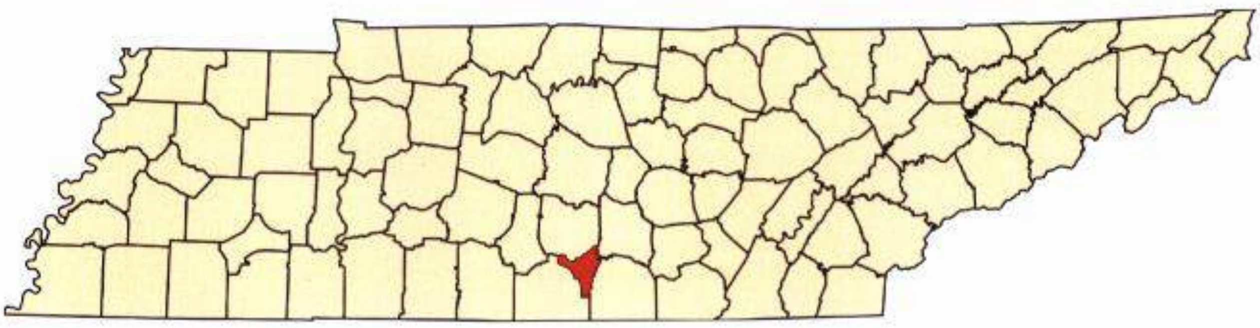
Metropolitan Lynchburg/ Moore County Hazard Mitigation Plan

2025 Update



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Metropolitan Lynchburg/Moore County Hazard Mitigation Planning Committee &
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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 extremely advantageous, the Disaster Mitigation Act of 2000 was developed as U.S. Federal legislation reinforcing the importance of pre-disaster mitigation planning by calling for local governments to develop mitigation plans *(44 CFR 201)*.

A local hazard mitigation plan aims to identify the community's notable risks and specific vulnerabilities and then to create/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 opportunities to be used on mitigation projects and can receive these funds faster than communities without a plan.

This 2025 update of the Metropolitan Lynchburg/Moore County Hazard Mitigation Plan addresses Building Resilient Communities and Infrastructure (BRIC), Flood Mitigation Assistance (FMA), and Hazard Mitigation Grant Program (HMGP) requirements. Moore county is a metropolitan government. As such, Metropolitan Lynchburg/Moore County is the only jurisdiction referenced in this plan and will be the only jurisdiction to adopt it.

In reference to the federal code title *44 CFR 201*, the plan is required to be submitted to both TEMA (State) and FEMA (Federal) for review to be approved. When the plan is deemed "approval pending adoption" by FEMA *(44 CFR 201.6(c)5)*, Metropolitan Lynchburg/Moore County will adopt the plan through a local resolution.

Table of Contents

Chapter 1. The Planning Process

1.1 Purpose and Need, Authority and Statement of Problem

1.1.1 Purpose and Need

FEMA defines "hazard mitigation" as 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 defined, prioritized, and implemented. The Hazard Mitigation Plan aims to identify, assess, and mitigate risk to better protect the people and property of Metropolitan Lynchburg/Moore 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 will use to decrease vulnerability and increase resiliency and sustainability. This Plan demonstrates the county's commitment to reducing risks from identified hazards and serves as a tool to help decision-makers direct mitigation activities and resources.

1.1.2 Authority

This Hazard Mitigation Plan has been adopted by Metropolitan Lynchburg/Moore County in accordance with the authority granted to local communities by the State of Tennessee. This Plan was updated per state and federal rules and regulations governing local hazard mitigation plans. The Plan shall be reviewed annually and go through a complete update process 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 Moore County Hazard Mitigation Plan was created and approved by FEMA in 2019. 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. This plan update has been prepared to meet requirements set forth by FEMA and the Tennessee Emergency Management Agency (TEMA) to ensure Metropolitan Lynchburg/Moore County is eligible for funding and technical assistance from state and federal hazard mitigation programs. All communities are welcome to address man-made hazards and risks in their hazard mitigation plan. However, it's important to note that the State and Federal governments only evaluate and approve based on natural hazards only as per federal code title 44 CFR 201.

1.2 Methodology, Update Process, and Participation Summary

This Hazard Mitigation Plan was developed under the guidance of a Hazard Mitigation Planning Committee (HMPC). The Committee included representatives of the whole community that make up Metropolitan Lynchburg/Moore County.

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. As a single-jurisdiction, Metropolitan Lynchburg/Moore County solely participated in the 2025 Plan update, as well as reviewed and provided timely comments on all draft components of the Plan. All participants were invited to this committee via email by the County EMA Director. Those who did not originally respond were reached out to via phone or email by the County EMA Director.

Table 1: Multi-Jurisdictional HMPC Participation

Jurisdiction	2019 Participation	2025 Participation
Metropolitan Lynchburg/Moore County	YES	YES

The HMPC for the 2025 plan update included key community representatives. *Table 2* details the HMPC members, meeting dates, associated FEMA Lifeline, and committee member attendance. FEMA Lifelines are fundamental way for a community to recover, however, all participants might not be associated with a FEMA Lifeline. If they are not associated with a FEMA Lifeline, then they will be indicated as not applicable (NA).
The EMA director invited individuals who represented regional and local agencies that have authority in regulating county/city development, individuals that represent vulnerable populations, as well as those that are responsible for responding to the identified hazards of prime concern. These partners include jurisdictional police, fire, public works, and health departments, community representatives, nonprofit organizations, local floodplain administration, the county/city school board, elected officials, and electric utility companies. All committee members provided key information to recognize and mitigate hazards of prime community concern. A more detailed summary of HMPC meeting dates, members seeking approval and FEMA lifeline association follows in *Table 2*. Meeting sign-in sheets are included in Appendix A.

Table 2: HMPC Members

Name	Title	Associated FEMA Lifeline	Organization/ Jurisdiction	Meeting Dates		
				09/17/2024	12/06/2024	09/30/2025
Hunter Case	Assistant Director	Health and Medical, Safety and Security	Emergency Management	X	X	X
Jason Deal	Director	Health and Medical, Communications, Safety and Security	Public Safety	X	X	X
Dwayne Clark	Assistant Director	Health and Medical, Safety and Security	EMS	X		
Jenilee Kenyon	ERC	Health and Medical	TN Department of Health	X		
Chad Brown	EMS Consultant	Health and Medical	TN Department of Health	X		X
Ronnie Cunningham	Director	Energy, Food, Water, and Shelter	Moore County Utilities	X		
Shannon Cauble	Road/Highway Superintendent	Transportation	County Roads/Highways	X		
Justin Whelan	Jack Daniels Risk Manager/Fire Chief	Health and Medical, Safety and Security	Jack Daniels	X		X
Mark Neal	Fire Chief	Health and Medical, Safety and Security	Moore County Fire	X		
William Groce	District Coordinator	All lifelines	Tennessee Emergency Management	X		X

			Agency			
Tyler Hatfield	Sheriff	Safety and Security	Moore County Sheriff's Department	X		X
Charles Cumrine	Special Agent	Safety and Security	Tennessee Office of Homeland Security	X		X
Brandon Thomas	Lieutenant	Safety and Security	Moore County Sheriff's Department	X		X
Shane Taylor	Chief Deputy	Safety and Security	Moore County Sheriff's Department	X		X
Aracely Castillo	Local Director	Health and Medical	Tennessee Department of Health	X		
Christine Pyrdom	Building Codes	All	Moore County Building Codes	X		
Chad Brown	Jack Daniels Representative	Energy, Food, Water, and Shelter	Jack Daniel's Distillery			X
Brandi Smith	Jack Daniels Representative	Energy, Food, Water, and Shelter	Jack Daniel's Distillery			X
Nicholas T. Sturgeon	Regional Planner III	All	Tennessee Emergency Management Agency	X	X	X
Taylor James	Operations Officer	All	Tennessee Emergency Management Agency			X

1.2.2 Hazard Mitigation Planning Process

The 2025 Metropolitan Lynchburg/Moore County Hazard Mitigation Plan was updated following guidance put forth by FEMA in the *Local Mitigation Planning Policy Guide* which became effective on April 19, 2023. This guidance emphasized the need for a whole community planning approach to include representatives from all sectors of the community with an emphasis on the increased need for vulnerable and underserved population representation. The guidance also highlighted increased emphasis on risk, vulnerability, and resilience assessments, the inclusion of high hazard dams, and future weather trends/patterns.

FEMA guidance proposes a structured four-phase approach to completing a Hazard Mitigation Plan 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 September 17th, 2024, at the local VFW post. 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 by the County EMA Director for the planning committee meetings, however, none chose to attend in person. Each of the counties were also presented with a draft of this plan for review. Some of those neighboring communities that were outreached to include Bedford-, Franklin-, Coffee-, and Lincoln- County.

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 meetings, and the collection of public and stakeholder comments on the draft plan. To ensure socially vulnerable and underserved populations were included in organizing efforts the Metropolitan Lynchburg/Moore County EMA director contacted organizations that had roots within the community such as the Department of Health and the largest employer, Jack Daniel's Distillery, which has a significant presence in the community. Due to the nature of the public meetings, neighboring communities, agencies, utilities, academia, civic organizations, and other interested parties were given the opportunity to participate.

A public notice was posted weeks in advance of each meeting in public buildings across the community and inviting members of the public to attend the 09/17/2024 Hazard Mitigation Planning Committee meeting. Documentation to support outreach efforts such as emails, community flyers, and social media postings can be found in Appendix A.

Sign-in sheets from all meetings are included in Appendix A. The meeting date and topics discussed are summarized below in *Table 3*. The meetings on 12/06/2024 and 09/30/2025 were open to the public and announced via newspaper, however, no members of the public chose to attend.

Table 3: Summary of Hazard Mitigation Planning Meetings

Meeting Number	Meeting Topic	Meeting Date	Meeting Location
Meeting #1	Overview of hazard mitigation	09/17/2024	119 Booneville Highway, Lynchburg, TN 37352
	Hazard Mitigation Planning Process		
	Purpose of the HMP		
	Area growth and changes		
	Identification of Hazards		
	Future weather predictions		
	Assessment of risk, vulnerabilities, resilience		
	Review of NFIP		
	Previous HMP goals/projects		
	New goals/projects		
	Overview of hazard mitigation		

Meeting #2	Hazard Mitigation Planning Process Purpose of the HMP Area growth and changes Identification of Hazards Future weather predictions Assessment of risk, vulnerabilities, resilience Review of NFIP Previous HMP goals/projects New goals/projects	12/06/2024	Virtual
Meeting #3	Complete review of the draft plan before the LEPC and opportunity to review and revise with local members.	09/30/2025	119 Booneville Highway, Lynchburg, TN 37352

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 and state partners to participate in the process. The coordination involved contacting these agencies through email, flyers, in-person 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 actively involved in the HMPC is as follows:

- Tennessee Emergency Management Agency
- Moore County Emergency Management Agency
- Tennessee Department of Health
- Moore County Sheriff's Office
- Jack Daniel's Distillery & Fire Brigade
- Tennessee Office of Homeland Security
- Community Organization

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. Metropolitan Lynchburg/Moore County uses a variety of planning mechanisms, such as land development regulations and ordinances, to guide growth and development. Integrating existing planning efforts, mitigation policies, and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs.

Table 4 identifies the existing planning mechanisms that were reviewed and how they were incorporated into the 2025 Hazard Mitigation Plan Update.

Table 4: Planning Mechanism Review

Existing Planning Mechanisms	Reviewed? (Yes/No)	Method of Use in Hazard Mitigation Plan
State Hazard Mitigation Plan	Yes	Identifying hazards, assessing vulnerabilities, and 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	Yes	Different years of code regulations utilized in different

Ordinances		jurisdictions
CDC Social Vulnerability Index	Yes	Analyze vulnerable populations in jurisdictions
FEMA's National Risk Index	Yes	Analyze natural hazard risk within each jurisdiction
Land Use Maps	Yes	Assessing vulnerabilities, development trends, and mitigation strategies
Critical2TN Infrastructure Database	Yes	Assessing vulnerabilities, mitigation strategies
NOAA Archives	Yes	Analyze weather data and trends
ETSU Geoinformatics & Disaster Science Lab	Yes	Analyze future weather trends and patterns
U.S Census Bureau	Yes	Analyze community demographic data and trends
Local County Hazard Mitigation Plan	Yes	Analyze previous plan for updates
Flood Insurance Rate Maps	Yes	Analyze flood-prone areas within the community

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 plan's risk assessment and hazard vulnerability sections as appropriate. The data was also used to determine the community's capability to implement certain mitigation strategies. To further enhance integration, the local hazard mitigation plan will be strategically synchronized with existing county and jurisdictional policies, plans, and procedures, leveraging investments from their own budgets. This coordinated effort maximizes resources and promotes efficient allocation of funds towards mitigation projects, strengthening community resilience against a spectrum of hazards.

Table 5: Planning Mechanism Analysis

Existing Planning Mechanisms	Updated? (Yes/No)	How was it utilized?
Local Basic Emergency Operations Plan	Yes	Identify major capabilities
Stormwater Ordinance	Yes	Capability assessment, mitigation strategies
Building and Zoning Codes and Ordinances	Yes	Different years of code regulations utilized in different jurisdictions
Critical2TN Infrastructure Database	Yes	Assessing vulnerabilities, mitigation strategies
Budget Hearings	Yes	Financial Budgeting

Phase II – Risk Assessment

Identify the Hazard, Assess the Risk and Vulnerabilities

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 and gaps. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the committee could assess the 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: Risk and Vulnerability Assessment.

Phase III – Mitigation Strategy

Set Goals and Review Actions

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 information and input collected during the HMPC meetings, and various agencies and individuals 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 Metropolitan Lynchburg/Moore 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 and actions. 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

The 2019 Metropolitan Lynchburg/Moore County Hazard Mitigation Plan contained a hazard identification and risk assessment for each jurisdiction and a corresponding action list aimed at mitigation risk. Since that time, progress has been made by both the County and incorporated jurisdictions on the implementation of the mitigation strategy with zero complete actions and two in progress. The HMPC has met annually over the past 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 2019 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 2019 plan. Only the information and data still valid from the 2019 plan was carried forward as applicable in this update. The following requirements were addressed during this plan update process with consideration of the priorities and goals of the Metropolitan Lynchburg/Moore County Hazard Mitigation Planning Committee:

- 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;
- Document NFIP as related to the county and jurisdictions;
- Incorporate new data or studies on hazards and risks;
- Incorporate new data related to future climate patterns and trend;
- Incorporate new capabilities or changes in capabilities;
- Incorporate social vulnerability data and vulnerable population information;
- Incorporate growth and development-related changes to inventories; and
- Incorporate new action recommendations or changes in action prioritization;
- Enhanced public outreach and multi-agency coordination efforts.

1.3.2 2019 HMP Strategy Review

During the 2019 update of the Metropolitan Lynchburg/Moore County Hazard Mitigation Plan, the HMPC identified nine actions as relevant to the county. Of these nine actions, none have been completed, two are in progress, and seven have not been started. Actions that had not been pursued were discussed for relevance to the new plan and were either carried over to the 2025 plan or deleted from the strategy. Six of these projects were determined to still be viable and will be carried over or revised in this plan update. Details and the status of all previous actions are in *Table 6.*

Table 6: Mitigation Action Progress Summary (2019 Plan)

Action Number	Action Description	Responsible Dept.	Location	Current Status			2025 Plan Update		Funding Source				Priority Score	Est. Cost (2019)	New or Existing Infrastructure
				Complete	In-Progress	Not yet Started	Delete Action	Carry Forward or Revise	HMGP	BRIC[1]	FMA	Local			
1	Improve communication capabilities between first responder and government agencies.	Emergency Management Agency	Metropolitan Lynchburg/ Moore County		X		X					X	High	$30,000	Existing
2	Retrofit identified shelter locations for generator hook-ups for warming centers and/or severe storm relief.	Emergency Management Agency			X			X	X		X	X	High	$250,000	New
3	Public safe space (room) project for high school.	Board of Education				X		X	X				High	$1,000,000	Existing
4	Shelter for citizens, tourists, emergency operations center; safe space/retrofit project; progress made – EOC.	Sheriff's Department				X		X	X		X		High	$2,000,000	New
5	Retrofit identified critical infrastructure, including public/private partnerships, for generator hook-ups to ensure continuity of operations.	Emergency Management Agency				X		X	X		X	X	Med	$250,000	New
6	Improve access to main street.	Highway Department				X		X	X				High	$500,000	Existing
7	Elevate road highway 129.	Highway Department				X		X	X				Med	N/A	Existing
8	Build or retrofit a hardened facility for storage of mobile command post and/or equipment.	Emergency Management Agency				X	X		X		X	X	Low	$1,000,000	New
9	Feasibility study for elevation of highway 129.	Highway Department				X	X		X				Low	$500,000	Existing

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

1.4 Multi-Jurisdictional Special Considerations

Hazards Assessment

Given this plan is written solely for Metropolitan Lynchburg/Moore County, there are no multi-jurisdictional differences within the area to be considered. However, the county still considers the potential for differences in how a hazard may impact the different areas of the jurisdiction more

Hazards	Will the hazard have multi-jurisdictional differences?
Drought	No
Earthquake	No
Extreme Temperature	Yes
Wildfire	Yes
Flooding	Yes
Geologic	Yes
Severe Weather	Yes
Tornado	Yes
Communicable Disease	No
Dam/Levee Failure	Yes
Hazardous Materials Release	No
Terrorism	No
Infrastructure Incident	No

1.5 Public Participation

Public involvement included press releases, public meetings, and a public comment period on the draft plan. Organizations representing vulnerable and underserved populations were contacted to gain further input from populations most at risk during hazardous events. The formal public meetings for this plan are summarized in *Table 3* (Section 1.2.2) discussed early in this chapter. The 09/17/2024 and 09/30/2025 HMPC meetings were open to the public; however, no members of the public chose to attend the meeting.

A public notice was posted in all public buildings and via social media two weeks in advance. Documentation to support the public outreach efforts can be found in Appendix A. Over the past five years, the community has been kept involved in the planning process through the implementation of projects in the plan.

1.6 County Data Profile

1.6.1 Resources and Assets

There are no hospitals, but two clinics in the county. There is a single nursing home which provides 88 beds. The county also has: 25 volunteer firefighters with five stations, and 13 full time Law Enforcement officers including the county sheriff. Metropolitan Lynchburg/Moore County School District facilities the learning of approximately 887 students via their system of two schools within the region. According to the RWJ Foundation County Health Rankings profile, Metropolitan Lynchburg/Moore County Schools are underfunded by $358 per pupil as related to dollars to test score achievement.

Metropolitan Lynchburg/Moore County houses zero radio stations and five tv networks. The main phone company in the area is AT&T. Residents in the county can either obtain internet via AT&T or Monster Broadband. Communication resources, a vital component of emergency response and preparedness, is notably lacking in the more rural portions of Metropolitan Lynchburg/Moore County. Between 2016 and 2020 only 73.3% of households had a computer and only 84.3% had broadband internet access according to the United States Census Bureau.

The main roadways that travel through the county are:

- State Route 50 (SR-50) – Runs through Lynchburg and connects to other highways, making it a key route in the county.
- U.S. Highway 55 (US-55) – This highway runs east-west and connects Lynchburg to nearby cities like Tullahoma and Manchester.

- State Route 82 (SR-82) – Passes through parts of Moore County, providing additional connectivity.
- State Route 129 (SR-129) – A smaller but important state highway in the region.

The nearest interstates are:

- Interstate 24 (I-24) – The closest major interstate, located to the northeast of Moore County. It runs through cities like Manchester and Murfreesboro, providing access to Nashville and Chattanooga.
- Interstate 65 (I-65) – Located to the west, near Lewisburg and Columbia. It runs north-south, connecting Nashville to Huntsville, AL.
- Interstate 840 (I-840) – A loop around the Nashville metro area, located further north of Moore County.

The major waterways that are in or near Metropolitan Lynchburg/Moore County are:

- Elk River – The primary river flowing through Moore County, providing a key water source and recreational opportunities such as fishing and kayaking.
- Mulberry Creek – A tributary of the Elk River that runs through parts of Moore County.
- East Fork Mulberry Creek – Another tributary of Mulberry Creek, contributing to the county's watershed.
- Tim's Ford Lake (nearby) – While not directly in Metropolitan Lynchburg/Moore County, this reservoir on the Elk River is just outside the county line and provides boating, fishing, and outdoor recreation.

A further analysis of these water systems will be explored in the hazard flood section as related to their propensity for flood events as appropriate.

The nearest international airports are:

- Regional and General Aviation Airport:
  - Tullahoma Regional Airport (THA) – Located about 12 miles northeast in Tullahoma, TN. Primarily serves general aviation, private, and corporate flights.
  - Winchester Municipal Airport (BGF) – About 20 miles southeast in Winchester, TN. Another small airport for general aviation.
  - Fayetteville Municipal Airport (FYM) – Located about 25 miles southwest in Fayetteville, TN, serving small aircraft and private flights.
- Nearest Commercial Airports:
  - Huntsville International Airport (HSV) – About 60 miles southwest in Huntsville, AL. The closest commercial airport with major airline service.
  - Nashville International Airport (BNA) – About 75 miles north in Nashville, TN. The largest and busiest airport in the region offering numerous domestic and international flights.

Given the limited public transportation options and the rural environment of Moore County, 36% of working individuals endure a commute of more than 30 minutes, and 85% of all working individuals drive alone to work.

Metropolitan Lynchburg/Moore County is governed by an elected Metropolitan Mayor and Metropolitan Councilmen. There are multiple regulatory committees that are appointed by both the Metropolitan Mayor and Metropolitan Councilmen.

1.6.2 Development and Growth

Like most of its counterparts, Metropolitan Lynchburg/Moore County has been experiencing rapid growth over the past few years. The population of the county increased between 2010 and 2020 censuses from 6,361 to 6,461. 11% of the 2,960 Metropolitan Lynchburg/Moore County households deal with at least 1 severe housing problem (overcrowding, high housing costs, lack of kitchen facilities, or lack of plumbing facilities). Most of Metropolitan Lynchburg/Moore Counties' employed population work within the services (35.7%) and manufacturing (26.5%) industries. Jack Daniel's Distillery is the largest employer in Metropolitan Lynchburg/Moore County which employs 630 staff. Metropolitan Lynchburg/Moore County is a member of Joint Economic and Community Development Boards to ensure and promote economic growth within the county and for its constituents. As stated, Metropolitan Lynchburg/Moore County has experienced much growth since the last planning period, specifically residentially/industrially/commercially. However, it is noteworthy that the jurisdiction continues to host a large tourist population at Jack Daniel's distillery and other locations associated with the distillery to include the General Store and Miss Mary Bobo's restaurant.

1.6.3 Demographics

Throughout the planning process, the Metropolitan Lynchburg/Moore County HMPC remained committed to recognizing socially vulnerable and underserved populations. To maintain this commitment, the HMPC reached out to key stakeholders as discussed previously and reviewed the CDC/ATSDR Social Vulnerability Index (SVI). SVI information is in Appendix B.

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 6,742 residents living within Metropolitan Lynchburg/Moore County:

- The median household income is $66,687
- 11.3% live below the national poverty line
- 100.0% live in rural areas
- 10% are confronted with food insecurity
- 16.5% of the under 65 years of age population live with a disability
- 6.1% of the under-65 population do not have health insurance
- Population as of 2024 was 50 people per square mile

Table 7: Population Data

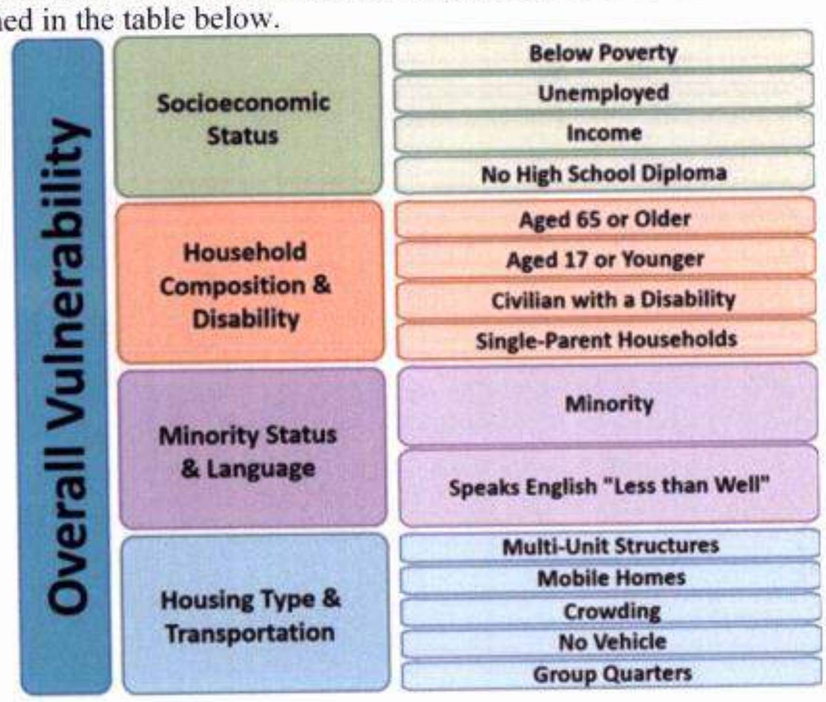
Demographic	Percentage
Identified gender	
Male	50
Female	50
Age Group	
Under 5	4.8%
Under 18	19.4%

Over 65	21.4%
Race/Ethnicity (one)	
White (not Hispanic/Latin)	92.70%
Asian	3.3%
Black or African American	1.9%
American Indian or Alaskan Native	1.1%
Hispanic/Latino	0.0%
Education	
High School Graduate or Higher	96.8%
Bachelor's Degree or Higher	24.7%

1.6.4 Social Vulnerability

Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human-caused threats, such as toxic chemical spills. Social vulnerability considerations were included in this plan update to identify areas across the planning area that might be more vulnerable to hazard impacts based on several factors. The County BEOP will also incorporate this information to improve response efforts in socially vulnerable neighborhoods.

The Center for Disease Control and Prevention (CDC) has developed a social vulnerability index (SVI) to measure the resilience of communities when confronted by external stresses such as natural or human-caused disasters or disease outbreaks. The SVI is broken down to the census tract level and provides insight into vulnerable populations to assist emergency planners and public health officials in identifying communities more likely to require additional support before, during, and after a hazardous event. The SVI index combines four main themes of vulnerability, which are, in turn, broken down into subcategories for 16 vulnerability factors. The themes are outlined in the table below.



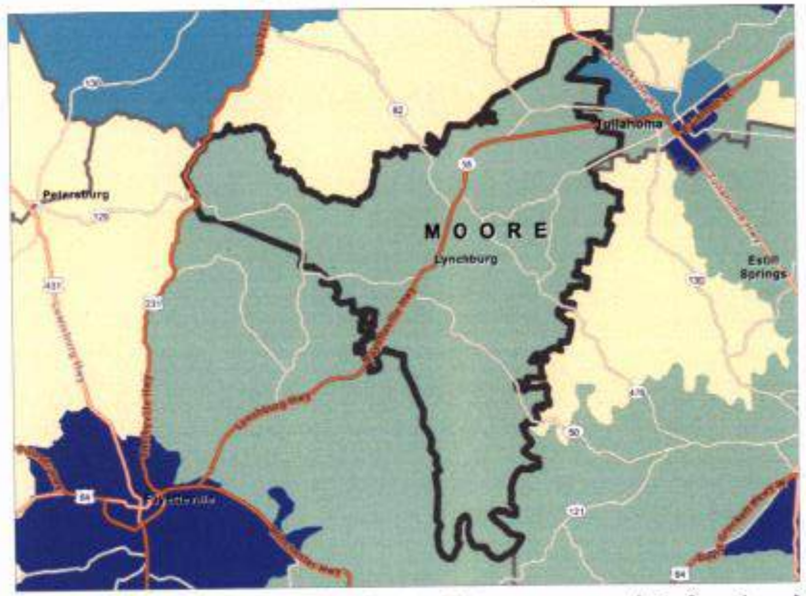
The specific breakdown for Metropolitan Lynchburg/Moore County and all participating jurisdictions are as follows:

Metropolitan Lynchburg/Moore County Social Vulnerability Factors	
Total Square Miles	129
Total Population (as of 2018)	6558
Housing Units Estimated	2981
Households	2558
Persons below Poverty	1772
Age 16+ unemployed	129
Per Capita Income	37,193
Age 25+ w/ no HS Diploma	663
Percentage of Persons below poverty	27.5
Unemployment rate	4.2
Per Capita Income	13.9
Percentage of persons w/ no HS diploma 25 yo+	1393
Aged 65+ & older	1272
Age 17 & younger	1016
Civilian noninstitutionalized population with a disability	142
Single Parent HH w/ children under 18	21.2
Percentage of person aged 65+	19.4
Percentage of persons 17 or younger	15.7
Percentage of civilian noninstitutionalized population with a disability	5.5
Percentage of single parent households with children under 18	503
Minority (all persons except white, non-Hispanic)	4
Persons (age 5+) who speak English "less than well"	7.6
Percentage minority (all persons except white, non-Hispanic)	.1
Percentage of persons (age 5+) who speak English "less than well"	10
Housing in structures with 10 or more units	307
Mobile Homes	46
At Household level (occupied housing units) more people than rooms	75
Households w/ no vehicle	95
Persons in Group Quarters	0.3
Percentage of housing in structures with 10 or more units	10.3
Percentage of mobile homes	2.1
Percentage of occupied housing units with more people than rooms	2.9
Percentage of households with no vehicle available	1.4
Percentage of persons in group quarters	129

CDC/ATSDR Social Vulnerability Index 2020

MOORE COUNTY, TENNESSEE

Overall Social Vulnerability[1]



Highest (Top 4th) | Vulnerability (SVI 2020)[3] | Lowest (Bottom 4th) | Data Unavailable[2]

Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human-caused threats, such as toxic chemical spills. The **CDC/ATSDR Social Vulnerability Index (CDC/ATSDR SVI 2020)**[3] **County Map** depicts the social vulnerability of communities, at census tract level, within a specified county. CDC/ATSDR SVI 2020 groups **sixteen census-derived factors** into **four themes** that summarize the extent to which the area is socially vulnerable to disaster. The factors include economic data as well as data regarding education, family characteristics, housing, language ability, ethnicity, and vehicle access. Overall Social Vulnerability combines all the variables to provide a comprehensive assessment.

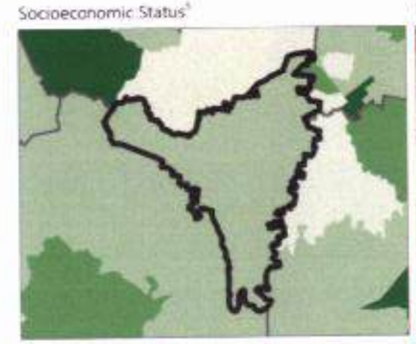
ATSDR Agency for Toxic Substances and Disease Registry

GRASP Geospatial Research, Analysis, and Services Program

CDC/ATSDR SVI 2020 – MOORE COUNTY, TENNESSEE

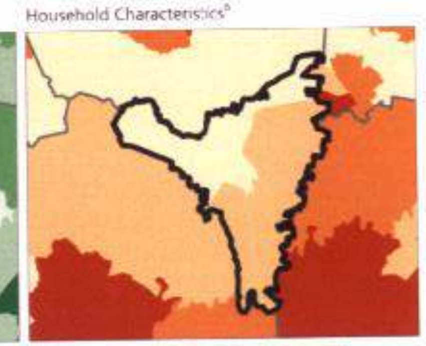
CDC/ATSDR SVI Themes

Socioeconomic Status[4]



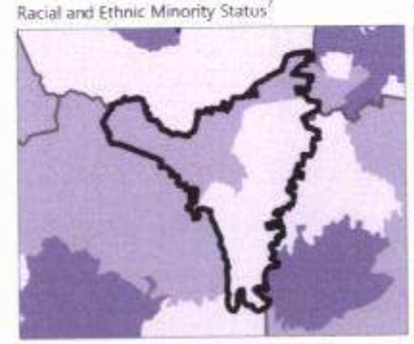
Highest (Top 4th) | Vulnerability (SVI 2020)[3] | Lowest (Bottom 4th)

Household Characteristics[5]



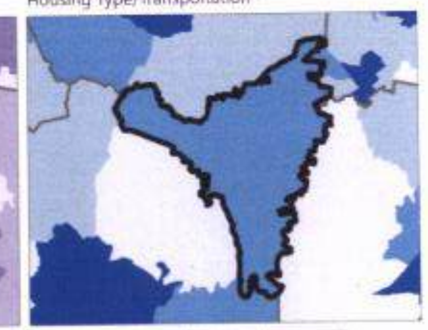
Highest (Top 4th) | Vulnerability (SVI 2020)[3] | Lowest (Bottom 4th)

Racial and Ethnic Minority Status[6]



Highest (Top 4th) | Vulnerability (SVI 2020)[3] | Lowest (Bottom 4th)

Housing Type/Transportation[8]



Highest (Top 4th) | Vulnerability (SVI 2020)[3] | Lowest (Bottom 4th)

Data Sources: CDC/ATSDR/GRASP, U.S. Census Bureau, Esri® StreetMap™ Premium.
Notes: [1]Overall Social Vulnerability: All 16 variables. [2]Census tracts with 0 population. [3]The CDC/ATSDR SVI combines percentile rankings of US Census American Community Survey (ACS) 2016-2020 variables, for the state, at the census tract level. [4]Socioeconomic Status: Below 150% Poverty, Unemployed, Housing Costs Burden, No High School Diploma, No Health Insurance. [5]Household Characteristics: Aged 65 and Older, Aged 17 and Younger, Civilian with a Disability, Single-Parent Households, English Language Proficiency. [6]Race/Ethnicity: Hispanic or Latino (of any race); Black and African American, Not Hispanic or Latino; American Indian and Alaska Native, Not Hispanic or Latino; Asian, Not Hispanic or Latino; Native Hawaiian and Other Pacific Islander, Not Hispanic or Latino; Two or More Races, Not Hispanic or Latino; Other Races, Not Hispanic or Latino. [7]Housing Type/Transportation: Multi-Unit Structures, Mobile Homes, Crowding, No Vehicle, Group Quarters.
Projection: NAD 1983 StatePlane Tennessee FIPS 4100.
References: Flanagan, B.E., et al., A Social Vulnerability Index for Disaster Management. Journal of Homeland Security and Emergency Management. 2011. 8(1). CDC/ATSDR SVI web page: https://www.atsdr.cdc.gov/placeandhealth/svi/index.html

1.6.5 Critical Infrastructure

Critical Infrastructure is assets in a community that are considered vital to the public's health and safety. Due to the sensitivity of these assets in Metropolitan Lynchburg/Moore County and the incorporated jurisdictions, these assets are restricted for public viewing. However, the data is viewable to restricted personnel on the State of Tennessee's Critical2TN Database. Metropolitan Lynchburg/Moore County currently has 16 assets identified as Foundation Infrastructure with 23 classed as Tier 2 Title 3 facilities.

1.7 Resource Capabilities

The committee gathered the following resource capabilities to determine what existing staff and resources are being used to support mitigation programs.

Table 8: Jurisdictional Mitigation Capabilities

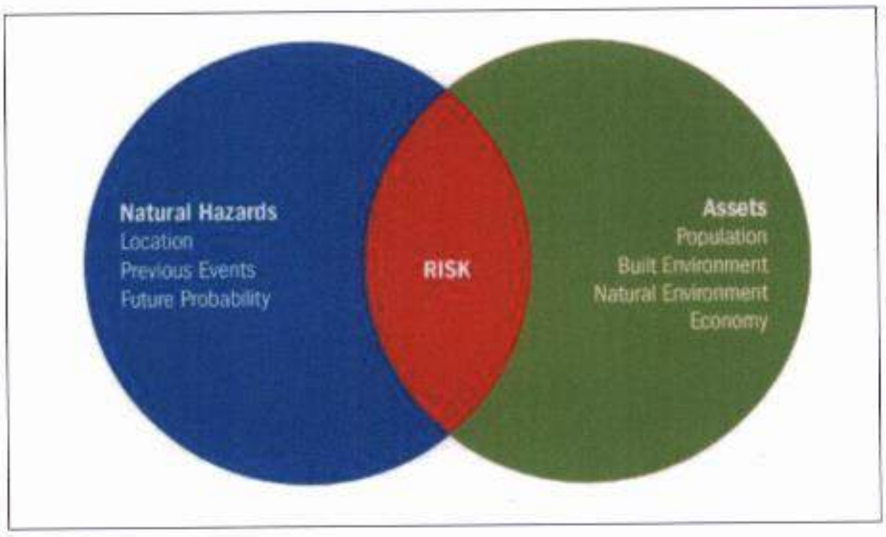
Mitigation Capabilities	Metropolitan Lynchburg/Moore County
Building Codes	Yes
Zoning Codes	Yes
Subdivision Ordinance	Yes
Stormwater Ordinance	No
Floodplain Ordinance	Yes
Erosion, Sedimentation and Pollution Control Ordinance	No
Stormwater Management Program	No
Site Plan Review Requirements	Yes
Capital Improvements Plan	Yes
Economic Development Plan	Yes
Local Emergency Operations Plan	Yes
Flooding or Engineering Study	Yes
Repetitive Loss Plan	Yes
Elevation Certificates	Yes
Grant writer (part-time or full-time)	No
Public Information Officer	Yes
Floodplain Manager	Yes
Volunteer Fire Service	Yes
Full Time Fire Service	No
School Resource Officers (SROs)	Yes
Law Enforcement	Yes
Emergency Manager	Yes
GIS Personnel	Yes
Capital improvements project funding	Yes
Fees for utility services	Yes
Impact fees for new development	No
General obligation bonds	Yes
Withhold spending in hazard-prone areas	Yes

Chapter 2: Hazard and Risk Assessment

2.1 Risk Assessment Overview

Hazard Mitigation Planning is about developing a strategy to reduce risk in the long term. An essential part of the process is identifying hazards, risks, impacts and vulnerabilities. In mitigation planning, "risk" is the potential for damage or loss when a hazard interacts with an asset. Assets can be people, buildings, infrastructure, the economy, or natural and cultural resources.

The risk assessment helps communicate vulnerabilities, develop priorities, and inform decision making. It is the factual basis for the mitigation strategy. The hazards and associated impacts in the risk assessment should be the hazards and impacts the mitigation strategy seeks to address. If, for example, the risk assessment shows that the state will have hurricane damage in a specific area, the mitigation strategy should include actions to protect state assets and jurisdictions, especially underserved communities, and socially vulnerable populations, in those areas.



The Metropolitan Lynchburg/Moore 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. Hazard data from the ETSU Geoinformatics & Disaster Science Lab was also analyzed as related to the changing weather trends and their significance. 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. Any hazard that has two or more green lifeline categories is considered a low risk for damage and therefore, will not be providing mitigation actions for those specific hazards.

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 Metropolitan Lynchburg/Moore County to identify known hazards. *Table 9* presents a list of all major disaster and emergency declarations that have occurred in Metropolitan Lynchburg/Moore County since 1953, illustrating which hazards pose the greatest risk to the County.

Table 9: Presidential Disaster Declarations in Metropolitan Lynchburg/Moore County (1953-2023)

Declaration #	Date	Event Details	Individual Assistance	Public Assistance
DR-4712-TN	3/1/2023	Severe Storm	None	PA, A-G
DR-4601-TN	3/25/2021	Tornado	None	PA, A-G
DR-4594-TN	2/11/2021	Severe Ice Storm	None	PA, A-G
DR-4514-TN	1/20/2020	COVID 19 Pandemic	Yes	PA-B
DR-4427-TN	2/19/2019	Flood	None	PA, A-G
DR-4211-TN	2/15/2015	Severe Ice Storm	None	PA, A-G
DR-4189-TN	6/5/2014	Severe Storm	None	PA, A-G
DR-1974-TN	4/25/2011	Severe Storm	None	PA, A-G
DR-1965-TN	2/28/2011	Severe Storm	None	PA, A-G
DR-1260-TN	12/23/1998	Severe Storm	None	PA, A-G
DR-1010-TN	2/9/1994	Severe Storm	None	PA, A-G
DR-366-TN	3/21/1973	Flood	Yes	PA, A-G

Table 10 documents the hazards of interest to Metropolitan Lynchburg/Moore County and the decision to re-evaluate or delete them from this plan update. The hazards of concern were altered as necessary to ensure the Metropolitan Lynchburg/Moore County Hazard Mitigation Plan is in accordance with the Tennessee Mitigation Strategy.

Table 10: Overview of Updates to Chapter 2: Risk and Vulnerability Assessment

Tennessee 2018 Mitigation Strategy	Metropolitan Lynchburg/Moore County 2019 HMP	Status	Metropolitan Lynchburg/Moore County 2025 HMP Update
Communicable Disease	Not a Hazard of Prime Concern	Evaluated	Not a Hazard of Prime Concern
Dam Failure	Not a Hazard of Prime Concern	Evaluated	Not a Hazard of Prime Concern
Drought	Hazard of Prime Concern	Re-evaluated	Hazard of Prime Concern
Earthquakes	Hazard of Prime Concern	Re-evaluated	Not a Hazard of Prime Concern
Extreme Temperatures	Not a Hazard of Prime Concern	Re-evaluated	Hazard of Prime Concern
Flooding	Hazard of Prime Concern	Re-evaluated	Hazard of Prime Concern
Geological Hazard	Not a Hazard of Prime Concern	Evaluated	Not a Hazard of Prime Concern
Hazardous Materials Release	Not a Hazard of Prime Concern	Evaluated	Not a Hazard of Prime Concern
Infrastructure	Not a Hazard of	Evaluated	Not a Hazard of

Incident	Prime Concern		Prime Concern
Terrorism	Not a Hazard of Prime Concern	Evaluated	Not a Hazard of Prime Concern
Tornadoes	Hazard of Prime Concern	Re-evaluated	Hazard of Prime Concern
Severe Weather (thunderstorms, lighting, hail)	Hazard of Prime Concern	Re-evaluated	Hazard of Prime Concern
Wildfire	Hazard of Prime Concern	Re-evaluated	Not a Hazard of Prime Concern

Summary of changes in the 2025 plan update:

- Earthquakes, Wildfires, and freezes were removed from the plan.
- Winter storms were added to the severe weather section.

The complete list of hazards to be addressed in this 2025 Plan Update includes:

- Drought
- Flooding
- Extreme Temperature
- Severe Weather
- Tornadoes

2.2 Drought

2.2.1 Hazard Overview

Drought is a deficiency in precipitation over an extended period. It is a standard, recurrent feature of climate that occurs in virtually all climate zones. The duration of droughts varies widely. In some cases, drought develops relatively quickly and lasts a very short time, exacerbated by extreme heat and/or wind. 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.

Table 11: Drought Classifications

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

The wide variety of disciplines affected by drought, its diverse geographical and temporal distribution, and the many scales drought operates on make it difficult to develop 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 and the Standardized Precipitation Index help describe the many scales of drought.

- The **U.S. Drought Monitor** summarizes 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) measures drought, which differs from the Palmer Drought Index (PDI). Like the PDI, this index is negative for lack 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 (rain), 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 the most effective for unirrigated cropland. It primarily reflects the Perry-term drought and has been used extensively to initiate drought relief. It is more complex than the SPI and the Drought Monitor.

2.2.2 County Profile

According to the PDSI map shown in *Figure 1*, Middle Tennessee has a relatively low risk of drought hazards. 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.

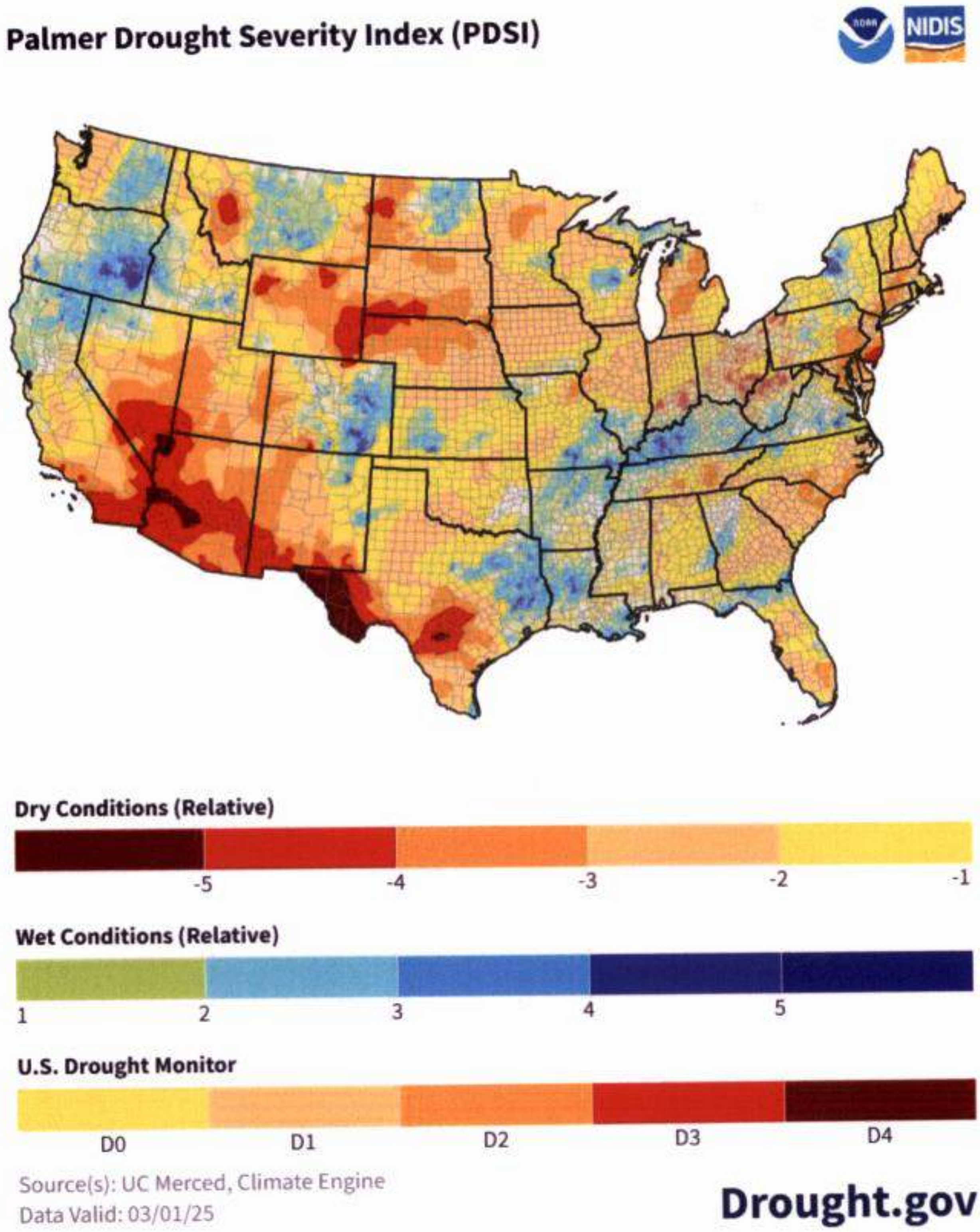


Figure 1 - Palmer Drought Map

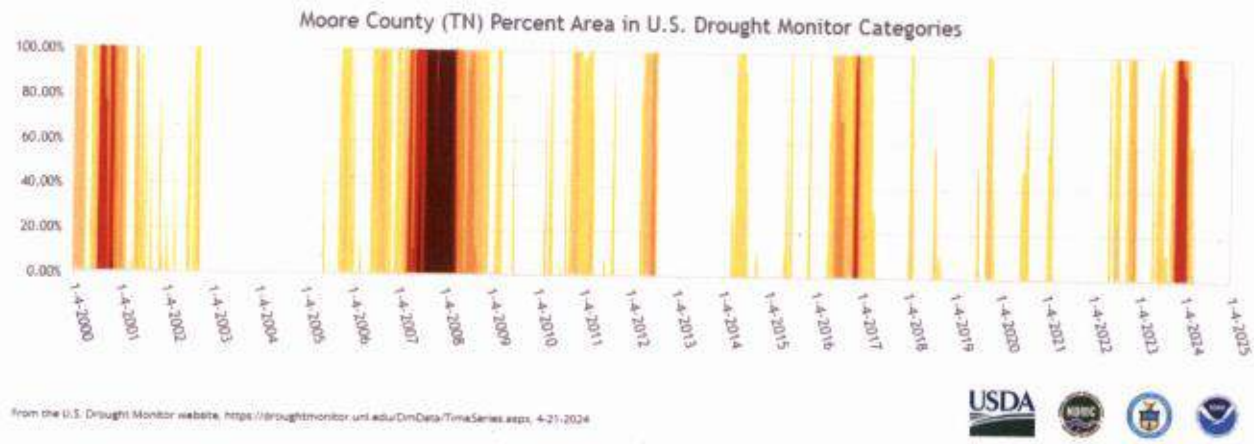


Figure 2 - Drought Monitor Time Series (Source: National Drought Mitigation Center)

Figure 2 above illustrates drought conditions within Metropolitan Lynchburg/Moore County between 2000 and 2025. According to the National Drought Mitigation Center, the last Extreme Drought (D4) period occurred in 2007. D4 (extreme drought) is categorized by browning grass, low lake levels, municipality water restrictions, and increased water prices. D0 (abnormally dry) conditions consist of hard ground and declining agriculture ponds and creeks. A table containing all NOAA-recorded drought events between 1950 - 2024 for Moore County is included in Appendix C.

Event Narrative 1 (As written by the National Weather Service):

- Episode Narrative: "March, traditionally the wettest month of the year, was instead one of the driest on record in 2007. Rainfall totals were less than two inches across the entire Central Tennessee Valley, with some areas seeing less than an inch. Normal rainfall for March is six to seven inches. By the end of the month, a significant portion of the area had been downgraded to D3 (Extreme Drought) status on the U.S. Drought Monitor. As a result, NWS Huntsville began issuing the drought statement at least twice per week. A few small grass fires developed during this period, but no known damages or injury reports were received."

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: " The U.S. Drought Monitor continued to improve ongoing drought conditions from November 2023 to now with abundant rainfall occurring in December and January. While no changes were made from the December 28th issuance for the first Drought Monitor issuance of 2024 on January 4th, rainfall across the area for the first half of January benefited drought-stricken regions. No changes were made from the issuance on the 4th or 11th in Southern Middle TN. Much more improvement was noted by the issuance on the 18th, when Extreme Drought (D3) Conditions were removed from all 3 Southern Middle TN Counties of Lincoln, Franklin, and Moore. Severe Drought (D2) Conditions accounted for the vast majority of the Drought Declarations in Southern Middle TN at this time, with Moderate Drought (D1) Conditions expanding to the NW across portions of Franklin, Lincoln, and Moore Counties. Further improvement was noted by the issuance on the 25th, where conditions were degraded down to Abnormally Dry (D0) across portions Franklin and Lincoln Counties. At this point, D2 was removed from Franklin in its entirety, with only a sliver remaining in far NW Moore County, TN.

By the final issuance for the month of January on the 30th, all categories were reduced by one level, with no areas included in D2 for the first time in 3 months. With this issuance, all counties in Southern Middle TN will be removed from Storm Data as having any Drought Declarations of D2 or higher (triggering their inclusion in Storm Data)."

Event Narrative 3 (As written by the National Weather Service):

- Episode Narrative: "Some normal to above normal rainfall fell across the Central Tennessee Valley during October. The first fifteen days of the month were essentially rain-free, except for a few spotty light showers that amounted to a tenth of an inch or less where they did occur. Temperatures, for the most part, stayed well above normal for the first half of the month as well. Periodic rain began during the second half of the month as the storm track moved southward over the area. The major event of the month was a slow-moving upper low that parked over the area from the 22nd through the 25th. October rain amounts ranged from one to three inches in Moore, Franklin and Lincoln Counties, the heaviest of which fell in Lincoln County. The rain was a nice short-term situation but dry conditions quickly reestablished by the end of the month. Exceptional drought (D4) improved slightly to the Extreme (D3) category in northwest portions of Moore and Lincoln Counties."

Probability Future Events – Likely (approximately every other year to every three years)
The probability of Moore County and its municipalities experiencing a drought event can be challenging to quantify but based on the historical record of 34 droughts since 1950; it can reasonably be assumed that this type of event has occurred every few years. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

2.2.3 Risk Assessment

Moore County is vulnerable to drought; however, estimated potential losses are inherently difficult to calculate because drought tends to cause minor damage to the built environment. Therefore, it is assumed that 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 more 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 through human intent, accident, or lightning can start a wildfire.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census preformed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Drought = Very Low

Although the National Risk Index is a well-valued tool it fails to properly show the feedback from the participating jurisdictions. Therefore, all identified hazards were evaluated regarding risk in FEMA lifelines for the single jurisdiction. The scenario that Metropolitan Lynchburg/Moore County would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

Table 12: Drought Risk based on selected FEMA Lifelines

Drought Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Metropolitan Lynchburg/Moore County	Green	Red	Yellow	Yellow	Green	Green	Green	Red

Colors indicate lifeline or component conditions:	
Red	Significant Impact, Multiple Required Resources
Yellow	Some Impact, Some Outside Resources Required
Green	Little to No Impact, No Outside Resources Required

Given the information above, it becomes vital that all participating jurisdictions are able to prioritize the mitigation actions in the following lifeline categories so that they can become more resilient to the whole community that they serve.

2.2.4 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, leading to increased impervious areas. An increase in population may also put increasing pressure on water and other natural resources, particularly during periods of drought. Therefore, future development could impact drought vulnerability in Metropolitan Lynchburg/Moore County.

2.2.5 Multi-Jurisdictional Differences

Due to the nature of drought, Metropolitan Lynchburg/Moore County and the incorporated jurisdictions are equally susceptible to drought conditions.

2.2.6 Effect on Vulnerable Populations

As is typical, vulnerable populations are unequally impacted by this hazard by reduction in recreational opportunities, accessibility, and significant increases in other negative health outcomes like dehydration or heat stroke.

2.2.7 Summary

Metropolitan Lynchburg/Moore County and all incorporated jurisdictions are equally vulnerable to drought. With historical frequency considered there is a significant chance of this event occurring every other year to every three years. 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 associated with drought—they become fuel for wildfires. Metropolitan Lynchburg/Moore County 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.

2.3 Extreme Temperatures

2.3.1 Hazard Overview

Heat Waves

Excessive Heat is when the heat index reaches at least 105ºF for at least three hours on two consecutive days, and the nighttime air temperature does not drop below 75ºF. The definition of Excessive Heat is a "rule of thumb" because the detrimental effects of high temperatures and humidity vary among segments of the population (old, young, etc.) and whether the population, in general, has built up a heat tolerance (residents in desert communities fair better than visitors). While some may be better able to cope with Excessive Heat as defined, others may still be adversely affected by a lower heat index. A "rule of thumb" works for mitigation planning because the benefits of specific mitigation actions start accruing before conditions reach Excessive Heat levels. Exposure to extreme heat can pose health risks, including sunburn, dehydration, heat cramps, and heat stroke.

The National Weather Service Heat Index calculates how hot it feels when relative humidity is factored in with the actual air temperature using a 4-factor scale: caution, extreme caution, danger, extreme danger. The National Weather Service (NWS) also issues Heat Alerts.

- A Heat Advisory is issued 12-24 hours before the onset, at least 100ºF but less than 105ºF for at least 2 hours.
- An Excessive Heat Watch is issued when temperatures of 105ºF or greater are forecasted for the next 24 to 72 hours.
- An Excessive Heat Warning is issued when temperatures of 105°F last for more than 3 hours per day for two consecutive days or temperatures exceed 115°F for any period.

NWS Heat Index — Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Figure 3 – National Weather Service Heat Index

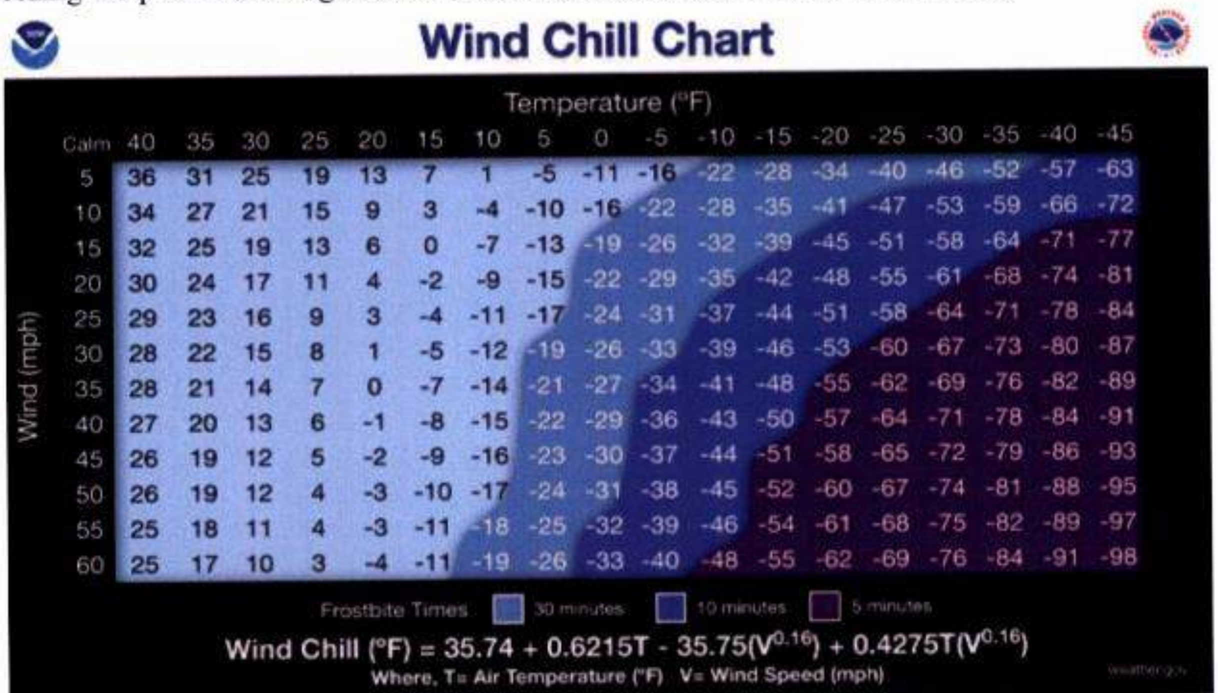
Cold Wave

Extreme cold temperatures occur during the winter months and typically accompany winter storm events. Extended periods of extremely cold temperatures result from the movement of high-pressure systems into the United States. When Arctic air masses are present, extreme winter temperatures hover over Tennessee.

The National Weather Service (NWS) issues the nation's Wind Chill Warning, Watch, and Advisory:

- Wind Chill Warning: NWS issues a wind chill warning when dangerously cold wind chill values are expected or occurring.
- Wind Chill Watch: NWS issues a wind chill watch when dangerously cold wind chill values are possible.
- Wind Chill Advisory: NWS issues a wind chill advisory when seasonably cold wind chill values, but not extremely cold values, are expected or occurring.

The National Weather Service Wind Chill Chart calculates the danger from winter winds and freezing temperatures using a 3-factor time-based scale (30 min, 10 min, 5 min).


Wind Chill Chart

Temperature (°F)

Wind (mph)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Figure 4 – National Weather Service Wind Chill Chart

2.3.2 County Profile

The following figure provides extreme temperature event information for Metropolitan Lynchburg/Moore County. The threat index for Metropolitan Lynchburg/Moore County is low.

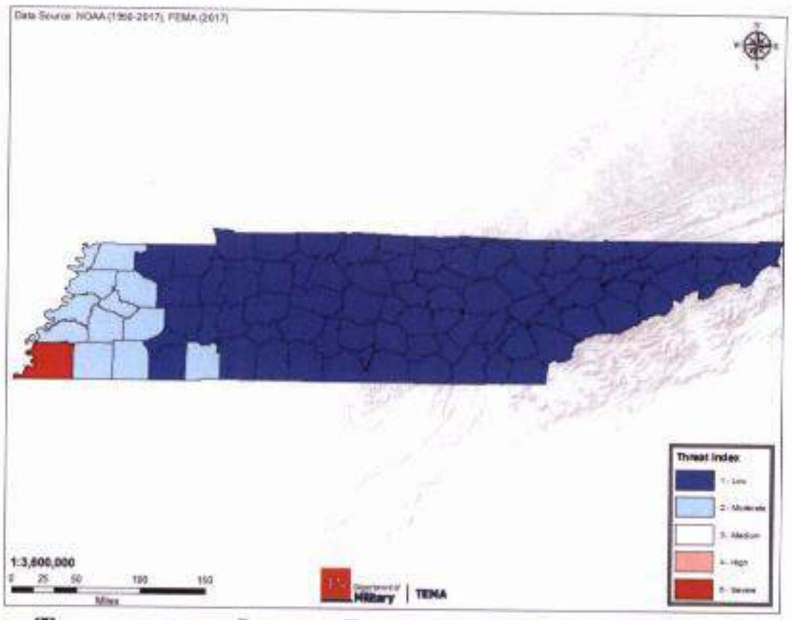


Figure 5 - Extreme Temperatures Impact Density (Source: 2018 Tennessee Hazard Mitigation Plan)

The following narratives were obtained via the NOAA Storm Event Database for Cold/Wind Chill, Excessive Heat, and Extreme Cold/Wind Chill. A table containing all NOAA-recorded events between 1950-2024 for Metropolitan Lynchburg/Moore County is included in Appendix C. The first recorded event was in 2009, suggesting that data was not collected prior.

Event Narrative 1 (As written by the National Weather Service):

- Episode Narrative: "A very hot period occurred during the last week of June. Maximum temperatures climbed to 100 degrees or higher on the 28th through 30th in Winchester, the 28th through 30th at Fayetteville, and on the 29th and 30th at Lynchburg. Even on the Cumberland Plateau, the temperature reached 101 degrees at Sewanee on the 30th. At Lynchburg, the temperature reached 108 degrees."

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: "A record cold airmass overspread the region beginning on the evening of January 5th as a strong cold front moved through. Rain changed to a brief period of sleet and snowfall from the late afternoon into the evening of the 6th producing a dusting of accumulation at most locations. However, 1 to 2 inches of snow fell on the Cumberland Plateau in Franklin County. Temperatures only climbed into the single digits and teens on the 6th and dropped into the zero to 10 above range for lows on the 7th. Northwest to north winds behind the front produced very low wind chills into the zero to 10 below range on the 6th, and 10 to 15 below zero, during the morning hours of the 6th, and again during the evening of the 7th."
- Event Narrative: "Wind chills of -1 to -9 degrees were observed."

Event Narrative 3 (As written by the National Weather Service):

- Episode Narrative: "An Arctic airmass overspread the region after the recent snowfall. North winds combined with the very cold temperatures to produce dangerous cold weather from the 16th into the 17th. During the morning of the 16th, wind chill values dropped into into the 0 to -10 degree range. During the overnight of the 16th into the morning of the 17th, temperatures dropped into the 0 to -12 degree range for morning lows. Although winds were light, wind chill values dropped briefly (less than an hour) into the -10 to -15 degree range."

- Event Narrative: "The overnight low temperature dropped to -12 degrees at Lynchburg. Although winds were light or calm most of this time period, the wind chills dropped briefly into the -10 to -15 degree range."

Probability of Future Events – Likely (one to two times per year)
The probability of Metropolitan Lynchburg/Moore County and its participating jurisdictions experiencing extreme temperature variations is difficult to predict but based on the historical record of events since 1950; it can reasonably be assumed that this type of event can occur frequently; 21 events over a 16-year period. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

2.3.3 Risk Assessment

In the county, road traveling conditions, electrical lines, human health, and agricultural functions are some of the most vulnerable features. The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state, and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census preformed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Cold Waves = Relatively Low
National Risk Index Score for Hot Waves = Very Low

Although the National Risk Index is a well-valued tool it fails to properly show the feedback from the participating jurisdictions. Therefore, all identified hazards were evaluated regarding risk in FEMA lifelines for the single jurisdiction. The scenario that Metropolitan Lynchburg/Moore County would evaluate the conditions off of was mid-level impact of the identified hazard. The results are below:

Table 13: Extreme Temperature Risk based on selected FEMA Lifelines

Extreme Temperatures Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Metropolitan Lynchburg/Moore County	Red	Red	Red	Yellow	Green	Yellow	Green	Red

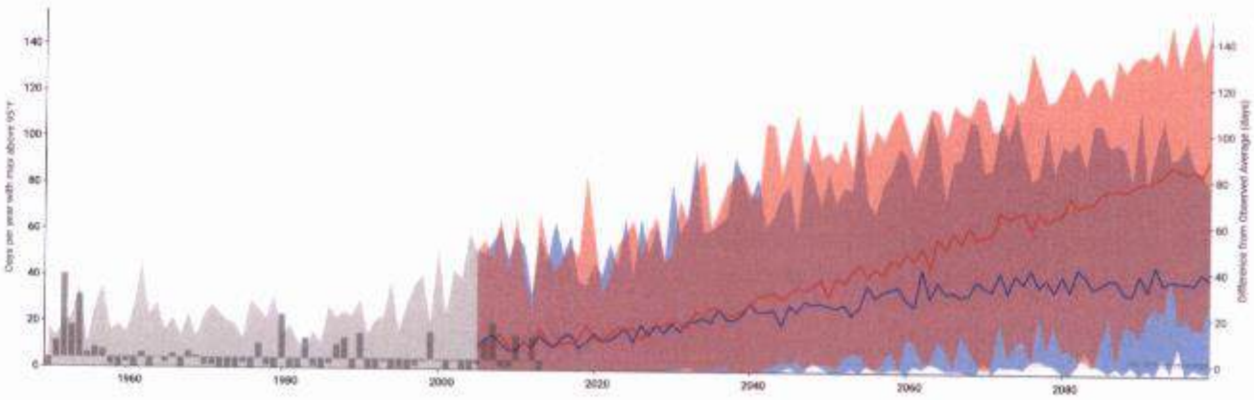
Colors indicate lifeline or component conditions:	
Red	Significant Impact, Multiple Required Resources
Yellow	Some Impact, Some Outside Resources Required

Green	Little to No Impact, No Outside Resources Required

Given the information above it becomes vital that all participating jurisdictions can prioritize the necessity of mitigation actions in the following lifeline categories so that they can become more resilient in the whole community that they serve.

Future Heat Events and Social Vulnerability

The cross-examination of NOAA Future Heat Events and CDC Social Vulnerability Index (2018) indicates that in 2030, Metropolitan Lynchburg/Moore County will have a projected maximum of 24 total days with temperatures over 95 degrees. Multiple determinates such as socioeconomic status, household composition, disability, minority status, language, housing, and transportation heavily indicate how an individual will be affected by extreme temperatures. Individuals within vulnerable or underserved populations are not only more likely to experience the effects of extreme temperatures but also likely to be impacted to a higher degree than their counterparts.



2.3.4 Land Use and Development

Extreme temperature events have significant or even catastrophic impacts on property and critical infrastructure. Metropolitan Lynchburg/Moore County is interested in protecting facilities, property, and infrastructure owned and managed by the jurisdictions. Disasters can damage not only private property but government property as well, placing a financial and operational burden on the County. Losses can extend from structures and contents to the interruption of services and the general economy. Many of these structures could receive indirect impacts, such as downed electrical lines that cut off electricity to the facilities, frozen pipelines that crack, destroyed crops, and customers not being able to access travel to the structures due to ice-covered roads.

2.3.5 Multi-Jurisdictional Differences

Due to the nature of extreme temperatures, all of Metropolitan Lynchburg/Moore County is susceptible. The entire State is vulnerable to extreme temperatures. Varying land elevations, the landscape's character, and proximity to large bodies of water play a significant role in the State's temperatures.

2.3.6 Effect on Vulnerable Populations

As is typical, vulnerable populations are unequally impacted by this hazard due to a variety of increased risk factors. Both extreme cold and warm temperatures can cause vulnerable populations like the elderly to succumb to natural health complications more easily such as hypothermia and heat stroke or dehydration. Additionally, for populations like the blind, simple travel can become more dangerous as conditions become more hazardous. While the seeing population can more easily avoid hazards such as ice buildup, blind populations are less likely to identify these hazards before necessary.

2.3.7 Summary

Metropolitan Lynchburg/Moore County is equally vulnerable to extreme temperatures, affecting people's health and safety. Therefore, it is essential to have proper measurements in place to prevent critical structures from being vulnerable to utility failure during extreme temperatures.

2.4 Flood

2.4.1 Hazard Overview

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 rain through ponding on the surface. Floods in Metropolitan Lynchburg/Moore County are usually caused by rain and may also be caused by snowmelt and man-made incidents.

The area adjacent to a channel is the floodplain, as shown in *Figure 6*. 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 do not experience a strong current. Floodplains are made when floodwaters exceed the capacity of the main channel or escapes 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 stream's bed.

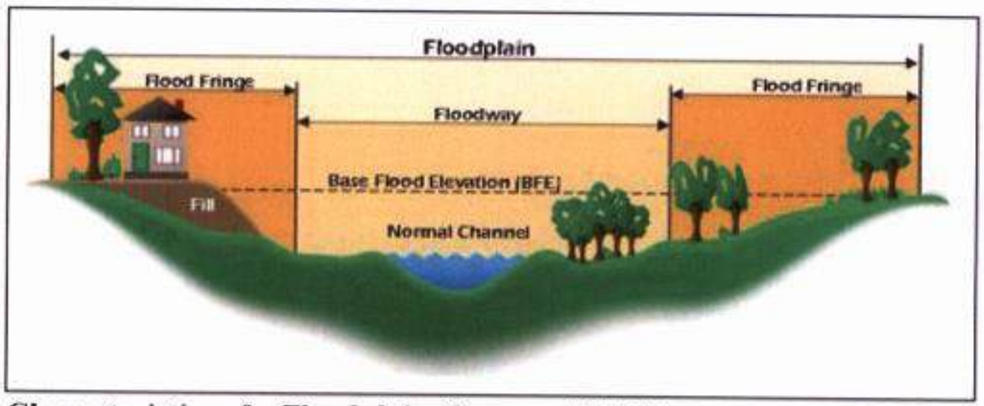


Figure 6 - Characteristics of a Floodplain (Source: FEMA)

Three general health hazards common to flood events:

1. Floodwaters carry anything on the ground that the upstream runoff picked up, including dirt, oil, bacteria, animal waste, lawn, farm, and industrial chemicals. Pastures and areas where farm animals are kept or their wastes are stored can contribute to polluted waters in 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 flood waters dilute it, raw sewage can be a breeding ground for bacteria such as *E. coli* and other disease-causing agents.
2. The second health problem arises after most water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet building areas that have not been adequately 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 adequately 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

Table 15: NFIP Policy Data

NFIP Policy Data for Moore County				
Jurisdiction	**CID Number**	**Policies In-Force**	**Insurance In-Force Whole $**	**Written Premium In-Force**
Metropolitan Lynchburg/Moore County	470138	10	$2,578,000	$8,639

Policies In-force: number of NFIP flood insurance policies
Insurance In-force whole $: the 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 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. Severe repetitive loss is defined as a facility or structure that has experienced four or more insurance claims exceeding $5,000 or two claims exceeding the value of the building. Within the NFIP, flood loss properties are usually considered the most vital structures to mitigate. The chart below provides a summary of repetitive and severe repetitive losses for Metropolitan Lynchburg/Moore County.

Table 16: NFIP Loss Data

NFIP Loss Data for Moore County					
Jurisdiction	**Total Losses**	**Closed Loses**	**Open Loses**	**CWOP Loses**	**Total Payments**
Metropolitan Lynchburg/Moore County	RL: 0	0	0	0	0
	SRL:0	0	0	0	0

RL: Repetitive Loss
SRL: Severe Repetitive Loss
Total Losses: number of flood insurance claims filed 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

Over the past ~27 years, there have been approximately 28 flooding events in Metropolitan Lynchburg/Moore County. A table of NOAA-reported flooding events is in Appendix C. The following narratives were obtained via the NOAA Storm Event Database. Typically, only events resulting in injury, death, or extensive damage (greater than $200.0K property/crop damage) are included as expanded narratives in Tennessee. However, Metropolitan Lynchburg/Moore County does not have any recorded data that fits these criteria. As such, three events with details provided by the National Weather Service were included.

Event Narrative 1 (As written by the National Weather Service):

- Episode Narrative: "17 counties in Tennessee requested federal assistance due to the flooding. The counties are Anderson, Bedford, Cannon, Coffee, Cumberland, Fentress, Giles, Hardin, Jackson, Lawrence, Lewis, Lincoln, McNairy, Maury, Putnam, Warren and Wayne. Doppler radar estimated as much as 6 to 8 inches of rain fell over the southern part of Middle Tennessee during this flood event."
- Event Narrative: "Highway department reported streams and creeks were out of their banks but not on the roads. 2 homes were damaged."

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: "The White House granted Governor Phil Bredesen's request for Presential Disaster Declaration for 20 counties in West and Middle Tennessee for damage as a result of tornadoes, flooding and severe thunderstorms which began on Sunday, May 4, 2003."
- Event Narrative: "News story mentioned that Mulbery Creek was out of its banks on Tuesday. Wiseman Park in Lynchburg was under water, including the ball field and horse show grounds. Flood waters got into the storage buildings located near the Moore County Farm Bureau's office and also into the garages of nearby homes."

Event Narrative 3 (As written by the National Weather Service):

-

Table 17: Flooding Extent History

Location	Extent & Impact	Event Date
Metropolitan Lynchburg/Moore County	On April 4th, 2008, Metropolitan Lynchburg/Moore County experienced a flooding event that was detailed by the National Weather Service and the local newspaper. The NWS states that one to three inches of rainfall fell during the first and third setting stage during a flash flood. Thunderstorms produced an additional one to three inches of rainfall over most of the county. This heavy rainfall led to about one to four inches of water in places like Wiseman Park and resulted in the closure of Goosebranch Road. This occurred in the period of about two hours.	April 4th, 2008, from 0800-1000

Probability of Future Events – Very Likely (28 events in 26 years)

The impact of extreme weather events may increase the frequency and intensity of flash flooding within Tennessee, particularly in highly urbanized regions such as Memphis, Nashville, Knoxville, and Chattanooga. Any area with extreme changes in deep terrain, predominantly in East Tennessee, will experience significant flooding impacts.

Based on a historical record of 28 flood events over 26 years (1998 - 2024), there is a likelihood for a flood event to occur annually or semiannually. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

2.4.3 Risk Assessment

The HMPC meeting cited flooding 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 risks, such as the private mitigation efforts that Jack Daniel's Distillery has taken to reduce flooding at the front end of their establishment. Future projects were also discussed at this time and can be found in the Mitigation Action Plan.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census preformed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Flooding = Very Low

Although the National Risk Index is a well-valued tool it fails to properly show the feedback from the participating jurisdictions. Therefore, all identified hazards were evaluated regarding risk in FEMA lifelines for the single jurisdiction. The scenario that Metropolitan Lynchburg/Moore County evaluated the conditions off of was a mid-level impact of the identified hazard. The results are below:

Table 18: Flooding Risk based on selected FEMA Lifelines

Flooding Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Metropolitan Lynchburg/Moore County	Red	Yellow	Red	Green	Green	Red	Green	Yellow

Colors indicate lifeline or component conditions:	
Red	Significant Impact, Multiple Required Resources
Yellow	Some Impact, Some Outside Resources Required
Green	Little to No Impact, No Outside Resources Required

Given the information above it becomes vital that all participating jurisdictions can prioritize the necessity of mitigation actions in the following lifeline categories so that they can become more resilient in the whole community that they serve.

HAZUS Data and Methodology

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

Building Inventory (General Building Stock)

HAZUS estimates that 3,583 buildings in the region have an aggregate total replacement value of 1,503 million US dollars.

- **Essential Facility Inventory:** HAZUS indicates that there are no hospitals in the region. There are three schools, six fire stations, one police station, and two emergency operation centers.
- **General Building Stock Damage:** For the 100-year flood scenario, HAZUS estimates that about one building will be at least moderately damaged. There are estimated to be no buildings that will be destroyed completely.

Debris Generation

- ***100-year Scenario:*** The model estimates that a total of 61 tons of debris will be generated. Of the total amount, Finishes comprised 74% of the total, Structure comprises 14% of the total, and Foundation comprises 12%. If the debris tonnage is converted into an estimated number of truckloads, it will require three truckloads (25 tons/truck) to remove the debris generated by the flood.

- ***500-year Scenario:*** The model estimates that a total of 160 tons of debris will be generated. Of the total amount, Finishes comprises 54% of the total, Structure comprises 26% of the total, and Foundation comprises 21%. If the debris tonnage is converted into an estimated number of truckloads, it will require seven truckloads (25 tons/truck) to remove the debris generated by the flood.

Shelter Requirements

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

- ***100-year Scenario:*** The model estimates 19 households (or 58 people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 10 people (out of a total population of 6,446) will seek temporary shelter in public shelters.
- ***500-year Scenario:*** The model estimates 29 households (or 88 people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 18 people (out of a total population of 6,446) will seek temporary shelter in public shelters.

2.4.4 Land Use and Development

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

2.4.5 Multi-Jurisdictional Differences

Flooding affects all jurisdictions differently; that is why it is essential to document the depth, duration, and time that flooding occurred. These differences are noted in past occurrences to demonstrate the toll that flooding can take on the county's rural and urban areas. Due to the topography of Moore County with its rolling hills and deep valleys, flood events are prone to occur near the streams within the county. FIRM Panels are located within Appendix D to help illustrate the areas at risk and depth of flooding within the county and its incorporated jurisdictions.

Intersections & Roads that consistently flood in Metropolitan Lynchburg/Moore County:

- **Main Street by EOC.**
- **Highway 129.**
- **Goose Branch.**
- **Motlow Barns Road.**
- **Cashion Road.**
- **Buckeye loop.**

Waterways that are prone to flooding in Metropolitan Lynchburg/Moore County:

- **Elk River**

2.4.6 Effect on Vulnerable Populations

As is typical, vulnerable populations are unequally impacted by this hazard due to a variety of increased risk factors. Flooding makes access to medical care very difficult, basic transportation more dangerous, and can create conditions that are harder for vulnerable populations to escape from when at risk. Flooding impacts many areas of the FEMA lifelines which are more important for the well-being of our vulnerable populations in Metropolitan Lynchburg/Moore County.

2.4.7 Summary

Severe flooding has the potential to inflict significant damage in Metropolitan Lynchburg/Moore County. The total economic loss estimated for the 100-year riverine flood is $18.57 million. The total economic loss estimated for the 500-year riverine flood is $29.86 million. Residential, commercial, and public buildings and critical infrastructures 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 contaminate local water bodies. Flooding kills animals and, in general, disrupts the ecosystem. Snakes and insects may also make their way to the flooded areas.

2.5 Severe Weather

2.5.1 Hazard Overview

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 greater than 35,000 ft. Thunderstorms are responsible for developing and forming many severe weather phenomena, posing significant hazards to the population and landscape. Damage 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

All jurisdictions are vulnerable to receiving damage from severe winds. The NOAA Storm Data Preparation document categorizes wind into three different types, as defined below.

- 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.

Historically, severe wind events occur multiple times yearly in Metropolitan Lynchburg/Moore County. It is not unusual for Metropolitan Lynchburg/Moore County to experience wind speeds up to 50mph, causing structural damage, power outages, and downed trees. Based on a historical record of 199 wind events over 53 years (1971- 2024), the historic frequency calculates a 100% chance of this event occurring yearly.

loses pressure, a boil order may be issued to protect people and animals from contaminated water.

3. The third problem is the long-term psychological impact of experiencing a flood and seeing one's home damaged and personal belongings destroyed. The cost and labor needed to repair a flood-damaged home severely strain people, especially the unprepared and uninsured. There is also a long-term problem for those who know 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.

2.4.2 County 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 developed by 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 multi-hazard risks to prepare for emergency response and recovery.

Table 14: Mapped Flood Insurance Zones

Flood Hazard Area	Description
HAZUS (100-yr)	Areas subject to inundation by the 1-percent-annual-chance flood event are generally determined using approximate methodologies. Mandatory flood insurance purchase requirements and floodplain management standards apply.
HAZUS (500-yr)	A 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.

Moore County 100yr Flood

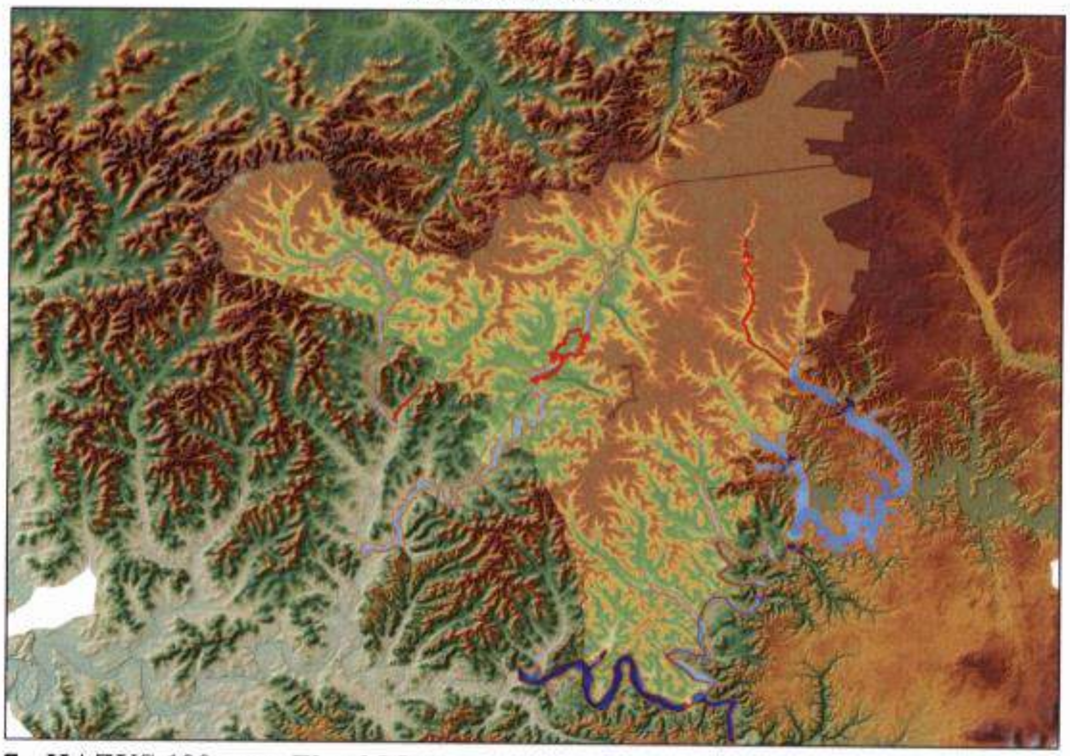


Figure 7 - HAZUS 100-year Flood Map

Moore County 500yr Flood

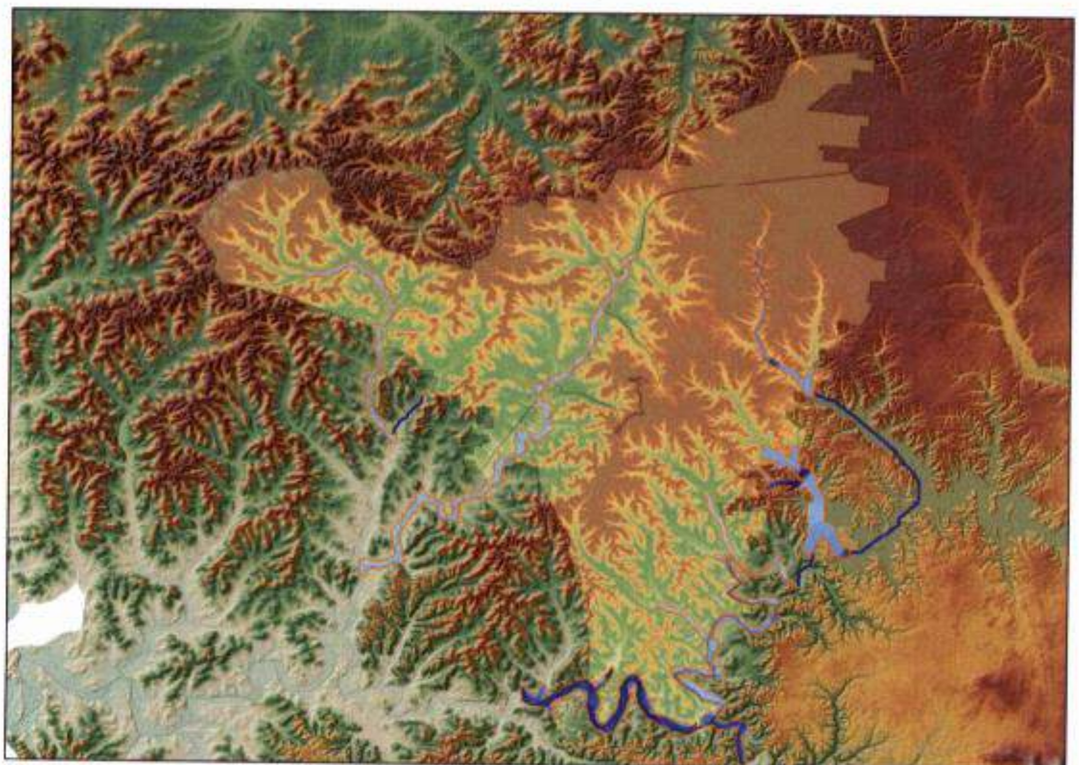


Figure 8 - HAZUS 500-year Flood Map

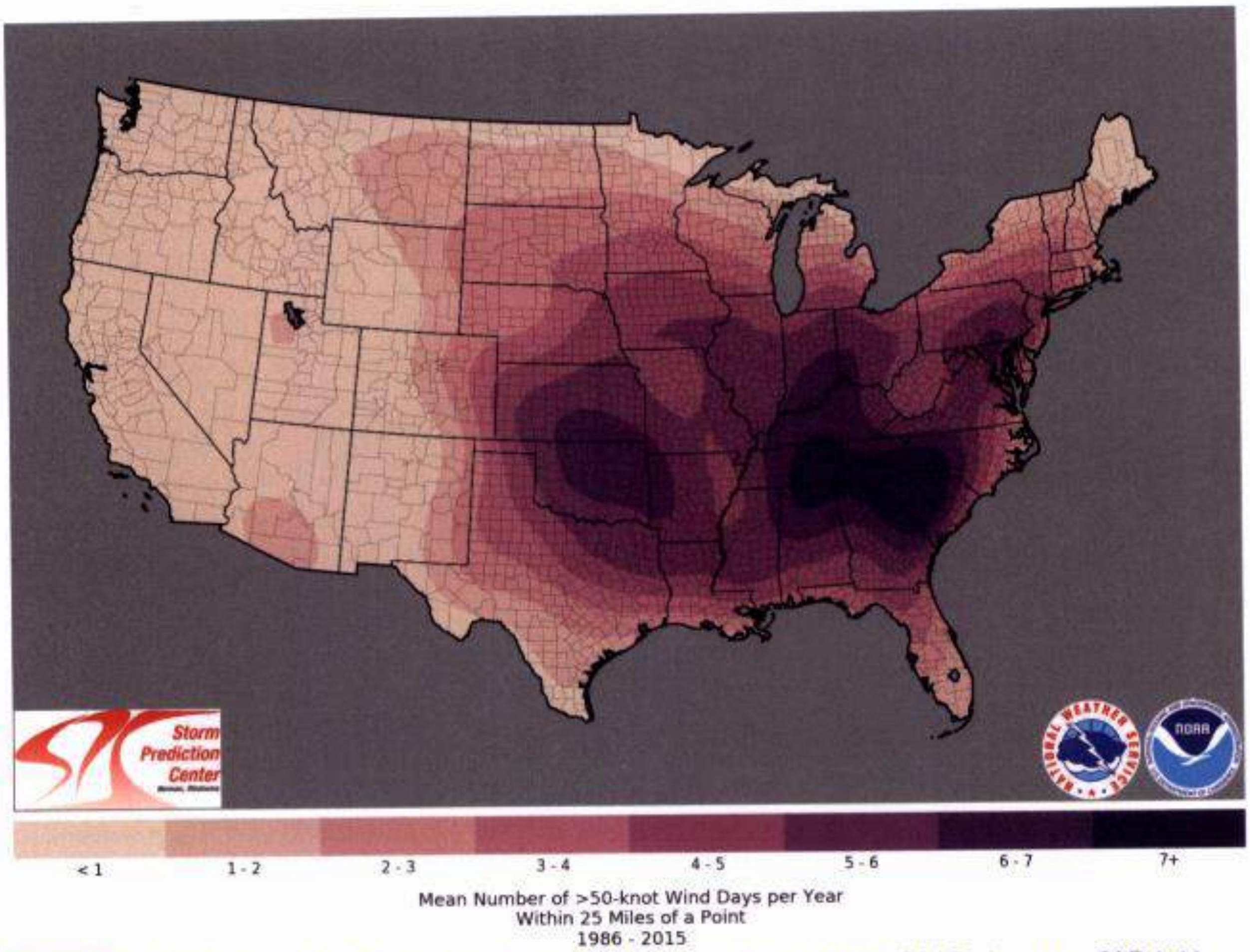


Figure 9 - Mean Number of >50-knot Wind Days per Year (1986-2015) (source: NOAA)

Hail

Hail forms when updrafts carry raindrops into icy areas of the atmosphere, where they freeze into ice. Hailstorms occur throughout spring, summer, and fall 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 yearly in the United States. *Table 19* provides an overview of the typical impacts on a community related to hailstone size.

Table 19: 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. Lightning is one of the more dangerous weather hazards in the United States. Annually, 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 annually. The institute estimates property damage, increased operating costs, production delays, and lost revenue from lightning and secondary effects to be more than $6 billion annually. Impacts can be direct or indirect. People or objects can be struck or damaged when the current passes through or nearby.

Winter Weather

A freeze occurs when temperatures are below 32 degrees Fahrenheit for a period. These temperatures can damage 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 Metropolitan Lynchburg/Moore County, the whole community is vulnerable to freezes and moderate winter storms, but not to the severity level seen in much of the northern U.S. Based on previous occurrences, Metropolitan Lynchburg/Moore County can experience multiple winter weather events in one year affecting the whole community equally. The severity of winter storms is commonly measured by inches of snowfall. However, in Metropolitan Lynchburg/Moore County, snowfall is typically no more then a "dusting" or a few inches. Ice accumulations can also cause hazardous conditions due to proximity to and around mountainous terrain. U.S. Mean snowfall per year is from 6-12" annually. Average mean snowfall per year is below in *Figure 10.*

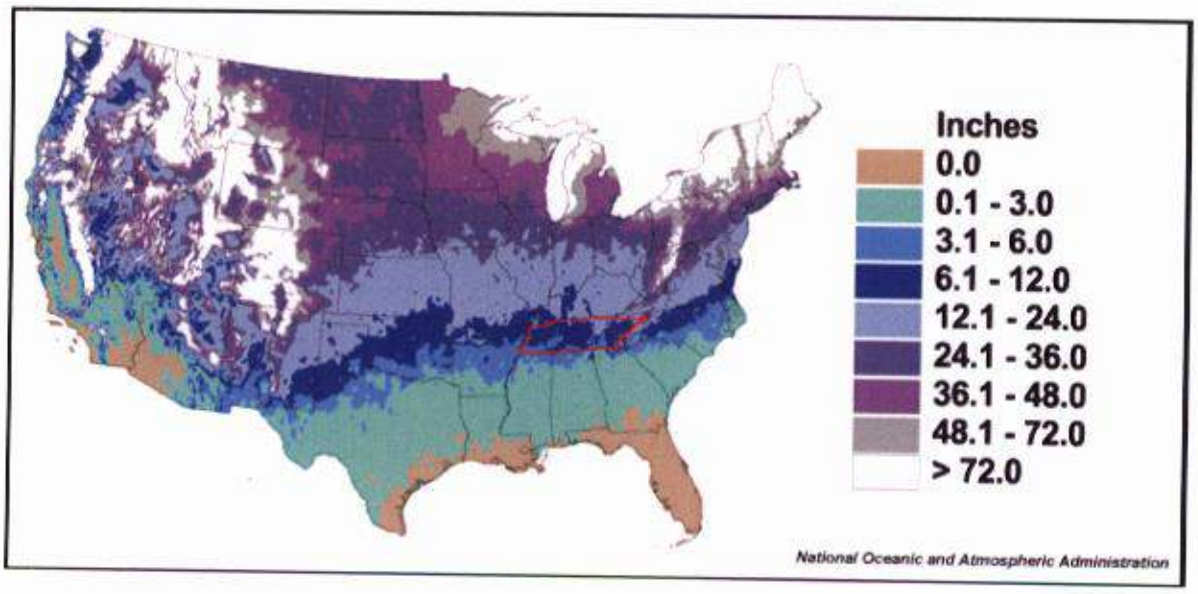


Figure 10 - Average Snowfall per Year (Source: NOAA)

2.5.2 County Profile

The entirety of Metropolitan Lynchburg/Moore County is at risk of severe weather. Severe weather events 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 severity measures as parameters more capable of producing considerable damage. Hail stones can vary in diameter, and in Tennessee, there have been records of hail up to 2.75 inches.

Event narratives were obtained via the NOAA Storm Event Database and are included below for each severe weather category. Tables containing all NOAA-recorded severe weather events between 1950- 2024 for Metropolitan Lynchburg/Moore County are contained in Appendix C.

Thunderstorms

Event Narrative 1 (As written by the National Weather Service):

- Episode Narrative: "The White House granted Governor Phil Bredesen's request for Presential Disaster Declaration for 20 counties in West and Middle Tennessee for damage as a result of tornadoes, flooding and severe thunderstorms which began on Sunday, May 4, 2003."
- Event Narrative: "Uprooted trees in the Center Grove area."

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: "Scattered severe thunderstorms developed during the early afternoon hours as an upper level disturbance interacted with a very unstable atmosphere. The storms initially produced several reports of large hail during the afternoon. Later in the afternoon and early evening, the storms became damaging wind producers with sporadic hail."
- Event Narrative: "Numerous trees were reported down across the county. One tree fell on and damaged a car. Some locations impacted included: Buckeye road, Pleasant Hill road, Highway 50, Tanyard Hill road, Bull Run road, Coffee Creek, Lost Creek County Line road, Bakertown road, and Damron road."

Wind

Event Narrative 1 (As written by the National Weather Service):

- Episode Narrative: "A highly anticipated strong Arctic Cold front arrived during the evening hours, which not only brought the onset of an intense bitterly cold wave for the next few days, but also produced a surge of strong and damaging wind gusts along the front. The wind gusts and damage were much like occurs along a warm season squall line. But in this case, a line of showers and a significant atmospheric pressure rise with the passage of the cold front contributed to the strong and gusty winds. In some cases, the winds exceeded 40 mph, then subsided into the 30 to 35 mph range."
- Event Narrative: "An initial peak wind gust of up to 46 mph, was followed by wind gusts of 30 to 40 mph for several hours."

Hail

Event Narrative 1 (As written by the National Weather Service):

- Event Narrative: "Dime size hail was reported by local law enforcement. A yard was covered with hailstones along Highway 50 east."

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: "A frontal boundary moved from northwest to southeast and sparked scattered strong to severe thunderstorms across southern middle Tennessee. There were scattered reports of large hail and damaging winds in portions of southern Middle Tennessee."
- Event Narrative: "Quarter sized hail was reported in the Charity community, six miles north of Lynchburg."

Lightning

Event Narrative 1 (As written by the National Weather Service):

- Event Narrative: "Lightning struck a 130-year-old red oak tree. Chunks of wood weighing as much as 175 pounds flew about 50 yards. One large piece of wood was embedded in a tail light of a car. The lightning followed the trees roots digging a trench almost 3 feet deep into and under the house. Flying wood damaged the house and a total of 3 cars."

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: "A MCS pushed southeast across southern Middle Tennessee. This system downed a few trees in portions of Lincon County and Moore County."
- Event Narrative: "A tree was down and on fire on Highway 41A near the Bedford, Coffee, and Moore County line."

Winter Weather

Event Narrative 1 (As written by the National Weather Service):

- Episode Narrative: "After midnight on the 6th into the day on the 7th, a low-pressure system which had developed in the northwestern Gulf of Mexico brought snowfall to southern middle Tennessee. Most locations received around one half of an inch. However, isolated locations received around 1 inch of snowfall. Refreezing of the melted snowfall produced slick conditions on the morning of the 8th."
- Event Narrative: "Up to one half inch of snowfall was reported. Slick road conditions worsened again during the morning of the 8th due to re-freezing of melted snow."

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: "A storm system produced areas of light snow during the early morning through midday hours before tapering to flurries. The snow mixed with or changed to rain over Franklin County where temperatures warmed a few degrees above freezing. Snow accumulations of 0.5 to 1.5 inches occurred in Lincoln and Moore Counties. Fortunately, since air temperatures remained at or just above freezing, most of the snow accumulation was on grassy or elevated surfaces.
- Event Narrative: "Snowfall accumulated to 0.2."

Probability of Future Events – Very Likely (Multiple types of severe weather/per year)
To determine the likelihood of future severe weather occurrences in Metropolitan Lynchburg/Moore County historic data and weather patterns were analyzed. Since 1950, 13 tornadoes have occurred within the county. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

2.5.3 Risk Assessment

Severe weather is not as spatially defined in any location in Metropolitan Lynchburg/Moore County; therefore, the entire County is equally at risk of severe weather. This includes the entire County population, all critical facilities, buildings (commercial and residential), and infrastructure.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census preformed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Hail = Very Low
National Risk Index Score for Strong Wind = Relatively Low
National Risk Index Score for Ice Storm = Relatively Low
National Risk Index Score for Winter Weather = Relatively Low

Although the National Risk Index is a well-valued tool it fails to properly show the feedback from the single jurisdiction. Therefore, all identified hazards were evaluated regarding risk in FEMA lifelines for the jurisdiction. The scenario that Metropolitan Lynchburg/Moore County would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

Table 19: Severe Weather Risk based on selected FEMA Lifelines

Severe Weather Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Metropolitan Lynchburg/Moore County	Red	Yellow	Yellow	Red	Red	Red	Yellow	Green

Colors indicate lifeline or component conditions:	
Red	Significant Impact, Multiple Required Resources
Yellow	Some Impact, Some Outside Resources Required
Green	Little to No Impact, No Outside Resources Required

Given the information above, it becomes vital that Metropolitan Lynchburg/Moore County can prioritize the mitigation actions in the following lifeline categories so that they can become more resilient to the whole community that they serve.

2.5.4 Land Use & Development

Increased development and population growth can reasonably translate to increased damage resulting from severe weather events. The population in Metropolitan Lynchburg/Moore County is expected to rise similarly to its surrounding counties and Tennessee. An increase in population will lead to an increase in the number of residential and commercial structures as well as new and improved infrastructure, which in turn means an increase in the number and value of assets at risk of wind damage.

2.5.5 Multi-Jurisdictional Differences

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

2.5.6 Effect on Vulnerable Populations

As is typical, vulnerable populations are unequally impacted by this hazard due to a variety of increased risk factors. Severe Weather can be broad in the hazards that are included. As such, the effects on our vulnerable populations are just as broad and significant. Hail can cause those who already have limited transportation a significant hinderance in their ability to travel to required appointments or locations. Those who may require evacuation from their home may have increased needs at their shelter location as well as assistance during the evacuation process.

2.5.7 Summary

Metropolitan Lynchburg/Moore 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; lightning can lead to house fires and serious injury. Hail can cause injury and severe property damage to homes and automobiles.

2.6 Tornadoes

2.6.1 Hazard Overview

Tornadoes have the potential to produce winds over 200 mph (EF5 on the Enhanced Fujita Scale) and can be very expansive. Before 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 wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage. *Table 20* shows the wind speeds associated with the enhanced Fujita scale ratings and the damage that could result at different intensity levels.

Table 20: Enhanced Fujita Scale

EF Rating	3 Second Wind Gust (mph)	Estimated Damage
0	65-85	**Light Damage.** Slight damage to roofs, gutters, siding, tree branches broken, 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, 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**. Substantial frame houses leveled off foundations and the automobile-sized missiles generated, and high rises experience considerable damage and deformation

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." Most tornadoes move from southwest to northeast or west to east.

Although tornadoes can occur in any location, 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 and mid-summer (February – June). The 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. The following map illustrates the frequency of tornadoes in Tennessee.

2.6.2 County Profile

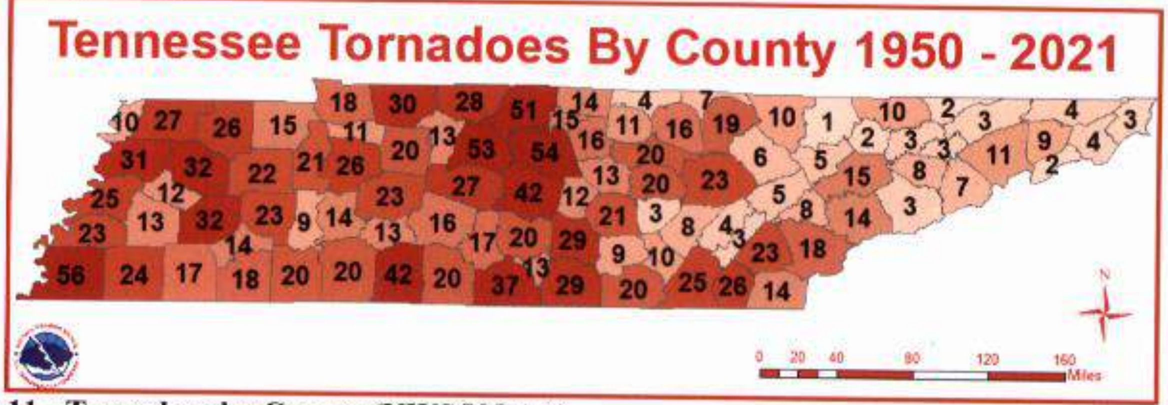


Figure 11 - Tornadoes by County (NWS/NOAA)

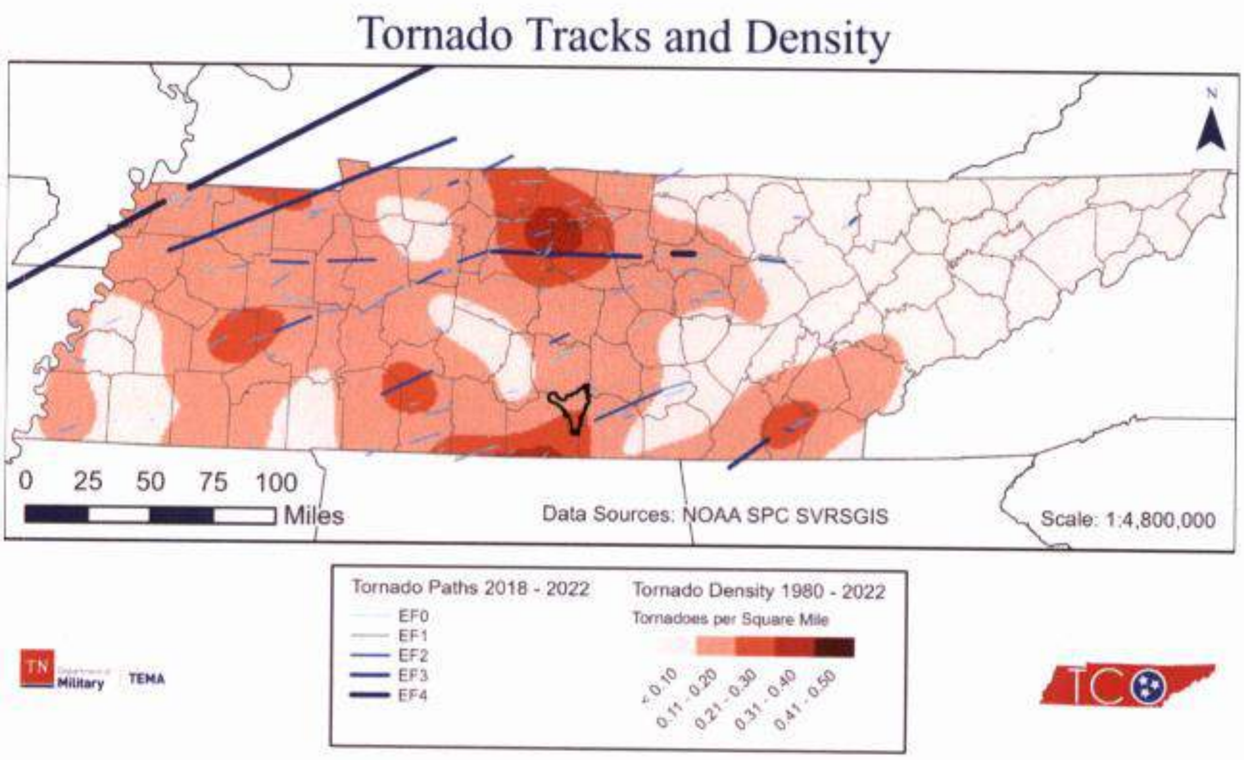


Figure 12 - Tornado Tracks and Density

The following narratives were obtained via the NOAA Storm Event Database. Only events resulting in injury, death, or extensive damage (greater than $200K property/crop damage) were included as expanded narratives. A table containing all NOAA-recorded tornadoes between 1950- 2024 for Metropolitan Lynchburg/Moore County is contained in Appendix C.

Event Narrative 1:

Episode Narrative: On February 13th, 1952, Metropolitan Lynchburg/Moore County experienced the effects of a F4 tornado. The tornado had a length of 1.3 miles and a width of 100 yards. The tornado directly resulted in nine injuries, no fatalities, and approximately $250,000 in damage. It was estimated that the tornado came through the area around 2230. No crop damage was reported.

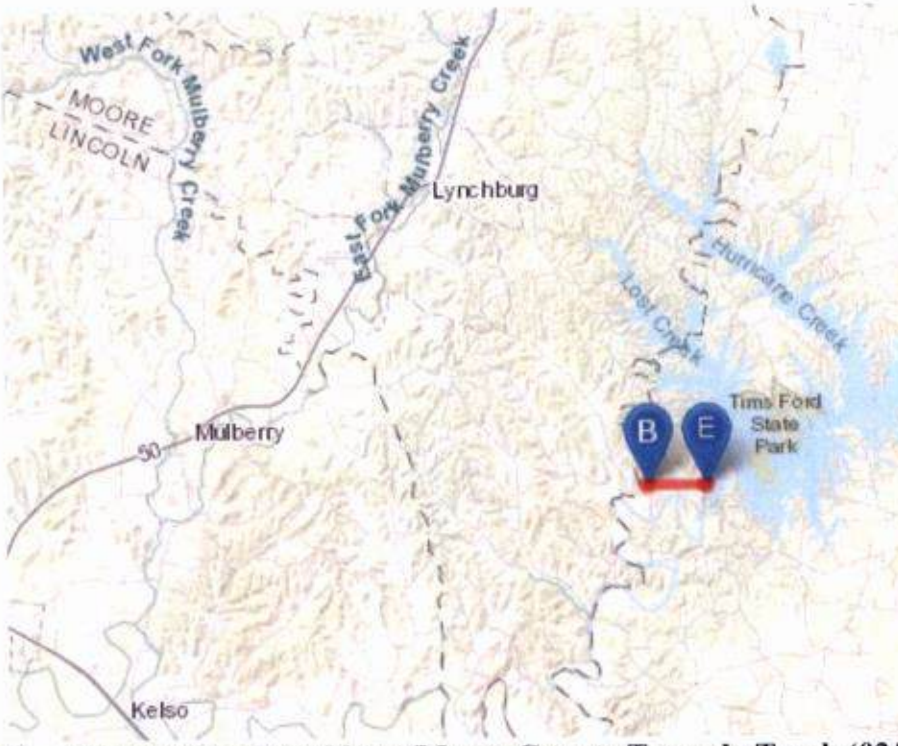


Figure 13 - Metropolitan Lynchburg/Moore County Tornado Track (02/13/1952)

Event Narrative 2 (As written by the National Weather Service):

- Episode Narrative: "A quasi-linear convective system (QLCS) produced a brief tornado in Moore County along with other thunderstorm wind damage. Severe weather began just after Midnight (CDT)."
- Event Narrative: "An EF-1 tornado with peak winds up to 95 mph began near the intersection of Griffin and Harry Hill roads, continued through the Pleasant Hill Community, then lifted near Markay Lane. The most significant damage was to residential homes, with two homes losing covered porches. In addition, one hay barn was destroyed. Other damage was limited to snapped and uprooted trees that fell on residential structures and roof damage."

Figure 14 - Metropolitan Lynchburg/Moore County Tornado Track (10/24/2010)

Event Narrative 3 (As written by the National Weather Service):

- Episode Narrative: "A powerful cold front and upper level system combined with a marginally unstable, moist and highly sheared environment to produce severe thunderstorms and a tornado. A quasi-linear convective system (QLCS) developed during the morning hours across the mid South and raced eastward at 50 to 60 mph. The storms arrived in southern middle Tennessee around midday, with one storm intensifying into a tornadic supercell. A strong tornado of EF-2 strength tracked from just east of Lynchburg (Moore County) to just northeast of Estill Springs (Franklin County), killing a 79 year old male (near Estill Springs) in his mobile home and injuring four others."
- Event Narrative: "An EF-2 tornado with peak winds of 600 yards initially touched down southeast of downtown Lynchburg. The most significant damage occurred from eastern Moore county. In these locations mobile homes were destroyed, multiple power poles and trees were snapped, and homes sustained significant roof damage."

Figure 15 - Metropolitan Lynchburg/Moore County Tornado Track (02/28/2011)

Probability of Future Events – Relatively Likely
Historical data and weather patterns were analyzed to determine the likelihood of future tornado occurrence in Metropolitan Lynchburg/Moore County. Since 1950 12 tornadoes have occurred within the county. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

2.6.3 Risk Assessment

The entirety of Metropolitan Lynchburg/Moore County can be considered at risk for a tornado. This includes the entire County population, 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.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census preformed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Tornado = Relatively Low

Although the National Risk Index is a well-valued tool it fails to properly show the feedback from the participating jurisdiction. Therefore, all identified hazards were evaluated regarding risk in FEMA lifelines for the single jurisdiction. The scenario that Metropolitan Lynchburg/Moore County evaluated the conditions off of was a mid-level impact of the identified hazard. The results are below:

Table 21: Tornado Risk based on selected FEMA Lifelines

Tornado Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Metropolitan Lynchburg/Moore County	Red	Yellow	Yellow	Red	Red	Red	Yellow	Green

Colors indicate lifeline or component conditions:	
Red	Significant Impact, Multiple Required Resources
Yellow	Some Impact, Some Outside Resources Required
Green	Little to No Impact, No Outside Resources Required

Given the information above it becomes vital that Metropolitan Lynchburg/Moore County can prioritize the necessity of mitigation actions in the following lifeline categories so that they can become more resilient in the whole community that they serve.

2.6.4 Land Use and Development Trends

Metropolitan Lynchburg/Moore County codes include proper wind strength and safety regulations consistent with state and federal regulations. While the adopted code provides adequate protection, older and mobile homes are highly susceptible to tornado events. There are multiple mobile home areas in the county, but an official counted to see how vulnerable those areas are. Additionally, many incorporated jurisdictions do not have building ordinances for the structures that reside in the area.

2.6.5 Multi-Jurisdictional Differences

The entirety of Metropolitan Lynchburg/Moore County is at 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 county's sizeable rural component, some tornadic events may have gone unreported.

2.6.6 Effect on Vulnerable Populations

As is typical, vulnerable populations are unequally impacted by this hazard due to a variety of increased risk factors. Those who may require evacuation from their home may have increased needs at their shelter location as well as assistance during the evacuation process. Roads and walkways may become more difficult to traverse due to debris and self-rescue efforts will be far more limited in many cases. Assistance may be delayed due to widespread impacts which may have profound negative impacts on vulnerable populations requiring swift assistance.

2.6.7 Summary

This includes the entire County population, all critical facilities, buildings (commercial and residential), and infrastructure. While all assets are considered at risk from this hazard, a tornado would only cause damage along its specific track. The weakest tornadoes, EF0, can cause minor roof damage, and stronger tornadoes can destroy frame buildings and 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 wind debris that tornadoes turn into missiles. Structures constructed of light materials such as mobile homes are most susceptible to damage.

Chapter 3. Mitigation Strategy

3.1 Mitigation Goals

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

Goal Setting Exercise

In 2019, the HMPC agreed upon the goals for their hazard mitigation plan. It was decided that the goals from the 2019 plan should be carried over into the 2025 plan. They still reflect the current hazards and current conditions in the community.

Resulting 2025 Plan Update Goals

At the end of the meeting, 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.

Expanding & Improving Mitigation Programs
Metropolitan Lynchburg/Moore County determined which areas it could improve or expand based on local subject matter expertise and through conversations with members of the community. One of the key areas for which Metropolitan Lynchburg/Moore County intends to improve in their mitigation capabilities over the next five years is by incorporating more members of the community into the planning effort. Although the plan is intended to be approved in 2025, the plan will undergo continual review as mentioned in Chapter 4. These reviews should include consistently greater reach within the community. Additionally, with each review, Metropolitan Lynchburg/Moore County intends on completing a comprehensive review of capabilities in local government as shown in Table 8. Gaps and limitations for each jurisdiction may be addressed in the mitigation strategy and through the addition of new mitigation actions as applicable. Finally, Metropolitan Lynchburg/Moore County looks to continue expanding their mitigation capabilities through continued and enhanced compliance with the National Flood Insurance Program (NFIP). The NFIP can significantly improve the resilience of the community following a flood event which this plan has profiled due to a history of occurrences.

3.2 Compliance with NFIP

Metropolitan Lynchburg/Moore County participates in FEMA's National Flood Insurance Program (NFIP). Each participating community enforces a flood damage prevention ordinance that regulates development within the Special Flood Hazard Area (SFHA). Additionally, as members of FEMA's NFIP, each community requires Elevation Certificates on all new buildings and substantial improvements within the SFHA.

Given the flood hazards in the planning area, an emphasis will be placed on continued compliance with the NFIP. Metropolitan Lynchburg/Moore County adopted minimum Floodplain Management Criteria on 09/29/1986. The initial FIRMs were completed on the same date and the current effective maps were done on 09/29/2010.

Permit Applications Review for SD/SI Buildings Located in Special Flood Hazard Areas
Utilize the answers from the jurisdiction questionnaire:

- How do you review permit applications for SD/SI buildings located in special flood hazard area?

The review of permit applications for structures designated as Substantially Damaged (SD) or Substantially Improved (SI) in special flood hazard areas is conducted with meticulous attention to building codes. Our review process involves comprehensive assessment of proposed construction to determine compliance with floodplain management criteria. We collaborate closely with relevant stakeholders, such as building officials, engineers, and architects, to ensure accurate interpretation and application of regulatory requirements. Permit applications are evaluated based on their potential impact on flood risk reduction and community resilience, with a focus on promoting sustainable development practices and safeguarding against future flood hazards. Building permits are already required and

Performing Damage Assessments and Substantial Damage Determinations

- How does a jurisdiction make substantial damage determinations following a flood event?

- How do you perform damage assessments?

The Metropolitan Lynchburg/Moore County Emergency Management Director, along with trained staff, makes damage assessments and determinations for all jurisdictions after a flooding event. If the scope of the event is beyond their ability or capability, they reach out to state and local partners to include other counties and TEMA District Coordinators. Damage assessments are completed using GIS tools supplied by the state to record and submit damage data.

Officials in NFIP-participating communities are responsible for regulating all development in SFHAs by issuing permits and enforcing local floodplain requirements, including SD, for the repairs of damaged buildings. After an event, they must:

- Determine where the damage occurred within the community and if the damaged structures are in an SFHA.
- Determine what to use for "market value" and cost to repair consistently; uniformly applying regulations will protect against liability and promote equitable administration.
- Determine if repairing plus improving the damaged structure equals or exceeds 50% of the structure's pre-damage value.
- Require permits for floodplain development.

Following a disaster event, the floodplain manager should act quickly to move forward with the SI/SD process. If it is determined that the cost to repair is 50% or more of the market value, the structure is considered Substantially Damaged and must be brought into compliance with current local floodplain management standards. Rebuilding to current standards decreases peril to life and property and prevents future disaster suffering. if the proposed work to improve a structure will cost 50% or more of the value, the structure is Substantially Improved and must be brought into compliance with current local floodplain management standards.

Informing Property Owners for SD/SI Permits

Utilize the answers from the jurisdiction questionnaire:

- How do you inform (communication type) property owners for SD/SI permits?

Based on the jurisdiction questionnaire responses, we utilize a variety of communication channels to inform property owners about Substantially Damaged (SD) or Substantially Improved (SI) permits. This includes direct mail, sending informational packets or letters directly to affected property owners to notify them of SD/SI permit requirements. Additionally, we regularly update the jurisdiction's website with relevant information, forms, and guidance on SD/SI permits. Social media platforms are utilized to disseminate information and reminders about SD/SI permits, and collaboration with local newspapers, radio stations, or television channels is made to broadcast announcements and raise awareness about SD/SI permit requirements.

Ongoing Involvement and Engagement

Metropolitan Lynchburg/Moore County participates in NFIP Webinars hosted by the State National Flood Insurance Program Office as often as afforded the opportunity. Metropolitan Lynchburg/Moore County will take the following steps 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; (See Appendix D)
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures.

Table 22: NFIP Designees and Webinar Attendance

Jurisdiction	Title & Name of NFIP Designee	Contact
Metropolitan Lynchburg/Moore County	Codes Enforcement - Christine Pyrdom	metromoore.codes@gmail.com 931-759-7068

3.3 Prioritization Process

The prioritization process was necessary as most mitigation projects represent a significant investment in financial and personal resources. By evaluating each project's degree of feasibility and the level of costs versus benefits, Metropolitan Lynchburg/Moore County could determine which projects should be included based on the 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 IV. This rating system uses five variables to evaluate each project's overall feasibility and appropriateness. *Figure 16* 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, social vulnerability and societal benefits	1	Low community acceptance/priority
		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 help needed
		2	Some staffing, no outside help 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 environmental impacts
		2	Some environmental impacts
		3	Few environmental impacts
T	**Technical:** the projects will be evaluated on their ability to reduce losses in the short term or long term.	1	Short-term fix
		2	Medium-term fix
		3	Long-term fix

Figure 16 - SAFE-T Project Prioritization

The identification and analysis process of mitigation alternatives allowed the HMPC to come to a consensus and prioritize recommended mitigation actions. The HMPC discussed the contribution of the effort to save lives or property 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 essential 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 by performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

3.4 Mitigation Action Plan

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 and when and how the actions will be implemented. Due to funding availability and other criteria, it should be clarified that the actions included in this mitigation strategy are subject to further review and refinement, alternatives analyses, and reprioritization. In this plan the term "local funding" occurs when the local governments use revenue to fund mitigation projects. In *Table 23* below, the column typically titled "Jurisdiction", was removed due to this plan being written for a single jurisdiction.

This document does not obligate Metropolitan Lynchburg/Moore County to implement any or all these projects. Rather, this mitigation strategy represents the community's desire to mitigate the risks and vulnerabilities of identified hazards.

Table 23: 2025 Metropolitan Lynchburg/Moore County Mitigation Actions and Projects

Action Number:	Action Description:	Responsible Department:	Time Frame:	Funding Source:	Societal:	Administrative:	Financial:	Environmental:	Technical:	Total SAFE-T Score:	Estimated Cost:	New or Existing Infrastructure:
Drought												
1	Developing agreements for secondary water sources that may be used during drought conditions.	Emergency Management Agency	0-3 Years	Local Funds, HMGP, BRIC.	3	3	3	3	3	15		Both
2	Developing new or upgrading existing water delivery systems to eliminate breaks and leaks.	Utility Department	3-5 Years	Local Funds, HMGP, BRIC.	2	2	1	3	2	10		New
3	Encourage citizens to take water-saving measures, such as the following: - Installing low-flow water saving showerheads and toilets. - Turning water flow off while brushing teeth or during other cleaning activities. - Adjusting sprinklers to water the lawn	Utility Department, Emergency Management Agency	0-3 Years	Local Funds, HMGP, BRIC.	2	3	2	3	3	13		Existing

Action Number:	Action Description:	Responsible Department:	Time Frame:	Funding Source:	Societal:	Administrative:	Financial:	Environmental:	Technical:	Total SAFE-T Score:	Estimated Cost:	New or Existing Infrastructure:
	and not the sidewalk or street. - Running the dishwasher and washing machine only when they are full. - Checking for leaks in plumping or dripping faucets. - Installing rain-capturing devices for irrigation. - Encouraging the installation of graywater systems in homes to encourage water reuse.											
	Extreme Temperatures											
4	Organizing outreach to vulnerable populations,	Emergency Management	0-3 Years		3	2	3	3	3	14		N/A

Action Number:	Action Description:	Responsible Department:	Time Frame:	Funding Source:	Societal:	Administrative:	Financial:	Environmental:	Technical:	Total SAFE-T Score:	Estimated Cost:	New or Existing Infrastructure:
	including establishing and promoting accessible heating or cooling centers in the community.	Agency										
5	Educating citizens regarding the dangers of extreme heat and cold and the steps they can take to protect themselves when extreme temperatures occur.	Utility Department, Emergency Management Agency	0-3 Years		3	3	2	3	3	14		N/A
6	Creating a database to track those individuals at high risk of death, such as the elderly, homeless, etc.	Emergency Management Agency, Fire Department	3-5 Years		3	2	2	3	2	12		New
Flood												
7	Passing and enforcing an ordinance that regulates dumping in streams and ditches.		0-3 Years	Local Funds, FMA, HMGP, BRIC.	2	2	3	3	3	13		N/A
8	Forming a citizen plan implementation steering	Emergency Management	3-5 Years	Local Funds,	2	2	3	3	2	12		Both

Action Number:	Action Description:	Responsible Department:	Time Frame:	Funding Source:	Societal:	Administrative:	Financial:	Environmental:	Technical:	Total SAFE-T Score:	Estimated Cost:	New or Existing Infrastructure:
	committee to monitor progress on local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.	Agency		FMA, HMGP.								
9	Requiring standard tie-downs of propane tanks.	Building Permits	0-3 Years	Local Funds, FMA, HMGP, BRIC.	1	2	2	2	3	10		Existing
Severe Weather												
10	Improving roof sheathing to prevent hail penetration on critical infrastructure facilities.	Emergency Management Agency	5-10 Years	Local Funds, HMGP, BRIC	2	2	2	2	3	11		Existing
11	Mailing safety brochures for all forms of severe weather specific to Moore County with monthly water bills.	Utility Department, Emergency Management Agency	0-3 Years	Local Funds, HMGP, BRIC	3	2	2	2	3	12		N/A

Action Number:	Action Description:	Responsible Department:	Time Frame:	Funding Source:	Societal:	Administrative:	Financial:	Environmental:	Technical:	Total SAFE-T Score:	Estimated Cost:	New or Existing Infrastructure:
12	Adding generators to five fixed critical infrastructure facilities, particularly fire stations.	Emergency Management Agency	5-10 Years	Local Funds, HMGP, BRIC	3	2	1	2	1	9		New
Tornadoes												
13	Add additional tornado outdoor warning sirens throughout the county.	Emergency Management Agency	3-5 Years	Local Funds, HMGP, BRIC	3	2	2	2	2	11		New
14	Purchase of five (5) mobile Starlink kits for critical infrastructure sites.	Emergency Management Agency	0-3 Years	Local Funds (5% project)	2	3	1	2	3	11		New
15	Retrofit emergency communications facility for additional resiliency against tornado events.	Emergency Management Agency	5-10 Years	Local Funds, HMGP, BRIC	3	2	1	2	1	9		New
Carried Forward from 2019 Plan												
16	Retrofit identified shelter locations for generator hook-ups for warming centers and/or severe storm	Emergency Management Agency	3-5 Years	Local Funds, HMGP, BRIC.	3	2	2	3	2	12	$260,000	Existing

Action Number:	Action Description:	Responsible Department:	Time Frame:	Funding Source:	Societal:	Administrative:	Financial:	Environmental:	Technical:	Total SAFE-T Score:	Estimated Cost:	New or Existing Infrastructure:
	relief.											
17	Public safe space (room) project for high school.	Emergency Management Agency, Board of Education	5-10 Years	Local Funds, HMGP, BRIC.	3	2	1	3	2	11	$1,040,000	New
18	Identify space and construct safe spaces for the community at each of the five volunteer fire stations.	Emergency Management Agency	0-3 Years	Local Funds, HMGP, BRIC.	3	2	1	3	2	11	$2,080,000	New
19	Install additional generators to support the water department (3) and the Woodards Market.	Emergency Management Agency, Water Department	0-3 Years	Local Funds, HMGP, BRIC.	2	3	3	3	3	14	$2,080,000	New
20	Conduct a study to identify methods for mitigating flooding that limits vehicle access on Main Street.	Emergency Management Agency	3-5 Years	Local Funds, FMA, HMGP, BRIC.	1	3	3	2	2	11	$75,000	Existing
21	Collaborate with Lincoln County EMA and the Tennessee Department of Transportation (TDOT) to Elevate road highway 129.	Emergency Management Agency, TDOT	3-5 Years	Local Funds, FMA, HMGP, BRIC.	3	1	2	2	2	10	$255,000	Existing

Chapter 4. Implementation, Integration, and Maintenance

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

4.1 Plan Adoption, Implementation, Monitoring, and Evaluation

4.1.1 Plan Adoption

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. A copy of the executed resolution is shown below. **Note to Reviewer: Executed resolutions will be inserted when they become available.**

4.1.2 Implementation

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 the 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 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.

Simultaneously, it is important to maintain constant monitoring of funding opportunities that can be leveraged to implement some of the more costly actions. This will include creating and maintaining a list of ideas on how to meet local match or participation requirements. When funding becomes available, the communities will be able to capitalize on the opportunity due to the diligence of the HMPC. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal 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 the implementation of various activities in the plan. Recommendations will be made to modify timeframes for the 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 unachievable may be removed from the plan entirely, and activities addressing problems unforeseen during plan development may be added.

4.2 Integration into Local Planning Mechanism

A vital implementation mechanism that is highly effective and low-cost is the incorporation of the Hazard Mitigation Plan recommendations and their underlying principles into other plans and tools. Metropolitan Lynchburg/Moore County will use existing methods and programs to implement hazard mitigation actions where possible. As previously stated, mitigation is most successful when it is incorporated into government and public service's day-to-day functions and priorities. 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:

- Regularity Capabilities
- Administrative Capabilities
- Fiscal Capabilities

For further information regarding the different capabilities refer to Chapter 3 – Mitigation Strategy.

Implementation and incorporation into existing planning mechanisms will be conducted by respective planning authorities and 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. Where appropriate, priority actions should be incorporated into Hazard Mitigation Plan updates.

4.3 Monitoring, Evaluating, Updating

For the Hazard Mitigation Plan update review process, the Metropolitan Lynchburg/Moore County Emergency Management Agency Director 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 Metropolitan Lynchburg/Moore 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.
- Before the review, department heads and others tasked with implementing various projects/actions will be queried concerning progress 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 the 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 to include residential, commercial, and industrial growth trends.
- The number of substantially damaged or improved structures by flood zone and review of jurisdictional NFIP membership.

- 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 hazardous events, narratives, and documented damages.
- 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 implementation status of projects/actions (mitigation strategies). The reason for the delay will be discussed for any projects that are behind schedule or have not yet started.

4.3.1 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, publicize mitigation success stories, and seek additional public comments. 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 public hearings.

Public Involvement Process for Annual Reviews

The public will be notified via the Metropolitan Lynchburg/Moore County website or any other form of a publicized social platform (i.e., local newspaper, Facebook, Twitter) well in advance of any public meetings or comment periods.

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 various 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.

LYNCHBURG
MOORE COUNTY
2024 COMMUNITY DATA PROFILE

QUICK FACTS

County Seat	Lynchburg
Year Incorporated	1841
Land Area in Square Miles (County)	129
Water Area in Square Miles (County)	1
Latitude	N35° 17.00′
Longitude	W86° 22.45′
Elevation	795′
Market Region	Nashville
Distance From Nashville	70 miles
Time Zone	Central
City Website	www.lynchburgtn.com/
Additional Incorporated Cities within the County	None
Unincorporated Cities	None

POPULATION

	City	County
2020 (Census)	3,353	6,461
2023 Population	3,456	6,584
2023 Median Age	46.2	46.8
2028 Population Projection	3,509	6,668
Annual Growth Rate (2023-2028 Projected)	0.30%	0.25%

Source: ESRI

CLIMATE

Annual Average Temperature	57.65 F
Average High Temperature	70.5° F
Average Low Temperature	44.8° F
Annual Average Precipitation	55.95"
Annual Average Snowfall	0"
Prevailing Winds	Southeast
Mean Length of Freeze-Free Period (days)	280

TAX STRUCTURE

LOCAL	City	County
Property Taxes (2023)		
• Rate per $100 value	$0.00	$2.43
Ratio of Assessment		
• Residential and Farm	25%	25%
• Commercial/Industrial	40%	40%
• Personal (Equipment)	30%	30%
Total Local Assessment (2022)	$21,548,845	$323,102,906
Hotel-Motel Tax	6%	6%
Motor Vehicle Wheel Tax Rate		$0.00

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

STATE

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

Local Sales Tax Rate
- 2.50%

Local and State Sales Tax Collected (FY2023)
- $5,878,973

Income Tax
- **Personal:** Repealed beginning January 1, 2021
- **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	Moore County
Type of Public School System	County
District Grades Served	Pre-K-12
Number of Schools	2
Number of Classroom Teachers	66
Student to Teacher Ratio	13:1
Additional Staff	11
Total Number of Students	887
Number of Private Schools	0
Total Number of Students	0
Number of Teachers	0
Number of High School Graduates (2023)	62
Graduation Rate	96.8%
Educational Attainment with a Degree (Adults Age 25+)	34.4%

Source: Tennessee Department of Education

REGIONAL HIGHER EDUCATIONAL INSTITUTIONS (within 30 miles)

- Motlow State Community College — Tullahoma
- TN College of Applied Technology — Shelbyville
- The University of the South — Sewanee

Source: National Center for Education Statistics

FastTrack Job Training Assistance Program Available — Yes

Source: Tennessee Department of Economic and Community Development

GOVERNMENT

GOVERNING BODY

City/County — Metropolitan Mayor and Metropolitan Councilmen
Meets 3rd Monday at 6:30 p.m.
American Legion

Fire Department

• Full-time fire fighters in city	0
• City volunteers	0
• Full-time fire fighters in county	1
• County volunteers	25
• Fire stations in city urban service	1
• City fire trucks	0
• Fire stations in county	4
• County fire trucks	9

Law Enforcement

• Full-time police officers in city	0
• Full-time police officers in county & sheriff	13
• City patrol cars	0
• County patrol cars	14

	City	County
Insurance Rating	7	9
Zoning Regulations	Yes	Yes
Planning Commission	Yes	Yes
Industrial Development Corp.	Yes	Yes

TRANSPORTATION

AIR SERVICE

Nearest General Aviation	Tullahoma Regional/ William Northern Field
Location Identifier	THA
Distance from Lynchburg	19 miles
Runway Length (3)	5,501 feet, 4,200 feet and 2,693 feet turf
Surface	Asphalt/Concrete
Lighting	MIRL/PAPI
Fuel	100LL/Jet A
Repairs	Major
Storage	Hangar, Tie Down
Nearest Commercial Service	Nashville International Airport
Location Identifier	BNA
Distance from Lynchburg	69 miles

Nashville International Airport (BNA) serves approximately 17 million total passengers annually. BNA is currently served by 22 major carriers, including international carriers. BNA offers 585+ daily flights and provides nonstop air service to more than 101 destinations.

HIGHWAYS

U.S. Highways	231
State Highways	41A, 50, 55, 129 and 130
Nearest Interstate	25 miles to access Interstate 24

COMMON CARRIERS

Air Freight Companies	2
Motor Freight Companies	2
Terminal Facilities	None
Bus Services	
Inter-City	No
Local	No
Carrier Service	No

RAILROADS SERVED BY

None

NAVIGABLE WATERWAYS

River	Cumberland
Channel Depth	9 feet
Nearest Port Facility	Nashville
Miles from Port	70

COMMUNICATIONS

Newspapers	Moore County News The Tennessean
Telephone Companies	AT&T
Radio Stations	None
Television Networks	5
Cable Service Available	Yes
Channels	30
Provider	AT&T
Internet Service Available	Yes
Provider	AT&T and Monster Broadband
Fiber Optics Available	Yes, some areas
Provider	

COMMUNITY FACILITIES

Health Care

Doctors	3
Dentists	1
Hospitals	0
Beds	0
Clinics	2
Nursing Homes	1
Beds	88
Retirement Homes	0
Residential Care/ Assisted Living	0

Religious Organizations

Protestant	25
Catholic	0
Jehovah's Witness	0
Seventh Day Adventist	0
Latter Day Saints	0
Other	

Day Care Centers	5
Day Care Homes	5

Recreation

Libraries	1
Parks	2
Golf Courses (Public & Private)	0
Swimming Pools (Public & Private)	0
Country Clubs	0
Theaters	0
Bowling Alleys	0
Ball Fields	4

Hotels & Motels	1
Rooms	24
Bed & Breakfasts	8

Largest Meeting Room

Capacity	800

Restaurants	6

Other

Tennis courts, playground facilities, horse show ring, skateboard court, Tims Ford Marina

FINANCIAL INSTITUTIONS

Banks:	Total Number of Institutions	2
	Total Number of Offices	2
	Deposits	83,000,000
Credit Unions:	Total Number of Branches	1
	Total Number of Offices	1
	Deposits	11,073,343
Countywide Combined Deposits		$94,073,343
(Deposits for June 30, 2023)		

Source: Federal Deposit Insurance Corporation and National Credit Union Administration

INDUSTRIAL SUPPORT SERVICES

Service	Location	Distance (Miles)
Tool & Die	Tullahoma	12
Heat Treating	Tullahoma	12
Foundry	Tullahoma	12
Heavy Hardware	Tullahoma	12
Sheet Metal	Tullahoma	12
Lubricants	Local	
Welding Supplies	Tullahoma	12
Abrasives		

SELECTED ECONOMIC INDICATORS

2023 ANNUAL AVERAGES (AGE 16+)

Labor Force	County	Labor Market Area*
Population	5,575	159,530
Employed	2,826	85,137
Unemployed	133	4,361
Unemployment Rate	4.5%	4.9%

* Drive Time: 45 minute radius from Lynchburg (County seat)

Source: ESRI

2023 EMPLOYED POPULATION (AGE 16+) BY INDUSTRY

Agriculture/Mining	1.5%
Construction	8.6%
Manufacturing	26.5%
Wholesale Trade	1.8%
Retail Trade	10.5%
Transportation/Utilities	5.9%
Information	1.2%
Finance/Insurance/Real Estate	3.5%
Services	35.7%
Public Administration	4.6%

Source: ESRI

MANUFACTURING IN AREA (Annual Averages 2019*)

no data for 2022

Number of Units	7
Ann. Avg. Employment	752
Ann. Avg. Weekly Wage	$1,375

Source: Tennessee Department of Labor and Workforce Development

PER CAPITA PERSONAL INCOME

Year	2023
Amount	$35,323

Source: ESRI

MEDIAN HOUSEHOLD INCOME

Year	2023
Amount	$68,482

Source: ESRI

AVERAGE HOME SALES

Year	2022
Number of Homes Sold	67
Average Cost	$325,490
2023 Median Home Value	$274,314

Source: Tennessee Housing Development Agency

RETAIL SALES

Year	2022
Amount	$48,195,253

Source: Tennessee Department of Revenue

NATURAL RESOURCES

Minerals: Limestone
Timber: Hardwood

AGRICULTURAL

Crops: Grain, tobacco, cotton
Livestock: Cattle and poultry

UTILITIES

WATER

Water Supplier	Metro-Moore Co. Utility Dept.
Phone	931.759.4297
Website	www.metroutilitydepartment.com/
Source	Mulberry Creek - Tims Ford Lake
Capacity	400,000 GPD
Current Consumption	266,000 GPD
Storage Capacity	1,050,000 Gallons

SEWER

Sewer Provider	Metro-Moore Co. Utility Dept.
Phone	931.759.4297
Website	www.metroutilitydepartment.com/
Type of Treatment	Extended aeration
Capacity	300,000 GPD
Current Usage	250,000 GPD
City Sewer Coverage	100%
Storm Sewer Coverage	0%
Solid Waste Disposal Type	door to door pickup one convenience center

ELECTRICITY

Source Company	Tennessee Valley Authority

LOCAL POWER COMPANY (City and County)
Duck River Electric Membership Corp.

Superintendent	Scott Spence
District Office	697 South Main Street Lynchburg, Tennessee 37352
Phone	931.759.7344
Emergency	931.759.7371
Website	www.dremc.com

LOCAL GAS COMPANY (City and County)
Atmos Energy

Marketing Manager	Danny Bertotti
District Office	810 Crescent Centre Dr. #600 Franklin, Tennessee 37067
Phone	615.771.8300
Website	www.atmosenergy.com
Fuel Oil Suppliers	several
Suppliers of LP Gas	several

MAJOR INDUSTRIAL MANUFACTURERS/DISTRIBUTION

Firm	Product or Service	Total Employees	Union	Phone Number
Jack Daniel's Distillery	Whiskey	630	None	931-759-4221

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
mtida@mtida.org
www.mtida.org

Sloan Stewart
Metropolitan Mayor
Moore County Courthouse
Post Office Box 206
Lynchburg, Tennessee 37352-0206
Phone: 931.750.7076
Fax: 931.759.6394
sstewart@metromoorecounty.org
www.lynchburgtn.com

Marsha Hale President
Metro Lynchburg/Moore County
Chamber of Commerce
46 Hiles Street
Lynchburg, TN 37352
Phone: 931.759.4111
info@lynchburgtn.com
www.lynchburgtn.com

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.

Updated January 2024

National Risk Index

January 15, 2025

Moore County, Tennessee

Summary

Risk Index is **Very Low**	Score **12.0**
Expected Annual Loss is **Very Low**	Score **13.1**
Social Vulnerability is **Very Low**	Score **11.1**
Community Resilience is **Relatively Low**	Score **33.4**

While reviewing this report, keep in mind that low risk is driven by lower loss due to natural hazards, lower social vulnerability, and higher community resilience.

For more information about the National Risk Index, its data, and how to interpret the information it provides, please review the **About the National Risk Index** and **How to Take Action** sections at the end of this report. Or, visit the National Risk Index website at **hazards.fema.gov/nri/learn-more** to access supporting documentation and links.

Risk Index

The Risk Index rating is **Very Low** for **Moore County, TN** when compared to the rest of the U.S.

Score **12.03**

National Percentile
12.03

Percentile Within Tennessee
8.40

0 100

12% of U.S. counties have a lower Risk Index

8% of counties in Tennessee have a lower Risk Index

Risk Index Legend

Very High · Relatively High · Relatively Moderate · Relatively Low · Very Low

No Rating · Not Applicable · Insufficient Data

Hazard Type Risk Index

Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's Expected Annual Loss value, community risk factors, and the adjustment factor used to calculate the risk value.

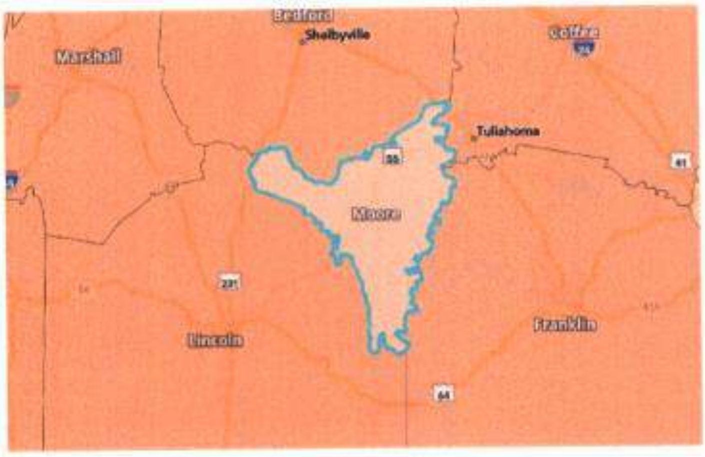
Hazard Type	Risk Index Rating	Risk Index Score	National Percentile
Avalanche	Not Applicable	--	
Coastal Flooding	Not Applicable	--	
Cold Wave	Relatively Low	48.8	0 100
Drought	Very Low	29	0 100
Earthquake	Very Low	52.4	0 100
Hail	Very Low	19.1	0 100
Heat Wave	Very Low	26.8	0 100
Hurricane	Very Low	26.3	0 100
Ice Storm	Relatively Low	30.8	0 100
Landslide	Relatively Low	35.1	0 100
Lightning	Very Low	18.9	0 100
Riverine Flooding	Very Low	10.9	0 100
Strong Wind	Relatively Low	46	0 100

Risk Factor Breakdown

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
Tornado	$957,676	Very Low	Relatively Low	1.08	$1,036,054	46.3
Strong Wind	$314,850	Very Low	Relatively Low	1.08	$340,498	46
Earthquake	$162,631	Very Low	Relatively Low	1.08	$175,718	52.4
Cold Wave	$54,971	Very Low	Relatively Low	1.08	$59,490	48.8
Hurricane	$32,671	Very Low	Relatively Low	1.08	$35,327	26.3
Lightning	$30,256	Very Low	Relatively Low	1.08	$32,737	18.9
Riverine Flooding	$23,955	Very Low	Relatively Low	1.08	$25,896	10.9
Winter Weather	$22,436	Very Low	Relatively Low	1.08	$24,275	28.6
Landslide	$21,900	Very Low	Relatively Low	1.08	$23,703	35.1
Ice Storm	$21,646	Very Low	Relatively Low	1.08	$23,404	30.8
Hail	$19,909	Very Low	Relatively Low	1.08	$21,527	19.1
Heat Wave	$14,009	Very Low	Relatively Low	1.08	$15,162	26.8
Drought	$3,139	Very Low	Relatively Low	1.08	$3,399	29
Wildfire	$706	Very Low	Relatively Low	1.08	$764	1.5

Expected Annual Loss

In **Moore County, TN**, expected loss each year due to natural hazards is **Very Low** when compared to the rest of the U.S.



Score **13.06**

National Percentile
13.06

Percentile Within Tennessee
11.60

0 100

13% of U.S. counties have a lower Expected Annual Loss

12% of counties in Tennessee have a lower Expected Annual Loss

Expected Annual Loss Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss **$1,680,752.43**

Composite Expected Annual Loss Rate National Percentile			**60**
Building EAL	**$804,821.94**	Population EAL	**0.07** fatalities
Building EAL Rate	**$1 per $1.87K of building value**	Population EAL Rate	**1 per 90.96K people**
Agriculture EAL	**$53,915.22**	Population Equivalence EAL	**$822,015.28**
Agriculture EAL Rate	**$1 per $429.81 of agriculture value**		

Expected Annual Loss for Hazard Types

Expected Annual Loss scores for hazard types are calculated using data for only a single hazard type, and reflect a community's relative expected annual loss for only that hazard type.

14 of 18 hazard types contribute to the expected annual loss for **Moore County, TN**.

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Tornado	Relatively Low	$957,676	49.9
Strong Wind	Relatively Low	$314,850	50.8
Earthquake	Very Low	$162,631	52.8
Cold Wave	Relatively Low	$54,971	51.0
Hurricane	Very Low	$32,671	27.0
Lightning	Very Low	$30,256	20.3

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Cold Wave	$54,971	$209	$29,690	0.00	$25,072
Drought	$3,139	n/a	n/a	n/a	$3,139
Earthquake	$162,631	$117,904	$44,727	0.00	n/a
Hail	$19,909	$17,048	$2,439	0.00	$422
Heat Wave	$14,009	$152	$13,831	0.00	$26
Hurricane	$32,671	$25,411	$208	0.00	$7,051
Ice Storm	$21,646	$19,455	$2,190	0.00	n/a
Landslide	$21,900	$4,500	$17,400	0.00	n/a
Lightning	$30,256	$7,080	$23,177	0.00	n/a
Riverine Flooding	$23,955	$47	$16,576	0.00	$7,332
Strong Wind	$314,850	$221,099	$84,855	0.01	$8,896
Tornado	$957,676	$385,146	$570,556	0.05	$1,973
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	$706	$649	$57	0.00	$1
Winter Weather	$22,436	$6,123	$16,308	0.00	$4

Exposure Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	$76,299,754,216	$1,502,981,029	$74,773,600,000	6,446.00	$23,173,187
Drought	$1,254,653	n/a	n/a	n/a	$1,254,653
Earthquake	$76,450,562,000	$1,502,962,000	$74,947,600,000	6,461.00	n/a
Hail	$76,299,754,216	$1,502,981,029	$74,773,600,000	6,446.00	$23,173,187
Heat Wave	$76,299,754,216	$1,502,981,029	$74,773,600,000	6,446.00	$23,173,187
Hurricane	$76,299,752,898	$1,502,981,029	$74,773,600,000	6,446.00	$23,171,869
Ice Storm	$76,276,581,029	$1,502,981,029	$74,773,600,000	6,446.00	n/a
Landslide	$58,161,668,228	$843,033,561	$57,318,634,667	4,941.26	n/a
Lightning	$76,276,581,029	$1,502,981,029	$74,773,600,000	6,446.00	n/a
Riverine Flooding	$1,936,152,188	$47,774,672	$1,887,101,655	162.68	$1,275,860
Strong Wind	$76,299,754,216	$1,502,981,029	$74,773,600,000	6,446.00	$23,173,187
Tornado	$76,299,754,216	$1,502,981,029	$74,773,600,000	6,446.00	$23,173,187
Tsunami	--	--	--	--	--

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Volcanic Activity	--	--	--	--	--
Wildfire	$9,341,277,633	$158,812,539	$9,178,424,586	791.24	$4,040,508
Winter Weather	$76,299,754,216	$1,502,981,029	$74,773,600,000	6,446.00	$23,173,187

Annualized Frequency Values

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	0.2 events per year	4	2005-2021 (16 years)
Drought	21.2 events per year	476	2000-2021 (22 years)
Earthquake	0.100% chance per year	n/a	2021 dataset
Hail	4.5 events per year	153	1986-2021 (34 years)
Heat Wave	0.2 events per year	3	2005-2021 (16 years)
Hurricane	0 events per year	4	East 1851-2021 (171 years) / West 1949-2021 (73 years)
Ice Storm	0.9 events per year	58	1946-2014 (67 years)
Landslide	0 events per year	0	2010-2021 (12 years)
Lightning	84.5 events per year	1,861	1991-2012 (22 years)

Hazard Type	Building EAL Rate (per building value)	Population EAL Rate (per population)	Agriculture EAL Rate (per agriculture value)
Cold Wave	$1 per $7.20M	1 per 2.52M	$1 per $924.26
Drought	--	--	$1 per $7.38K
Earthquake	$1 per $12.75K	1 per 1.67M	--
Hail	$1 per $88.16K	1 per 30.65M	$1 per $54.98K
Heat Wave	$1 per $9.90M	1 per 5.41M	$1 per $895.79K
Hurricane	$1 per $59.15K	1 per 359.47M	$1 per $3.29K
Ice Storm	$1 per $77.25K	1 per 34.14M	--
Landslide	$1 per $334.00K	1 per 4.30M	--
Lightning	$1 per $212.30K	1 per 3.23M	--
Riverine Flooding	$1 per $32.27M	1 per 4.51M	$1 per $3.16K
Strong Wind	$1 per $6.80K	1 per 881.19K	$1 per $2.61K
Tornado	$1 per $3.90K	1 per 131.05K	$1 per $11.74K
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	$1 per $2.32M	1 per 1.32B	$1 per $41.38M
Winter Weather	$1 per $245.48K	1 per 4.58M	$1 per $5.17M

Social Vulnerability

Social groups in **Moore County, TN** have a **Very Low** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.

Score **11.08**

National Percentile **11.08**

Percentile Within Tennessee **2.10**

0 100

11% of U.S. counties have a lower Social Vulnerability

2% of counties in Tennessee have a lower Social Vulnerability

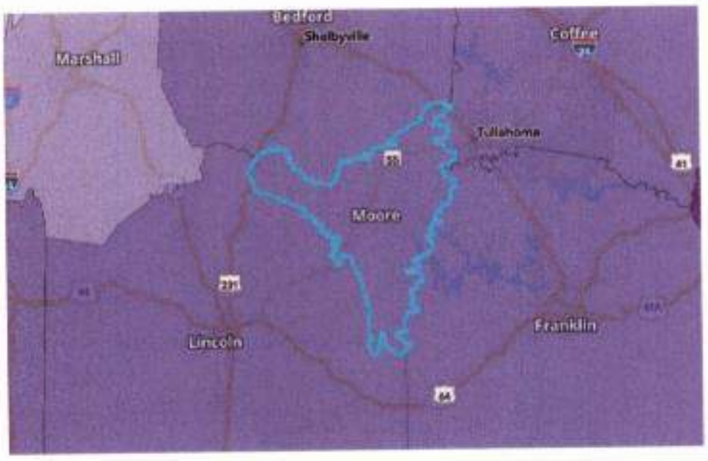
Social Vulnerability Legend

Very High · Relatively High · Relatively Moderate · Relatively Low · Very Low

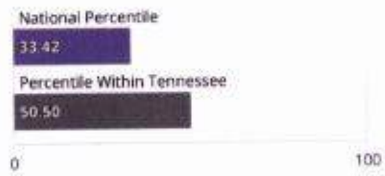
Data Unavailable

Community Resilience

Communities in **Moore County, TN** have a **Relatively Low** ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S.



Score **33.42**



67% of U.S. counties have a higher Community Resilience

50% of counties in Tennessee have a higher Community Resilience

Community Resilience Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

Data Unavailable

About the National Risk Index

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather.

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and Census tract. These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Explore the National Risk Index Map at **hazards.fema.gov/nri/map**.

Visit the National Risk Index website at **hazards.fema.gov/nri/learn-more** to access supporting documentation and links.

Calculating the Risk Index

Risk Index values are calculated using an equation* that combines values for Expected Annual Loss (EAL) due to natural hazards, with the Community Risk Factor (CRF), which is a function of Social Vulnerability and Community Resilience:

Risk Index = Expected Annual Loss × Community Risk Factor

where Community Risk Factor = $f\left(\frac{\text{Social Vulnerability}}{\text{Community Resilience}}\right)$

*County-level risk values are derived by summing the risk values of all census tracts within that county.

Risk is presented as a composite value and score for all 18 hazard types, as well as individual values and scores for each hazard type.

For more information, visit **hazards.fema.gov/nri/determining-risk**.

Calculating Expected Annual Loss

Expected Annual Loss values are calculated using an equation* that combines values for exposure, annualized frequency, and historic loss ratios for 18 hazard types:

Expected Annual Loss = **Exposure** × **Annualized Frequency** × **Historic Loss Ratio**

*Excluding Avalanche, Drought, Earthquake, and Tornado, EAL values for each hazard are calculated at the Census block level and summed together to determine Census tract and county-level hazard type EAL values.

Expected Annual Loss is presented as a composite value and score for all 18 hazard types, as well as individual values and scores for each hazard type.

For more information, visit **hazards.fema.gov/nri/expected-annual-loss**.

Calculating Social Vulnerability

Social Vulnerability is measured using the Social Vulnerability Index (SVI) published by the Centers for Disease Control and Prevention (CDC).

For more information, visit **hazards.fema.gov/nri/social-vulnerability**.

Calculating Community Resilience

Community Resilience is measured at the County level using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).

For more information, visit **hazards.fema.gov/nri/community-resilience**.

Values, Scores, and Ratings

The National Risk Index provides three different types of results for Risk and each component used to derive Risk: EAL, Social Vulnerability, and Community Resilience:

Values. Values for Risk and EAL are in units of dollars, representing the community's average economic loss from natural hazards each year. For Social Vulnerability and Community Resilience, values are the index values for the community provided by the source data sets.

Scores. Scores represent the national percentile ranking of the community's component value compared to all other communities at the same level (county or Census tract).

Ratings. Ratings refer to the qualitative terms that describe the relative risk of an area within the same geographic level. These rating categories range from "Very Low" to "Very High". Ratings for Social Vulnerability and Community Resilience are based on quintiles of those components' scores, while Risk and EAL ratings are based on more advanced statistical calculations on values . As a result, there is no fixed range of scores or values that correspond to the rating categories.

How to Take Action

There are many ways to reduce natural hazard risk through mitigation. Communities with high National Risk Index scores can take action to reduce risk by decreasing Expected Annual Loss due to natural hazards, decreasing Social Vulnerability, and increasing Community Resilience.

For information about how to take action and reduce your risk, visit **hazards.fema.gov/nri/take-action**.

Disclaimer

The National Risk Index (the Risk Index or the Index) and its associated data are meant for planning purposes only. This tool was created for broad nationwide comparisons and is not a substitute for localized risk assessment analysis. Nationwide datasets used as inputs for the National Risk Index are, in many cases, not as accurate as available local data. Users with access to local data for each National Risk Index risk factor should consider substituting the Risk Index data with local data to recalculate a more accurate risk index. If you decide to download the National Risk Index data and substitute it with local data, you assume responsibility for the accuracy of the data and any resulting data index. Please visit the **Contact Us** page if you would like to discuss this process further.

The methodology used by the National Risk Index has been reviewed by subject matter experts in the fields of natural hazard risk research, risk analysis, mitigation planning, and emergency management. The processing methods used to create the National Risk Index have produced results similar to those from other natural hazard risk analyses conducted on a smaller scale. The breadth and combination of geographic information systems (GIS) and data processing techniques leveraged by the National Risk Index enable it to incorporate multiple hazard types and risk factors, manage its nationwide scope, and capture what might have been missed using other methods.

The National Risk Index does not consider the intricate economic and physical interdependencies that exist across geographic regions. Keep in mind that hazard impacts in surrounding counties or Census tracts can cause indirect losses in your community regardless of your community's risk profile.

Nationwide data available for some risk factors are rudimentary at this time. The risk profiles for the vast majority of hazard types are based on historical frequency and loss data. They represent risk and expected annual loss based on average past conditions, not future predictions; therefore, they may not fully consider the potential impacts of recent changes to the environment, including anthropomorphic landscape changes, or climate change. The National Risk Index will be continuously updated as new data become available and improved methodologies are identified.

For comprehensive details about how the Risk Index can help you and its limitations, see the **National Risk Index Technical Documentation**

Assumption of Risk

In view of the identified limitations of the National Risk Index associated data, by using the data, you acknowledge and agree that FEMA makes no representations or warranties about the accuracy, completeness, or fitness for any particular purpose of the data; that the data is provided "as is" without warranty of any kind; that you assume full responsibility for any consequences that may arise, including financial losses, legal disputes, or other adverse outcomes; and that you release FEMA and the federal government from any liability that may arise to the extent allowable by law.

Attribution, No Endorsement

Please attribute your use of the National Risk Index and its associated data to the Federal Emergency Management Agency.

However, you acknowledge and agree that nothing herein constitutes and endorsement of you or your work by FEMA or the federal government, and you shall not imply through use of the National Risk Index or its associated data or through providing attribution, that FEMA or the federal government endorses you.

Moore County Climate Trends and Variations

Drought

The future risk of drought in Moore County is tied to changes in the precipitation and temperature patterns the county may experience due to climate trends and variations. The Fourth National Climate Assessment (2018, NCA4) states climate variability is expected to increase the average temperature and the number of high-heat days in the southeastern United States and intensify the hydrologic cycle, leading to an increase in both extreme precipitation events and periods of drought in the southeastern United States. The Climate Mapping Risk Assessment (CMRA) Report for Moore County shows that while overall annual precipitation may increase, the number of dry days is expected to increase through the 21st century. Also, high-heat days are expected to increase, which could favor short-term periods of drought.

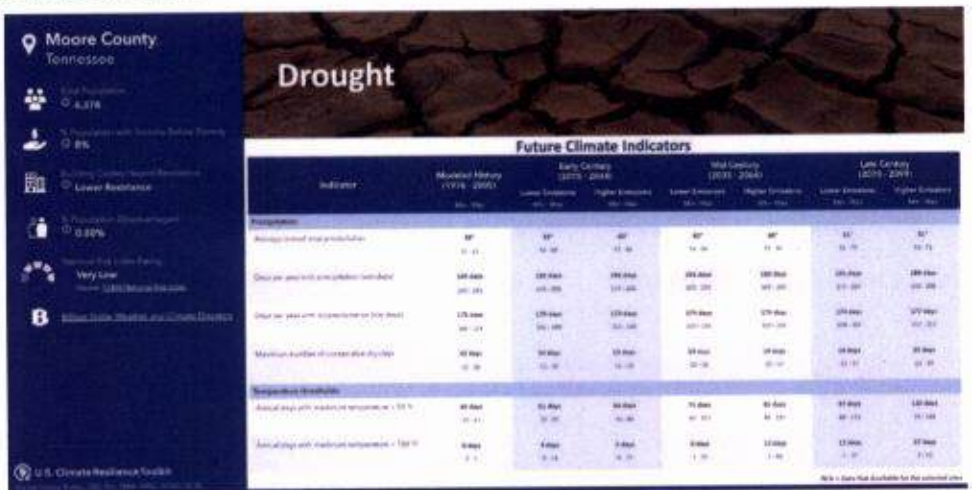


Figure 1: Climate Mapping Risk Assessment Report for Drought in Moore County. (Source: US Climate Resilience Toolkit)

The increasing trends in average temperature and total precipitation in Moore County are also supported by observed historical data available from the NOAA National Centers for Environmental Information Climate-at-a-Glance tool (refer to subsequent figures). The trends of increasing temperature and annual precipitation have been more pronounced over the past several decades compared to the longer-term (1895-2023) trend. The long-term trend in temperature is slightly positive but less than +0.1°F per decade due to several warm decades in the early 20th century followed by a cool period from the 1950's to the early 1980's, and then years that were mostly warmer than the 20th century average after 1985. The medium-term (1961-2023) shows an increased warming trend of +0.4°F per decade and the short-term (1991-2023) shows an increasing trend of +0.6°F per decade. Additionally, the county's climate stripes graphics from NOAA show that aside from a few warmer than normal years early in the period, most of the above average temperature years have occurred in the past two decades. This indicates that warming has substantially increa sed in Moore County and, based on the NCA4, this trend is expected to continue in the future.

However, total precipitation has also been increasing in Moore County, with the long-term (1895-2023) trend in precipitation having a +0.80" increase per decade, the medium-term (1961-2023) shows a stronger trend of +1.31" increase per decade, and the short-term (1991-2023) shows an even stronger increasing trend of +1.62" per decade. This indicates that precipitation has increased in Moore County; however, there is a large amount of inter-annual variability. Based on the NCA4, this trend is expected to continue in the future. Refer to Figures 19-21 in the Flood section for additional information. An increasing trend in precipitation may infer a decrease in drought potential; however, the observed pattern has been highly variable year-to-year and on shorter time periods. As temperatures increase, there can be more rapid evapotranspiration, potentially leading to more rapid onset of drought occurrences (i.e., Flash Droughts).

Figure 2: Observed (1895-2023) Annual Temperature for Moore County, Tennessee, Compared to the 20th Century Average with Darkening Shades of Blue for Below Average Temperature and Darkening Shades of Red for Above Average Temperature.
(Source: NOAA NCEI)

Figure 3: Observed (1895-2023) Annual Precipitation for Moore County, Tennessee, Compared to the 20th Century Average with Darkening Shades of Brown for Below Average Precipitation and Darkening Shades of Green for Above Average.
(Source: NOAA NCEI)

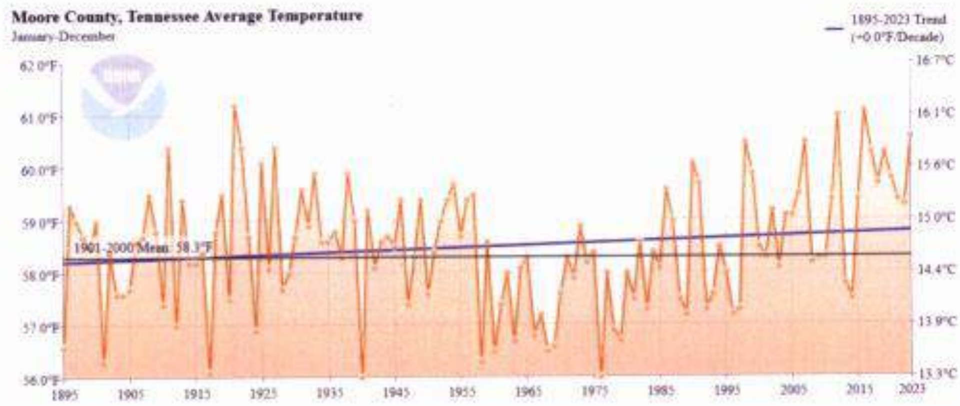


Figure 4: Annual Average Temperature for Moore County Tennessee, Showing a less than +0.1°F Increase per Decade Since 1895.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

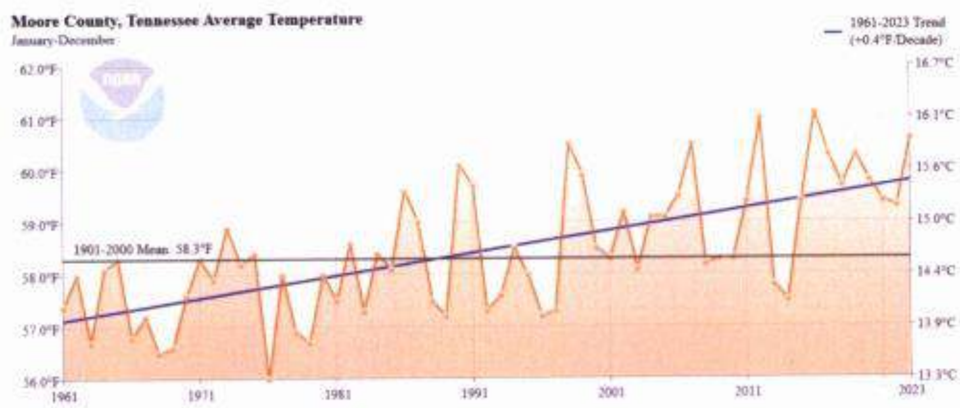


Figure 5: Annual Average Temperature for Moore County, Tennessee, Showing a +0.4°F Increase per Decade Since 1961.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

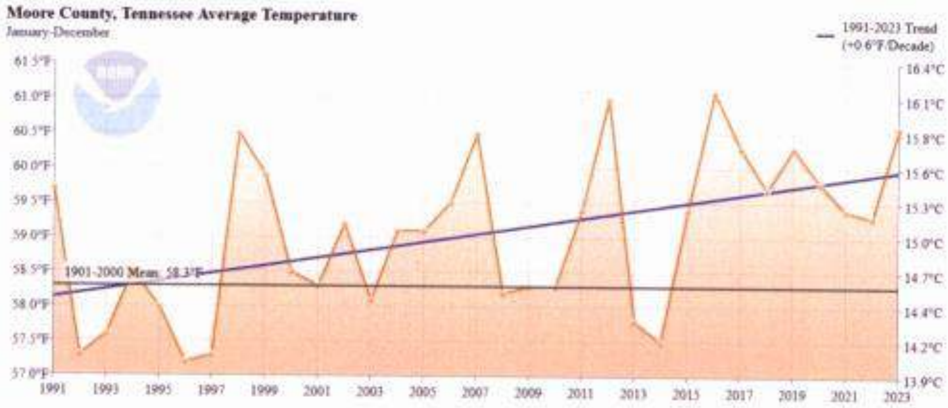


Figure 6: Annual Average Temperature for Moore County, Tennessee, Showing a +0.6°F Increase per Decade Since 1991.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

The U.S. Drought Monitor (USDM) provides a weekly snapshot of drought conditions across the United States, starting in January of 2000 and continuing through the present. Using the timeline of drought conditions from the USDM, the cyclical nature of drought in Moore County is clear. Several periods of drought were recorded in this time, with the most intense drought seen in 2007, but several other short periods of severe drought observed, including 2016 and the later parts of 2023. The Tennessee Climate Office (TCO) analyzed trends in the USDM throughout Tennessee from 2000 to 2022. County-level trends were developed based on the amount of each county that was covered in D1 (Moderate Drought) or worse, D2 (Severe Drought) or worse, D3 (Extreme Drought) or worse, and D4 (Exceptional Drought) each week. Trends were assessed using space-time cube analysis tools in ArcGIS Pro, with the results shown subsequently. There was no significant trend in the amount of time that Moore County spent in drought conditions over this period.

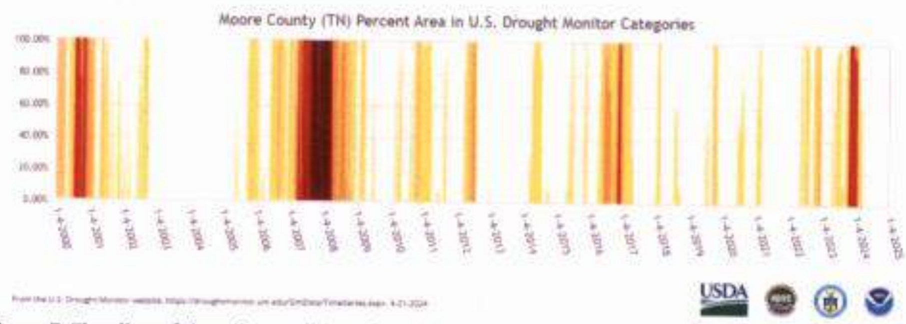


Figure 7: Timeline of drought conditions from the U.S. Drought Monitor from 2000 – 2023 for Moore County.

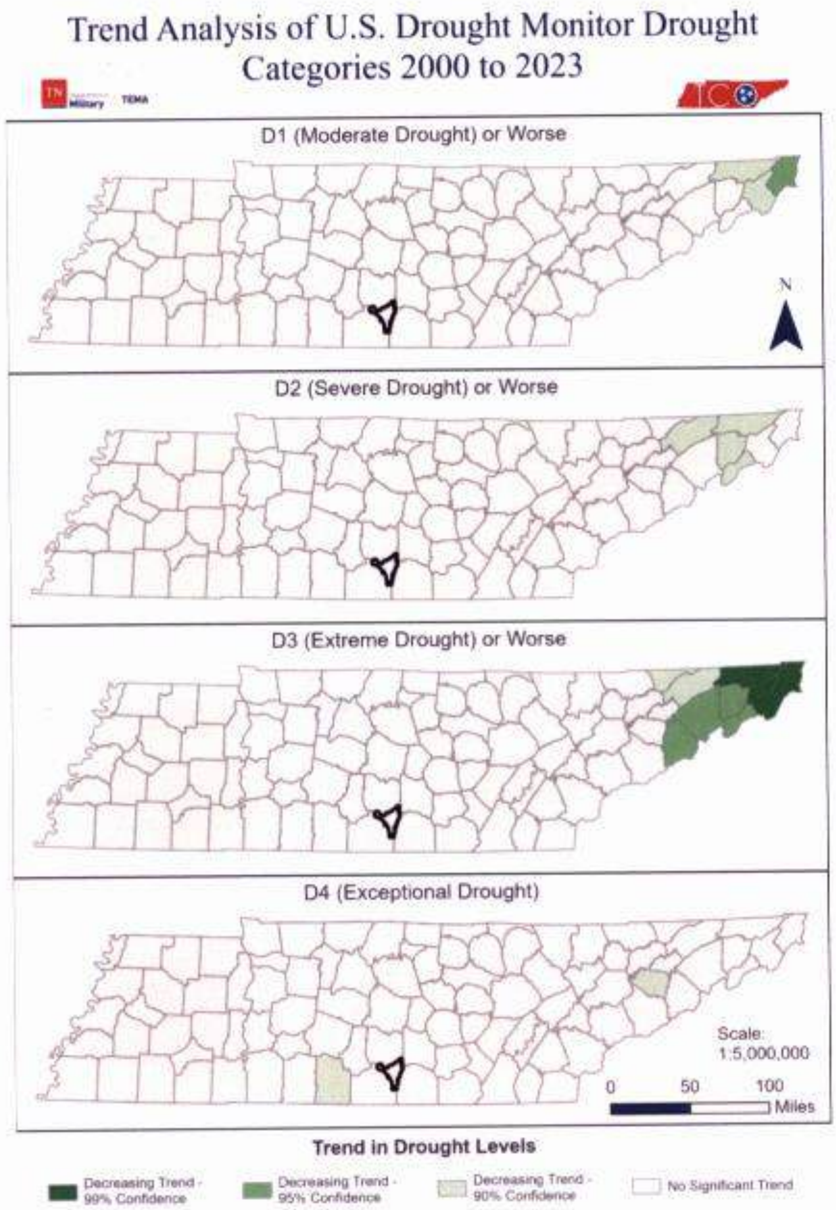


Figure 8: Trend Analysis of U.S. Drought Monitor from 2000 – 2023, Moore County Outlined in Bold.

Since the USDM only dates back to 2000, other metrics must be used to examine longer trends in drought occurrences. The Standardized Precipitation Index (SPI) is another metric that can quantify drought and periods of wetness by capturing how observed precipitation deviates from the climatological average. Drought.gov provides a timeline of the SPI derived from the Global Historical Climatology Network (GHCN), with data back to 1895 for the contiguous U.S. Red hues indicate drier conditions, while blue hues indicate wetter conditions. With this longer dataset the cyclical nature of dry and wet periods across Moore County is even more apparent. It also shows that the shorter and less intense dry periods observed from 2008 to 2023 is one of the longer periods of time with minimal long-term drought impacts for the county.

Looking at the longer-term Standardized Precipitation Index (SPI) from the NCEI nClimGrid-monthly dataset (starting 1895) there is an increasing trend in the 3-month SPI value, indicating an increasing trend in precipitation (averaged over 3-months) across all of Tennessee with a moderate to strong increase in values across Moore County. A gridded SPI dataset is also available at a 5km resolution from NCEI. This gridded dataset with data from 1895 to 2023 was used to analyze the linear trend in 3-month SPI values (SPI value calculated from the dryness or wetness values of the previous 3 months), shown in the following figure. All areas of Tennessee had an increasing trend in SPI values over this time period, indicating an increasing trend in precipitation that is consistent with other observed records and climate models signifying that Tennessee is seeing a decrease in the risk for longer-term droughts. The overall trend in increasing wetness will not prevent future periods of drought, especially short-duration high-intensity Flash Droughts.

Table 1: SPI Category and Value Definitions.

SPI Category	SPI Value	Description
D4	≤ -2	Exceptionally Dry
D3	-1.6 to -1.9	Extremely Dry
D2	-1.3 to -1.5	Severely Dry
D1	-0.8 to -1.2	Moderately Dry
D0	-0.5 to –0.7	Abnormally Dry
W0	+0.5 to + 0.7	Abnormally Wet
W1	+0.8 to +1.2	Moderately Wet
W2	+1.3 to +1.5	Severely Wet
W3	+1.6 to +1.9	Extremely Wet
W4	≥ 2.0	Exceptionally Wet

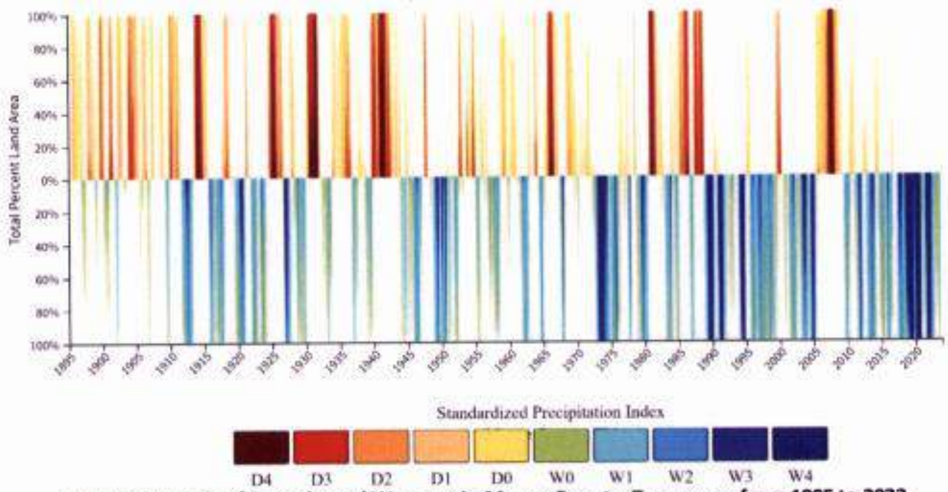


Figure 9: Periods of Drought and Wetness in Moore County, Tennessee from 1895 to 2023. (Source: Drought.gov)

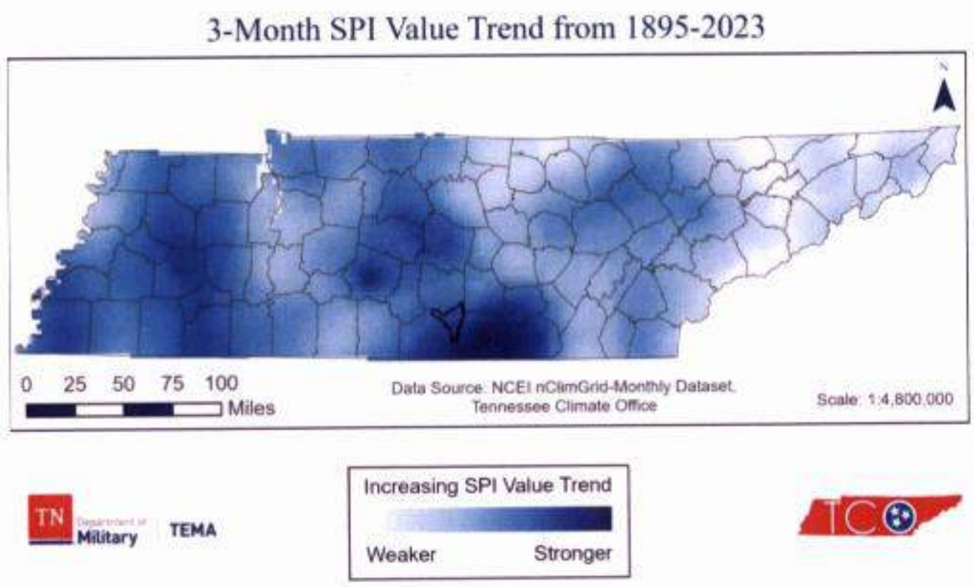


Figure 10: SPI Value Trend for 3-Months from 1895 to 2023, Moore County Outlined in Bold.

The previous trends are based on observed historical data, but the Climate Mapping for Resilience and Adaptation (CMRA) Assessment tool provides county-level output from future climate projections. Data from this tool indicates Moore County could expect an increase in the number of dry days per year due to climate variability. However, the tool provides a range of possible outcomes, with higher and lower greenhouse gas emission scenarios, for Early-Century (2015-2044), Mid-Century (2035-2064), and Late Century (2070-2099) time periods, and maximum, minimum, and mean projected values. The following table shows the projected change in the number of dry days per year for Moore County. The Early-, Mid-, and Late-Century values represent the increase (positive values) or decrease (negative values) in dry days per year compared to the number of dry days per year from modeled history. In the mean projection, Moore County could see an increase of 2.9 to 4.0 dry days per year by Mid-Century and an increase of 3.2 to 6.5 dry days per year by Late-Century.

Table 2: Possible Change in the Number of Dry Days per Year for Moore County, Tennessee.

High Emissions Scenario	Modeled History (1976-2005)	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Driest Projection	175.6	+16.2	+20.0	+41.2
Mean Projection	170.8	+2.5	+4.0	+6.5
Wettest Projection	164.2	-1.1	-5.0	-7.2
Low Emissions Scenario	**Modeled History (1976-2005)**	**Early Century (2015-2044)**	**Mid Century (2035-2064)**	**Late Century (2070-2099)**
Driest Projection	175.6	+13.5	+20.4	+15.1
Mean Projection	170.8	+2.2	+2.9	+3.2
Wettest Projection	164.2	-3.6	-5.6	-5.6

The projected increase in high-heat days and the intensification of the hydrologic cycle will likely lead to more Flash Droughts, defined by the rapid onset or intensification of drought conditions. Flash Droughts in the southeastern United States are often connected to short periods of time (a couple of weeks or months) with much higher-than-normal temperatures and much lower-than-normal precipitation leading to the rapid depletion of soil moisture and streamflow. September 2019 and October 2023 are prime examples of recent Flash Droughts in Tennessee, and more broadly across the Southeast. During the 2023 fall flash drought, Moore County went from 97.58% of the county in Moderate Drought (D1) conditions on the October 3rd release of the U.S. Drought Monitor to 100% of the county being in Extreme Drought (D3) conditions on the November 7th release of the US Drought Monitor.

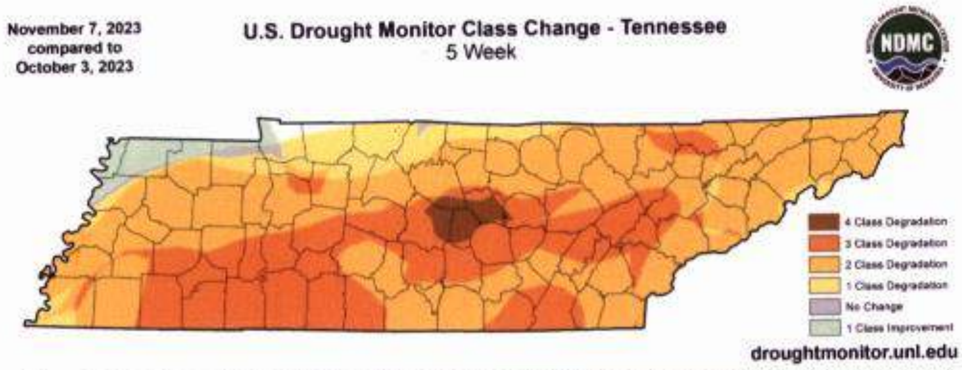


Figure 11: U.S. Drought Monitor Five Week Class Change in the State of Tennessee from October 3, 2023 to November 7, 2023.
(Source: National Drought Mitigation Center)

A study conducted by the U.S. Department of Agriculture (USDA) and U.S. Forest Service Office of Sustainability and Climate compared the length of a 10-year Drought, defined as a once in a decade drought as measured by the number of consecutive dry days (days with less than 0.1 inches of rain) during the summer season (May – September) between historical data and future climate models. For this study, the historical period was based on observed data from 1975 to 2005, and the future scenario was for the 2080's based on the RCP8.5 (higher emissions) ensemble mean of 20 global climate models from the CMIP5 experiment. The output of this study, shown in the following figure, indicates that most areas of Tennessee could expect a 10-year Drought (10% annual probability of occurrence) to maintain its current length or increase by as much as 6 days in the 2080's compared to a 1-year Drought from 1975-2005. In Moore County, a 10-year drought could increase in length from 0.1 to 4 days compared to the modeled history. This demonstrates that although the average annual precipitation amount may increase in Tennessee and in Moore County, periods between precipitation events could get longer, leading to flash droughts or shorter-term drought periods.

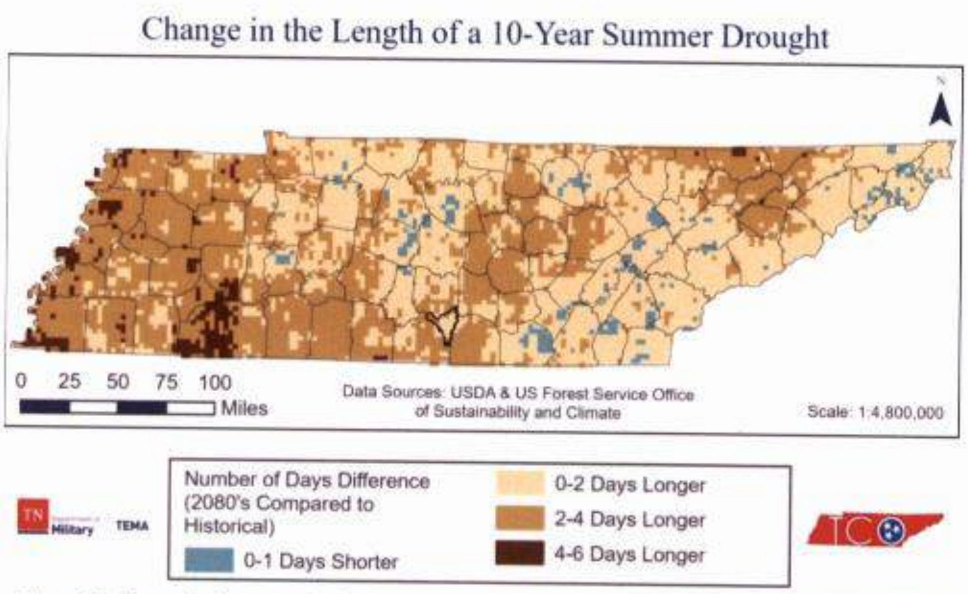


Figure 12: Change in the Length of a 10-Year (10% Annual Probability of Occurrence) Drought from Historical Data (1975-2005) to a 10-Year Drought in the 2080s (RCP8.5 Scenario), Moore County Outlined in Bold.

In addition to the variable climate, population growth and development in Tennessee means that the state will be at a higher risk for hydrological and socioeconomic droughts in the future as water demand increases.

Earthquake

There is little to no direct impact of climate trends and variations on the earthquake risk in Moore County. However, there are some USGS and NASA scientists who believe melting glaciers in mountainous regions and at the poles could induce tectonic activity due to the tremendous amount of weight that is shifted on the earth's crust as water melts and runs off. This newly freed crust can experience post-glacial isostatic uplift, which could cause seismic plates to slip and stimulate seismic activity as it returns to its original, pre-glacial shape. These shifts in tectonic plates would not directly impact Tennessee, but changes to stress/strain in other parts of the North American tectonic plate could impact existing faults/seismic zones in Tennessee indirectly. Also, secondary impacts of earthquakes such as liquefaction or mass wasting may increase due to soils saturated from repetitive or extreme precipitation.

Extreme Temperature

The Fourth National Climate Assessment (2018, NCA4) states climate variability is expected to increase the average temperature and the number of high-heat days in the southeastern United States and intensify the hydrologic cycle, leading to an increase in both extreme temperature and precipitation events in the southeastern United States. The increasing trend in average temperature in Moore County is also supported by observed historical data available from the NOAA National Centers for Environmental Information Climate-at-a-Glance tool (refer to Figures 4-6 in the Drought section of this appendix), and based on the NCA4, this trend is expected to continue in the future.

Heat

The Climate Mapping Risk Assessment (CMRA) Report for Moore County shows the potential for an increase in high heat days, when examining temperature thresholds and annual temperatures. By mid-century, Moore County could experience between 75 and 85 days of maximum temperatures exceeding 90°F, compared to an historical (1976-2005) average of 29 days. There could be 8-12 days of maximum temperatures exceeding 100°F by mid-century, compared to an historical average of 0 days per year. Additionally, the annual single highest maximum temperature could be 102-104°F by mid-century, compared to an historical average of 97°F.

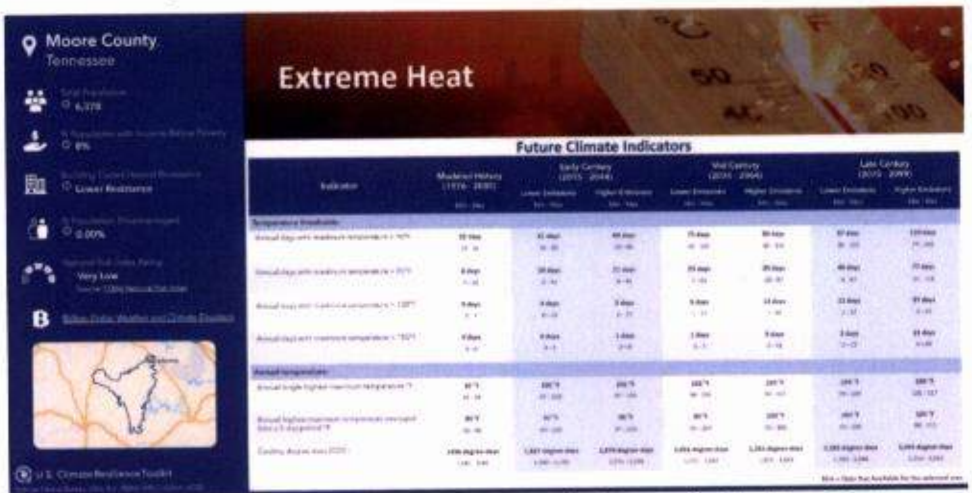


Figure 13: Climate Mapping Risk Assessment Report for Extreme Heat in Moore County. (Source: US Climate Resilience Toolkit)

Trend analysis of heat advisories/excessive heat warnings showed no significant increasing or decreasing trend for Moore County, meaning that these types of advisories and warnings (issued by the National Weather Service) have remained relatively stable between 2005 and 2023. Moore County was identified as a sporadic hot spot for heat advisories/excessive heat warnings; meaning it was statistically more likely to have heat advisories or warnings than other parts of the state occasionally through the time period.

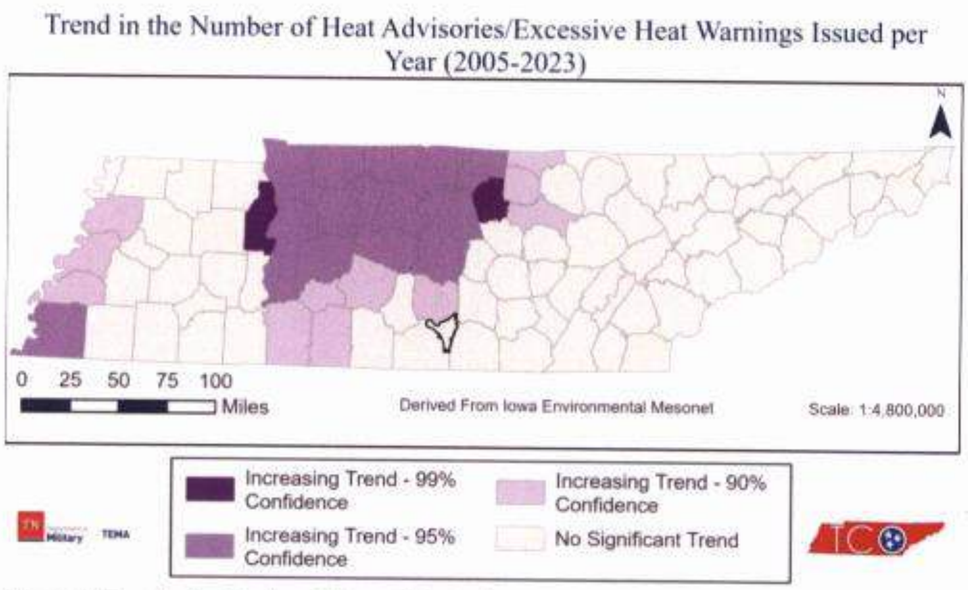


Figure 14: Trend in the Number of Heat Advisories/Excessive Heat Warnings Issued per Year, Moore County Outlined in Bold.

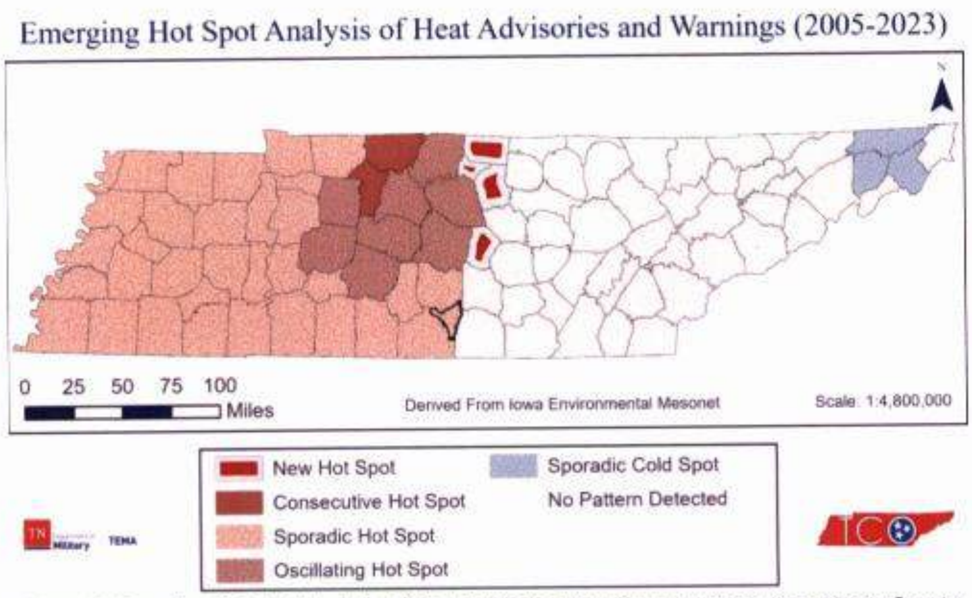


Figure 15: Emerging Hot Spot Analysis of Heat Advisories/Warnings Issued per Year, Moore County Outlined in Bold.

Cold

Trend analysis of cold/windchill advisories and extreme cold/extreme windchill warnings showed no significant increasing or decreasing trend for Moore County, meaning that these types of advisories and warnings (issued by the National Weather Service) have remained relatively stable from 2005 to 2022. Moore County was also not identified as an emerging hot or cold spot for cold temperature or wind chill-based advisories or warnings; meaning it was not statistically more or less likely to have heat advisories or warnings than other parts of the state.

Trend in the Number of Cold/Windchill Advisories and Extreme Cold/Extreme Windchill Warnings Issued per Year (2005-2022)

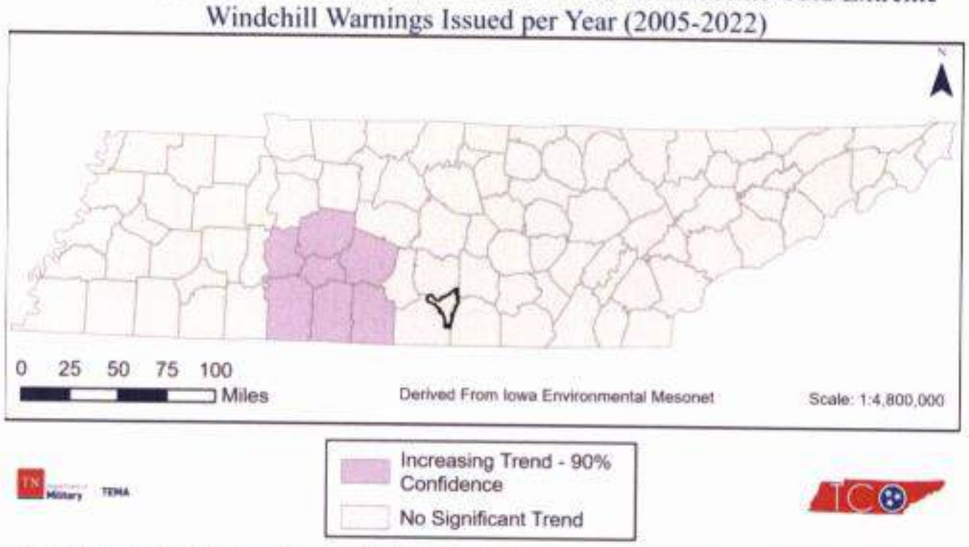


Figure 16: Trend in the Number of Cold/Windchill Advisories and Extreme Cold/Extreme Windchill Warnings Issued per Year, Moore County Outlined in Bold.

Emerging Hot Spot Analysis of Cold/Windchill Advisories and Warnings (2005-2022)

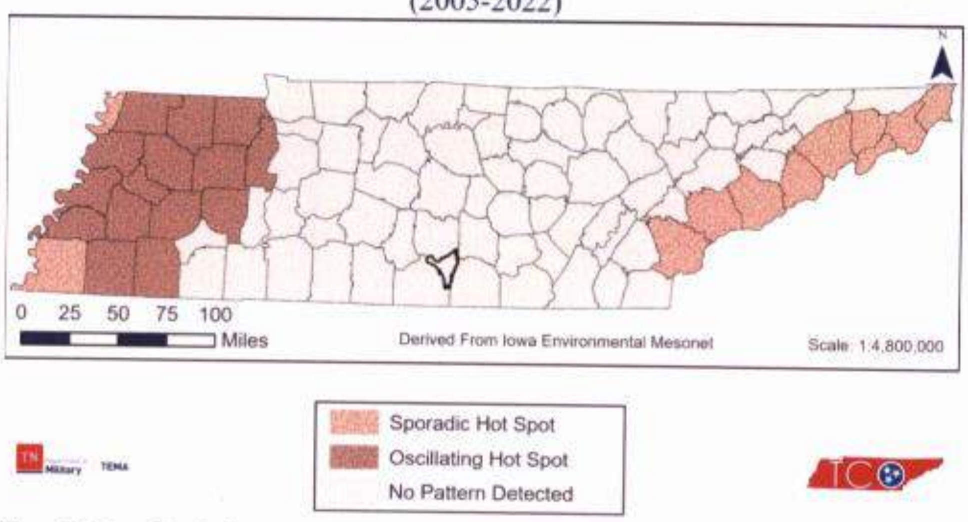


Figure 17: Emerging Hot Spot Analysis of Cold/Windchill Advisories/Warnings, Moore County Outlined in Bold.

Flooding

The future risk of flooding in Moore County is tied to predicted changes in the precipitation patterns. Tennessee and Moore County have increasing trends in observed precipitation, and the Fourth National Climate Assessment (2018) reports that the broader Southeast region has seen an increase in the frequency and intensity of extreme rainfall events. There is high confidence that this trend will continue in the future. According to the Climate Mapping Risk Assessment (CMRA) Report, Moore County is expected to experience a modest increase in various flood indicators by mid- and late-century. Both the increase in total precipitation and extreme rainfall events will increase the risk of flooding in Moore County. The long-term (1895-2023) trend in annual precipitation shows an increase of +0.80" per decade, the medium-term (1961-2023) trend in precipitation shows a stronger increasing trend of +1.31" per decade, and the short-term (1991-2023) trend shows an even stronger increase of 1.62" per decade. This indicates that precipitation has increased in Moore County over the past several decades, but with a large amount of inter-annual variation, with the driest and wettest years observed occurring since 2000.

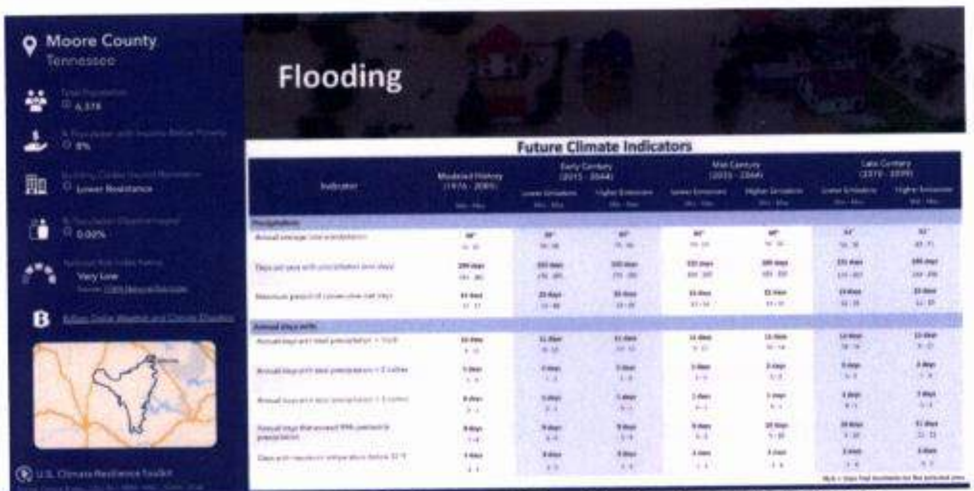


Figure 18: Climate Mapping Risk Assessment Report for Flooding in Moore County. (Source: US Climate Resilience Toolkit)

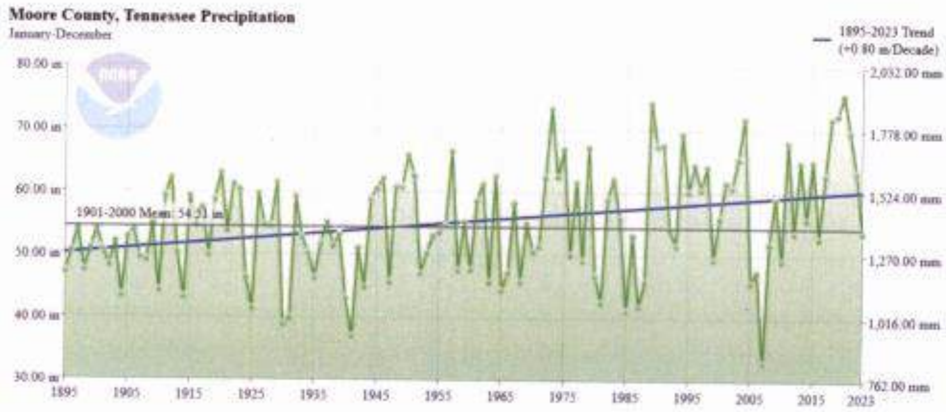


Figure 19: Total Annual Precipitation for Moore County, Tennessee, Showing a +0.80-inch Increase per Decade Since 1895.
(Source: NOAA NCEI, Climate at a Glance: County Time Series)

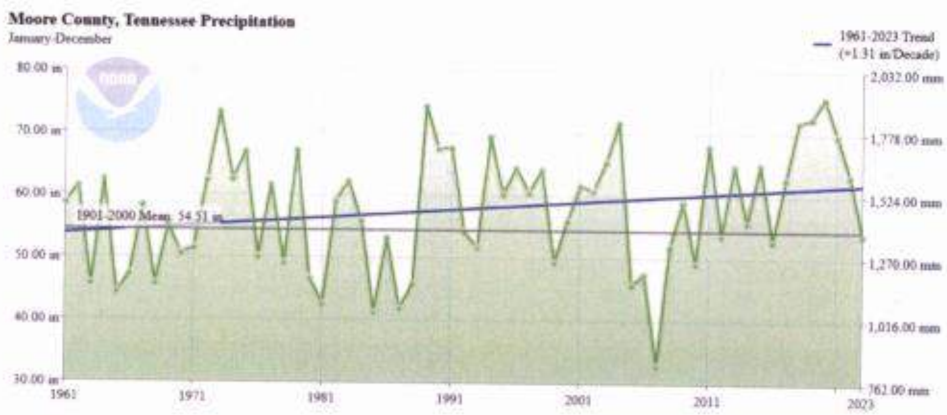


Figure 20: Total Annual Precipitation for Moore County, Tennessee, Showing a +1.31-inch Increase per Decade Since 1961.
(Source: NOAA NCEI, Climate at a Glance: County Time Series)

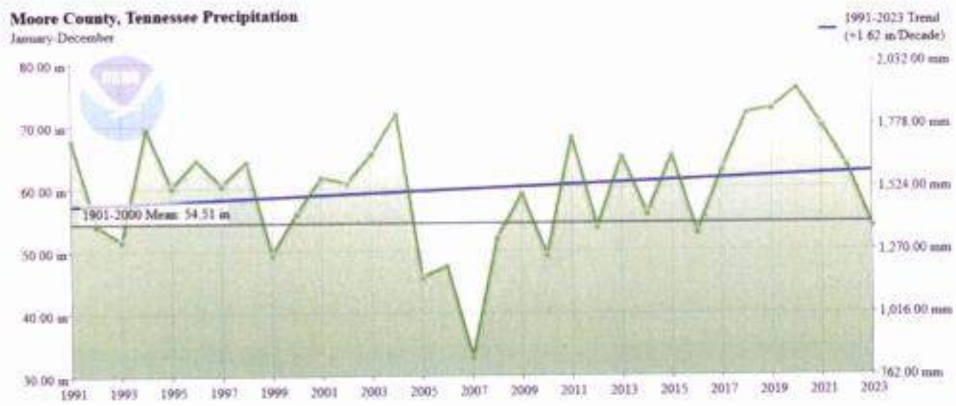


Figure 21: Total Annual Precipitation for Moore County, Tennessee, Showing a +1.62-inch Increase per Decade Since 1991.
(Source: NOAA NCEI, Climate at a Glance: County Time Series)

Using the NOAA Storm Events Database, flood events and flood damages (dollars) were examined for trends between 1996 and 2022. Moore County showed no significant increasing trend in the number of flood events or amount of flood damages in the Storm Events Database in this time period. The trends in flood events and flood damages presented above are for riverine flooding, but as overall rainfall increases and trends towards higher intensity precipitation events continue flash flooding may become a higher concern for parts of Tennessee, including Moore County. The TCO analyzed trends in flash flood events and flash flood related damages from the NOAA Storm Events Database from 1996 to 2022. Moore County showed no significant trend in these events.

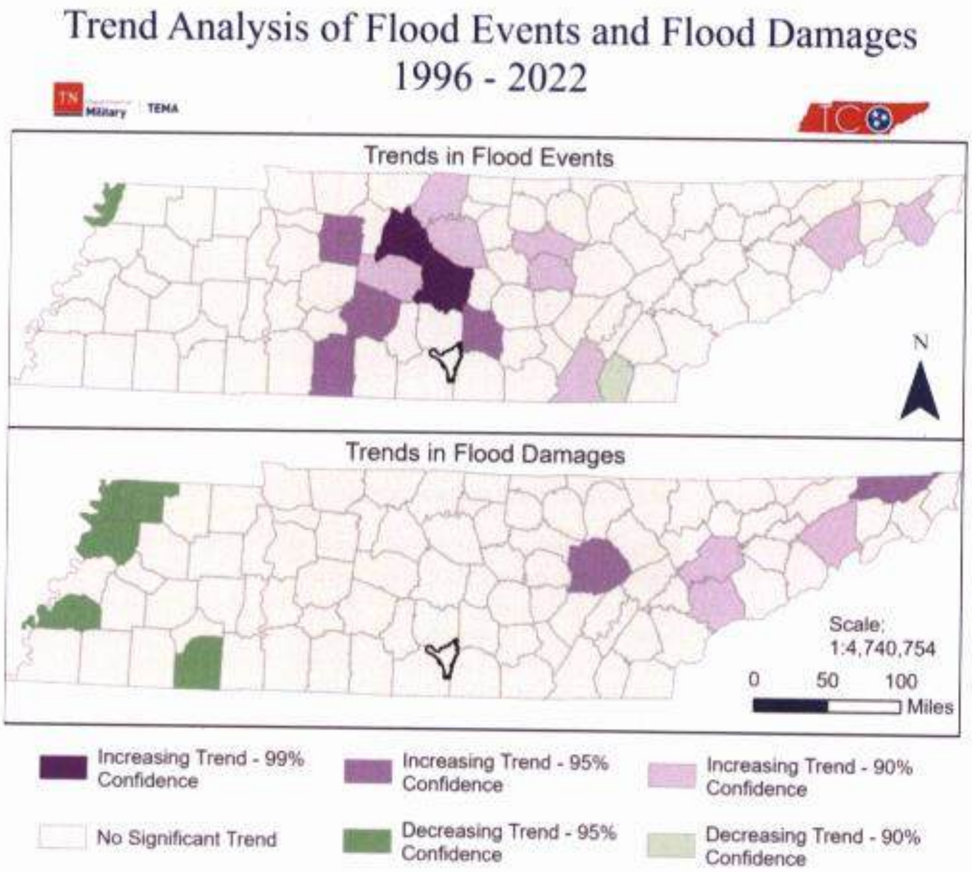


Figure 22: Trend in Flood Events and Flood Damages Reported in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

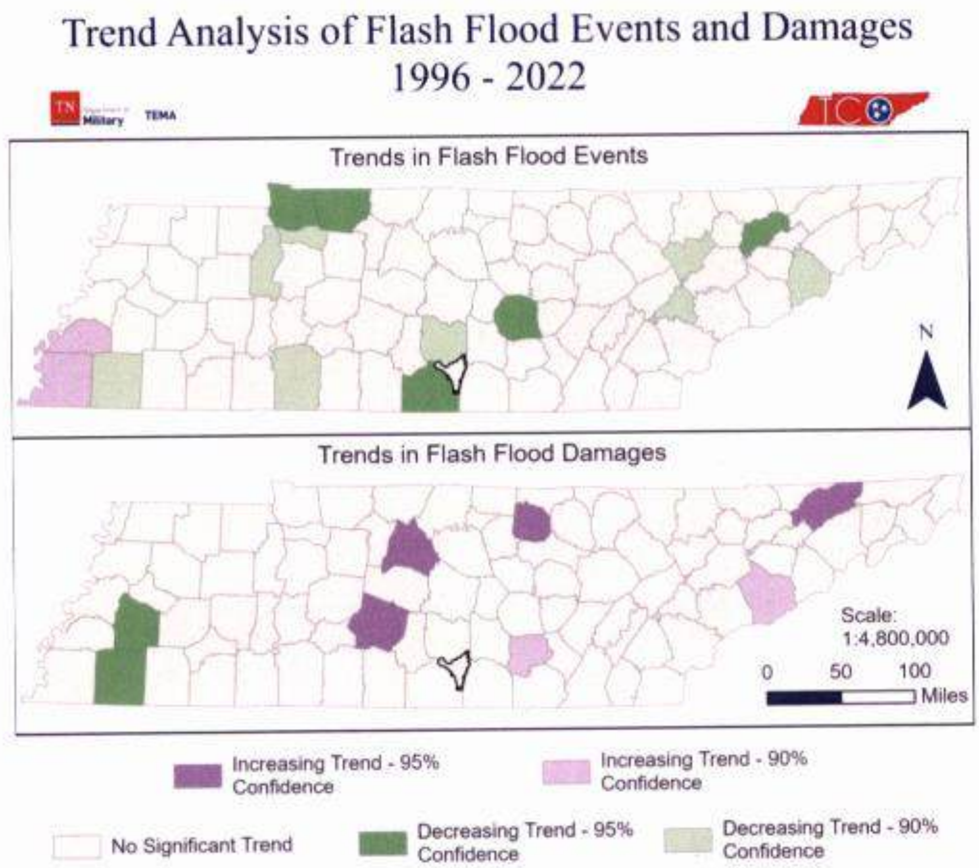


Figure 23: Trend in Flash Flood Events and Flash Flood Damages Reported in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

Extreme rainfall events are often categorized based on how much above or below their amounts were compared to the 100-year, or 1% annual probability, rainfall amounts. For Moore County, a 100-year 1-hour extreme rainfall total would be approximately 3.76-4.00 inches. For a 100-year 24-hour extreme rainfall event, Moore County would experience 7-8 inches of rain.

1-Hour Extreme Rainfall Amounts (100-year / 1% Annual Probability)

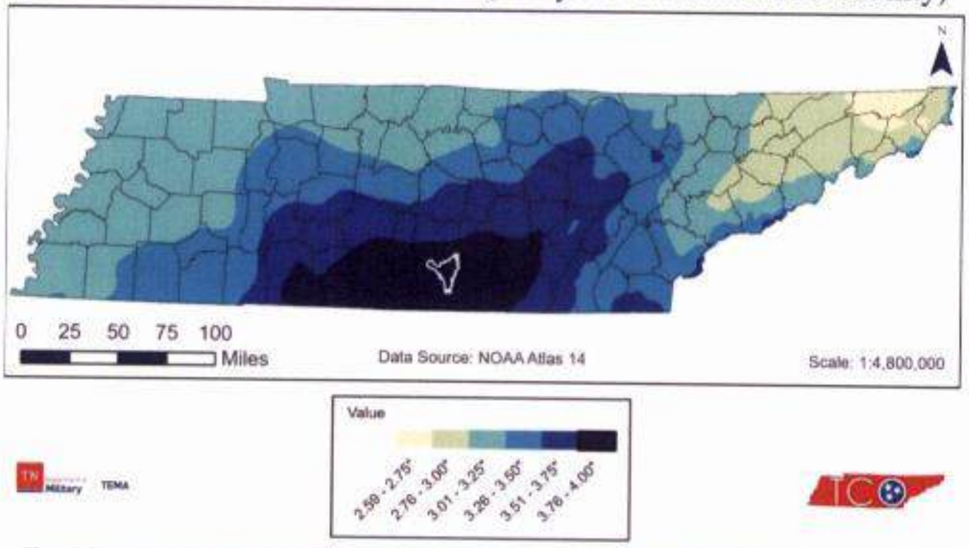


Figure 24: 1-hour Extreme Rainfall Estimates for 100-year Return Period (1% Annual Probability of Exceedance) using NOAA Atlas 14, Moore County, Outlined in Bold White.

24-Hour Extreme Rainfall Amounts (100-year / 1% Annual Probability)

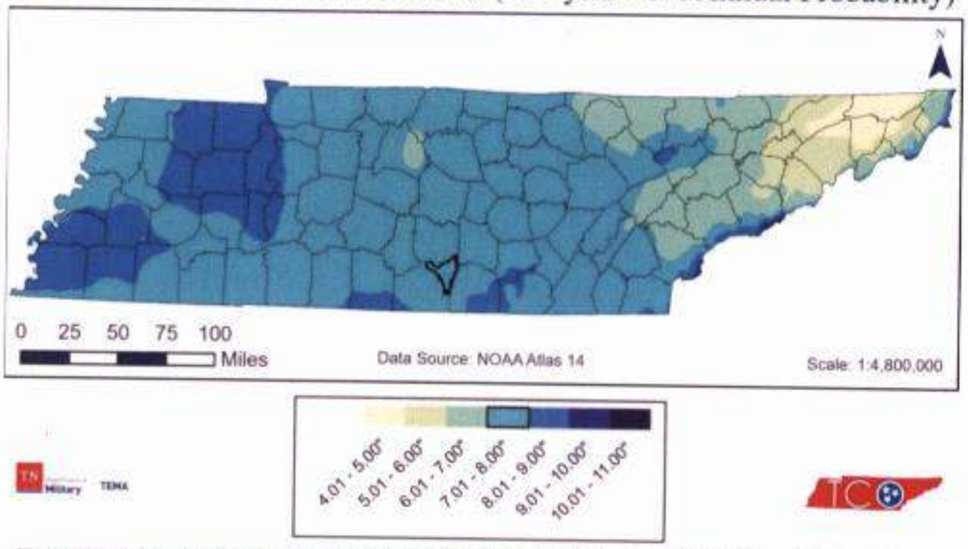


Figure 25: 24-hour Extreme Rainfall Estimates for 100-year Return Period (1% Annual Probability of Exceedance) using NOAA Atlas 14, Moore County, Outlined in Bold.

The TCO analyzed trends in heavy precipitation days per year in counties across Tennessee, these were the number of days that daily rainfall totals exceeded a 1-year (100% chance of annual probability), 2-year (50% chance of annual probability), or 5-year (20% chance of annual probability) event. Moore County showed no significant trend for these heavy precipitation events.

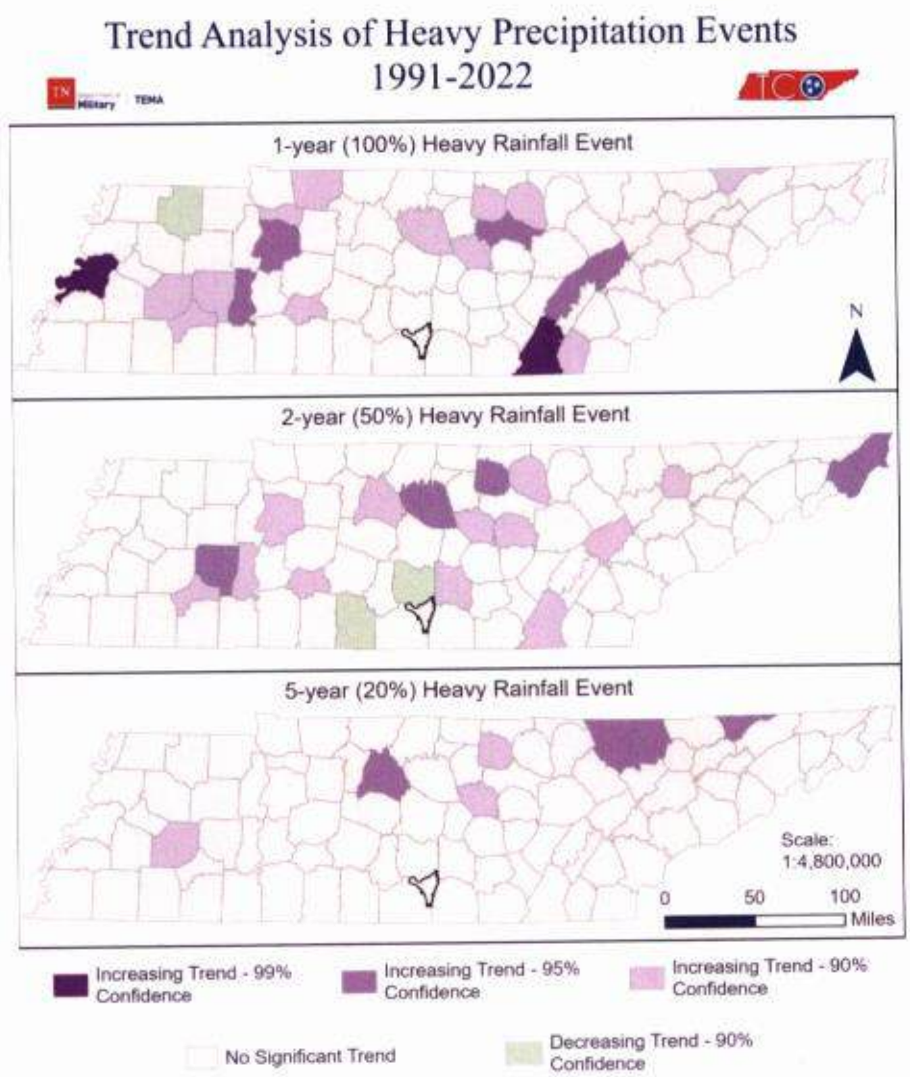


Figure 26: Trend in Heavy Precipitation Events (1-year, 2-year, and 5-year Return Period Exceedance Events), Moore County Outlined in Bold.

Additional data from the CMRA report for Moore County predicts an increase in the number of days per year with extreme precipitation throughout the 21st century. Based on analysis by the NCICS and NOAA, Lynchburg (the county seat of Moore County) currently has a 100-year 24-hour extreme rainfall amount of 7.83 inches and that amount is predicted to rise by as much as 1.3 inches (to 9.13") by 2055.

Table 3: Possible Change in the Number of Days per Year with Precipitation Exceeding 99th Percentile (Extreme Precipitation Days).

High Emissions Scenario	Modeled History (1976-2005)	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Driest Projection	7.3	+1.3	+1.8	+3.2
Mean Projection	7.8	+1.2	+1.7	+3.3
Wettest Projection	8.2	+1.1	+1.6	+3.2
Low Emissions Scenario	**Modeled History (1976-2005)**	**Early Century (2015-2044)**	**Mid Century (2035-2064)**	**Late Century (2070-2099)**
Driest Projection	7.3	+0.8	+1.3	+2.2
Mean Projection	7.8	+0.7	+1.3	+2.2
Wettest Projection	8.2	+0.6	+1.2	+2.3

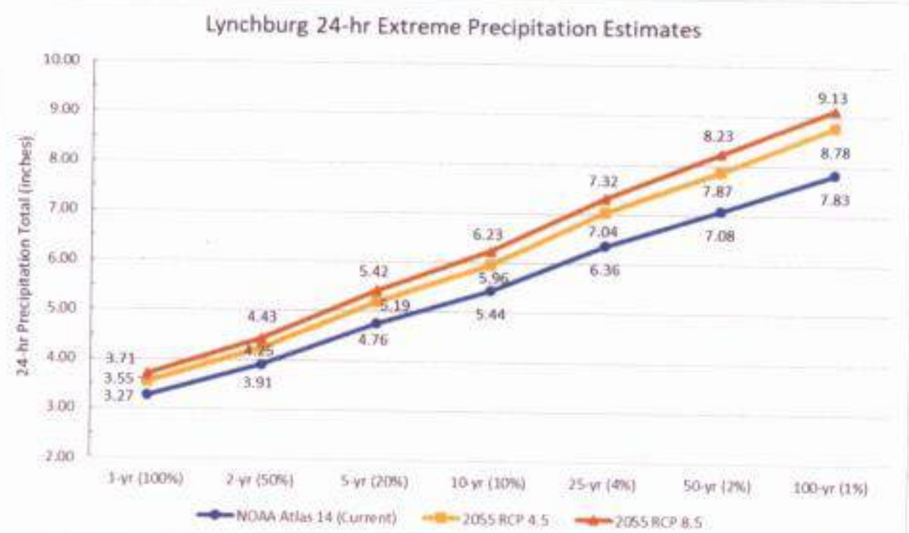


Figure 27: 24-hour Extreme Rainfall Estimates for 1-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year Return Periods using NOAA Atlas 14 (historical data) and Mid-Century Values for 2055 using RCP4.5 and RCP8.5 Emission Scenarios.

The US Department of Agriculture and US Forest Service created a report based on models and projection data from Multivariate Adaptive Constructed Analogs (MACA), that show most of Tennessee is expected to see an increase in annual precipitation by the late 21st century. Moore County is projected to see an increase of 2-4% in annual precipitation by the late 21st century. However, potential changes in precipitation are not expected to be spread equally across all four seasons. The largest change for Moore County is projected to come in the spring season, with an increase of 6-8% compared to the historical average for spring. Fall precipitation shows the second largest change, with a projected increase of 4-6% compared to the historical average precipitation. Winter precipitation shows a weaker change, with 0.1-4% increase over historical precipitation amounts. Summer precipitation is projected to decrease by 0.1-2% compared to the historical average summer precipitation.

Percent Change in Annual Precipitation by Late 21st Century

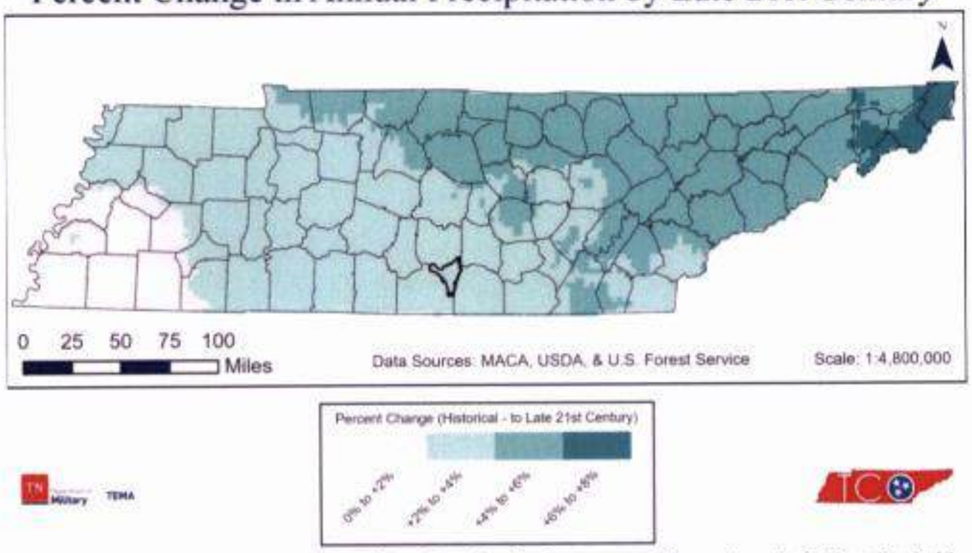


Figure 28: Projected Change in Annual Precipitation for Tennessee, Moore County Outlined in Bold.

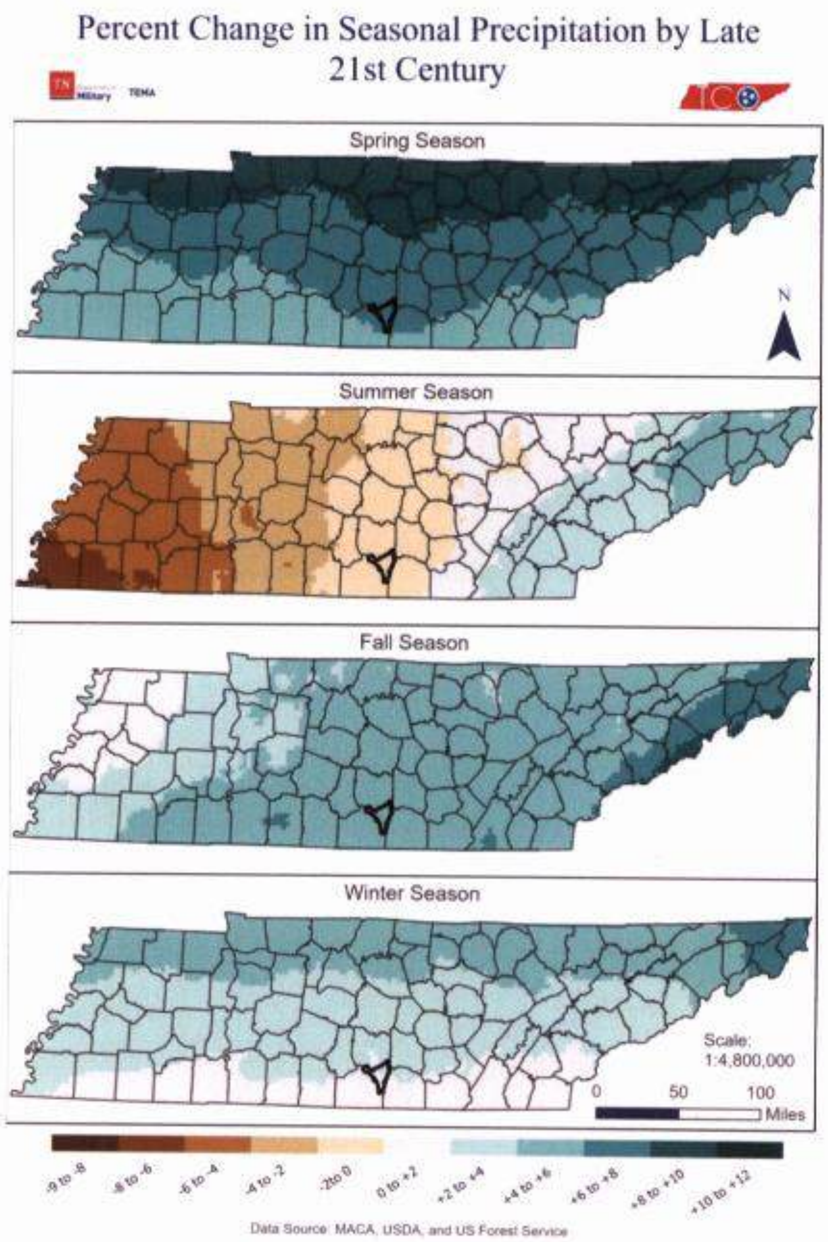


Figure 29: Projected Change in Seasonal Precipitation for Tennessee, Moore County Outlined in Bold.

Geologic Hazards

Specific impacts of climate on geologic hazards may vary depending on the local geological conditions of the area. Other factors, such as land use practices and human interventions, can interact with climate to influence the occurrence and severity of geologic hazards. Increased precipitation can result in greater soil moisture content, causing expansive soils to swell more and potentially lead to landslides and damage to infrastructure. Conversely, increased frequency and severity of drought can cause soils to shrink and crack, leading to subsidence and foundation problems in structures. The impacts of climate on landslides would be increased water from intense rainfalls that would weaken the soil's stability due to an increase in saturation which increases pore water pressure. Landslides and other types of mass wasting events can be triggered by weather events like extreme rainfall or repeated freeze-thaw cycles that destabilize slopes and cause fracturing in exposed rock surfaces. Climate variability is expected to increase the number and severity of extreme precipitation events in the Southeast U.S. (see the Flood section for more details about expected changes in extreme precipitation), which could increase the likelihood of landslides in parts of Moore County. Climate can also alter vegetation patterns which could drastically impact landslides since vegetation plays a crucial role in stabilizing slopes, and any changes can affect slope stability, potentially leading to increased landslide occurrences.

A study conducted by the USDA and U.S. Forest Service Office of Sustainability and Climate found that the frost-free season (the longest period of the year during which the temperature does not drop below freezing) could increase in length by 50 to 53 days in Moore County by the late 21st century. The lengthening of the frost-free season and overall decrease in number of days with temperatures below freezing would reduce the amount of time during the year rock surfaces and soils would be exposed to freeze-thaw cycles. This reduction could reduce the number of localized rockfalls in Moore County. See the Winter Weather sub-section of Severe Weather section of this appendix for more information on observed and expected changes to winter temperatures in Moore County.

Changes in precipitation patterns and groundwater recharge rates can alter water table levels. These fluctuations in the water table can lead to the dissolution of soluble rocks, potentially increasing the formation of sinkholes in most areas of Moore County that have underlying karst geology.

Severe Weather

Climate trends and variations may lead to an increase in frequency and intensity of certain types of severe storms. Warmer air temperatures can contribute to more moisture in the atmosphere, providing fuel for stronger rainfall events and potentially more intense thunderstorms. The increased energy in the atmosphere can also contribute to the development of more powerful storms. Climate trends can also result in altered precipitation patterns influencing the distribution, timing, and intensity of rainfall during storms. Climate trends can influence the paths and tracks of severe storms too. Changes in atmospheric circulation patterns may lead to shifts in the regions where storms typically form or move, potentially affecting the areas that are historically vulnerable to specific types of storms. This can result in new areas being exposed to severe storms while other areas experience a decrease. Research by Ashley et al. (2023) into supercell thunderstorm formation compared historical data (1990-2005) and future climate models for the late 21st century (2085 – 2100), which indicate that the mid-South region of the U.S. could see an increase in the number of supercell thunderstorms capable of producing severe thunderstorm hazards and tornadoes. These increases were mostly found in the late winter to early spring months of February, March, and April. Additionally, they found that an increasing number of supercell thunderstorms in this region could form in the late afternoon to overnight hours. Climate trends can contribute to compound events where multiple extreme weather events can occur simultaneously or in succession. These compound events can amplify the overall impacts on communities and ecosystems, making them more challenging to manage and recover from.

Severe Thunderstorms (Convective Wind, Hail, and Lightning)

Using data from the NOAA Storm Prediction Center severe storm reports archive from 1980-2022, Moore County has a high number of severe thunderstorm wind damage and moderate number of severe hail reports compared to other parts of the state. Moore County averages 0.5-1 severe thunderstorm wind damage report per square mile and 0.11-0.2 severe hail reports per square mile. Moore County has a low density of lightning strikes per year compared to other areas in the state, however surrounding counties have a moderate to high density and the strike density found in Moore county could be an artifact of the way lightning data is reported. The Tennessee Climate Office (TCO) analyzed trends for thunderstorm winds (convective wind) and severe hail reports in counties across Tennessee using the NOAA Storm Events Database with data from 1996 to 2022, and lightning strikes per county from 1996 to 2023 from the NOAA Severe Weather Data Inventory (SWDI). The trend analysis for convective wind reports and severe hail showed no significant trend in the number of these severe storm reports in Moore County. Trend analysis for lightning strikes showed a decreasing trend for the county that was significant to the 99% confidence level.

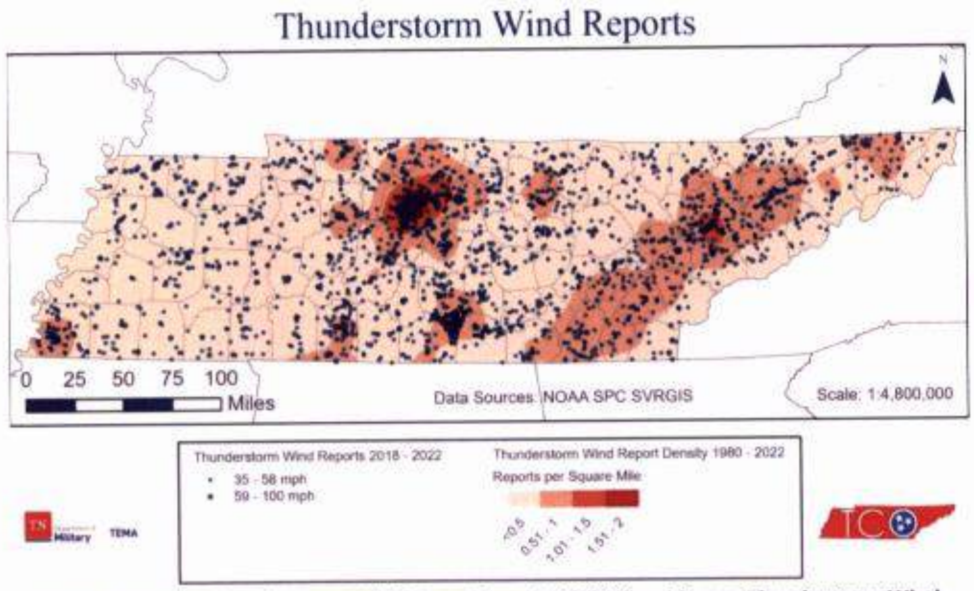


Figure 30: Severe Thunderstorm Wind Reports from 2018-2022 and Severe Thunderstorm Wind Report Density from 1980-2022, Moore County Outlined in Bold.

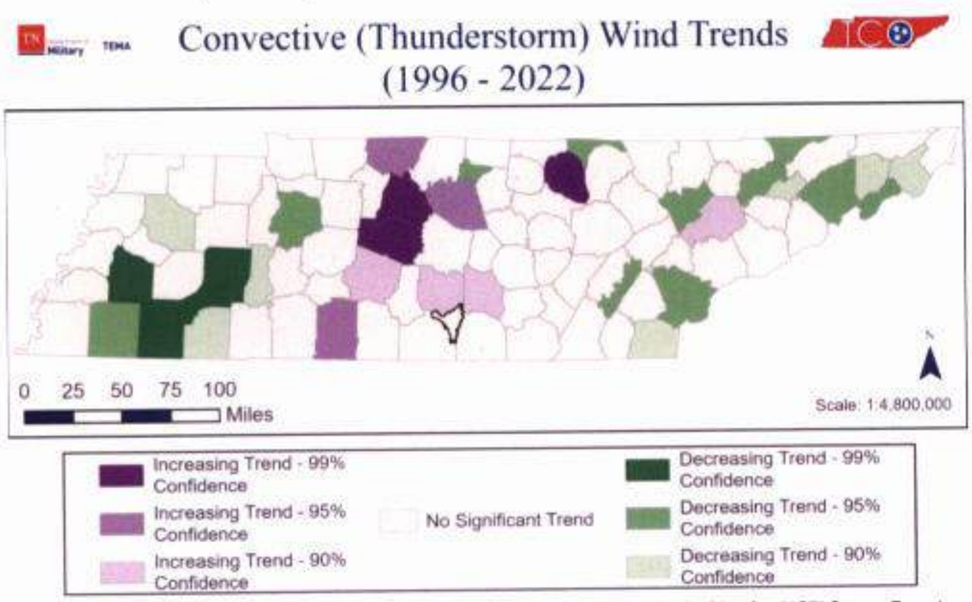


Figure 31: Trends in the Number of Thunderstorm Wind Events Recorded in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

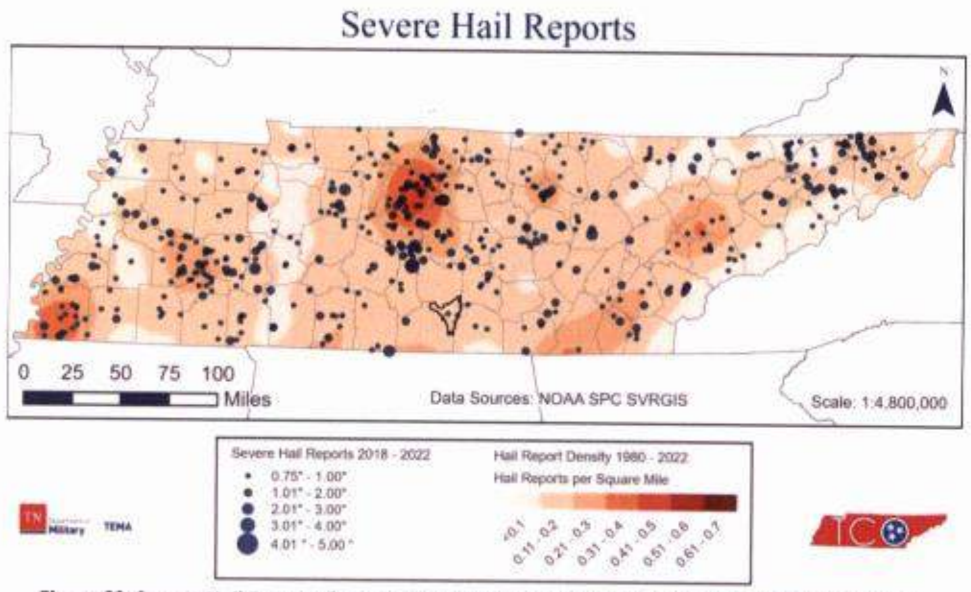


Figure 32: Severe Hail Reports from 2018-2022 and Severe Hail Density from 1980-2022, Moore County Outlined in Bold.

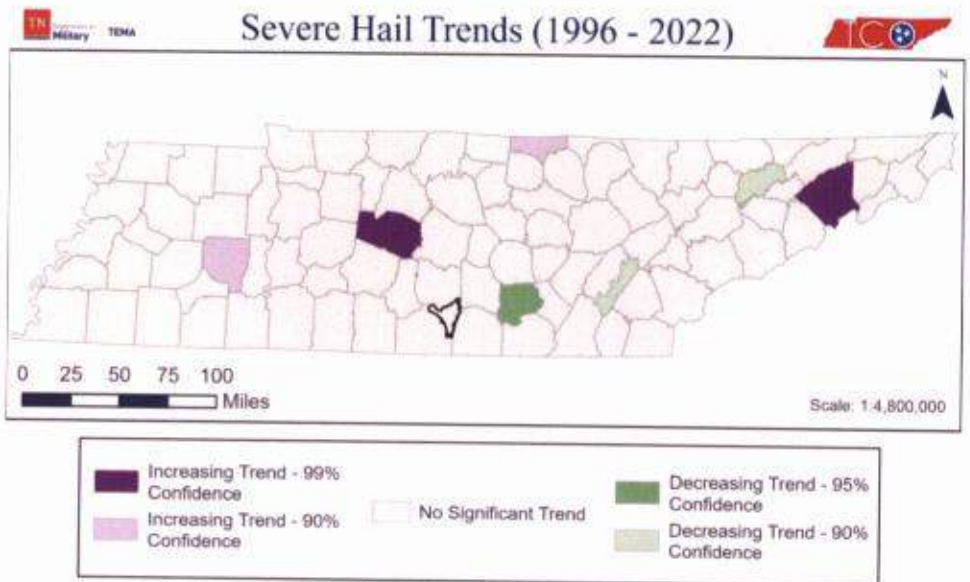


Figure 33: Trends in the Number of Severe Hail Events Recorded in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

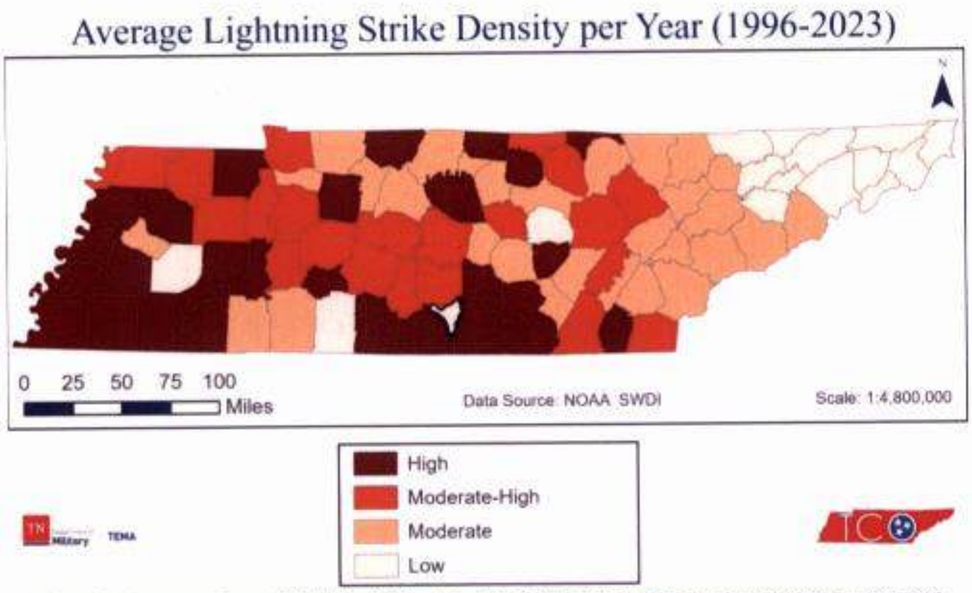


Figure 34: Average Annual Lightning Strike Density 1996 to 2023, Moore County Outlined in Bold.

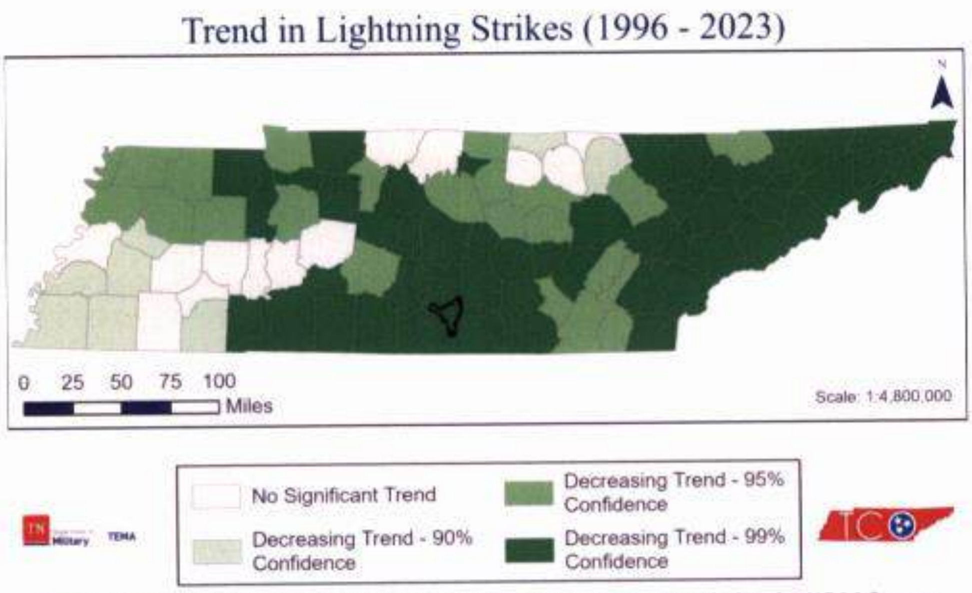


Figure 35: Trends in the Number of Lightning Strikes per County Recorded in the NOAA Severe Weather Data Inventory from 1996 to 2023, Moore County Outlined in Bold.

Non-Thunderstorm Winds

The Tennessee Climate Office (TCO) also analyzed trends for non-convective (non-thunderstorm) wind reports in counties across Tennessee using the NOAA Storm Events Database with data from 1996 to 2022, and Moore County showed no significant trend in non-convective wind events during this time.

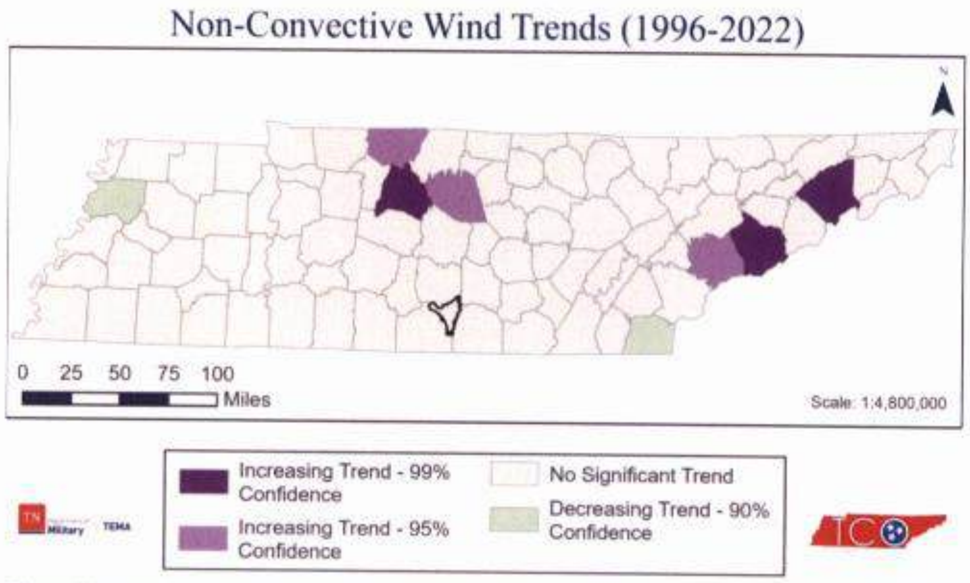


Figure 36: Trends in the Number of Non-Convective Wind Events Recorded in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

Winter Weather

Data from the National Weather Service NOHRSC National Gridded Snowfall Analysis webpage covering the winters of 2008-2009 to 2022-2023 (the last 15-years) indicates that the average annual snowfall for Moore County ranges from 2 to 4-inches per year. Using data from the NOAA Storm Events Database, trend analysis was performed on winter weather-related storms from 1996 to 2022 across the state of Tennessee. In this time period there was an increasing trend in the number of winter storms impacting Moore County significant to the 99% confidence level.

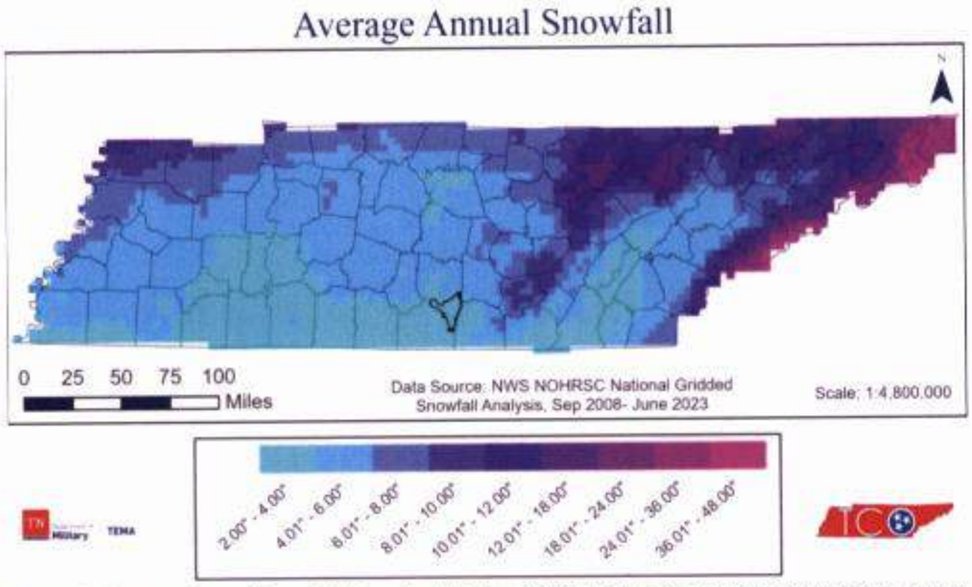


Figure 37: Average Annual Snowfall from the Winter of 2008/2009 to the Winter of 2022/2023, Moore County Outlined in Bold.

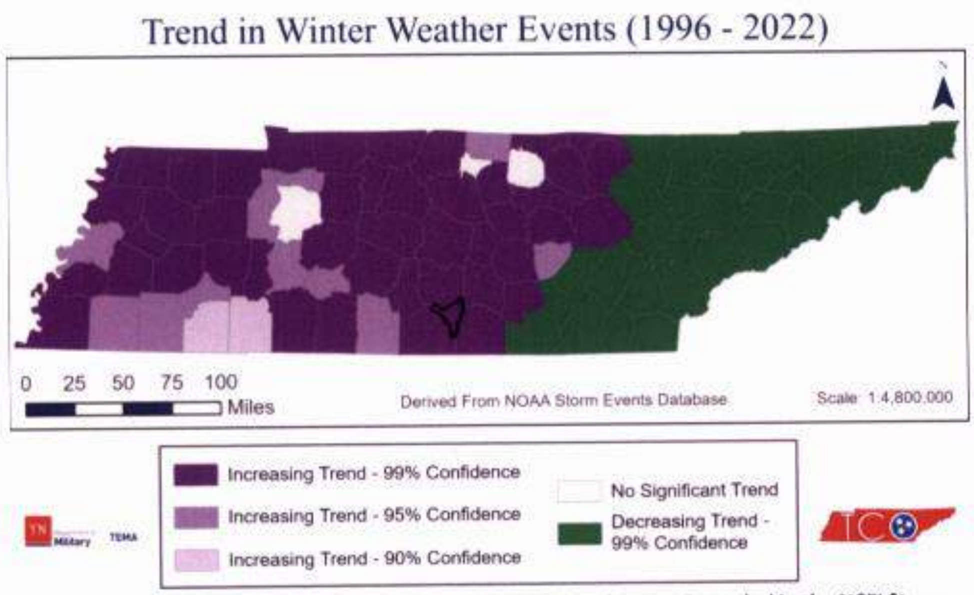


Figure 38: Trends in the Number of Winter Weather-Related Events Recorded in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

Climate trends and variability will impact the future likelihood of winter weather events or severe winter storms in Tennessee, likely decreasing but not eliminating the overall risk. Average annual temperatures are expected to increase across the Southeast US, including temperatures during the winter season. Moore County has an observed warming trend of +0.1°F per decade from 1896 to 2024 throughout the meteorological/climatological winter season (December – February). In the medium-term (1961 - 2024) the winter temperature trend shows greater warming at +0.8°F per decade, however the short-term (1991 - 2024) trend shows slightly moderated warming of +0.6°F per decade during the winter season. The moderation was caused by the exclusion of the very cold winters of 1963-1964, 1970, and 1977-1979.

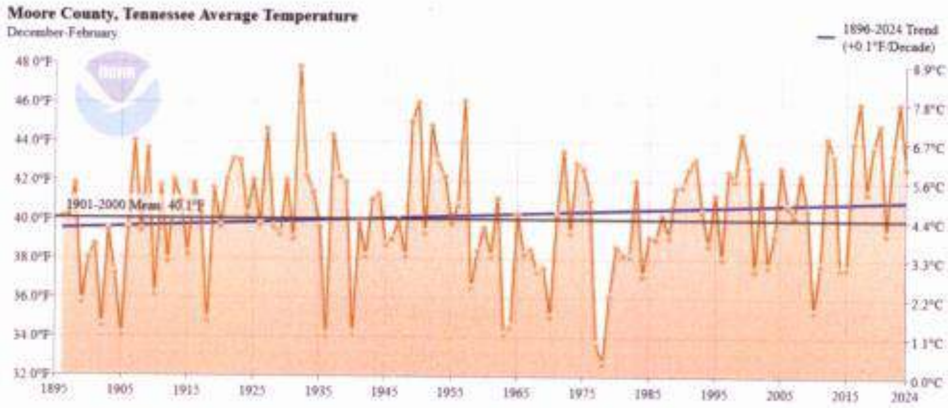


Figure 39: Winter (December to February) Mean Temperature for Moore County, Tennessee, Showing a +0.1°F Increase per Decade Since 1895.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

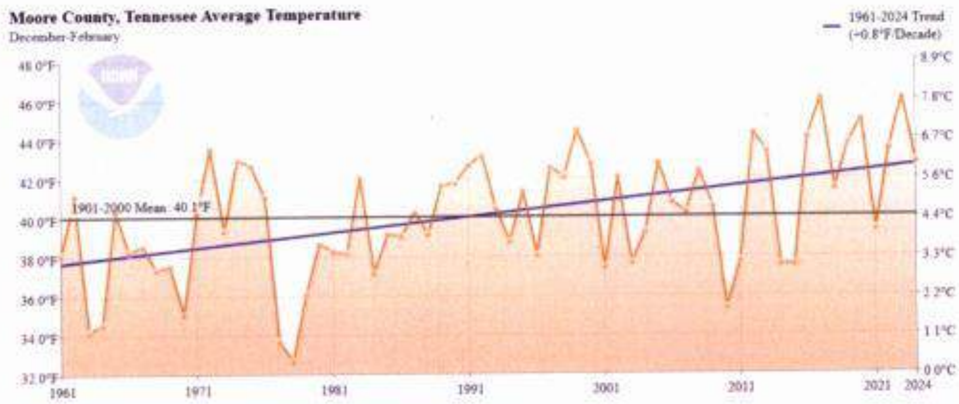


Figure 40: Winter (December to February) Mean Temperature for Moore County, Tennessee, Showing a +0.8°F Increase per Decade Since 1961.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

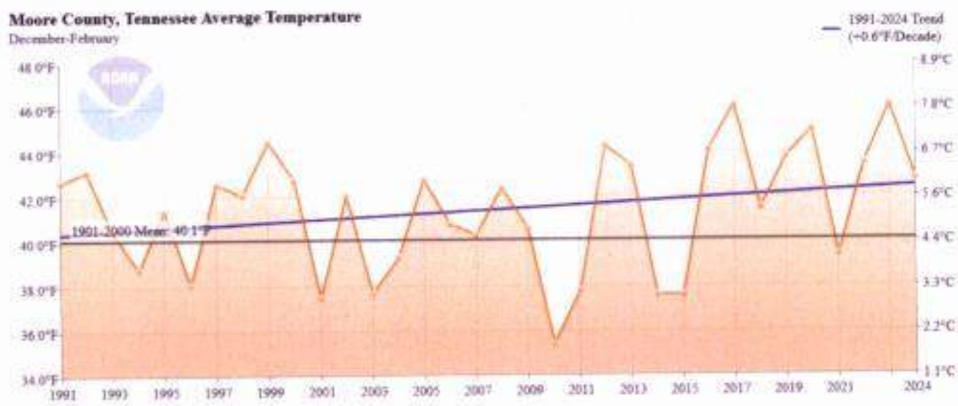


Figure 41: Winter (December to February) Mean Temperature for Moore County, Tennessee, Showing a +0.6°F Increase per Decade Since 1991.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

In addition to the increasing average annual and winter temperatures, the USDA and U.S. Forest Service Office of Sustainability and Climate projects that the length of the frost-free season will increase by 50-53 days across Moore County by the late 21st century. This means that the amount of time during the year where winter weather is possible will decrease. Currently, the average frost season in Moore County lasts for about five months of the year (from late October until early April), but by the late 21st century that is projected to decrease to just about three and a half to four months of the year. In the following two figures the historical and projected number of Frost Days (days with a minimum temperature below freezing) and Icing Days (days with a maximum temperature below freezing) are shown for Moore County from the U.S. Climate Resilience Toolkit Climate Explorer. The mean projection for the low emissions scenario indicates that Moore County could have 28 fewer Frost Days per year by the end of the century, while the mean projection for the high emissions scenario indicates there could be 40 fewer Frost Days per year than the 1961-1990 observed average number of frost days. The mean projection for the low emissions scenario shows that Moore County could observe approximately four fewer Icing Days per year, while the high emissions scenario shows that there could be approximately five fewer Icing Days per year by the end of the century compared to the 1961-1990 observed average.

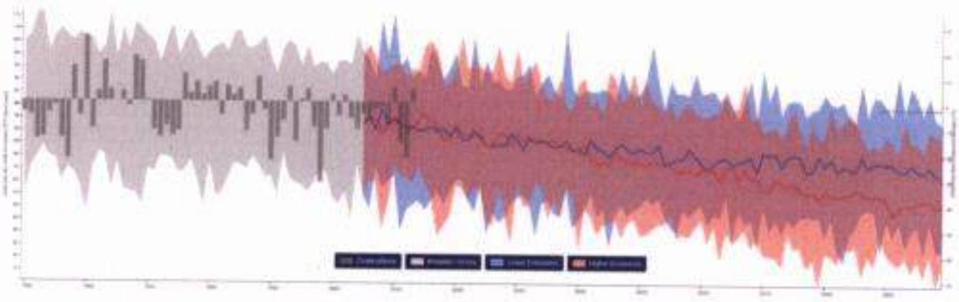


Figure 42: Days Per Year with Minimum Temperature Below 32°F (Frost Days) with Historical Observations from 1950 to 2013 and High (red) and Low (blue) Emission Scenarios Going to 2100 for Moore County, Tennessee.
(Source: U.S. Climate Resilience Toolkit Climate Explorer)

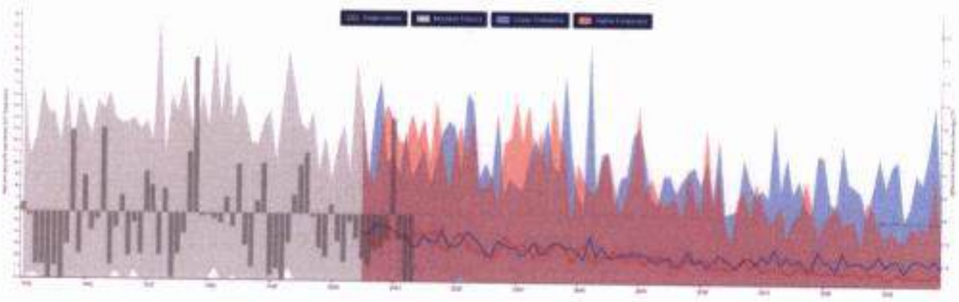


Figure 43: Days per Year with a Maximum Temperature Below 32°F (Icing Days) With Historical Observations from 1950 to 2013 and High (red) and Low (blue) Emission Scenarios Going to 2100 for Moore County, Tennessee.
(Source: U.S. Climate Resilience Toolkit Climate Explorer)

Additionally, the USDA forecasted changes in plant hardiness zones for the Southeast U.S. The following figure, from the Fourth National Climate Assessment (2018) indicates that Moore County may transition from Plant Hardiness Zone 6b/7a (historical data, 1976-2005) to Plant Hardiness Zone 7b/8a by 2070-2099, based on climate models using the RCP8.5 (higher emissions) greenhouse gas emissions scenario. That would correlate to a warming of approximately 10 degrees in the average coldest temperature expected in parts of the county, from historical values of -5°F to +5°F to future values of +5°F to +15°F.

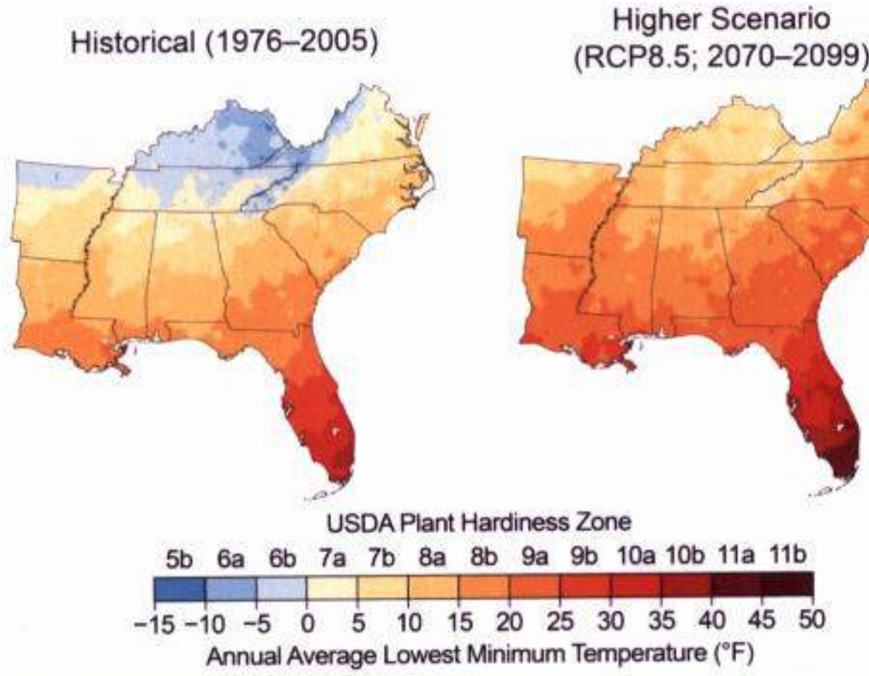


Figure 44: Comparison of Plant Hardiness Zones Across the Southeast U.S. from Historical Averages and Projected Values for Late Century using RCP8.5 (high emissions) Scenario Models. (Source: Fourth National Climate Assessment (Southeast Chapter))

Tornado

It is uncertain how climate trends will impact the overall frequency of tornadoes, with convective storms (from which tornadoes form) being the least well understood extreme events when it comes to attributing future changes to climate trends and variations. However, some studies suggest that the number of days conducive to severe thunderstorms, which can spawn tornadoes, may increase in certain regions. Additionally, warmer temperatures can provide more energy to storms, potentially leading to more intense tornadoes. Tornado formation depends on the interaction of multiple atmospheric factors, including temperature, humidity, wind shear, and instability. While climate trends may alter some of these factors, the precise impact on tornado formation remains uncertain. Warmer temperatures and increased moisture content in the atmosphere can contribute to more favorable conditions for tornado formation, but other factors like wind shear patterns may also change and reduce the chances for tornado formation.

Using historical data from 1980 to 2022, Moore County has a moderate-to-high density for tornadoes in Tennessee, with an average of 0.11 to 0.2 tornado tracks per square mile in most of the county and 0.21 to 0.3 tornado tracks per square mile in the southern end of the county.

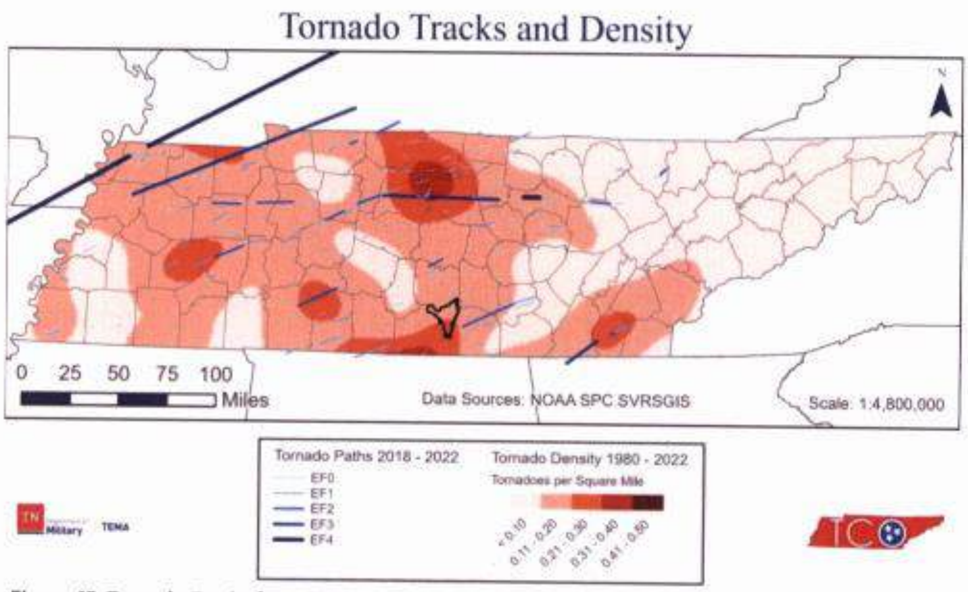


Figure 45: Tornado Tracks from 2018-2022 and the Density of Tornado Tracks across Tennessee from 1980 to 2022, Moore County Outlined in Bold.

Using data from the NOAA Storm Events Database, trend analysis and emerging hotspot analysis were performed on the number of tornadoes reported in each county of Tennessee from 1996 to 2022. There was no significant increasing or decreasing trend in the number of tornadoes observed in Moore County. Moore County was also not identified as an emerging hot spot, meaning that it was not more or less likely to be a hot spot for tornado reports over this time period.

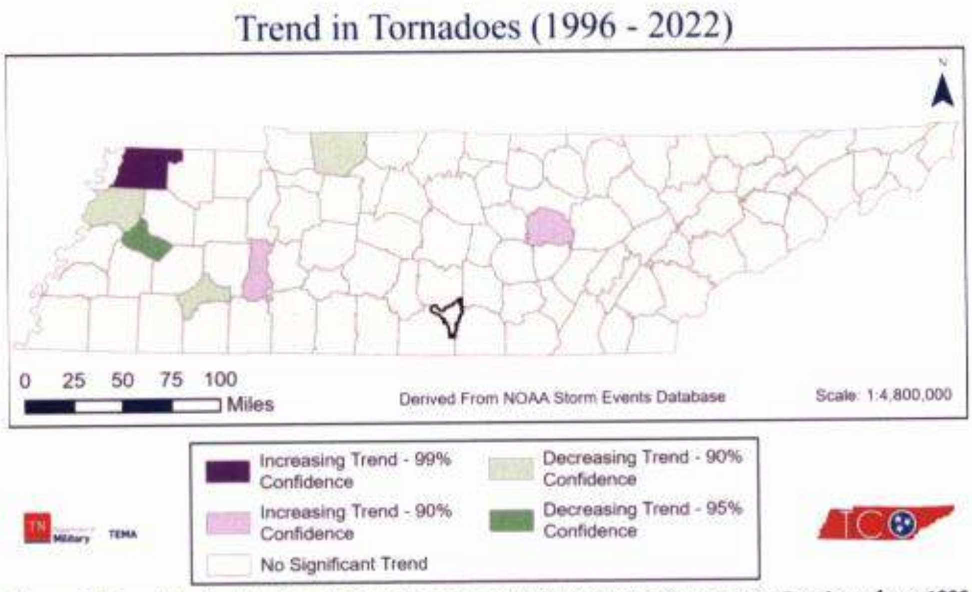


Figure 46: Trends in the Number of Tornadoes Recorded in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

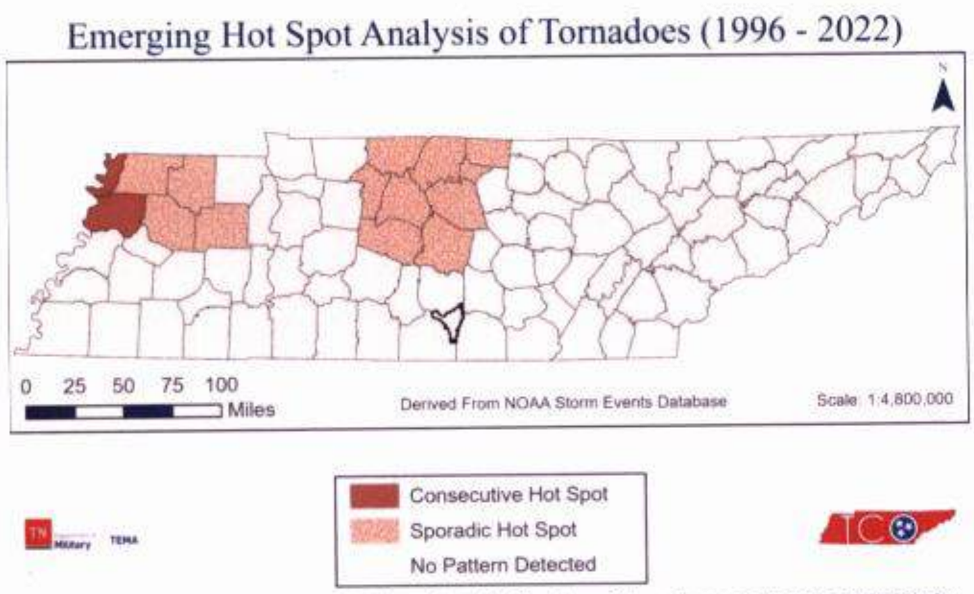


Figure 47: Emerging Hot Spot Analysis based on the Number of Tornadoes per Year Recorded in the NCEI Storm Events Database from 1996 to 2022, Moore County Outlined in Bold.

Hazus: Flood Global Risk Report

Region Name: Moore_100yr

Flood Scenario: Moore_100yr

Print Date: Monday, May 20, 2024

Disclaimer:
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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Table of Contents

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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 5 square miles and contains 262 census blocks. The region contains over 3 thousand households and has a total population of 6,446 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 3,583 buildings in the region with a total building replacement value (excluding contents) of 1,503 million dollars. Approximately 91.43% of the buildings (and 58.71% of the building value) are associated with residential housing.

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Building Inventory

General Building Stock

Hazus estimates that there are 3,583 buildings in the region which have an aggregate total replacement value of 1,503 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	882,302	58.7%
Commercial	168,643	11.2%
Industrial	138,611	9.2%
Agricultural	11,493	0.8%
Religion	50,048	3.3%
Government	9,908	0.7%
Education	241,692	16.1%
Total	**1,502,697**	**100%**

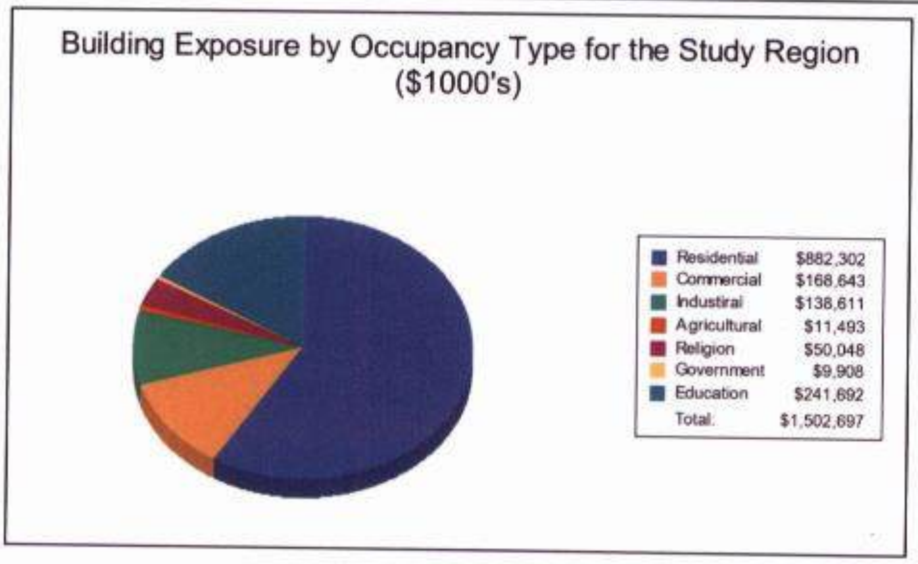

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Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	146,506	44.6%
Commercial	74,972	22.8%
Industrial	79,045	24.1%
Agricultural	1,352	0.4%
Religion	6,832	2.1%
Government	2,614	0.8%
Education	17,097	5.2%
Total	**328,418**	**100%**

Building Exposure by Occupancy Type for the Scenario ($1000's)

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 3 schools, 6 fire stations, 1 police station and 2 emergency operation centers.

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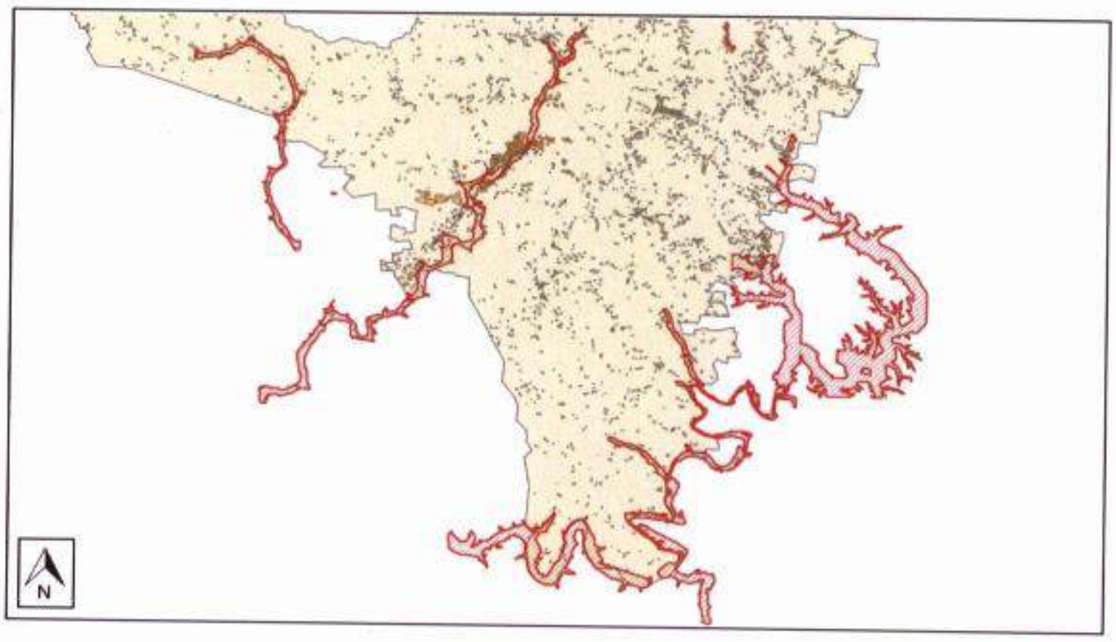
Flood Scenario Parameters

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

Study Region Name:	Moore_100yr
Scenario Name:	Moore_100yr
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 1 building will be at least moderately damaged. This is over 50% of the total number of buildings in the scenario. There are an estimated 0 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

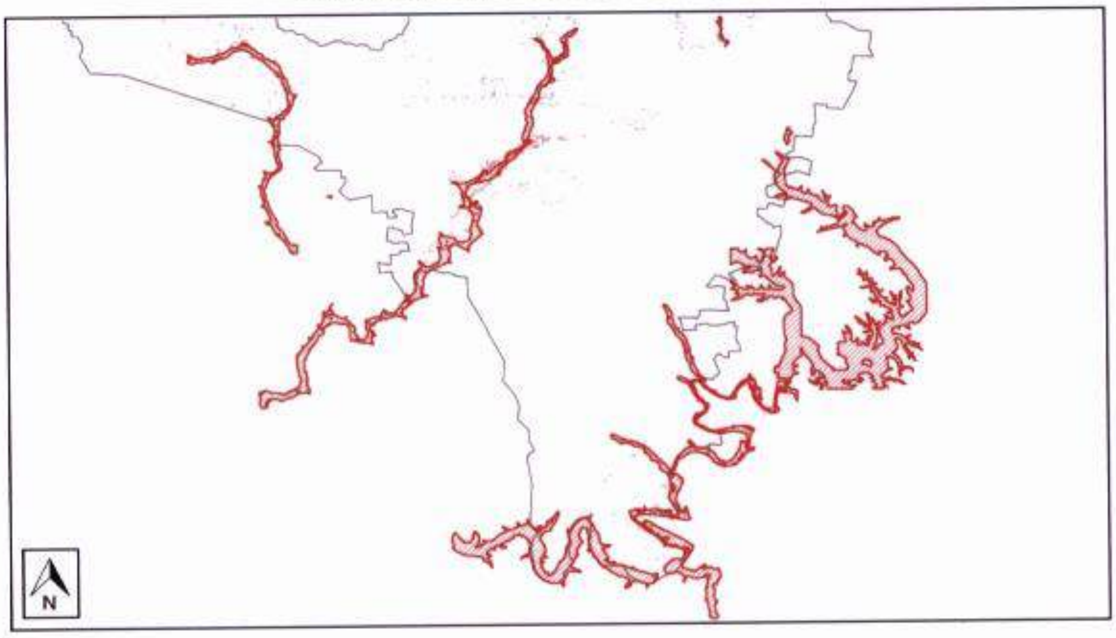

Table 3: Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	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	0	0	1	100	0	0	0	0	0	0	0	0
Total	**0**		**1**		**0**		**0**		**0**		**0**	

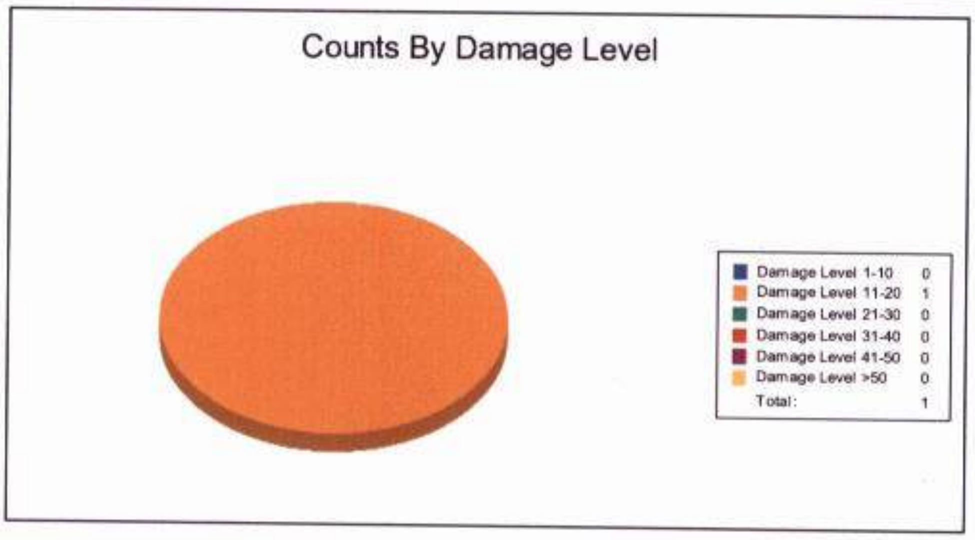

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Table 4: Expected Building Damage by Building Type

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	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	1	100	0	0	0	0	0	0	0	0

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Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 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	2	0	0	0
Fire Stations	6	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	3	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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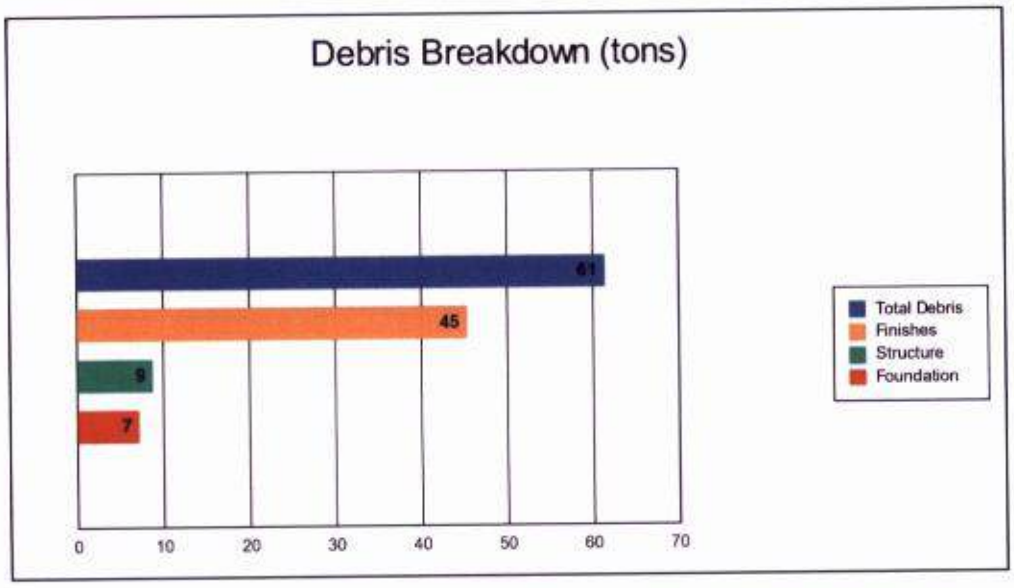
Induced Flood Damage

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.

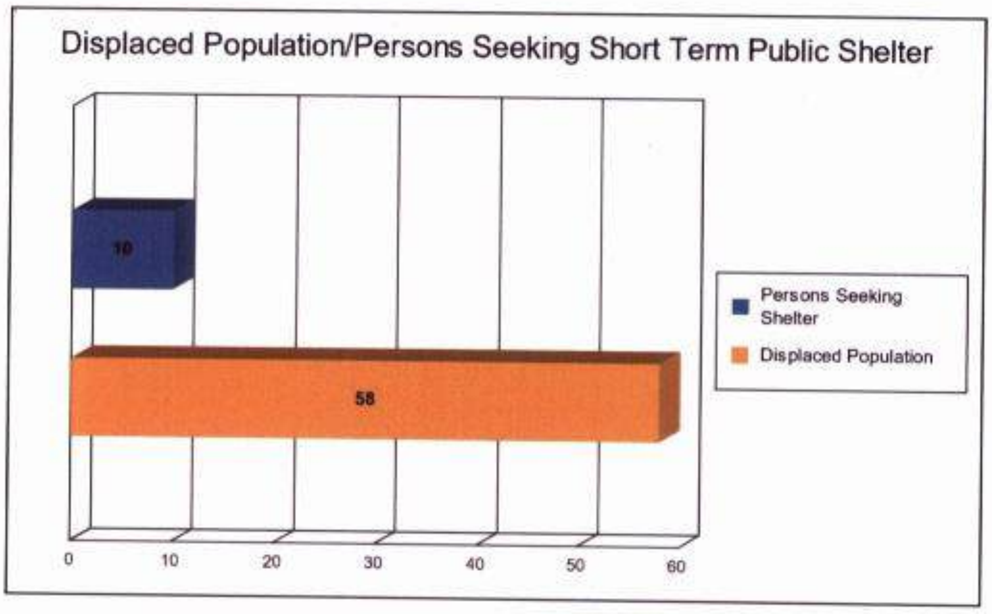


The model estimates that a total of 61 tons of debris will be generated. Of the total amount, Finishes comprises 74% of the total, Structure comprises 14% of the total, and Foundation comprises 12%. If the debris tonnage is converted into an estimated number of truckloads, it will require 3 truckloads (@25 tons/truck) to remove the debris generated by the flood.

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 19 households (or 58 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 10 people (out of a total population of 6,446) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 18.57 million dollars, which represents 5.65 % 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 8.31 million dollars. 55% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 10.80% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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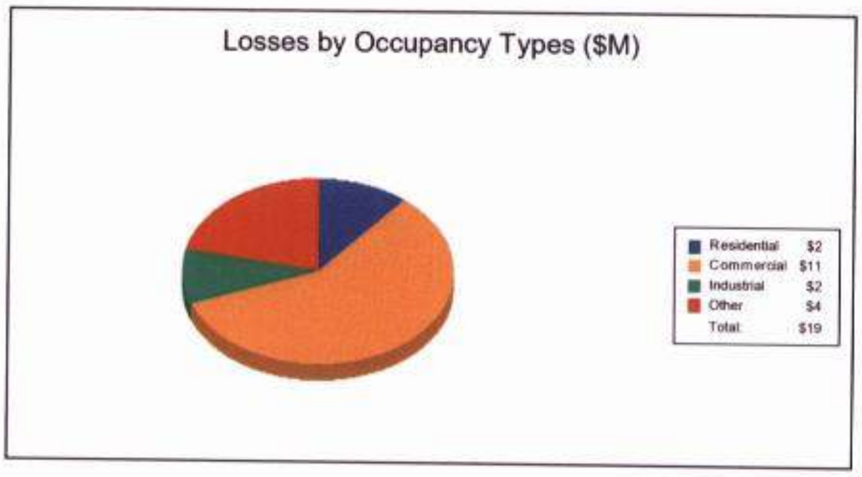
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	1.04	0.79	0.39	0.13	2.36
	Content	0.52	2.54	1.05	0.87	4.99
	Inventory	0.00	0.76	0.21	0.00	0.97
	Subtotal	**1.56**	**4.10**	**1.65**	**1.00**	**8.31**
Business Interruption						
	Income	0.01	2.90	0.04	0.32	3.27
	Relocation	0.31	0.71	0.07	0.18	1.28
	Rental Income	0.09	0.54	0.01	0.04	0.69
	Wage	0.03	2.51	0.06	2.43	5.02
	Subtotal	**0.44**	**6.66**	**0.18**	**2.98**	**10.26**
ALL	**Total**	**2.01**	**10.76**	**1.83**	**3.98**	**18.57**



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Appendix A: County Listing for the Region

Tennessee

- Moore

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Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Tennessee				
Moore	6,446	882,302	620,395	1,502,697
Total	**6,446**	**882,302**	**620,395**	**1,502,697**
Total Study Region	**6,446**	**882,302**	**620,395**	**1,502,697**

Hazus: Flood Global Risk Report

Region Name: Moore_500yr

Flood Scenario: Moore_500yr

Print Date: Wednesday, May 22, 2024

Disclaimer:
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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Table of Contents

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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 5 square miles and contains 262 census blocks. The region contains over 3 thousand households and has a total population of 6,446 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 3,583 buildings in the region with a total building replacement value (excluding contents) of 1,503 million dollars. Approximately 91.43% of the buildings (and 58.71% of the building value) are associated with residential housing.

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Building Inventory

General Building Stock

Hazus estimates that there are 3,583 buildings in the region which have an aggregate total replacement value of 1,503 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	882,302	58.7%
Commercial	168,643	11.2%
Industrial	138,611	9.2%
Agricultural	11,493	0.8%
Religion	50,048	3.3%
Government	9,908	0.7%
Education	241,692	16.1%
Total	**1,502,697**	**100%**

Building Exposure by Occupancy Type for the Study Region
($1000's)

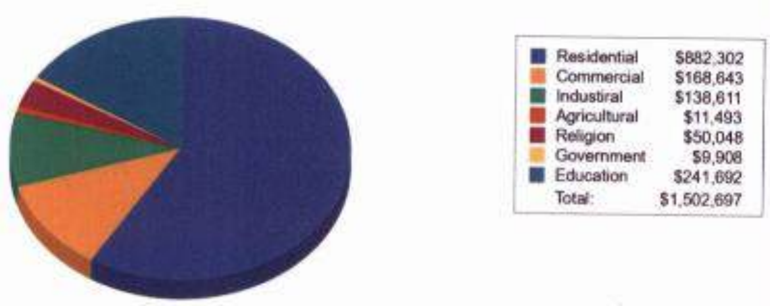
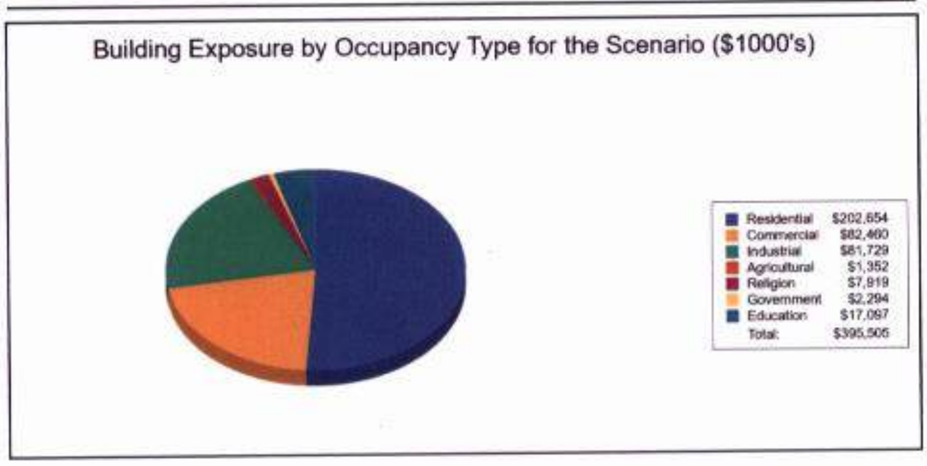


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	202,654	51.2%
Commercial	82,460	20.8%
Industrial	81,729	20.7%
Agricultural	1,352	0.3%
Religion	7,919	2.0%
Government	2,294	0.6%
Education	17,097	4.3%
Total	**395,505**	**100%**



Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 3 schools, 6 fire stations, 1 police station and 2 emergency operation centers.

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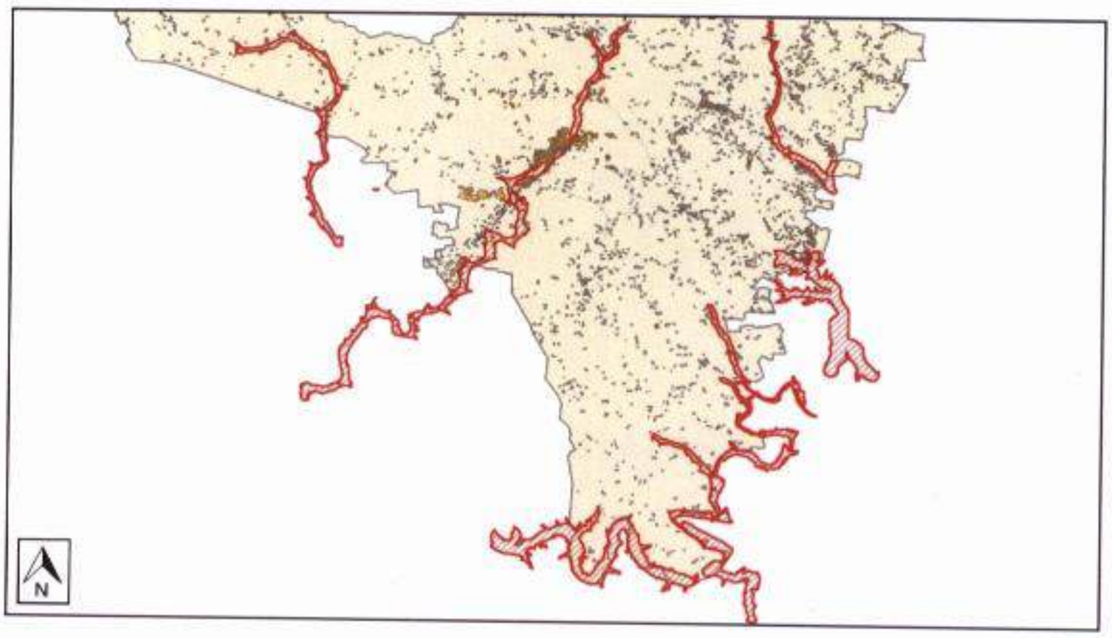
Flood Scenario Parameters

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

Study Region Name:	Moore_500yr
Scenario Name:	Moore_500yr
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



Building Damage

General Building Stock Damage

Hazus estimates that about 1 building will be at least moderately damaged. This is over 100% of the total number of buildings in the scenario. There are an estimated 0 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

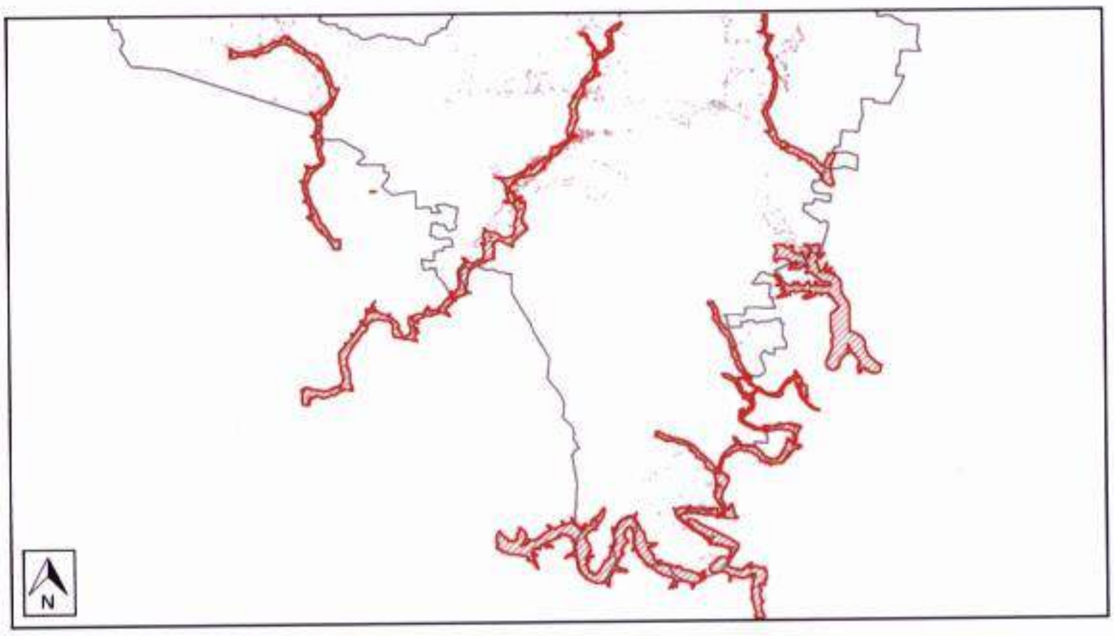


Table 3: Expected Building Damage by Occupancy

Occupancy	1-10 Count	1-10 (%)	11-20 Count	11-20 (%)	21-30 Count	21-30 (%)	31-40 Count	31-40 (%)	41-50 Count	41-50 (%)	>50 Count	>50 (%)
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	1	100	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	0	0	1	100	0	0	0	0	0	0	0	0
Total	**1**		**1**		**0**		**0**		**0**		**0**	

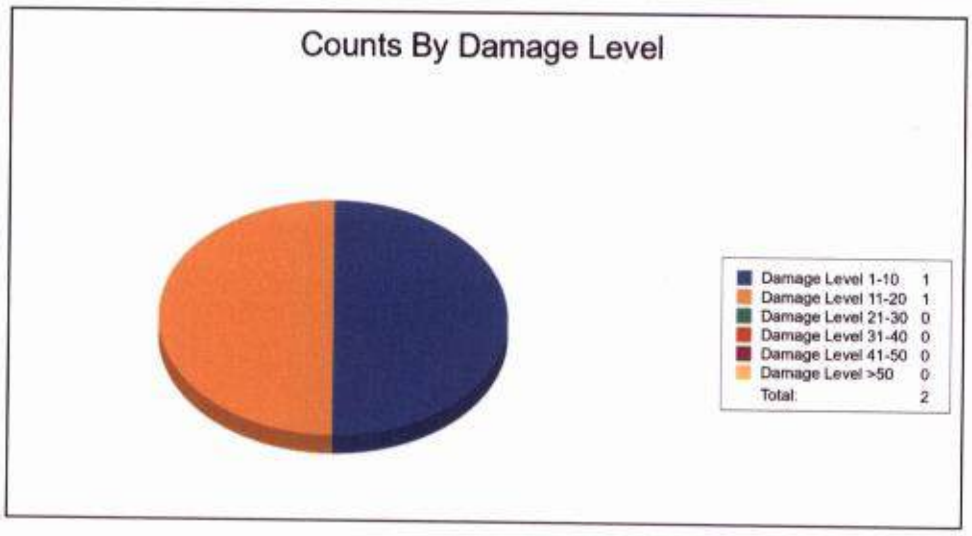


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Table 4: Expected Building Damage by Building Type

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	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	1	100	0	0	0	0	0	0	0	0

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Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 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	2	0	0	0
Fire Stations	6	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	3	0	0	0

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

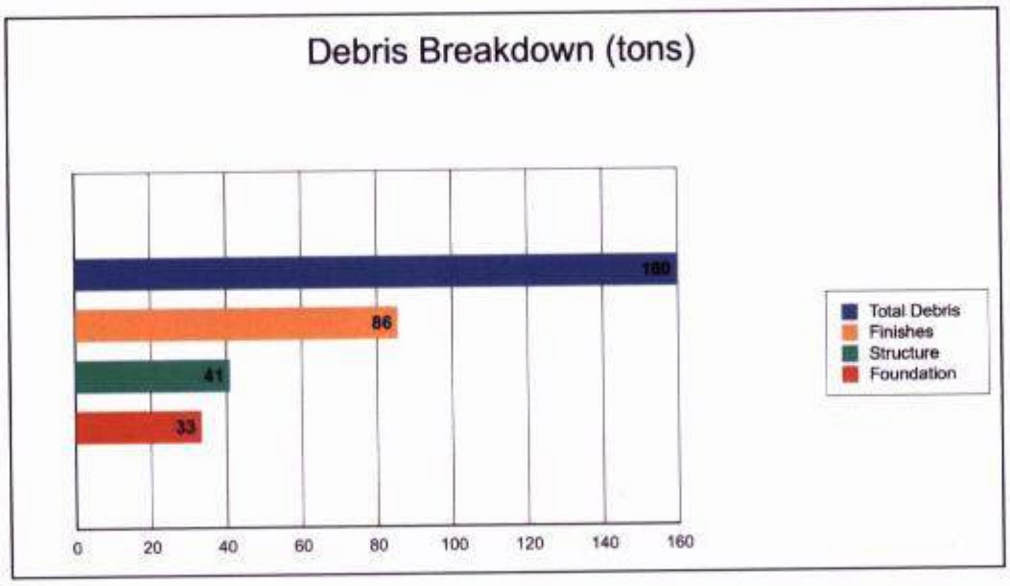
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(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.

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 160 tons of debris will be generated. Of the total amount, Finishes comprises 54% of the total, Structure comprises 26% of the total, and Foundation comprises 21%. If the debris tonnage is converted into an estimated number of truckloads, it will require 7 truckloads (@25 tons/truck) to remove the debris generated by the flood.

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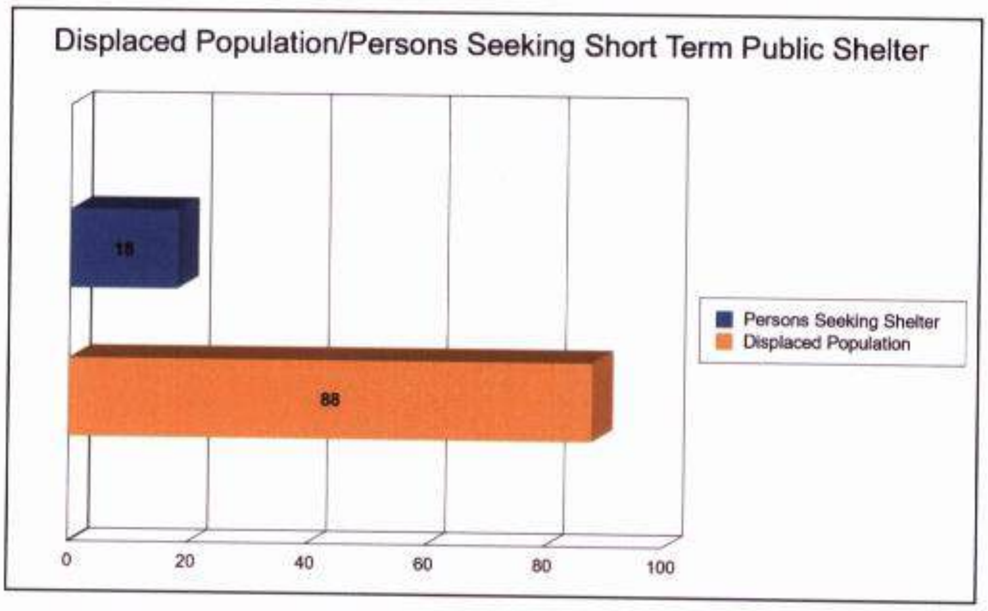
Social Impact

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 29 households (or 88 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 18 people (out of a total population of 6,446) will seek temporary shelter in public shelters.



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Economic Loss

The total economic loss estimated for the flood is 29.86 million dollars, which represents 7.55 % 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 15.40 million dollars. 48% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 16.37% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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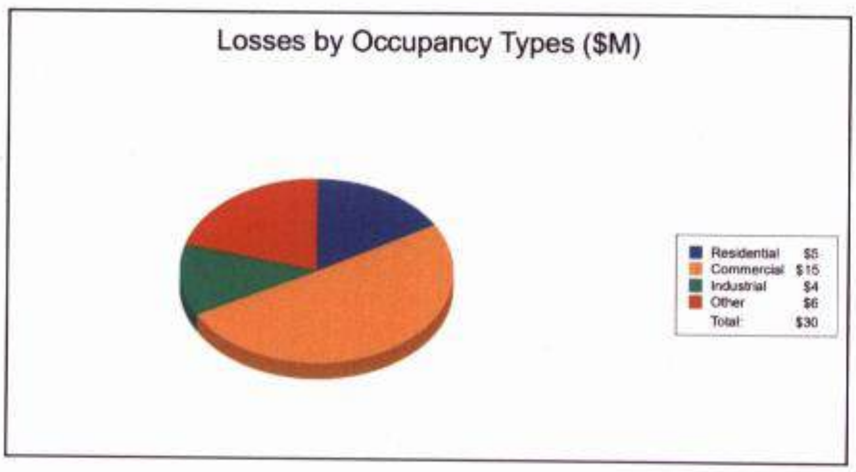
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	2.54	1.24	0.77	0.24	4.78
	Content	1.30	3.90	2.30	1.57	9.07
	Inventory	0.00	1.13	0.42	0.00	1.55
	Subtotal	**3.84**	**6.27**	**3.48**	**1.81**	**15.40**
Business Interruption						
	Income	0.10	3.80	0.05	0.50	4.46
	Relocation	0.52	0.94	0.11	0.24	1.80
	Rental Income	0.19	0.71	0.02	0.06	0.97
	Wage	0.24	3.42	0.09	3.48	7.23
	Subtotal	**1.05**	**8.86**	**0.27**	**4.29**	**14.46**
ALL	**Total**	**4.89**	**15.12**	**3.76**	**6.10**	**29.86**



Appendix A: County Listing for the Region

Tennessee

- Moore

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EARTHQUAKE · WIND · FLOOD · TSUNAMI

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Tennessee				
Moore	6,446	882,302	620,395	1,502,697
Total	**6,446**	**882,302**	**620,395**	**1,502,697**
Total Study Region	**6,446**	**882,302**	**620,395**	**1,502,697**

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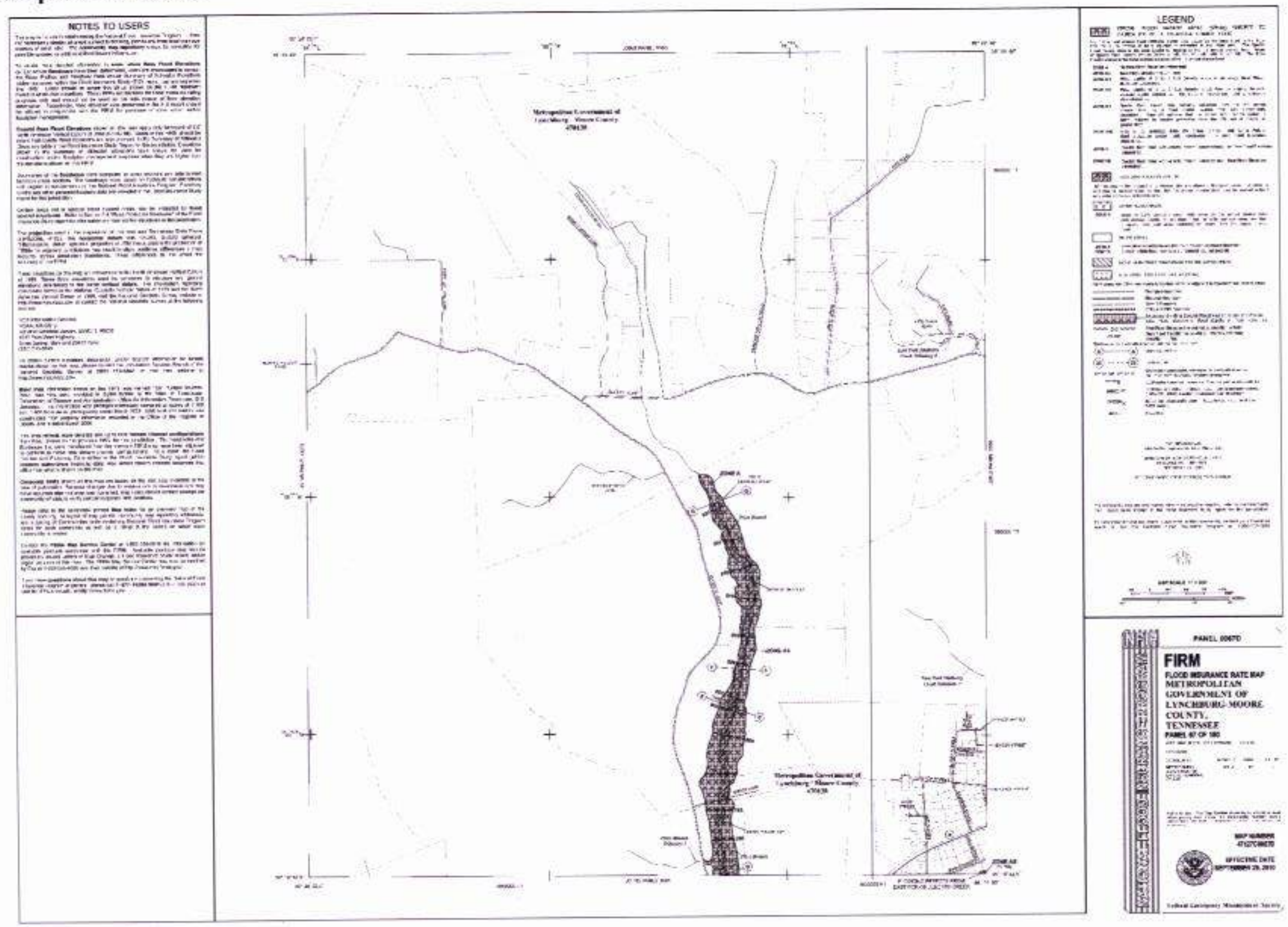

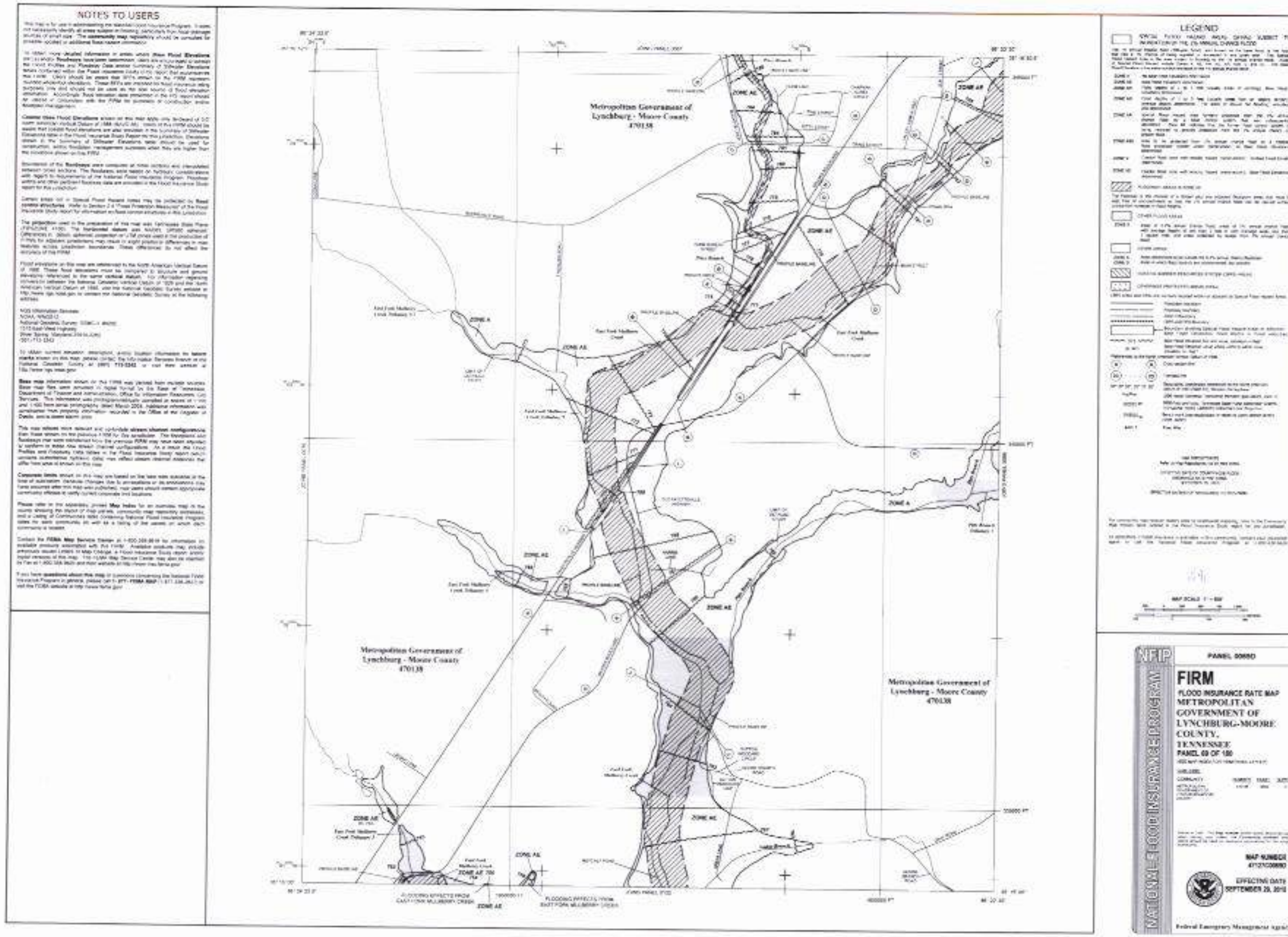
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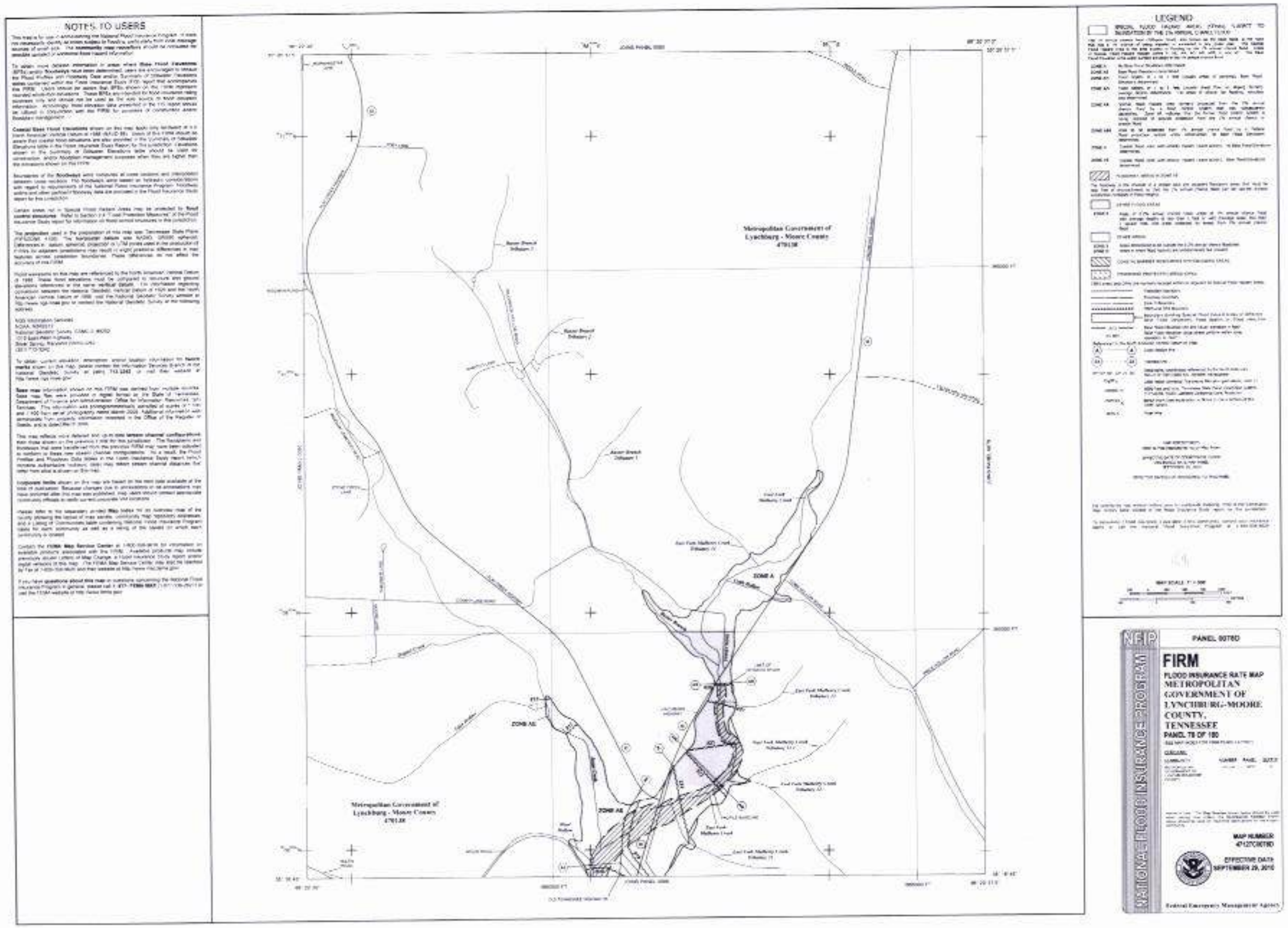
Metropolitan Government of
Lynchburg - Moore County
470138
ZONE AE
ZONE A
FLOODING EFFECTS FROM
EAST FORK MULBERRY CREEK
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
METROPOLITAN
GOVERNMENT OF
LYNCHBURG-MOORE
COUNTY,
TENNESSEE
MAP NUMBER
EFFECTIVE DATE
SEPTEMBER 29, 2010
Federal Emergency Management Agency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Lynchburg - Moore County
470138
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PANEL 0078D
FIRM
FLOOD INSURANCE RATE MAP
METROPOLITAN
GOVERNMENT OF
LYNCHBURG-MOORE
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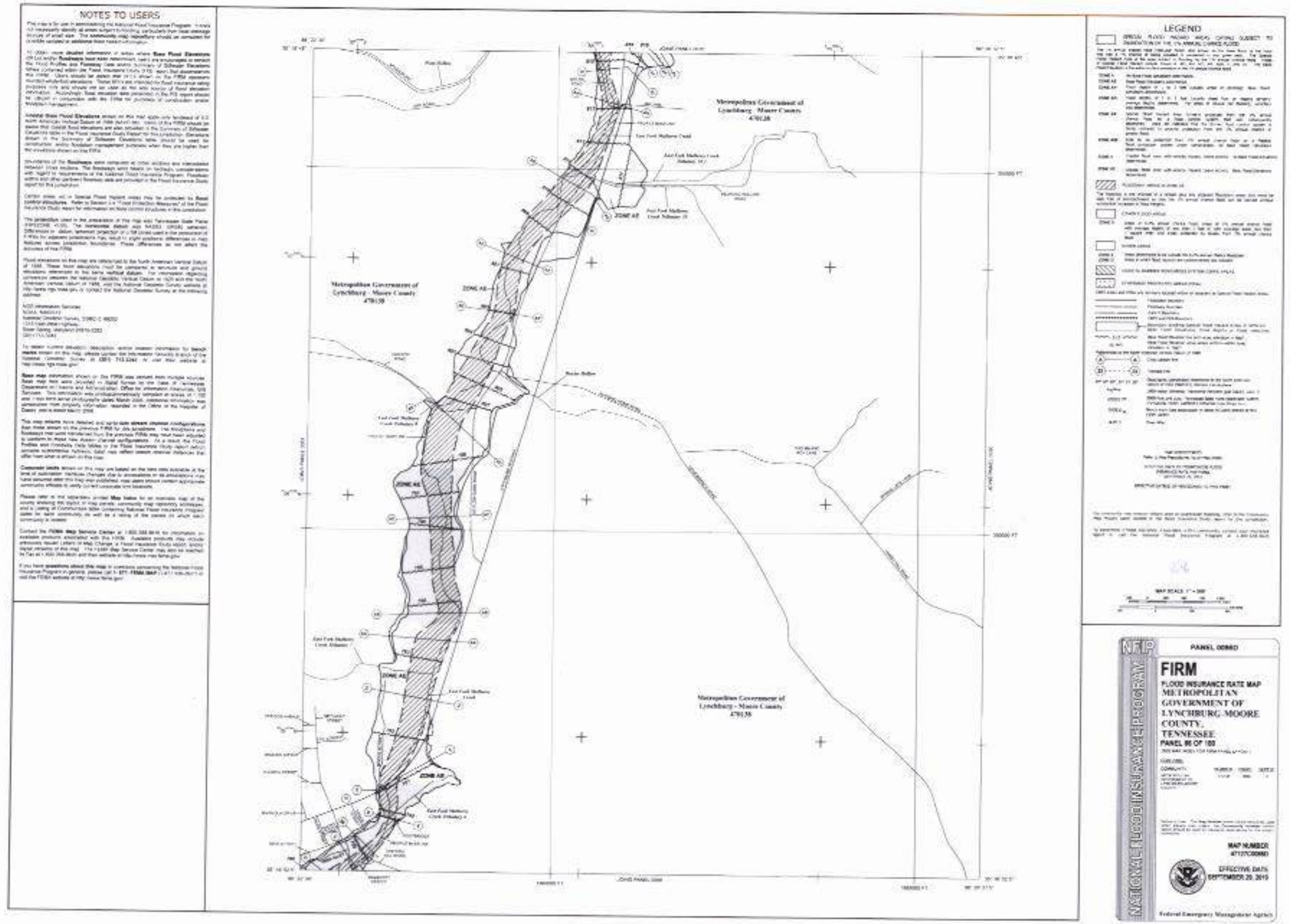
Federal Emergency Management Agency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ZONE AE
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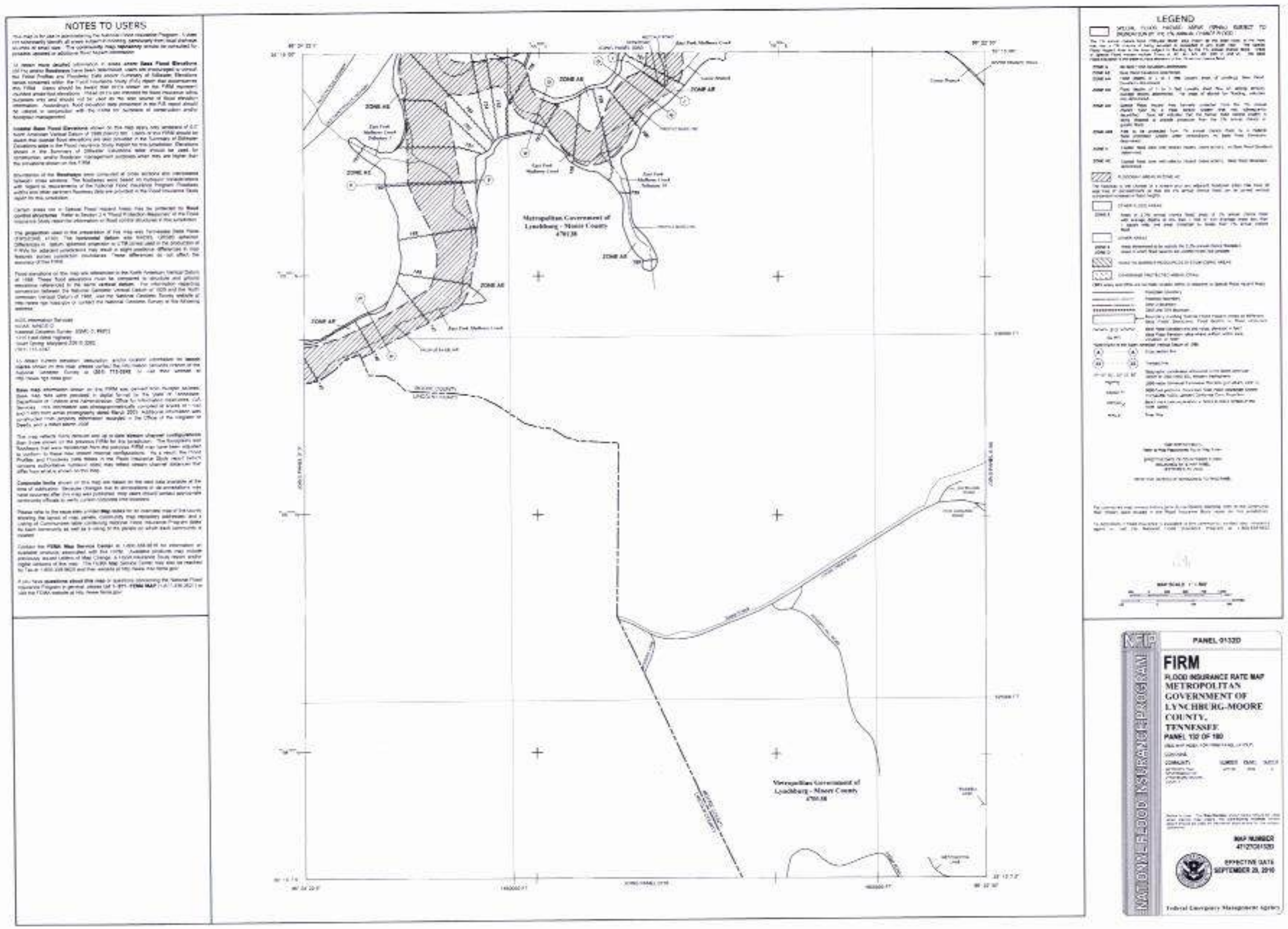
MAP NUMBER
Federal Emergency Management Agency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LEGEND
Metropolitan Government of Lynchburg - Moore County 470138
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NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0132D
FIRM
FLOOD INSURANCE RATE MAP
METROPOLITAN GOVERNMENT OF LYNCHBURG-MOORE COUNTY, TENNESSEE
PANEL 132 OF 180
MAP NUMBER
EFFECTIVE DATE
SEPTEMBER 29, 2010
Federal Emergency Management Agency

APPENDIX E

National Inventory of Dams (No Dams in Metropolitan Lynchburg Moore County):