

Jefferson County Hazard Mitigation Plan

2025 Update



Prepared By:

Jefferson County Hazard Mitigation Planning Committee
Jefferson County Emergency Management Agency/Office of Emergency Management

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 Jefferson County Hazard Mitigation Plan addresses Building Resilient Communities and Infrastructure (BRIC), Flood Mitigation Assistance (FMA), and Hazard Mitigation Grant Program (HMGP) requirements. Each jurisdiction within the county participated in the preparation of the update, including:

- Jefferson County
- Jefferson City
- Dandridge
- Baneberry

In reference to 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*), each of the participating jurisdictions will adopt the plan through a local resolution.

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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 Jefferson County from the effects of natural and man-made hazards. This Plan documents the hazard mitigation planning process and identifies relevant hazards, vulnerabilities, and strategies the County and incorporated jurisdictions will use to decrease vulnerability and increase resiliency and sustainability. This Plan demonstrates the participating communities’ commitment to reducing risks from identified hazards and serves as a tool to help decision-makers direct mitigation activities and resources.

1.1.2 Authority

This Hazard Mitigation Plan has been adopted by Jefferson County and all participating jurisdictions 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 Jefferson 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 Jefferson 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 Jefferson County, Jefferson City, Baneberry, and Dandridge.

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. Jefferson County and all its incorporated jurisdictions (Dandridge and Jefferson City) participated in the 2025 Plan update, as well as reviewed and provided timely comments on all draft components of the Plan. A summary of past and current community participation is shown below in *Table 1*. All participants were invited to this committee via email 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
Jefferson County	Y	Y
Jefferson City	Y	Y
Dandridge	Y	Y
Baneberry	N	Y

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	
				4/11/2025	5/15/2025
Michael Lamphere	East Region Planner	Safety & Security	TEMA	X	X
Tim Wilder	EMA Director	Safety & Security	Jefferson County	X	X
Mark Potts	Mayor	Safety & Security	Jefferson	X	

			County		
Russ Gawler	Fire Chief	Safety & Security	City of Baneberry	X	
Jeremy Stewart	Utility Supervisor	Energy, Food, Water, and Shelter	Town of White Pine	X	
Robert Lee Turner, Jr.	Fire Chief	Safety & Security	Jefferson City	X	
James Gallup	City Manager	Safety & Security, Communications	Jefferson City	X	
Chris Shockley	Town Administrator	Communications	Town of Dandridge	X	X
Kelly Coggins	Teacher	Safety & Security	JC Schools		X
Austin Bridgewater	Teacher	Safety & Security	JC Schools		X
Lee Rayburn	Jefferson City Fire	Safety & Security	Jefferson City		X

1.2.2 Hazard Mitigation Planning Process

The 2025 Jefferson 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 **4/11/2025** at the **Mayor's office in Dandridge, TN**. 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. Some of those neighboring counties that were outreached include: Hamblen, Grainger, Knox, Sevier, and Cocke counties.

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. In order to ensure socially vulnerable and underserved populations were included in organizing efforts the Jefferson County EMA director contacted organizations that had roots within the community such as churches, civic organizations, schools, and community centers. 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 on **4/23/2025** in the Jefferson County Post newspaper, local courthouses, and on the county social media pages inviting members of the public to attend the **5/15/2025** 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 meeting on **5/15/2025** was open to the public and announced via the Jefferson County Post newspaper, local courthouses, and on the county social media pages, however, no members of the general public chose to attend.

Table 3 Summary of Hazard Mitigation Planning Meetings

Meeting Number	Meeting Topic	Meeting Date	Meeting Location
Meeting #1 and #2	Overview of hazard mitigation	4/11/2025 and 5/15/2025	Mayor's Office, Dandridge, TN on 4/11/2025 and Dandridge Courthouse on 5/15/2025
	Hazard Mitigation Planning Process		
	Purpose of the HMP		
	Area growth and changes		
	Identification of Hazards		
	Future weather predictions		
	Assessment of risk, vulnerabilities, resilience, and hazards discussion		
	Review of NFIP		
	Previous HMP goals/projects		
	Finalization of New		

	goals/projects		
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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
- Jefferson County Emergency Management Agency / Office of Emergency Management
- Jefferson County Highway Dept
- Jefferson City (Public Works, Fire, Police, Utilities)
- Dandridge (Public Works, Fire, Police, Utilities)
- Baneberry (Public Works, Fire, Police, Utilities)
- White Pine (Was at the 1st meeting, but has not actively participated)
- Jefferson County Schools
- TN Homeland Security and TBI
- Jefferson County Health Department
- TVA
- Sheriff's Department
- TDOT (TN Dept of Transportation)
- East TN VOAD
- Health & Human Services
- County Commission
- TN Highway Patrol
- American Red Cross
- Jefferson County EMS

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. Jefferson 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 Ordinances	Yes	Different years of code regulations utilized in different 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 Jefferson 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 Jefferson 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 0 completed actions and 0 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 2025 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 Jefferson 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 2025 HMP Strategy Review

During the 2025 update of the Jefferson County Hazard Mitigation Plan, the HMPC identified 27 actions as relevant to the county. Of these 27 actions, 0 have been completed, 0 are in progress, and 0 have 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. 18 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 *Chapter 3*.

1.4 Multi-Jurisdictional Special Considerations

Hazards Assessment

Most of the natural hazards identified within this plan have an impact on both Jefferson County and the incorporated jurisdictions. Some hazards have a larger impact on the County rather than the incorporated jurisdictions and vice versa. Impacts of identified hazards differ the most at the rural and urban interface where flooding can have different severity levels. Therefore, the flooding section emphasizes the depth, duration, and timing of severe flooding events. Below is a table that shows whether a hazard will have multi-jurisdictional impacts.

Hazards	Will the hazard have multi-jurisdictional differences?
Drought	No
Earthquake	Yes
Extreme Temperature	Yes
Wildfire	Yes
Flooding	Yes
Geologic	Yes
Severe Weather	Yes
Tornado	Yes
Communicable Disease	Yes
Dam/Levee Failure	Yes
Hazardous Materials Release	No
Terrorism	Yes
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 in an effort 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 **5/15/2025** HMPC meeting was open to the public; however, no members of the public chose to attend the meeting.

A public notice was posted in the Jefferson County Post, local courthouses, and on the county social media pages on **4/23/2025**. Documentation to support the public outreach efforts can be found in Appendix A. Over the past five years, the community was kept involved in the planning process through the implementation of projects in the plan.

1.6 County Data Profile

Middle TN(Some overlap in SE and East): <https://www.mtida.org/regions>

Southeast: <https://www.seida.info/about/>

East: <https://www.eteda.org/>

West: <https://www.wtia.org/>

1.6.1 Resources and Assets

Tennova Jefferson Memorial Hospital in Jefferson City provides 24-hour emergency care to residents of the county and is home to 58 beds. The county also has: 120 volunteer firefighters with 8 stations, and Approximately 150-155 full time Law Enforcement officers including the county sheriff. Jefferson County School District facilities the learning of approximately 6,854 students via their system of 14 public schools within the region. According to the RWJ Foundation County Health Rankings profile Jefferson County Schools are underfunded by \$1,649 per pupil as related to dollars to test score achievement.

Jefferson County houses two radio stations (WNRX 99.3 and WJFC AM 1480 or 102.9FM) and 0 tv networks. The main phone companies in the area are T-Mobile, AT&T, Verizon, US Cellular, Spectrum, and Xfinity. Residents in the county can either obtain internet via Xfinity, Spectrum, AT&T, or Starlink. Communication resources, a vital component of emergency response and preparedness, is notably lacking in the more rural portions of Jefferson County. Between 2019 and 2023 92.9%of households had a computer and 84.9% had broadband internet access according to the United States Census Bureau.

The main roadways that travel through the county are US Route 11E, US 25E, 64 and State Route 66, 92, 341, 139, and 113. The nearest interstate is I-40 runs East-West through the Southern part of the County and I-81 intersects with I-40 and runs Northeast. The main waterways that run through the County are the Nolichucky River, Douglas Lake (Douglas Reservoir), Cherokee Lake, and the French Broad River. Other smaller waterways that intersect throughout Jefferson County are Big Creek, Dumplin Creek, Flat Creek, Muddy Creek, Nina Creek, Indian Creek, Long Creek, Hickman Creek, Raccoon Creek, Sinking Creek, Wolf Creek, and Pinhook Creek. A further analysis of these water systems will be explored in the hazard flood section as related to their propensity for flood events.

The nearest international airport is McGhee Tyson TYS (approx. 45 miles West), and the closest general aviation location is Moore-Murrell Airport (MOR) in Morristown. There is also a private airstrip in Dandridge for a skydiving business off I-40. Given the limited public transportation options and the rural environment of Jefferson County, 44% of working individuals endure a commute of more than 30 minutes, and 84% of all working individuals drive alone to work.

Jefferson County is governed by an elected County Mayor and Board of Commissioners. The jurisdictions within Jefferson County are governed by an elected Mayor and Council.

There are multiple regulatory committees that are appointed by both the County Mayor and the Board of Commissioners.

1.6.2 Development and Growth

Like a majority of its counterparts, Jefferson County has been experiencing rapid growth over the past few years. The population of the county increased between 2010 and 2020 censuses from 51,407 to 54,683. 10% of the 21,351 Jefferson 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 Jefferson Counties' employed population work within the transportation industry, followed by manufacturing, education, and healthcare. Jefferson County is a member of the Joint Economic and Community Development Boards to ensure and promote economic growth within the county and for its constituents. As stated, Jefferson County has experienced much growth since the last planning period, specifically residentially. Highway 92 and Highway 25/70 are experiencing rapid commercial and residential growth off the highway.

1.6.3 Demographics

Throughout the planning process, Jefferson 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 59,217 residents living within Jefferson County as of 1 July 2024:

- The median household income is \$63,084
- 12.9% live below the national poverty line
- 75.8% live in rural areas
- 12% are confronted with food insecurity
- 14% of the under 65 years of age population live with a disability
- 12% of the under-65 population do not have health insurance
- Population as of 2020 was 198.8 people per square mile

Table 7 Population Data

Demographic		Percentage
Identified gender		
	Male	49.3
	Female	50.7%
Age Group		
	Under 5	4.7%
	Under 18	19.2%
	Over 65	20.9%

Race/Ethnicity (one)	
White (not Hispanic/Latin)	94.9%
Asian	0.8%
Black or African American	2.1%
American Indian or Alaskan Native	0.5%
Hispanic/Latino	4.8%
Education	
High School Graduate or Higher	88.9%
Bachelor's Degree or Higher	21%

Data sources:

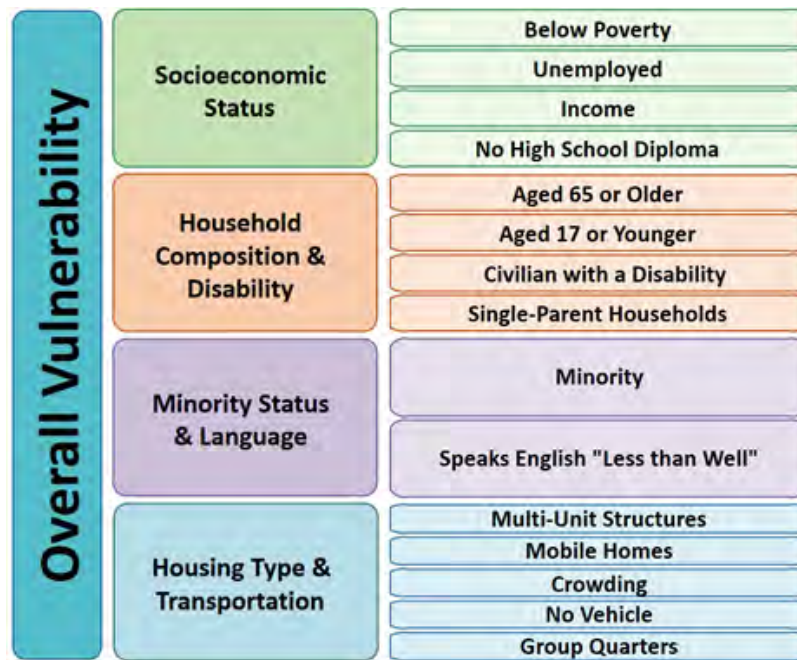
<https://www.census.gov/quickfacts/fact/table/US/PST045221>

<https://www.countyhealthrankings.org/app/tennessee/2024/overview>

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 Jefferson County and all participating jurisdictions are as follows

Jefferson County Social Vulnerability Factors	
Total Square Miles	198.8
Total Population (as of 2024)	59,217
Housing Units Estimated	26,048
Households	21,351
Persons below Poverty	10,555
Age 16+ unemployed	1,453
Per Capita Income	34,953
Age 25+ w/ no HS Diploma	4,730
Percentage of Persons below poverty	19.9%
Unemployment rate	5.4%
Percentage of persons w/ no HS diploma 25 yo+	12%
Aged 65+ & older	11,137
Age 17 & younger	10,498
Civilian noninstitutionalized population with a disability	11,073
Single Parent HH w/ children under 18	1,185
Percentage of person aged 65+	20.2%
Percentage of persons 17 or younger	19.1%
Percentage of civilian noninstitutionalized population with a disability	20.4%
Percentage of single parent households with children under 18	5.7%
Minority (all persons except white, non-Hispanic)	4,938
Persons (age 5+) who speak English "less than well"	665

Percentage minority (all persons except white, non-Hispanic)	9%
Percentage of persons (age 5+) who speak English "less than well"	1.3%
Housing in structures with 10 or more units	350
Mobile Homes	5,783
At Household level (occupied housing units) more people than rooms	332
Households w/ no vehicle	548
Persons in Group Quarters	1,764
Percentage of housing in structures with 10 or more units	1.4%
Percentage of mobile homes	23.2%
Percentage of occupied housing units with more people than rooms	1.6%
Percentage of households with no vehicle available	2.6%
Percentage of persons in group quarters	3.2%

1.6.5 Critical Infrastructure

Critical Infrastructure are assets in a community that are considered vital to the public's health and safety. Due to the sensitivity of these assets in Jefferson County and the incorporated jurisdictions, these assets are restricted for public viewing. However, the data is viewable to restricted personal on the State of Tennessee's Critical2TN Database. The County and incorporated jurisdictions currently have 41 assets identified.

<https://cikr-tnema.hub.arcgis.com/>

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

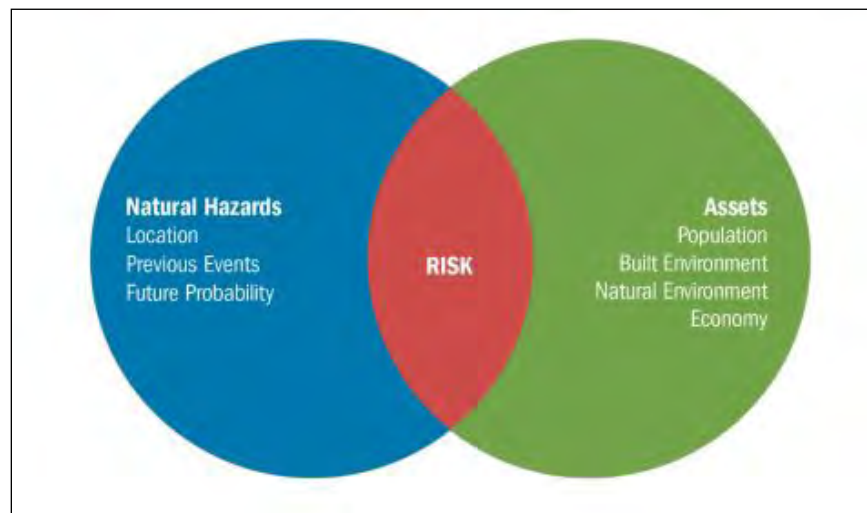
Mitigation Capabilities	Jefferson County	Jefferson City	Dandridge	Baneberry
Building Codes	Y	Y	Y	Y
Zoning Codes	Y	Y	Y	Y
Subdivision Ordinance	N	Y	Y	Y
Stormwater Ordinance	N	Y	Y	N
Floodplain Ordinance	Y	Y	Y	Y
Erosion, Sedimentation and Pollution Control Ordinance	N	Y	Y	N
Stormwater Management Program	Y	Y	Y	Y
Site Plan Review Requirements	Y	Y	Y	Y
Capital Improvements Plan	N	Y	Y	N
Economic Development Plan	Y	Y	Y	Y
Local Emergency Operations Plan	Y	Y	Y	Y
Flooding or Engineering Study	Y	Y	Y	N
Repetitive Loss Plan	Y	Y	Y	Y
Elevation Certificates	Y	Y	Y	Y
Grant writer (part-time or full-time)	Y	Y	N	N
Public Information Officer	Y	Y	Y	N
Floodplain Manager	Y	Y	Y	Y
Volunteer Fire Service	Y	Y	Y	Y
Full Time Fire Service	Y	Y	N	N
School Resource Officers (SROs)	Y	Y	Y	Y
Law Enforcement	Y	Y	Y	Y
Emergency Manager	Y	Y	Y	Y
GIS Personnel	Y	N	Y	N
Capital improvements project funding	N	Y	Y	Y
Fees for utility services	Y	Y	Y	N
Impact fees for new development	N	N	Y	N
General obligation bonds	N	Y	Y	N
Withhold spending in hazard-prone areas	N	N	N	N

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 Jefferson 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 had two or more green lifeline categories is considered 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 Jefferson County to identify known hazards. *Table 8* presents a list of all major disaster and emergency declarations that have occurred in Jefferson County since 1953, illustrating which hazards pose the greatest risk to the County.

Table 9 Presidential Disaster Declarations in Jefferson County (1953-2025)

Declaration #	Date	Event Details	Individual Assistance	Public Assistance
3625	4/02/2025	Severe Storm	N	N
4832	10/2/2024	Tropical Storm Helene	Y	Y
4742	03/8/2023	Severe Storm	N	Y
4514	4/2/2020	Biological (Covid)	Y	Y
3473	3/13/2020	Biological (Covid)	N	N
4427	4/17/2019	Flood	N	Y
4320	6/23/2017	Severe Storm	N	N
4211	4/2/2015	Severe Ice Storm	N	Y
1974	5/1/2011	Severe Storm	Y	Y
1965	3/31/2011	Severe Storm	N	Y
3217	9/5/2005	Hurricane Katrina	N	Y
1464	5/8/2003	Severe Storm	Y	Y
1215	4/20/1998	Severe Storm	N	N
1197	1/13/1998	Severe Storm	N	N
1022	4/14/1994	Flood	N	N
3095	3/14/1993	Snowstorm	N	N
708	5/25/1984	Flood	N	N
424	04/04/1974	Tornado	N	N
366	03/21/1973	Flood	N	N

Table 9 documents the hazards of interest to Jefferson 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 Jefferson 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	Jefferson County 2019 HMP	Status	Jefferson County 2025 HMP Update
Communicable Disease	N	Reviewed	N
Dam Failure	N	Reviewed	N
Drought	N	Reviewed	Y
Earthquakes	N	Reviewed	Y
Extreme Temperatures	Y	Reviewed	Y
Flooding	Y	Reviewed	Y
Geological Hazard	N	Reviewed	Y
Hazardous Materials Release	N	Reviewed	N
Infrastructure Incident	N	Reviewed	N

Terrorism	N	Reviewed	N
Tornadoes	Y	Reviewed	Y
Severe Weather (thunderstorms, lighting, hail)	Y	Reviewed	Y
Wildfire	Y	Reviewed	Y

Summary of changes in the 2025 plan update:

- Earthquakes, Geological Hazards, and Drought were added.

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

- List all hazards to be addressed: Drought, Earthquakes, Geological Hazards, Extreme Temperatures, Flooding, Tornadoes, Severe Weather, and Wildfires.

2.2 Dams

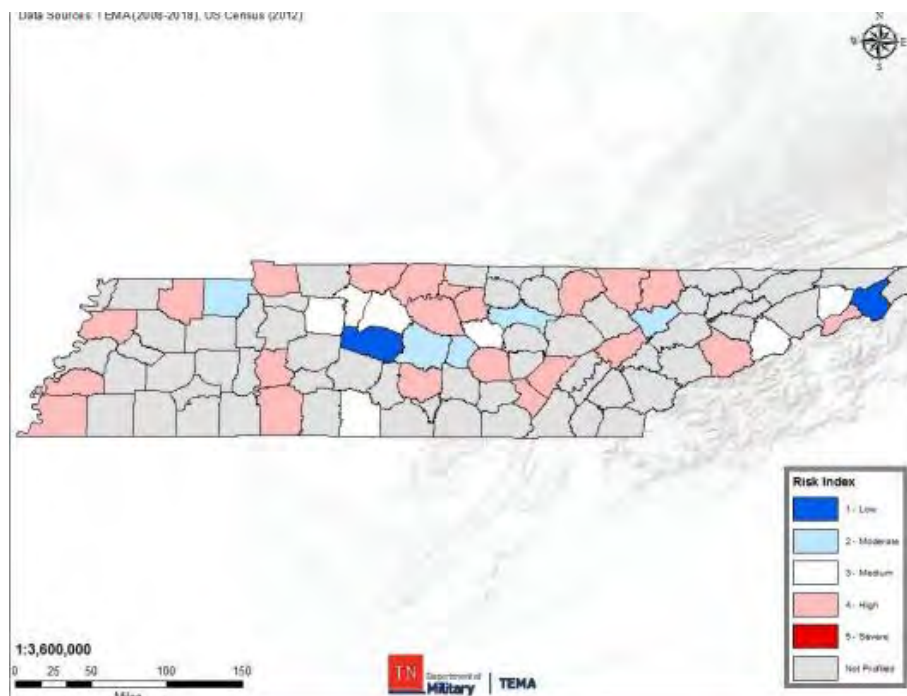
2.2.1 Hazard Overview

A dam is a barrier across flowing water that obstructs, directs, or slows the flow, often creating a reservoir, lake, or impoundment. Most dams have a section called a spillway or weir, over or through, in which water flows, either intermittently or continuously. According to the Tennessee Safe Dams Program, a dam is a structure at least 20 feet high or can impound at least 30 acre-feet of water.

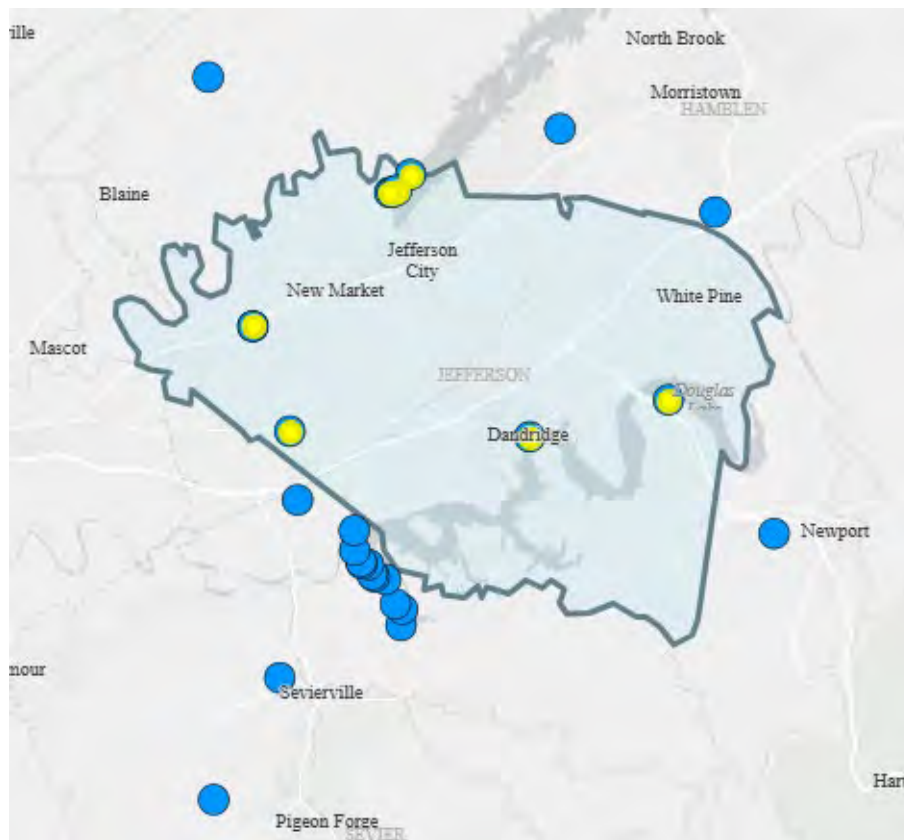
Dams fail in two ways, a controlled spillway release to prevent total failure or the partial or complete collapse of the dam itself. In each instance, an overwhelming amount of water and potential debris is released. Dam failures are rare, but when they occur can cause loss of life and immense damage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

Common reasons for dam failure are the following:

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



Tennessee Dam Failure Hazard Risk



Jefferson County Dam Locations (Source: [USACE](#))

2.2.2 County Profile

Dam failures can occur with little warning. Intense storms may produce a flood in a few hours or even minutes from upstream locations. A dam failure can occur within hours of the first signs of breaching. Although the floodwater will drain, the area will be affected by flooding from dam failure for days to weeks, and the destruction will affect the area for years. Tennessee has a total of 1,238 dams and levees within its borders, with 660 being state regulated. Roughly 93% are earth dams less than 50 feet tall, 40 of these dams are made of concrete, and 37 of the state's dams are over 100 feet tall. 64% of the state's dams are privately owned, 15% locally, 12% by the state, 8% federally, and 1% by a public utility. Of those, 274 are considered a high-hazard potential, with 355 significant and 609 low hazards. The focus of mitigation efforts is on high-hazard dams owned by the state and local governments and privately owned dams. Tennessee does not consider Federally regulated dams for hazard mitigation due to their inability to conduct projects on those dams.

Jefferson County High Hazard Dams

Name	Hazard Potential Classification
Cherokee Dam (TVA)	High
Cherokee Dam Saddle Dam No. 1 (TVA)	High

Douglas Dam Dandridge Backwater Dike (TVA)	High
Cherokee Dam Saddle Dam No. 2 (TVA)	High
Cherokee Dam Saddle Dam No. 3 (TVA)	High
Young Mill Tailings Dam (Nyrstar TN Mines-Strawberry Plains)	Significant

Pull information from the link: <https://nid.sec.usace.army.mil/#/>

Past Occurrences

The prime illustration of dam failure in the state is the 2008 Kingston Plant retention pond dam failure. The 40-acre pond was used by the Tennessee Valley Authority to hold a slurry of ash generated by the coal-burning plant. The break caused a release of a frigid mix of water, ash, and mud that damaged 12 homes and put hundreds of acres of rural land under water. This incident caused significant interruptions to the surrounding infrastructure, agriculture, and major soil and water quality issues for miles downstream. The Kingston incident displays the second and third-order effects that can occur from a dam failure beyond just flooding and emphasizes the necessity of mitigating the potential of failure through maintenance and downstream projects.

According to the Association of State Dam Safety, there has been **no** recorded history of any dam incidents in Jefferson County. The database is not considered comprehensive of all dam safety incidents, both historical and current, and reflects only the data that ASDSO has been able to collect. Much of the identifying information on specific dams is obtained from the National Inventory of Dams. Although there have been no dam failures, significant water releases have resulted in areas in the county having substantial flooding.

- **-No history of Dam failures in Jefferson County as of 2025.**
- [What parts of East Tennessee are flooded? Map shows dams, rivers impacted by Helene](#)

Probability of Future Events – It is unlikely a Dam failure will occur over the next five years. Based on historical data and probability, there is a less than 5% chance of a dam failure in the next 5 years

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

2.2.3 Risk Assessment

Many buildings and many infrastructure networks throughout the county can be vulnerable to dam failure. The risk of this is incredibly low, but the nature of the mechanics of a dam failure is complicated to predict. Therefore, the committee found it essential to include this natural hazard in their plan.

The [Social Vulnerability Index \(SVI\)](#) is a dataset that uses 16 census variables that help local officials identify communities that may need support before, during or after disasters. Unfortunately, the National Risk Index does not capture non-natural disaster impacts, therefore, using the SVI can help public health officials and local planners better prepare for and respond to emergency events such as dam failure.

Social Vulnerability Index Score for Jefferson County = Not Listed

Although the Social Vulnerability Index is a well-valued resource it fails to properly show the feedback from the participating jurisdictions. Therefore, all identified hazards were evaluated in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

Dam Failure Risk based on selected FEMA Lifelines								
Dam Failure Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Jefferson County								
Jefferson City								
Dandridge								
Baneberry								
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 necessity of mitigation actions in the following lifeline categories so that they can become more resilient in the whole community that they serve. Most of the High Hazard dams in Jefferson County are owned and operated by Tennessee Valley Authority (TVA) and are federally regulated and privately owned making them ineligible for hazard mitigation funding, however the County would be severely impacted in the event of a TVA dam failure.

2.2.4 Land Use & Development

Dams are assigned potential hazard categories that reflect the threat to life and property in the event of a failure. Safety inspections of dams are performed by Safe Dams staff for one,

two, and three years, respectively, for these categories of dams. The responsibility of building and maintaining a dam rests solely with the owner. The dam owner is liable for the water stored behind the dam. A failure resulting in an uncontrolled reservoir release can have a devastating effect on people and property downstream. It can impair many other infrastructure systems, such as roads, bridges, and water systems. Additionally, a dam failure could mean the loss of a vital resource to the owner. Therefore, proper construction, operation, maintenance, repair, and rehabilitation of a dam are critical elements in preventing failure, limiting the owner's liability, and maintaining the water resource.

2.2.5 Multi-Jurisdictional Differences

Due to the locations of dams in Jefferson County, Jefferson is the area most at risk for dam failures. However, if there is a complete failure of any of the county dams, then all incorporated jurisdictions are susceptible. Dam inundation maps can be found in Appendix E to further illustrate the most at-risk areas within the county.

2.2.6 Summary

The risk and consequences of dam failure must be lowered to improve public safety and resilience. Progress requires better planning for mitigating the effects of failures, increased regulatory oversight of dam safety, improved coordination and communication across governing agencies, and the development of tools, training, and technology. Dam failures risk public safety and can cost our economy millions of dollars in damage.

2.3 Drought

2.3.1 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.

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.

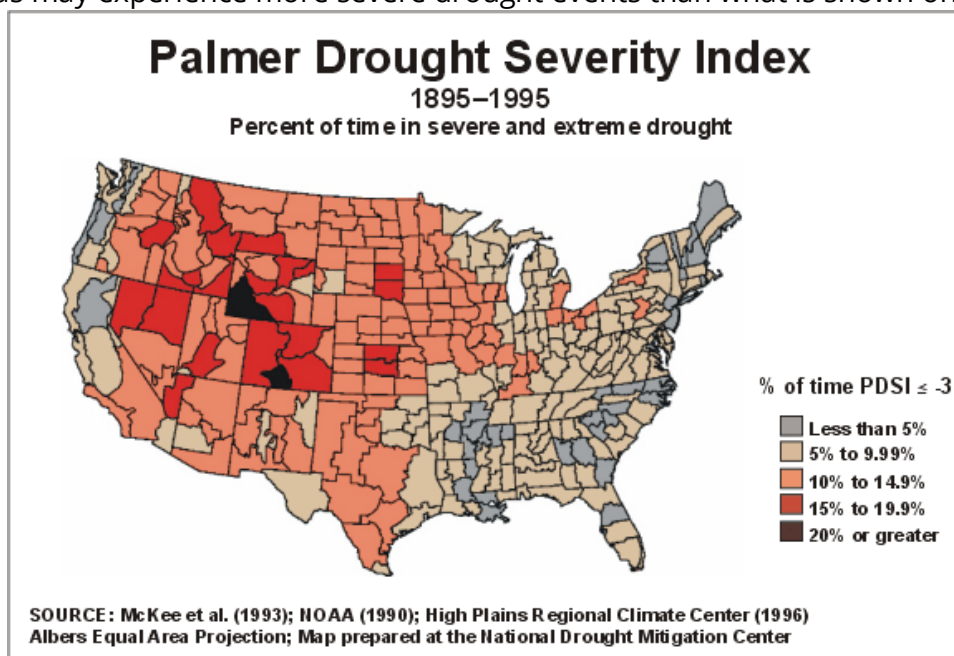
The wide variety of disciplines affected by drought, its diverse geographical and temporal distribution, and the many scales drought operates on make it difficult to develop a definition to describe drought and an index to measure it. Many quantitative measures of droughts have been developed in the United States, depending on the discipline affected, the region being considered, and the particular 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

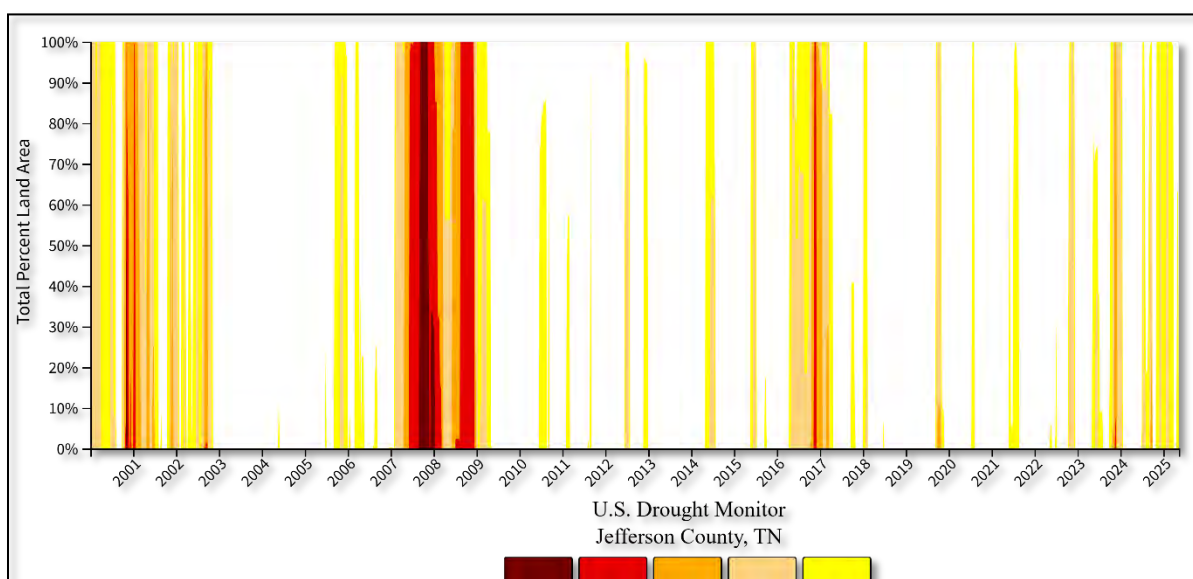
the Perry-term drought and has been used extensively to initiate drought relief. It is more complex than the SPI and the Drought Monitor.

2.3.2 County Profile

According to the PDSI map shown below, 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.



Palmer Drought Map



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

<https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx>

The figure above illustrates drought conditions within Jefferson 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.

2007: This drought event began in May 2007 and lasted until approximately October. This drought event affected much of Middle Tennessee, including surrounding counties: Humphreys, Hickman, Lewis, Wayne, and Benton. Many reports of poor/low-quality crops were made, dairy cows were producing 20% less milk, fish were dying by the thousands, and numerous ponds, creeks, streams, and some wells were drying up. Tennessee crop losses in 2007 approximated around \$750 million. Some counties/cities had to implement water restrictions throughout the drought.

Probability Future Events – It is unlikely a significant drought will occur in the next five years.

The probability of Jefferson County and its municipalities experiencing a drought event can be challenging to quantify but based on the historical record of 2 droughts since 2000; it can reasonably be assumed that this type of event can occur once per decade. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

2.3.3 Risk Assessment

Jefferson 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 tract. Some of these community risk factors include social vulnerability which is

determined by the data pulled from the Census performed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Drought = Relatively 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 in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

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
Jefferson County								
Jefferson City								
Dandridge								
Baneberry								
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.

2.3.4 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 Jefferson County.

2.3.5 Multi-Jurisdictional Differences

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

2.3.6 Summary

Jefferson County and all incorporated jurisdictions are equally vulnerable to drought. With historical frequency considered there is a significant chance of this event occurring each year. Drought can affect people's health and safety. Examples of drought impacts on society include anxiety or depression about economic losses, conflicts when there is not enough water, reduced incomes, fewer recreational activities, higher incidents of heat stroke, and even loss of human life. Drought conditions can also provide a substantial increase in wildfire risk. As plants and trees wither and die from a lack of precipitation, increased insect infestations, and diseases—all associated with drought—they become fuel for wildfires. Jefferson 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.

2.4 Earthquakes

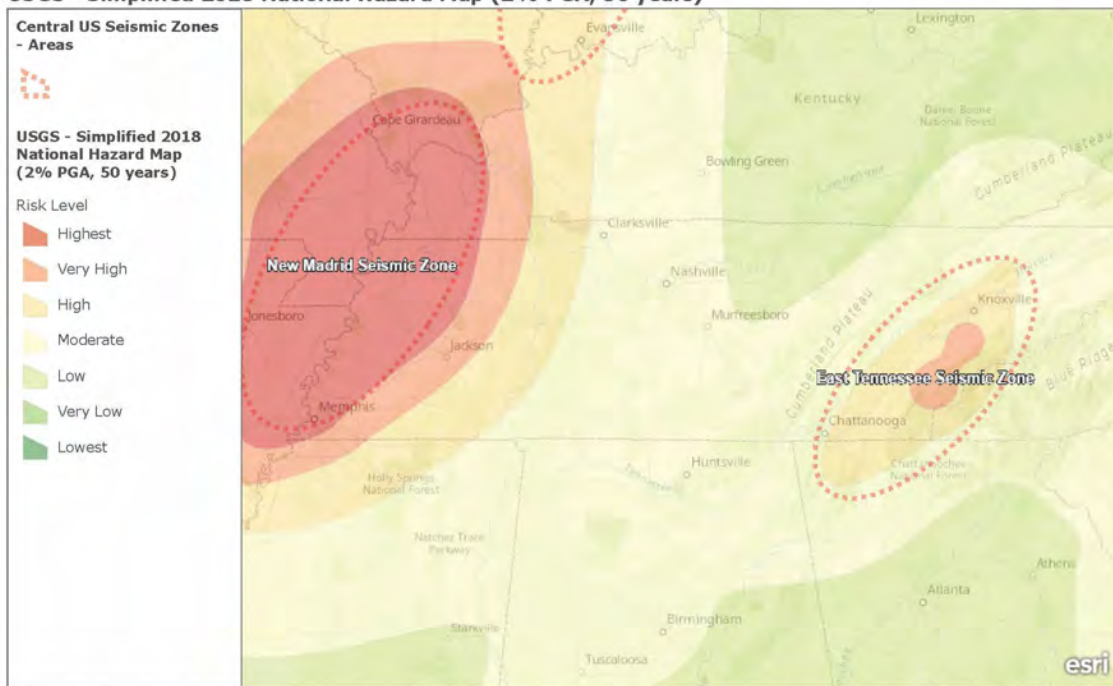
2.4.1 Hazard Overview

An earthquake results from a sudden release of energy in the Earth's crust that creates seismic waves. The energy originates from a subsurface fault. A fault is a fracture or discontinuity in a volume of rock along tectonic plates. In the most general sense, the word earthquake describes any event that generates seismic waves. Earthquakes are typically caused by the rupturing of geological faults. Occasionally, they are also caused by other events such as volcanic activity, landslides, mine blasts, and nuclear tests. An earthquake's point of initial rupture is called its focus or hypocenter. The epicenter is the point at ground level directly above the hypocenter.

2.4.2 County Profile

Jefferson County is near the major intraplate (within a tectonic plate) seismic zone known as the New Madrid Seismic Zone. The New Madrid Seismic Zone (NMSZ) is an approximately 120-mile-long fault system that stretches across five states, including Western Tennessee. Jefferson County is near the East Tennessee Seismic Zone (ETSZ) which stretches across three states. The figure below illustrates the risk level of the ETSZ within the state.

USGS - Simplified 2018 National Hazard Map (2% PGA, 50 years)



Earthquake hazard map showing peak ground accelerations having a 2 percent probability of being exceeded in 50 years, for a firm rock site.

Esri, USGS | Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

New Madrid Seismic Zone (Source: [CUSEC](#))

Jefferson has experienced 4 small magnitude (1.0 or greater) earthquakes in the past 20 years, or approximately 20% chance per year for the past 20 years, with the strongest, a 2.9 on 12/18/2008. <https://www.homefacts.com/earthquakes/Tennessee/Jefferson-County.html>

The NMSZ is known for producing four of the largest North American earthquakes in recorded history, all of which would have been felt in Jefferson County. This includes the noted three-month period between December 1811 and February 1812 that had at least four earthquakes which are understood by scientists to be greater than a M7.0. During this period, there were dozens of strong earthquakes ranging between M6.0 and M7.5. Thousands of smaller shocks were documented. Similar to the 1811-12 New Madrid earthquake sequence which created Reelfoot Lake in Lake County, Tennessee, very large magnitude earthquake sequences are believed to have occurred in pre-historic times as well. Paleo-liquefaction and geologic evidence suggests large earthquake sequences occurred in the New Madrid Seismic Zone in 1450 AD and 900AD.

Based on geologic research on the paleo seismic record of past earthquakes, the USGS estimates that there is a 7 to 10 percent chance of a New Madrid earthquake the size of those in 1811-12 occurring in the next 50 years. However, the occurrence of even a moderate-sized earthquake located in close proximity to urban centers such as Memphis or St. Louis could be locally devastating. The last magnitude-6 earthquake struck near Charleston, Missouri, in 1895. The chance of such an earthquake occurring in the New Madrid region in the next 50 years is 25 to 40 percent.

These probabilities are derived from the USGS National Seismic Hazard Maps, which are developed from geologic information about faults, evidence of prehistoric earthquakes, instrumental and historical earthquake catalogs generated by seismic monitoring, and ground deformation measurements. The National Seismic Hazard Maps are used to estimate probabilities of large earthquakes and the ground shaking to be expected if those earthquakes occur.

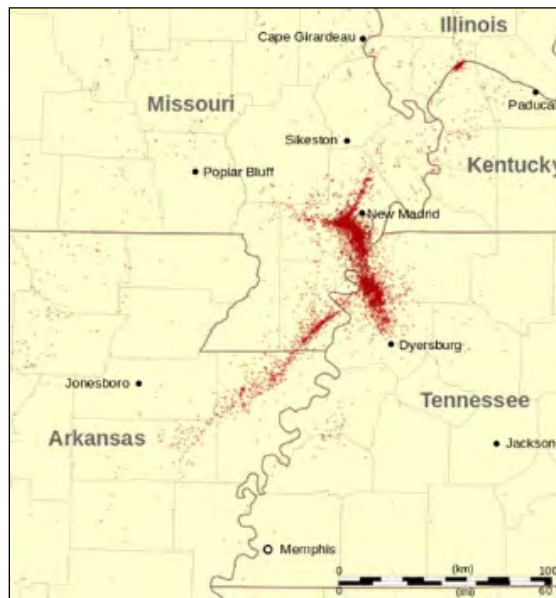
The Eastern Tennessee Seismic Zone (ETSZ), a zone of small earthquakes stretching from northeastern Alabama to southwestern Virginia. The ETSZ is the second-most active natural seismic zone in the central and eastern United States, behind the New Madrid Seismic Zone in the Mississippi River region that produced the 1811-1812 magnitude 7+ earthquakes. In historic times, the ETSZ has not produced earthquakes larger than magnitude 4.8, however scientists believe the ETSZ is capable of generating magnitude 6 or greater. The ETSZ region is home to several nuclear power plants and hydroelectric dams related to the Tennessee Valley Authority, along with major population centers such as Knoxville and Chattanooga.

Richter Scale Classification (Source: USGS)

Richter Scale for Earthquakes		
Magnitudes	Description	Typical Impacts
< 2.0	Micro	Not felt.
2.0-2.9	Slight	Generally, not felt but recorded.
3.0-3.9	Minor	Often felt, but rarely causes damage.
4.0-4.9	Light	Noticeable shaking of indoor items and rattling noises. Significant damage is likely.

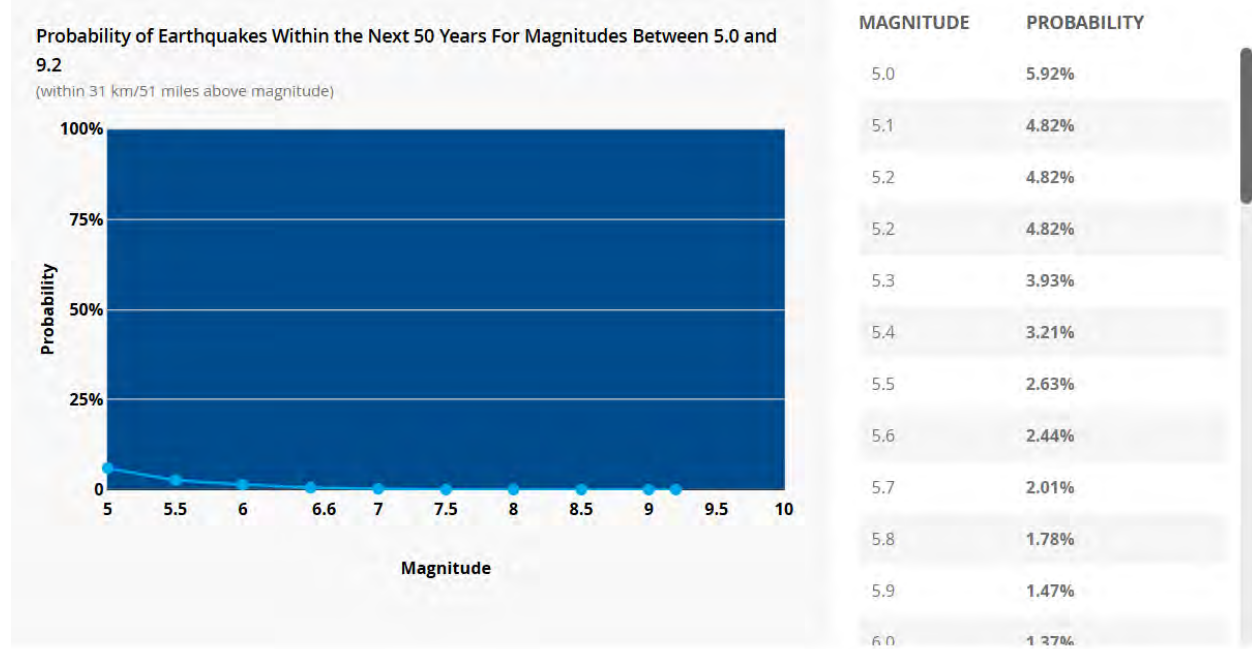
5.0-5.9	Moderate	It can cause major damage to poorly constructed buildings in small regions. At most slight damage to well-designed buildings.
6.0-6.9	Strong	It can be destructive in areas up to about 100 miles across populated areas.
7.0-7.9	Major	It can cause serious damage over larger areas.
8.0-8.9	Great	It can cause severe damage in areas several hundred miles across.
9.0-9.9	Epic	They are devastating in areas several thousand miles across.

Since 1812, the most significant recorded earthquakes from the New Madrid Zone were in 1895 and 1968. Since seismic measurement instruments were installed in and around the zone in the 1970s, more than 4,000 small earthquakes have been recorded, with the vast majority being too small to be felt.



NMSZ Earthquakes Recorded Since 1974 (Source: USGS)

According to a 2008 FEMA report, a severe earthquake in the NMSZ could result in the highest economic loss due to a natural disaster in U.S. history. Based on this report, a 7.7 magnitude quake in the NMSZ would result in thousands of fatalities, hundreds of billions of dollars in damage to structures, and total disruption of vital infrastructure in Western Tennessee, including Jefferson County.



Probability of Future Events – While precise short-term predictions aren't possible, we can use **probabilistic seismic hazard analysis (PSHA)** benchmarks:

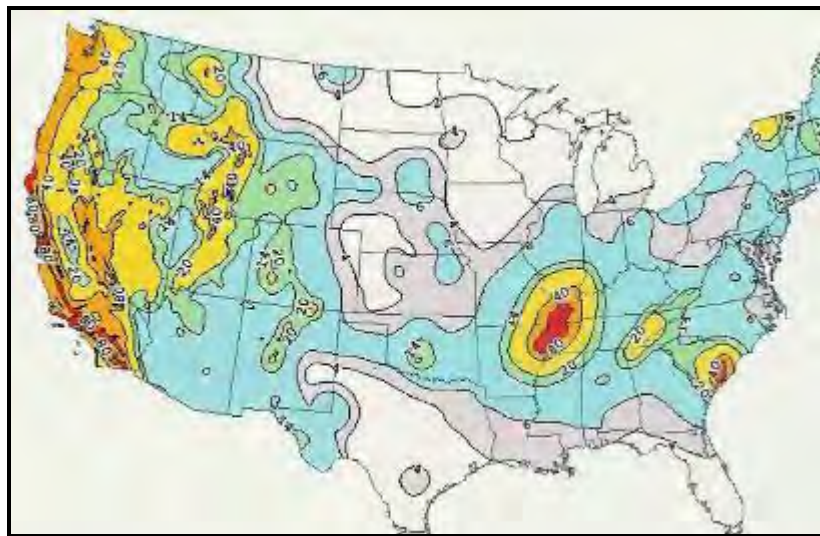
- **Annual chance of felt ($M \geq 3$) quake:** Roughly **50–100%** per year in ETSZ.
 - Over 5 years, very likely to experience one or more small quakes.
- **Chance of moderate quake (M 4–5):**
 - Estimated **5–10% per decade** in ETSZ → ~ **2.5–5%** chance over 5 years.
- **Chance of major quake (M 6+):**
 - Paleoseismic data suggest such events recur every **thousands of years** → implies a low **< 1%** chance in the next 5 years.

A catastrophic earthquake at the NMSZ would result in \$100-200 million in building damages. Furthermore, according to the HAZUS, Jefferson County will experience the following in a catastrophic earthquake scenario:

Impact Overview	Numerical Value
Fatalities (Depending on time of day)	0-7
Injuries	Unknown
Displaced Residents (Households)	5
Residents Requiring Shelter	2
Debris (tons)	23k tons
Residencies experiencing >moderate damage	366.44 or 66.65%
Day 1	
Households without power	0
Households without potable water	0
Resources Functioning on Day 1	Infrastructure Functioning after Day 1

Resource	Percentage Functioning	Resource	Percentage Functioning
Hospitals	98%	Highway Segments	100%
Police Stations	100%	Railway Segments	100%
Fire Stations	100%	Airport Segments	100%
Schools	100%	Bus facilities	100%
Communications	100%	Ports	100%

Many buildings and the majority of infrastructure networks throughout the county could be vulnerable to earthquake impacts. Jefferson County's building stock can be broken down into the following percentage categories: 77.85% residential, 5.65% commercial, 0.87% industrial, 0.41% agricultural, 0.92% religious, 0.19% governmental, and 0.08 educational. Throughout the county, all buildings and infrastructure are vulnerable to earthquake impacts.



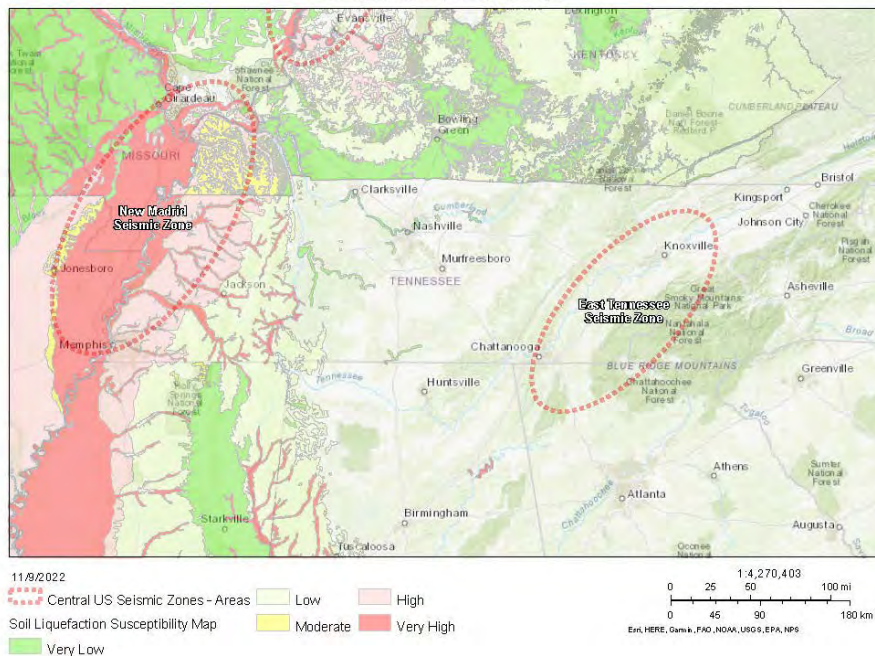
**National Seismic Hazard Map (Source: USGS)
Ground Motions with a 2% Chance of Occurring in 50 Years**



Mercalli Intensity Zones In Jefferson County (Source: [USGS](#))

As indicated in the above maps, all of Jefferson County's jurisdictions and districts sit within intensity zones II (Weak) to IV (Light) of the Modified Mercalli Intensity Scale due to its proximity to the ETSZ. According to the Central United States Earthquake Consortium (CUSEC), Jefferson County is at Low level of risk for liquefaction following an earthquake.

Letter ANSI A Landscape



Earthquake Induced Liquefaction (Source: [CUSEC](#))

2.4.3 Risk Assessment

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 tract. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census performed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Earthquake = Relatively 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 in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

Earthquake Risk based on selected FEMA Lifelines								
Earthquake Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Jefferson County	Red	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow
Jefferson City	Green	Green	Green	Green	Green	Green	Green	Green
Dandridge	Green	Green	Green	Green	Green	Green	Green	Green
Baneberry	Green	Green	Green	Green	Green	Green	Green	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 all participating jurisdictions are able to 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.

2.4.4 Land Use and Development Trends

Heavily populated or industrialized centers are at a higher risk for catastrophic earthquake damage. Jefferson County, like much of Tennessee, is experiencing rapid growth increasing the likelihood of significant impacts to life and property from a significant earthquake.

2.4.5 Multi-Jurisdictional Differences

Counties predominantly in the West Portion of Tennessee will be more likely impacted by the New Madrid Zone. However, a significant magnitude earthquake can cause primary and secondary effects across the state.

2.4.6 Summary

Due to its proximity to the New Madrid Fault, the entirety of Jefferson County could be subject to an earthquake. This includes the entire County population and all infrastructure. A significant earthquake event would result in a substantial loss of life and billions of dollars in damages.

2.5 Extreme Temperatures

2.5.1 Hazard Overview

Heat Waves

Excessive Heat is when the heat index reaches at least 105°F for at least three hours on two consecutive days, and the nighttime air temperature does not drop below 75°F. 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 100°F but less than 105°F for at least 2 hours.
- An Excessive Heat Watch is issued when temperatures of 105°F 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.

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.

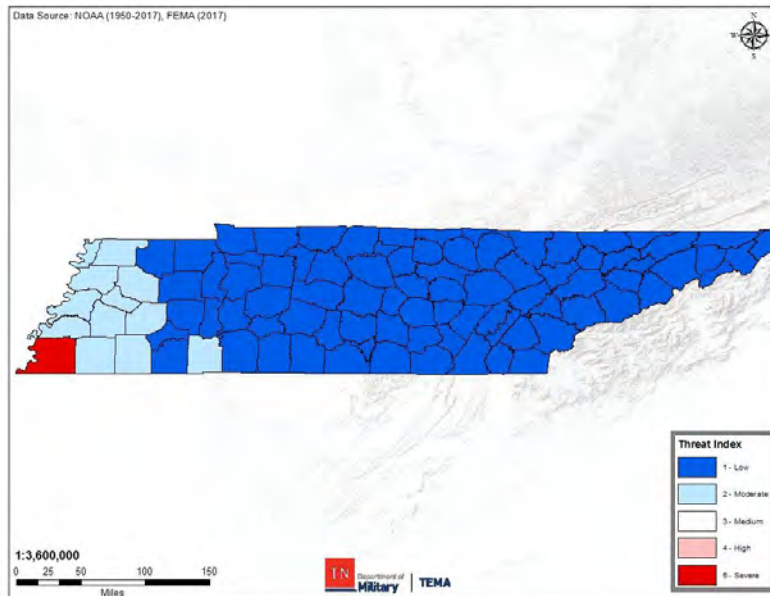
The National Weather Service (NWS) issues the nation's Wind Chill Warning, Watch, and Advisory:

- 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).

2.5.2 County Profile

The following figure provides extreme temperature event information for Jefferson County. The threat index for Jefferson County is Low.



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.

There are Zero storm events listed for Cold/Wind Chill, Excessive Heat, Extreme Cold/Wind Chill, Frost/Freeze, or Heat in the NOAA Storm Event Database.

Probability of Future Events – The probability of Jefferson 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; 0 events over a 75-year period. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

-Annual chance of at least one heat-wave event in Jefferson County: **~80–90%.**

-Over 5 years, the odds of experiencing at least one significant heat wave exceed **> 99%.**

-Forecasting extreme cold (< 0 °F): 1–3% annual chance.

-Over 5 years, cumulative risk of a single record cold snap is still low: **5–15%**

2.5.3 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 tract. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census performed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Cold Waves = No rating

National Risk Index Score for Hot Waves = No rating

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 in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was mid-level impact of the identified hazard. The results are below:

Extreme Temperature Risk based on selected FEMA Lifelines								
Extreme Temperature Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Jefferson County								
Jefferson City								
Dandridge								
Baneberry								
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 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, Jefferson County will have a projected maximum of 3-5 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.

2.5.4 Land Use and Development

Extreme temperature events have significant or even catastrophic impacts on property and critical infrastructure. Jefferson 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.

2.5.5 Multi-Jurisdictional Differences

Due to the nature of extreme temperatures, Jefferson County and the incorporated jurisdictions are equally 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.

2.5.6 Summary

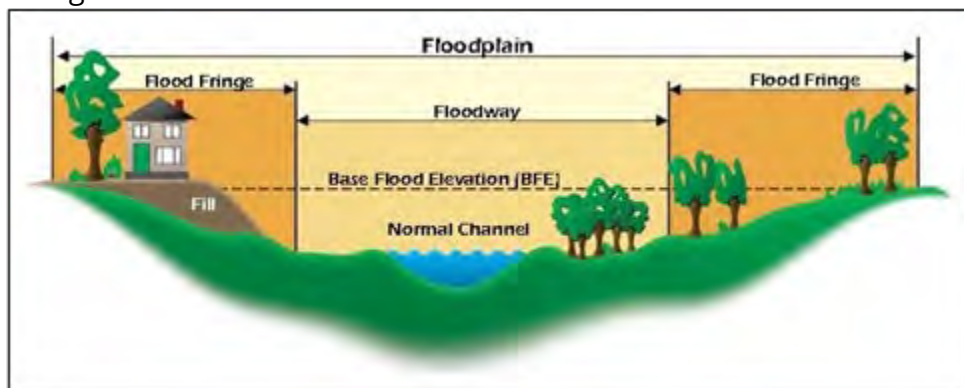
Jefferson County and the incorporated jurisdictions are equally vulnerable to extreme temperatures, affecting people's health and safety. Therefore, it is essential to have proper measurements in place to prevent critical structures from being vulnerable to utility failure during extreme temperatures.

2.6 Flood

2.6.1 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 Jefferson County are usually caused by rain and may also be caused by snowmelt and man-made incidents.

The area adjacent to the channel is the floodplain, as shown below. 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 escape the channel by eroding its banks. When this occurs, sediments (including rocks and debris) are deposited that gradually build up over time to create the floor of the floodplain. Floodplains generally contain unconsolidated sediments, often extending below the stream's bed.



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 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.

2.6.2 County Profile

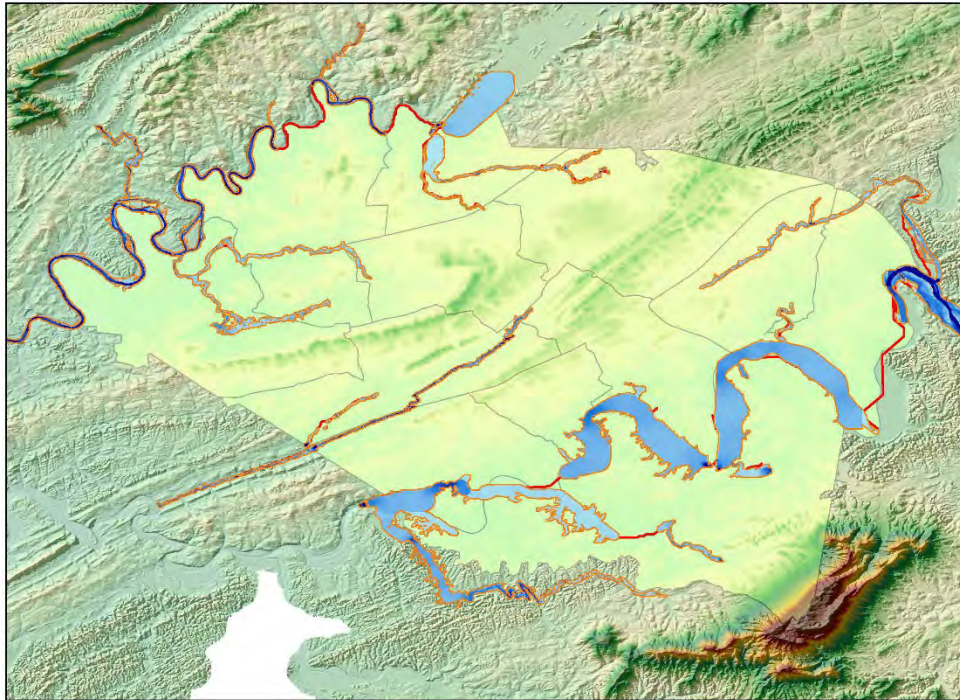
Riverine flooding occurs from inland water bodies such as streams and rivers. In Tennessee, flooding is highly dependent on precipitation amounts and is highly variable within the State.

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.

Mapped Flood Insurance Zones

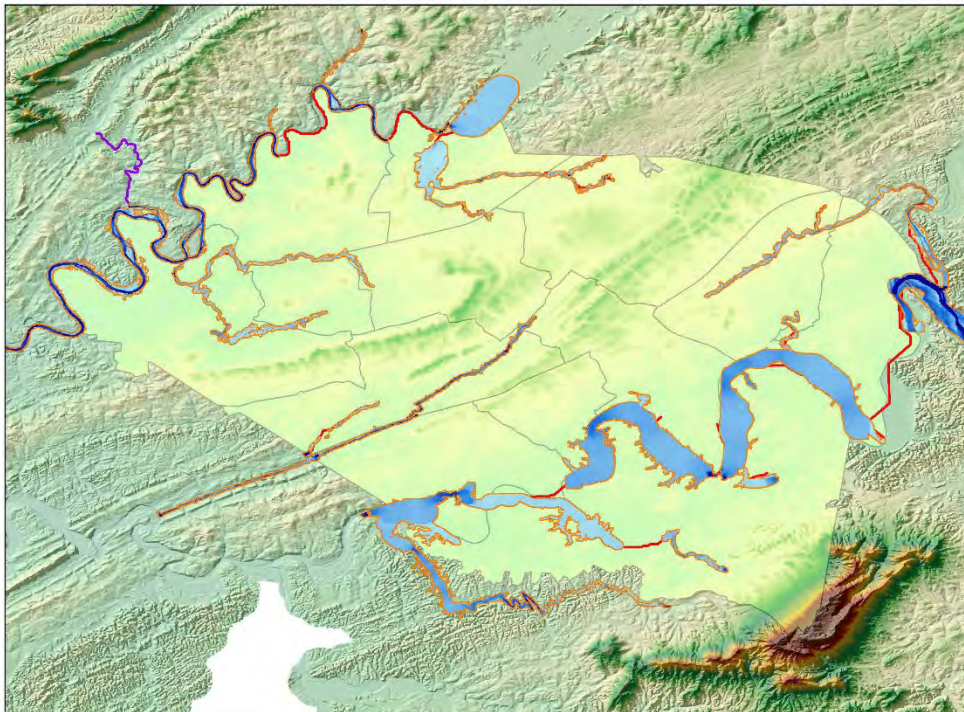
Flood Hazard Area	Description
HAZUS (100-yr)	Areas subject to inundation by the 1-percent-annual-chance flood event are generally determined using approximate methodologies. Mandatory flood insurance purchase requirements and floodplain management standards apply.
HAZUS (500-yr)	A 500-year flood zone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

Jefferson County 100yr Flood



HAZUS 100-year Flood Map

Jefferson County 500yr Flood



HAZUS 500-year Flood Map

NFIP Policy Data

NFIP Policy Data for Jefferson County				
Jurisdiction	CID Number	Policies In-Force	Insurance In-Force Whole \$	Written Premium In-Force
Jefferson County	470097	39	10,282,000	31,620
Jefferson City	475430	9	3,201,000	7,831
Dandridge	470299	0	0	0
Baneberry	470452	1	250,000	438
White Pine	470332	36	6,238,000	22,918
New Market	470385	5	1,703,000	16,819

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 Jefferson County.

NFIP Loss Data

-No Properties are Listed-

NFIP Loss Data for Jefferson County					
Jurisdiction	Total Losses	Closed Loses	Open Loses	CWOP Loses	Total Payments
Jefferson County	RL: 0				
	SRL: 0				
Jefferson City	RL: 0				
	SRL: 0				
Dandridge	RL: 0				
	SRL: 0				
Baneberry	RL:0				
	SRL: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 75 years, there have been approximately 15 flooding events in Jefferson County. A table of NOAA-reported flooding events is located below. The following narratives were obtained via the NOAA Storm Event Database. The database does not

include Hurricane Helene data that significantly impacted East TN including Jefferson County. [What parts of East Tennessee are flooded? Map shows dams, rivers impacted by Helene](#)

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	2.257M	0.00K
JEFFERSON CITY	JEFFERSON CO.	TN	06/14/1997	17:45	EST	Flash Flood		0	0	0.00K	0.00K
COUNTYWIDE	JEFFERSON CO.	TN	07/11/1999	11:00	EST	Flash Flood		0	0	0.00K	0.00K
JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	03/17/2002	08:45	EST	Flood		0	0	0.00K	0.00K
COUNTYWIDE	JEFFERSON CO.	TN	03/17/2002	17:30	EST	Flash Flood		0	0	0.00K	0.00K
JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	02/14/2003	12:00	EST	Flood		0	0	58.00K	0.00K
COUNTYWIDE	JEFFERSON CO.	TN	02/16/2003	02:00	EST	Flash Flood		0	0	0.00K	0.00K
JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	02/21/2003	12:00	EST	Flood		0	0	0.00K	0.00K
JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	04/10/2003	08:00	EST	Flood		0	0	0.00K	0.00K
JEFFERSON CITY	JEFFERSON CO.	TN	09/26/2009	14:00	EST-5	Flood		0	0	0.00K	0.00K
JEFFERSON CITY	JEFFERSON CO.	TN	02/28/2011	13:50	EST-5	Flood		0	0	2.190M	0.00K
JEFFERSON CITY	JEFFERSON CO.	TN	01/30/2013	20:00	EST-5	Flood		0	0	1.00K	0.00K
WHITE PINE	JEFFERSON CO.	TN	03/03/2020	07:30	EST-5	Flood		0	0	0.00K	0.00K
JEFFERSON CITY	JEFFERSON CO.	TN	03/28/2021	07:30	EST-5	Flash Flood		0	0	1.00K	0.00K
NEW MARKET	JEFFERSON CO.	TN	08/07/2023	14:00	EST-5	Flash Flood		0	0	5.00K	0.00K
WHITE PINE	JEFFERSON CO.	TN	08/14/2023	23:00	EST-5	Flash Flood		0	0	2.00K	0.00K
Totals:								0	0	2.257M	0.00K

Flooding Extent History

Location	Extent & Impact	Event Date
Jefferson County	State Route 139 (Westford Road / Blue Springs Road). Closures due to flooding reported at two segments: Westford Rd to Workman Rd (mile 1.7–4.4) and near Blue Springs Rd (mile 1.09), per TDOT alerts during heavy rain events. Ranging from several inches to over a foot. Also placed under closures during storm events alongside downed power lines (e.g., at Glenbrook Lane). Massive inflows from Hurricane Helene remnants pushed debris near Dandridge and caused floating material accumulation across	Various

	the reservoir. TVA even deployed a boom upstream of town to mitigate downstream flooding impact from Hurricane Helene remnants in September 2024.	
Jefferson City	Low-lying areas around Jefferson City, Bean Station, Russellville, noted in flood advisories as prone to roadway flooding ranging from several inches to over a foot depending on rainfall. A severe statewide event (May 1–2, 2010) produced 10–20 inches of rain. Though centered west of Knoxville, heavy rainfall upstream contributed to high reservoir releases affecting downstream areas like Jefferson City and Cherokee Lake shoreline. In May 2003, prolonged “training” of thunderstorms dumped over 9 inches in parts of East TN. While not directly recorded in Jefferson City, such regional events elevate Holston River flows into Cherokee Lake, raising downstream flood risk.	Various
Dandridge	Cherokee Dr at I-40 reported storm flooding depending on rainfall from several inches to over a foot. In 1942, TVA’s construction of Douglas Dam threatened to inundate downtown Dandridge, which lay below the reservoir’s maximum pool level. A saddle dike was built (top elevation ~1,009 ft, ~7 ft above crest gates) to protect the business district, courthouse, jail, and sections of Highway 9. This structure, known locally as “The Dike That Saved Dandridge,” remains a key flood defense feature.	Various
Baneberry	In May 2010, record-breaking rains (10–20" across Middle Tennessee) caused widespread flooding and reservoir surges. Douglas Lake water levels rose significantly, increasing flood risk to lakefront properties in Baneberry.	Various

Probability of Future Events – Annual flood threat probability: **20–30%**, leading to a roughly **60–70% chance** in five 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, predominately in East Tennessee, will experience significant flooding impacts. Based on a historical record of 15 flood events over 75 years (1950 - 2025), 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.

2.6.3 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 adding more tiles in frequent flood prone areas, purchasing property to build retention ponds in flood prone areas, and conducting ACOE surveys to better address and understand hydrology in flood prone areas. 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 tract. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census performed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Flooding = Relatively 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 in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

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
Jefferson County	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Red
Jefferson City	Green	Green	Green	Green	Green	Green	Green	Green
Dandridge	Yellow	Yellow	Green	Red	Green	Red	Yellow	Red
Baneberry	Yellow	Yellow	Green	Red	Green	Red	Yellow	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 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-yr and 500-year return periods. The Level I vulnerability assessment is presented below by return period.

Building Inventory (General Building Stock)

HAZUS estimates that 27,073 buildings in the region have an aggregate total replacement value of \$8.481 million.

- **Essential Facility Inventory:** HAZUS indicates that there is 1 hospital in the region with a total capacity of 58 beds. There are 15 schools, 10 fire stations, 6 police stations, and 1 emergency operation center.
- **General Building Stock Damage:** For the 100-year flood scenario, HAZUS estimates that about 2 buildings will be at least moderately damaged. This is over 40% of the total number of buildings in the scenario. There are estimated 0 buildings that will be destroyed completely.

Debris Generation

- **100-year Scenario:** The model estimates that a total of 299 tons of debris will be generated. Of the total amount, Finishes comprises 43% of the total, Structure comprises 27% of the total, and Foundation comprises 30%. If the debris tonnage is converted into an estimated number of truckloads, it will require 12 truckloads (@25 tons/truck) to remove the debris generated by the flood.
- **500-year Scenario:** The model estimates that a total of 353 tons of debris will be generated. Of the total amount, Finishes comprises 41% of the total, Structure comprises 29% of the total, and Foundation comprises 30%. If the debris tonnage is converted into an estimated number of truckloads, it will require 15 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 accommodations in temporary public shelters.

- **100-year Scenario:** The model estimates 68 households (or 205 people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 52 people (out of a total population of 54,645) will seek temporary shelter in public shelters.
- **500-year Scenario:** The model estimates 85 households (or 256 people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 65 people (out of a total population of 54,645) will seek temporary shelter in public shelters.

2.6.4 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.

2.6.5 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 Jefferson 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.

(FIRM Panels: <https://msc.fema.gov/portal/home>)

Intersections & Roads that consistently flood in Jefferson County:

- State Route 139 (Westford Road / Blue Springs Road). Closures due to flooding reported at two segments: Westford Rd to Workman Rd (mile 1.7–4.4) and near Blue Springs Rd (mile 1.09), per TDOT alerts during heavy rain events. Ranging from several inches to over a foot. Also placed under closures during storm events alongside downed power lines (e.g., at Glenbrook Lane)
- US 25W / US 70 / SR 9 intersection at SR 363 in Reidtown. This low-lying intersection near Douglas Lake/Young's Bend sees frequent ponding during heavy rainfall.
- State Route 363 (Indian Creek Road). Experienced more than just flooding—cracking of the roadway led to closures at mile markers 2–2.5, exacerbated by slope instability and water damage.
- Cherokee Drive in Dandridge. Noted in damage reports due to flooding—for instance, closures were issued near or at its intersection with I-40 ramp.

Waterways that are prone to flooding in Jefferson County:

SR 139 (Westford / Blue Springs) Regularly closed during rainstorms

US 25W/US 70/SR 9 at SR 363 Flooding, ponding near Douglas Lake

SR 363 (Indian Creek Rd) Closed due to cracking/slope issues

Cherokee Dr at I-40 (Dandridge) Storm flooding closures reported

East Emory Rd at Dry Gap Flood-prone during severe weather

Jefferson City / Bean Station area Low-lying, minor roadway flooding during advisories

2.6.6 Summary

Severe flooding has the potential to inflict significant damage in Jefferson County. The total economic loss estimated for the 100-year riverine flood is \$40.80 million. The total economic loss estimated for the 500-year riverine flood is \$44.36 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.

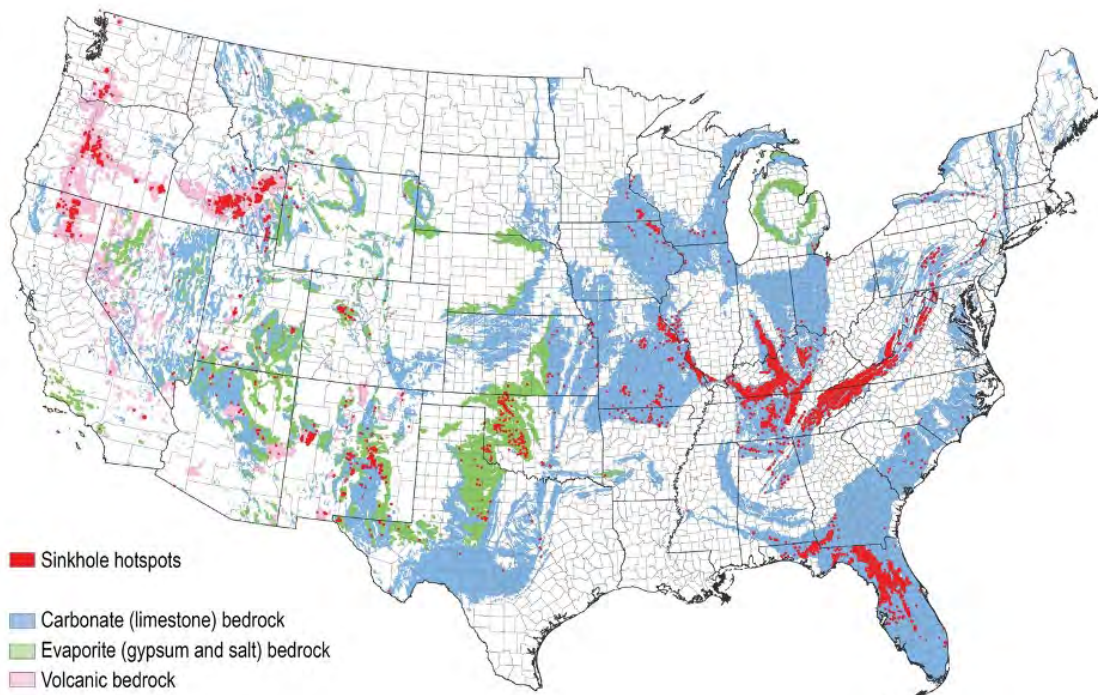
2.7 Geological

2.7.1 Hazard Overview

The speed of onset of a landslide or sinkhole event is very rapid and unpredictable. However, broad areas that are susceptible to this type of hazard may be identified by soil samples and/or surrounding geological/riverine features. This hazard is usually measured in terms of yards of soil displaced and financial damage caused. Land subsidence and sinkholes can develop from both natural processes or as a consequence of indirect or direct human intervention. Sinkholes formed as a consequence of human activity typically result from: the pumping of water, oil, and gas from underground reservoirs; alteration of surface runoff patterns; dissolution of limestone aquifers; the collapse of underground mines; drainage of organic soils; and initial wetting of dry soils (hydro compaction). Land subsidence could occur anywhere in Tennessee and is usually not easily observable because it occurs over a large area. Land subsidence and sinkholes can occur naturally in parts of the country with Karst landscapes. Karst landscapes typically feature caves, underground water sources, and sinkholes.

2.7.2 County Profile

It is difficult to predict where land subsidence and sinkholes will occur accurately. Still, the USGS has managed to identify Tennessee areas with higher risk potential. It is doubtful that a sinkhole will form in an area not considered a Karst formation. The figure below illustrates karst landscapes across the country, the bedrock in which they are found, and the sinkhole hotspots. As shown, eastern and middle Tennessee have a higher tendency for sinkhole hotspots.



Karst Map of the Conterminous United States (Source: United States Geological Service)

The following table contains the documented sinkholes for Jefferson County, which were obtained via the USGS Landform database. There are 2,364 Sinkholes in Jefferson County, 103 caves, and 773 sinkholes over 3m deep.

Sinkholes in Jefferson County
Sinkhole Database: <https://tnlandforms.us/landforms/sinks.php>

County	Sinkholes	Caves	sinkholes 3m+	depth feet	area km ²	volume m ³
Haywood	0	0	0	0	0	0
Henderson	29	0	1	15.1	0.0073	1,953
Henry	52	0	9	24.6	0.0614	13,007
Hickman	111	85	39	32.8	0.1961	48,473
Houston	72	14	23	26.9	0.0597	17,961
Humphreys	40	4	12	28.2	0.0502	18,308
Jackson	40	75	11	43.0	0.0519	24,332
Jefferson	2,364	103	773	76.8	0.3856	326,747
Johnson	20	25	12	47.9	0.0218	15,469
Knox	1,663	167	697	77.4	2.2135	1,535,832
Lake	0	0	0	0	0	0
Lauderdale	0	0	0	0	0	0
Lawrence	27	30	11	21.7	0.1862	47,989
Lewis	9	12	2	42.7	0.0122	7,840
Lincoln	92	18	29	66.6	0.1211	25,922
Loudon	795	22	327	72.5	1.2930	1,065,106

county sinkholes of distinction

Probability of Future Events – There is a likelihood of at least 1 geological hazard occurring every year over the next five years.

Heavy rains and flooding can trigger sinkholes. An increase in the number and intensity of severe storms, and resulting heavy rains and flooding, may also result in sinkholes developing more frequently. With several areas within the state increasing in population and infrastructure (both public and private), this could damage infrastructure, property values, and commerce disruption. Historically, most sinkhole impacts have occurred along the border between Tennessee's central and east regions. This makes Jefferson County vulnerable to these constant changes.

2.7.3 Risk Assessment

Sinkholes and surface depressions receive precipitation runoff which filters down through the soil and rock strata into the cavities in the rock and becomes part of the groundwater regime. This serves to replenish the groundwater supply. However, when trash and waste materials are dumped into the sinkholes and depressions, water that filters through the sinkholes then becomes contaminated, significantly affecting the groundwater supply. Many buildings and the majority of infrastructure networks throughout the county can be vulnerable to sinkholes. This risk is moderate and challenging to predict. Therefore, with

over 2k sinkholes listed, the committee found it essential to include this natural hazard in their 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 and 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 tract. Some of these community risk factors include social vulnerability, which is determined by the data pulled from the Census performed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Landslide = Relatively low

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

Geological Risk based on selected FEMA Lifelines								
Geological Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Jefferson County								
Jefferson City								
Dandridge								
Baneberry								
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 necessity of mitigation actions in the following lifeline categories so that they can become more resilient in the whole community that they serve.

2.7.4 Land Use and Development Trends

In rural areas, sinkholes usually develop naturally from the normal weathering process. However, sometimes the grading for ponds or ground silos in the soil underlain by a cavernous rock can and often leads to the development of new sinkholes, as can the concentration of water flow in ditch lines or the re-routing of surface water.

2.7.5 Multi-Jurisdictional Differences

Due to the nature of sinkholes, Jefferson County and its 2,364 sinkholes, all jurisdictions are equally susceptible to them. A large sinkhole on the main highways such as the interstate (I-40) could have major multi-jurisdictional differences in regards to response and working with outside agencies and resources to direct the flow of a major traffic corridor.

2.7.6 Summary

The relief of the ridges and mountains can be very dramatic and scenic. However, these unusual and often dramatic scenes can be interrupted by the sudden collapse of a roadway or a house or even the flooding of a sinkhole basin crossed by a road or occupied by a residential, public, or commercial structure. The karst landscape can impact many areas of Tennessee, causing damage to all facilities and landscapes. In rare and dramatic cases, karst may cause bodily harm or injury. Sinkholes are not incredibly dangerous at this time in Jefferson County; however, due to their unreliable nature, the HMPC finds it essential to capture this natural occurrence in Tennessee.

2.8 Severe Weather

2.8.1 Hazard Overview

Thunderstorms

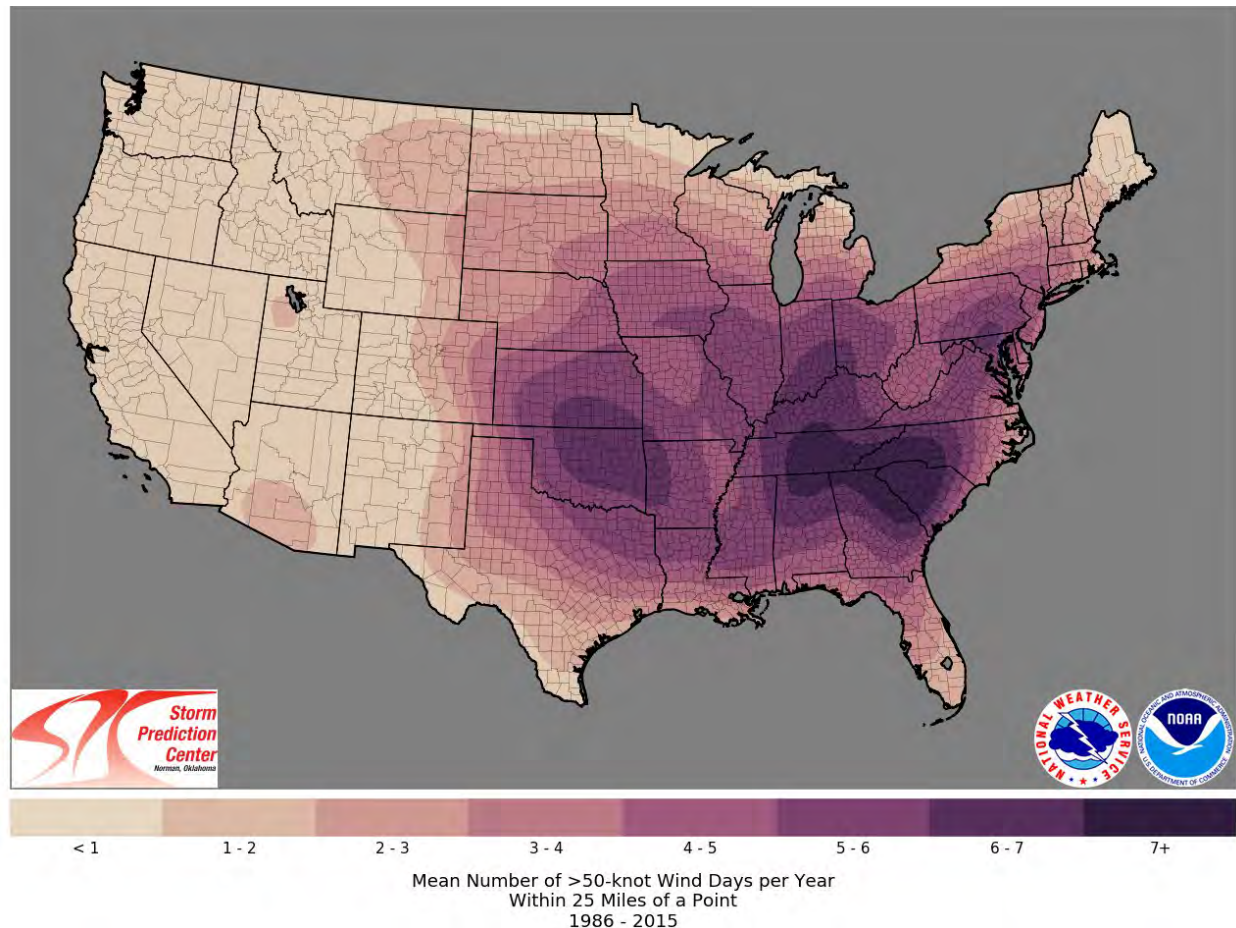
Thunderstorms result from the rapid upward movement of warm, moist air. They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights greater than 35,000 ft. Thunderstorms are responsible for 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 Jefferson County. It is not unusual for Jefferson County to experience winds speeds up to 1-25 knots (1-29 mph), causing structural damage, power outages, and downed trees. Based on a historical record of 6 wind events (not counting Thunderstorm Winds) over 75 years (1950- 2025), the historic frequency calculates an 8% chance of this event occurring yearly. If counting Thunderstorm Winds (231 over 75 years), there is a 308% chance of this occurring yearly.



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 the 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. *The table below* provides an overview of the typical impacts on a community related to hailstone size.

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

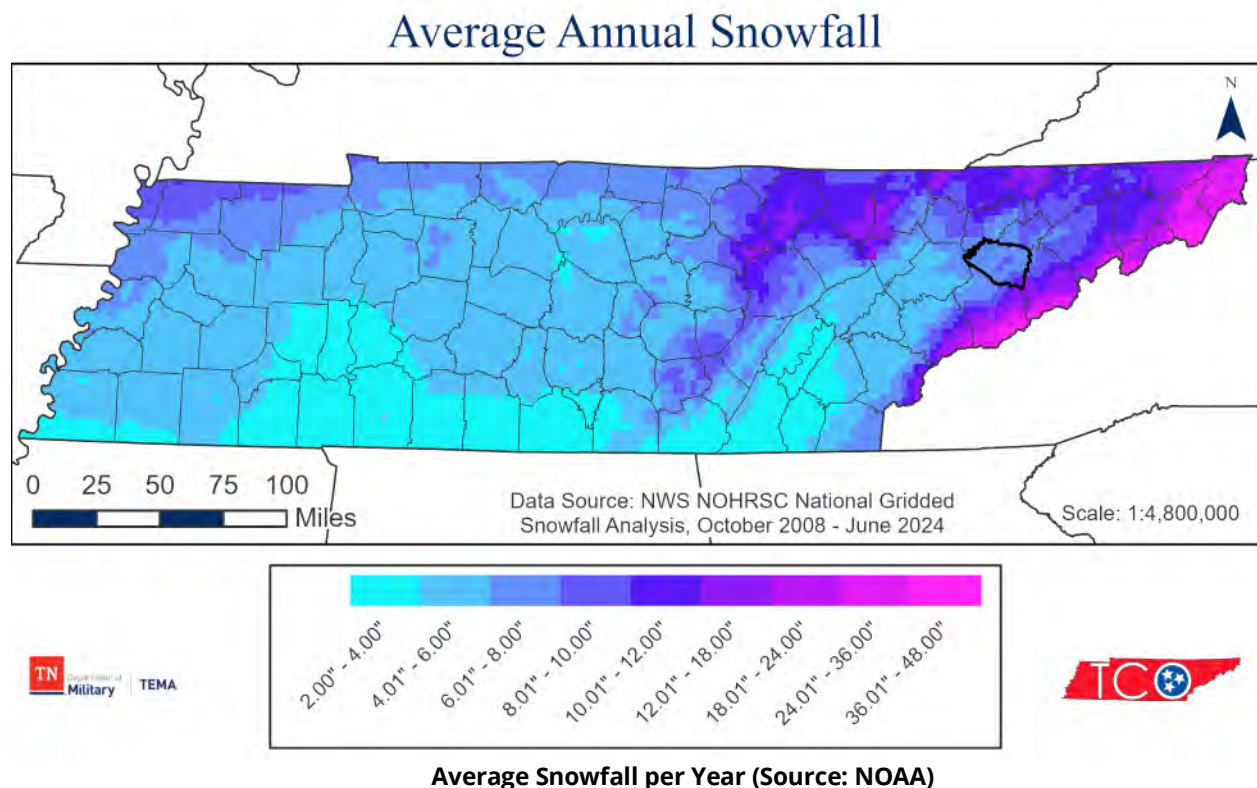
H8	Softball	76-90	Severe damage to aircrafts
H9	Grapefruit	91-100	Extensive structural damage, risk of severe or fatal injuries to people caught in storm
H10	Melon	>100	Extensive structural damage, risk of severe or fatal injuries to people caught in storm

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 Jefferson County, all jurisdictions are 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, Jefferson County can experience multiple winter weather events in one year affecting all jurisdictions equally. The severity of winter storms is commonly measured by inches of snowfall. It is possible for snowfall to accumulate up to 1 foot in Jefferson County and/or ice accumulations to cause hazardous conditions due to its proximity to and around the mountains. U.S. Mean snowfall per year is from 6-12" annually average mean snowfall per year is below in the table.



Average Snowfall per Year (Source: NOAA)

2.8.2 County Profile

The entirety of Jefferson 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. Only significant events are listed here. Tables containing all NOAA-recorded severe weather events between 1950- 2025 for Jefferson County are contained in Appendix C.

Thunderstorms

NEW MARKET	JEFFERSON CO.	TN	04/26/2015	01:25	EST-5	Thunderstorm Wind	55 kts. EG	0	0	15.00K	0.00K
DANDRIDGE	JEFFERSON CO.	TN	06/24/2011	02:35	EST-5	Thunderstorm Wind	60 kts. EG	0	0	20.00K	0.00K
DANDRIDGE	JEFFERSON CO.	TN	08/05/2010	15:00	EST-5	Thunderstorm Wind	60 kts. EG	0	0	25.00K	0.00K

Wind

DANDRIDGE	JEFFERSON CO.	TN	04/03/2007	22:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	25.00K	0.00K
JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	08/30/2005	09:00	EST	Strong Wind	45 kts. EG	0	0	40.00K	0.00K
COUNTYWIDE	JEFFERSON CO.	TN	10/24/2001	23:30	EST	Thunderstorm Wind		0	0	250.00K	20.00K

Hail

DANDRIDGE	JEFFERSON CO.	TN	04/27/2011	19:48	EST-5	Hail	2.00 in.	0	0	0.00K	0.00K
Talbott	JEFFERSON CO.	TN	05/13/1995	16:00	CST	Hail	1.00 in.	0	0	1.00K	0.00K

Lightning

DANDRIDGE	JEFFERSON CO.	TN	08/24/2010	03:44	EST-5	Lightning		0	0	80.00K	0.00K
NEW MARKET	JEFFERSON CO.	TN	08/05/2006	16:30	EST	Lightning		0	0	60.00K	0.00K
DANDRIDGE	JEFFERSON CO.	TN	06/24/1996	10:00	EST	Lightning		0	0	10.00K	0.00K

Winter Weather

JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	01/18/2024	15:00	EST-5	Winter Weather		0	0	0.00K	0.00K
JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	02/17/2015	11:15	EST-5	Winter Storm		0	0	0.00K	0.00K
JEFFERSON (ZONE)	JEFFERSON (ZONE)	TN	01/09/2004	02:00	EST	Winter Storm		0	0	0.00K	0.00K

Probability of Future Events – To determine the likelihood of future severe weather occurrences in Jefferson County historic data and weather patterns were analyzed. Since 1950, 10 tornadoes have occurred within the county. To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

Hail & Damaging Winds

Large hail (> $\frac{3}{4}$ ") and severe straight-line winds (>58 mph) occur **every year across the County**. Hail particularly peaks in **May**, while damaging winds are most frequent in **June–July**. Estimated annual chance for at least one **severe hail or wind event: ~50–70%**

Over five years, that suggests a **~90%+** probability of experiencing such an event.

0.7 winter weather events per year on average—roughly one significant snow, ice, or cold event every 1.4 years

2.8.3 Risk Assessment

Severe weather is not as spatially defined in any location in Jefferson 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 tract. Some of these community risk factors include social vulnerability which is

determined by the data pulled from the Census performed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Hail = Relatively Low

National Risk Index Score for Strong Wind = Relatively Moderate

National Risk Index Score for Ice Storm = Very 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 participating jurisdictions. Therefore, all identified hazards were evaluated in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

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
Jefferson County	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow
Jefferson City	Yellow	Yellow	Yellow	Red	Red	Red	Green	Yellow
Dandridge	Yellow	Yellow	Yellow	Red	Red	Yellow	Green	Yellow
Baneberry	Red	Red	Red	Red	Red	Red	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.

2.8.4 Land Use & Development

Increased development and population growth can reasonably translate to increased damages resulting from severe weather events. The population in Jefferson 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.

2.8.5 Multi-Jurisdictional Differences

The entirety of Jefferson 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.

2.8.6 Summary

Jefferson 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.

2.9 Tornadoes

2.9.1 Hazard Overview

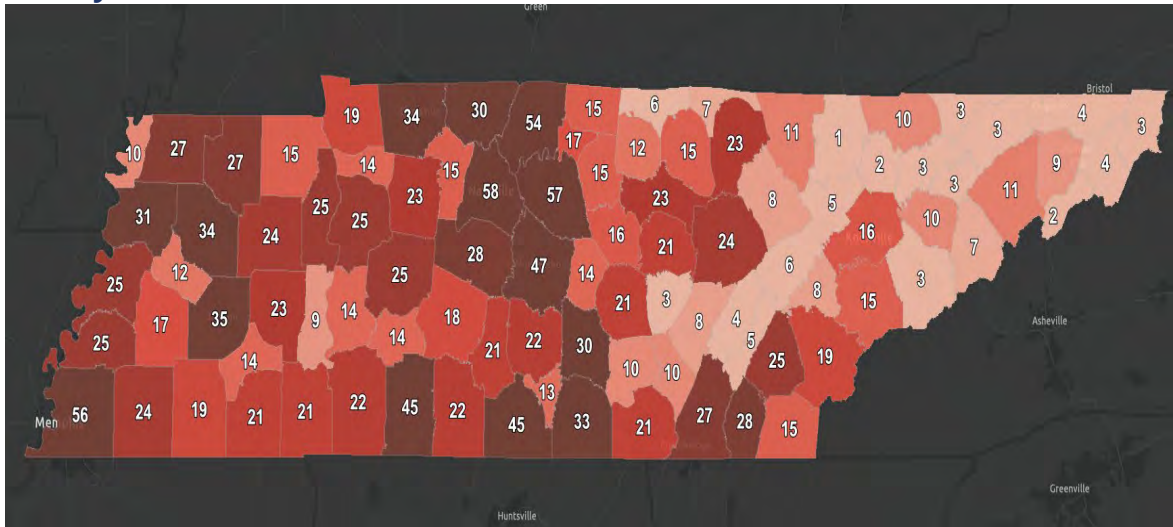
Tornadoes have the potential to produce winds over 200 mph (EF5 on the Enhanced Fujita Scale) and can be very expansive. Before February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage. *The table below* shows the wind speeds associated with the enhanced Fujita scale ratings and the damage that could result at different intensity levels.

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.

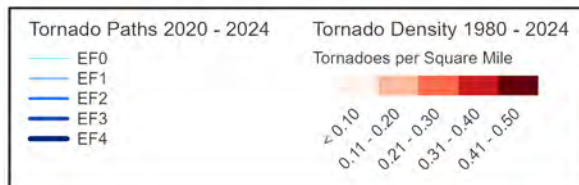
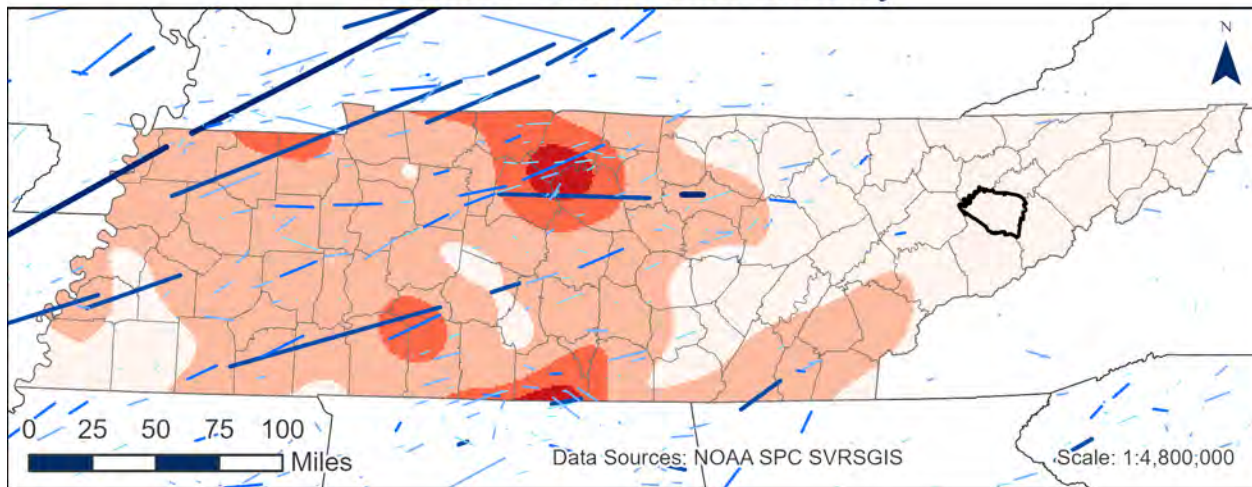
2.9.2 County Profile



Tornadoes by County (NWS/NOAA)

The figure below illustrates the track of tornadoes through Jefferson County as recorded by the National Weather Service Nashville and the National Climatic Data Center and compiled into a visual database by Mississippi State University. Tornadoes commonly hit between 3pm and 9pm in Jefferson County based on historical data.

Tornado Tracks and Density



The following narratives were obtained via the NOAA Storm Event Database.

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	152.50K	0.00K
JEFFERSON CO.	JEFFERSON CO.	TN	03/25/1955	17:30	CST	Tornado	F2	0	0	2.50K	0.00K
JEFFERSON CO.	JEFFERSON CO.	TN	04/04/1974	01:00	CST	Tornado	F0	0	0	25.00K	0.00K
NEW MARKET	JEFFERSON CO.	TN	07/04/1997	16:50	EST	Tornado	F0	0	0	25.00K	0.00K
KANSAS	JEFFERSON CO.	TN	04/27/2011	19:46	EST-5	Tornado	EF0	0	0	20.00K	0.00K
JEFFERSON CITY	JEFFERSON CO.	TN	04/27/2011	20:11	EST-5	Tornado	EF0	0	0	20.00K	0.00K
OAKLAND	JEFFERSON CO.	TN	04/27/2011	20:24	EST-5	Tornado	EF0	0	0	5.00K	0.00K
CHESTNUT HILL	JEFFERSON CO.	TN	04/27/2011	20:32	EST-5	Tornado	EF0	0	0	5.00K	0.00K
HODGES	JEFFERSON CO.	TN	06/13/2013	14:11	EST-5	Tornado	EF1	0	0	50.00K	0.00K
SHADY GROVE	JEFFERSON CO.	TN	01/12/2023	13:14	EST-5	Tornado	EF0	0	0	0.00K	0.00K
DOUGLAS LAKE NORTH	JEFFERSON CO.	TN	01/12/2023	13:26	EST-5	Tornado	EF0	0	0	0.00K	0.00K
Totals:								0	0	152.50K	0.00K

Probability of Future Events – Historical data and weather patterns were analyzed to determine the likelihood of future tornado occurrence in Jefferson County. Since 1950 10 tornadoes have occurred within the county (13.3% annually probability). To reference the climate trend analyzed by East Tennessee State University, reference Appendix C.

Tornadoes occur year-round, with a seasonal peak in **April** and again in November.

-Eastern Tennessee sees several tornadoes annually, often rated EF0–EF1, with stronger (EF2+) less common but still possible. Based on historical frequency:

Annual chance of ≥ EF1 tornado in the county: **10–15%**

Cumulative five-year probability: around **40–60%**

2.9.3 Risk Assessment

The entirety of Jefferson 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 tract. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census performed 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 jurisdictions. Therefore, all identified hazards were evaluated in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

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
Jefferson County	Yellow	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow
Jefferson City	Red	Red	Red	Red	Red	Red	Red	Red
Dandridge	Yellow	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow
Baneberry	Red	Red	Red	Red	Red	Red	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 necessity of mitigation actions in the following lifeline categories so that they can become more resilient in the whole community that they serve.

2.9.4 Land Use and Development Trends

Jefferson County codes include proper wind strength and safety regulations consistent with state and federal regulations. The County adopted the 2018 IRC for all residential construction throughout the County. There are multiple mobile home areas in the county, however information isn't clear due to the county only permitting construction but does not verify for occupancy.

2.9.5 Multi-Jurisdictional Differences

The entirety of Jefferson County and its incorporated jurisdictions are at risk for a tornado event; however, historically, a large portion of tornado events have taken place NE and East of the middle of the County. It is also worth noting that given the county's sizeable rural component, some tornadic events may have gone unreported.

2.9.6 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 damages 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.

2.10 Wildfire

2.10.1 Hazard Overview

According to the Tennessee Division of Forestry, debris burning, and arson are the two leading causes of wildfires. Generally, three significant factors sustain wildfires and allow predictions of a given area's potential to burn. These factors include, fuel, topography; and weather.

Fuel is the material that feeds the fire and is a critical factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Artificial structures and other associated combustibles are also considered a fuel source. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and catalyze spreading wildfires.

An area's **topography** (terrain and land slopes) affects its susceptibility to wildfire spread. Fire intensities and rates of spread increase as the slope increases due to the tendency of heat from a fire to rise via convection and radiation. The natural arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.

Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. The wind is the most treacherous weather factor. The issue of drought conditions contributes to concerns about wildfire vulnerability.

2.10.2 County Profile

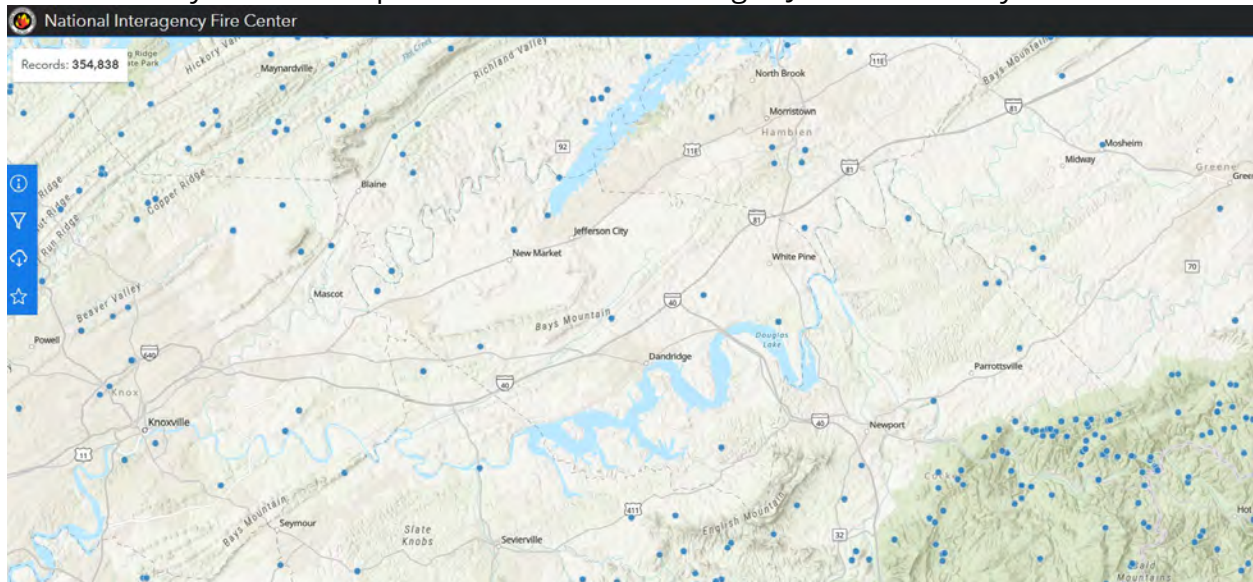
Jefferson County is in the East District of the Tennessee Division of Forestry. The Tennessee Division of Forestry provides statistics for each region, summarizing wildfire events. Due to outside data sources, including federal and state land, causing confusion in wildfire data, the Tennessee Division of Forestry will always remain the only source of information for Counties within the State of Tennessee. It is not the responsibility of Jefferson County to mitigate federal or state land. Hopefully, in the future, a more defined dataset can be provided. At this time, this is the only information Jefferson County can obtain that is consistent and confirmed. Below are the statistics for Jefferson County from 2007 to 2016. These statistics also provide the extent of the Wildfire Hazard.

Year	# of Fires	Cause	Total	Date	Location	Total Acres Burned
2025	1	Human	1	3/14/2025	Birchwood Dr	1
2025	1	Undetermined	1	3/11/2025	Banks Lane	13
2024	1	Human	1	11/10/2024	2376 Stone Way Place	5.5
2023	1	Human	1	2/23/2023	1849 C H Rankin Rd	8.9

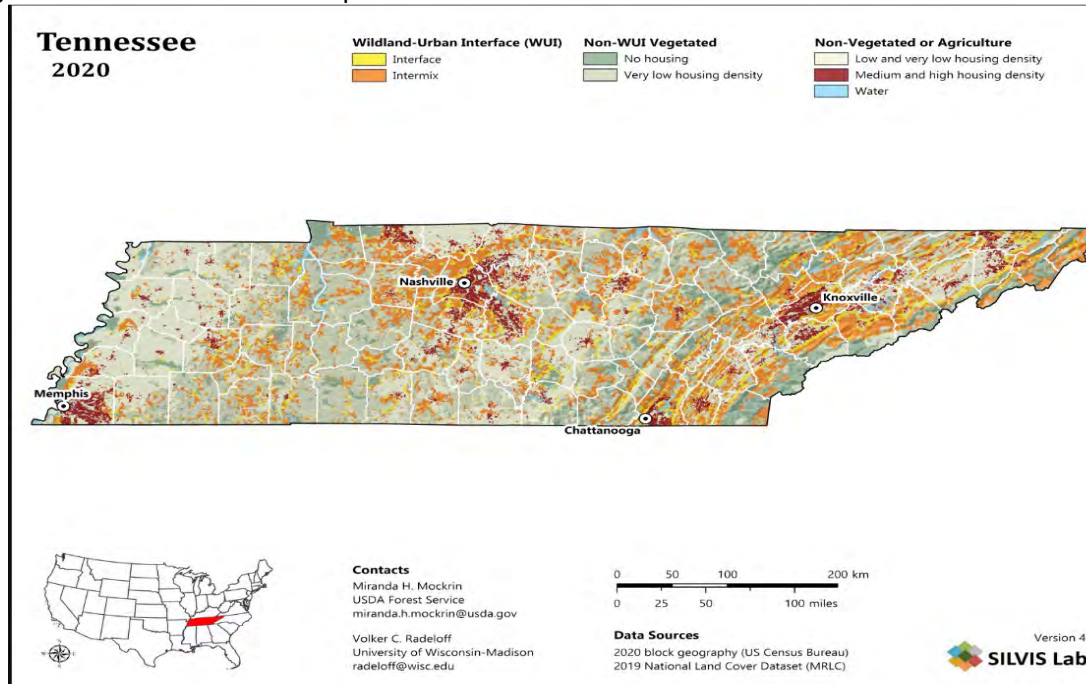
CHAPTER 2: RISK AND VULNERABILITY ASSESSMENT

2023	1	Human	1	4/1/2023	2183 North Ridge Dr	4.5
2023	1	Natural	21	6/19/2023	Hatmaker Rd	0.1

There are very few news reports of Wildfires occurring in Jefferson County.



Due to the terrain and rural nature of the county, combined with limited resources and capabilities inside the county, wildfire poses a significant risk to the region's agricultural resources and residential structures. As seen by the Wildland Urban Interface map below, most of the county is either intermixed or no housing. The sparse population and the availability of fuel create an environment where fires could develop and spread rapidly and delay the notice as well as response.



Probability of Future Events – It is unlikely Jefferson County will experience a significant Wildfire, but there is always a possibility due to the terrain and weather changes such as lightning or from drought.

It is hard to predict the likelihood of wildfires as many factors contribute to the ignition of a wildfire. Wildfires can be part of a natural and healthy forest disturbance process, but they have become increasingly frequent and severe in recent years. Higher spring and summer temperatures cause soils to be drier for longer, increasing the likelihood of drought and a more extended wildfire season. These hot, dry conditions also increase the chance that wildfires will be more intense and long-burning once they are started by lightning strikes or human error.

Due to changing precipitation patterns, future conditions make forests more susceptible to severe fires. Wildfires emit carbon dioxide, greenhouse gases, and air pollutants such as methane and nitrous oxide, up to 3% of annual U.S. greenhouse gas emissions. Wildfires release carbon that has been sequestered by the trees that are burned. However, these effects are not uniform across all forests.

One of the most severe future conditions concerns about wildfires is that it could lead to an increase in the conditions that lead to more enormous wildfires – which is essential as most of the area burned in the Eastern United States results from a limited number of massive wildfires. After examining what conditions were associated with VLFs (very large fires), the researchers found that they are some of the same related to future conditions.

2.10.3 Risk Assessment

Wildfires have a higher likelihood of occurring during periods of drought due to dryer foliage being quicker to ignite and spread.

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 tract. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census performed every ten years. A higher social vulnerability score is proportional to a higher risk score.

National Risk Index Score for Wildfire = 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 in regard to risk in FEMA lifelines per jurisdiction. The scenario that local jurisdictions would evaluate the conditions off of was a mid-level impact of the identified hazard. The results are below:

Wildfire Risk based on selected FEMA Lifelines								
Wildfire Risk	FEMA Lifelines							
Jurisdiction	Safety & Security	Food, Water & Shelter	Health & Medical	Energy	Communications	Transportation	Hazardous Materials	Water Systems
Jefferson County	Yellow	Red	Green	Green	Green	Green	Green	Green
Jefferson City	Green	Green	Green	Green	Green	Green	Green	Green
Dandridge	Red	Green	Green	Red	Yellow	Yellow	Yellow	Red
Baneberry	Red	Red	Red	Red	Red	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 are able to 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.

2.10.4 Land Use and Development Trends

Many residential and commercial buildings and most infrastructure networks throughout the county may be vulnerable to wildfire impacts. Many of these structures are at risk for direct impacts and indirect impacts, such as downed electrical lines, decreased water quality, decreased air quality, devastated agriculture crops, and restricted travel routes.

2.10.5 Multi-Jurisdictional Differences

Due to the nature of wildfires, Jefferson County and all incorporated jurisdictions are equally susceptible to them. Depending on the size of the wildfire would determine how much outside help would be needed and whether multi-jurisdictional differences would be in play. Due to the large amount of wooded areas and in close proximity the areas cover other counties could also be considered a multi-jurisdictional difference.

2.10.6 Summary

Jefferson County and the incorporated jurisdictions are equally vulnerable to wildfire. Fires, smoke, and air quality can affect people's health and safety. Therefore, it is essential to have proper measurements in place to prevent critical structures, homes, and businesses from being vulnerable to fire and smoke 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

The participating jurisdictions determined which areas they could improve or expand based on the table above. Gaps and limitations for each jurisdiction may be addressed in the mitigation strategy.

Expanding & Improving Mitigation Programs in Jefferson County, TN Since 2020

1. Updated Hazard Mitigation Plan

- Jefferson County participates in a **multi-jurisdictional Hazard Mitigation Plan (HMP)**, updated every 5 years in collaboration with FEMA and TEMA.
- **Most recent update:** 2020 or later, depending on FEMA approval schedule.
- Enhancements included:
 - New risk assessments for **flooding, severe storms, and seismic activity**
 - Prioritization of **critical infrastructure upgrades** (e.g., water, power, and communication systems)
 - Improved data mapping using **GIS tools** and floodplain modeling.

2. Floodplain Management & Infrastructure Resilience

- Increased investment in **stormwater infrastructure** in vulnerable communities like Dandridge and Jefferson City.
- Enforcement of **updated floodplain ordinances** in line with FEMA guidelines.
- Projects through **TEMA's Resilient TN program** or the **Building Resilient Infrastructure and Communities (BRIC) grants** have helped:
 - Replace or elevate aging culverts and bridges
 - Expand capacity of drainage basins
 - Improve the tile systems in the Talbott and New Market areas to alleviate flooding areas but has been met with mixed success.
 - Purchase property/build retention pond in Ashley Oaks area.
 - Conduct an ACOE survey of other flood prone areas to better understand the hydrology of those areas.

3. Community Wildfire Protection

- In areas bordering the **Cherokee National Forest**, local fire departments have expanded **wildland-urban interface (WUI) mitigation strategies**:
 - Prescribed burns
 - Vegetation thinning
 - Public education on defensible space

4. Emergency Services Modernization

- Jefferson County Emergency Management Agency (EMA) has:
 - Improved early warning systems (NOAA radios, CodeRED alerts)
 - Secured funding for **mobile emergency operations center (EOC)** capabilities
 - Enhanced inter-agency coordination with **regional mutual aid agreements**

5. Public Education & Community Outreach

- Local governments and the EMA have increased **hazard preparedness campaigns**, especially for:
 - Tornado safety (after events in 2020 and 2021)
 - Flood evacuation procedures
- Partnered with schools and community groups for:
 - **Preparedness workshops**
 - CERT (Community Emergency Response Team) training

6. Grant Funding & Federal Partnerships

- Jefferson County has applied for or received:
 - FEMA Hazard Mitigation Grant Program (HMGP) funds post-disasters
 - ARPA funds post-COVID, some of which were used for public safety and mitigation investments

7. COVID-19 as a Mitigation Case Study

- Emergency preparedness was tested and adapted during the pandemic.
- Improved **public health coordination**, mass vaccination site planning, and **PPE stockpiling** were integrated into the county's planning.

3.2 Compliance with NFIP

Jefferson County, Jefferson City, Dandridge, Baneberry, White Pine, and New Market all participate 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. Jefferson County adopted minimum Floodplain Management Criteria on 9/2/1977 (Resolution #470097).

Permit Applications Review for SD/SI Buildings Located in Special Flood Hazard Areas

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.

Performing Damage Assessments and Substantial Damage Determinations

The Jefferson 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.

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 considered to be Substantially Improved and must be brought into compliance with current local floodplain management standards.

Informing 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, and public postings in city and county government locations.

Ongoing Involvement and Engagement

Each participating community 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;
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures.

NFIP Designees	
Jurisdiction	Title of NFIP Designee
Jefferson County (470097)	Stephanie Rustin (Zoning Officer) srustin@jeffersoncountyttn.gov
Jefferson City (475430)	Jeff Houston (jhouston@jeffersoncitytn.gov)
Dandridge (470299)	Terry Reneau (treneau@dandridgetn.gov)
Baneberry (470452)	City Manager
New Market (470385)	Wayne Henkile (cityofnewmarket@yahoo.com)
White Pine (470332)	Codes Enforcement/Secretary

3.3 Prioritization Process

The prioritization process was necessary as most mitigation projects represent a significant investment of financial and personal resources. By evaluating each project's degree of feasibility and the level of costs versus benefits, Jefferson 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.

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

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 the table below, the column titled Jurisdiction indicates which local government is using its revenue received via taxes, charges, or fees to fund the mitigation project.

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

Jefferson County Mitigation Actions and Projects

Time Frame	Action Description	Responsible Dept.	Location	Current Status			2025 Plan Update		Funding Source				Priority Score	Est. Cost	New or Existing Infrastructure
				Complete	In-Progress	Not yet Started	Delete Action	Carry Forward or Revise	HMGF	BRIC	EMA	Local			
2020 Projects															
1-5yrs	Ashley Oaks Catch Basin Project (Flooding)	Jefferson County EMA	Jefferson County			X		X	X	X	X	X	12	1.5M	Existing
1-5yrs	Byrd Springs Drainage Project (Flooding)	JC Highway Dept./Public Works Dept.	Jefferson County			X		X	X	X	X	X	11	950k	Existing
1-5yrs	Lost Creek/Beaver Creek drainage Project (Flooding)	JC Highway Dept.	Jefferson County			X		X	X	X	X	X	11	900k	Existing
1-5yrs	Flooding Mitigation Public Education	Jefferson County EMA	All Jurisdictions			X		X	X	X	X	X	13	150k	Existing
1-5yrs	White Pine School Safe Room (All Hazards)	JC School Board	Jefferson County			X		X	X	X	X	X	10	850k	Existing
1-5yrs	Maury School Safe Room (All Hazards)	JC School Board	Jefferson County			X		X	X	X	X	X	10	800k	Existing
1-5yrs	Generator for Chestnut Hill Ambulance Station (All Hazards)	Jefferson County EMA	Jefferson County			X		X	X	X	X	X	11	450k	Existing
1-5yrs	Generator for Rescue Squad (All Hazards)	Jefferson County EMA	Jefferson County			X		X	X	X	X	X	11	450k	Existing
1-5yrs	All Hazards Public Education Workshop (All Hazards)	Jefferson County EMA	Jefferson County			X		X	X	X	X	X	13	300k	New/Existing
1-5yrs	Firewise Workshop (Wildfires)	JC EMA/JC Fire Dept	All Jurisdictions			X		X	X	X	X	X	13	250k	Existing
1-5yrs	Generators for County, School, and Courthouse Annex (All Hazards)	Jefferson County Commission / EMA	All Jurisdictions			X		X	X	X	X	X	12	900k	Existing
1-5yrs	Treadway Dr. Culverts (Flooding)	Dandridge Public Works	Dandridge			X		X	X	X	X	X	11	650k	Existing
1-5yrs	Generators for LE and Public Works (All Hazards)	Dandridge Public Works /	Dandridge			X		X	X	X	X	X	9	650k	Existing

BRIC and FMA funding programs have been removed as of early 2025.

CHAPTER 3: MITIGATION STRATEGY

		Dandridge Police Chief													
1-5yrs	Nursing Home Buffer Zone (Wildfires)	City Manager	Dandridge			X		X	X	X	X	X	11	600k	Existing
1-5yrs	Buffer Zones for Ruritan Building, Justice Center, Dandridge Elementary, and Parrets Chapel (Wildfires)	Dandridge FD / EMA	Dandridge			X		X	X	X	X	X	11	800k	Existing
1-5yrs	Generators for Community Center, Public Works (All Hazards)	Jefferson City Public Works	Jefferson			X		X	X	X	X	X	12	850k	Existing
1-5yrs	Community Center Safe Room (All Hazards)	Jefferson City Rec Dept.	Jefferson			X		X	X	X	X	X	12	950k	Existing
1-5yrs	Buffer Zone for Public Works Building (Wildfires)	Jefferson Public Works	Jefferson			X		X	X	X	X	X	11	450k	Existing
2025 New Projects															
6 Mths	Generator Installation at Dandridge VFD, Police Dept, Water Plant, and Public Works (All Hazards)	Dandridge VFD, PD, Utilities	Dandridge			X			X	X	X	X	14	900k	New
1yr	Weather Radios for at-risk Communities (All Hazards)	Jefferson County EMA	Jefferson County			X			X	X	X	X	15	50k	New
1-5yrs	Warning Sirens for all hazards (Tornadoes)	Jefferson County EMA	Jefferson County			X			X	X	X	X	13	500k	New
1-5yrs	Reinforce potential flooding at Mt Horeb School (Flooding)	Jefferson School Board	Jefferson County			X			X	X	X	X	13	500k	New
1yr	Reverse notification system capability for County (All Hazards)	Jefferson County EMA	Jefferson County			X			X	X	X	X	14	250k	New
1yr	Stormwater System Maintenance Project (Flooding)	Baneberry Utilities	Baneberry			X			X	X	X	X	12	700k	New
1yr	Engineering Study on Sinkholes/Updated Flood Map (Geological, Earthquake, Dams, Flooding)	Jefferson County Public Works, EMA	All Jurisdictions			X			X	X	X	X	13	250k	New
1yr	Backup generator for Public Works Bldg (All Hazards)	Jefferson City Public Works	Jefferson City			X			X	X	X	X	14	50k	New
1yr	Backup generator Community Center Bldg (All Hazards)	Parks & Rec	Jefferson City			X			X	X	X	X	14	50k	New

Chapter 4. Implementation, Integration, and Maintenance

This section provides an overview of the overall plan 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. Copies of the executed resolutions are 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.

Simultaneous to these efforts, 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 does become 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. All plan participants 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 Jefferson 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 Jefferson 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 delay will be discussed for any projects that are behind schedule or 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 comment. The plan maintenance and update process will include continued public

and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and public hearings.

Public Involvement Process for Annual Reviews

The public will be notified via the Jefferson 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.