Sullivan County
Hazard Mitigation Plan

2025 Update

Prepared By:
Sullivan County Hazard Mitigation Planning Committee
Sullivan 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 Sullivan 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:

- Sullivan County
- City of Bristol
- City of Kingsport
- Town of Bluff City

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 Sullivan 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 Sullivan 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 Sullivan County Hazard Mitigation Plan was created and approved by FEMA in 2020. 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 Sullivan 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 Sullivan County, City of Bristol, City of Kingsport, and Bluff City.

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. Sullivan County and all its incorporated jurisdictions (City of Kingsport,) 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	2020 Participation	2025 Participation
Sullivan County	Y	Y
City of Bristol	Y	Y
City of Kingsport	Y	Y
Town of Bluff City	Y	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	
				2/12/2025	6/11/2025
Jim Bean	Sullivan County EMA	Safety & Security	Sullivan County	X	X
Michelle Matson	District Coordinator	Safety & Security	TEMA	X	X
Michael Lamphere	East Region Planner	Safety & Security	TEMA	X	X

Sherri Devault	Grants Coordinator	Safety & Security	Sullivan County EM Agency	X	X
Terry Arnold	Assistant Fire Chief	Safety & Security	Kingsport FD	X	
Kelli Bourgois	City Manager	Safety & Security	Bristol	X	
Nikki Riffle	Sullivan County Emergency Management	Safety & Security	Sullivan County	X	
Amber Torbett	SC Planning	Safety & Security	Sullivan County	X	
John Luti	Operations Officer	Safety & Security	Sullivan County Emergency Management	X	X
Mason Bersther	Sullivan County Emergency Management	Safety & Security	Sullivan County	X	
Samuel Cooper	Kingsport Planner II	Safety & Security	Kingsport	X	X
Brian Ramsey	Bristol Public Works	Water Systems	Bristol	X	
Mike Carrier	Bristol Fire Dept	Safety & Security	Bristol FD	X	
Christopher Robinson	Vol FD	Safety & Security	421 Area Emergency Services		X
Alex Williams	Meteorologist	Communications	WJHL-TV		X
Lori Staton	Mayor	Safety & Security	Bluff City		X
Rebekah McNerney	Reporter	Communications	Times News (Kingsport)		X
Tommy Castle	Assistant Chief Ops	Safety & Security	Bristol FD		X
Chris Goodwin	Traffic Technician	Safety & Security, Transportation	Sullivan County Highway Dept		X
Jerry Malone	Alderman	Safety & Security	Bluff City		X

1.2.2 Hazard Mitigation Planning Process

The 2025 Sullivan 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 **2/12/2025** at the **Sullivan County EOC**. 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. Some members of the public attended including Channel 11 news. Some of those neighboring counties that were outreached to include: Johnson, Carter, Washington, and Hawkins 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 Sullivan County EMA director contacted organizations that had roots within the community such as the community center, and Channel 11 news. 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 **5/23/2025** on the County social media pages inviting members of the public to attend the **6/11/2025** 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 **6/11/2025** was open to the public and announced social media and county courthouse posting.

Table 3 Summary of Hazard Mitigation Planning Meetings

Meeting Number	Meeting Topic	Meeting Date	Meeting Location
Meeting #2	Hazard Mitigation Plan, past and future Projects, Current hazards, past and present Hazard plan, Public and Stakeholder Q&A session, and media presentation.	6/11/2025	Sullivan County EOC
Meeting #1	Overview of hazard mitigation	2/12/2025	Sullivan County EOC
	Hazard Mitigation Planning Process		
	Purpose of the HMP		
	Area growth and changes		
	Identification of Hazards		
	Future weather predictions		
	Assessment of risk, vulnerabilities, resilience		
	Review of NFIP		
	Previous HMP goals/projects		
	New goals/projects		

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
- Sullivan County Emergency Management Agency / Office of Emergency Management
- City of Bristol
- City of Kingsport
- Town of Bluff City
- Sullivan County Fire/Police Departments
- Health Dept
- Sullivan County Schools

- Sullivan County LEPC Committee
- Sullivan County Government and all jurisdiction's Governments
- American Red Cross
- Municipal Technical Advisory Service (MTAS)
- GIS and Planning departments
- Highway Dept, Utilities, Public Works
- Tennessee Valley Authority
- Sheriff's Office
- 911 Director
- Channel 11 News
- Health & Human Services
- Bristol Motor Speedway
- East TN VOAD

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. Sullivan 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 Sullivan 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 2025 Sullivan 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 2025 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 2020 plan. Only the information and data still valid from the 2020 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 Sullivan 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 Sullivan County Hazard Mitigation Plan, the HMPC identified 32 actions as relevant to the county. Of these 32 actions, 0 have been completed, 0 are in progress, and none 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. All of the previous plan's 19 projects were determined to still be viable, except one that was deleted. The rest 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 Sullivan 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	No
Tornado	Yes
Communicable Disease	No
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 **6/11/2025** HMPC meeting was open to the public; Channel 11 News covered the event. Sullivan County revisits hazard mitigation plan | WJHL | Tri-Cities News & Weather

A public notice was posted on May 23rd on the Sullivan County Emergency Management Agency website, the county courthouse, and the county social media site. 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

1.6.1 Resources and Assets

Bristol Regional Medical Center provides 24-hour emergency care to residents of the county and is home to 312 beds. The County in total has 5 hospitals with 1,175 beds (Holston Valley w/24/7 ER care (312 beds) and Indian Path Community Hospital (24/7 ER care (239 beds). The county also has: 10 volunteer fire stations and 2 Municipal stations (24 total stations), and over 200 full time Law Enforcement officers including the county sheriff with 7 police stations, and 1 Emergency Operations Center (EOC). Sullivan County School District facilities the learning of approximately 20,000 students via their system of 56 schools within the region. According to the RWJ Foundation County Health Rankings profile Sullivan County Schools are underfunded by $1,727 per pupil as related to dollars to test score achievement.

Sullivan County has several local radio stations and tv networks that service the Tri-Cities area including WJHL (CBS), WCYB (NBC), WKPT, WAPK, WXBQ (96.9), WQUT (101.5), WPWT (96.3), and WOPI. The main phone companies in the area are Verizon, AT&T, T-Mobile, and Spectrum. Residents in the county can either obtain internet via Verizon, Spectrum, Starlink, and CenturyLink. Communication resources, a vital component of emergency response and preparedness, is notably lacking in the more rural portions of Sullivan County. Between 2019 and 2023 91.3%of households had a computer and 86.9% had broadband internet access according to the United States Census Bureau.

The main roadways that travel through the county are US Route 11W, US-19E, 11E, and 421. State Route 36 and 394. The nearest interstates are I-26 and I-81. The main waterways in the county are the Watauga River, Holston River, Beaver Creek, Horse Creek, and Reedy 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 Charlotte Douglas International (CLT), and the closest general aviation location is Tri-Cities Regional (TRI). Given the limited public transportation options and the rural environment of Sullivan County, 26% of working individuals endure a commute of more than 30 minutes, and 83% of all working individuals drive alone to work.

Sullivan County is governed by an elected County Mayor and Board of Commissioners. The jurisdictions within Sullivan 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, Sullivan County, has been experiencing rapid growth over the past few years. The population of the county increased between the 2010 and 2020 censuses from 156,823 to 162,135 as of 1 July 2024. 10% of the 162,135 Sullivan 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 Sullivan Counties' employed population work within the Healthcare industry, retail, and manufacturing industry. Sullivan County is a member of Joint Economic and Community Development Boards to ensure and promote economic growth within the county and for its constituents. As stated, Sullivan County has experienced much growth since the last planning period.

Kingsport:

-Residential growth has increased in Rock Springs, Indian Springs, and all around I-40 and I-81 areas near the interstates.

-Industrial growth has occurred in many areas in the County, in particular the areas near Sullivan Gardens, Domtar (downtown), Eastern Chemical Campus, Airport Parkway, and the Holston Army Ammunition Plant.

-Commercial growth has also increased near East Stone Commons area, John B Dennis/S Wilcox Corridor, East Stone Drive and Kingsport Pavilion vicinity, and near Fort Henry Dr and Fort Henry Mall.

Bristol:

-Bristol has seen significant residential growth especially near Hudson Terrace, Fox Meadows, Island Rd, Chadsworth, Monroe Rd, and Rock Rd.

-SR394 Corridor has seen industrial growth

-Commercial growth has occurred in Centre Point and the Pinnacle.

Bluff City:

-Residential growth has increased along Dry Branch Rd.

-Commercial growth has also increased near Boone Lake area, Bluff City Highway, and on Main St.

1.6.3 Demographics

Throughout the planning process, Sullivan County HMPC remained committed to recognizing socially vulnerable and underserved populations. In order 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 located 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 162,135 residents living within Sullivan County:

- The median household income is $56,802
- 13.5% live below the national poverty line

- 26.5% live in rural areas
- 14% are confronted with food insecurity
- 13.2% of the under 65 years of age population live with a disability
- 10.5% of the under-65 population do not have health insurance
- Population as of 2020 was 382.6 people per square mile

Table 7 Population Data

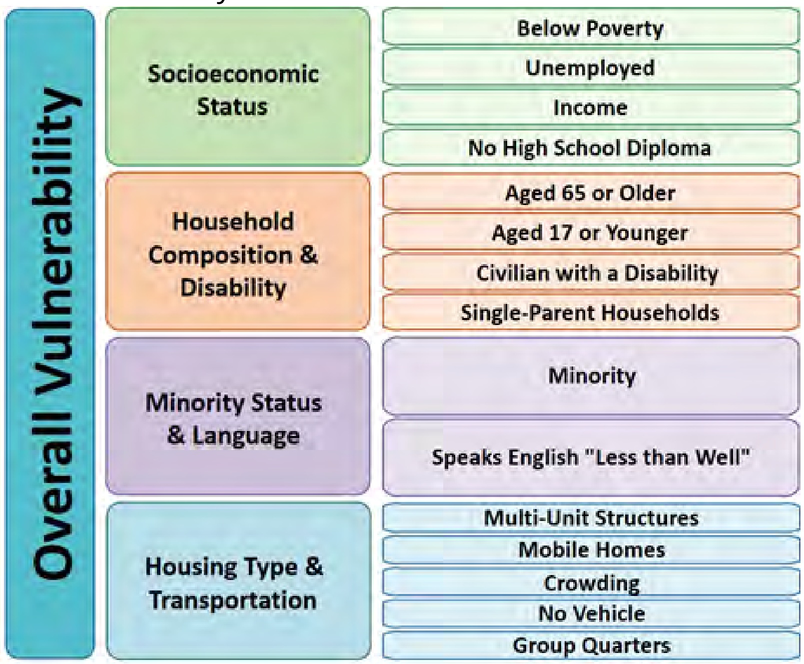
Demographic	Percentage
Identified gender	
Male	49%
Female	51%
Age Group	
Under 5	4.7%
Under 18	19%
Over 65	22.5%
Race/Ethnicity (one)	
White (not Hispanic/Latin)	94.3%
Asian	0.9%
Black or African American	2.5%
American Indian or Alaskan Native	0.4%
Hispanic/Latino	2.8%
Education	
High School Graduate or Higher	89.6%
Bachelor's Degree or Higher	26.6%

Data sources:
https://www.census.gov/quickfacts/fact/table/US/PST045221
https://www.countyhealthrankings.org/app/tennessee/2022/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 below table.



The specific breakdown for Sullivan County and all participating jurisdictions are as follows

Sullivan County Social Vulnerability Factors	
Total Square Miles	413.44
Total Population (as of 2023)	162,135
Housing Units Estimated	76,693
Households	68,408
Persons below Poverty	39,874
Age 16+ unemployed	4,568
Per Capita Income	35,143
Age 25+ w/ no HS Diploma	12,392
Percentage of Persons below poverty	25.5%
Unemployment rate	6.2%
Percentage of persons w/ no HS diploma 25 yo+	10.7%
Aged 65+ & older	34,884
Age 17 & younger	30,301
Civilian noninstitutionalized population with a disability	29,452
Single Parent HH w/ children under 18	3,808
Percentage of person aged 65+	22%
Percentage of persons 17 or younger	19.1%
Percentage of civilian noninstitutionalized population with a disability	18.8%
Percentage of single parent households with children under 18	5.6%
Minority (all persons except white, non-Hispanic)	12,055

Persons (age 5+) who speak English "less than well"	596
Percentage minority (all persons except white, non-Hispanic)	7.6%
Percentage of persons (age 5+) who speak English "less than well"	0.2%
Housing in structures with 10 or more units	3,767
Mobile Homes	8,245
At Household level (occupied housing units) more people than rooms	782
Households w/ no vehicle	3,285
Persons in Group Quarters	2,583
Percentage of housing in structures with 10 or more units	4.9%
Percentage of mobile homes	10.9%
Percentage of occupied housing units with more people than rooms	1.2%
Percentage of households with no vehicle available	4.9%
Percentage of persons in group quarters	1.6%

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 Sullivan 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 80 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	Sullivan County	City of Bristol	City of Kingsport	Town of Bluff City
Building Codes	Y	Y	Y	Y
Zoning Codes	Y	Y	Y	Y
Subdivision Ordinance	Y	Y	Y	Y
Stormwater Ordinance	Y	Y	Y	Y
Floodplain Ordinance	Y	Y	Y	Y
Erosion, Sedimentation and Pollution Control Ordinance	Y	Y	Y	N
Stormwater Management Program	Y	Y	Y	Y
Site Plan Review Requirements	Y	Y	Y	Y
Capital Improvements Plan	Y	Y	Y	N
Economic Development Plan	Y	Y	Y	N
Local Emergency Operations Plan	Y	Y	Y	N
Flooding or Engineering Study	Y	Y	Y	N
Repetitive Loss Plan	N	N	Y	N
Elevation Certificates	Y	Y	Y	Y
Grant writer (part-time or full-time)	Y	Y	Y	Y
Public Information Officer	Y	Y	Y	N
Floodplain Manager	Y	Y	Y	Y
Volunteer Fire Service	Y	N	Y	Y
Full Time Fire Service	Y	Y	Y	N
School Resource Officers (SROs)	Y	Y	Y	Y
Law Enforcement	Y	Y	Y	Y
Emergency Manager	Y	Y	Y	N
GIS Personnel	Y	Y	Y	Y
Capital improvements project funding	Y	Y	Y	Y
Fees for utility services	Y	Y	Y	Y
Impact fees for new development	N	N	N	N
General obligation bonds	Y	Y	N	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 Sullivan 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 damages 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 Sullivan County to identify known hazards. *Table 8* presents a list of all major disaster and emergency declarations that have occurred in Sullivan County since 1953, illustrating which hazards pose the greatest risk to the County.

Table 9 Presidential Disaster Declarations in Sullivan County (1953-2024)

Declaration #	Date	Event Details	Individual Assistance	Public Assistance
4832	10/2/2024	Tropical Storm Helene	Y	Y
4514	4/2/2020	Biological (Covid)	Y	Y
3473	3/13/2020	Biological (Covid	N	N
1974	5/1/2011	Severe Storm	Y	Y
3217	9/5/2005	Hurricane Katrina	N	Y
1197	1/13/1998	Severe Storm	N	N
3095	3/14/1993	Snowstorm	N	N
424	4/4/1974	Tornado	N	N
366	3/21/1973	Flood	N	N

Table 9 documents the hazards of interest to Sullivan 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 Sullivan 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	Sullivan County 2020 HMP	Status	Sullivan County 2025 HMP Update
Communicable Disease	N	Reviewed	N
Dam Failure	N	Reviewed	Y
Drought	Y	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:

- The County has added Dam Failures, Earthquakes, and Geological Hazards to this plan update.

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

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

2.2 Dams

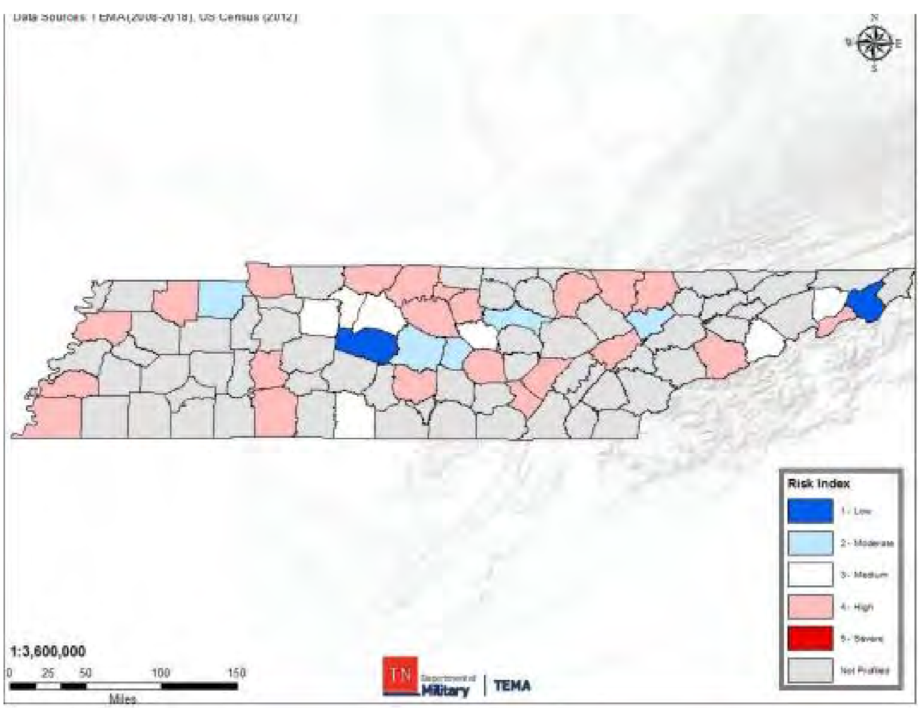
2.2.1 Hazard Overview

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

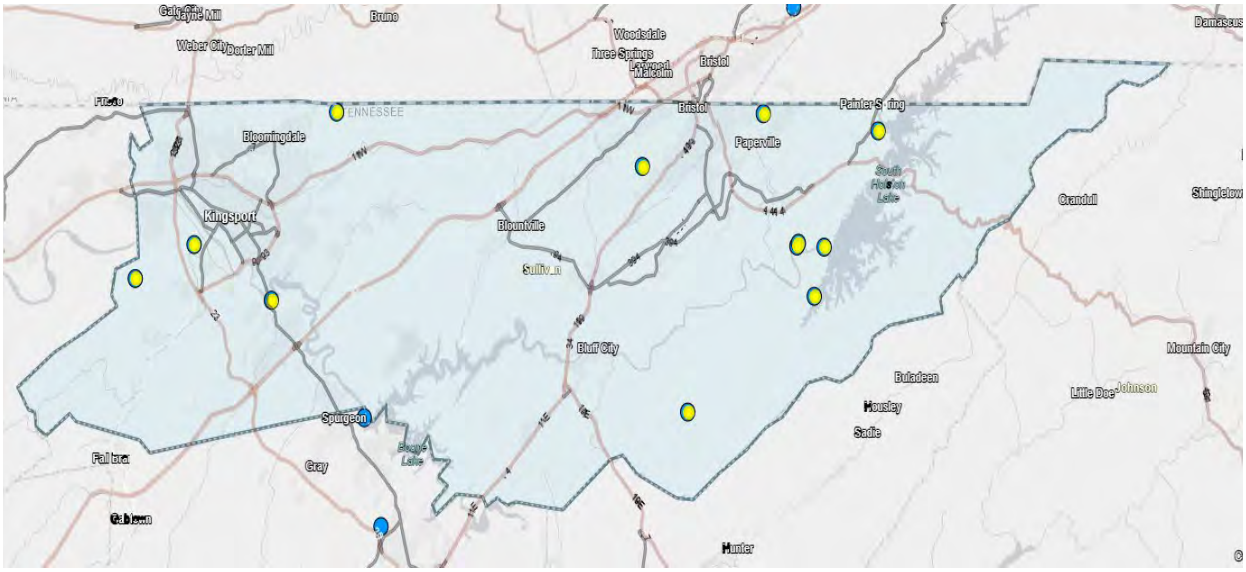
Dams fail in two ways, a controlled spillway release to prevent total failure or the partial or complete collapse of the dam itself. In each instance, an overwhelming amount of water and potential debris is released. Dam failures are rare, but when they occur can cause loss of life and immense damage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



Sullivan County Dam Locations (Source: USACE)

List of High Hazard Dams

South Holston Dam
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: TVA
Primary Purpose: Flood Risk Reduction

B Bend Hollow Dam
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: Eastman Chemical Company

Fort Patrick Henry Dam
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: TVA
Primary Purpose: Flood Risk Reduction

Steele Creek Dam
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: City Of Bristol

Bays Mountain Dam
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: City Of Kingsport

Jeansonne Dam
Hazard Potential Classification: High
Emergency Action Plan: Not Required
Owner Name: Jeansonne, Dr. Greg And Dr. Susan
Primary Purpose: Recreation

South Holston Left Channel Reregulation Weir
Hazard Potential Classification: High

Emergency Action Plan: Yes
Owner Name: TVA
Primary Purpose: Other
Underwood Park Dam
Hazard Potential Classification: Significant
Emergency Action Plan: Not Required
Owner Name: Carrier, Clarence
Middlebrook Dam
Hazard Potential Classification: Significant
Emergency Action Plan: Not Required
Owner Name: Middlebrook H.o.a.
South Holston Dam - Saddle Dam No. 1
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: TVA
Primary Purpose: Flood Risk Reduction
South Holston Right Channel Reregulation Weir
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: TVA
Primary Purpose: Other
South Holston Dam - Bent Branch Auxiliary Spillway
Hazard Potential Classification: High
Emergency Action Plan: Yes
Owner Name: TVA
Primary Purpose: Flood Risk Reduction

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 floodwaters will drain, the area will be affected by flooding from the dam failure for days to weeks, and the destruction will affect the area for years. Tennessee has a total of 1238 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 the inability to conduct projects on those dams. Sullivan County works regularly with state, local, and federal dam owners to ensure safety and compliance with regulations. They also share and work with TVA and others in preparing for dam failures, sharing maps and data, and exercise dam failures.

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 Sullivan 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.

Probability of Future Events – There is unlikely (less than 5%) to be a Dam Failure within the next 5 years.
Complete dam failure can be triggered by heavy rainfall, earthquakes, and flooding. With several areas in the county increasing in population and infrastructure (both public and private), this could damage a significant amount of infrastructure, property values, and commerce disruption.

2.2.3 Risk Assessment and Vulnerable Populations
Many buildings and the majority of 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 Sullivan County = No Rating

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**
Sullivan County	Green	Green	Green	Green	Green	Green	Green	Green
City of Bristol	Green	Green	Green	Green	Green	Green	Green	Green
City of Kingsport	Green	Green	Green	Green	Green	Green	Green	Green
Town of Bluff City	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow

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

Given the information above it becomes vital that all participating jurisdictions 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.

2.2.4 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 Sullivan County, Sullivan 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.

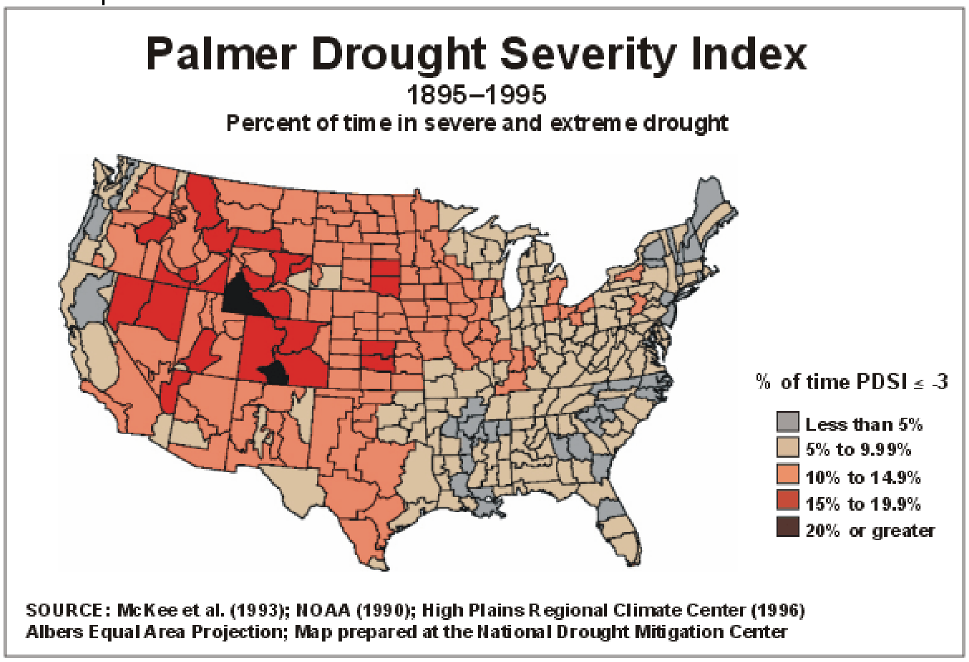
The wide variety of disciplines affected by drought, its diverse geographical and temporal distribution, and the many scales drought operates on make it difficult to develop a definition to describe drought and an index to measure it. Many quantitative measures of droughts have been developed in the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

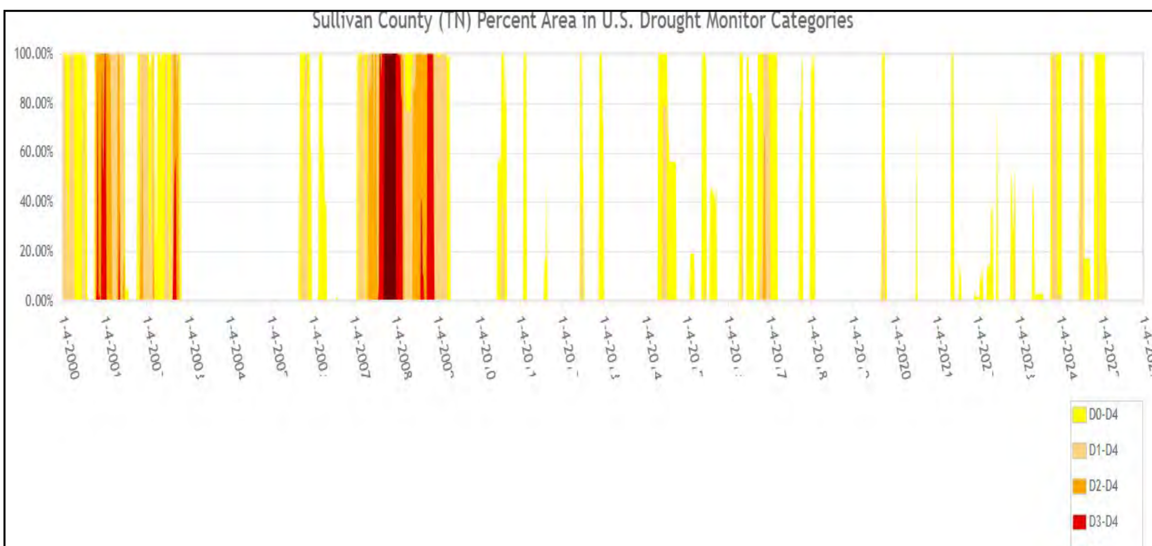
the Perry-term drought and has been used extensively to initiate drought relief. It is more complex than the SPI and the Drought Monitor.

2.3.2 County Profile

According to the PDSI map shown in *below,* East 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)

The figure above illustrates drought conditions within Sullivan 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 of Future Events – It is possible a drought could occur in the next 5 years, but very unlikely due to historical data.
The probability of Sullivan County and its municipalities experiencing a drought event can be challenging to quantify but based on the historical record of 2 droughts since 1998; it can reasonably be assumed that this type of event only occurs every few decades.

2.3.3 Risk Assessment and Vulnerable Populations

Sullivan County is vulnerable to drought; however, estimated potential losses are inherently difficult to calculate because drought tends to cause minor damage to the built environment. Therefore, it is assumed that all buildings and facilities in the planning area would technically be exposed to the drought hazard; there is no significant vulnerability to these buildings on a structural level.

Potential drought losses can be calculated in terms of the value of agriculture in the County, which is perhaps most vulnerable to drought. According to the USDA, the net income for agriculture is around $2.6 million. Population growth could contribute directly to this hazard, as more users pull from the available water supply within the region. Drought can also increase the County's vulnerability to wildfires. Dry, hot, and windy weather combined with dry vegetation and a spark through human intent, accident, or lightning can start a wildfire.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census 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
Sullivan County	Green	Red	Yellow	Yellow	Green	Green	Green	Red
City of Bristol	Green	Red	Yellow	Yellow	Green	Green	Green	Red
City of Kingsport	Green	Green	Green	Green	Green	Green	Green	Green
Town of Bluff City	Yellow	Yellow	Yellow	Green	Green	Green	Green	Yellow

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

Given the information above, it becomes vital that all participating jurisdictions 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 Sullivan County.

2.3.5 Multi-Jurisdictional Differences

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

2.3.6 Summary

Sullivan 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. Sullivan 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.

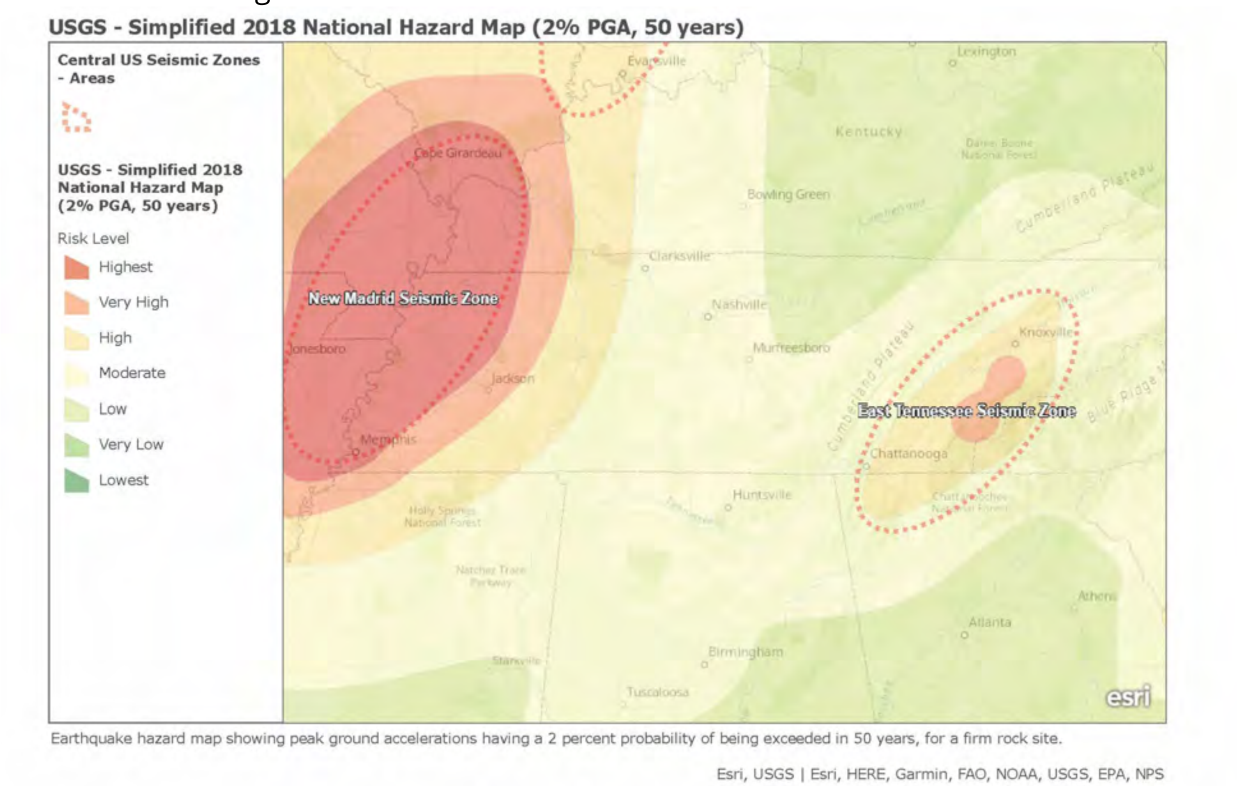
2.4 Earthquakes

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

Sullivan 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. Sullivan County is near the East Tennessee Seismic Zone (ETSZ) which stretches across three states. The figure below illustrates the risk level of the NMSZ/ETSZ within the state.



New Madrid Seismic Zone (Source: CUSEC)

Sullivan County can experience earthquakes several times a year and often go unfelt by residents due to its proximity to the active ETSZ. There isn't very much data on # of quakes in the past 20 years, but TN as a whole reports over 400 a year throughout the state. The most recent that was felt throughout much of Eastern TN was on May 10th, 2025 when a 4.1

magnitude hit 30 miles S of Knoxville. There is very little news on damage reported. 4.1 magnitude earthquake in Tennessee rattles homes as far away as Atlanta | PBS News. The NMSZ is known for producing four of the largest North American earthquakes in recorded history, all of which would have been felt in Sullivan 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.

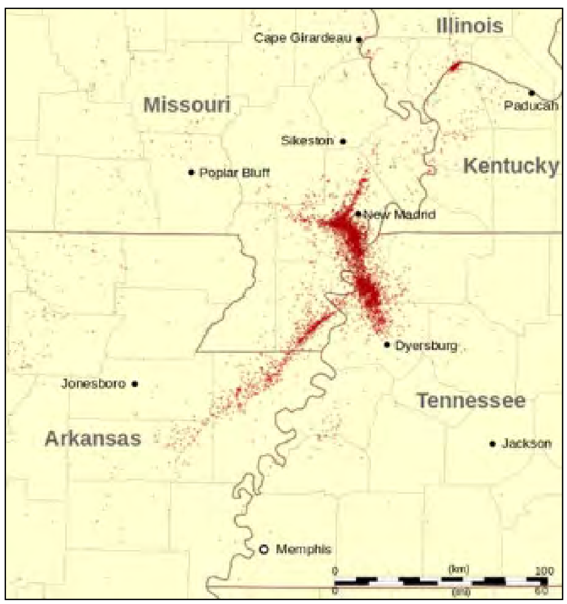
The Eastern Tennessee Seismic Zone (ETSZ), a zone of small earthquakes stretching from northeastern Alabama to southwestern Virginia. The ETSZ is the second-most active natural seismic zone in the central and eastern United States, behind the New Madrid Seismic Zone in the Mississippi River region that 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)

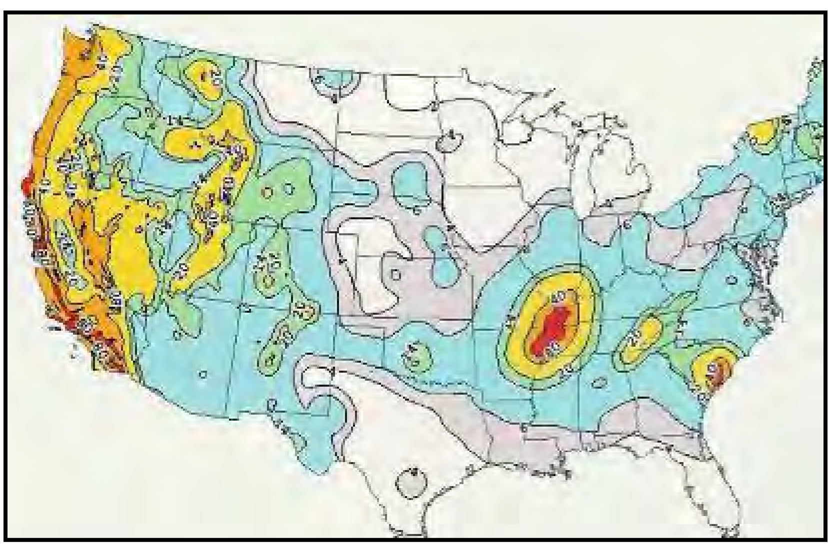
According to a 2008 FEMA report, a severe earthquake in the NMSZ could result in the highest economic loss due to a natural disaster in U.S. history. Based on this report, a 7.7 magnitude quake in the NMSZ would result in thousands of fatalities, hundreds of billions of dollars in damage to structures,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

Probability of Future Events – It is possible Sullivan County could experience an EQ in the next 5 years due to its proximity to the ETSZ. In 2025, a magnitude 4.1 quake near Greenback, TN, was recorded. Such quakes of magnitude ≥4 occur in the ETSZ roughly once per year, while magnitude 5–6 events typically recur every 200–300 years.

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

Impact Overview		**Numerical Value**	
Fatalities		Up to 12 depending on time of day and severity	
Injuries		Unknown	
Displaced Residents		3 Households	
Residents Requiring Shelter		2	
Debris (tons)		36k tons	
Residencies experiencing >moderate damage		765	
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	100%	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. Sullivan County's building stock can be broken down into the following percentage categories: 80.36% residential, 7.15% commercial, 1.42% industrial, 0.22% agricultural, 1.16% religious, 0.20% governmental, 9.34% other residential, and 0.14% educational. Throughout the county, all buildings and infrastructure are vulnerable to earthquake impacts.

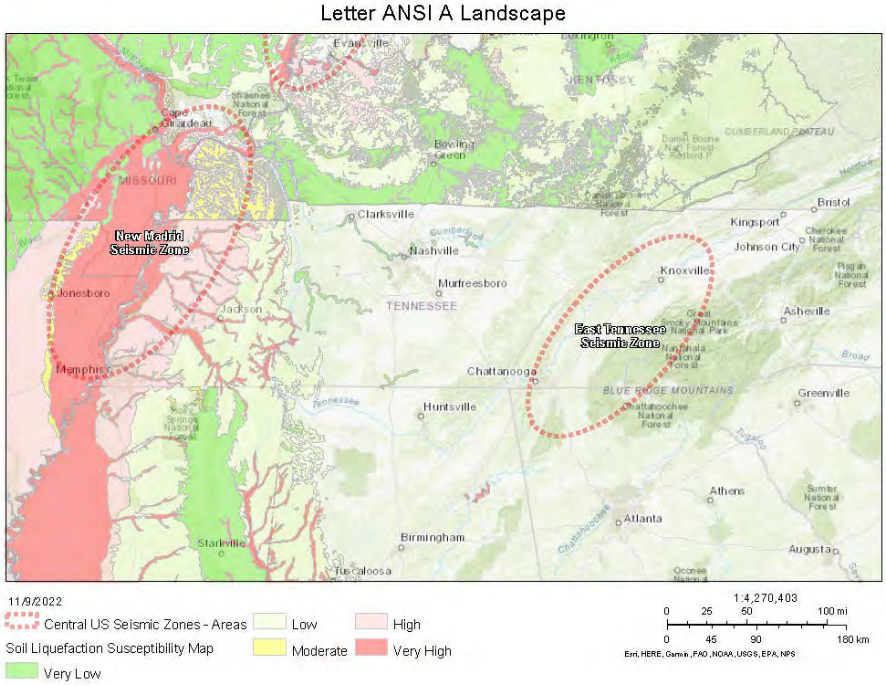


National Seismic Hazard Map (Source: USGS)
Ground Motions with a 2% Chance of Occurring in 50 Years

Mercalli Intensity Zones In Sullivan County (Source: USGS)

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

Letter ANSI A Landscape



Earthquake Induced Liquification (Source: CUSEC)

2.4.3 Risk Assessment and Vulnerable Populations

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

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. Sullivan 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 Sullivan 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 105ºF for at least three hours on two consecutive days, and the nighttime air temperature does not drop below 75ºF. The definition of Excessive Heat is a "rule of thumb" because the detrimental effects of high temperatures and humidity vary among segments of the population (old, young, etc.) and whether the population, in general, has built up a heat tolerance (residents in desert communities fair better than visitors). While some may be better able to cope with Excessive Heat as defined, others may still be adversely affected by a lower heat index. A "rule of thumb" works for mitigation planning because the benefits of specific mitigation actions start accruing before conditions reach Excessive Heat levels. Exposure to extreme heat can pose health risks, including sunburn, dehydration, heat cramps, and heat stroke. The National Weather Service Heat Index calculates how hot it feels when relative humidity is factored in with the actual air temperature using a 4-factor scale: caution, extreme caution, danger, extreme danger. The National Weather Service (NWS) also issues Heat Alerts.

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

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.

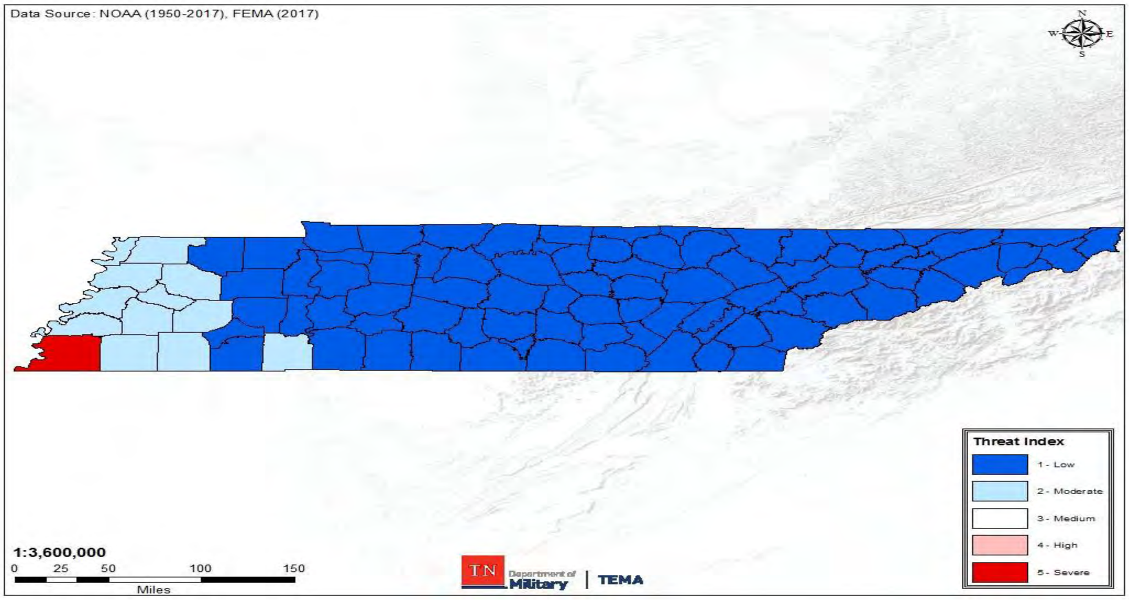
The National Weather Service (NWS) issues the nation's Wind Chill Warning, Watch, and Advisory:

- 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 Sullivan County. The threat index for Sullivan 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. A table containing all NOAA-recorded events between 1950-2024 for Sullivan County is listed below.

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	08/06/2007	00:00	EST-5	Excessive Heat		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/23/2022	06:00	EST-5	Cold/wind Chill		0	0	0.00K	0.00K
Totals:								0	0	0.00K	0.00K

Probability of Future Events – It is possible the County could experience Extreme Temperatures in the next 5 years.

The probability of Sullivan 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 infrequently; 2 events over a 74-year period have been recorded.

2.5.3 Risk Assessment and Vulnerable Populations

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

National Risk Index Score for Cold Waves = Relatively Low
National Risk Index Score for Hot Waves = 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
Sullivan County	Green	Red	Red	Red	Green	Green	Green	Green
City of Bristol	Green	Red	Red	Red	Green	Green	Green	Green
City of Kingsport	Green	Green	Green	Green	Green	Green	Green	Green
Town of Bluff City	Yellow	Yellow	Yellow	Green	Green	Green	Green	Yellow

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

Given the information above it becomes vital that all participating jurisdictions 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, Sullivan County will have a projected maximum of 3 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. Sullivan 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, Sullivan 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

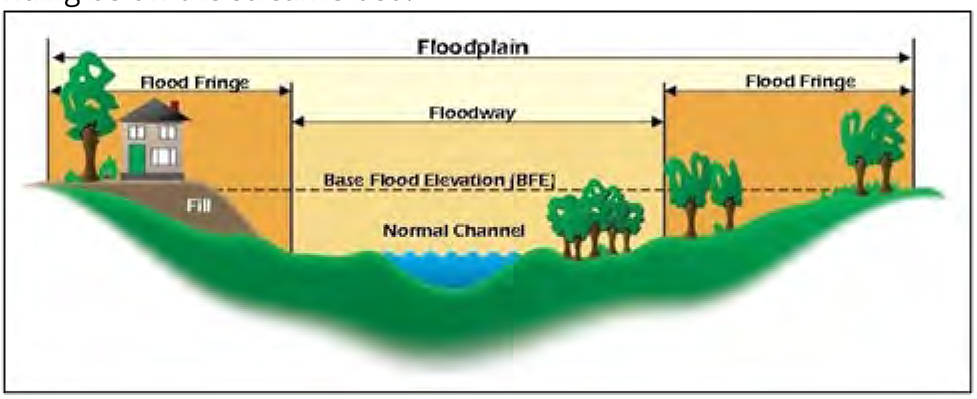
Sullivan County and the incorporated jurisdictions are equally vulnerable to extreme temperatures, affecting people's health and safety. Therefore, it is essential to have proper measurements in place to prevent critical structures from being vulnerable to utility failure during extreme temperatures.

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

The area adjacent to a channel is the floodplain, as shown 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.

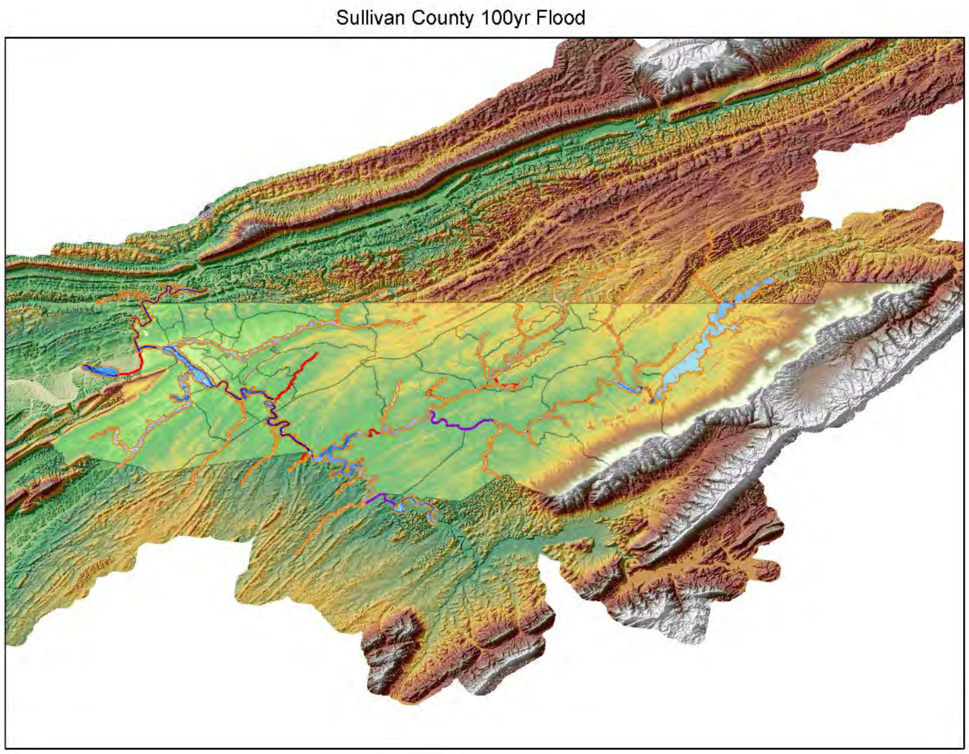
2.6.2 County Profile

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.

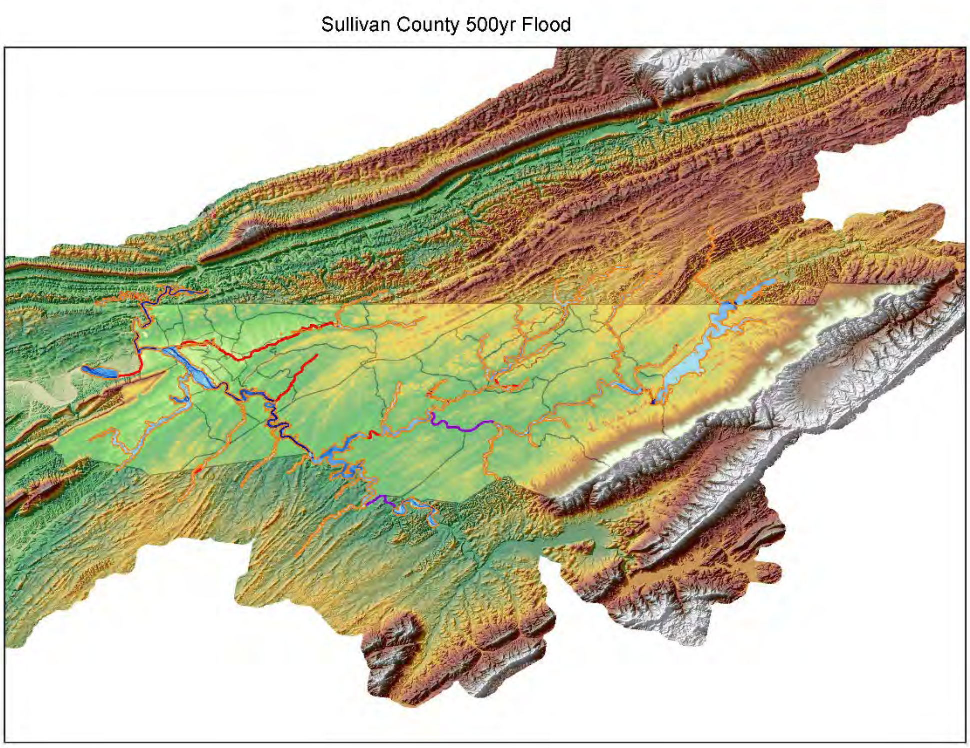
HAZUS is a regional multi-hazard loss estimation model developed by FEMA and the National Institute of Building Sciences (NIBS). The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily 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.



HAZUS 100-year Flood Map



HAZUS 500-year Flood Map

NFIP Policy Data

NFIP Policy Data for Sullivan County				
Jurisdiction	**CID Number**	**Policies In-Force**	**Insurance In-Force Whole $**	**Written Premium In-Force**
Sullivan County	470181	119	26,876,000	95,454
Kingsport	470184	149	36,928,000	147,967
Bristol	470182	43	11,331,000	68,090
Bluff City	470296	1	43,000	974

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 Sullivan County.

NFIP Loss Data

NFIP Loss Data for Sullivan County					
Jurisdiction	**Total Losses**	**Closed Loses**	**Open Loses**	**CWOP Loses**	**Total Payments**
Sullivan County	RL: 0	17 (Residential)			
	SRL: 0				
Kingsport	RL: 0	15 (10 Residential / 5 Non-Residential)			
	SRL: 0				
Bluff City	RL: 0	2 (Residential)			
	SRL: 0				
Bristol	RL: 0	4 (Residential)			
	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 74 years, there have been approximately 20 flooding events in Sullivan County. The following narratives were obtained via the NOAA Storm Event Database. Only events resulting in injury, death, or extensive damage (greater than $200.0K property/crop damage) were included as expanded narratives.

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	7.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/22/1997	18:15	EST	Flood		0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/22/1998	20:00	EST	Flood		0	0	0.00K	0.00K
SULLIVAN GARDENS	SULLIVAN CO.	TN	06/24/1998	16:45	EST	Flood		0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/24/1999	14:00	EST	Flood		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	03/17/2002	08:45	EST	Flood		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	02/14/2003	12:00	EST	Flood		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	02/21/2003	12:00	EST	Flood		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	04/10/2003	08:00	EST	Flood		0	0	0.00K	0.00K
HOWARD HILL	SULLIVAN CO.	TN	09/26/2009	13:20	EST-5	Flood		0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	12/09/2009	02:00	EST-5	Flood		0	0	0.00K	0.00K
SILVACOLA	SULLIVAN CO.	TN	07/10/2012	08:00	EST-5	Flood		0	0	1.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	01/15/2013	19:00	EST-5	Flood		0	0	1.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	04/23/2017	17:00	EST-5	Flood		0	0	2.00K	0.00K
THOMAS BRIDGE	SULLIVAN CO.	TN	04/15/2018	22:30	EST-5	Flood		0	0	1.00K	0.00K
SULLIVAN GARDENS	SULLIVAN CO.	TN	02/07/2019	09:00	EST-5	Flood		0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	02/06/2020	04:00	EST-5	Flood		0	0	2.00K	0.00K
HOLSTON VLY	SULLIVAN CO.	TN	02/06/2020	12:01	EST-5	Flood		0	0	0.00K	0.00K
THOMAS BRIDGE	SULLIVAN CO.	TN	03/28/2021	09:30	EST-5	Flood		0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	07/14/2023	18:25	EST-5	Flood		0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	09/26/2024	12:04	EST-5	Flood		0	0	0.00K	0.00K
Totals:								0	0	7.00K	0.00K

Probability of Future Events – There is a high likelihood the county experiences at least 1 flooding event per year.

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 20 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 A.

2.6.3 Risk Assessment and Vulnerable Populations

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 projects that have been added to the HMP in Chapter 3 from public input. Future projects were also discussed at this time and can be found in the Mitigation Action Plan.

Flood Risk Assessment in Sullivan County: Sullivan County's flood risks are primarily associated with the South Fork Holston River and its tributaries. The Tennessee Valley Authority (TVA) has constructed dams, such as the South Holston Dam and Boone Dam, to manage flooding and generate hydroelectric power.

Geographic and Structural Vulnerabilities:

- **Mobile Home Residents:** Mobile homes are more susceptible to flood damage compared to other housing types. Their structural characteristics and the locations of many parks in flood-prone areas contribute to this increased risk. Studies have shown that residents of mobile home parks often face heightened disaster risks due to both physical vulnerabilities and socio-economic factors.

Socioeconomic Factors:

- **Low-Income Households:** Individuals and families with limited financial resources may struggle to implement flood mitigation measures, such as elevating homes or purchasing flood insurance. This financial constraint can lead to greater exposure to flood risks and challenges in recovering from flood-related damages.
- **Elderly and Disabled Populations:** Seniors and individuals with disabilities may face mobility challenges during evacuation and may require additional assistance before, during, and after flood events.
- **Non-English Speaking Communities:** Residents who are not fluent in English might encounter difficulties accessing emergency information and resources, potentially hindering their ability to respond effectively to flood warnings.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census 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
Sullivan County	Yellow	Red	Yellow	Green	Yellow	Red	Yellow	Yellow
City of Bristol	Yellow	Red	Yellow	Green	Yellow	Red	Yellow	Yellow
City of Kingsport	Yellow	Green	Yellow	Green	Yellow	Green	Green	Yellow
Town of Bluff City	Yellow	Yellow	Yellow	Green	Green	Yellow	Yellow	Yellow

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

Given the information above it becomes vital that all participating jurisdictions 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 68,340 buildings in the region have an aggregate total replacement value of $24.808 million.

- **Essential Facility Inventory:** HAZUS indicates that there are 5 hospitals in the region with a total capacity of 1,175 beds. There are 56 schools, 26 fire stations, 7 police stations, and 1 emergency operation center.
- **General Building Stock Damage:** For the 100-year flood scenario, HAZUS estimates that about 419 buildings will be at least moderately damaged. This is over 68% of the total number of buildings in the scenario. There are estimated 65 buildings that will be destroyed completely.

Debris Generation

- ***100-year Scenario:*** The model estimates that a total of 14,784 tons of debris will be generated. Of the total amount, Finishes comprises 36% of the total, Structure comprises 35% of the total, and Foundation comprises 29%. If the debris tonnage is converted into an estimated number of truckloads, it will require 592 truckloads (@25 tons/truck) to remove the debris generated by the flood.

- ***500-year Scenario:*** The model estimates that a total of 23,516 tons of debris will be generated. Of the total amount, Finishes comprises 23% of the total, Structure comprises 42% of the total, and Foundation comprises 35%. If the debris tonnage is converted into an estimated number of truckloads, it will require 941 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 68k households (or 158,067 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 2,740 people (out of a total population of 158,067) will seek temporary shelter in public shelters.
- ***500-year Scenario:*** The model estimates 802 households (or 2,407 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 723 people (out of a total population of 158,067) 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 Sullivan 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 Sullivan County:

- Cleek Rd .4 miles N of Orebank Rd; Generally, 24-36" of water in roadway depending on rainfall.
- W Sullivan St at Donelson Dr; 24-36" of water in roadway depending on rainfall.
- Ft. Robinson Dr and Industry Dr frequently flood anywhere from a few inches to over a foot depending on rainfall.
- Big El Rd .3 miles N of Netherland Inn Rd; up to 48" of water depending on rainfall and overflow from Holston River.

- McClelland St: Up to 8" and heavy flow
- Bluff City Highway between Fleming St and Lakeview Dr. Between 2-6" depending on rainfall.
- Lochwood road estimated 12 ft. maximum depth recorded in 10 events.
- Cassel Drive, up to 36" recorded
- West Carters Valley Rd./Gleason Rd: 36" – 48"; nearby creek susceptible to flash flooding causing the depth to fluctuate.

Waterways that are prone to flooding in Sullivan County:

- **South Holston River:** 1940 flood (post-dam) peaked at 68,800 cfs, rose 12 ft at 2 ft/hr; flooded 126 houses on Long Island; $43,000 damage.
- **Back Creek:** The October 2, 1977, flood reached 1,442.2 ft NAVD at river mile 0.5 due to Beaver Creek backwater. No damage records exist, but water-surface elevations were profiled in the FEMA Flood Insurance Study.
- **Beaver Creek:** October 2, 1977: Crest of 1,671.8 ft NAVD; recurrence interval ~20 years; total estimated damage $1 million for Bristol, TN.
- **Cedar Creek:** October 1977 flood reached elevation 1,656.6 ft NAVD at river mile 5.80; recurrence interval ~10 years.
- **Little Creek:** October 1977 flood reached 1,668.8 ft NAVD at State Street (river mile 0.2); ~35-year recurrence interval.
- **Sinking Creek:** April 1977: Middlebrook Dam breach at river mile 2.13; minor damage downstream; dam reconstructed in October 1990.
- **Whitetop Creek:** October 2, 1977, flood reached 1,449.5 ft NAVD at river mile 1.30; estimated 10-year recurrence interval.
- **Randy Creek:** Multiple minor flash floods reported, particularly during convective storms in summer months; floods close Stone Drive and adjacent streets.
- **Mad Branch:** February 1990 flood caused by rapid snowmelt and rain; local roads and structures flooded; incident reported in FEMA FIS.

2.6.6 Summary

Severe flooding has the potential to inflict significant damage in Sullivan County. The total economic loss estimated for the 100-year riverine flood is $1,556.54 million. The total economic loss estimated for the 500-year riverine flood is $1,555.70 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.

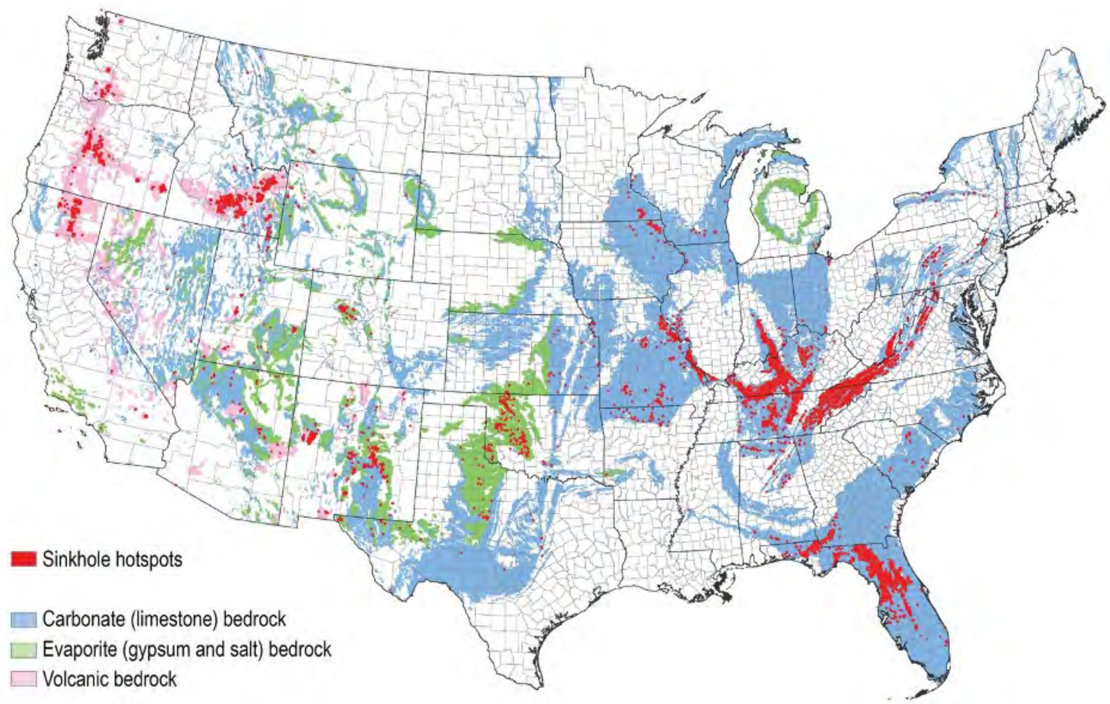
2.7 Geological

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 karst landscapes figure below illustrates 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 hotpots.



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

The following table contains the documented sinkholes for Sullivan County, which were obtained via the USGS Landform database.

Sinkholes in Sullivan County

County	Sinkholes	Caves	sinkholes 3m+	depth feet	area km²	volume m³
Rutherford	2,988	130	572	76.8	1.4227	343,784
Scott	6	10	2	12.1	0.0096	1,693
Sequatchie	36	24	14	43.3	0.0821	47,539
Sevier	586	64	236	79.1	0.6025	486,887
Shelby	0	0	0	0	0	0
Smith	150	105	31	45.9	0.0786	39,636
Stewart	145	14	29	53.5	0.2044	85,549
Sullivan	1,876	167	672	89.2	0.4402	309,614
Sumner	371	42	53	47.6	1.2270	758,651
Tipton	0	0	0	0	0	0
Trousdale	87	12	22	65.6	0.1368	49,576
Unicoi	3	9	1	23.0	0.0263	10,712
Union	706	58	289	82.3	0.2086	241,526
Van_Buren	653	836	228	141.4	2.2759	1,334,351
Warren	1,596	495	598	182.1	4.8722	3,164,142

county sinkholes of distinction

Sinkhole Database: https://tnlandforms.us/landforms/sinks.php

Probability of Future Events – There is a possibility of a sinkhole (less than 5%) or landslide (60%) occurring in the next 5 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 Sullivan County vulnerable to these constant changes. While specific recent incidents in Sullivan County are not detailed in the available sources, neighboring areas have experienced significant geologic events.

2.7.3 Risk Assessment and Vulnerable Populations

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 minimal, but the nature of sinkholes is challenging to predict. Therefore, 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 trace. 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 Moderate

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
Sullivan County	Green	Green	Green	Green	Green	Green	Green	Green
City of Bristol	Green	Green	Green	Green	Green	Green	Green	Green
City of Kingsport	Green	Green	Green	Green	Green	Green	Green	Green
Town of Bluff City	Green	Green	Green	Green	Green	Green	Green	Yellow

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

Given the information above it becomes vital that all participating jurisdictions 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, Sullivan County and all incorporated jurisdictions are equally susceptible to sinkholes. Given the geological risks, it's crucial for residents and authorities in Sullivan County to be proactive in monitoring and mitigating the impacts of sinkholes and landslides. Engaging with local building departments and geotechnical engineers can provide valuable insights into assessing and addressing these hazards. For instance, in Hawkins County, a mudslide occurred in 2019, sweeping a car 200 feet down an embankment. This event highlighted the potential dangers of landslides in the region.

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 Sullivan 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

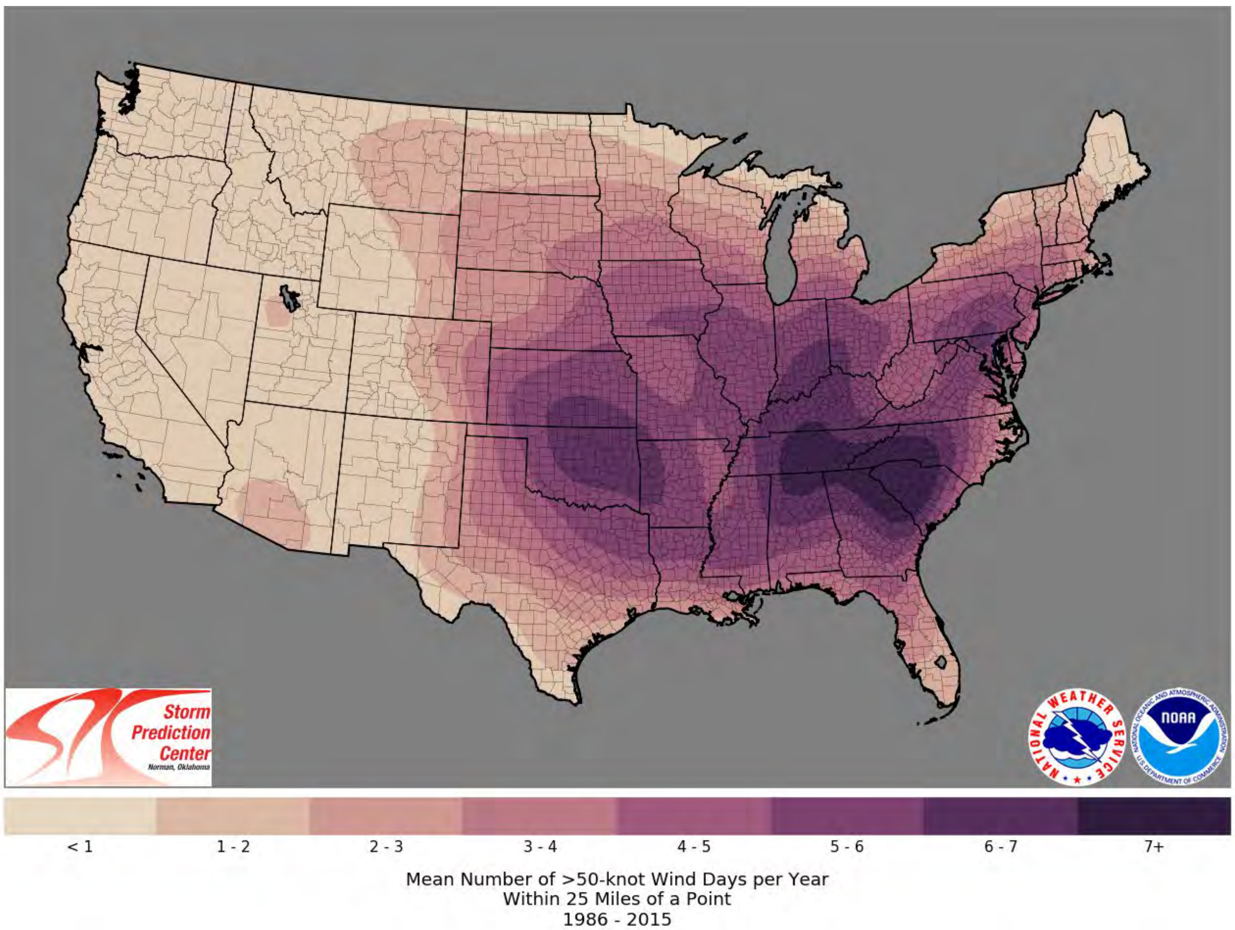
All jurisdictions are vulnerable to receiving damage from severe winds. The NOAA Storm Data Preparation document categorizes wind into three different types, as defined below.

- 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 Sullivan County. It is not unusual for Sullivan County to experience wind events causing structural damage, power outages, and downed trees. Wind speeds can range from an average of 5mph to 60mph wind gusts. In February 2025, Kingsport recorded a peak wind gust of 55.9mph from the West-Southwest. Based on NOAA historical data, there have been only 8 wind events over the last 74 years (1950- 2024).

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	2	116.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	02/03/2003	22:00	EST	Strong Wind	40 kts. EG	0	0	1.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/01/2006	12:00	EST-5	High Wind	60 kts. EG	0	0	30.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/09/2009	10:00	EST-5	High Wind	60 kts. EG	0	0	30.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/09/2009	10:00	EST-5	High Wind	60 kts. EG	0	0	20.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	04/16/2011	14:30	EST-5	Strong Wind	45 kts. EG	0	1	30.00K	0.00K

SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	02/26/2013	12:30	EST-5	High Wind	55 kts. EG	0	0	5.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	04/01/2023	11:24	EST-5	High Wind	52 kts. EG	0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	09/27/2024	06:35	EST-5	High Wind	70 kts. EG	0	1	0.00K	0.00K
Totals:								0	2	116.00K	0.00K



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.

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

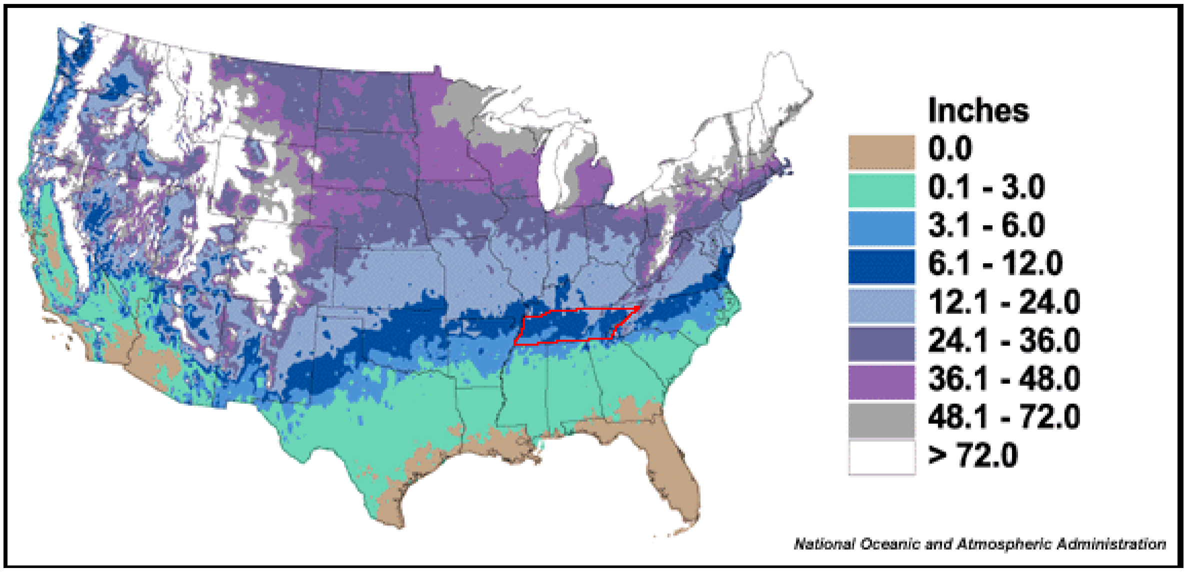
H2	Marble	16-20	Significant damage to crops and vegetation
H3	Walnut	21-30	Severe damage to fruits and crops, damage to glass and plastic structures, wood and paint scored
H4	Pigeons Egg	31-40	Widespread glass damage, auto-body damage
H5	Golf Ball	41-50	Destruction of glass, damage to tiled roofs, significant 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 Sullivan 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, Sullivan 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 Sullivan 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 shown below.



Average Snowfall per Year (Source: NOAA)

2.8.2 County Profile

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

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

Thunderstorms

KINGSPORT	SULLIVAN CO.	TN	05/25/1998	22:05	EST	Thunderstorm Wind		0	0	1.500M	0.00K
PINEY FLATS	SULLIVAN CO.	TN	07/28/2000	16:55	EST	Thunderstorm Wind		0	0	20.00K	10.00K
KINGSPORT	SULLIVAN CO.	TN	05/26/2004	16:55	EST	Thunderstorm Wind	78 kts. EG	0	0	300.00K	0.00K

Hail

GALLOWAY MILL	SULLIVAN CO.	TN	05/26/2011	16:27	EST-5	Hail	1.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/27/2011	22:06	EST-5	Hail	2.75 in.	0	0	0.00K	0.00K

Lightning

BRISTOL	SULLIVAN CO.	TN	04/25/2006	18:25	EST	Lightning		0	0	25.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	02/14/2000	00:15	EST	Lightning		0	0	25.00K	0.00K

Winter Weather

SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/24/2020	17:00	EST-5	Heavy Snow		0	0	0.00K	0.00K

SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/15/2024	00:00	EST-5	Heavy Snow		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/18/2024	16:30	EST-5	Winter Weather		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	11/21/2024	13:00	EST-5	Winter Weather		0	0	0.00K	0.00K

Probability of Future Events – There is a high likelihood (95%) of at least one severe weather event occurring in the next five years.
In order to determine the likelihood of future severe weather occurrences in Sullivan County historic data and weather patterns were analyzed.

2.8.3 Risk Assessment and Vulnerable Populations

Severe weather is not as spatially defined in any location in Sullivan 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. Sullivan County, Tennessee, is susceptible to severe weather events, including tornadoes, thunderstorms, hail, strong winds, lightning, and winter storms. Understanding the risk assessment and identifying vulnerable populations are essential for effective preparedness and mitigation strategies.

Severe Weather Risk Assessment:

Tennessee experiences a high frequency of severe weather events, with tornadoes being a significant concern. The National Weather Service's Severe Weather Climatology for the Morristown area indicates that between 1950 and 1996, there were 163 tornadoes, 75 of which were categorized as F2 or greater, resulting in 38 deaths and 782 injuries across East Tennessee, including Sullivan County.

Vulnerable Populations:

- **Elderly Individuals:** Older adults may have mobility challenges or health conditions that make evacuation and recovery more difficult.
- **Low-Income Families:** Limited financial resources can hinder access to necessary resources, such as storm shelters or emergency supplies.
- **Individuals with Disabilities:** Physical or cognitive impairments may require additional assistance during evacuations.
- **Children:** Young children are more vulnerable to injury and may require special care during emergencies.
- **Rural Residents:** Those living in remote areas may have limited access to emergency services and may face challenges during evacuations.

According to the U.S. Census Bureau, Sullivan County has a diverse population, with a significant proportion of residents aged 65 and older, which may increase the number of vulnerable individuals.

Mitigation and Preparedness:

To address these risks, Sullivan County has engaged in emergency management planning, including the development of hazard mitigation plans that encompass severe weather risks. The Sullivan County Emergency Management Agency coordinates efforts to prepare for and respond to natural disasters, ensuring that vulnerable populations receive the necessary support. Residents are encouraged to participate in local preparedness programs, stay informed about current weather conditions, and develop personal emergency plans to protect themselves and their families.

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

Although the National Risk Index is a well-valued tool it fails to properly show the feedback from the 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
Sullivan County								
City of Bristol								
City of Kingsport								

Town of Bluff City								

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 Sullivan 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 Sullivan 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

Sullivan 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

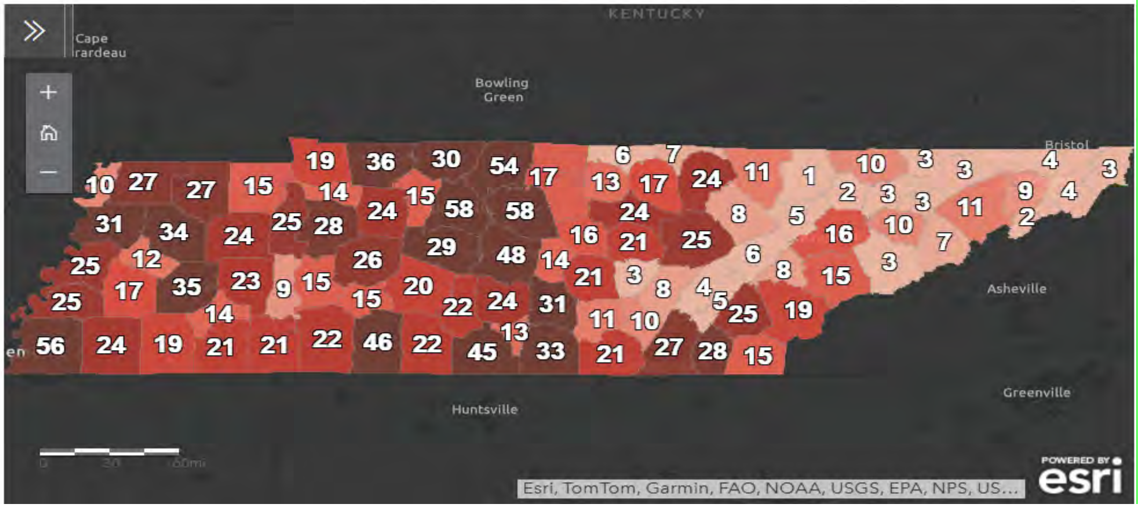
According to the Glossary of Meteorology (AMS 2000), a tornado is "a violently rotating column of air, pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud." Most tornadoes move from southwest to northeast or west to east.

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

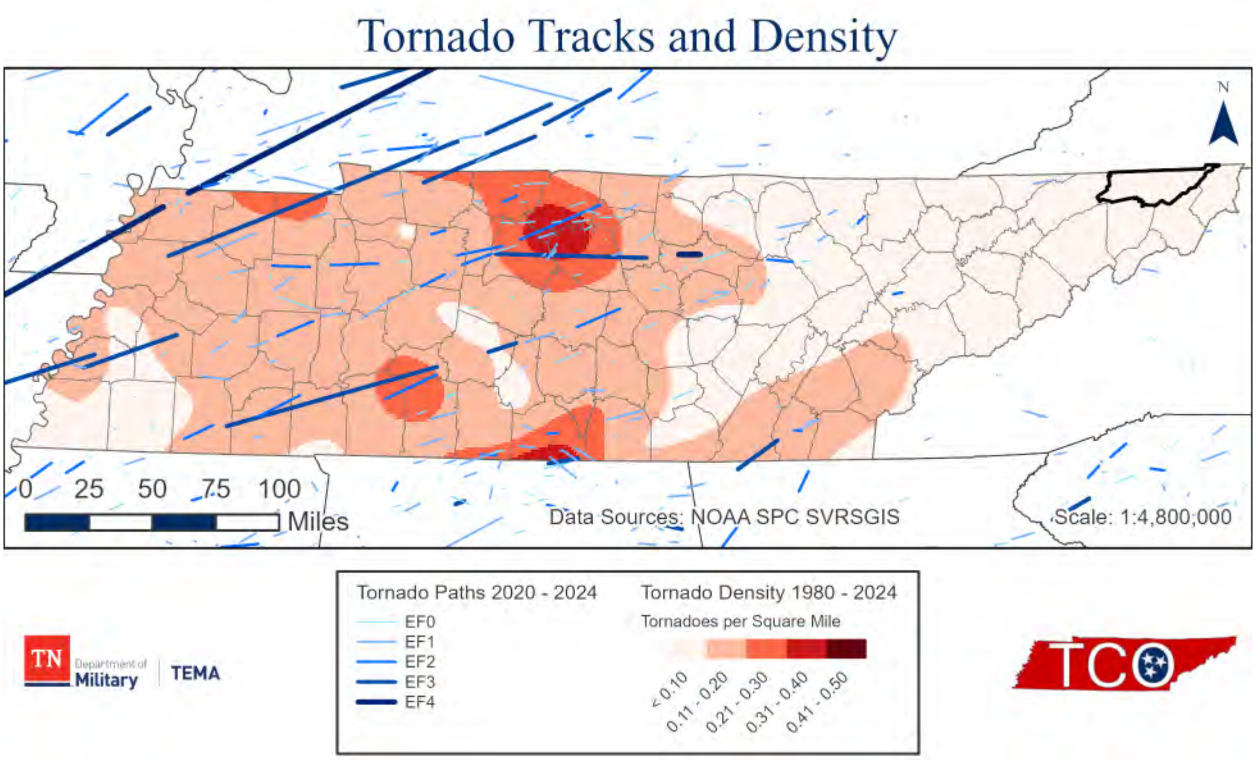
Interactive Tennessee Tornado Totals by County Map (1950-2025)

For more details, click on a county of interest.



Tornadoes by County (NWS/NOAA)

The figure below illustrates the track of tornadoes through Sullivan 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.



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

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	12	2.750M	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/04/1974	02:00	CST	Tornado	F0	0	2	250.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	10/01/1977	14:35	CST	Tornado	F1	0	10	2.500M	0.00K
ROCK SPGS	SULLIVAN CO.	TN	07/27/2014	16:45	EST-5	Tornado	EF1	0	0	0.00K	0.00K
Totals:								0	12	2.750M	0.00K

Probability of Future Events – It is very unlikely (less than 5%) Sullivan County could experience a Tornado in the next 5 years

Historical data and weather patterns were analyzed to determine the likelihood of future tornado occurrence in Sullivan County. Since 1950, only 3 tornadoes have occurred within the county.

2.9.3 Risk Assessment and Vulnerable Populations

The entirety of Sullivan 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.

Tornado Risk Assessment:

Tennessee experiences a high frequency of tornadoes, ranking first nationally in the percentage of tornadoes that result in injuries. The Tennessee Hazard Mitigation Plan provides a comprehensive risk and vulnerability assessment for the state, including tornado risks. This plan utilizes advanced geographic information systems to evaluate areas most susceptible to tornado damage.

Vulnerable Populations:

- **Elderly Individuals:** Older adults may have mobility challenges or health conditions that make evacuation and recovery more difficult.
- **Low-Income Families:** Limited financial resources can hinder access to necessary resources, such as storm shelters or emergency supplies.
- **Individuals with Disabilities:** Physical or cognitive impairments may require additional assistance during evacuations.
- **Children:** Young children are more vulnerable to injury and may require special care during emergencies.
- **Rural Residents:** Those living in remote areas may have limited access to emergency services and may face challenges during evacuations.

According to the U.S. Census Bureau, Sullivan County has a diverse population, with a significant proportion of residents aged 65 and older, which may increase the number of vulnerable individuals.

Mitigation and Preparedness:

To address these risks, Sullivan County has engaged in emergency management planning, including the development of hazard mitigation plans that encompass tornado risks. The Sullivan County Emergency Management Agency coordinates efforts to prepare for and respond to natural disasters, ensuring that vulnerable populations receive the necessary support. Residents are encouraged to participate in local preparedness programs, stay informed about current weather conditions, and develop personal emergency plans to protect themselves and their families.

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

Town of Bluff City								

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

Sullivan County adopted the 2018 international residential codes (IRC) and the international energy conservation codes (IECC) to comply with TN state regulations. While the adopted code provides adequate protection, older and mobile homes are highly susceptible to tornado events.

2.9.5 Multi-Jurisdictional Differences

The entirety of Sullivan County and its incorporated jurisdictions are at risk for a tornado event; however, historically, a large portion of tornado events have taken place in the Northeastern part 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.

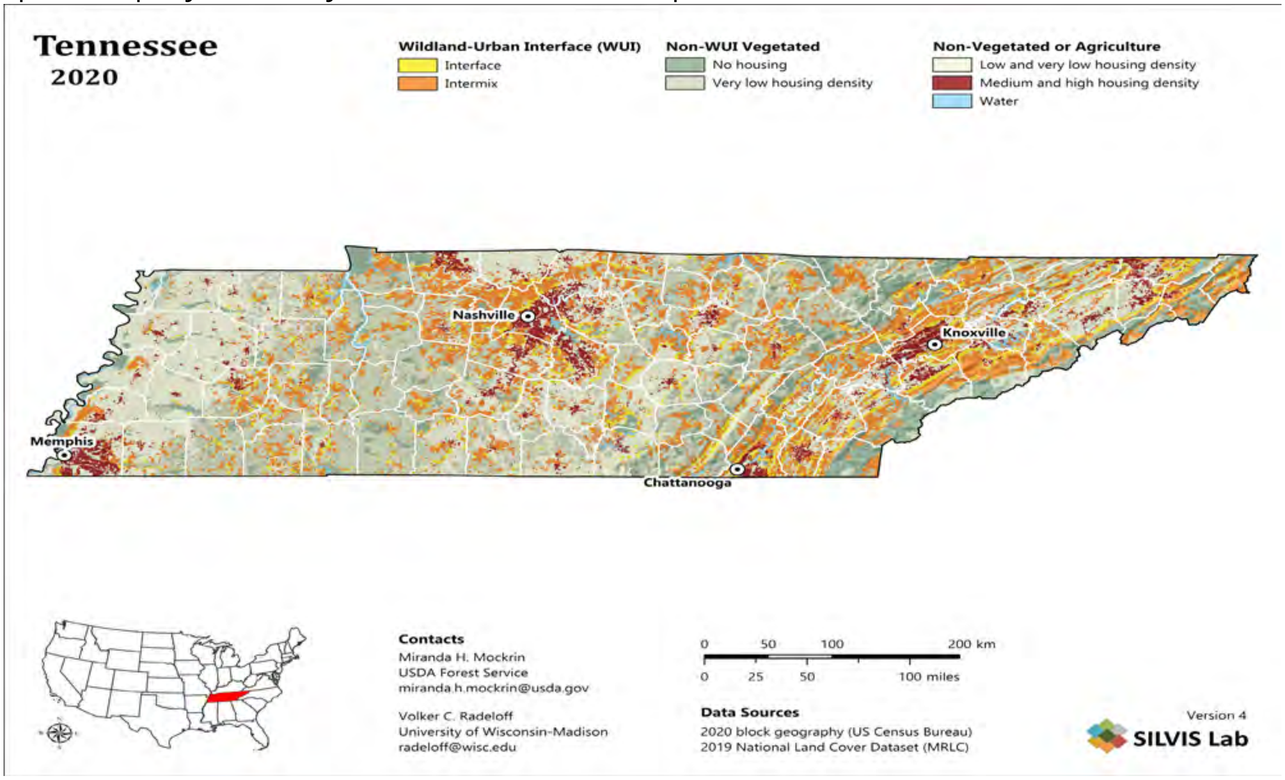
Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. The wind is the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

2.10.2 County Profile

Sullivan 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 Sullivan 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 Sullivan County can obtain that is consistent and confirmed. Below are the statistics for Sullivan County from 2007 to 2016. These statistics also provide the extent of the Wildfire Hazard.

There are very few news reports of Wildfires occurring in Sullivan County. NOAA database and other sources indicate there is no significant history of wildfires in Sullivan 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 medium and high housing or low housing areas. 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.



Wildland-Urban Interface (SILVIS LAB)

Probability of Future Events – There is a low possibility (less than 5%) Sullivan County could experience a Wildfire in the next 5 years.
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 and Vulnerable Populations

Wildfires have a higher likelihood of occurring during periods of drought due to dryer foliage being quicker to ignite and spread. Sullivan County, Tennessee, is susceptible to wildfires, particularly in its rural and forested regions. Assessing wildfire risk and identifying vulnerable populations are essential for effective mitigation and response strategies.

The Southern Wildfire Risk Assessment Portal provides detailed information on wildfire risks in the Southern United States, including Sullivan County. This platform offers interactive maps and data to help communities understand their specific wildfire risks. Additionally, the Tennessee Division of Forestry offers a "What's Your Risk" tool, allowing residents to enter their addresses to assess their individual wildfire risk. This resource is valuable for homeowners to understand their property's vulnerability.

Vulnerable Populations:

- **Elderly Individuals:** Older adults may have mobility challenges or health conditions that make evacuation and recovery more difficult.
- **Low-Income Families:** Limited financial resources can hinder access to necessary resources, such as fire-resistant materials or evacuation transportation.
- **Individuals with Disabilities:** Physical or cognitive impairments may require additional assistance during emergencies.
- **Children:** Young children are more vulnerable to smoke inhalation and may require special care during evacuations.
- **Rural Residents:** Those living in remote areas may have limited access to emergency services and may face challenges during evacuations.

According to the U.S. Census Bureau, Sullivan County has a diverse population, with a significant proportion of residents aged 65 and older, which may increase the number of vulnerable individuals.

Mitigation and Preparedness:

To address these risks, Sullivan County has engaged in wildfire mitigation efforts, including developing Community Wildfire Protection Plans (CWPPs). These plans are based on wildfire risk assessments and involve collaboration among local fire departments, residents, and other stakeholders to reduce wildfire hazards.

Residents are encouraged to participate in local preparedness programs, stay informed about current wildfire risks, and develop personal emergency plans to protect themselves and their families.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for natural hazards. It was built and designed by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government. The Risk Index leverages available source data for natural hazards and community risk factors to develop a baseline relative risk assessment for each county and census trace. Some of these community risk factors include social vulnerability which is determined by the data pulled from the Census 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
Sullivan County	Red	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green
City of Bristol	Red	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green
City of Kingsport	Yellow	Green	Yellow	Green	Yellow	Green	Green	Yellow
Town of Bluff City	Yellow	Yellow	Green	Green	Green	Green	Yellow	Yellow

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

Given the information above it becomes vital that all participating jurisdictions 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, Sullivan County and all incorporated jurisdictions are equally susceptible to them. In Sullivan County, Tennessee, wildfire prevention and response are managed by multiple fire departments, each with specific jurisdictions and responsibilities. Understanding these distinctions is crucial for residents to ensure compliance with local regulations and to access appropriate services.

Fire Department Jurisdictions:

Sullivan County encompasses several fire departments, each serving distinct areas:

- **Sullivan County Volunteer Fire Department:** Serves the unincorporated areas of Sullivan County.
- **Bristol Fire Department:** Covers the city of Bristol.
- **Kingsport Fire Department:** Serves the city of Kingsport.
- **Bluff City Volunteer Fire Department:** Covers the city of Bluff City.
- **Avoca Volunteer Fire Department:** Serves the Avoca community.
- **Hickory Tree Volunteer Fire Department:** Covers the Hickory Tree area.
- **Piney Flats Volunteer Fire Department:** Serves the Piney Flats community.
- **East Sullivan County Volunteer Fire Department:** Covers the eastern part of Sullivan County.
- **Sullivan West Volunteer Fire Department:** Serves the western part of Sullivan County.
- **421 Area Emergency Services Volunteer Fire Department:** Covers the 421 area.
- **Sullivan County EMS:** Provides emergency medical services countywide.

Sullivan County also borders next to the State of Virginia, which also poses multi-jurisdictional issues in the event of a wildfire near or in both states.

Wildfire Mitigation Efforts:

The Appalachian Resource Conservation and Development Council offers a Community Wildfire Protection Plan (CWPP) to help communities reduce wildfire hazards. Residents are encouraged to contact their local fire department to understand specific regulations and mitigation efforts in their area.

2.10.6 Summary

Sullivan 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 2020, the HMPC agreed upon the goals for their hazard mitigation plan. It was decided that the goals from the 2020 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.

Expansion Narrative

Jurisdiction/Applicant	How are you able to expand?
Sullivan County	Sullivan County has taken several steps in expand mitigation efforts since 2020. **SR 126 Roundabout & Signal Upgrades (May 2025)**: TDOT's construction of a roundabout at SR 126 & Blountville Boulevard and signal upgrades in May 2025 aim to improve traffic safety and reduce crash risk. **Hyper Reach Emergency Notification System (April 2022)**: This system sends geo-targeted alerts (severe weather, missing person, hazmat) via SMS and IPAWS, involving citizen opt-in for live alerts. **911 Text-to-911 & Professionalized Dispatch**: Since April 1, 2022, residents can text 911—critical for silent or disabled callers. Sullivan County 911 also earned APCO emergency communications certification in early 2022 and upgraded training across its dispatch team. **Local Emergency Preparedness Council**: The county's Local Emergency Preparedness Council (LEPC) meets monthly—excluding December—to coordinate mitigation, preparedness, and public safety efforts with agencies like fire, EMS, law enforcement, health, and industry.
City of Bristol	Completed mitigation project on Hampton St (culvert installation) to help alleviate flooding in 2022. Established a dedicated stormwater maintenance crew in 2023 to continually clean stormwater systems and bridges within the city. Applied for a generator grant at Fire Station #3. **Stormwater Fee & Infrastructure Upgrades (2024)**

	Implemented a dedicated stormwater utility fee in July 2024 to fund drainage maintenance and upgrades. **MS4/NPDES Phase II Program** As a permit holder since at least 2022, Bristol enforces stormwater quality through runoff regulations, public education, and detention/retention systems following EPA and TDEC standards. **Floodplain Mapping & Public Engagement (July 2023)** The city hosted an open-house to present updated flood maps, encouraging public feedback and awareness. **Floodplain Ordinances & Retrofitting Resources** Ongoing promotion of floodplain ordinances, floodplain district regulations, and homeowner resources (e.g. retrofitting guides, insurance advice) on the city's flood information portal. **Disaster Relief Hub (Oct 2024)** Bristol Motor Speedway served as a regional disaster relief center after Hurricane Helene, assisting with donations, logistics, and search-and-rescue coordination.
City of Kingsport	**Bays Mountain Park Upgrades** Significant improvements begun in 2024–2026 include playground upgrades, a nature center overhaul, new otter habitat, and observation tower restoration—boosting recreational resilience and tourism appeal. **Brickyard Park / Cement Hill Redevelopment** This transformative project built new parkland, Miracle Field with adaptive playground, trails, and initiated a mixed-use development with residential units linked to downtown via a pedestrian bridge—complemented by sustainable goat grazing for vegetation management. **FEMA AFG Grant (Aug 2022)** Kingsport received a **$321,175 Assistance to Firefighters Grant** earmarked for fire operations, safety, and equipment upgrades. **Justice Center Expansion** The city expanded its Police and Court facilities—including two new courtrooms and consolidated offices—in March 2024, enhancing public safety resilience. **Main Street Rebuild & Utility Enhancements**

	As part of a comprehensive downtown revitalization, Kingsport upgraded Main Street and associated utility/stormwater systems in 2023–2024. **Public Library Renovation** In 2024, successful design plans doubled the children's area and study spaces, adding new facilities to support community education and emergency informational support. **MS4 Stormwater Management Program** Running since obtaining the MS4 NPDES Phase II permit, the city enforces stormwater quality controls via detention, retention, and treatment measures, regularly reviewing and ensuring compliance. Since 2016, Kingsport has held Qualifying Local Program status, allowing them to streamline stormwater construction projects. **Stormwater System Upgrades** New stormwater infrastructure, such as improvements along Sullivan Street (Aug 2023), has enhanced flood handling and street drainage, reducing water damage and erosion during heavy rain events. **Pave Kingsport Sustainable Resurfacing Program** Since 2016, this data-driven initiative has assessed and prioritized streets for resurfacing every year. From 2020 to 2024, the city spent between $3.8M and $10.8M annually, resurfacing ~115 miles since 2017—with another $5M planned in 2025—greatly reducing roadway deterioration and improving traffic safety.
Town of Bluff City	Work has been done in the past 5 years to address flooding and severe weather, specifically on McClellan St and Bluff City Highway, however flooding is still an issue, and new projects have been added to address this area. **"Only Rain Down the Drain" Stormwater Program** Bluff City enforces a local stormwater ordinance, educates residents on pollution prevention (e.g., proper disposal, rain gardens), and provides a hotline for reporting illegal dumping or erosion near creeks and Boone Lake. **Updates to Stormwater Regulations** The municipal code saw an

	amendment in 2024 specifically addressing stormwater management—indicating a modernization of policy and regulations. **Sewer Overflow Corrections** Following a 2016 settlement with TDEC over sewer overflows into Boone Lake, Bluff City has implemented multi-phase fixes (Phase I and II reported ongoing as of 2024), filed annual overflow and remediation reports, and submitted capacity/maintenance plans required by TDEC. **Ongoing Municipal Updates** Bluff City has passed ordinances across 2021–2024—including water/sewer rate adjustments, stormwater code amendments, and zoning/property maintenance rules—reflecting active management of utilities and land-use standards.

3.2 Compliance with NFIP

Sullivan County, City of Bristol, City of Kingsport, and Town of Bluff City 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. Sullivan County adopted minimum Floodplain Management Criteria on 12/30/1977 (470181B).

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 resides with the Planning & Codes Department, which oversees building permits, including those for substantial improvements (SD) and substantial damage (SI) in Special Flood Hazard Areas (SFHAs). To ensure compliance with federal and state regulations, the department requires that all new construction and substantial improvements within SFHAs meet specific elevation standards. This typically involves elevating the lowest floor of the structure to or above the Base Flood Elevation (BFE) to minimize flood risk.

The county adheres to the National Flood Insurance Program (NFIP) guidelines, which mandate that communities enforce minimum floodplain management regulations to reduce flood risks. These regulations include requirements for elevation, floodproofing, and other measures to protect structures in flood-prone areas. 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 Sullivan 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. Information about SD/SI permits is on the county website where residents can review SD/SI permit requirements or in person by going to the county clerk’s office.

Ongoing Involvement and Engagement

Each jurisdiction participates in NFIP Webinars hosted by the State National Flood Insurance Program Office. 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; (See Appendix D)
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance, and proper construction measures.

NFIP Designees and Webinar Attendance

Jurisdiction	Title of NFIP Designee
Sullivan County	Andrew Lutterloh (Permits)
City of Bristol	Cherith Young
City of Kingsport	Keith Bruner (Chief Building Official)
Town of Bluff City	Irene Wells (Mayor)

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, Sullivan 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 project list 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 Sullivan 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.

Sullivan County Mitigation Actions and Projects
Mitigation Action Progress Summary (2025 Plan)

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	HMGP	Local			
2020 Projects													
1-5yrs	Old Elizabethton Hwy & Weaver Branch/Tate Rd Flooding Project (Flooding)	SC Highway Dept.	Sullivan County			X		X	X	X	12	800k	Existing
1-5yrs	Tate Rd Flooding Project (Flooding)	SC Highway Dept.	Sullivan County			X		X	X	X	12	750k	Existing
1-5yrs	Ead Rd & Weaver Branch Flooding Project (Flooding)	SC Highway Dept.	Sullivan County			X		X	X	X	12	700k	Existing
1-5yrs	Flooding Mitigation Public Education	Sullivan County EMA	All Jurisdictions			X		X	X	X	13	150k	Existing
1-5yrs	Ready Creek near 11W Flooding Project (Flooding)	SC Highway Dept.	Sullivan County			X		X	X	X	12	750k	Existing
1-5yrs	County EMS Generators (All Hazards)	SC EMS	Sullivan County			X		X	X	X	12	400k	Existing
1-5yrs	Volunteer Fire Dept Generators (All Hazards)	Individual Fire Depts within County	All Jurisdictions			X		X	X	X	13	950k	Existing
1-5yrs	Sewer/Water Plant Generators (All Hazards)	SC Public Works	All Jurisdictions			X		X	X	X	12	500k	Existing
1-5yrs	All Hazards Public Education Workshop (All Hazards)	Sullivan County EMA	Sullivan County			X		X	X	X	13	300k	Existing
1-5yrs	Firewise Workshop (Wildfires)	SC EMA/SC Fire Dept	All Jurisdictions			X		X	X	X	10	250k	Existing
1-5yrs	Develop a Drought Mitigation Plan (Drought)	Sullivan County Public Works / EMA	All Jurisdictions			X		X	X	X	14	500k	Existing

1-5yrs	Buyout Repetitive Loss Properties (Flooding)	City of Bristol Commission	Bristol			X		X	X	X	9	2M	Existing
1-5yrs	Flooding Project Mitigation on Vance Dr (Flooding)	City of Bristol Commission	Bristol			X		X	X	X	11	650k	Existing
1-5yrs	Culvert Replacement at S. Hampton Dr. (Flooding) -Completed in 2022	City of Bristol Commission	Bristol	x		X	x		X	X	10	600k	Existing
1-5yrs	Water Booster Stations for Permanent Generators (Flooding)	Bristol Public Works	Bristol			X		X	X	X	10	600k	Existing
1-5yrs	Flooding Project for Downtown Stormwater Pond (Flooding)	Kingsport Public Works	Kingsport			X		X	X	X	12	850k	Existing
1-5yrs	Install Bridge over Ward Place (Flooding)	SC Highway Dept	Kingsport			X		X	X	X	9	2M	Existing
1-5yrs	Flooding Project to address flooding on Lockwood Rd (Flooding)	SC Highway Dept	Kingsport			X		X	X	X	10	750k	Existing
1-5yrs	Generator for Police Dept Bluff City (All Hazards)	Bluff City PD	Bluff City			X		X	X	X	12	500k	Existing
2025 Projects													
1-5yrs	Generator for Highway Department (All Hazards)	SC EMA, Eric Kerney	Sullivan County)			X			X	X	11	151k	New
1-5yrs	Become Firewise compliant city/county (Wildfires)	Kingsport FD/Sullivan EMA	Kingsport/Sullivan County			X			X	X	13	400k	New
1-5yrs	Sewer/Water Plant Generator (All Hazards)	Kingsport Utilities	Kingsport			X			X	X	12	500k	New
1-5yrs	Generators for new County Offices and EOC (All Hazards)	SC EMA	Sullivan County			X			X	X	13	700k	New
1-5yrs	Earthquake Preparedness Workshop (Earthquakes and Geological Hazards)	SC EMA, Fire Dept	All Jurisdictions			X			X	X	14	150k	New
1-5yrs	Sirens (All Hazards)	Bristol Police Chief	Bristol			X			X	X	14	100k	New
1-5yrs	Stormwater Project on Shelby St (Flooding)	Engineering/Public Works	Bristol			X			X	X	10	1M	New
1-5yrs	Emergency Shelters (All Hazards)	City Manager	Bristol			X			X	X	10	2M	New

1yr	Informational Class (Wildfires)	Public Works/Public Safety	Bluff City			X			X	X	8	50k	New
1yr	Informational Class (Extreme Temps)	Public Works/Public Safety	Bluff City			X			X	X	8	50k	New
1yr	Backup Generators for four (4) Pump Stations and Water Plant (All Hazards)	Public Works	Bluff City			X			X	X	15	700k	New
1yr	Stormwater drain assessment and repairs. McClelland St & Bluff City Hwy. Stormwater floods wastewater pumps causing SSOs. At "Critical Overflow" status as of 7/1/25. (Flooding)	Public Works	Bluff City			X			X	X	15	1.5M	New
1-3yrs	Sewer line assessment and repairs. Sewer lines are old and deteriorating (Flooding)	Public Works	Bluff City			X			X	X	15	1.5M	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 Sullivan 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 Sullivan 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 Sullivan 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.

EMERGENCY MANAGEMENT
Sullivan County

DATE: February 12, 2025

Sullivan County Hazard Mitigation Plan Update
Meeting Sign in Sheet

Name	Agency	Email
Mike Carrier	BTFD	mcarrier@bristoltn.org
Brian Ramsey	Bristol, TN PW	bramsey@bristoltn.org
Samuel Cooper	Kingsport Planning Dept	samuelcooper@kingsporttn.gov
Mason Bertschler	Sull Co EMA	Mbechtler91@GMAIL.com
John Lufi	SC EMA	john.lufi@sullivancountytn.gov
Ambre Torbett	SC Planning & Codes	planning@sullivancountytn.gov
Nicci Riffle	SCEMA	Nicci.Riffle@gmail.com
Kelli Bourgeois	Bristol	kbourgeois@bristoltn.org
Terry Arnold	Kingsport	terryarnold@kingsporttn.gov
Michelle Matson	TEMA	michelle.matson@tn.gov
Jim Bean	Sullivan EMA	jim.bean@sullivancountytn.gov
Sherri DeVault	Sullivan EMA	sherri.devault@sullivancountytn.gov
Michael Lamphere	TEMA	Michael.Lamphere@TN.GOV

3193 Highway 126, Suite 101
Blountville, TN 37617

Telephone: (423) 323-6912
Fax: (423) 279-2816

Sullivan County Hazard Mitigation Meeting #2
6/11/2025

Name	Title	Agency Representing	Email Address	Phone Number
Mike Lamphere	EM Planner	TEMA	Michael.Lamphere@TN.Gov	907-315-4291
Michelle Matson	DC	TEMA	michelle.matson@tn.gov	865-599-9945
Samuel Cooper	Planner II	City of Kingsport	samuelcooper@kingsporttn.gov	423-393-9783
Jim Bean	EM Director	Sullivan County	jim.bean@sullivancountytn.gov	423 440-9626
John Lufi	Operations Officer	Sullivan County EMA	john.lufi@sullivancountytn.gov	423.217.8414
Christopher Robin		421 AES	C_Robinson863@yahoo	860-234-8687
Lori Staton	Mayor	Bluff City	L.staton@bluffcityTN.gov	423612-1273
Jerry Malone	Alderman	" "	malonejw91[illegible]@gmail	423-646-6161
Chris Goodwin	Traffic Technician	Sullivan County Hwy	Christopher.Goodwin@SullivancountyTN.gov	423-418-2212
Tommy Castle	Asst. Chief Ops	Bristol Tn. City	tcastle@bristoltn.gov	423-340-6510
Rebekah Mcnerney	reporter	Times News - Kingsport		423-213-3404
Sherri DeVault	grants coordinator	Sullivan County	sherri.devault@sullivancountytn.gov	423-782-7775
Alex Williams	Muteorologist	WJHL-TV	awilliams2@wjhl.com	423-557-4361

Page 1 of 1

PUBLIC MEETING: HAZARD MITIGATION PLAN UPDATE

We're working with TEMA to update Sullivan County's 5-Year Hazard Mitigation Plan, and we need your input.

This is your opportunity to:

✓ Share your local knowledge about risks and vulnerabilities

✓ Learn how hazard mitigation helps reduce disaster impact

✓ Help shape the plan that guides future safety and resilience efforts

What's Hazard Mitigation?

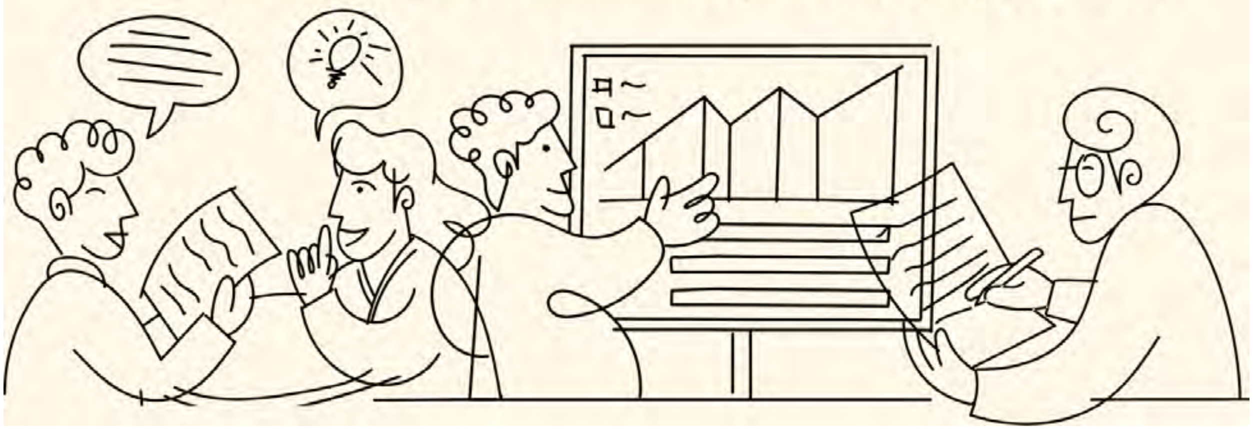
Hazard mitigation means taking action before disasters happen. It's about long-term solutions that reduce loss of life, property damage, and disaster recovery costs.

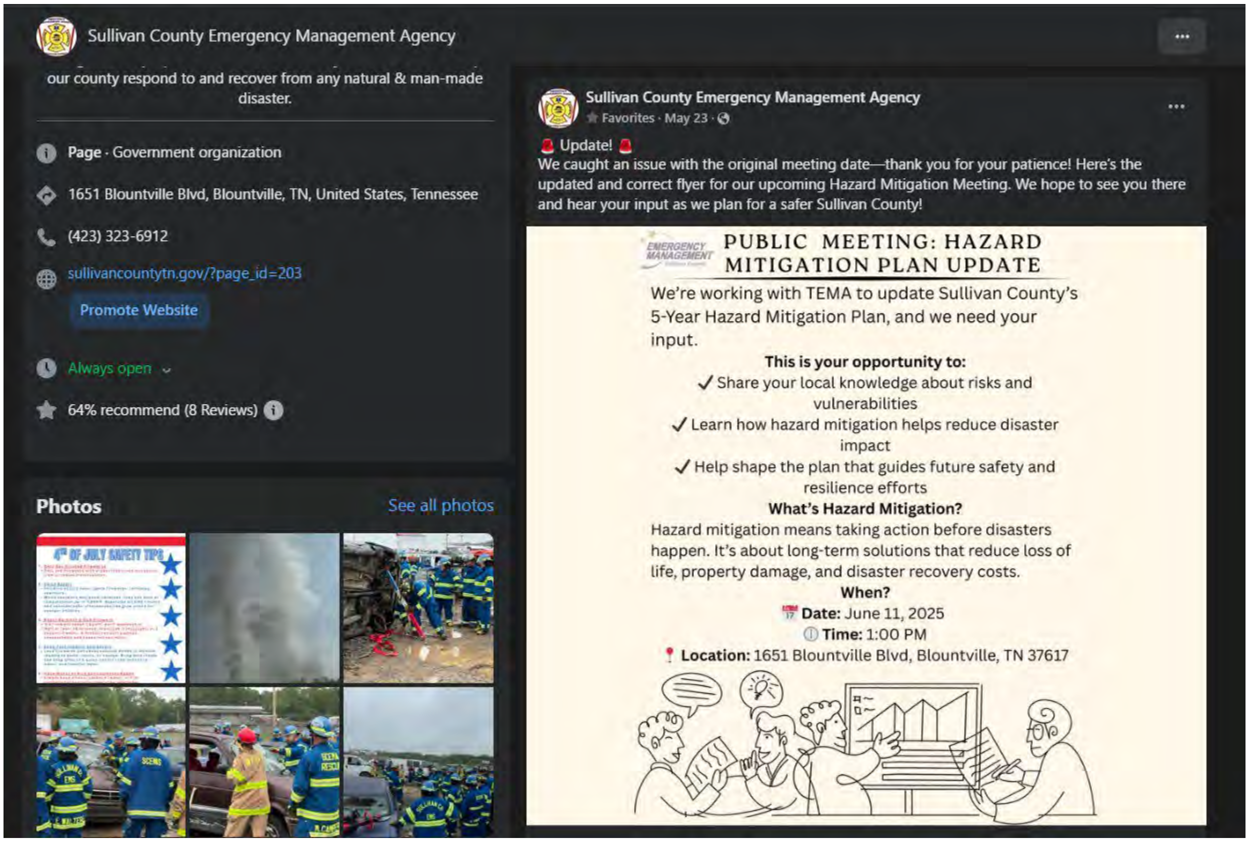
When?

Date: June 11, 2025

Time: 1:00 PM

Location: 1651 Blountville Blvd, Blountville, TN 37617




Sullivan County Emergency Management Agency
our county respond to and recover from any natural & man-made disaster.
Page · Government organization
1651 Blountville Blvd, Blountville, TN, United States, Tennessee
(423) 323-6912
sullivancountytn.gov/?page_id=203
Promote Website
Always open
64% recommend (8 Reviews)
Photos
See all photos
Sullivan County Emergency Management Agency
Favorites · May 23
Update!
We caught an issue with the original meeting date—thank you for your patience! Here's the updated and correct flyer for our upcoming Hazard Mitigation Meeting. We hope to see you there and hear your input as we plan for a safer Sullivan County!
PUBLIC MEETING: HAZARD MITIGATION PLAN UPDATE
We're working with TEMA to update Sullivan County's 5-Year Hazard Mitigation Plan, and we need your input.
This is your opportunity to:
✓ Share your local knowledge about risks and vulnerabilities
✓ Learn how hazard mitigation helps reduce disaster impact
✓ Help shape the plan that guides future safety and resilience efforts
What's Hazard Mitigation?
Hazard mitigation means taking action before disasters happen. It's about long-term solutions that reduce loss of life, property damage, and disaster recovery costs.
When?
Date: June 11, 2025
Time: 1:00 PM
Location: 1651 Blountville Blvd, Blountville, TN 37617

National Risk Index

June 25, 2025

Sullivan County, Tennessee

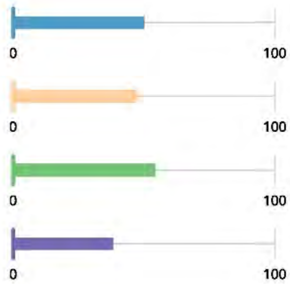
Summary

Risk Index is **Relatively Low** — Score **50.1**

Expected Annual Loss is **Very Low** — Score **47.3**

Social Vulnerability is **Relatively Moderate** — Score **54.5**

Community Resilience is **Relatively Low** — Score **38.1**

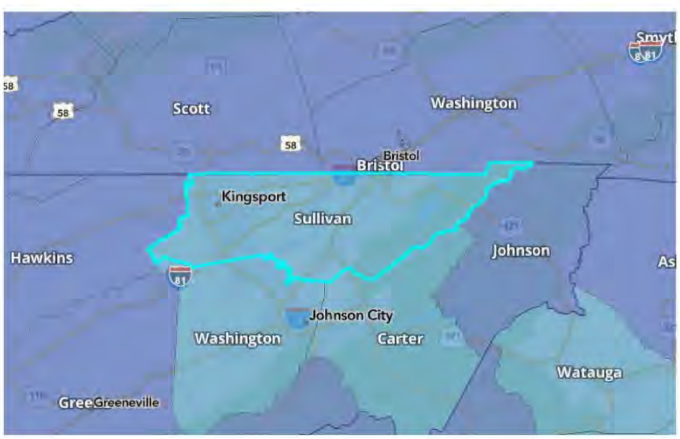


While reviewing this report, keep in mind that low risk is driven by lower loss due to natural hazards, lower social vulnerability, and higher community resilience.

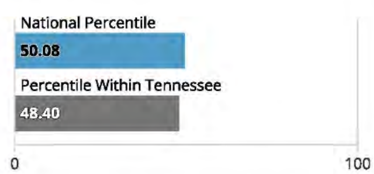
For more information about the National Risk Index, its data, and how to interpret the information it provides, please review the **About the National Risk Index** and **How to Take Action** sections at the end of this report. Or, visit the National Risk Index website at **hazards.fema.gov/nri/learn-more**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

Risk Index

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



Score	50.08



50% of U.S. counties have a lower Risk Index

48% of counties in Tennessee have a lower Risk Index

6/25/25, 12:19 PM Community Report - Sullivan County, Tennessee | National Risk Index

Risk Index Legend

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

No Rating · Not Applicable · Insufficient Data

Hazard Type Risk Index

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

[illegible]	[illegible]	[illegible]	[illegible]
Avalanche	Not Applicable	–	
Coastal Flooding	Not Applicable	–	
Cold Wave	Relatively Low	57.5	0 100
Drought	Relatively Low	52.8	0 100
Earthquake	Relatively Low	86.2	0 100
Hail	Relatively Low	56.2	0 100
Heat Wave	No Rating	0	0 100
Hurricane	Very Low	51.3	0 100
Ice Storm	Relatively Low	39.7	0 100
Landslide	Relatively Moderate	87	0 100
Lightning	Relatively High	93.6	0 100
Riverine Flooding	Relatively Low	57.3	0 100
Strong Wind	Relatively Moderate	77.7	0 100
Tornado	Relatively Low	48.8	0 100
Tsunami	Not Applicable	–	
Volcanic Activity	Not Applicable	–	
Wildfire	Very Low	35.6	0 100
Winter Weather	Relatively Low	50.5	0 100

https://hazards.fema.gov/nri/report/viewer?dataLOD=Counties&dataIDs=C47163#SectionSummary 2/13

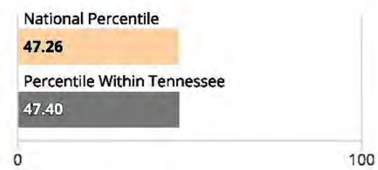
Risk Factor Breakdown

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
Earthquake	$1,449,792	Relatively Moderate	Relatively Low	1.25	$1,891,299	86.2
Tornado	$937,948	Relatively Moderate	Relatively Low	1.25	$1,145,479	48.8
Strong Wind	$750,117	Relatively Moderate	Relatively Low	1.25	$917,462	77.7
Lightning	$748,611	Relatively Moderate	Relatively Low	1.25	$899,423	93.6
Riverine Flooding	$511,009	Relatively Moderate	Relatively Low	1.25	$660,802	57.3
Hurricane	$187,173	Relatively Moderate	Relatively Low	1.25	$230,682	51.3
Landslide	$122,400	Relatively Moderate	Relatively Low	1.25	$149,547	87
Hail	$119,787	Relatively Moderate	Relatively Low	1.25	$144,115	56.2
Cold Wave	$89,756	Relatively Moderate	Relatively Low	1.25	$107,731	57.5
Winter Weather	$50,964	Relatively Moderate	Relatively Low	1.25	$61,563	50.5
Ice Storm	$32,513	Relatively Moderate	Relatively Low	1.25	$38,545	39.7
Drought	$28,622	Relatively Moderate	Relatively Low	1.25	$33,774	52.8
Wildfire	$14,558	Relatively Moderate	Relatively Low	1.25	$17,305	35.6
Heat Wave	$0	Relatively Moderate	Relatively Low	1.25	$0	0
Avalanche	--	Relatively Moderate	Relatively Low	1.25	--	--
Coastal Flooding	--	Relatively Moderate	Relatively Low	1.25	--	--
Tsunami	--	Relatively Moderate	Relatively Low	1.25	--	--
Volcanic Activity	--	Relatively Moderate	Relatively Low	1.25	--	--

Expected Annual Loss

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

Score	47.26



47% of U.S. counties have a lower Expected Annual Loss

47% of counties in Tennessee have a lower Expected Annual Loss

Expected Annual Loss Legend

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

No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss	**$5,043,251.19**
Composite Expected Annual Loss Rate National Percentile	**0.8**

Building EAL	**$2,482,231.67**	Population EAL	**0.21** fatalities
Building EAL Rate	**$1 per $10.00K of building value**	Population EAL Rate	**1 per 739.53K people**
Agriculture EAL	**$81,630.70**	Population Equivalence EAL	**$2,479,388.81**
Agriculture EAL Rate	**$1 per $309.25 of agriculture value**		

Expected Annual Loss for Hazard Types

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

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

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Earthquake	Relatively Low	$1,449,792	82.9
Tornado	Relatively Low	$937,948	49.4

[illegible]	[illegible]	[illegible]	[illegible]
Strong Wind	Relatively Moderate	$750,117	77.0
Lightning	Relatively High	$748,611	92.9
Riverine Flooding	Relatively Low	$511,009	55.4
Hurricane	Very Low	$187,173	49.3
Landslide	Relatively Moderate	$122,400	84.3
Hail	Relatively Low	$119,788	56.8
Cold Wave	Relatively Low	$89,756	58.2
Winter Weather	Relatively Low	$50,964	51.5
Ice Storm	Relatively Low	$32,513	39.6
Drought	Relatively Low	$28,622	53.3
Wildfire	Very Low	$14,558	34.3
Heat Wave	No Expected Annual Losses	$0	0.0
Avalanche	Not Applicable	—	—
Coastal Flooding	Not Applicable	—	—
Tsunami	Not Applicable	—	—
Volcanic Activity	Not Applicable	—	—

Expected Annual Loss Values

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Avalanche	—	—	—	—	—
Coastal Flooding		—	—		—
Cold Wave	$89,756	$306	$78,589	0.01	$10,861
Drought	$28,622	n/a	n/a	n/a	$28,622
Earthquake	$1,449,792	$1,181,707	$268,085	0.02	n/a
Hail	$119,787	$835	$114,155	0.01	$4,797
Heat Wave	$0	$0	$0	0.00	$0
Hurricane	$187,173	$180,171	$3,446	0.00	$3,556
Ice Storm	$32,513	$30,315	$2,198	0.00	n/a
Landslide	$122,400	$105,000	$17,400	0.00	n/a
Lightning	$748,611	$5,816	$742,795	0.06	n/a
Riverine Flooding	$511,009	$5,144	$493,928	0.04	$11,938

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Strong Wind	$750,117	$425,701	$302,696	0.03	$21,721
Tornado	$937,948	$532,196	$405,617	0.03	$134
Tsunami	—	—	—	—	—
Volcanic Activity	—	—	—	—	—
Wildfire	$14,558	$10,345	$4,212	0.00	$0
Winter Weather	$50,964	$4,695	$46,268	0.00	$1

Exposure Values

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Avalanche	—	—	—	—	—
Coastal Flooding	—	—	—	—	—
Cold Wave	$1,858,414,937,517	$24,812,493,285	$1,833,577,200,000	158,067.00	$25,244,232
Drought	$3,586,669	n/a	n/a	n/a	$3,586,669
Earthquake	$1,859,502,822,000	$24,812,022,000	$1,834,690,800,000	158,163.00	n/a
Hail	$1,858,414,937,517	$24,812,493,285	$1,833,577,200,000	158,067.00	$25,244,232
Heat Wave	$0	$0	$0	0.00	$0
Hurricane	$1,840,899,575,123	$24,603,671,266	$1,816,271,411,421	156,575.12	$24,492,437
Ice Storm	$1,858,389,693,285	$24,812,493,285	$1,833,577,200,000	158,067.00	n/a
Landslide	$1,228,512,638,062	$16,351,268,630	$1,212,161,369,431	104,496.67	n/a
Lightning	$1,858,389,693,285	$24,812,493,285	$1,833,577,200,000	158,067.00	n/a
Riverine Flooding	$33,274,837,185	$623,734,683	$32,649,896,289	2,814.65	$1,206,212
Strong Wind	$1,858,414,937,517	$24,812,493,285	$1,833,577,200,000	158,067.00	$25,244,232
Tornado	$1,858,414,937,517	$24,812,493,285	$1,833,577,200,000	158,067.00	$25,244,232
Tsunami	—	—	—	—	—
Volcanic Activity	—	—	—	—	—
Wildfire	$38,298,306,157	$420,423,791	$37,877,742,703	3,265.32	$139,662
Winter Weather	$1,858,414,937,517	$24,812,493,285	$1,833,577,200,000	158,067.00	$25,244,232

Annualized Frequency Values

[illegible]	[illegible]	[illegible]	[illegible]
Avalanche	—	—	—

[illegible]	[illegible]	[illegible]	[illegible]
Coastal Flooding	--	--	--
Cold Wave	0.1 events per year	1	2005-2021 (16 years)
Drought	15.7 events per year	406	2000-2021 (22 years)
Earthquake	0.074% chance per year	n/a	2021 dataset
Hail	3.3 events per year	112	1986-2021 (34 years)
Heat Wave	0 events per year	0	2005-2021 (16 years)
Hurricane	0 events per year	4	East 1851-2021 (171 years) / West 1949-2021 (73 years)
Ice Storm	0.1 events per year	5	1946-2014 (67 years)
Landslide	0 events per year	0	2010-2021 (12 years)
Lightning	57 events per year	1,255	1991-2012 (22 years)
Riverine Flooding	1.3 events per year	31	1996-2019 (24 years)
Strong Wind	3.3 events per year	113	1986-2021 (34 years)
Tornado	0.1 events per year	2	1950-2021 (72 years)
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	0.007% chance per year	n/a	2021 dataset
Winter Weather	1.3 events per year	21	2005-2021 (16 years)

Historic Loss Ratios

[illegible]	[illegible]
Avalanche	--
Coastal Flooding	--
Cold Wave	Very Low
Drought	Relatively Moderate
Earthquake	Relatively Moderate
Hail	Very Low
Heat Wave	No Rating
Hurricane	Very Low
Ice Storm	Relatively Low
Landslide	Very Low
Lightning	Relatively Moderate

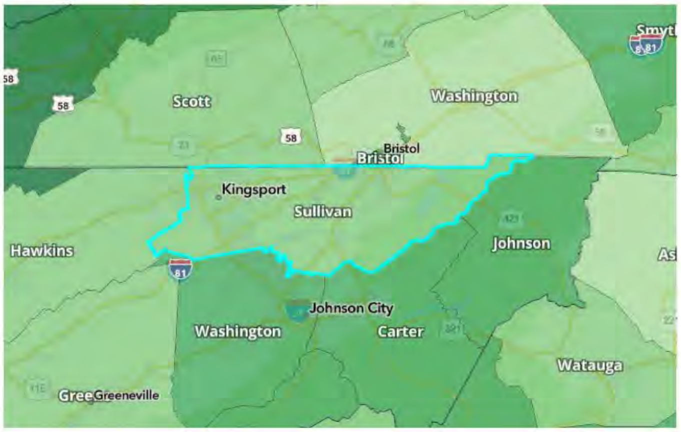
Hazard Type	Overall Rating
Riverine Flooding	Very Low
Strong Wind	Very Low
Tornado	Relatively Low
Tsunami	--
Volcanic Activity	--
Wildfire	Relatively Low
Winter Weather	Very Low

Expected Annual Loss Rate

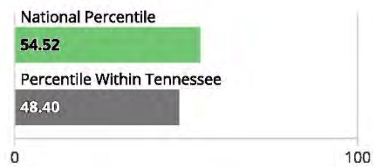
Hazard Type	Building EAL Rate (per building value)	Population EAL Rate (per population)	Agriculture EAL Rate (per agriculture value)
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	$1 per $81.08M	1 per 23.33M	$1 per $2.32K
Drought	--	--	$1 per $881.98
Earthquake	$1 per $21.00K	1 per 6.84M	--
Hail	$1 per $29.70M	1 per 16.06M	$1 per $5.26K
Heat Wave	--	--	--
Hurricane	$1 per $137.72K	1 per 532.07M	$1 per $7.10K
Ice Storm	$1 per $818.48K	1 per 834.27M	--
Landslide	$1 per $236.31K	1 per 105.38M	--
Lightning	$1 per $4.27M	1 per 2.47M	--
Riverine Flooding	$1 per $4.82M	1 per 3.71M	$1 per $2.11K
Strong Wind	$1 per $58.29K	1 per 6.06M	$1 per $1.16K
Tornado	$1 per $46.62K	1 per 4.52M	$1 per $187.84K
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	$1 per $2.40M	1 per 435.27M	$1 per $110.20M
Winter Weather	$1 per $5.28M	1 per 39.63M	$1 per $36.93M

Social Vulnerability

Social groups in **Sullivan County, TN** have a **Relatively Moderate** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.



Score **54.52**



55% of U.S. counties have a lower Social Vulnerability

48% of counties in Tennessee have a lower Social Vulnerability

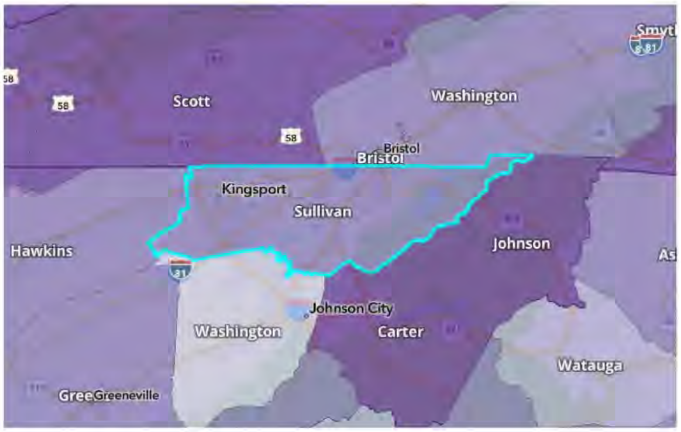
Social Vulnerability Legend

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

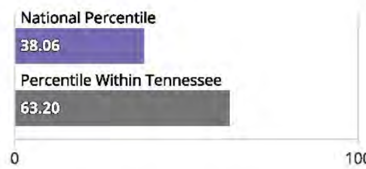
Data Unavailable

Community Resilience

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



Score	38.06



62% of U.S. counties have a higher Community Resilience

37% of counties in Tennessee have a higher Community Resilience

Community Resilience Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low | Data Unavailable

About the National Risk Index

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

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

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

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

Calculating the Risk Index

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

Risk Index = Expected Annual Loss × Community Risk Factor

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

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

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

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

Calculating Expected Annual Loss

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

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

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

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

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

Calculating Social Vulnerability

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

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

Calculating Community Resilience

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

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

Values, Scores, and Ratings

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

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

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

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

How to Take Action

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

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

Disclaimer

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

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

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

Nationwide data available for some risk factors are rudimentary at this time. The risk profiles for the vast majority of hazard types are based on historical frequency and loss data. They represent risk and expected annual loss based on average past conditions, not future predictions. The National Risk Index will be continuously updated as new data become available and improved methodologies are identified.

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

Assumption of Risk

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

Attribution, No Endorsement

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

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

Preferred citation for the National Risk Index:

Zuzak, C., E. Goodenough, C. Stanton, M. Mowrer, A. Sheehan, B. Roberts, P. McGuire, and J. Rozelle. 2023. National Risk Index Technical Documentation. Federal Emergency Management Agency, Washington, DC.

The National Risk Index Contact Us page is available at **hazards.fema.gov/nri/contact-us.**

APPENDIX B

Historical Hazard Data

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								1	6	4.460M	420.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/16/1957	19:30	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/17/1957	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	09/14/1957	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	10/08/1960	16:00	CST	Hail	1.00 in.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/03/1962	17:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	08/03/1964	18:35	CST	Thunderstorm Wind	50 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/23/1967	21:50	CST	Hail	1.50 in.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/23/1967	22:25	CST	Hail	1.50 in.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	05/08/1967	13:00	CST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/23/1968	21:25	CST	Hail	1.00 in.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/23/1968	21:25	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	07/22/1968	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/24/1969	11:20	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/24/1969	11:20	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/28/1969	16:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	07/25/1969	15:35	CST	Hail	1.00 in.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	07/25/1969	15:35	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	05/16/1970	14:10	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/05/1970	13:30	CST	Thunderstorm Wind	70 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/26/1971	16:00	CST	Hail	0.75 in.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	09/16/1971	13:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	05/23/1973	18:13	CST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	01/28/1974	10:40	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/04/1974	02:30	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/04/1974	02:40	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/08/1974	13:30	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	05/05/1977	14:00	CST	Hail	2.75 in.	0	0	0.00K	0.00K

SULLIVAN CO.	SULLIVAN CO.	TN	12/05/1977	10:40	CST	Thunderstorm Wind	60 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	07/20/1983	14:45	CST	Thunderstorm Wind	61 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	07/24/1983	11:35	CST	Thunderstorm Wind	76 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	08/11/1983	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	08/11/1983	18:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	09/03/1984	15:05	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	07/16/1988	17:10	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/27/1989	15:30	CST	Hail	1.00 in.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	05/06/1989	12:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/02/1989	12:25	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/12/1989	19:45	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	05/28/1990	15:15	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	06/22/1990	22:19	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/09/1991	16:17	CST	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	04/29/1991	17:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	07/10/1991	14:00	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
SULLIVAN CO.	SULLIVAN CO.	TN	08/29/1991	19:30	CST	Thunderstorm Wind	0 kts.	0	0	0.00K	0.00K
Kingsport	SULLIVAN CO.	TN	08/20/1993	14:20	CST	Thunderstorm Wind	0 kts.	0	0	0.50K	0.00K
Kingsport	SULLIVAN CO.	TN	08/26/1993	17:00	CST	Thunderstorm Wind	45 kts.	0	0	5.00K	0.00K
Kingsport	SULLIVAN CO.	TN	06/11/1995	16:15	CST	Thunderstorm Wind	0 kts.	0	0	20.00K	0.00K
Southern Sullivan Co	SULLIVAN CO.	TN	06/11/1995	17:00	CST	Thunderstorm Wind	0 kts.	0	0	2.00K	0.00K
Bristol/Kingsport	SULLIVAN CO.	TN	06/26/1995	19:50	CST	Thunderstorm Wind	0 kts.	0	0	5.00K	0.00K
Bristol	SULLIVAN CO.	TN	07/10/1995	19:06	CST	Thunderstorm Wind	0 kts.	0	0	5.00K	0.00K
Kingsport	SULLIVAN CO.	TN	07/25/1995	16:30	CST	Thunderstorm Wind	0 kts.	0	0	10.00K	0.00K
Kingsport Bloomingdal	SULLIVAN CO.	TN	08/11/1995	17:25	EST	Thunderstorm Wind	0 kts.	0	0	10.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/06/1996	21:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/11/1996	19:00	EST	Winter Storm		0	0	0.00K	0.00K

SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	02/02/1996	02:00	EST	Winter Storm		0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	04/13/1996	16:30	EST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/21/1996	19:40	EST	Thunderstorm Wind		0	0	0.00K	5.00K
KINGSPORT	SULLIVAN CO.	TN	05/24/1996	20:40	EST	Hail	1.75 in.	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	05/24/1996	21:45	EST	Thunderstorm Wind		0	0	5.00K	5.00K
BLOOMINGDALE	SULLIVAN CO.	TN	05/25/1996	15:05	EST	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/25/1996	15:50	EST	Hail	1.25 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/29/1996	01:45	EST	Hail	0.75 in.	0	0	0.00K	0.00K
INDIAN SPGS	SULLIVAN CO.	TN	06/24/1996	12:10	EST	Thunderstorm Wind		0	0	4.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	07/02/1996	15:15	EST	Thunderstorm Wind		0	0	0.00K	2.00K
COUNTYWIDE	SULLIVAN CO.	TN	07/14/1996	17:15	EST	Thunderstorm Wind		0	0	15.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	08/07/1996	14:45	EST	Thunderstorm Wind		0	0	0.00K	5.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/18/1996	16:00	EST	Winter Storm		0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	01/05/1997	03:45	EST	Thunderstorm Wind		0	0	0.00K	10.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/10/1997	11:00	EST	Winter Storm		0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/13/1997	19:25	EST	Thunderstorm Wind	52 kts.	0	0	0.00K	0.00K
E HALF OF COUNTY	SULLIVAN CO.	TN	07/16/1997	14:00	EST	Thunderstorm Wind		0	0	0.00K	30.00K
KINGSPORT	SULLIVAN CO.	TN	08/04/1997	15:15	EST	Hail	1.25 in.	0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/30/1997	05:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/27/1998	19:30	EST	Winter Storm		0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	02/17/1998	11:30	EST	Thunderstorm Wind	55 kts.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	04/03/1998	18:40	EST	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	04/03/1998	18:50	EST	Hail	1.25 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	04/16/1998	16:30	EST	Thunderstorm Wind		0	0	0.00K	9.00K
COLONIAL HGTS	SULLIVAN CO.	TN	05/07/1998	18:50	EST	Hail	1.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	05/07/1998	20:35	EST	Hail	1.75 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/25/1998	22:05	EST	Thunderstorm Wind		0	0	1.500M	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/03/1998	19:09	EST	Hail	0.75 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/22/1998	18:28	EST	Hail	1.00 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/24/1998	13:40	EST	Hail	0.75 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/24/1998	14:00	EST	Hail	0.75 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/24/1998	16:50	EST	Thunderstorm Wind		0	0	0.00K	2.00K

KINGSPORT	SULLIVAN CO.	TN	07/19/1998	16:05	EST	Thunderstorm Wind		0	0	15.00K	10.00K
BLUFF CITY	SULLIVAN CO.	TN	07/19/1998	16:25	EST	Thunderstorm Wind		0	0	0.00K	15.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/06/1999	08:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	03/13/1999	05:00	EST	Winter Storm		0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/02/1999	19:15	EST	Hail	1.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/02/1999	19:15	EST	Thunderstorm Wind		0	0	15.00K	0.00K
SOUTH HOLSTON LAKE	SULLIVAN CO.	TN	06/02/1999	20:11	EST	Thunderstorm Wind		0	0	11.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/24/1999	14:00	EST	Thunderstorm Wind		0	0	2.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/24/1999	14:05	EST	Thunderstorm Wind		0	0	10.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	08/01/1999	18:50	EST	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	08/01/1999	19:30	EST	Thunderstorm Wind		0	0	5.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/18/1999	23:05	EST	Thunderstorm Wind		0	0	1.00K	0.00K
(TRI)TRI CITY ARPT B	SULLIVAN CO.	TN	10/04/1999	17:00	EST	Hail	0.88 in.	0	0	0.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	10/04/1999	17:25	EST	Thunderstorm Wind		0	0	10.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/22/2000	10:00	EST	Winter Storm		0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	02/14/2000	00:00	EST	Thunderstorm Wind		0	0	20.00K	14.00K
BLUFF CITY	SULLIVAN CO.	TN	02/14/2000	00:15	EST	Lightning		0	0	25.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	04/17/2000	14:25	EST	Hail	1.00 in.	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	05/27/2000	20:20	EST	Thunderstorm Wind		0	0	0.00K	16.00K
BLOOMINGDALE	SULLIVAN CO.	TN	05/27/2000	20:45	EST	Thunderstorm Wind		0	0	0.00K	4.00K
KINGSPORT	SULLIVAN CO.	TN	05/28/2000	14:30	EST	Hail	0.75 in.	0	0	0.00K	0.00K
BLOOMINGDALE	SULLIVAN CO.	TN	05/28/2000	14:47	EST	Thunderstorm Wind		0	0	0.00K	5.00K
KINGSPORT	SULLIVAN CO.	TN	05/28/2000	17:45	EST	Hail	1.00 in.	0	0	0.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	06/15/2000	18:20	EST	Thunderstorm Wind		0	0	0.00K	6.00K
PINEY FLATS	SULLIVAN CO.	TN	06/15/2000	18:40	EST	Thunderstorm Wind		0	0	10.00K	8.00K
BLOOMINGDALE	SULLIVAN CO.	TN	07/11/2000	01:19	EST	Thunderstorm Wind		0	0	0.00K	1.00K
COLONIAL HGTS	SULLIVAN CO.	TN	07/28/2000	16:20	EST	Hail	1.75 in.	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	07/28/2000	16:55	EST	Thunderstorm Wind		0	0	20.00K	10.00K
KINGSPORT	SULLIVAN CO.	TN	08/03/2000	18:15	EST	Thunderstorm Wind		0	0	0.00K	21.00K
COUNTYWIDE	SULLIVAN CO.	TN	08/09/2000	23:35	EST	Thunderstorm Wind		0	0	0.00K	23.00K

COUNTYWIDE	SULLIVAN CO.	TN	08/10/2000	00:05	EST	Thunderstorm Wind		0	0	0.00K	23.00K
COUNTYWIDE	SULLIVAN CO.	TN	11/09/2000	18:40	EST	Thunderstorm Wind		0	0	0.00K	30.00K
KINGSPORT	SULLIVAN CO.	TN	11/09/2000	19:15	EST	Thunderstorm Wind		0	0	0.00K	13.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/02/2000	19:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/18/2000	19:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/01/2001	03:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/20/2001	04:00	EST	Winter Storm		0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/21/2001	12:20	EST	Thunderstorm Wind		0	0	18.00K	12.00K
KINGSPORT	SULLIVAN CO.	TN	05/21/2001	12:20	EST	Hail	0.88 in.	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	05/21/2001	19:00	EST	Thunderstorm Wind		0	0	0.00K	8.00K
COLONIAL HGTS	SULLIVAN CO.	TN	05/21/2001	19:45	EST	Thunderstorm Wind		0	0	0.00K	8.00K
KINGSPORT	SULLIVAN CO.	TN	05/21/2001	20:20	EST	Thunderstorm Wind		0	0	0.00K	8.00K
COLONIAL HGTS	SULLIVAN CO.	TN	05/22/2001	12:20	EST	Hail	0.88 in.	0	0	0.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	05/22/2001	12:35	EST	Thunderstorm Wind		0	0	0.00K	20.00K
BLUFF CITY	SULLIVAN CO.	TN	06/25/2001	17:20	EST	Thunderstorm Wind		0	0	0.00K	2.00K
BLOOMINGDALE	SULLIVAN CO.	TN	06/29/2001	16:20	EST	Hail	0.88 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/29/2001	16:35	EST	Hail	0.75 in.	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	07/04/2001	16:00	EST	Thunderstorm Wind		0	0	0.00K	14.00K
KINGSPORT	SULLIVAN CO.	TN	07/08/2001	15:33	EST	Thunderstorm Wind		0	0	0.00K	21.00K
BRISTOL	SULLIVAN CO.	TN	08/23/2001	20:45	EST	Thunderstorm Wind		0	0	0.00K	16.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/23/2001	20:45	EST	Thunderstorm Wind		0	0	0.00K	5.00K
KINGSPORT	SULLIVAN CO.	TN	08/23/2001	22:30	EST	Thunderstorm Wind		0	0	0.00K	1.00K
BRISTOL	SULLIVAN CO.	TN	08/23/2001	22:30	EST	Thunderstorm Wind		0	0	0.00K	5.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/23/2001	22:40	EST	Thunderstorm Wind		0	0	0.00K	8.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/05/2002	23:00	EST	Winter Storm		0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/28/2002	15:15	EST	Hail	0.75 in.	0	0	5.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	05/01/2002	22:00	EST	Thunderstorm Wind		0	0	10.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	05/02/2002	18:45	EST	Thunderstorm Wind		0	0	10.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	05/02/2002	19:30	EST	Thunderstorm Wind		0	0	10.00K	0.00K

BLOUNTVILLE	SULLIVAN CO.	TN	05/13/2002	08:50	EST	Thunderstorm Wind		0	0	10.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/02/2002	15:38	EST	Hail	0.75 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/02/2002	13:35	EST	Hail	0.75 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/02/2002	18:00	EST	Thunderstorm Wind		0	0	20.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	07/03/2002	14:50	EST	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/03/2002	15:40	EST	Thunderstorm Wind		0	0	15.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	07/04/2002	16:05	EST	Thunderstorm Wind		0	0	10.00K	0.00K
JACOB	SULLIVAN CO.	TN	07/23/2002	17:45	EST	Thunderstorm Wind		0	3	20.00K	20.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/30/2002	14:45	EST	Thunderstorm Wind		0	0	15.00K	5.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/01/2002	20:25	EST	Thunderstorm Wind		0	0	5.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	08/02/2002	16:25	EST	Hail	0.75 in.	0	0	0.00K	0.00K
PAPERVILLE	SULLIVAN CO.	TN	08/02/2002	16:40	EST	Thunderstorm Wind		0	0	5.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/24/2002	14:30	EST	Thunderstorm Wind		0	0	3.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	11/10/2002	23:00	EST	Thunderstorm Wind		0	0	25.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	12/04/2002	00:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/16/2003	13:00	EST	Winter Storm		0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/22/2003	19:00	EST	Winter Storm		0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	05/01/2003	15:00	EST	Lightning		0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	05/01/2003	15:00	EST	Lightning		0	0	0.00K	0.00K
BLOOMINGDALE	SULLIVAN CO.	TN	05/01/2003	15:54	EST	Hail	0.88 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/02/2003	14:15	EST	Thunderstorm Wind	60 kts. EG	0	0	12.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	05/09/2003	02:07	EST	Thunderstorm Wind	57 kts. MG	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/11/2003	17:00	EST	Thunderstorm Wind	55 kts. EG	0	0	15.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/11/2003	19:20	EST	Thunderstorm Wind	55 kts. EG	0	0	8.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/16/2003	15:10	EST	Hail	0.75 in.	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	07/09/2003	14:50	EST	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	07/10/2003	19:30	EST	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	07/16/2003	13:15	EST	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	08/04/2003	19:45	EST	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	08/16/2003	01:15	EST	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K

BRISTOL	SULLIVAN CO.	TN	08/28/2003	01:45	EST	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	09/27/2003	14:45	EST	Hail	0.88 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	09/27/2003	15:15	EST	Thunderstorm Wind	55 kts. EG	0	0	6.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/09/2004	03:00	EST	Winter Storm		0	0	0.00K	0.00K
TRI CITY ARPT	SULLIVAN CO.	TN	04/13/2004	14:37	EST	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/26/2004	16:55	EST	Thunderstorm Wind	78 kts. EG	0	0	300.00K	0.00K
BLOOMINGDALE	SULLIVAN CO.	TN	05/26/2004	16:55	EST	Thunderstorm Wind	78 kts. EG	0	0	1.500M	0.00K
BLOOMINGDALE	SULLIVAN CO.	TN	05/26/2004	17:30	EST	Thunderstorm Wind	70 kts. MG	0	0	1.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	05/31/2004	03:05	EST	Thunderstorm Wind	60 kts. EG	0	0	25.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/14/2004	15:53	EST	Hail	0.88 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/14/2004	16:10	EST	Thunderstorm Wind	65 kts. EG	0	0	15.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/05/2004	19:45	EST	Thunderstorm Wind	60 kts. EG	0	0	15.00K	0.00K
HOLSTON VLY	SULLIVAN CO.	TN	07/10/2004	18:40	EST	Thunderstorm Wind	45 kts. EG	0	2	0.00K	0.00K
SULLIVAN GARDENS	SULLIVAN CO.	TN	04/22/2005	21:35	EST	Hail	0.88 in.	0	0	0.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	04/22/2005	21:55	EST	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/13/2005	17:10	EST	Hail	0.75 in.	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	05/14/2005	18:05	EST	Thunderstorm Wind	60 kts. EG	0	0	15.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/01/2005	17:32	EST	Thunderstorm Wind	55 kts. EG	0	0	6.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/01/2005	17:35	EST	Thunderstorm Wind	55 kts. EG	0	0	6.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/02/2005	14:05	EST	Thunderstorm Wind	60 kts. EG	0	0	30.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	07/19/2005	16:45	EST	Thunderstorm Wind	45 kts. MG	0	0	15.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	08/03/2005	16:00	EST	Thunderstorm Wind	45 kts. EG	0	0	10.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	04/25/2006	18:05	EST	Thunderstorm Wind	65 kts. EG	0	0	12.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/25/2006	18:25	EST	Lightning		0	0	25.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/18/2006	19:10	EST	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/18/2006	19:10	EST	Hail	0.88 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	05/18/2006	19:35	EST	Hail	0.75 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/26/2006	14:56	EST	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	05/26/2006	14:58	EST	Hail	1.00 in.	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	06/11/2006	02:05	EST	Thunderstorm Wind	60 kts. EG	0	0	8.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/11/2006	02:10	EST	Hail	0.75 in.	0	0	0.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	06/11/2006	14:00	EST	Thunderstorm Wind	60 kts. EG	0	0	10.00K	0.00K

COUNTYWIDE	SULLIVAN CO.	TN	06/11/2006	22:50	EST	Thunderstorm Wind	60 kts. EG	0	0	8.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/04/2006	22:00	EST	Thunderstorm Wind	60 kts. EG	0	0	12.00K	0.00K
BLOOMINGDALE	SULLIVAN CO.	TN	07/28/2006	17:15	EST	Thunderstorm Wind	60 kts. EG	0	0	15.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/06/2006	18:10	EST	Thunderstorm Wind	60 kts. EG	0	0	12.00K	0.00K
COUNTYWIDE	SULLIVAN CO.	TN	08/08/2006	12:40	EST	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
SULLIVAN GARDENS	SULLIVAN CO.	TN	09/28/2006	13:51	EST	Hail	1.75 in.	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	04/03/2007	22:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	20.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/08/2007	18:30	EST-5	Thunderstorm Wind	60 kts. EG	0	0	15.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/14/2007	15:30	EST-5	Lightning		0	0	2.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	06/15/2007	17:18	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/16/2007	14:30	EST-5	Hail	0.88 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/01/2007	17:25	EST-5	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/01/2007	17:30	EST-5	Lightning		0	0	10.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	08/29/2007	14:10	EST-5	Hail	0.75 in.	0	0	0.00K	0.00K
ALLISON MILL	SULLIVAN CO.	TN	03/04/2008	17:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	06/09/2008	17:10	EST-5	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/09/2008	17:53	EST-5	Thunderstorm Wind	65 kts. EG	0	0	25.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	06/10/2008	18:28	EST-5	Thunderstorm Wind	55 kts. EG	0	0	3.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/11/2008	15:35	EST-5	Thunderstorm Wind	55 kts. EG	0	0	8.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/11/2008	15:35	EST-5	Hail	0.75 in.	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/04/2008	16:05	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/04/2008	16:09	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/04/2008	16:15	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
EAST KINGSPORT	SULLIVAN CO.	TN	07/04/2008	16:20	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/04/2008	16:40	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/22/2008	19:15	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/02/2008	15:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K

SPRINGDALE	SULLIVAN CO.	TN	04/10/2009	16:45	EST-5	Hail	0.88 in.	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	05/08/2009	20:10	EST-5	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	06/02/2009	16:48	EST-5	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/11/2009	15:15	EST-5	Thunderstorm Wind	60 kts. EG	0	0	20.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/16/2009	18:40	EST-5	Thunderstorm Wind	60 kts. EG	0	0	20.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/18/2009	14:10	EST-5	Thunderstorm Wind	60 kts. EG	0	0	20.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/18/2009	14:10	EST-5	Thunderstorm Wind	60 kts. EG	0	0	20.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/09/2009	15:25	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
GREY MILL	SULLIVAN CO.	TN	09/09/2009	10:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
COLONIAL HGTS	SULLIVAN CO.	TN	09/09/2009	10:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
GUNNINGS	SULLIVAN CO.	TN	05/16/2010	16:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	06/15/2010	16:56	EST-5	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/21/2010	17:26	EST-5	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/21/2010	17:30	EST-5	Thunderstorm Wind	55 kts. EG	0	0	25.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	06/24/2010	16:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/04/2010	16:50	EST-5	Thunderstorm Wind	58 kts. EG	0	0	10.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	08/05/2010	12:45	EST-5	Thunderstorm Wind	58 kts. EG	0	0	15.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	08/05/2010	12:55	EST-5	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	09/16/2010	21:40	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	10/25/2010	08:00	EST-5	Thunderstorm Wind	60 kts. EG	0	0	20.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	10/25/2010	08:00	EST-5	Thunderstorm Wind	60 kts. EG	0	0	30.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	03/24/2011	00:20	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	04/25/2011	15:45	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
SULLIVAN GARDENS	SULLIVAN CO.	TN	04/27/2011	20:25	EST-5	Thunderstorm Wind	60 kts. EG	0	0	25.00K	0.00K
SULLIVAN GARDENS	SULLIVAN CO.	TN	04/27/2011	20:25	EST-5	Hail	2.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/27/2011	21:06	EST-5	Hail	2.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/27/2011	21:13	EST-5	Hail	1.25 in.	0	0	0.00K	0.00K

BLOUNTVILLE	SULLIVAN CO.	TN	04/27/2011	21:39	EST-5	Hail	1.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/27/2011	21:58	EST-5	Hail	2.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/27/2011	22:06	EST-5	Hail	2.75 in.	0	0	0.00K	0.00K
(TRI)TRI CITY ARPT B	SULLIVAN CO.	TN	05/13/2011	14:58	EST-5	Thunderstorm Wind	50 kts. MG	0	0	0.00K	0.00K
FORDTOWN	SULLIVAN CO.	TN	05/22/2011	18:25	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
BORING	SULLIVAN CO.	TN	05/22/2011	18:28	EST-5	Thunderstorm Wind	52 kts. MG	0	0	0.00K	0.00K
ROCK SPGS	SULLIVAN CO.	TN	05/22/2011	18:35	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	05/24/2011	10:17	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	05/24/2011	14:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	05/26/2011	15:58	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
COLONIAL HGTS	SULLIVAN CO.	TN	05/26/2011	16:00	EST-5	Hail	1.50 in.	0	0	0.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	05/26/2011	16:20	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	05/26/2011	16:24	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	05/26/2011	16:27	EST-5	Hail	1.75 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	05/26/2011	16:29	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	05/26/2011	16:46	EST-5	Hail	1.25 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/09/2011	15:45	EST-5	Thunderstorm Wind	55 kts. EG	0	0	20.00K	0.00K
COLONIAL HGTS	SULLIVAN CO.	TN	06/21/2011	20:12	EST-5	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/21/2011	20:20	EST-5	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
VANCE	SULLIVAN CO.	TN	07/22/2011	15:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/22/2011	18:12	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BLOOMINGDALE	SULLIVAN CO.	TN	08/08/2011	16:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	2.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	09/03/2011	15:05	EST-5	Thunderstorm Wind	65 kts. EG	0	0	50.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	09/03/2011	15:35	EST-5	Thunderstorm Wind	65 kts. EG	0	0	0.00K	0.00K
HARR	SULLIVAN CO.	TN	07/01/2012	23:14	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	07/05/2012	14:30	EST-5	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/05/2012	15:15	EST-5	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K

BRISTOL	SULLIVAN CO.	TN	07/24/2012	15:14	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/24/2012	15:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	07/31/2012	18:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/03/2012	16:10	EST-5	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	04/11/2013	23:20	EST-5	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	05/21/2013	19:25	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	05/21/2013	19:40	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	05/21/2013	19:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
VANCE	SULLIVAN CO.	TN	05/22/2013	13:50	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	06/13/2013	12:46	EST-5	Thunderstorm Wind	53 kts. EG	0	0	15.00K	0.00K
WEAVER	SULLIVAN CO.	TN	07/17/2013	15:27	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/17/2013	16:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	07/18/2013	16:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	07/18/2013	16:05	EST-5	Thunderstorm Wind	65 kts. EG	0	1	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/18/2013	16:25	EST-5	Thunderstorm Wind	60 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	02/21/2014	03:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	8.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	04/28/2014	15:35	EST-5	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	04/28/2014	15:44	EST-5	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
HARR	SULLIVAN CO.	TN	05/13/2014	16:02	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	05/21/2014	22:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	05/27/2014	15:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	06/29/2014	18:10	EST-5	Thunderstorm Wind	50 kts. EG	0	0	8.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/08/2014	16:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
RIDGEFIELD	SULLIVAN CO.	TN	07/27/2014	16:38	EST-5	Hail	1.75 in.	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/27/2014	16:40	EST-5	Thunderstorm Wind	70 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/27/2014	16:42	EST-5	Hail	2.75 in.	0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	02/17/2015	01:00	EST-5	Winter Storm		0	0	0.00K	0.00K

COLONIAL HGTS	SULLIVAN CO.	TN	06/08/2015	16:45	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	06/08/2015	16:53	EST-5	Thunderstorm Wind	51 kts. MG	0	0	0.00K	0.00K
THOMAS BRIDGE	SULLIVAN CO.	TN	06/08/2015	17:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	07/13/2015	17:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/13/2015	17:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	07/13/2015	17:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
COLONIAL HGTS	SULLIVAN CO.	TN	06/04/2016	15:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	06/23/2016	21:11	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/04/2016	19:28	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	07/04/2016	19:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
(TRI)TRI CITY ARPT B	SULLIVAN CO.	TN	07/08/2016	17:13	EST-5	Thunderstorm Wind	54 kts. MG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	08/16/2016	17:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	08/16/2016	17:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	11/30/2016	07:00	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	11/30/2016	10:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BEIDLEMAN MILL	SULLIVAN CO.	TN	05/12/2017	13:05	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
HARR	SULLIVAN CO.	TN	05/12/2017	13:30	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BORING	SULLIVAN CO.	TN	11/18/2017	22:10	EST-5	Thunderstorm Wind	52 kts. MG	0	0	0.00K	0.00K
ROCK SPGS	SULLIVAN CO.	TN	03/17/2018	19:24	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
PETTYJOHNS MILL	SULLIVAN CO.	TN	04/04/2018	01:39	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	07/20/2018	21:38	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
EAST KINGSPORT	SULLIVAN CO.	TN	09/09/2018	18:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SULLIVAN GARDENS	SULLIVAN CO.	TN	11/06/2018	06:24	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
AVOCA	SULLIVAN CO.	TN	04/14/2019	18:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SOUTH HOLSTON LAKE	SULLIVAN CO.	TN	06/22/2019	00:30	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	08/01/2019	18:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BLOOMINGDALE	SULLIVAN CO.	TN	08/01/2019	18:35	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K

BRISTOL	SULLIVAN CO.	TN	08/01/2019	19:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
AVOCA	SULLIVAN CO.	TN	08/01/2019	20:03	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
VANCE	SULLIVAN CO.	TN	08/01/2019	20:15	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
GALLOWAY MILL	SULLIVAN CO.	TN	08/01/2019	20:40	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
(TRI)TRI CITY ARPT B	SULLIVAN CO.	TN	01/11/2020	18:59	EST-5	Thunderstorm Wind	53 kts. MG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	01/11/2020	19:05	EST-5	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
HOWARD HILL	SULLIVAN CO.	TN	03/29/2020	06:00	EST-5	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
CEDAR GROVE	SULLIVAN CO.	TN	03/29/2020	06:26	EST-5	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
BLUFF CITY	SULLIVAN CO.	TN	06/14/2020	13:07	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
COLONIAL HGTS	SULLIVAN CO.	TN	07/05/2020	15:27	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
HORSE CREEK	SULLIVAN CO.	TN	07/05/2020	16:12	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
PINEY FLATS	SULLIVAN CO.	TN	07/23/2020	14:20	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
AVOCA	SULLIVAN CO.	TN	07/24/2020	18:11	EST-5	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
BRIDWELL HGTS	SULLIVAN CO.	TN	03/27/2021	10:20	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
MILL PT	SULLIVAN CO.	TN	03/27/2021	10:30	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
BEIDLEMAN MILL	SULLIVAN CO.	TN	03/27/2021	12:10	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
BRIDWELL HGTS	SULLIVAN CO.	TN	05/06/2022	16:10	EST-5	Hail	1.25 in.	0	0	0.00K	0.00K
FRIENDSHIP	SULLIVAN CO.	TN	05/06/2022	18:00	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
LYNN GARDEN	SULLIVAN CO.	TN	05/19/2022	14:13	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
LYNN GARDEN	SULLIVAN CO.	TN	05/19/2022	18:05	EST-5	Hail	1.50 in.	0	0	0.00K	0.00K
HOWARD HILL	SULLIVAN CO.	TN	05/19/2022	18:09	EST-5	Hail	1.50 in.	0	0	0.00K	0.00K
LONG IS	SULLIVAN CO.	TN	05/19/2022	18:10	EST-5	Hail	1.50 in.	0	0	0.00K	0.00K
GROSS XRD	SULLIVAN CO.	TN	05/21/2022	15:53	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
AVOCA	SULLIVAN CO.	TN	06/17/2022	14:30	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
AVOCA	SULLIVAN CO.	TN	07/05/2022	16:07	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
BRISTOL	SULLIVAN CO.	TN	07/18/2022	17:05	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HOLSTON VLY	SULLIVAN CO.	TN	08/14/2022	23:40	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K

SPRINGDALE	SULLIVAN CO.	TN	09/25/2022	17:40	EST-5	Thunderstorm Wind	50 kts. EG	1	0	0.00K	0.00K
COLONIAL HGTS	SULLIVAN CO.	TN	01/03/2023	16:15	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
(TRI)TRI CITY ARPT B	SULLIVAN CO.	TN	01/12/2023	14:19	EST-5	Thunderstorm Wind	54 kts. MG	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	03/03/2023	17:00	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
KINGSPORT	SULLIVAN CO.	TN	07/29/2023	16:15	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
SPRINGDALE	SULLIVAN CO.	TN	08/14/2023	21:10	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HARR	SULLIVAN CO.	TN	09/07/2023	15:57	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
HARR	SULLIVAN CO.	TN	09/07/2023	15:57	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	01/18/2024	16:30	EST-5	Winter Weather		0	0	0.00K	0.00K
(TRI)TRI CITY ARPT B	SULLIVAN CO.	TN	08/16/2024	17:09	EST-5	Thunderstorm Wind	51 kts. MG	0	0	0.00K	0.00K
AVOCA	SULLIVAN CO.	TN	08/16/2024	17:33	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
EAST KINGSPORT	SULLIVAN CO.	TN	09/24/2024	18:42	EST-5	Hail	1.00 in.	0	0	0.00K	0.00K
BLOUNTVILLE	SULLIVAN CO.	TN	09/24/2024	19:05	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
LEONARD	SULLIVAN CO.	TN	09/24/2024	19:12	EST-5	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
SULLIVAN (ZONE)	SULLIVAN (ZONE)	TN	11/21/2024	13:00	EST-5	Winter Weather		0	0	0.00K	0.00K
Totals:								1	6	4.460M	420.00K

Sullivan County Climate Trends and Variations

Dam Failure

Climate trends and variations could impact the risk of dam failures in Sullivan County connected to changes in the hydrologic cycle. Observed increases in annual precipitation and projected increases in the number of extreme precipitation events could increase the pressure on existing dams in and upstream of Sullivan County. For a more detailed analysis of these trends see the Flooding section of this appendix.

Drought

The future risk of drought in Sullivan County is tied to changes in the precipitation and temperature patterns the county may experience due to climate trends and variations. The Fifth National Climate Assessment (2023, NCA5) states climate variability is expected to increase the average temperature and the number of high-heat days in the southeastern United States and intensify the hydrologic cycle, leading to an increase in both extreme precipitation events and periods of drought in the southeastern United States. The Climate Mapping Risk Assessment (CMRA) Report for Sullivan County shows that while overall annual precipitation may increase, the number of dry days is expected to increase through the 21st century. Also, high-heat days are expected to increase, which could favor short-term periods of drought.

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

The increasing trends in average temperature and total precipitation in Sullivan County are also supported by observed historical data available from the NOAA National Centers for Environmental Information Climate-at-a-Glance tool (refer to subsequent figures). The trends of increasing temperature and annual precipitation have been more pronounced over the past several decades compared to the longer-term (1895-2024) trend. The long-term trend in temperature showed a slight increase of +0.1°F per decade due to several warm decades in the early 20th century followed by a cool period from the 1950's to the early 1980's, and then years that were mostly warmer than the 20th century average after 1985. The medium-term (1965-2024) shows an increased warming trend of +0.5°F per decade and the short-term (1995-2024) shows an increase of +0.8°F per decade. Additionally, the county's climate stripes graphics from NOAA show that aside from a few warmer than normal years early in the period, most of the above average temperature years have occurred in the past two decades. This indicates that warming has substantially increased in Sullivan County and based on the NCA5, this trend is expected to continue in the future.

However, total precipitation has also been increasing in Sullivan County, with the long-term (1895-2024) trend in precipitation having a +0.19" increase per decade, while the medium-term (1965-2024) shows a stronger trend of +0.66" increase per decade and the short-term (1995-2024) shows an even stronger increasing trend of +1.84" per decade. This indicates that precipitation has increased in Sullivan County; however, there is a large amount of inter-annual variability. Based on the NCA5, this trend is expected to continue in the future. Refer to Figures 19-21 in the Flooding section for additional information. An increasing trend in precipitation may infer a decrease in drought potential; however, the observed pattern has been highly variable year-to-year and on shorter time periods. As temperatures increase, there can be more rapid evapotranspiration, potentially leading to more rapid onset of drought occurrences (i.e., Flash Droughts).

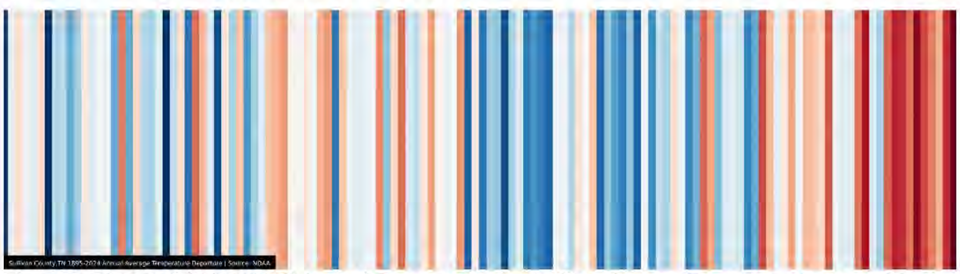


Figure 2: Observed (1895-2024) Annual Temperature for Sullivan County, Tennessee, Compared to the 20th Century Average with Darkening Shades of Blue for Below Average Temperature and Darkening Shades of Red for Above Average Temperature.
(Source: NOAA NCEI)

Figure 3: Observed (1895-2024) Annual Precipitation for Sullivan County, Tennessee, Compared to the 20th Century Average with Darkening Shades of Brown for Below Average Precipitation and Darkening Shades of Green for Above Average.
(Source: NOAA NCEI)

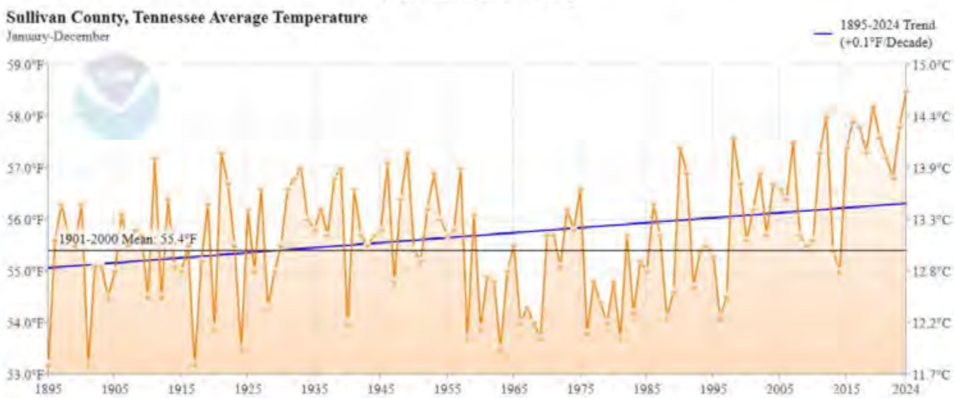


Figure 4: Annual Average Temperature for Sullivan County Tennessee, Showing a 0.1˚F Increase per Decade Since 1895.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

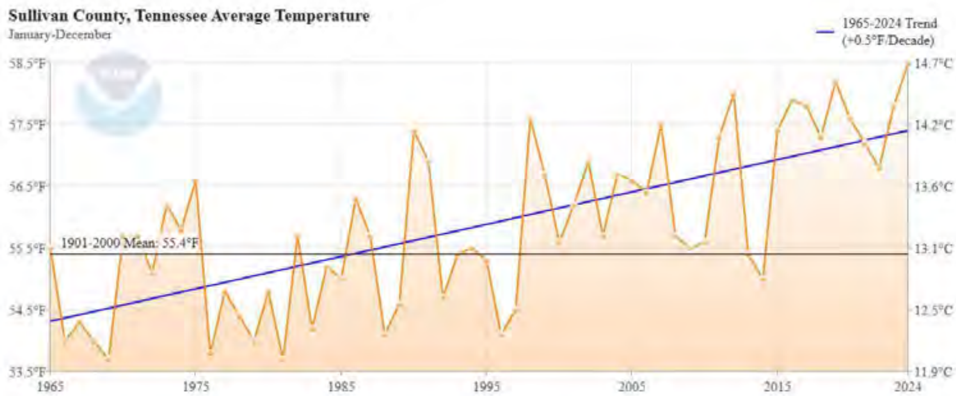


Figure 5: Annual Average Temperature for Sullivan County, Tennessee, Showing a +0.5°F Increase per Decade Since 1965.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

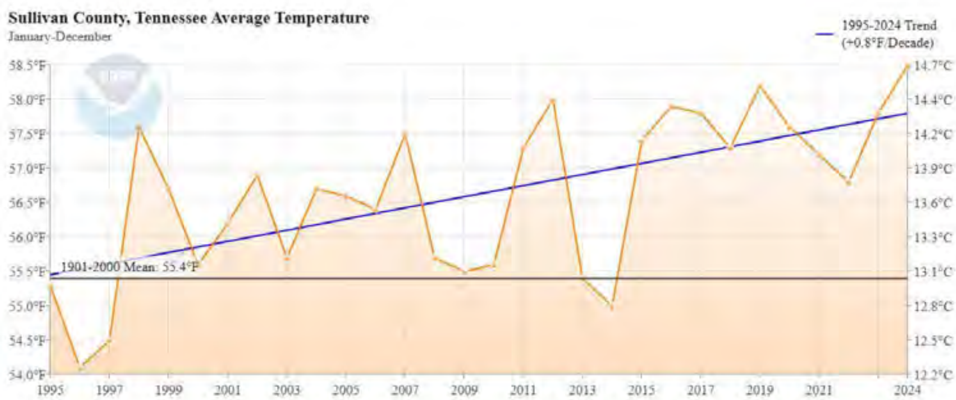


Figure 6: Annual Average Temperature for Sullivan County, Tennessee, Showing a +0.8°F Increase per Decade Since 1995.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

The U.S. Drought Monitor (USDM) provides a weekly snapshot of drought conditions across the United States, starting in January of 2000 and continuing through the present. Using the timeline of drought conditions from the USDM, the cyclical nature of drought in Sullivan County is clear. Several periods of drought were recorded in this time, with the most intense drought seen in 2007-2008, but other short periods of severe drought were also observed, including those in 2000 and 2016. The Tennessee Climate Office (TCO) analyzed trends in the USDM throughout Tennessee from 2000 to 2024. County-level trends were developed based on the amount of each county that was covered in D1 (Moderate Drought) or worse, D2 (Severe Drought) or worse, D3 (Extreme Drought) or worse, and D4 (Exceptional Drought) each week. Trends were assessed using space-time cube analysis tools in ArcGIS Pro, with the results shown subsequently. There was no significant trend in the amount of time that Sullivan County spent in drought conditions (D1 or worse) over this period, but there was a decreasing trend in the amount of time the county spent in D2 or worse drought, significant to the 90% confidence level, and in D3 or worse drought, significant to the 99% confidence level. There was no significant trend in the amount of time that Sullivan County spent in D4 drought.

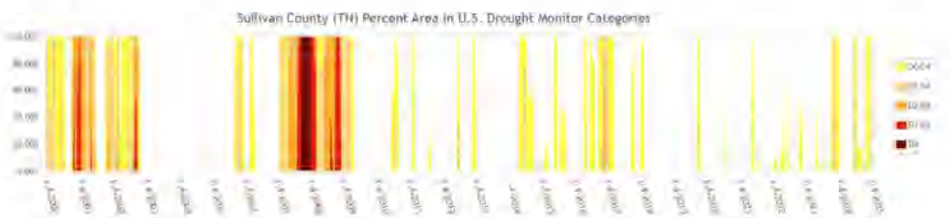


Figure 7: Timeline of drought conditions from the U.S. Drought Monitor from 2000 – 2024 for Sullivan County.

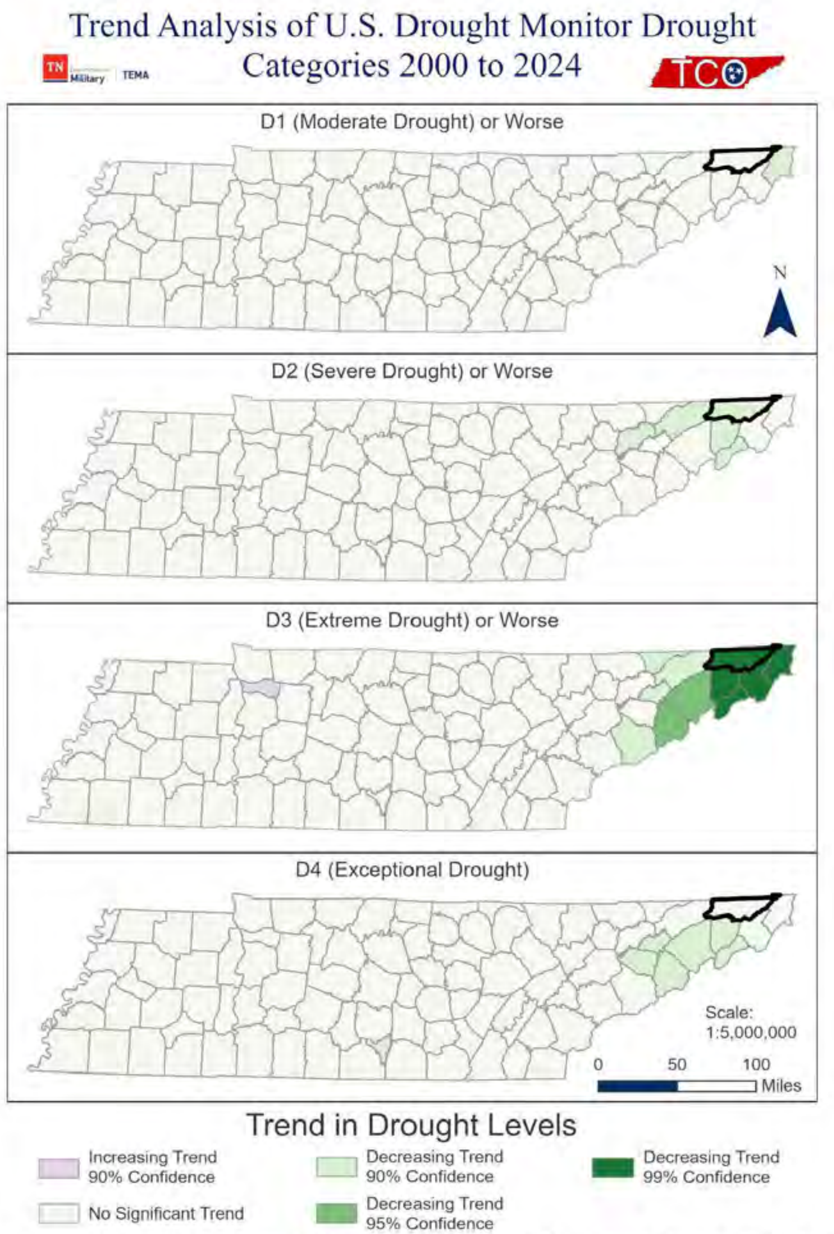


Figure 8: Trend Analysis of U.S. Drought Monitor from 2000 – 2024, Sullivan County Outlined in Bold.

Since the USDM only dates back to 2000, other metrics must be used to examine longer trends in drought occurrences. The Standardized Precipitation Index (SPI) is another metric that can quantify drought and periods of wetness by capturing how observed precipitation deviates from the climatological average. Drought.gov provides a timeline of the SPI derived from the Global Historical Climatology Network (GHCN), with data back to 1895 for the contiguous U.S. Red hues indicate drier conditions, while blue hues indicate wetter conditions. With this longer dataset the cyclical nature of dry and wet periods across Sullivan County is even more apparent. It also shows that the shorter and less intense dry periods observed from 2016 to 2024 represent one of the longer periods of time with minimal long-term drought impacts for the county.

A gridded SPI dataset is also available at a 5km resolution from NCEI. This gridded dataset with data from 1895 to 2024 was used to analyze the linear trend in 3-month SPI values (SPI value calculated from the dryness or wetness values of the previous 3 months), shown in figure 10. All areas of Tennessee had an increasing trend in SPI values over this time period, with a slight increase in values across Sullivan County, indicating an increasing trend in precipitation that is consistent with other observed records and climate models signifying that Tennessee is seeing a decrease in the risk for longer-term droughts. The overall trend in increasing wetness will not prevent future periods of drought, especially short-duration high-intensity Flash Droughts.

Table 1: SPI Category and Value Definitions.

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

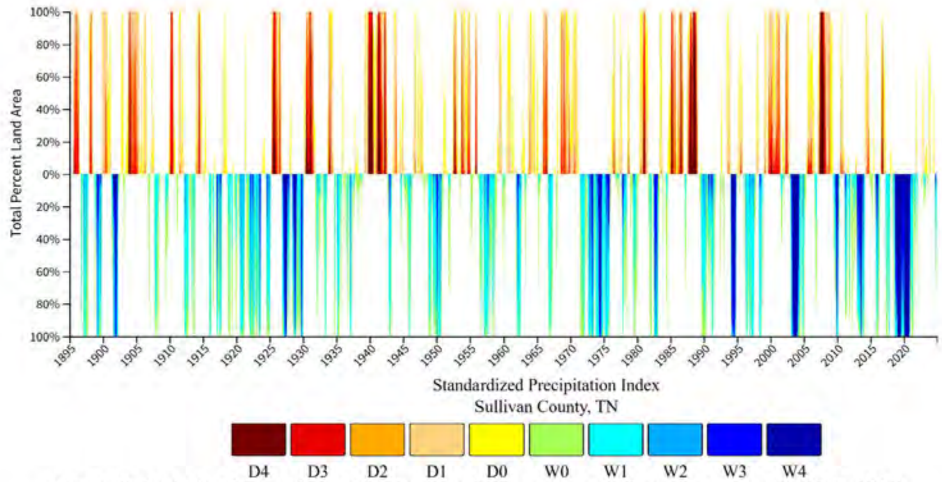


Figure 9: Periods of Drought and Wetness in Sullivan County, Tennessee from 1895 to 2025.
(Source: Drought.gov)

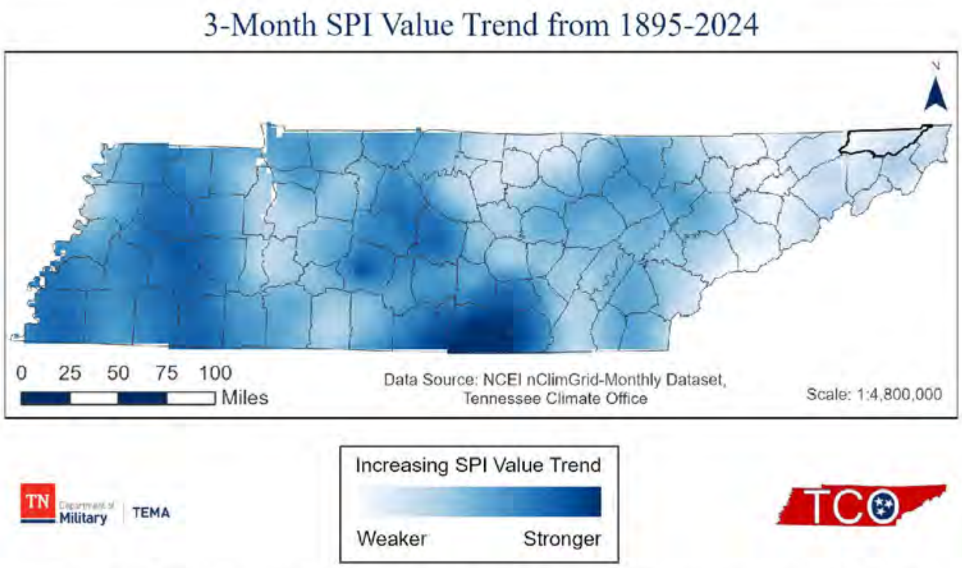


Figure 10: SPI Value Trend for 3-Months from 1895 to 2024, Sullivan County Outlined in Bold.

The previous trends are based on observed historical data, but the Climate Mapping for Resilience and Adaptation (CMRA) Assessment tool provides county-level output from future climate projections. Data from this tool indicates Sullivan County could expect an increase in the number of dry days per year due to climate variability. However, the tool provides a range of possible outcomes, with higher and lower greenhouse gas emission scenarios, for Early-Century (2015-2044), Mid-Century (2035-2064), and Late Century (2070-2099) time periods, and maximum, minimum, and mean projected values. The following table shows the projected change in the number of dry days per year for Sullivan County. The Early-, Mid-, and Late-Century values represent the increase (positive values) or decrease (negative values) in dry days per year compared to the number of dry days per year from modeled history. In the mean projection, Sullivan County could see an increase of 2.0 to 3.3 dry days per year by Mid-Century and an increase of 2.9 to 5.5 dry days per year by Late-Century.

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

High Emissions Scenario	Modeled History (1976-2005)	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Driest Projection	164.3	+15.8	+22.8	+33.6
Mean Projection	160.5	+2.1	+3.3	+5.5
Wettest Projection	154.0	-3.2	-10.0	-11.6
Low Emissions Scenario	**Modeled History (1976-2005)**	**Early Century (2015-2044)**	**Mid Century (2035-2064)**	**Late Century (2070-2099)**
Driest Projection	164.3	+13.8	+14.5	+15.0
Mean Projection	160.5	+2.3	+2.0	+2.9
Wettest Projection	154.0	-1.7	-5.5	-3.7

The projected increase in high-heat days and the intensification of the hydrologic cycle will likely lead to more Flash Droughts, defined by the rapid onset or intensification of drought conditions. Flash Droughts in the southeastern United States are often connected to short periods of time (a couple of weeks or months) with much higher-than-normal temperatures and much lower-than-normal precipitation leading to the rapid depletion of soil moisture and streamflow. September 2019 and October 2023 are prime examples of recent Flash Droughts in Tennessee, and more broadly across the Southeast. During the 2023 fall flash drought, Sullivan County went from 0% of the county in drought or abnormally dry conditions (D0-4) on the October 3rd release of the U.S. Drought Monitor to 100% of the county being in Moderate Drought (D1) conditions by the November 7th release of the US Drought Monitor. This flash drought continued until early December for Sullivan County, but areas farther west in the state saw Extreme (D3) or Exceptional (D4) drought levels from late October to January.

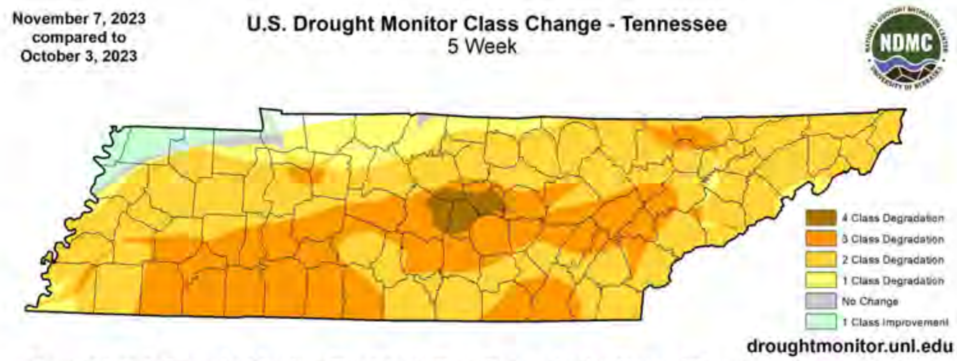


Figure 11: U.S. Drought Monitor Five Week Class Change in the State of Tennessee from October 3, 2023 to November 7, 2023.
(Source: National Drought Mitigation Center)

A study conducted by the U.S. Department of Agriculture (USDA) and U.S. Forest Service Office of Sustainability and Climate compared the length of a 10-year Drought, defined as a once in a decade drought as measured by the number of consecutive dry days (days with less than 0.1 inches of rain) during the summer season (May – September) between historical data and future climate models. For this study, the historical period was based on observed data from 1975 to 2005, and the future scenario was for the 2080's based on the RCP8.5 (higher emissions) ensemble mean of 20 global climate models from the CMIP5 experiment. The output of this study, shown in the following figure, indicates that most areas of Tennessee could expect a 10-year Drought (10% annual probability of occurrence) to maintain its current length or increase by as much as 6 days in the 2080's compared to a 10-year Drought from 1975-2005. In Sullivan County, a 10-year drought could decrease by up to 1 day or increase in length from 0.1 to 2 days compared to the modeled history. This demonstrates that although the average annual precipitation amount may increase in Tennessee and in Sullivan County, periods between precipitation events could get longer, leading to flash droughts or shorter-term drought periods.

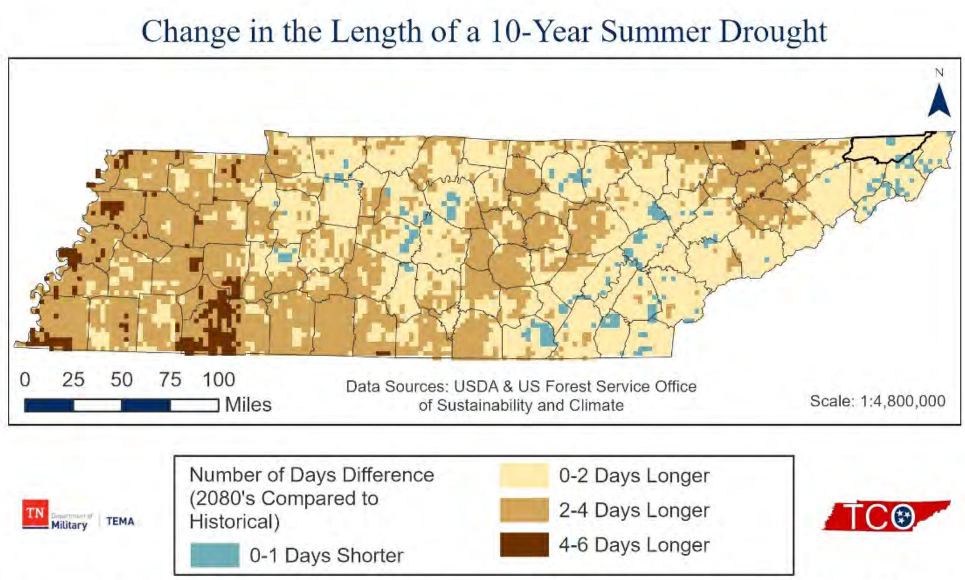


Figure 12: Change in the Length of a 10-Year (10% Annual Probability of Occurrence) Drought from Historical Data (1975-2005) to a 10-Year Drought in the 2080s (RCP8.5 Scenario), Sullivan County Outlined in Bold.

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

Earthquake

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

Extreme Temperature

The Fifth National Climate Assessment (2023, NCA5) states climate variability is expected to increase the average temperature and the number of high-heat days in the southeastern United States and intensify the hydrologic cycle, leading to an increase in both extreme temperature and precipitation events in the southeastern United States. The increasing trend in average temperature in Sullivan County is also supported by observed historical data available from the NOAA National Centers for Environmental Information Climate-at-a-Glance tool (refer to Figures 4-6 in the Drought section of this appendix), and based on the NCA5, this trend is expected to continue in the future.

Heat

The Climate Mapping Risk Assessment (CMRA) Report for Sullivan County shows the potential for an increase in high heat days, when examining temperature thresholds and annual temperatures. By mid-century, Sullivan County could experience between 45 and 56 days of maximum temperatures exceeding 90°F, compared to an historical (1976-2005) average of 9 days. There could be 2-4 days of maximum temperatures exceeding 100°F by mid-century, compared to a historical average of 0 days per year. Additionally, the annual single highest maximum temperature could be 99-100°F by mid-century, compared to an historical average of 94°F.

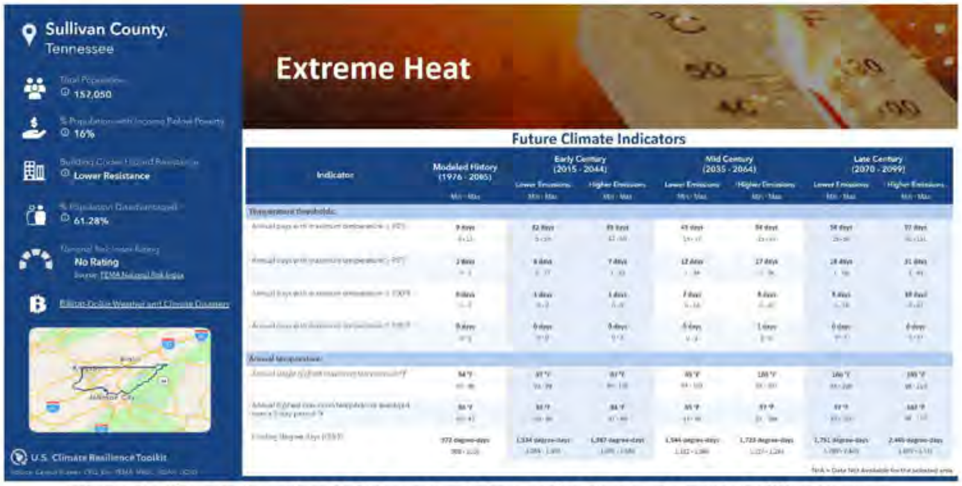


Figure 13: Climate Mapping Risk Assessment Report for Extreme Heat in Sullivan County. (Source: US Climate Resilience Toolkit)

Trend analysis of heat advisories/excessive heat warnings showed no significant increasing or decreasing trend for Sullivan County, meaning that these types of advisories and warnings (issued by the National Weather Service) have not increased or decreased between 2005 and 2024. Sullivan County was identified as a sporadic cold spot for heat advisories/excessive heat warnings; meaning it was statistically less likely to have heat advisories or warnings than other parts of the state in 2024 and on-and-off through the period, but for less than 90% of the time intervals.

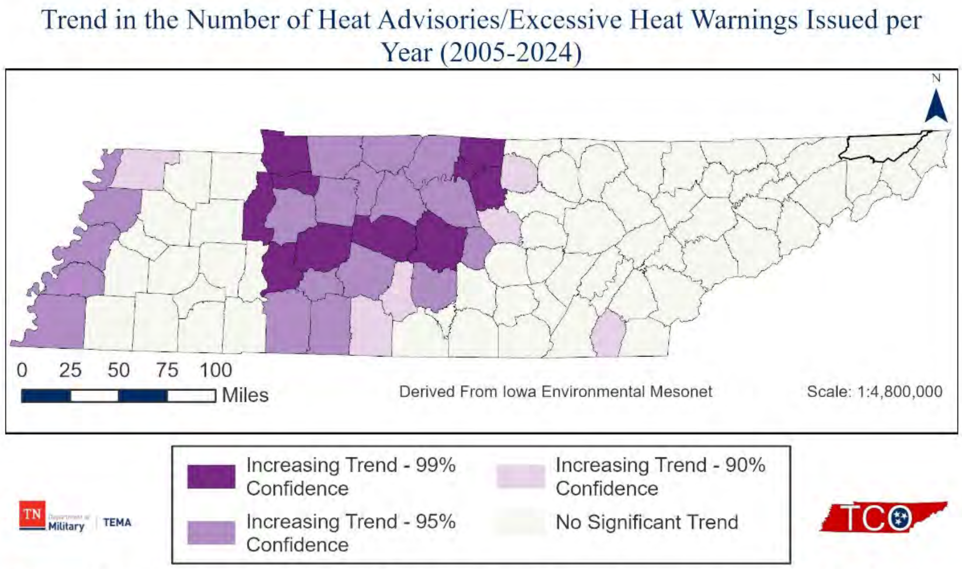


Figure 14: Trend in the Number of Heat Advisories/Excessive Heat Warnings Issued per Year, Sullivan County Outlined in Bold.

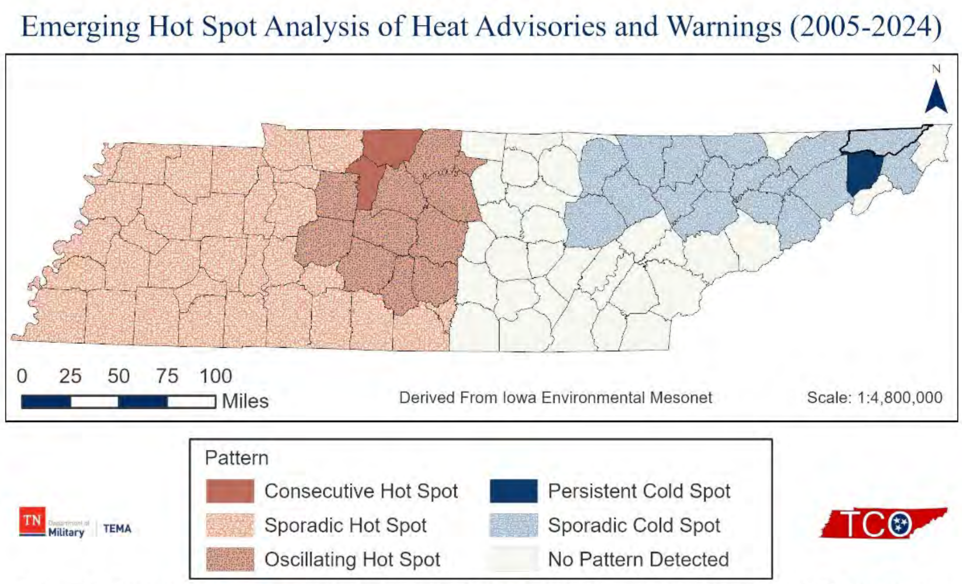


Figure 15: Emerging Hot Spot Analysis of Heat Advisories/Warnings Issued per Year, Sullivan County Outlined in Bold.

Cold

Trend analysis of cold/windchill advisories and extreme cold/extreme windchill warnings showed no significant increasing or decreasing trend for Sullivan County, meaning that these types of advisories and warnings (issued by the National Weather Service) have remained relatively stable from 2005 to 2024. Sullivan County was not identified as an emerging hot or cold spot for these types of warnings and advisories, meaning it was not statistically more or less likely to have these types of warnings and advisories compared to other parts of the state.

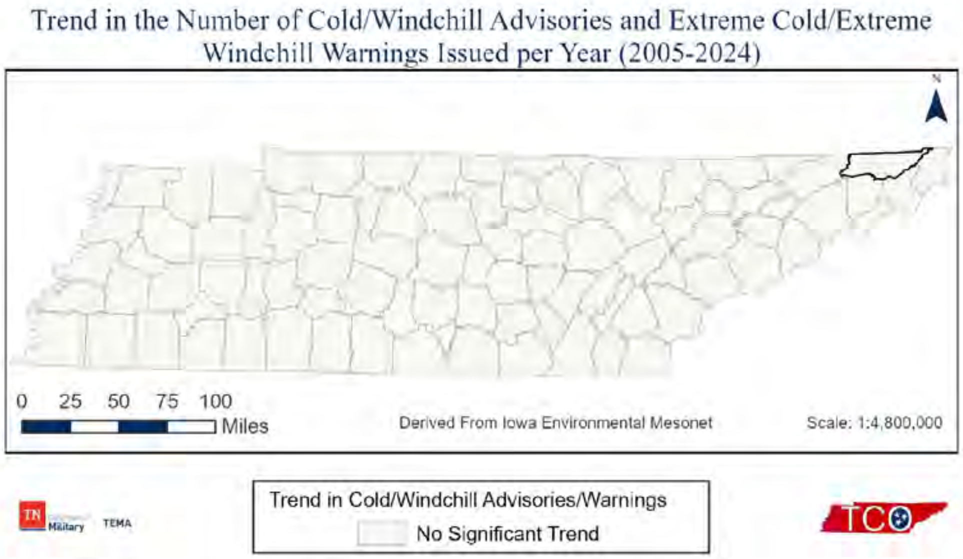


Figure 16: Trend in the Number of Cold/Windchill Advisories and Extreme Cold/Extreme Windchill Warnings Issued per Year, Sullivan County Outlined in Bold.

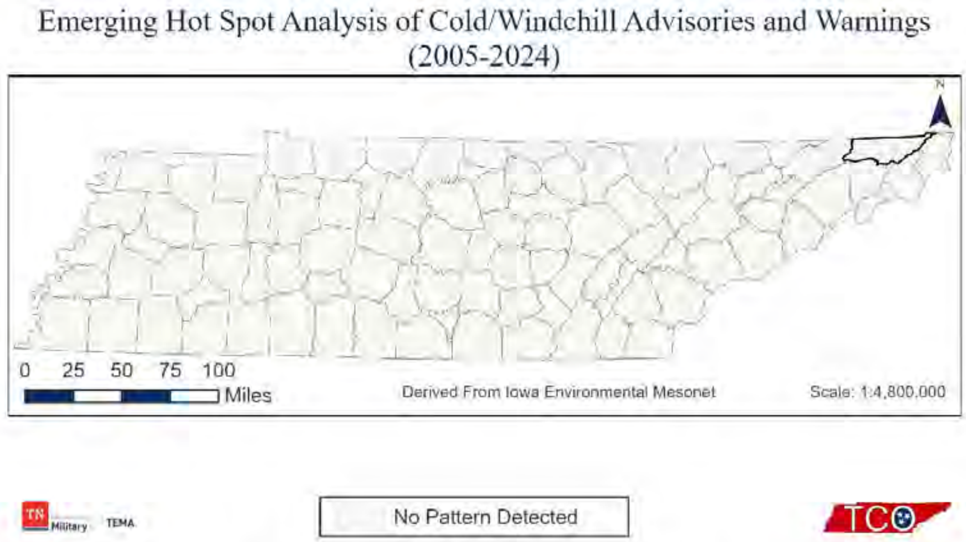


Figure 17: Emerging Hot Spot Analysis of Cold/Windchill Advisories/Warnings, Sullivan County Outlined in Bold.

Flooding

The future risk of flooding in Sullivan County is tied to predicted changes in the precipitation patterns. Tennessee and Sullivan County have increasing trends in observed precipitation, and the Fifth National Climate Assessment (2023) reports that the broader Southeast region has seen an increase in the frequency and intensity of extreme rainfall events. There is high confidence that this trend will continue in the future. According to the Climate Mapping Risk Assessment (CMRA) Report, Sullivan County is expected to experience a modest increase in various flood indicators by mid- and late-century. Both the increase in total precipitation and extreme rainfall events will increase the risk of flooding in Sullivan County. The long-term (1895-2024) trend in annual precipitation shows an increase of +0.19" per decade, the medium-term (1965-2024) trend in precipitation shows a stronger increasing trend of +0.66" per decade, and the short-term (1995-2024) trend shows an even stronger increase of +1.84" per decade. This indicates that precipitation has increased in Sullivan County over the past several decades, but with a large amount of inter-annual variation. Comparing annual rainfall totals in the 21st century to the 20th century mean for Sullivan County shows that the county has had 15 years with above average precipitation and 8 years with below average precipitation, and one year with average precipitation. Additionally, 2003, 2020, 2019, 2013, and 2018 were the 5 wettest years on record for Sullivan County (in that order), while 2007 was the driest year on record for the county.

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

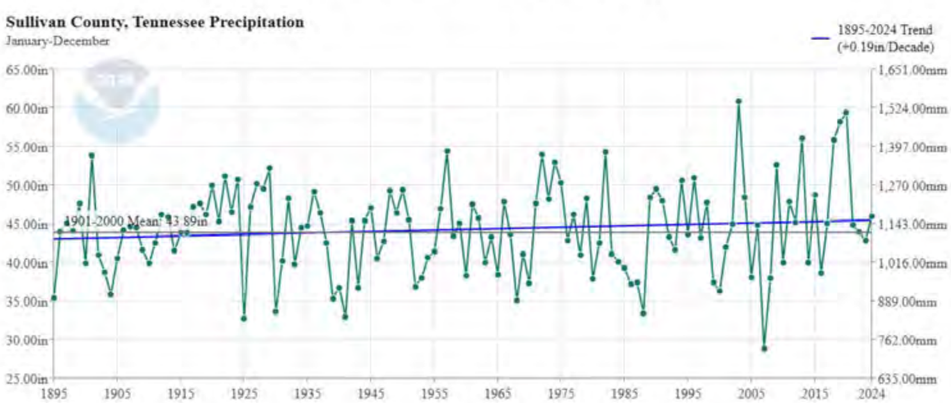


Figure 19: Total Annual Precipitation for Sullivan County, Tennessee, Showing a +0.19-inch Increase per Decade Since 1895. (Source: NOAA NCEI, Climate at a Glance: County Time Series)

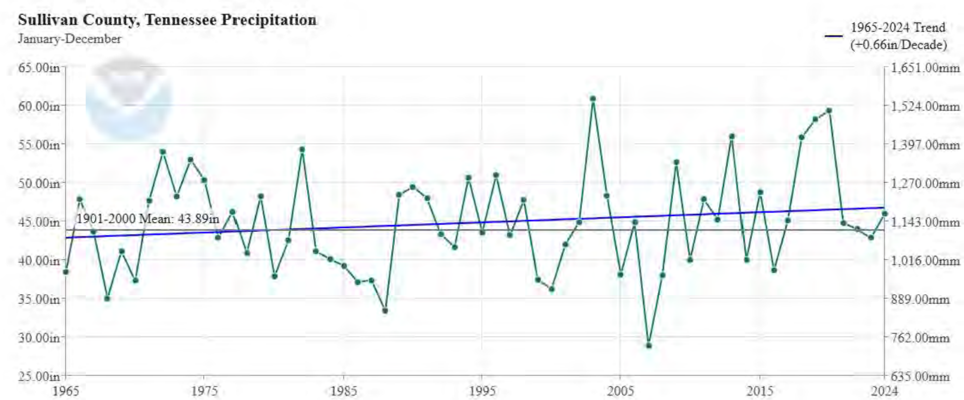


Figure 20: Total Annual Precipitation for Sullivan County, Tennessee, Showing a +0.66-inch Increase per Decade Since 1965.
(Source: NOAA NCEI, Climate at a Glance: County Time Series)

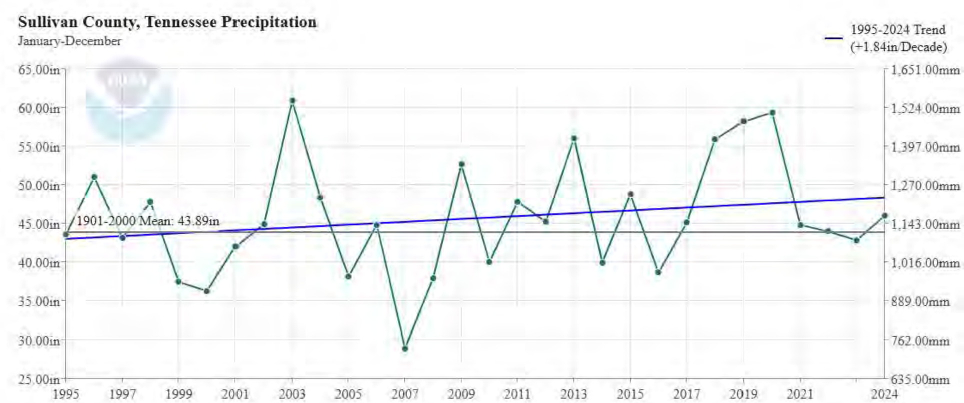


Figure 21: Total Annual Precipitation for Sullivan County, Tennessee, Showing a +1.84-inch Increase per Decade Since 1995.
(Source: NOAA NCEI, Climate at a Glance: County Time Series)

Using the NOAA Storm Events Database, flood events and flood damages (dollars) were examined for trends between 1996 and 2024. Sullivan County showed no significant increasing trend in the number of flood events, but did show an increasing trend for flood damages in the Storm Events Database in this time period, significant to the 90% confidence level. The trends in flood events and flood damages presented above are for riverine flooding, but as overall rainfall increases and trends towards higher intensity precipitation events continue flash flooding may become a higher concern for parts of Tennessee, including Sullivan County. The TCO analyzed trends in flash flood events and flash flood related damages from the NOAA Storm Events Database from 1996 to 2024. Sullivan County showed no significant trend in the number of flash flood events or damages from flash floods in the NOAA Storm Events Database.

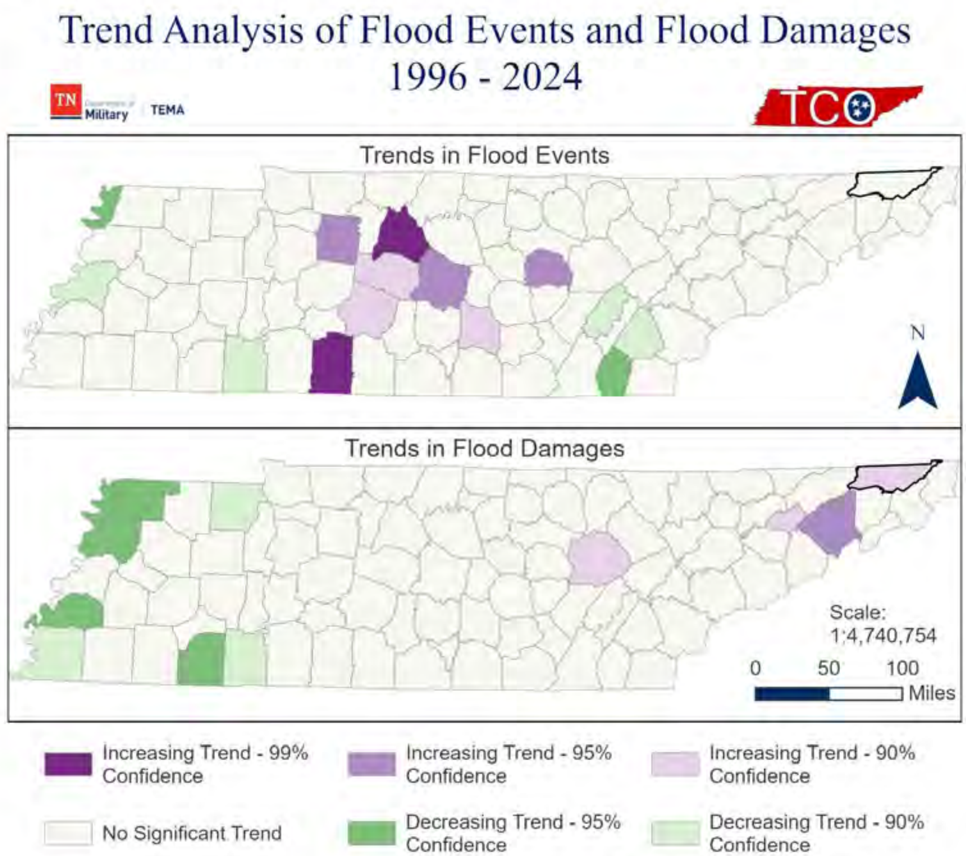


Figure 22: Trend in Flood Events and Flood Damages Reported in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

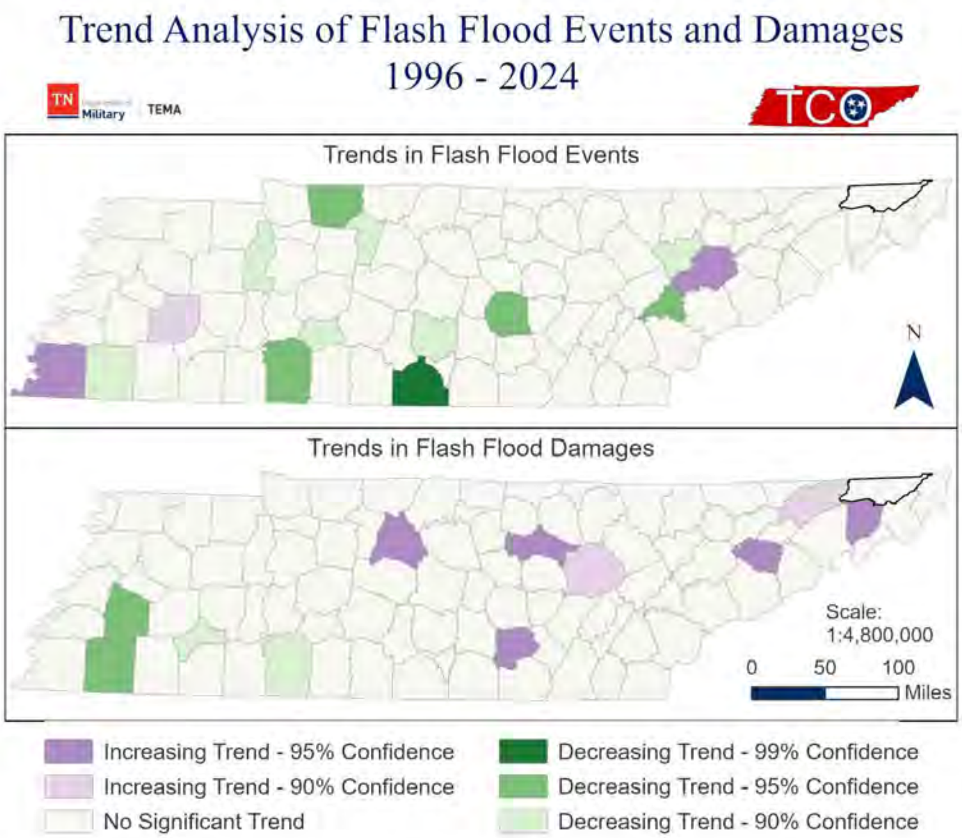


Figure 23: Trend in Flash Flood Events and Flash Flood Damages Reported in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

Extreme rainfall events are often categorized based on how much above or below their amounts were compared to the 100-year, or 1% annual probability, rainfall amounts. For Sullivan County, a 100-year 1-hour extreme rainfall total would be approximately 2.59-3.00 inches. For a 100-year 24-hour extreme rainfall event, Sullivan County would experience 4-6 inches of rain, with higher amounts in the high elevations at the eastern end of the county.

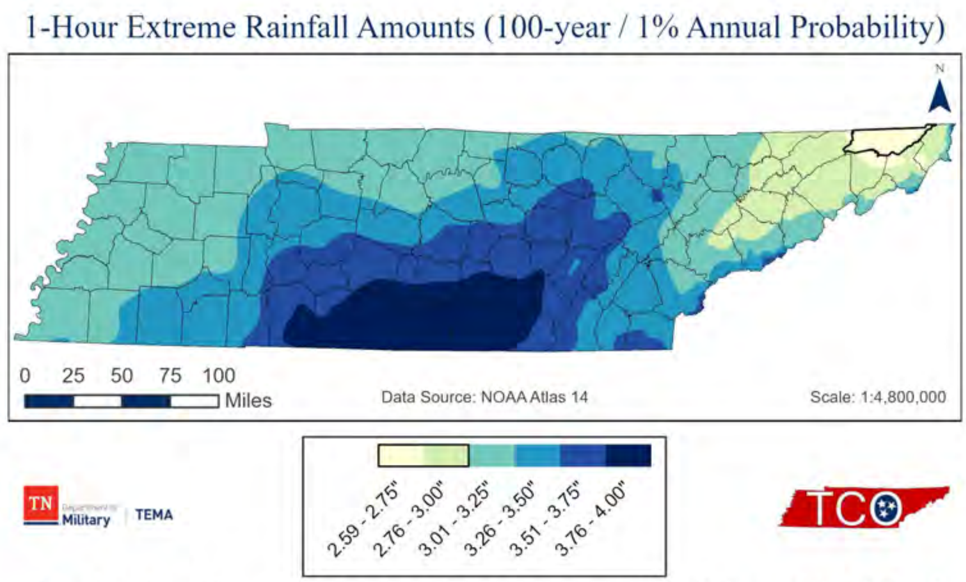


Figure 24: 1-hour Extreme Rainfall Estimates for 100-year Return Period (1% Annual Probability of Exceedance) using NOAA Atlas 14, Sullivan County, Outlined in Bold.

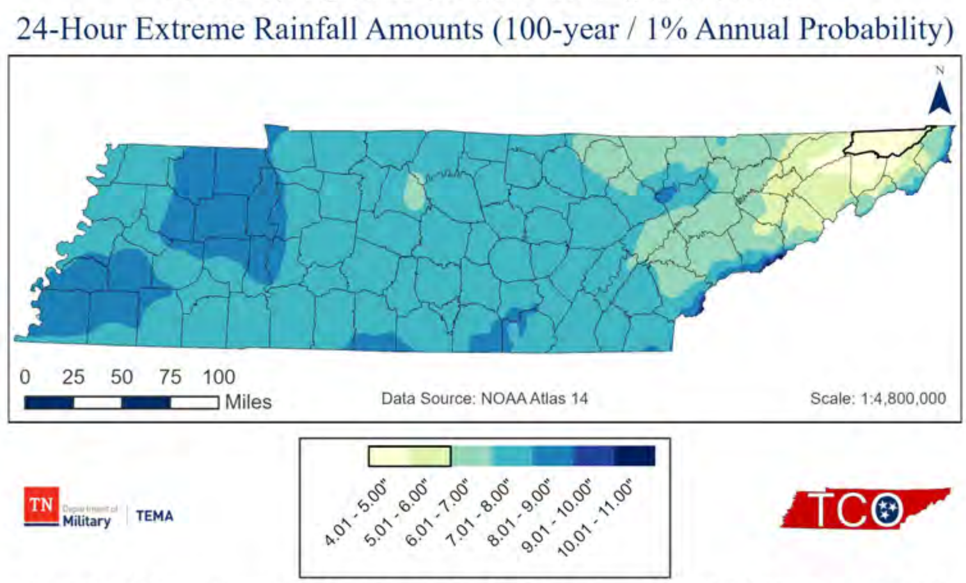


Figure 25: 24-hour Extreme Rainfall Estimates for 100-year Return Period (1% Annual Probability of Exceedance) using NOAA Atlas 14, Sullivan County, Outlined in Bold.

The TCO analyzed trends in heavy precipitation days per year in counties across Tennessee, these were the number of days that daily rainfall totals exceeded a 1-year (100% chance of annual probability), 2-year (50% chance of annual probability), or 5-year (20% chance of annual probability) event. Sullivan County showed no significant trend for 1-year or 2-year heavy precipitation events but did show an increasing trend for 5-year heavy precipitation events, significant to the 95% confidence level.

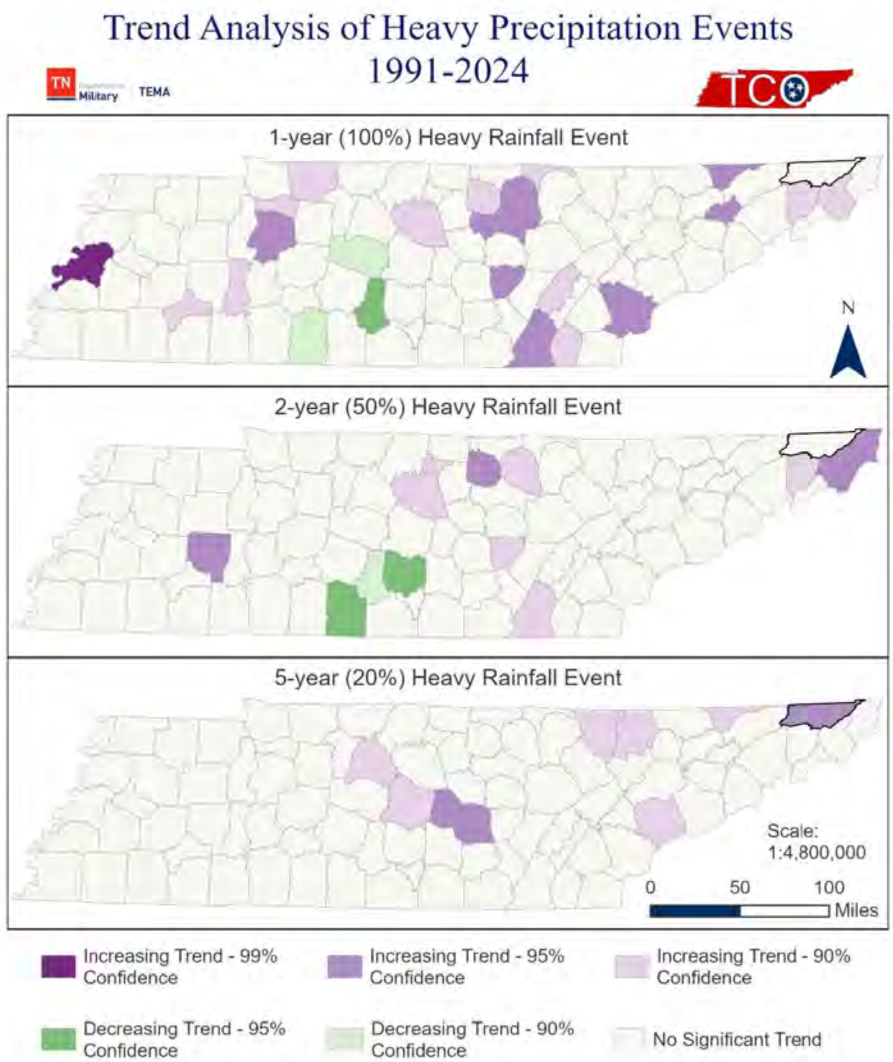


Figure 26: Trend in Heavy Precipitation Events (1-year, 2-year, and 5-year Return Period Exceedance Events), Sullivan County Outlined in Bold.

Additional data from the CMRA report for Sullivan County predicts an increase in the number of days per year with extreme precipitation throughout the 21st century. Based on analysis by the NCICS and NOAA, Blountville (the county seat of Sullivan County) currently has a 100-year 24-hour extreme rainfall amount of 4.28 inches and that amount is predicted to rise by as much as 0.75 inches (to 5.03") by 2055.

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

High Emissions Scenario	Modeled History (1976-2005)	Early Century (2015-2044)	Mid Century (2035-2064)	Late Century (2070-2099)
Driest Projection	4.1	+1.0	+1.5	+2.4
Mean Projection	4.6	+1.0	+1.5	+2.6
Wettest Projection	5.8	+1.1	+1.6	+2.8
Low Emissions Scenario	**Modeled History (1976-2005)**	**Early Century (2015-2044)**	**Mid Century (2035-2064)**	**Late Century (2070-2099)**
Driest Projection	4.1	+0.9	+1.1	+1.5
Mean Projection	4.6	+0.9	+1.2	+1.5
Wettest Projection	5.8	+1.0	+1.5	+1.5

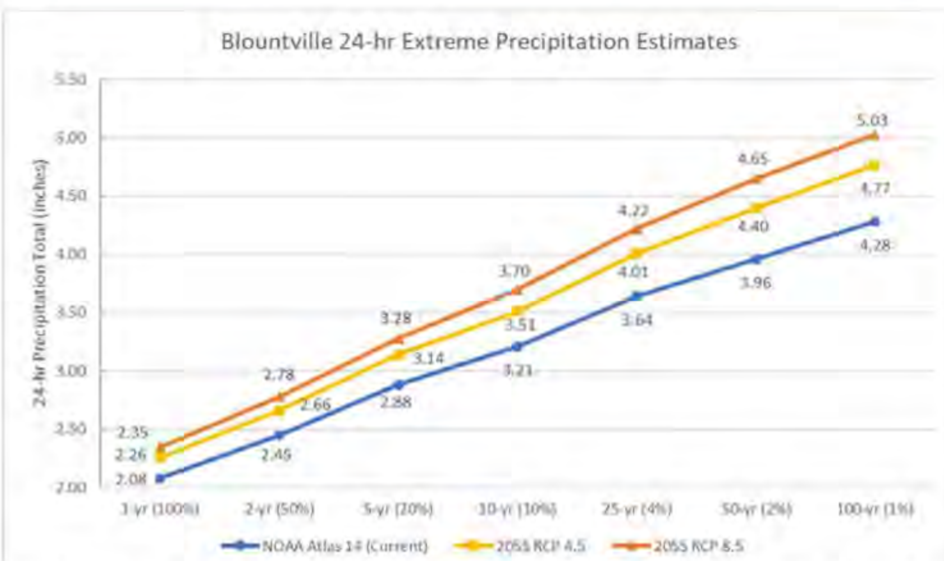


Figure 27: 24-hour Extreme Rainfall Estimates for 1-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year Return Periods using NOAA Atlas 14 (historical data) and Mid-Century Values for 2055 using RCP4.5 and RCP8.5 Emission Scenarios.

The US Department of Agriculture and US Forest Service created a report based on models and projection data from Multivariate Adaptive Constructed Analogs (MACA), and most of Tennessee is expected to see an increase in annual precipitation by the late 21st century. Sullivan County is projected to see an increase of 4-8% in annual precipitation by the late 21st century. However, potential changes in precipitation are not expected to be spread equally across all four seasons. Spring precipitation is expected to change the most, increasing by 6-10% compared to the historical average. Summer precipitation is expected to increase by 2-6%, fall precipitation is expected to increase by 4-8%, and winter precipitation is expected to increase by 4-8%.

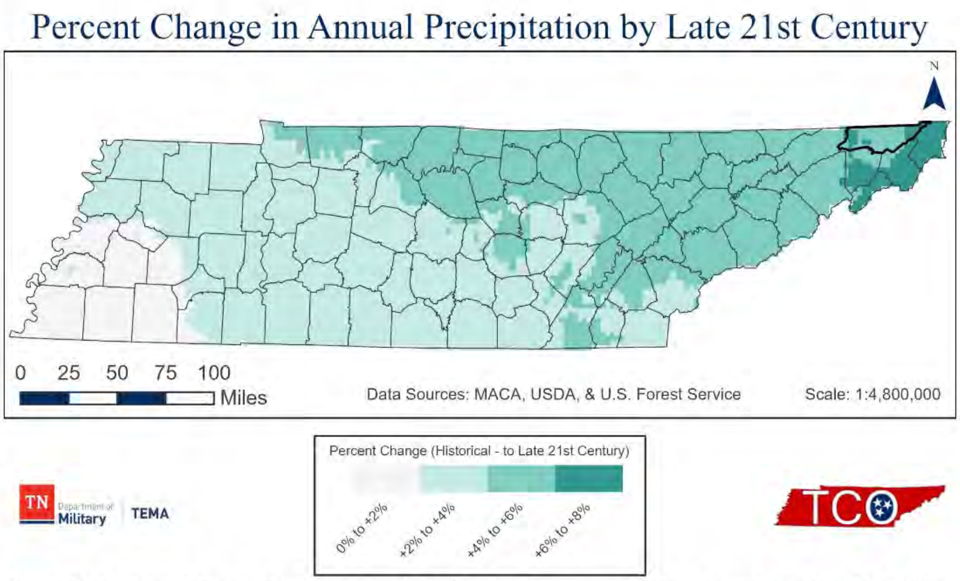


Figure 28: Projected Change in Annual Precipitation for Tennessee, Sullivan County Outlined in Bold.

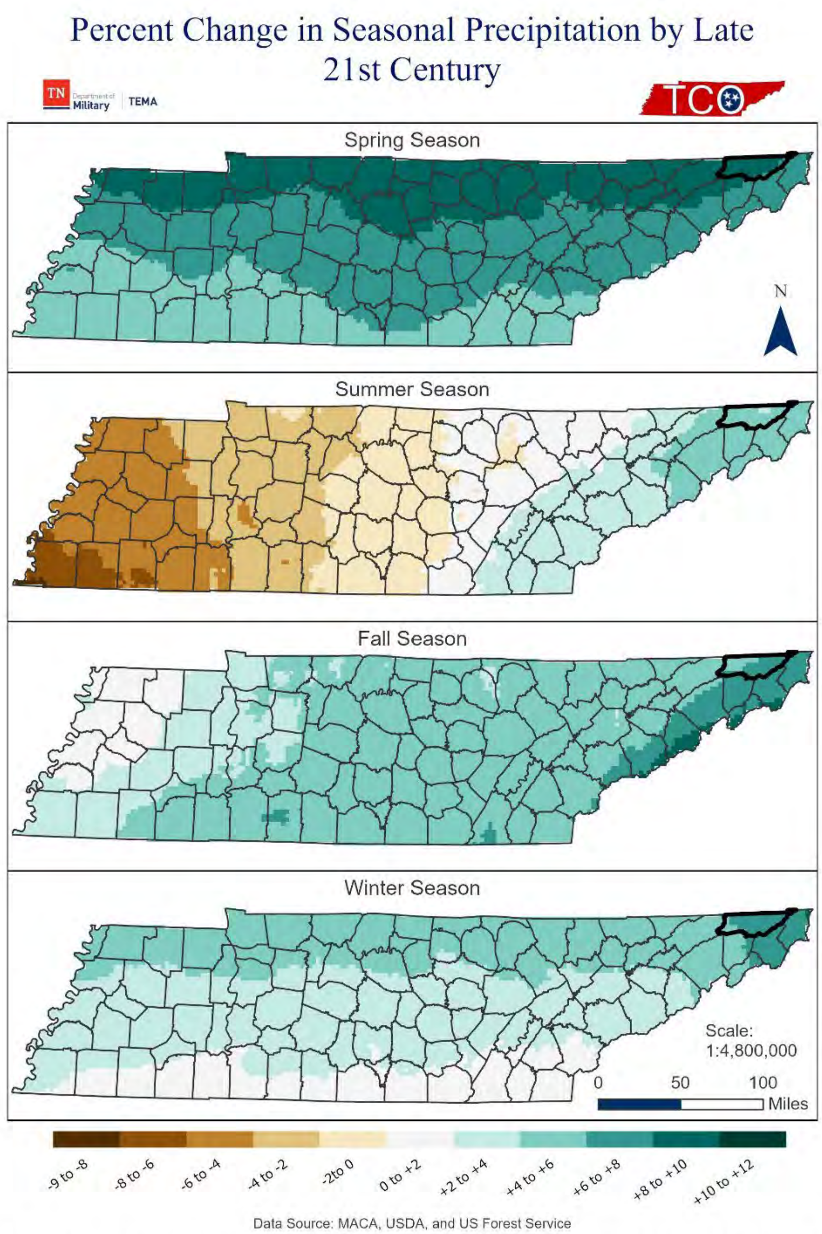


Figure 29: Projected Change in Seasonal Precipitation for Tennessee, Sullivan County Outlined in Bold.

Geologic Hazards

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

A study conducted by the USDA and U.S. Forest Service Office of Sustainability and Climate found that the frost-free season (the longest period of the year during which the temperature does not drop below freezing) could increase in length by 44 to 47 days in Sullivan County by the late 21st century. The lengthening of the frost-free season and overall decrease in number of days with temperatures below freezing would reduce the amount of time during the year rock surfaces and soils would be exposed to freeze-thaw cycles. This reduction could reduce the number of localized landslides and rockfalls in Sullivan County. See the Winter Weather sub-section of the Severe Weather section of this appendix for more information on observed and expected changes to winter temperatures in Sullivan County.

Severe Storms

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

Severe Thunderstorms (Convective Wind, Hail, and Lightning)

Using data from the NOAA Storm Prediction Center severe storm reports archive from 1980-2024, Sullivan County has a low-to-moderate number of severe thunderstorm wind damage reports and severe hail reports compared to other parts of the state. Sullivan County has a moderately low number of lightning strikes per year (6-10 strikes per square mile) compared to other areas of the state. The Tennessee Climate Office (TCO) analyzed trends for thunderstorm winds (convective wind) and severe hail reports in counties across Tennessee using the NOAA Storm Events Database with data from 1996 to 2024, and lightning strikes per county from 1996 to 2024 from the NOAA Severe Weather Data Inventory (SWDI). The trend analysis for convective wind reports showed a decreasing trend for Sullivan County significant to the 90% confidence level. The trend analysis for severe hail and lightning both showed a decreasing trend for Sullivan County significant to the 99% confidence level.

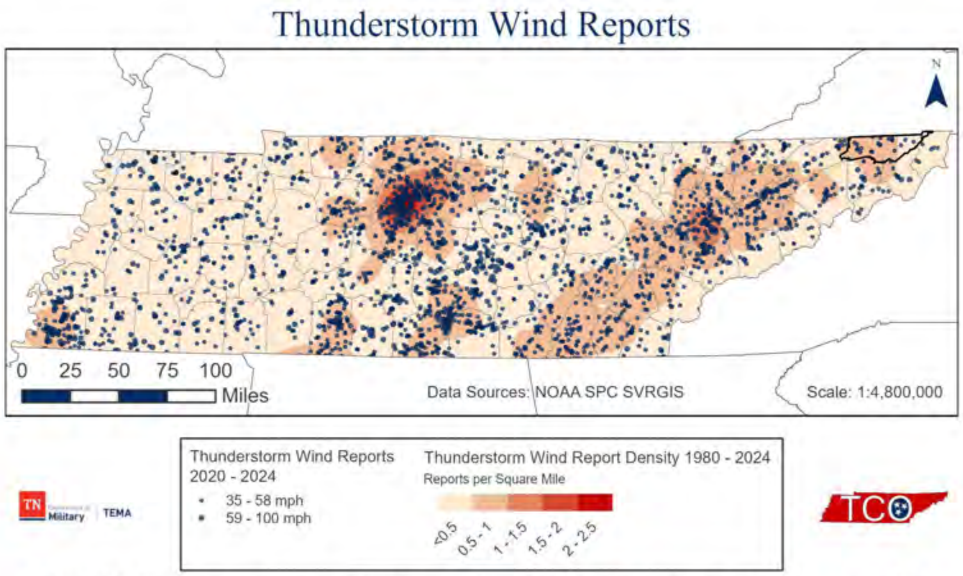


Figure 30: Severe Thunderstorm Wind Reports from 2020-2024 and Severe Thunderstorm Wind Report Density from 1980-2024, Sullivan County Outlined in Bold.

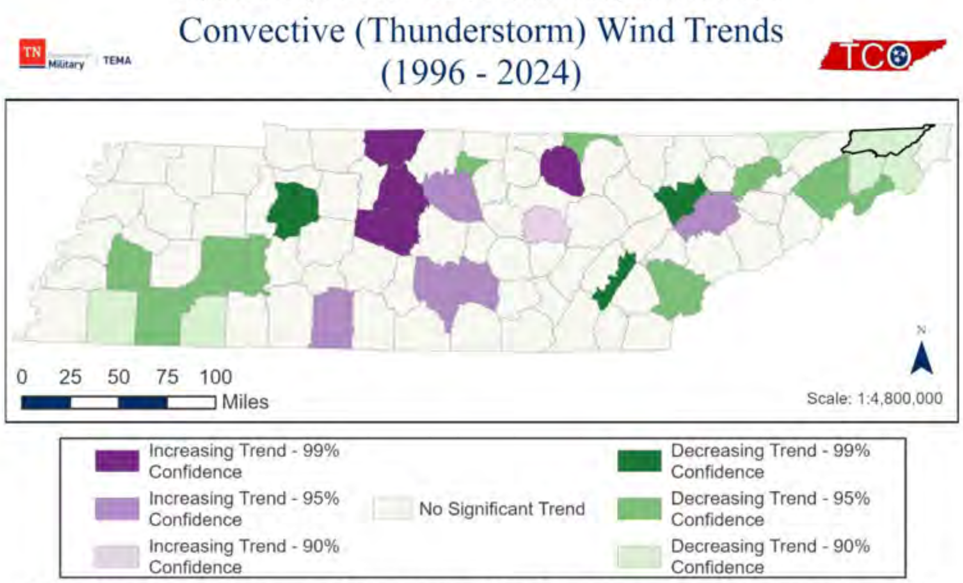


Figure 31: Trends in the Number of Thunderstorm Wind Events Recorded in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

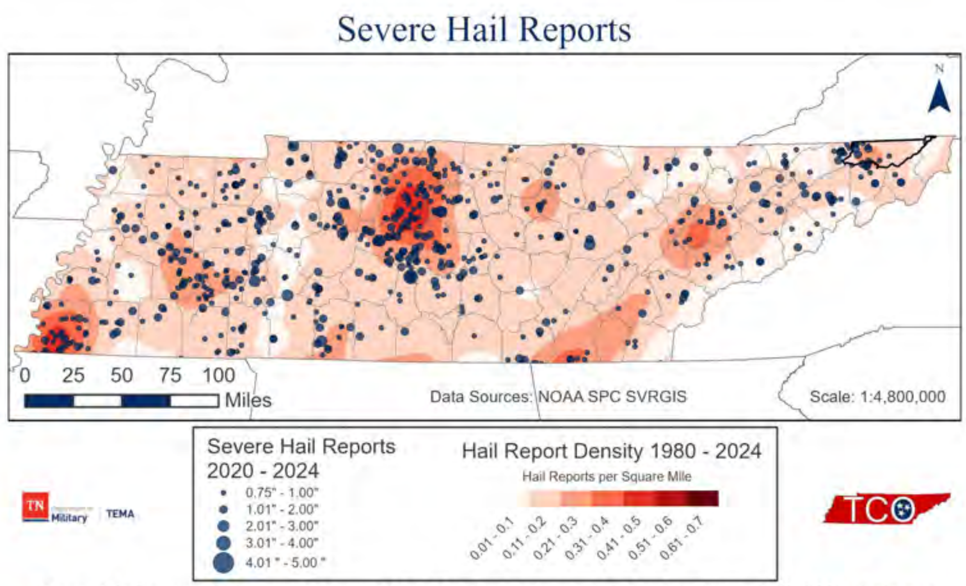


Figure 32: Severe Hail Reports from 2020-2024 and Severe Hail Density from 1980-2024, Sullivan County Outlined in Bold.

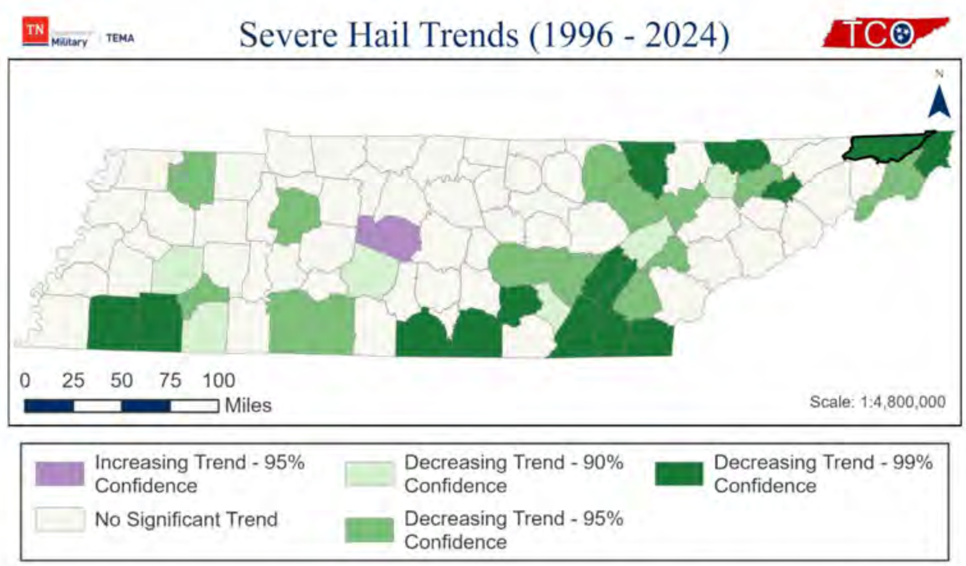


Figure 33: Trends in the Number of Severe Hail Events Recorded in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

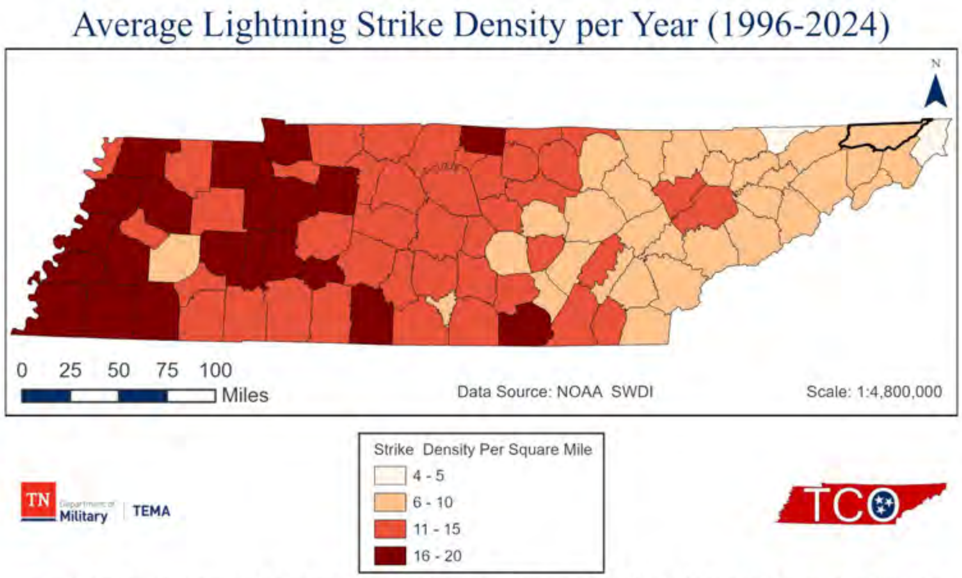


Figure 34: Average Annual Lightning Strike Density from 1996 to 2024, Sullivan County Outlined in Bold.

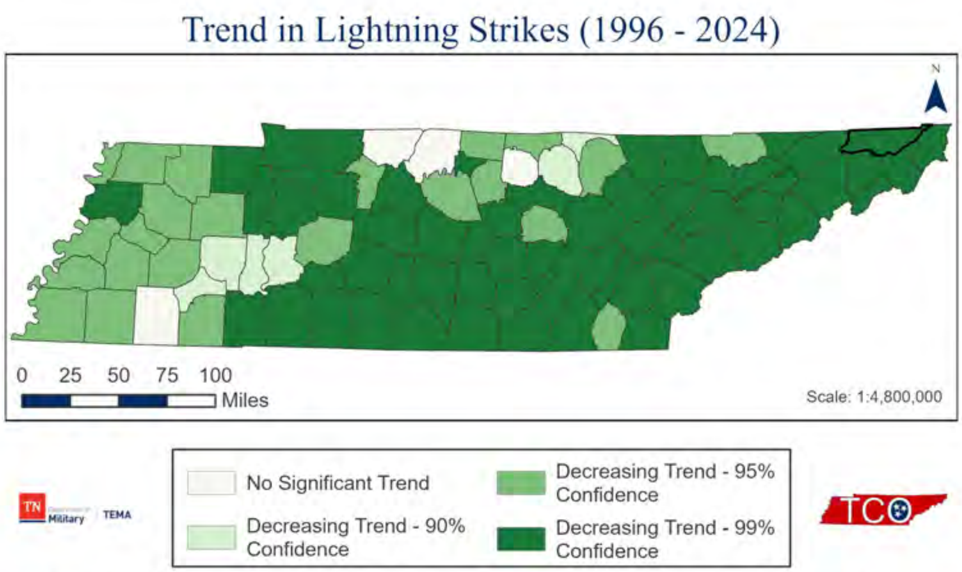


Figure 35: Trends in the Number of Lightning Strikes per County Recorded in the NOAA Severe Weather Data Inventory from 1996 to 2024, Sullivan County Outlined in Bold.

Non-Thunderstorm Winds

The Tennessee Climate Office (TCO) also analyzed trends for non-convective (non-thunderstorm) wind reports in counties across Tennessee using the NOAA Storm Events Database with data from 1996 to 2024, and Sullivan County showed no significant trend in non-convective wind events during this time.

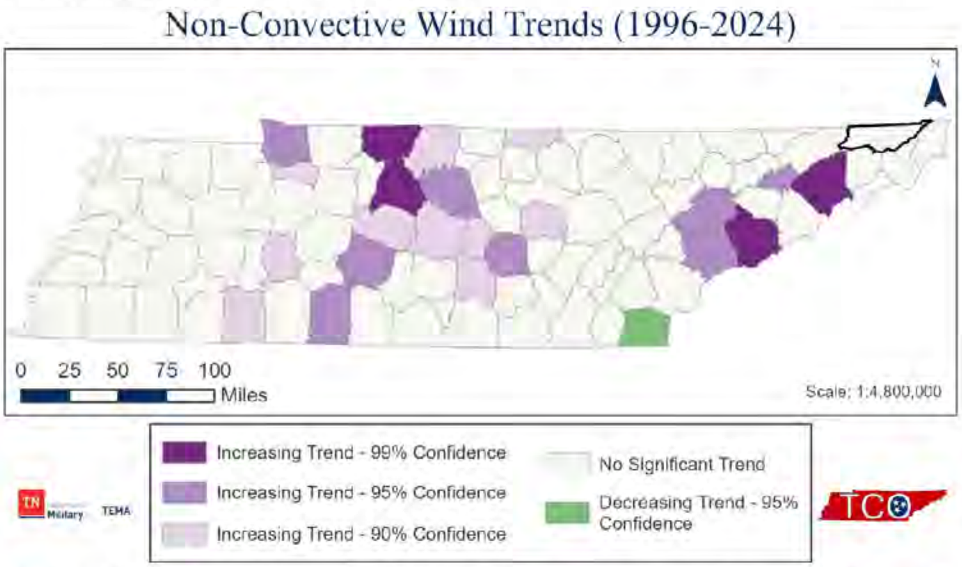


Figure 36: Trends in the Number of Non-Convective Wind Events Recorded in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

Winter Weather

Data from the National Weather Service NOHRSC National Gridded Snowfall Analysis webpage covering the winters of 2008-2009 to 2023-2024 (the last 16-years) indicates that the average annual snowfall for Sullivan County ranges from 8 to 36-inches per year, with higher totals in the higher elevation areas at the eastern end of the county. Using data from the NOAA Storm Events Database, trend analysis was performed on winter weather-related storms from 1996 to 2024 across the state of Tennessee. In this time period there was a decreasing trend in the number of winter storms impacting Sullivan County and all of East Tennessee due to a high number of winter weather events early in the time period. This decreasing trend was significant to the 99% confidence level.

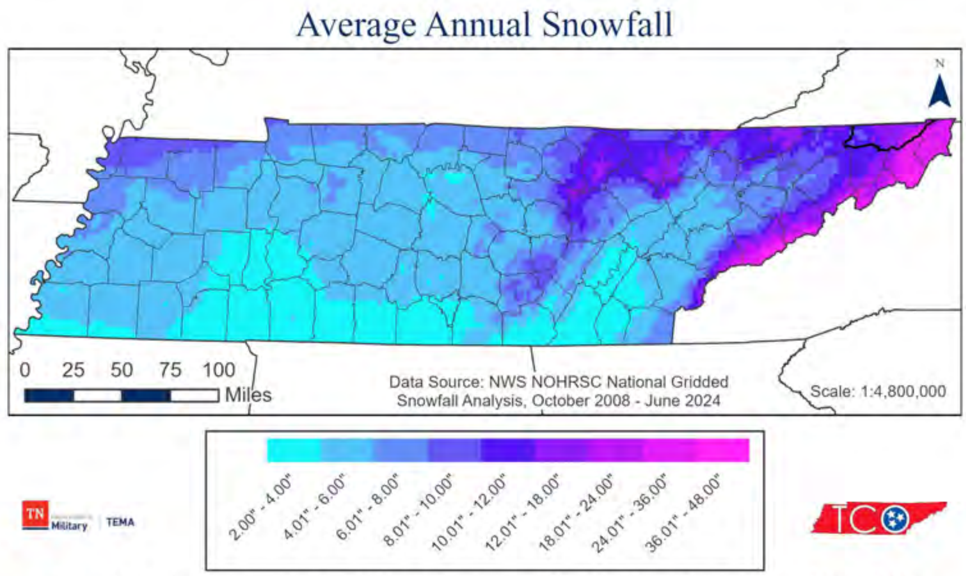


Figure 37: Average Annual Snowfall from the Winter of 2008/2009 to the Winter of 2023/2024, Sullivan County Outlined in Bold.

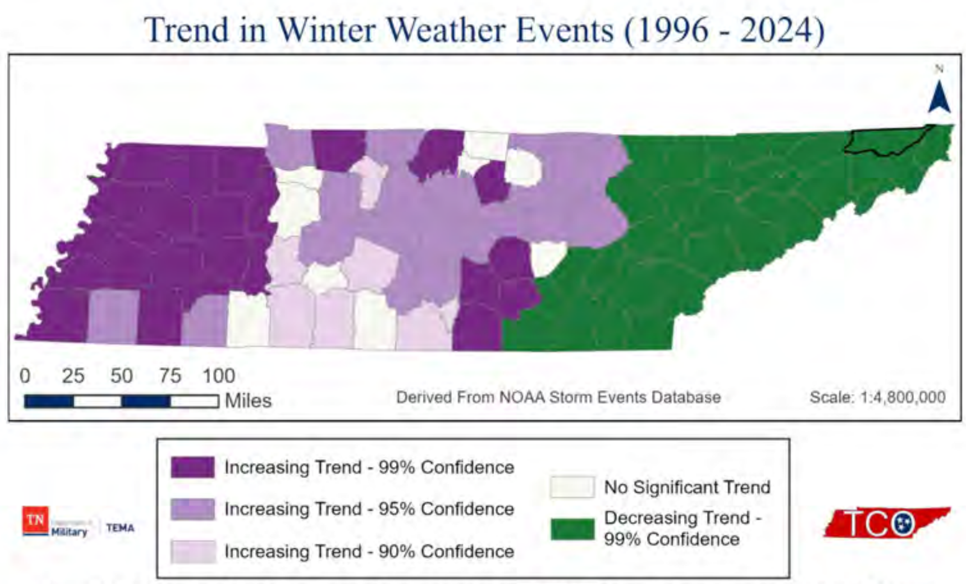


Figure 38: Trends in the Number of Winter Weather-Related Events Recorded in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

Climate trends and variability will impact the future likelihood of winter weather events or severe winter storms in Tennessee, likely decreasing but not eliminating the overall risk. Average annual temperatures are expected to increase across the Southeast US, including temperatures during the winter season. Sullivan County has an observed warming trend of +0.2°F per decade from 1896 to 2024 throughout the meteorological/climatological winter season (December – February). In the medium-term (1965 - 2024) the winter temperature trend shows greater warming at +0.8°F per decade, and the short-term (1995 - 2024) trend shows an even stronger warming trend of +1.1°F per decade during the winter season.

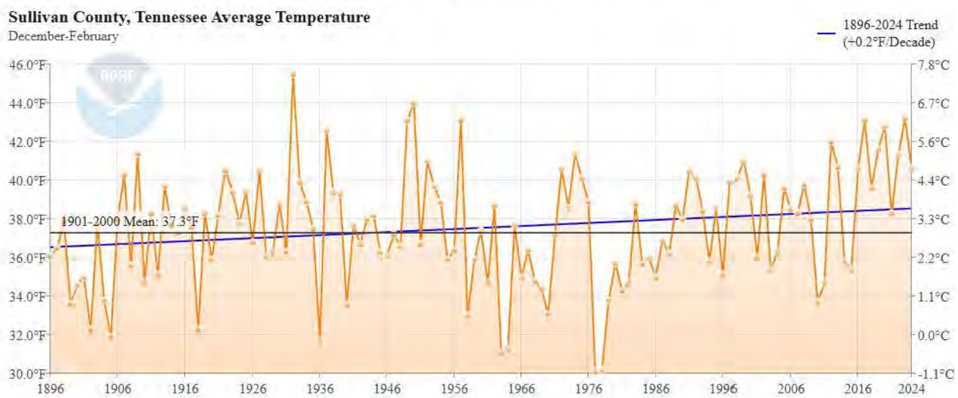


Figure 39: Winter (December to February) Mean Temperature for Sullivan County, Tennessee, Showing a +0.2°F Increase per Decade Since 1895.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

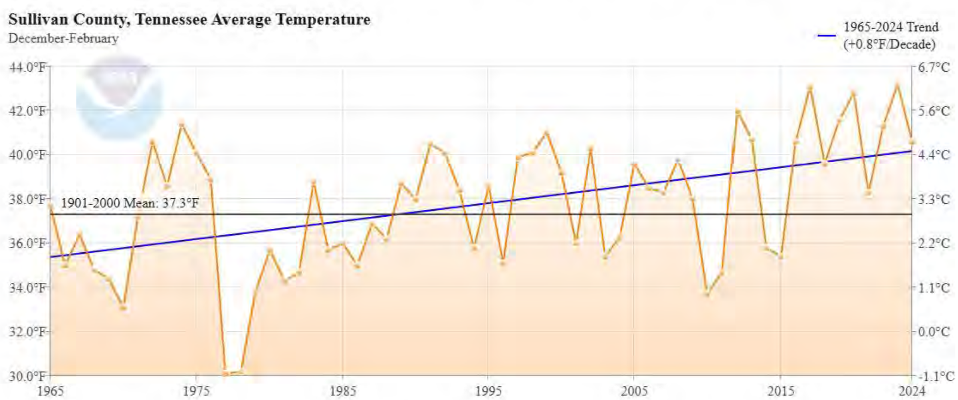


Figure 40: Winter (December to February) Mean Temperature for Sullivan County, Tennessee, Showing a +0.8°F Increase per Decade Since 1965.
(Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

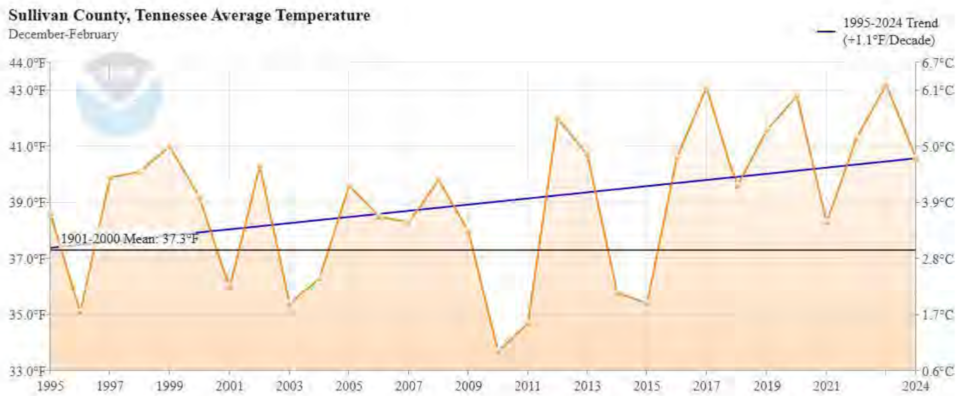


Figure 41: Winter (December to February) Mean Temperature for Sullivan County, Tennessee, Showing a +1.1°F Increase per Decade Since 1995. (Source: NOAA NCEI, Climate-at-a-Glance: County Time Series)

In addition to the increasing average annual and winter temperatures, the USDA and U.S. Forest Service Office of Sustainability and Climate projects that the length of the frost-free season will increase by 44-47 days across Sullivan County by the late 21st century. This means that the amount of time during the year where winter weather is possible will decrease. Currently, the average frost season in the lower elevations of Sullivan County lasts for about five and a half months (late October to early April) and about seven months (mid-October to late April) for the higher elevations in the county, but by the late 21st century that is projected to decrease to just under five months of the year for the lower elevations and just under six months for the higher elevations. In the following two figures the historical and projected number of Frost Days (days with a minimum temperature below freezing) and Icing Days (days with a maximum temperature below freezing) are shown for Sullivan County from the U.S. Climate Resilience Toolkit Climate Explorer. The mean projection for the low emissions scenario indicates that Sullivan County could have 27 fewer Frost Days per year by the end of the century, while the mean projection for the high emissions scenario indicates there could be 47 fewer Frost Days per year than the 1961-1990 observed average number of frost days. The mean projection for the low emissions scenario shows that Sullivan County could observe approximately seven fewer Icing Days per year, while the high emissions scenario shows that there could be approximately eight fewer Icing Days per year by the end of the century compared to the 1961-1990 observed average.

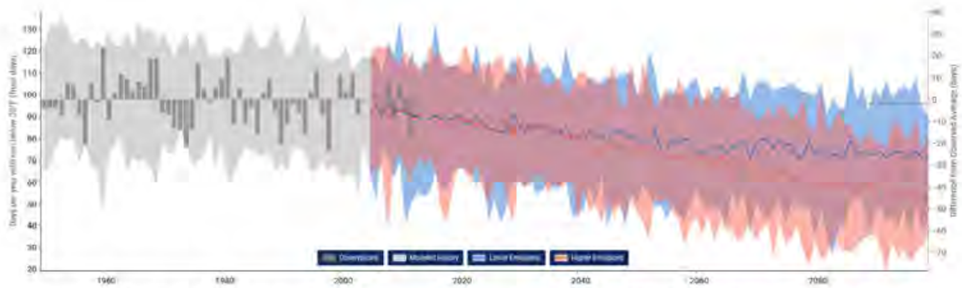


Figure 42: Days Per Year with Minimum Temperature Below 32°F (Frost Days) with Historical Observations from 1950 to 2013 and High (red) and Low (blue) Emission Scenarios Going to 2100 for Sullivan County, Tennessee.
(Source: U.S. Climate Resilience Toolkit Climate Explorer)

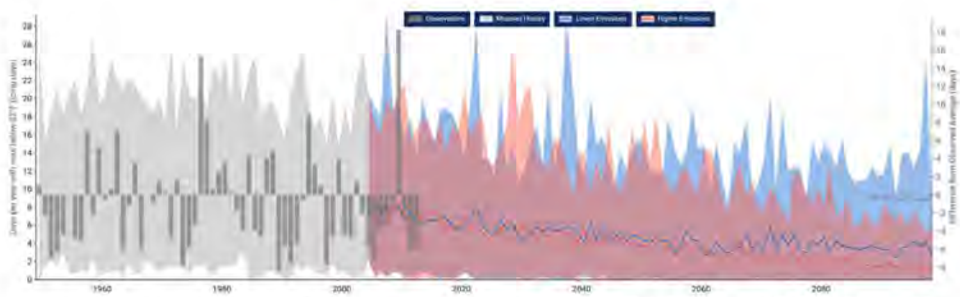


Figure 43: Days per Year with a Maximum Temperature Below 32°F (Icing Days) With Historical Observations from 1950 to 2013 and High (red) and Low (blue) Emission Scenarios Going to 2100 for Sullivan County, Tennessee.
(Source: U.S. Climate Resilience Toolkit Climate Explorer)

Additionally, the USDA forecasted changes in Plant Hardiness Zones for the Southeast U.S. The following figure, from the Fifth National Climate Assessment (2023) indicates that Sullivan County may transition from Plant Hardiness Zones 7b/7a in the lower elevation areas and 6b in the highest elevation areas (historical data, 1991-2020) to Plant Hardiness Zones 8b/8a by 2070-2099, based on climate models using the SSP5-8.5 (higher emissions) greenhouse gas emissions scenario. That would correlate to a warming of approximately 10-15 degrees in the average coldest temperature expected in parts of the county, from historical values of 0°F to 10°F to future values of 15°F to 20°F.

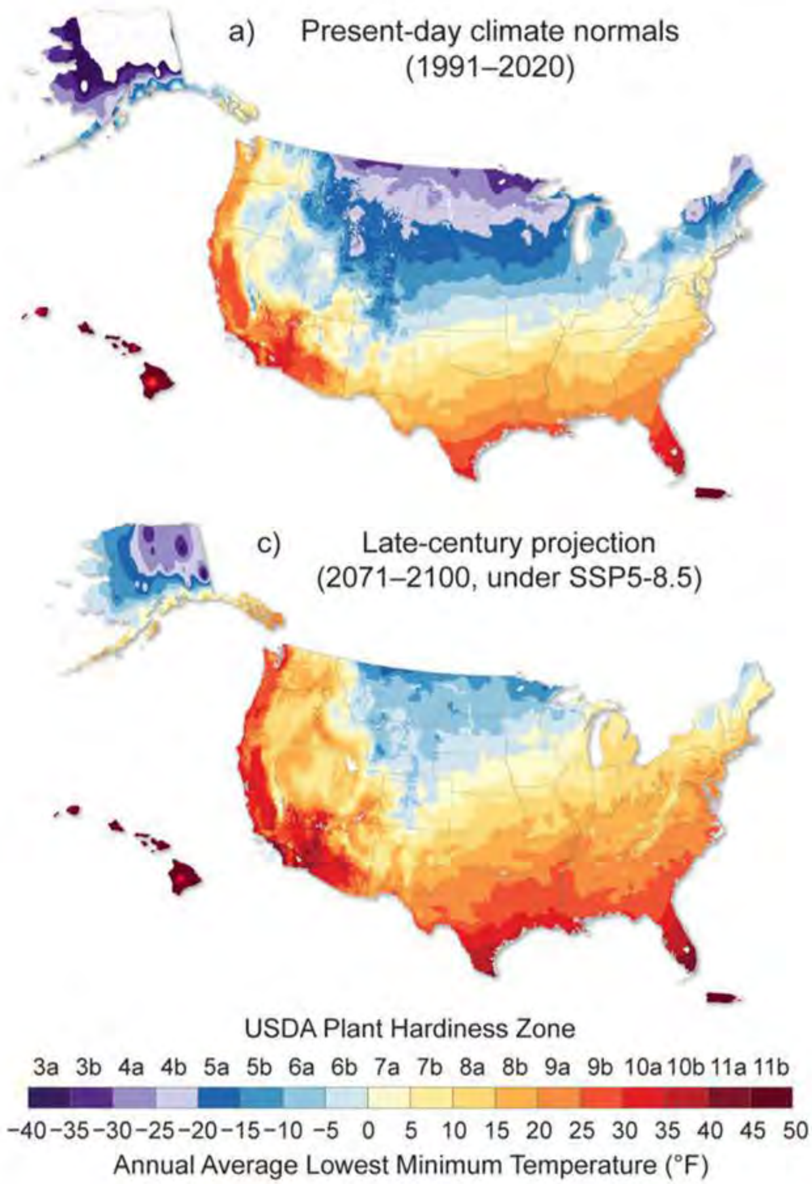


Figure 44: Comparison of Plant Hardiness Zones Across the Southeast U.S. from Current Averages and Projected Values for Late Century using SSP5-8.5 (high emissions) Scenario Models. (Source: Fifth National Climate Assessment (Chapter 11))

Tornado

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

Using historical data from 1980 to 2024, Sullivan County has a low density for tornadoes in Tennessee, with an average of less than 0.10 tornado tracks per square mile. Using data from the NOAA Storm Events Database, trend analysis and emerging hotspot analysis were performed on the number of tornadoes reported in each county of Tennessee from 1996 to 2024. There was no significant increasing or decreasing trend in the number of tornadoes observed in Sullivan County and it was not identified as an emerging hot spot. These results indicate that while tornadoes can occur in Sullivan County, there is not a significant increasing or decreasing trend in the number of tornadoes observed per year over the past 29 years.

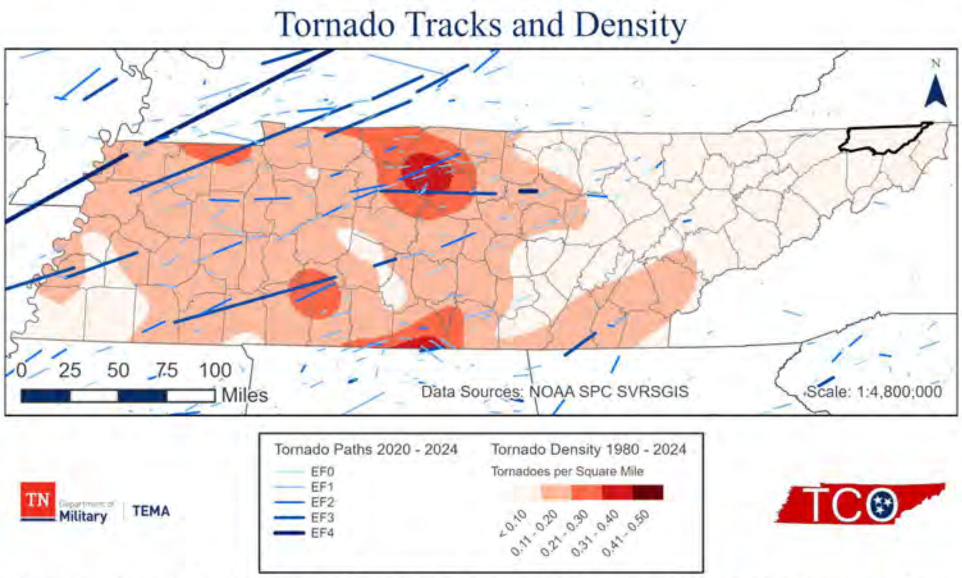


Figure 45: Tornado Tracks from 2020-2024 and the Density of Tornado Tracks across Tennessee from 1980 to 2024, Sullivan County Outlined in Bold.

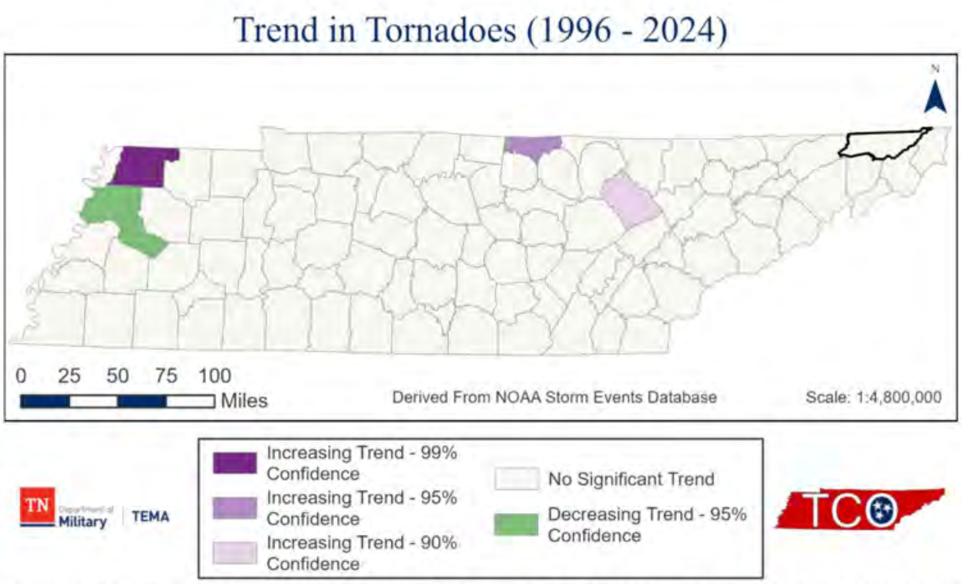


Figure 46: Trends in the Number of Tornadoes Recorded in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

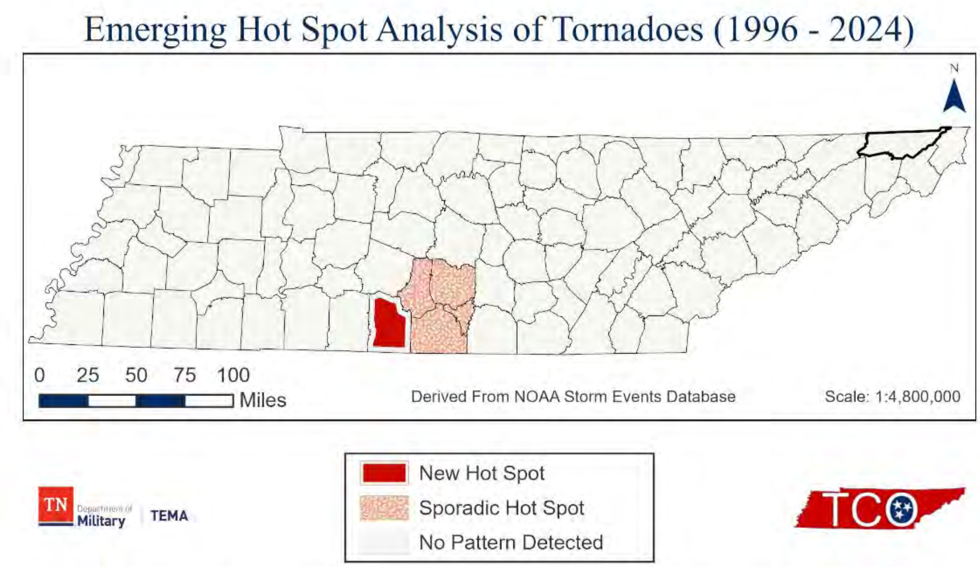


Figure 47: Emerging Hot Spot Analysis based on the Number of Tornadoes per Year Recorded in the NCEI Storm Events Database from 1996 to 2024, Sullivan County Outlined in Bold.

Wildfire

Climate trends and variations are expected to increase the intensity of the hydrological cycle (more precipitation coming in extreme rainfall events with longer dry stretches between precipitation events) which could lead to an increased risk of wildfires for Sullivan County. According to the Climate Mapping Risk Assessment (CMRA) Report, Sullivan County is expected to experience a modest increase in wildfire risk indicators like the number of dry days per year and high heat days per year, by mid- and late-century.

Figure 48: Climate Mapping Risk Assessment Report for Wildfire in Sullivan County. (Source: US Climate Resilience Toolkit)

The Fifth National Climate Assessment (2023) states that wildfires occur with greater frequency in the Southeast U.S. than in any other region of the country. However, mitigation measures, particularly prescribed fire can significantly reduce wildfire risk and have been widely adopted across rural communities in the Southeast. They found that a doubling of prescribed fire at the landscape scale reduced wildfire ignitions by a factor of four, and that prescribed fires reduce the potential for crown fires.

While climate variability will impact the future risk of wildfires in Sullivan County, a stronger impact will likely come from development within the county. Of particular concern is development in the wildland urban interface (WUI) where structures are at an enhanced risk of burning during a wildfire.

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RiskMAP
Increasing Resilience Together

Hazus: Earthquake Global Risk Report

Region Name: Sullivan_EQ

Earthquake Scenario: Madisonville_6.1_East_SE

Print Date: June 11, 2025

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

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

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Table of Contents

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General Description of the Region

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

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Tennessee

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

The geographical size of the region is 431.13 square miles and contains 40 census tracts. There are over 67 thousand households in the region which has a total population of 158,163 peopleF. The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 68 thousand buildings in the region with a total building replacement value (excluding contents) of 24,812 (millions of dollars). Approximately 90.00 % of the buildings (and 55.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 3,995 and 2,818 (millions of dollars) , respectively.

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Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 68 thousand buildings in the region which have an aggregate total replacement value of 24,812 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 53% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 1,175 beds. There are 56 schools, 26 fire stations, 7 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 6,813.00 (millions of dollars). This inventory includes over 147.89 miles of highways, 348 bridges, 3,457.31 miles of pipes.

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Table 1: Transportation System Lifeline Inventory

System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	348	753.7006
	Segments	97	1481.9587
	Tunnels	0	0.0000
		Subtotal	**2235.6593**
Railways	Bridges	28	118.8600
	Facilities	2	5.3260
	Segments	31	1597.2112
	Tunnels	0	0.0000
		Subtotal	**1721.3972**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	2	3.2332
		Subtotal	**3.2332**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	1	13.8937
	Runways	2	21.1360
		Subtotal	**35.0297**
		Total	**3,995.30**

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Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	68.8253
	Facilities	6	175.8240
	Pipelines	0	0.0000
		Subtotal	**244.6493**
Waste Water	Distribution Lines	NA	41.2952
	Facilities	8	1026.2712
	Pipelines	0	0.0000
		Subtotal	**1067.5664**
Natural Gas	Distribution Lines	NA	27.5301
	Facilities	2	9.6968
	Pipelines	6	174.8673
		Subtotal	**212.0942**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	4	1293.5665
		Subtotal	**1293.5665**
Communication	Facilities	12	1.0560
		Subtotal	**1.0560**
		Total	**2,818.90**

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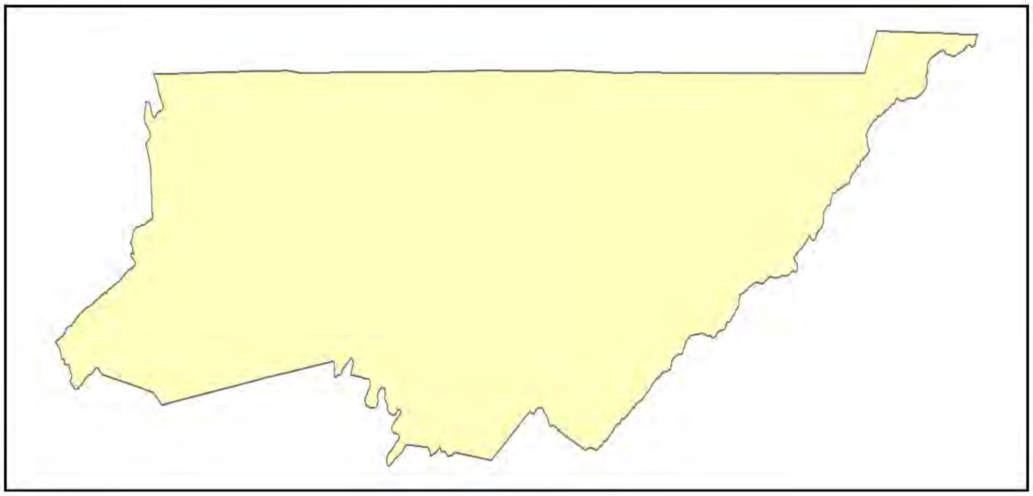
Earthquake Scenario

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



Scenario Name	Madisonville_6.1_East_SE
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-84.34
Latitude of Epicenter	35.51
Earthquake Magnitude	6.10
Depth (km)	15.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

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Direct Earthquake Damage

Building Damage

Hazus estimates that about 765 buildings will be at least moderately damaged. This is over 1.00 % of the buildings in the region. There are an estimated 6 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

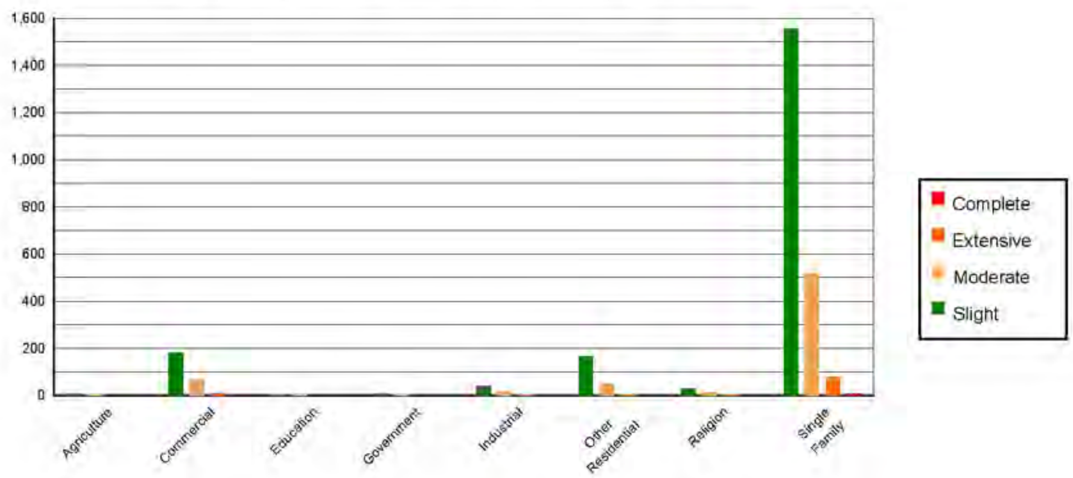

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	146.27	0.22	4.09	0.21	1.46	0.22	0.17	0.19	0.01	0.08
Commercial	4690.94	7.15	181.25	9.14	67.96	10.16	9.37	10.33	0.48	7.61
Education	89.84	0.14	3.65	0.18	1.31	0.20	0.18	0.20	0.01	0.21
Government	133.99	0.20	4.96	0.25	1.79	0.27	0.25	0.27	0.02	0.27
Industrial	933.67	1.42	40.52	2.04	16.42	2.46	2.27	2.50	0.12	1.91
Other Residential	6124.99	9.34	164.46	8.29	51.12	7.65	1.42	1.57	0.01	0.08
Religion	763.77	1.16	29.17	1.47	10.50	1.57	1.48	1.63	0.09	1.37
Single Family	52707.96	80.36	1554.85	78.41	518.00	77.48	75.58	83.31	5.61	88.47
Total	65,591		1,983		669		91		6	

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Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	35931.45	54.78	389.28	19.63	30.62	4.58	0.00	0.00	0.00	0.00
Steel	2988.67	4.56	81.47	4.11	29.64	4.43	2.68	2.96	0.00	0.00
Concrete	281.60	0.43	7.23	0.36	1.67	0.25	0.07	0.07	0.00	0.00
Precast	223.89	0.34	7.35	0.37	4.50	0.67	0.76	0.84	0.00	0.00
RM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
URM	23055.89	35.15	1375.76	69.38	558.21	83.49	85.92	94.71	6.34	100.00
MH	3109.92	4.74	121.87	6.15	43.92	6.57	1.29	1.42	0.00	0.00
Total	**65,591**		**1,983**		**669**		**91**		**6**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

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Essential Facility Damage

Before the earthquake, the region had 1,175 hospital beds available for use. On the day of the earthquake, the model estimates that only 1,108 hospital beds (94.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 98.00% of the beds will be back in service. By 30 days, 100.00% will be operational.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	5	0	0	5
Schools	56	0	0	56
EOCs	1	0	0	1
PoliceStations	7	0	0	7
FireStations	26	0	0	26

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Transportation Lifeline Damage

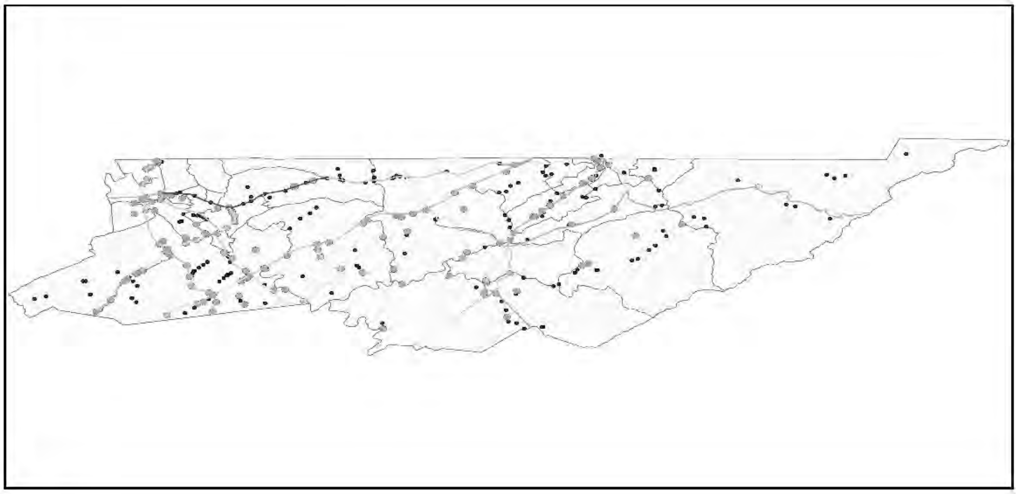

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Table 6: Expected Damage to the Transportation Systems

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	With Functionality > 50 % After Day 7
Highway	Segments	97	0	0	97	97
	Bridges	348	0	0	348	348
	Tunnels	0	0	0	0	0
Railways	Segments	31	0	0	31	31
	Bridges	28	0	0	28	28
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	2	0	0	2	2
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	6	0	0	6	6
Waste Water	8	0	0	0	0
Natural Gas	2	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	4	0	0	0	0
Communication	12	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	2,138	0	0
Waste Water	1,283	0	0
Natural Gas	36	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power						

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Induced Earthquake Damage

Fire Following Earthquake

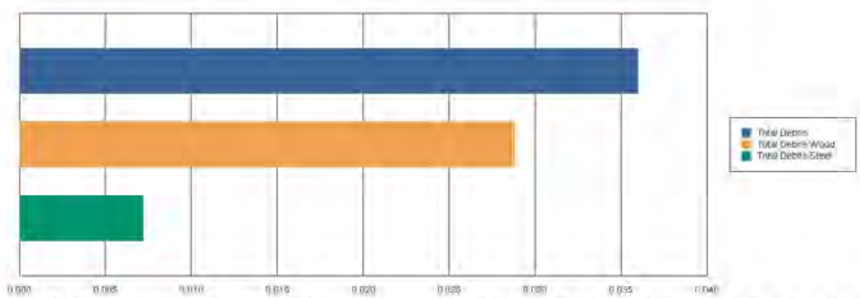
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 36,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 80.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 1,440 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.03	0.01	0.04	1,440 (@25 tons/truck)

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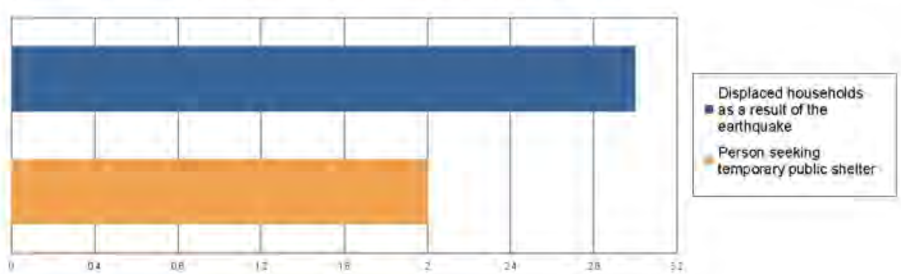
Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 3 households to be displaced due to the earthquake. Of these, 2 people (out of a total population of 158,163) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
3	2

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

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Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.15	0.02	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.20	0.02	0.00	0.00
	Other-Residential	0.65	0.05	0.00	0.00
	Single Family	10.56	1.31	0.10	0.19
	Total	**12**	**1**	**0**	**0**
2 PM	Commercial	9.45	1.17	0.09	0.16
	Commuting	0.00	0.00	0.00	0.00
	Educational	2.82	0.35	0.03	0.05
	Hotels	0.00	0.00	0.00	0.00
	Industrial	1.49	0.19	0.01	0.02
	Other-Residential	0.20	0.01	0.00	0.00
	Single Family	3.60	0.46	0.04	0.07
	Total	**18**	**2**	**0**	**0**
5 PM	Commercial	6.00	0.74	0.05	0.10
	Commuting	0.01	0.01	0.03	0.01
	Educational	0.33	0.04	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.93	0.12	0.01	0.02
	Other-Residential	0.24	0.02	0.00	0.00
	Single Family	4.22	0.54	0.04	0.08
	Total	**12**	**1**	**0**	**0**

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Economic Loss

The total economic loss estimated for the earthquake is 59.71 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

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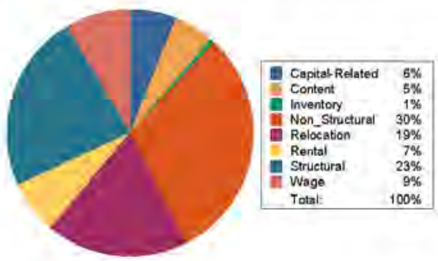
Building-Related Losses

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

The total building-related losses were 59.04 (millions of dollars); 41 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 40 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

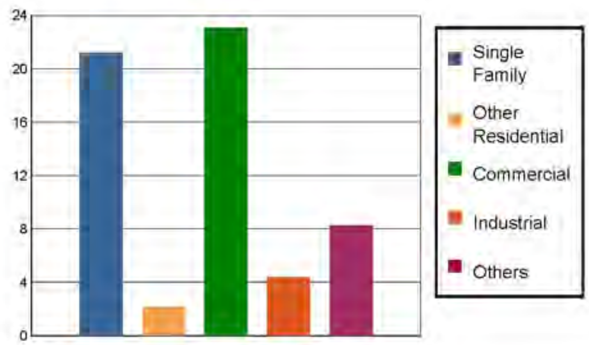


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.1156	4.2102	0.1649	0.6580	5.1487
	Capital-Related	0.0000	0.0491	3.2786	0.1035	0.2001	3.6313
	Rental	1.2618	0.2096	2.2768	0.1265	0.2468	4.1215
	Relocation	4.5927	0.1649	3.2807	0.7327	2.2605	11.0315
	Subtotal	**5.8545**	**0.5392**	**13.0463**	**1.1276**	**3.3654**	**23.9330**
Capital Stock Losses							
	Structural	6.2880	0.3217	4.0936	1.4591	1.5266	13.6890
	Non_Structural	8.2912	1.1663	4.5596	1.1440	2.7618	17.9229
	Content	0.7684	0.1519	1.0771	0.5189	0.5861	3.1024
	Inventory	0.0000	0.0000	0.2837	0.1008	0.0096	0.3941
	Subtotal	**15.3476**	**1.6399**	**10.0140**	**3.2228**	**4.8841**	**35.1084**
	Total	**21.20**	**2.18**	**23.06**	**4.35**	**8.25**	**59.04**

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Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	1481.9587	0.0000	0.00
	Bridges	753.7006	0.5741	0.08
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**2235.6593**	**0.5741**	
Railways	Segments	1597.2112	0.0000	0.00
	Bridges	118.8600	0.0002	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	5.3260	0.0210	0.39
	Subtotal	**1721.3972**	**0.0212**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	3.2332	0.0091	0.28
	Subtotal	**3.2332**	**0.0091**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	13.8937	0.0460	0.33
	Runways	21.1360	0.0000	0.00
	Subtotal	**35.0297**	**0.0460**	
	Total	**3,995.32**	**0.65**	

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Table 13: Utility System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	175.8240	0.0142	0.01
	Distribution Lines	68.8253	0.0000	0.00
	Subtotal	**244.6493**	**0.0142**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	1026.2712	0.0000	0.00
	Distribution Lines	41.2952	0.0000	0.00
	Subtotal	**1067.5664**	**0.0000**	
Natural Gas	Pipelines	174.8673	0.0000	0.00
	Facilities	9.6968	0.0000	0.00
	Distribution Lines	27.5301	0.0000	0.00
	Subtotal	**212.0942**	**0.0000**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	1293.5665	0.0000	0.00
	Subtotal	**1293.5665**	**0.0000**	
Communication	Facilities	1.0560	0.0000	0.00
	Subtotal	**1.0560**	**0.0000**	
	Total	**2,818.93**	**0.01**	

Appendix A: County Listing for the Region

Sullivan,TN

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Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Tennessee					
	Sullivan	158,163	13,637	11,174	24,812
Total Region		**158,163**	**13,637**	**11,174**	**24,812**

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Hazus: Flood Global Risk Report

Region Name: Sullivan_100yr

Flood Scenario: Sullivan_100yr

Print Date: Tuesday, June 10, 2025

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

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

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General Description of the Region

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

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

- Tennessee

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

The geographical size of the region is approximately 60 square miles and contains 3,550 census blocks. The region contains over 68 thousand households and has a total population of 158,067 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 68,340 buildings in the region with a total building replacement value (excluding contents) of 24,808 million dollars. Approximately 89.56% of the buildings (and 54.96% of the building value) are associated with residential housing.

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Building Inventory

General Building Stock

Hazus estimates that there are 68,340 buildings in the region which have an aggregate total replacement value of 24,808 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	13,634,929	55.0%
Commercial	6,256,823	25.2%
Industrial	2,119,726	8.5%
Agricultural	58,422	0.2%
Religion	834,496	3.4%
Government	284,573	1.1%
Education	1,618,926	6.5%
Total	**24,807,895**	**100%**

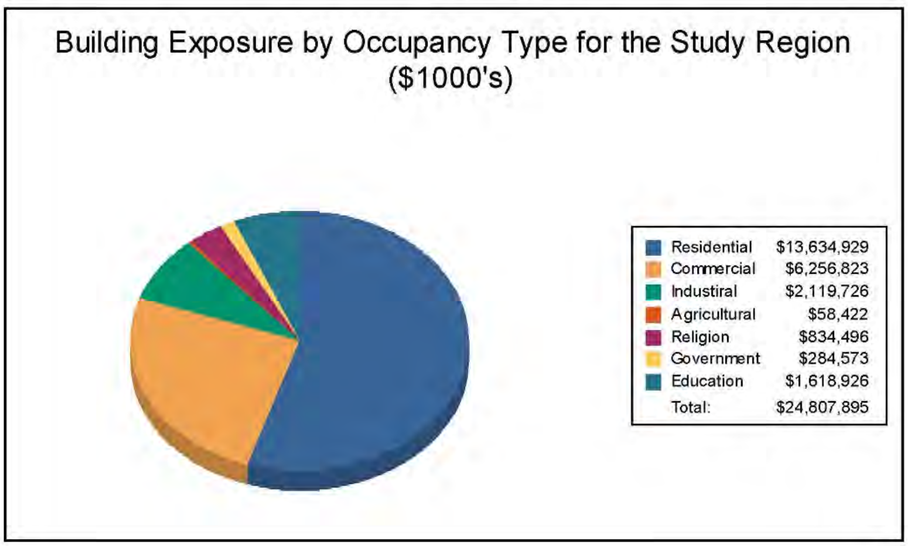

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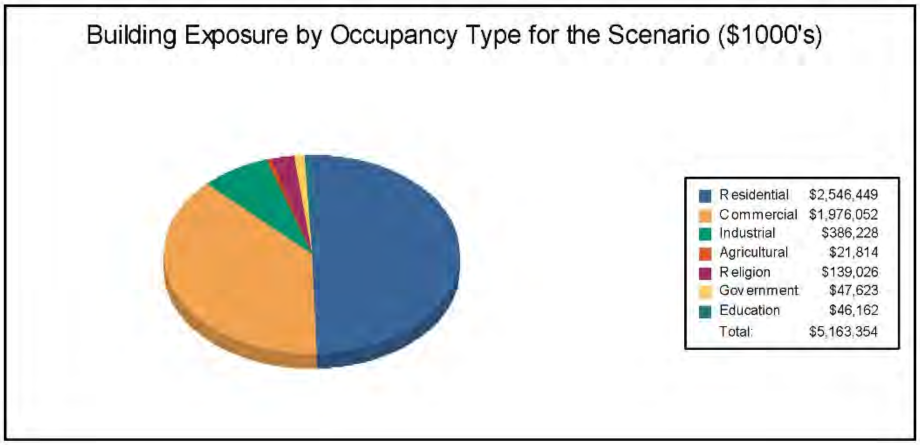
Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,546,449	49.3%
Commercial	1,976,052	38.3%
Industrial	386,228	7.5%
Agricultural	21,814	0.4%
Religion	139,026	2.7%
Government	47,623	0.9%
Education	46,162	0.9%
Total	**5,163,354**	**100%**



Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 1,175 beds. There are 56 schools, 26 fire stations, 7 police stations and 1 emergency operation center.

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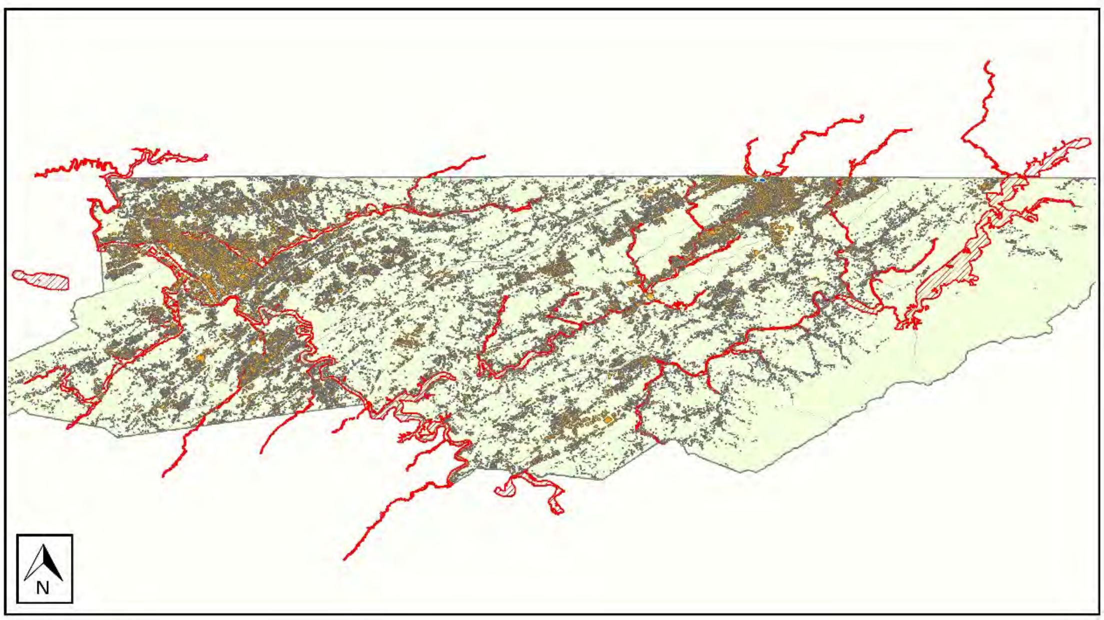
Flood Scenario Parameters

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

Study Region Name:	Sullivan_100yr
Scenario Name:	Sullivan_100yr
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

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



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Building Damage

General Building Stock Damage

Hazus estimates that about 419 buildings will be at least moderately damaged. This is over 68% of the total number of buildings in the scenario. There are an estimated 65 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

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

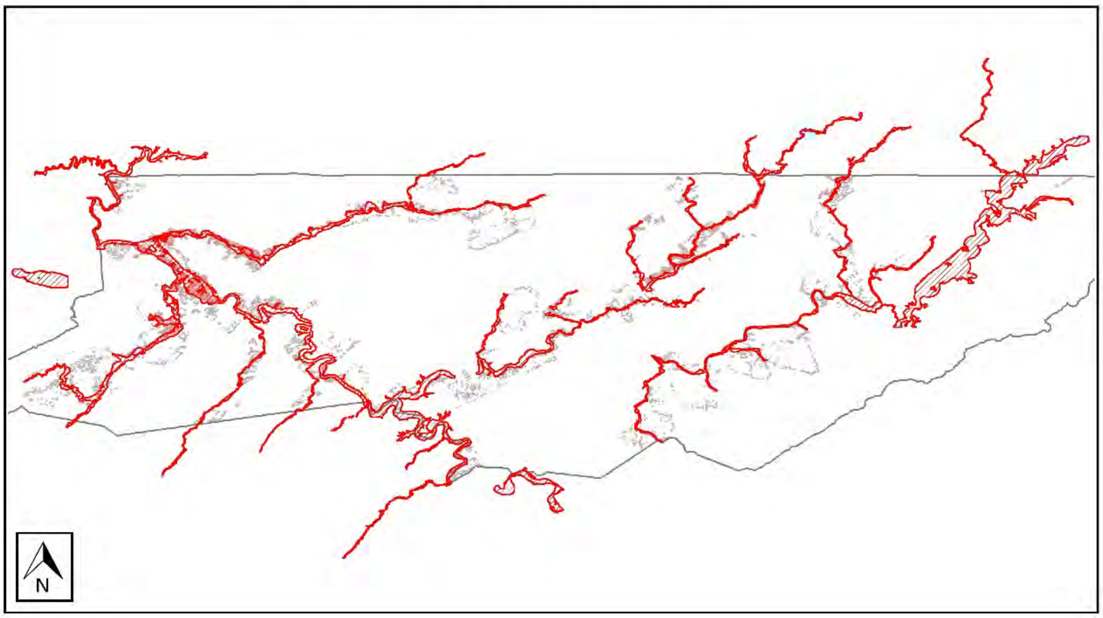

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Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	16	11	89	60	31	21	7	5	5	3	1	1
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	2	67	1	33	0	0	0	0	0	0	0	0
Industrial	1	5	7	37	3	16	8	42	0	0	0	0
Religion	0	0	2	100	0	0	0	0	0	0	0	0
Residential	48	15	96	31	58	19	29	9	18	6	64	20
Total	**67**		**195**		**92**		**44**		**23**		**65**	

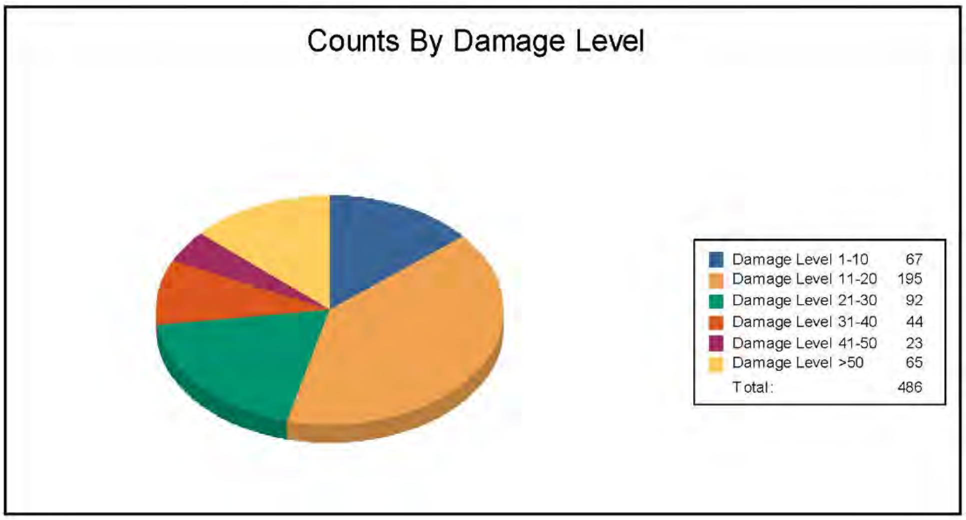

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Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	1	100	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	9	100
Masonry	29	18	69	43	28	17	16	10	7	4	12	7
Steel	7	10	34	49	20	29	7	10	2	3	0	0
Wood	27	12	80	36	39	17	20	9	14	6	43	19

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Essential Facility Damage

Before the flood analyzed in this scenario, the region had 1,175 hospital beds available for use. On the day of the scenario flood event, the model estimates that 1,175 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	26	0	0	0
Hospitals	5	0	0	0
Police Stations	7	1	0	1
Schools	56	0	0	0

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

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

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

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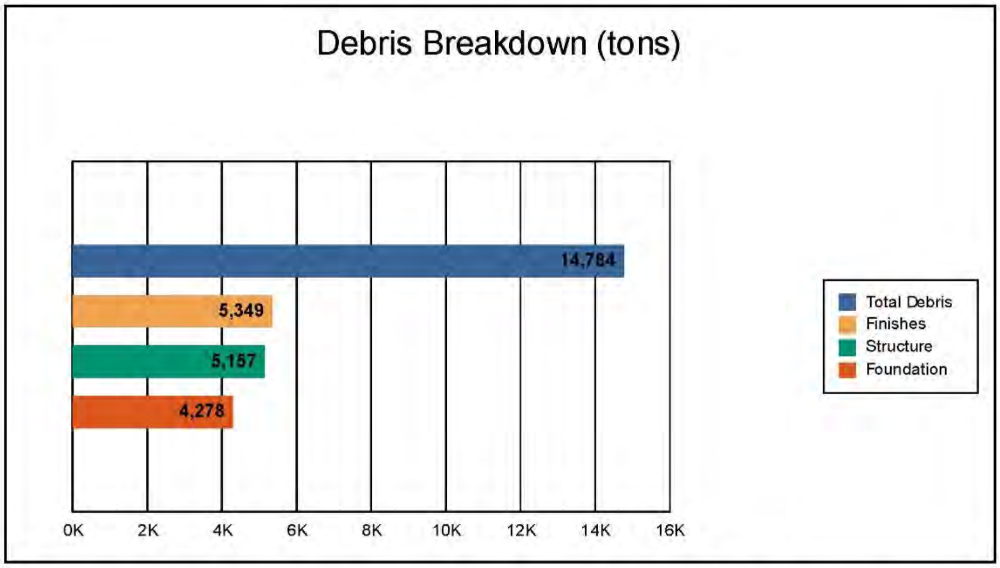
Induced Flood Damage

Debris Generation

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



The model estimates that a total of 14,784 tons of debris will be generated. Of the total amount, Finishes comprises 36% of the total, Structure comprises 35% of the total, and Foundation comprises 29%. If the debris tonnage is converted into an estimated number of truckloads, it will require 592 truckloads (@25 tons/truck) to remove the debris generated by the flood.

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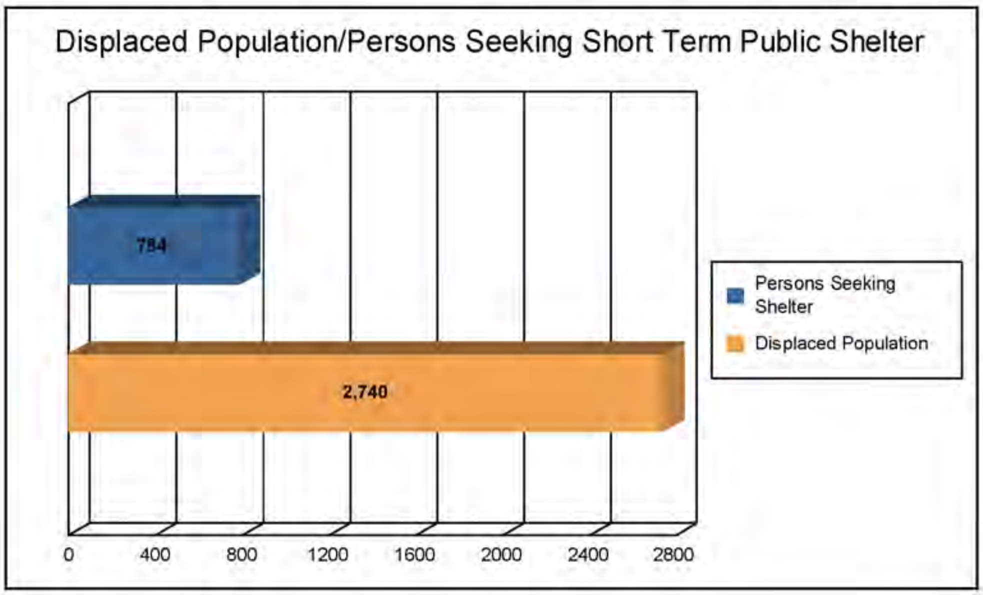
Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 913 households (or 2,740 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 784 people (out of a total population of 158,067) will seek temporary shelter in public shelters.



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Economic Loss

The total economic loss estimated for the flood is 1,556.54 million dollars, which represents 30.15 % of the total replacement value of the scenario buildings.

Building-Related Losses

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

The total building-related losses were 806.47 million dollars. 48% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 9.28% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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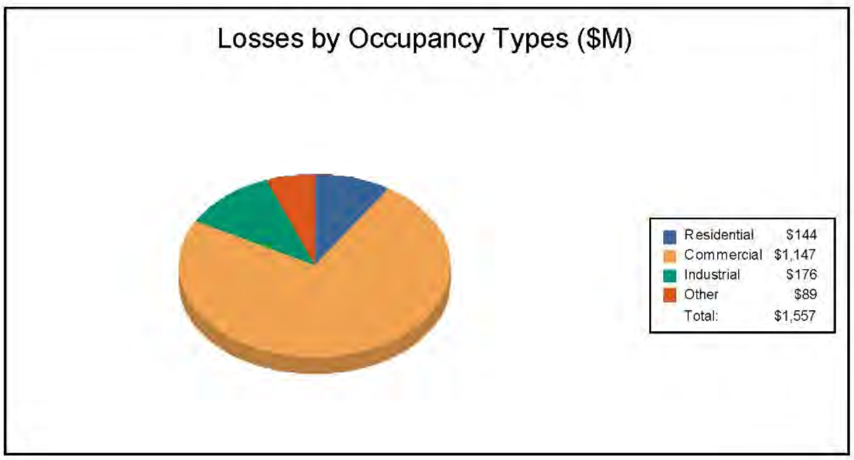
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	73.23	111.92	47.92	4.34	237.41
	Content	37.56	337.81	101.64	22.35	499.36
	Inventory	0.00	51.18	17.07	1.45	69.70
	Subtotal	**110.79**	**500.91**	**166.62**	**28.14**	**806.47**
Business Interruption						
	Income	1.22	229.35	2.11	6.16	238.84
	Relocation	19.92	69.10	3.22	3.95	96.19
	Rental Income	9.64	48.99	0.50	0.89	60.02
	Wage	2.88	298.96	3.66	49.53	355.02
	Subtotal	**33.65**	**646.40**	**9.49**	**60.53**	**750.07**
ALL	**Total**	**144.44**	**1,147.31**	**176.11**	**88.68**	**1,556.54**



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Appendix A: County Listing for the Region

Tennessee
- Sullivan

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Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Tennessee				
Sullivan	158,067	13,634,929	11,172,966	24,807,895
Total	**158,067**	**13,634,929**	**11,172,966**	**24,807,895**
Total Study Region	**158,067**	**13,634,929**	**11,172,966**	**24,807,895**

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Hazus: Flood Global Risk Report

Region Name: Sullivan500yr

Flood Scenario: Sullivan_500yr

Print Date: Wednesday, June 11, 2025

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

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Agricultural	58,422	0.2%
Religion	834,496	3.4%
Government	284,573	1.1%
Education	1,618,926	6.5%
Total	**24,807,895**	**100%**

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

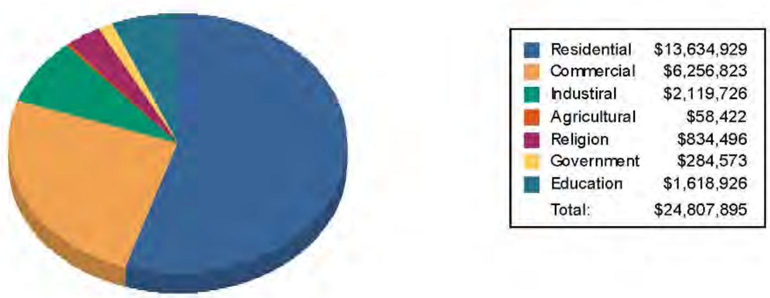

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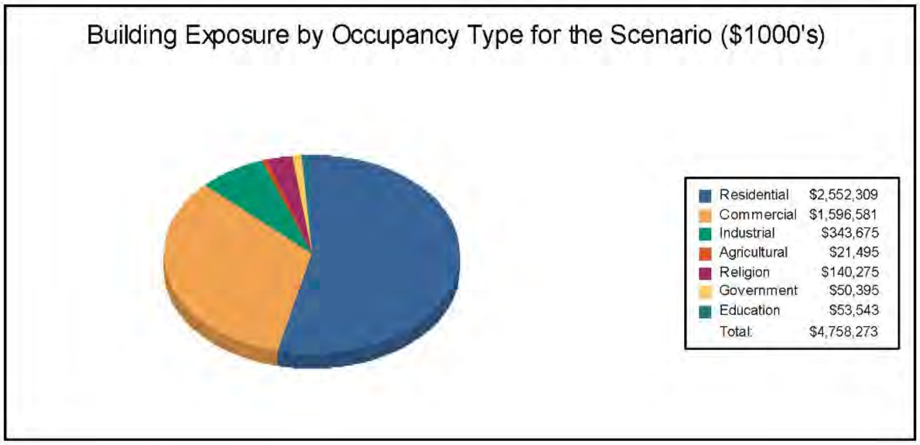
Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,552,309	53.6%
Commercial	1,596,581	33.6%
Industrial	343,675	7.2%
Agricultural	21,495	0.5%
Religion	140,275	2.9%
Government	50,395	1.1%
Education	53,543	1.1%
Total	**4,758,273**	**100%**



Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 1,175 beds. There are 56 schools, 26 fire stations, 7 police stations and 1 emergency operation center.

HAZUS™

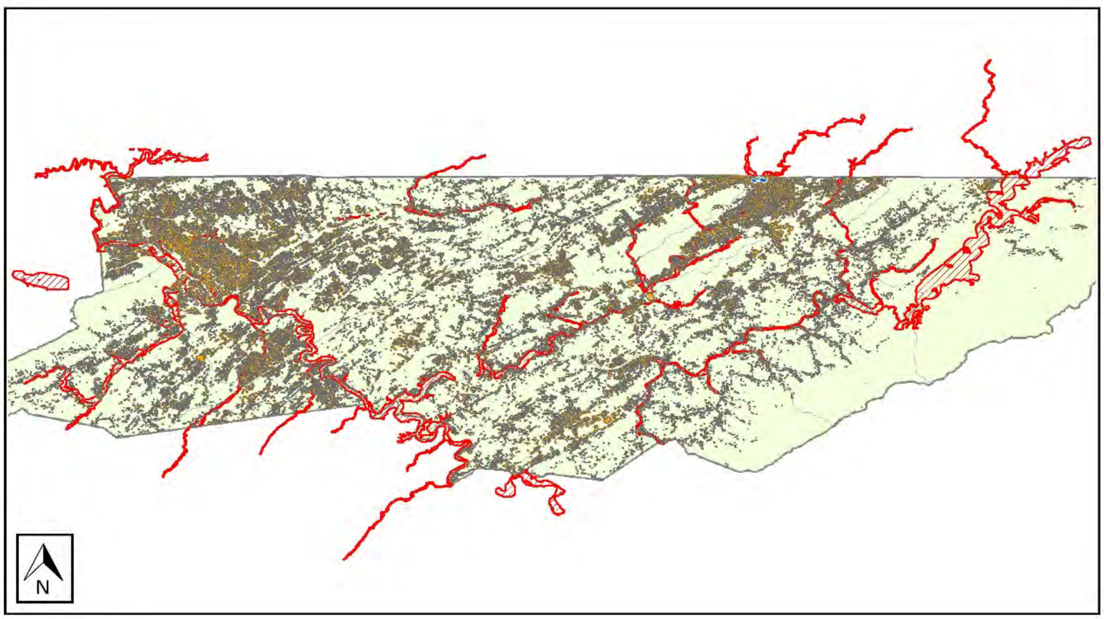
Flood Scenario Parameters

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

Study Region Name:	Sullivan500yr
Scenario Name:	Sullivan_500yr
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

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



FEMA

RiskMAP
Increasing Resilience Together

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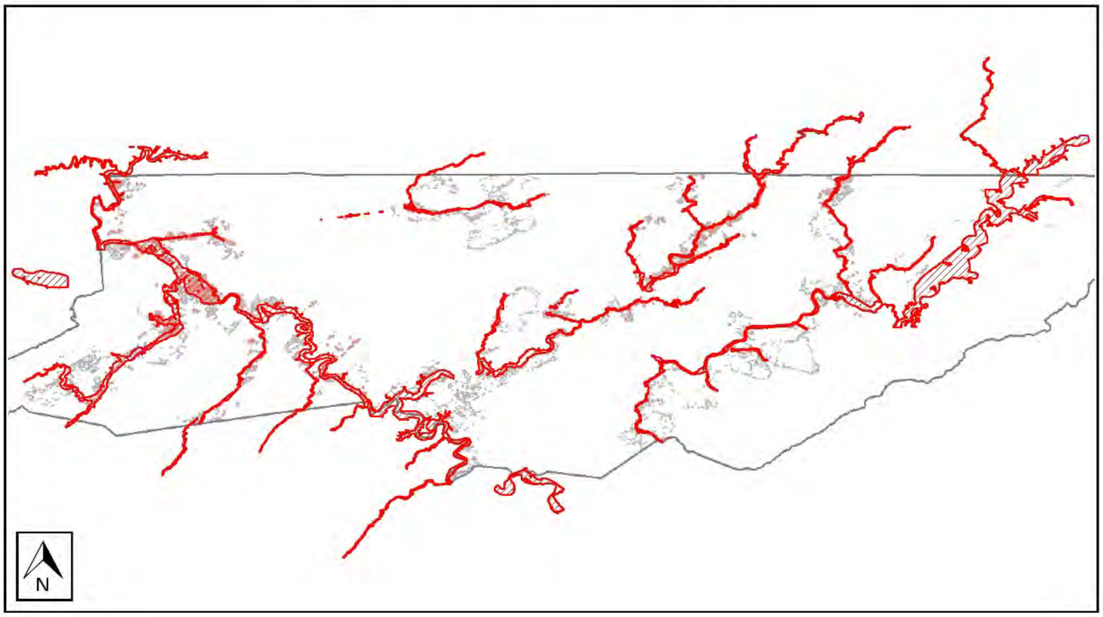
Building Damage

General Building Stock Damage

Hazus estimates that about 357 buildings will be at least moderately damaged. This is over 42% of the total number of buildings in the scenario. There are an estimated 160 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

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



HAZUS

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	10	8	40	33	41	34	14	12	8	7	7	6
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	2	100	0	0	0	0	0	0	0	0
Industrial	0	0	2	14	2	14	5	36	5	36	0	0
Religion	0	0	2	100	0	0	0	0	0	0	0	0
Residential	10	4	34	14	21	9	12	5	9	4	153	64
Total	**20**		**80**		**64**		**31**		**22**		**160**	

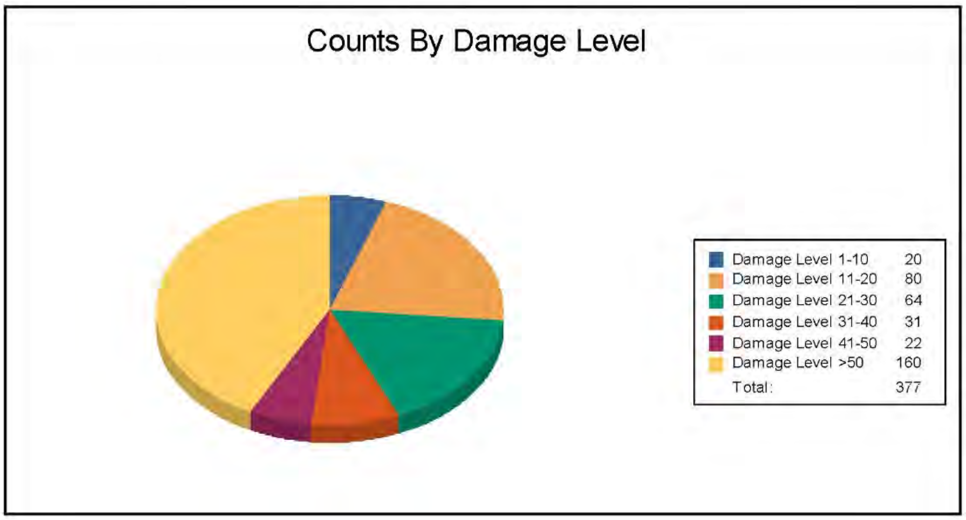


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Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	1	100	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	14	100
Masonry	9	8	31	27	20	17	9	8	7	6	40	34
Steel	1	2	16	30	24	44	7	13	5	9	1	2
Wood	6	3	28	15	22	12	13	7	10	5	103	57

HAZUS™

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 1,175 hospital beds available for use. On the day of the scenario flood event, the model estimates that 1,175 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	26	0	0	0
Hospitals	5	0	0	0
Police Stations	7	1	0	1
Schools	56	0	0	0

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

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

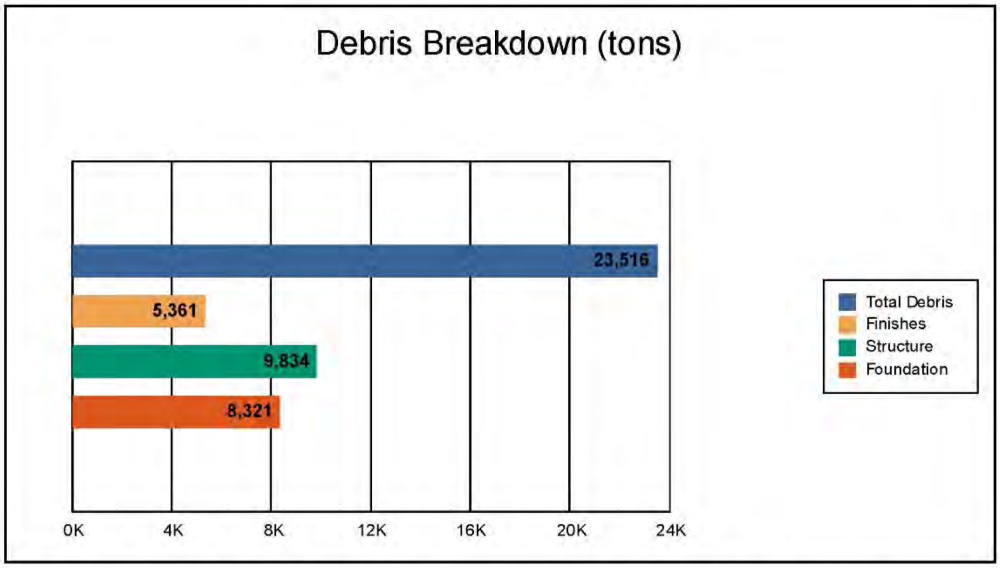
(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

HAZUS™

Induced Flood Damage

Debris Generation

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



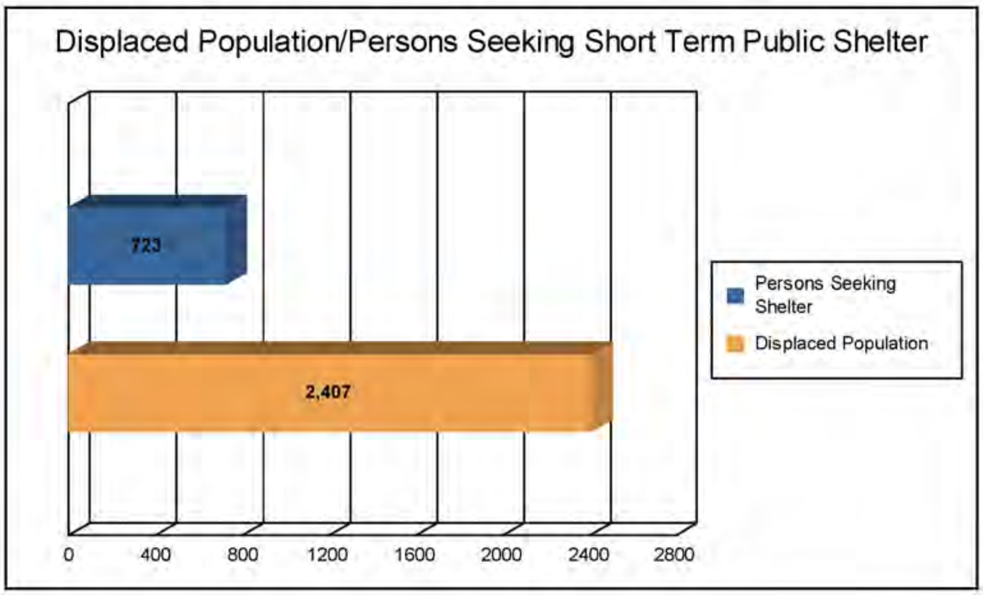
The model estimates that a total of 23,516 tons of debris will be generated. Of the total amount, Finishes comprises 23% of the total, Structure comprises 42% of the total, and Foundation comprises 35%. If the debris tonnage is converted into an estimated number of truckloads, it will require 941 truckloads (@25 tons/truck) to remove the debris generated by the flood.

HAZUS™

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 802 households (or 2,407 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 723 people (out of a total population of 158,067) will seek temporary shelter in public shelters.



HAZUS™

Economic Loss

The total economic loss estimated for the flood is 1,555.70 million dollars, which represents 32.69 % of the total replacement value of the scenario buildings.

Building-Related Losses

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

The total building-related losses were 856.39 million dollars. 45% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 11.08% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

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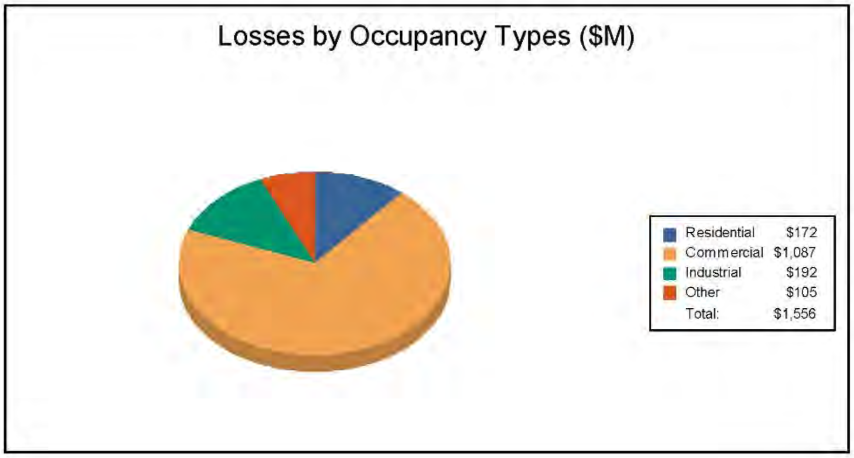
Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	92.77	130.20	54.48	7.22	284.67
	Content	45.82	330.85	111.44	26.93	515.04
	Inventory	0.00	38.24	17.35	1.08	56.67
	Subtotal	**138.59**	**499.30**	**183.27**	**35.24**	**856.39**
Business Interruption						
	Income	0.81	209.22	1.86	7.46	219.35
	Relocation	21.48	62.00	2.89	4.82	91.19
	Rental Income	9.55	43.61	0.43	1.01	54.60
	Wage	1.91	272.80	3.29	56.17	334.17
	Subtotal	**33.75**	**587.62**	**8.47**	**69.46**	**699.31**
ALL	**Total**	**172.34**	**1,086.92**	**191.74**	**104.70**	**1,555.70**



HAZUS™

Appendix A: County Listing for the Region

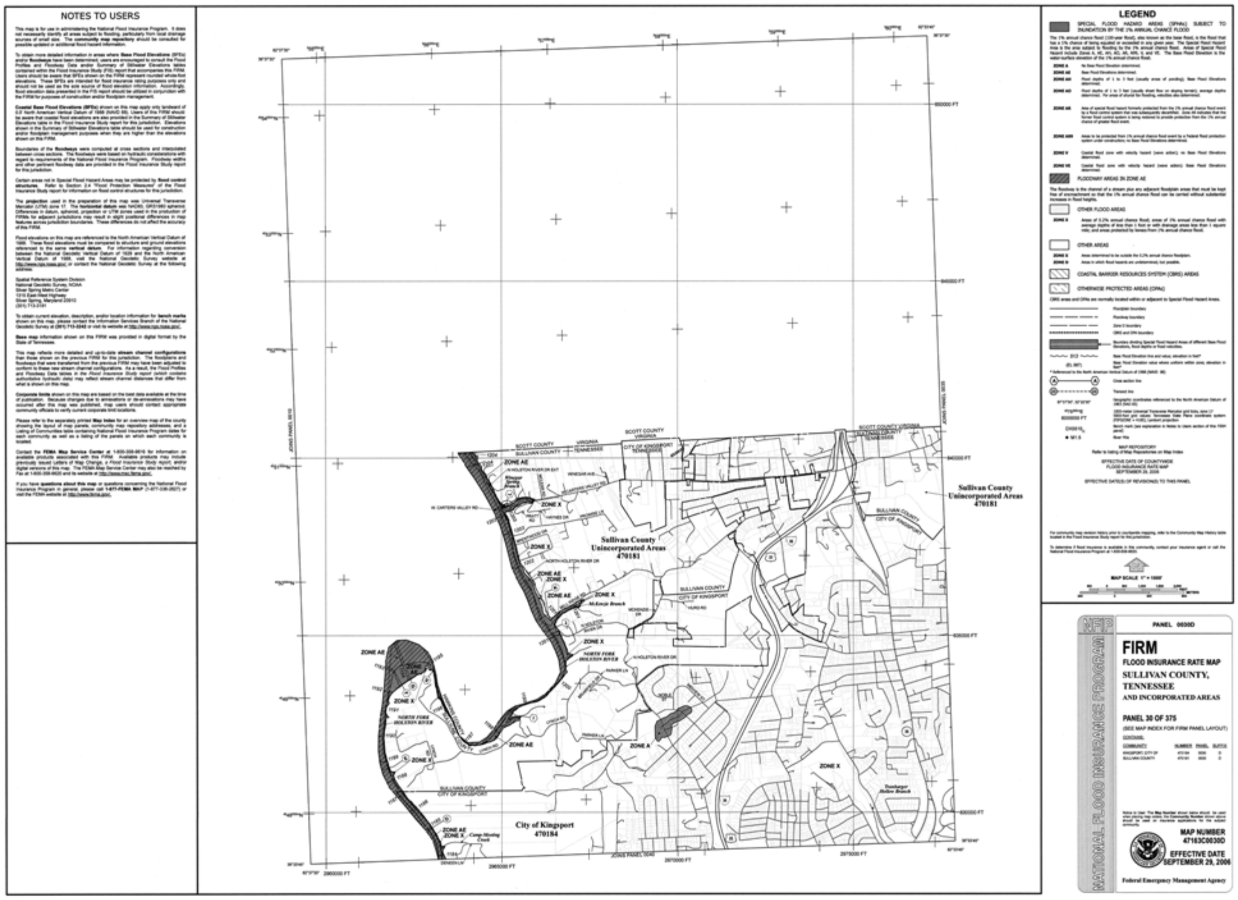
Tennessee

- Sullivan

HAZUS™

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Tennessee				
Sullivan	158,067	13,634,929	11,172,966	24,807,895
Total	**158,067**	**13,634,929**	**11,172,966**	**24,807,895**
Total Study Region	**158,067**	**13,634,929**	**11,172,966**	**24,807,895**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Unincorporated Areas
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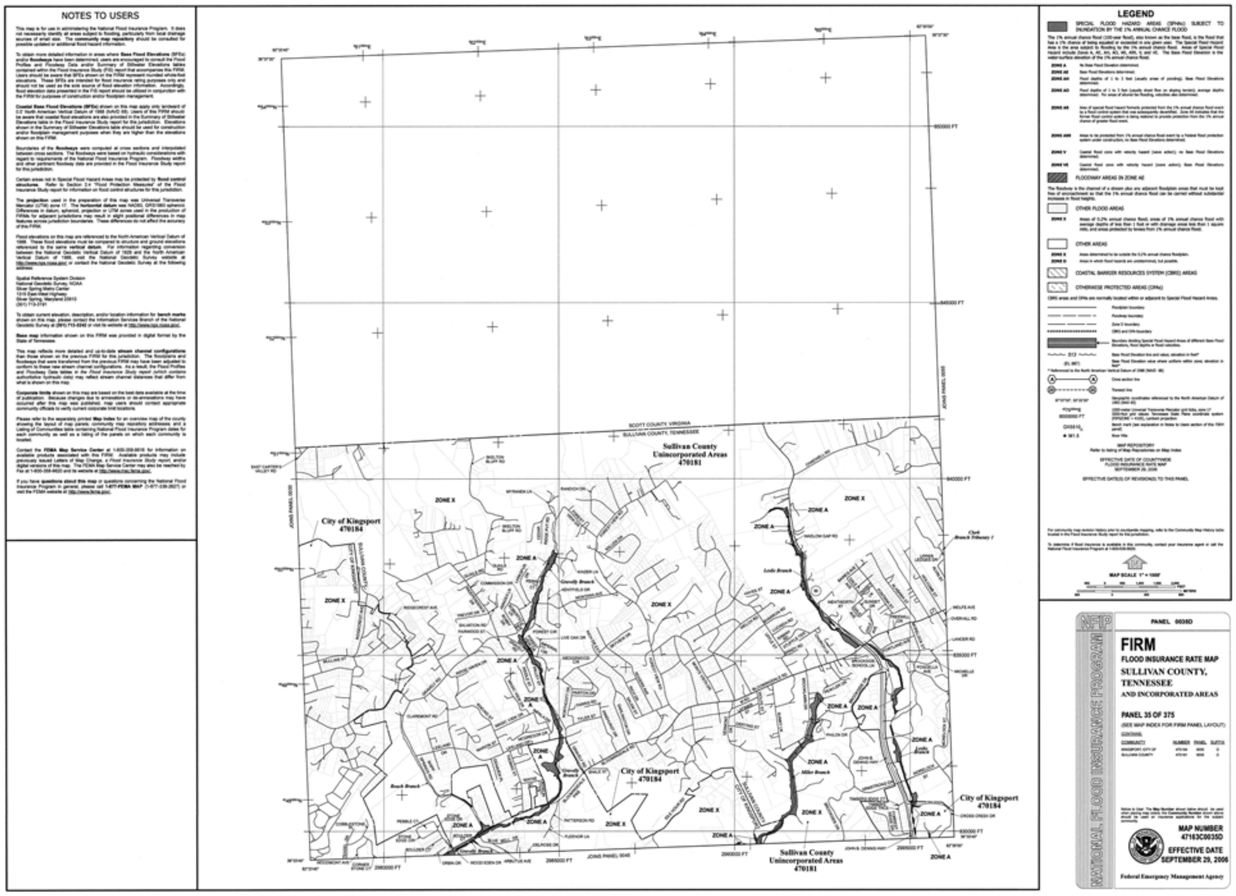
City of Kingsport
470184
ZONE AE
ZONE X
ZONE A
NORTH FORK HOLSTON RIVER
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0030D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 30 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
47163C0030D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency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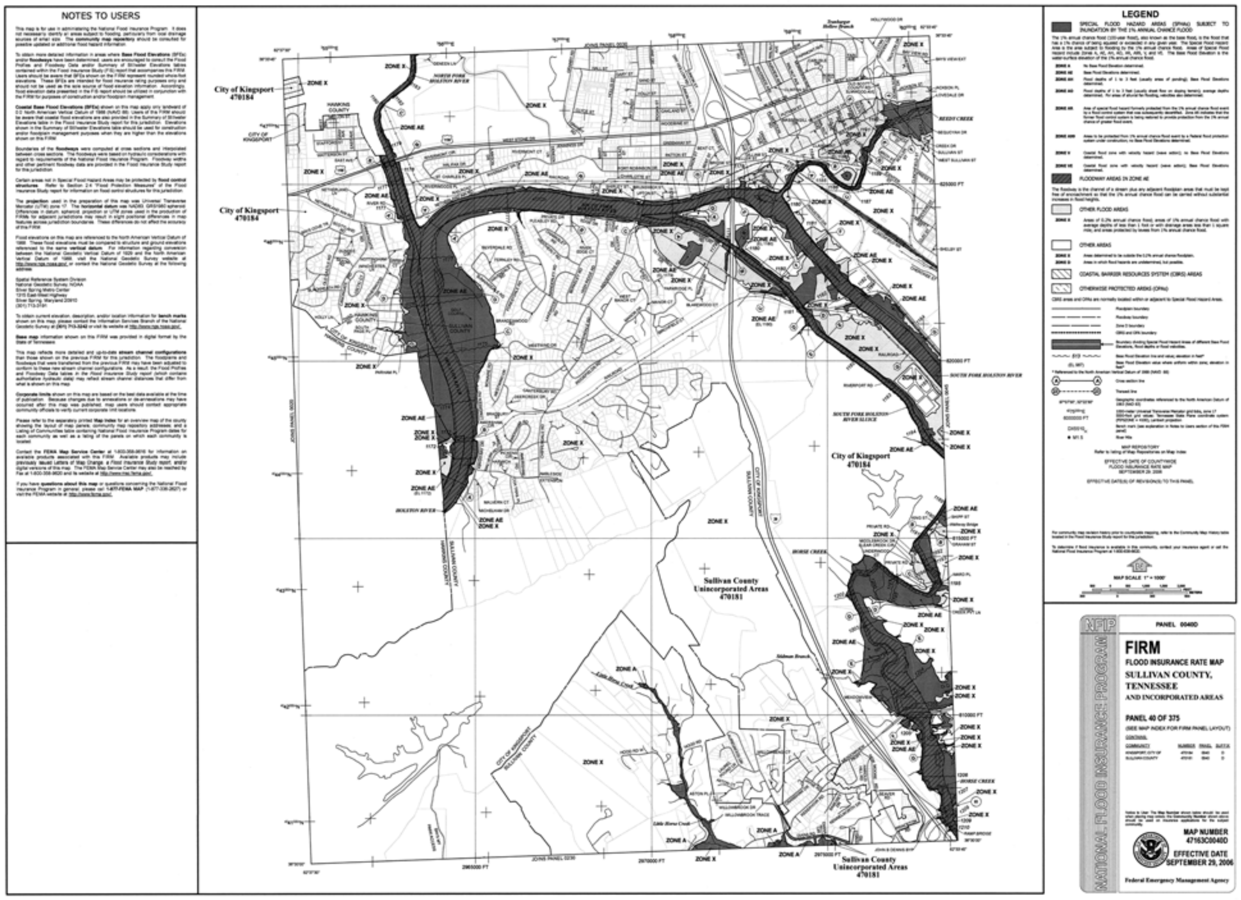
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Unincorporated Areas
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ZONE AE
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SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
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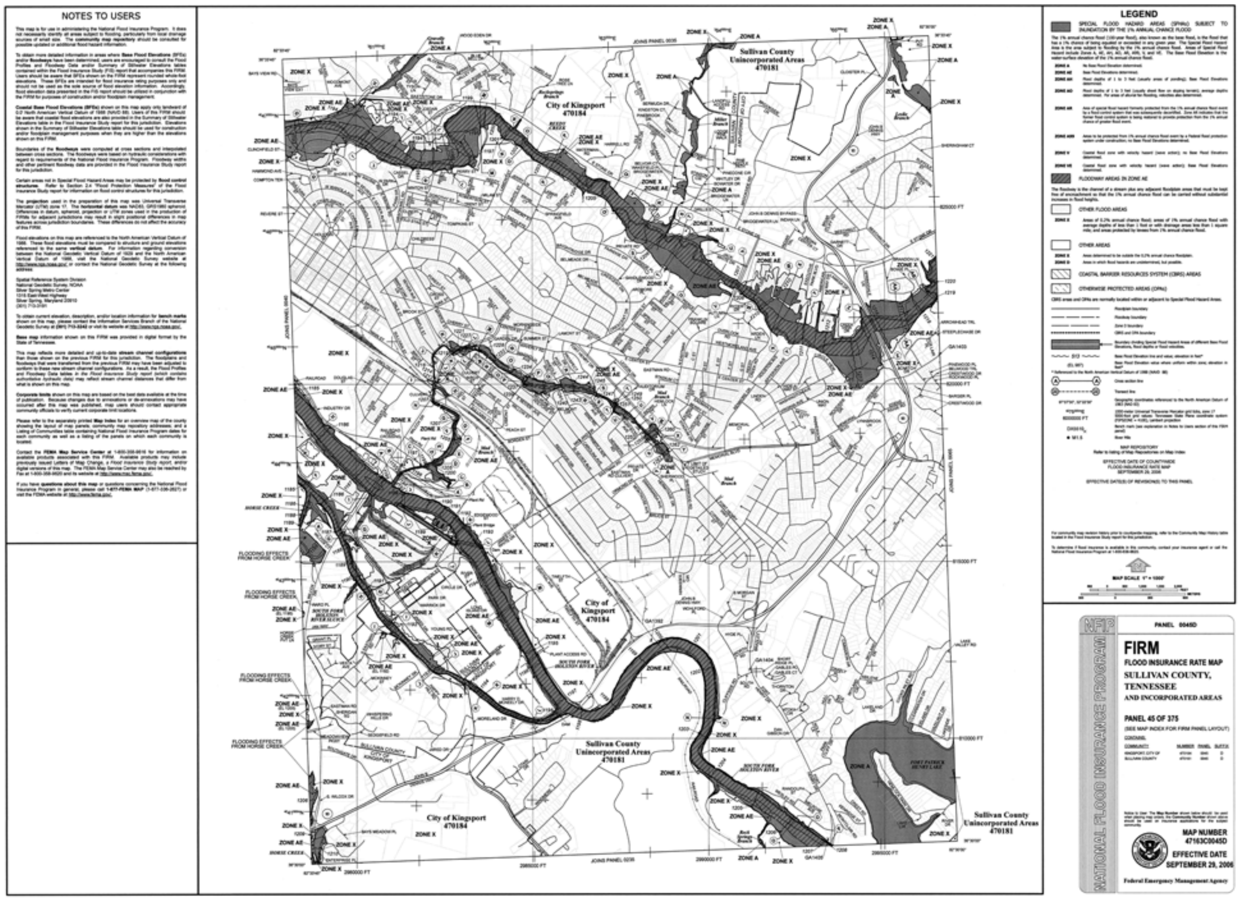
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Sullivan County
Unincorporated Areas
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SOUTH FORK HOLSTON RIVER
NFIP
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PANEL 0045D
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SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
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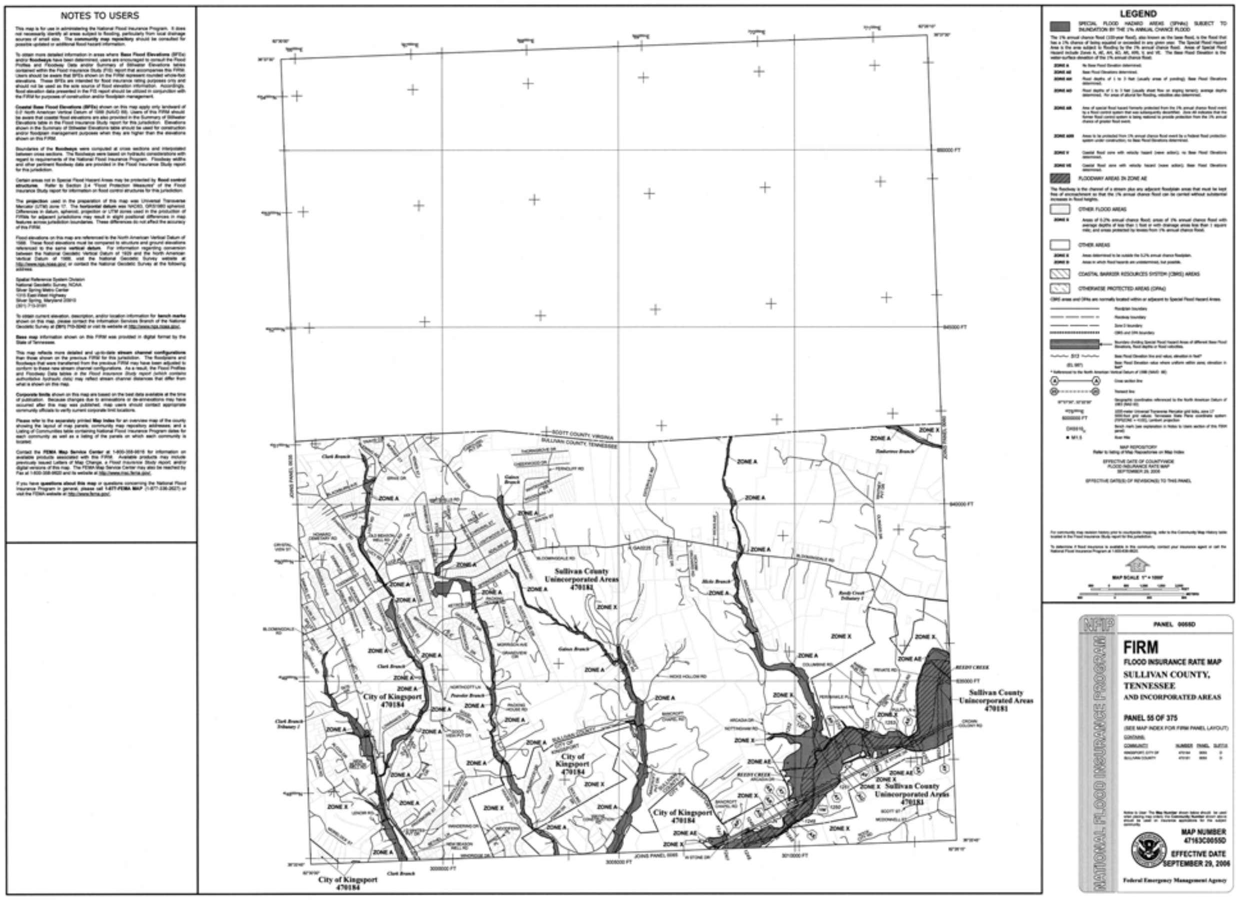
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AND INCORPORATED AREAS
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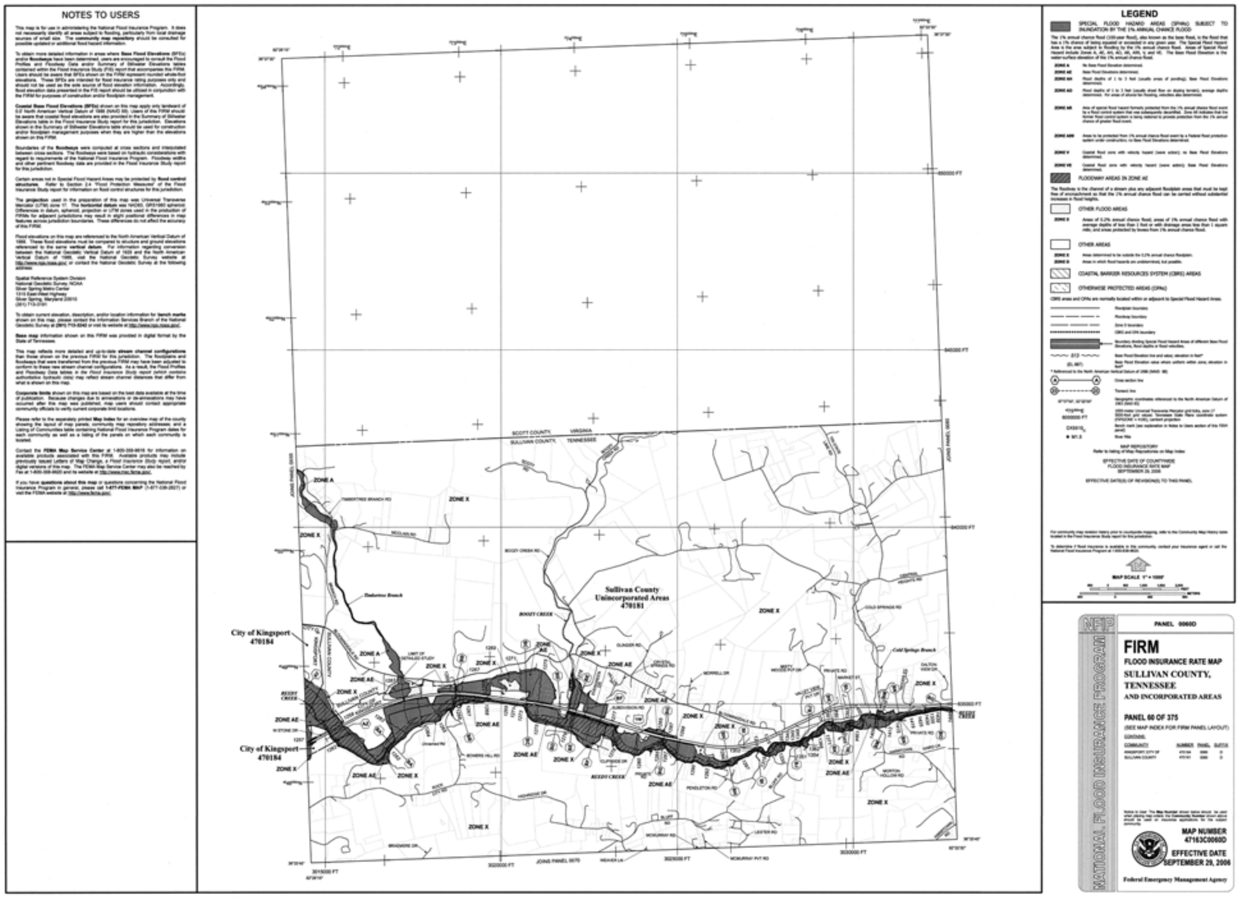
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City of Kingsport
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ZONE AE
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SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
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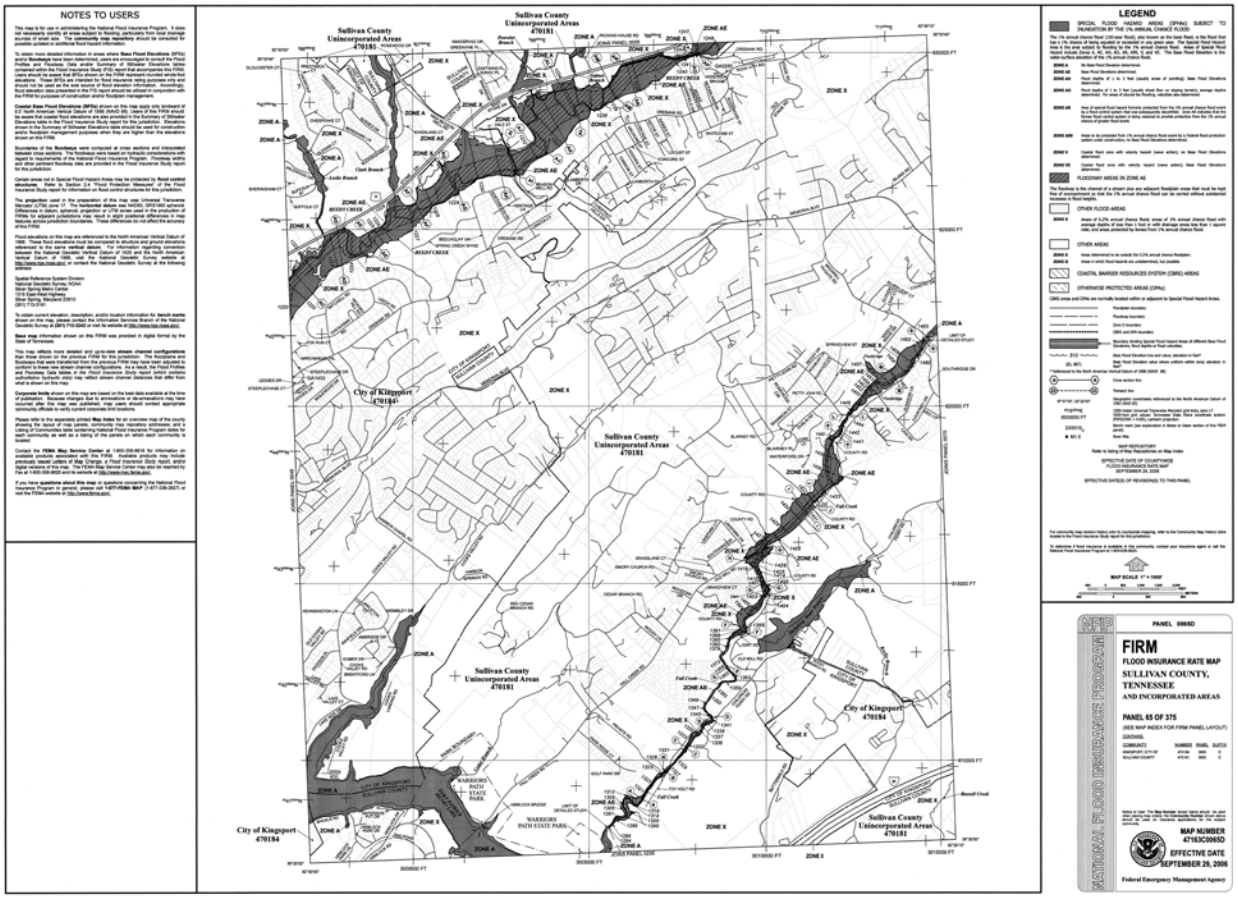
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Unincorporated Areas
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City of Kingsport
470184
ZONE A
ZONE AE
ZONE X
REEDY CREEK
Fall Creek
WARRIORS PATH STATE PARK
MAP SCALE 1" = 1000'
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0065D
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SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
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(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
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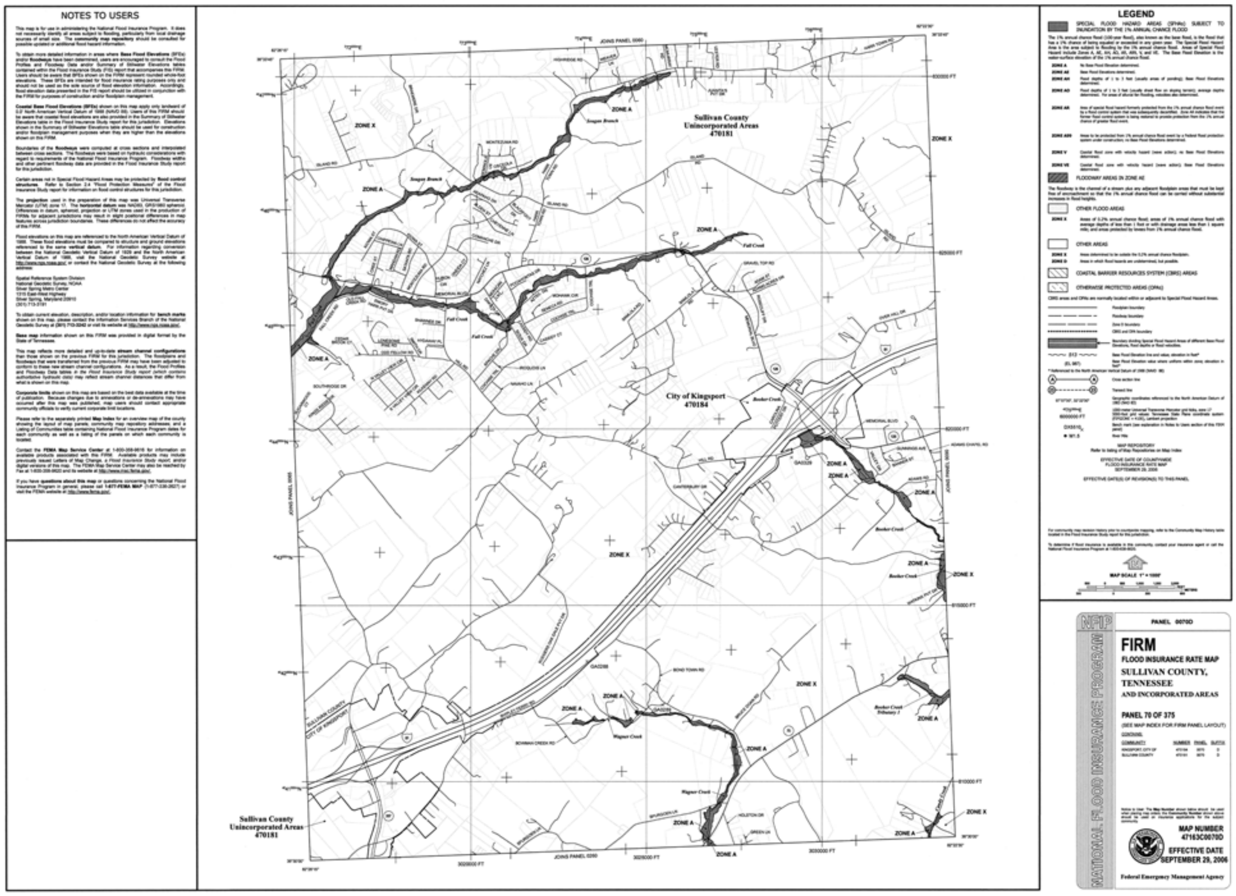
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City of Kingsport
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SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
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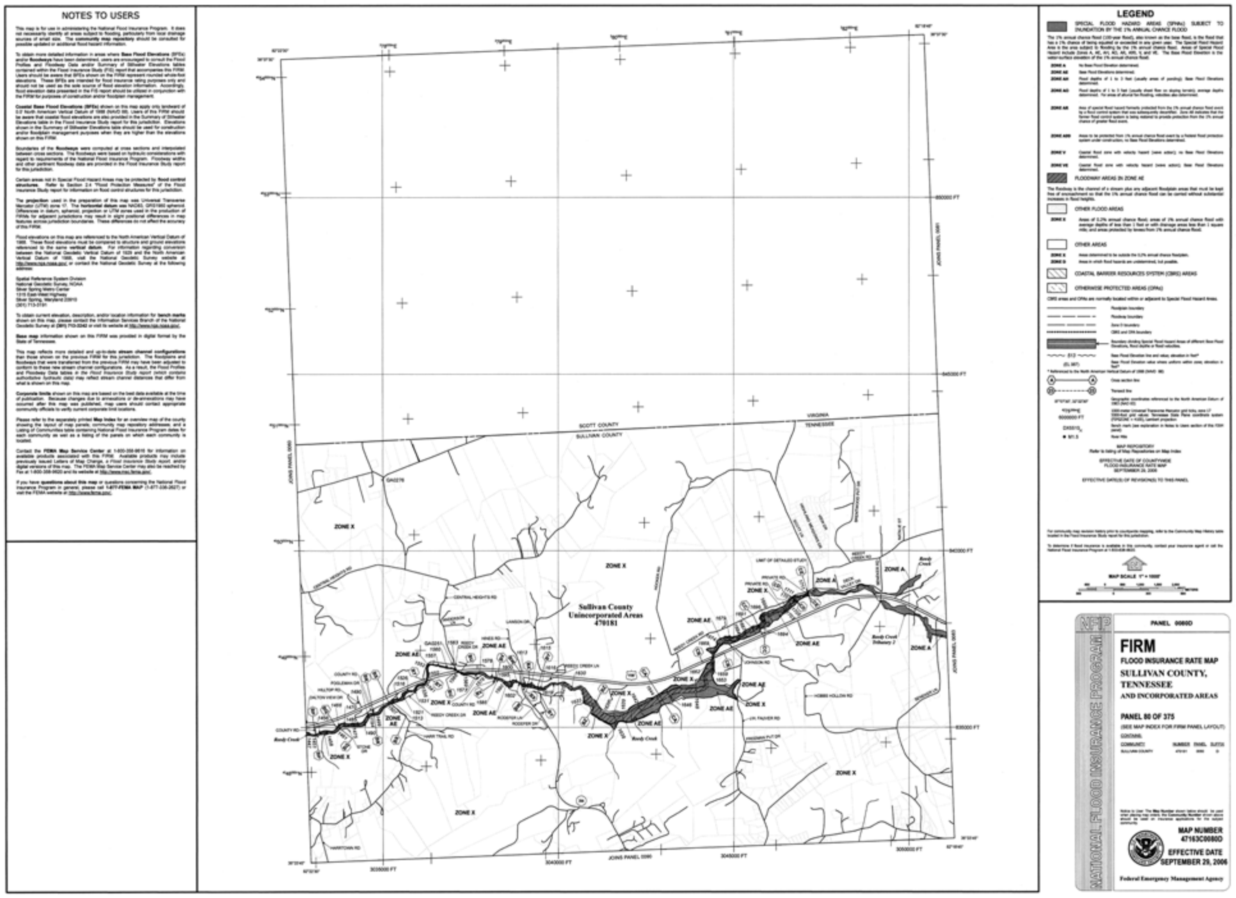
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TENNESSEE
AND INCORPORATED AREAS
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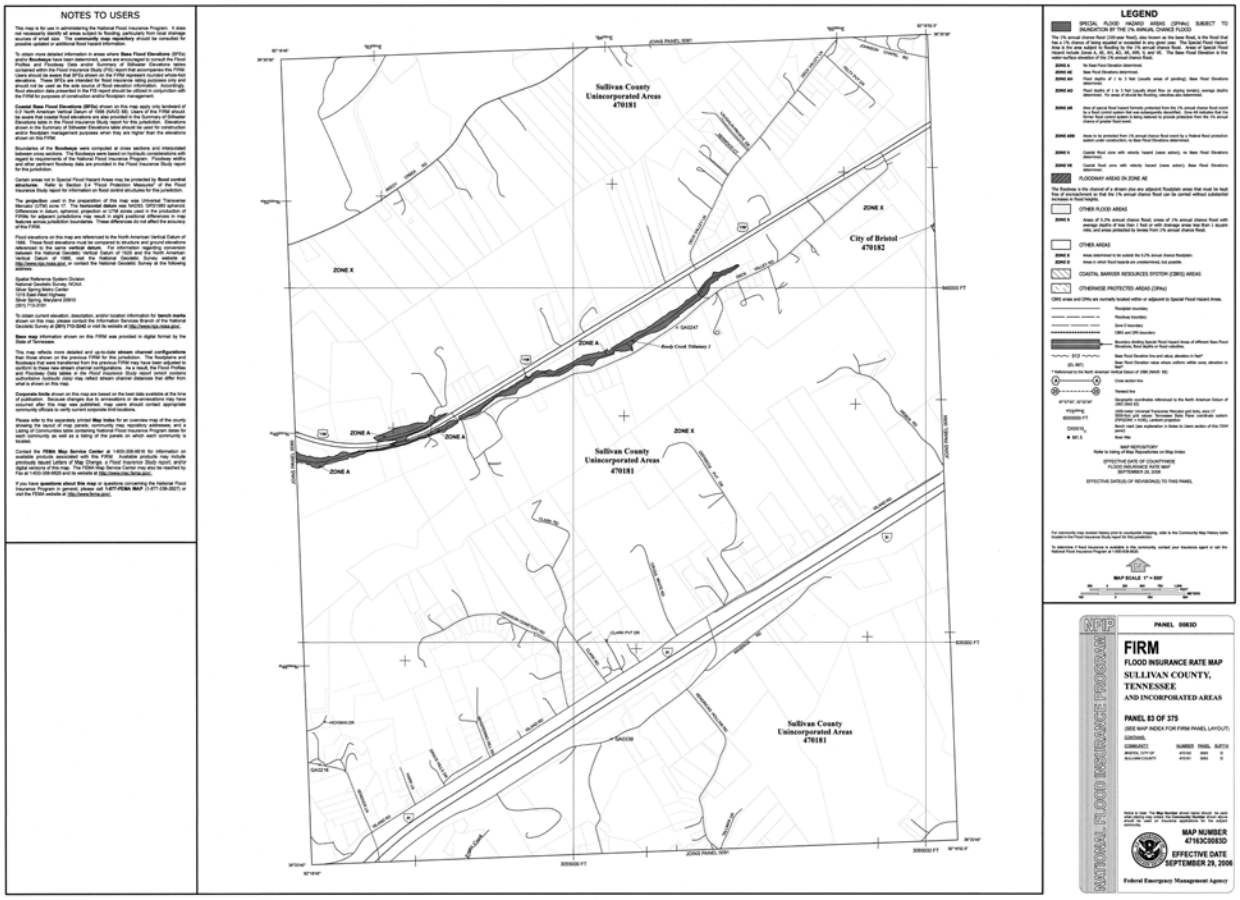
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City of Bristol
470182
ZONE X
ZONE A
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PANEL 0083D
FIRM
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SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 83 OF 375
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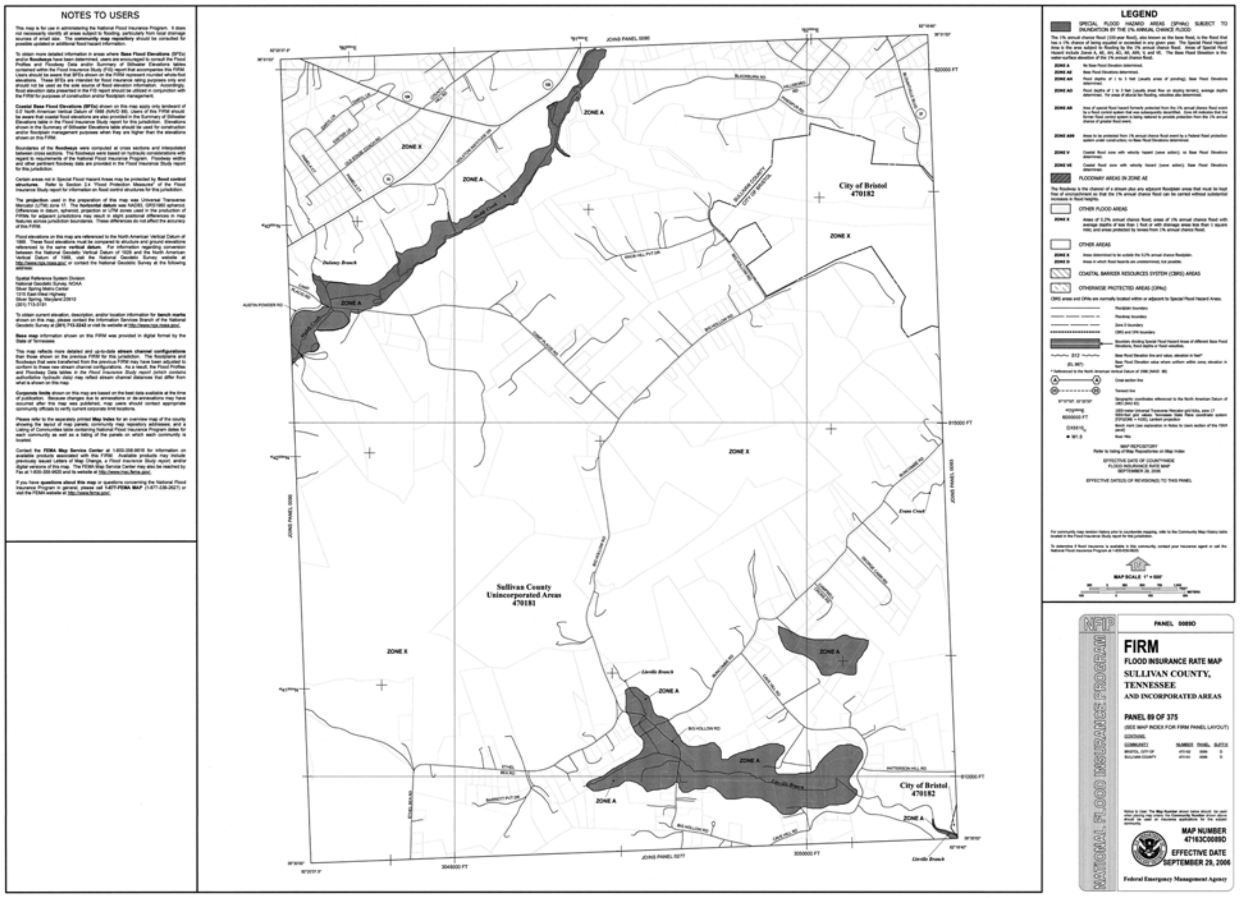
Federal Emergency Management Agency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Sullivan County
Unincorporated Areas
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ZONE X
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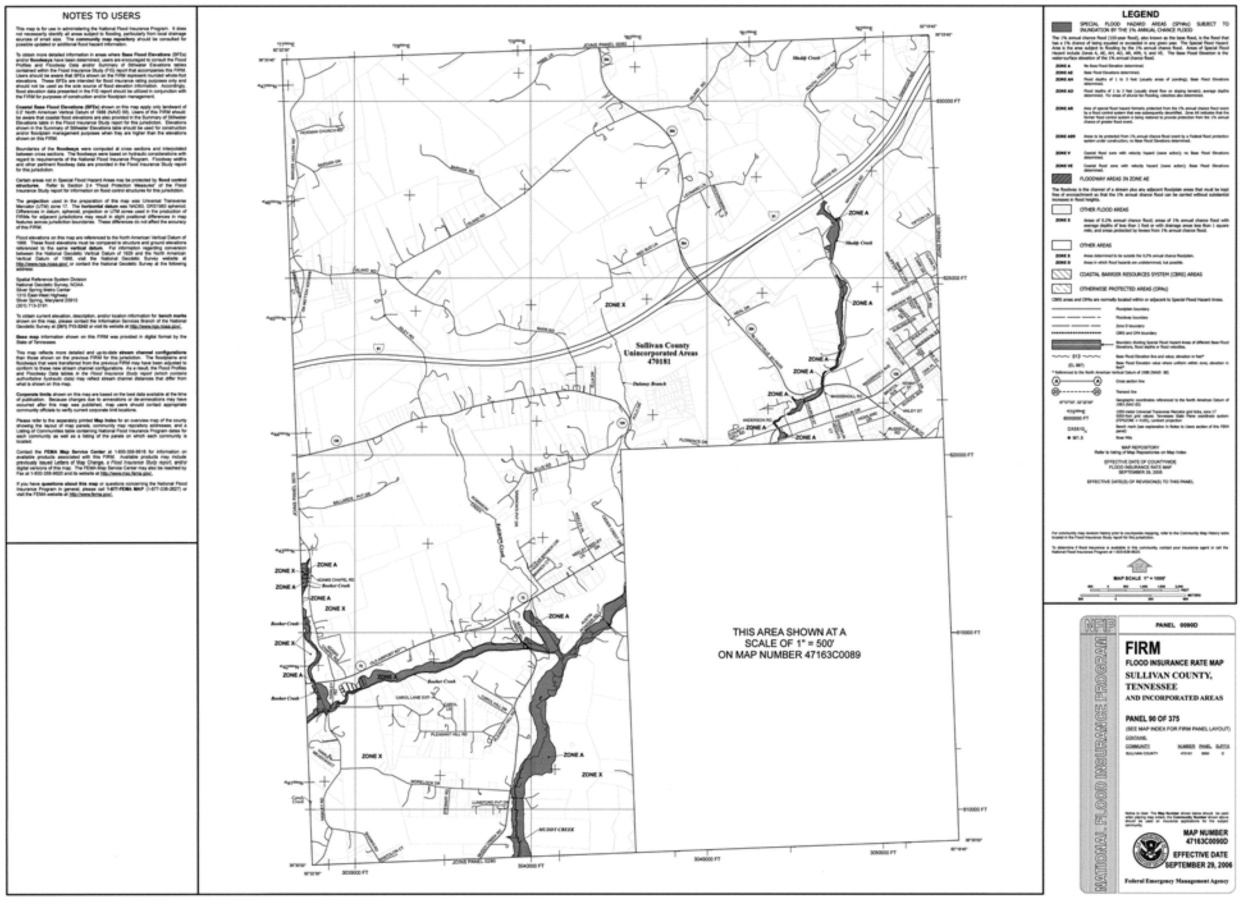
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SCALE OF 1" = 500'
ON MAP NUMBER 47163C0089
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0090D
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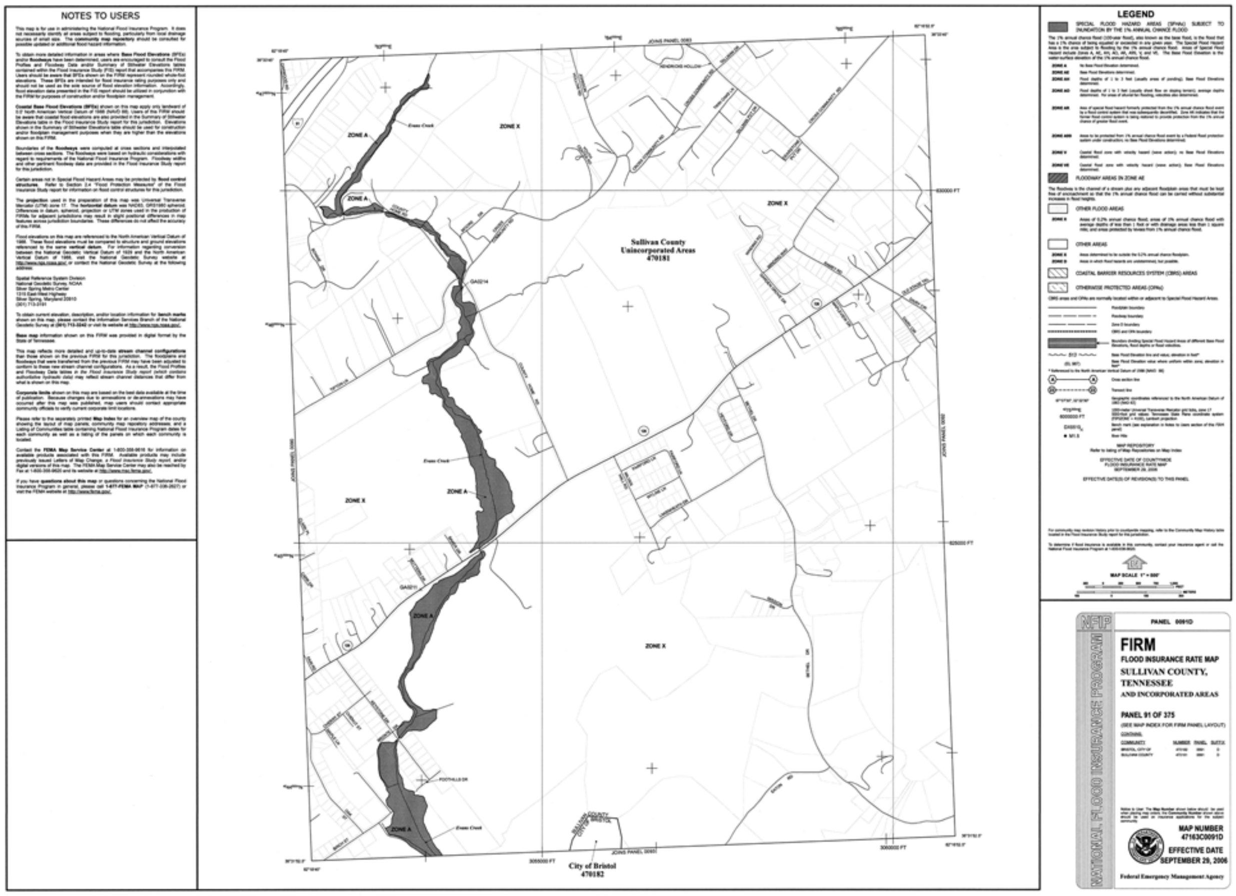
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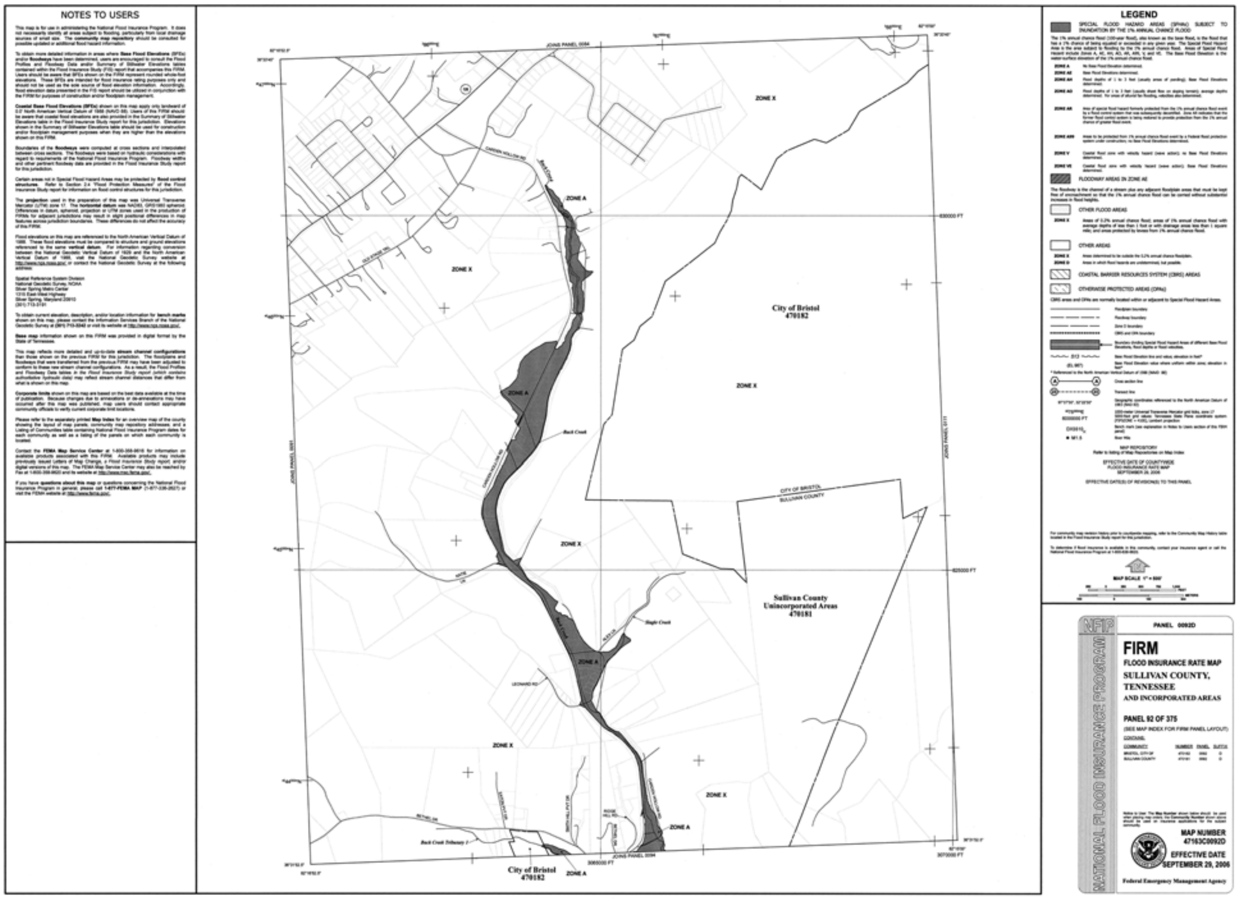
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TENNESSEE
AND INCORPORATED AREAS
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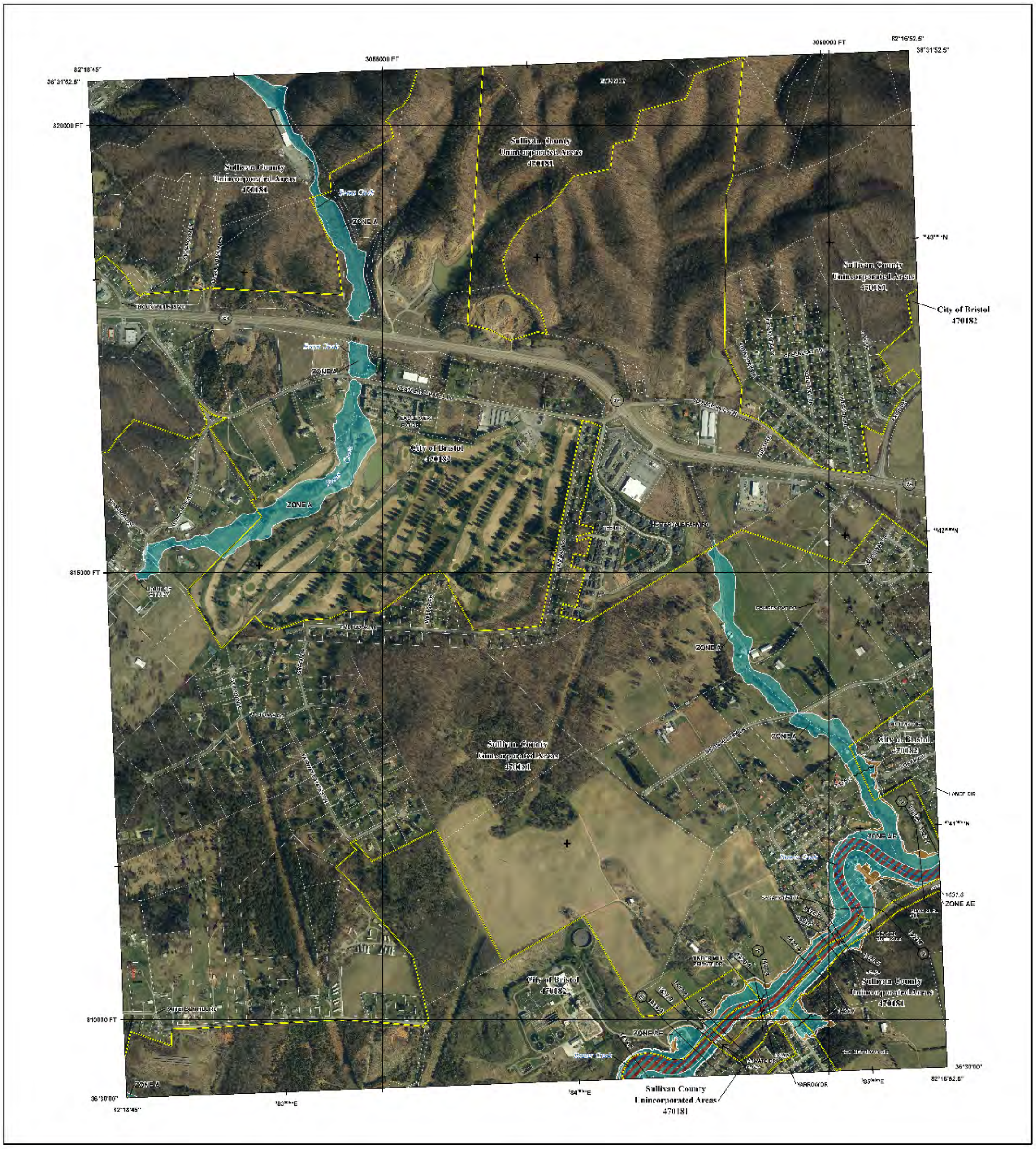
Federal Emergency Management Agency



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR* Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X* Future Conditions 1% Annual Chance Flood Hazard *Zone X* Area with Reduced Flood Risk due to Levee See Notes. *Zone X* Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X* Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
	Cross Sections with 1% Annual Chance Water Surface Elevation (E, 18.2, 17.5) Coastal Transect (B) Coastal Transect Baseline Profile Baseline Hydrographic Feature Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with the FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM came from the State of Tennessee Department of Finance and Administration, GIS Department. Orthophotography was collected by the Tennessee Department of Transportation and was flown in 2016 with a 12-inch ground sample distance.

SCALE

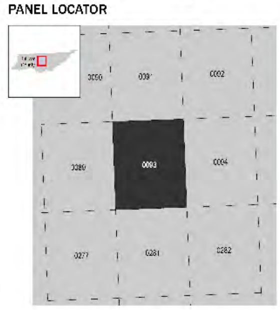
Map Projection:

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SULLIVAN COUNTY, TENNESSEE

and Incorporated Areas

PANEL 93 OF 375

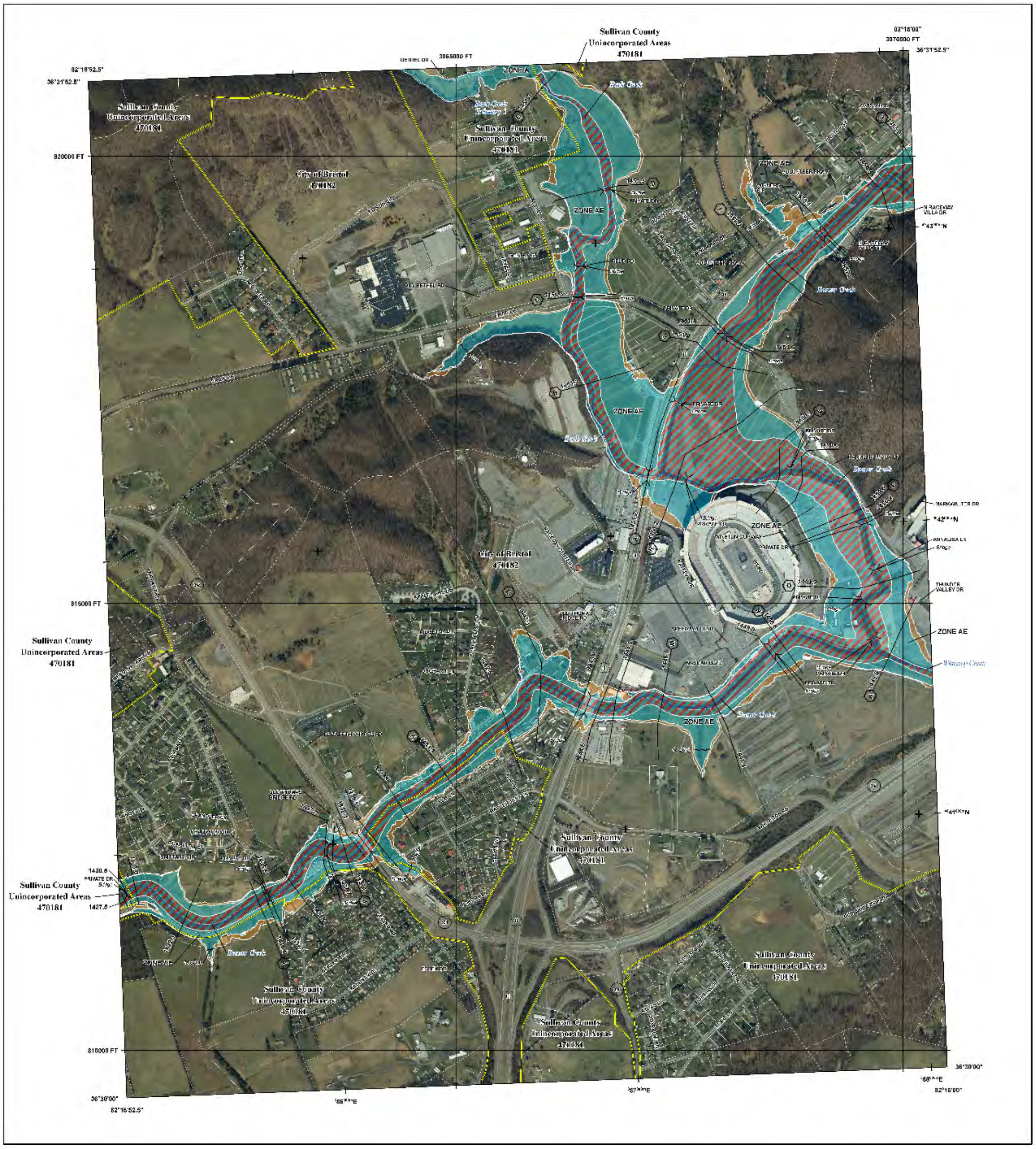
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BRISTOL, CITY OF	470182	0093	E
SULLIVAN COUNTY	470181	0093	E

VERSION NUMBER
2.6.3.0

MAP NUMBER
47163C0093E

MAP REVISED
July 31, 2024



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

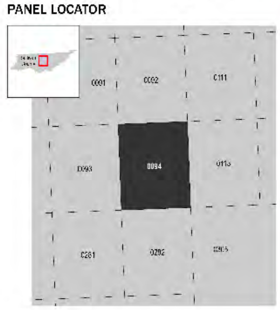
SCALE

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

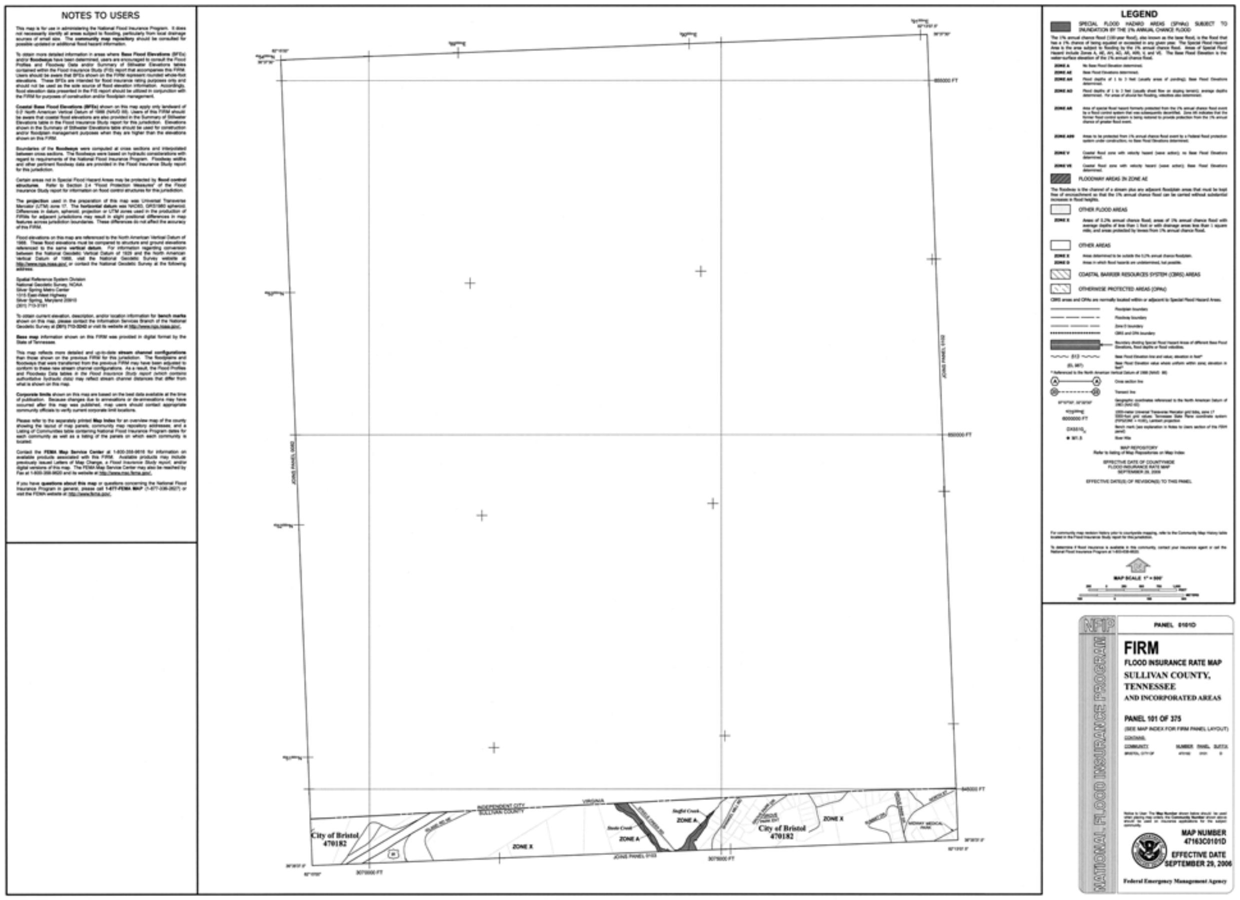
SULLIVAN COUNTY, TENNESSEE

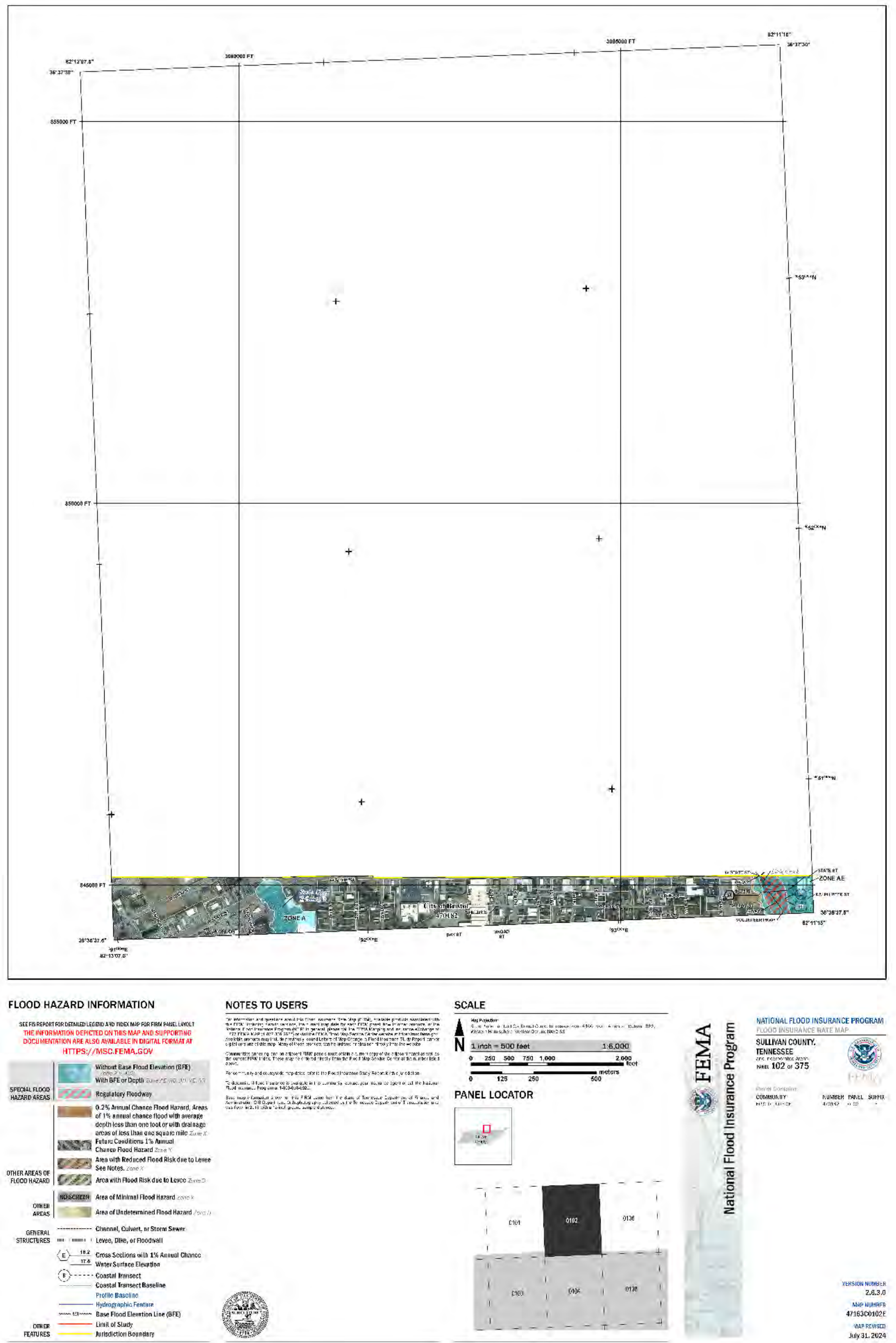
PANEL 94 OF 375

VERSION NUMBER
2.6.3.0

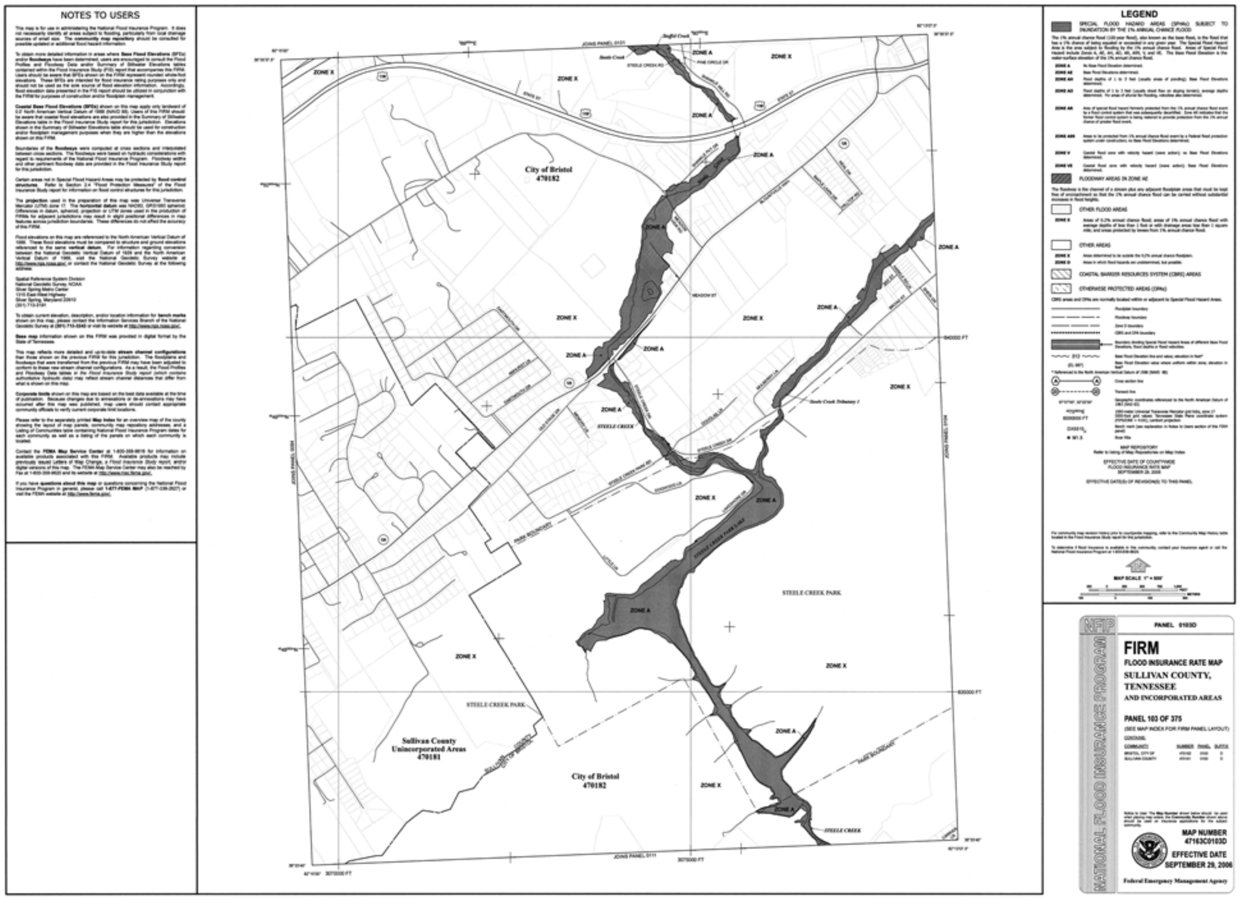
MAP NUMBER
47163C0094E

MAP REVISED
July 31, 2024


NOTES TO USERS
LEGEND
City of Bristol
470182
ZONE X
ZONE A
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0101D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 101 OF 375
MAP NUMBER
47163C0101D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency



3085000 FT
3090000 FT
855000 FT
850000 FT
845000 FT
City of Bristol
470182
ZONE A
ZONE AE
BAY ST
BROAD ST
VOLUNTEER PKWY
36°36'37.6"
82°11'15"
82°13'07.6"
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee See Notes. Zone X
Area with Flood Risk due to Levee Zone D
OTHER AREAS
NO SCREEN Area of Minimal Flood Hazard
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
18.2
17.5
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 500 feet
1:6,000
0 250 500 750 1,000 2,000 feet
0 125 250 500 meters
PANEL LOCATOR
0101
0102
0106
0103
0104
0108
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
PANEL 102 OF 375
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0102E
MAP REVISED
July 31, 2024


NOTES TO USERS
LEGEND
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
STEELE CREEK PARK
ZONE X
ZONE A
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0103D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 103 OF 375
MAP NUMBER
47163C0103D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes. Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	Base Flood Elevation Line (BFE)
OTHER FEATURES	Limit of Study
	Jurisdiction Boundary

NOTES TO USERS

SCALE

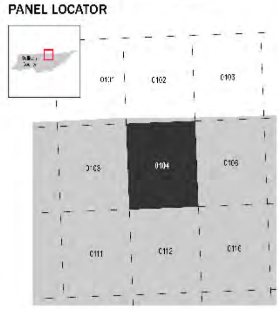
Map Projection:

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

SULLIVAN COUNTY, TENNESSEE

and Incorporated Areas

PANEL 104 OF 375

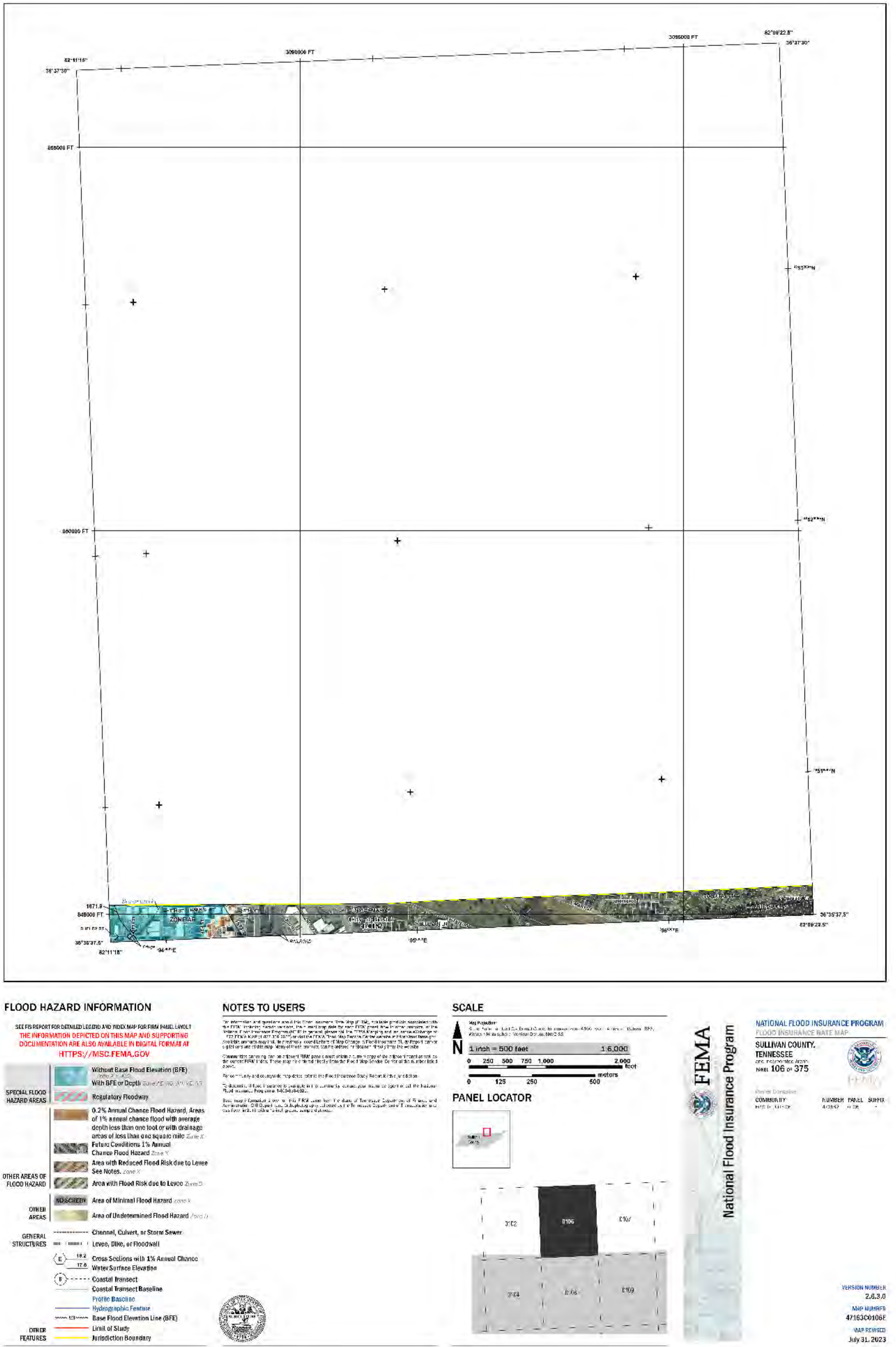
Panel Contains:

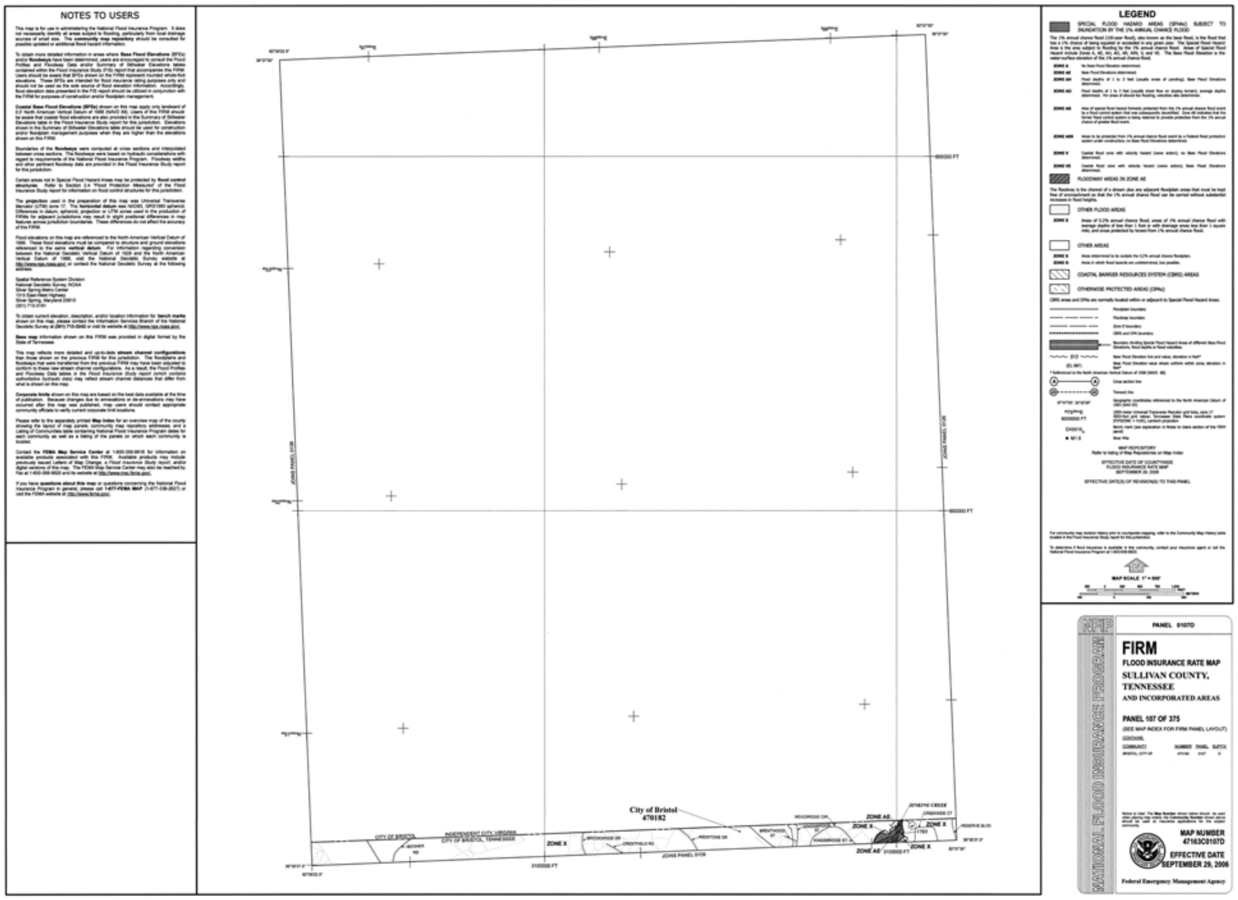
COMMUNITY	NUMBER	PANEL	SUFFIX

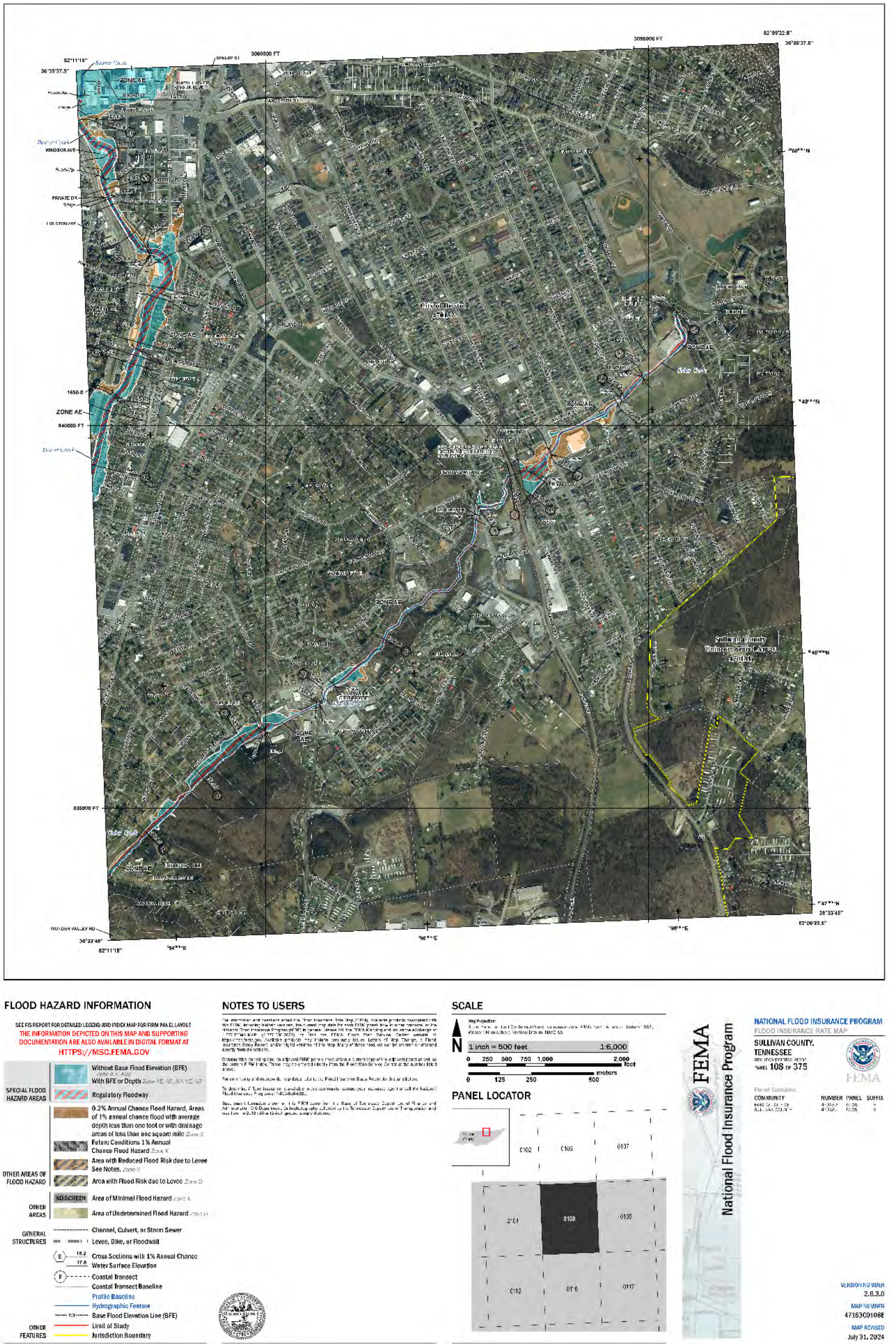
VERSION NUMBER 2.6.3.0

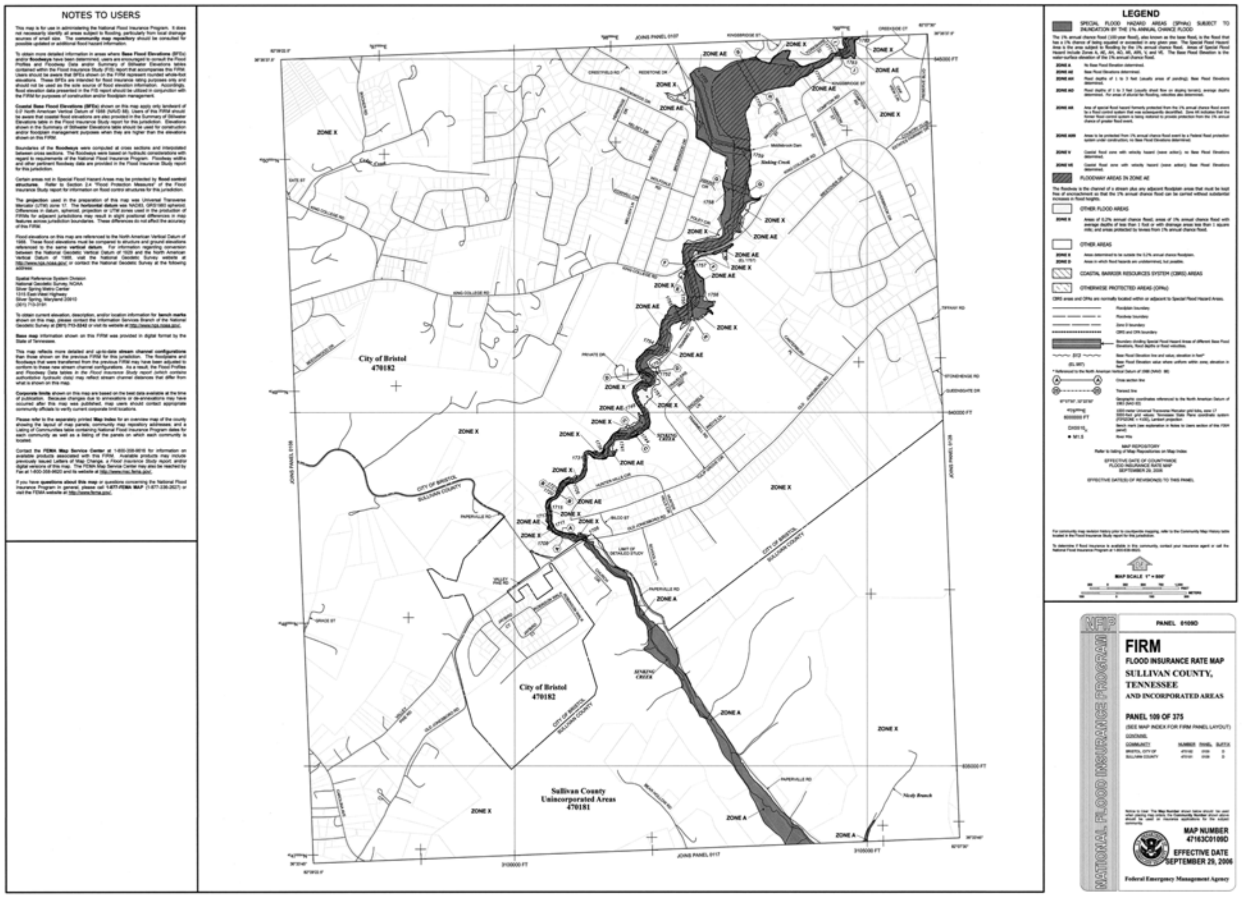
MAP NUMBER 47163C0104E

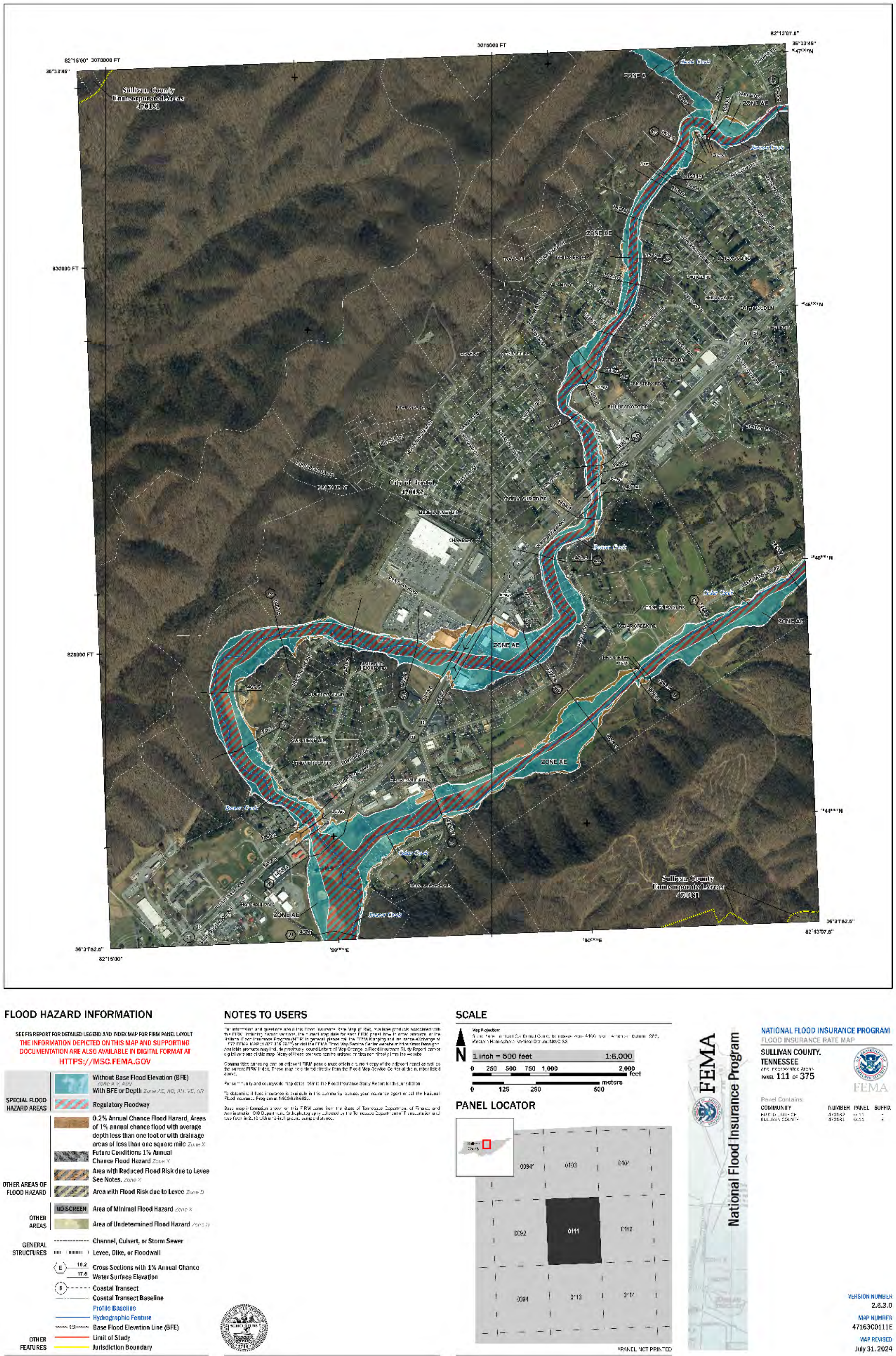
MAP REVISED July 31, 2024

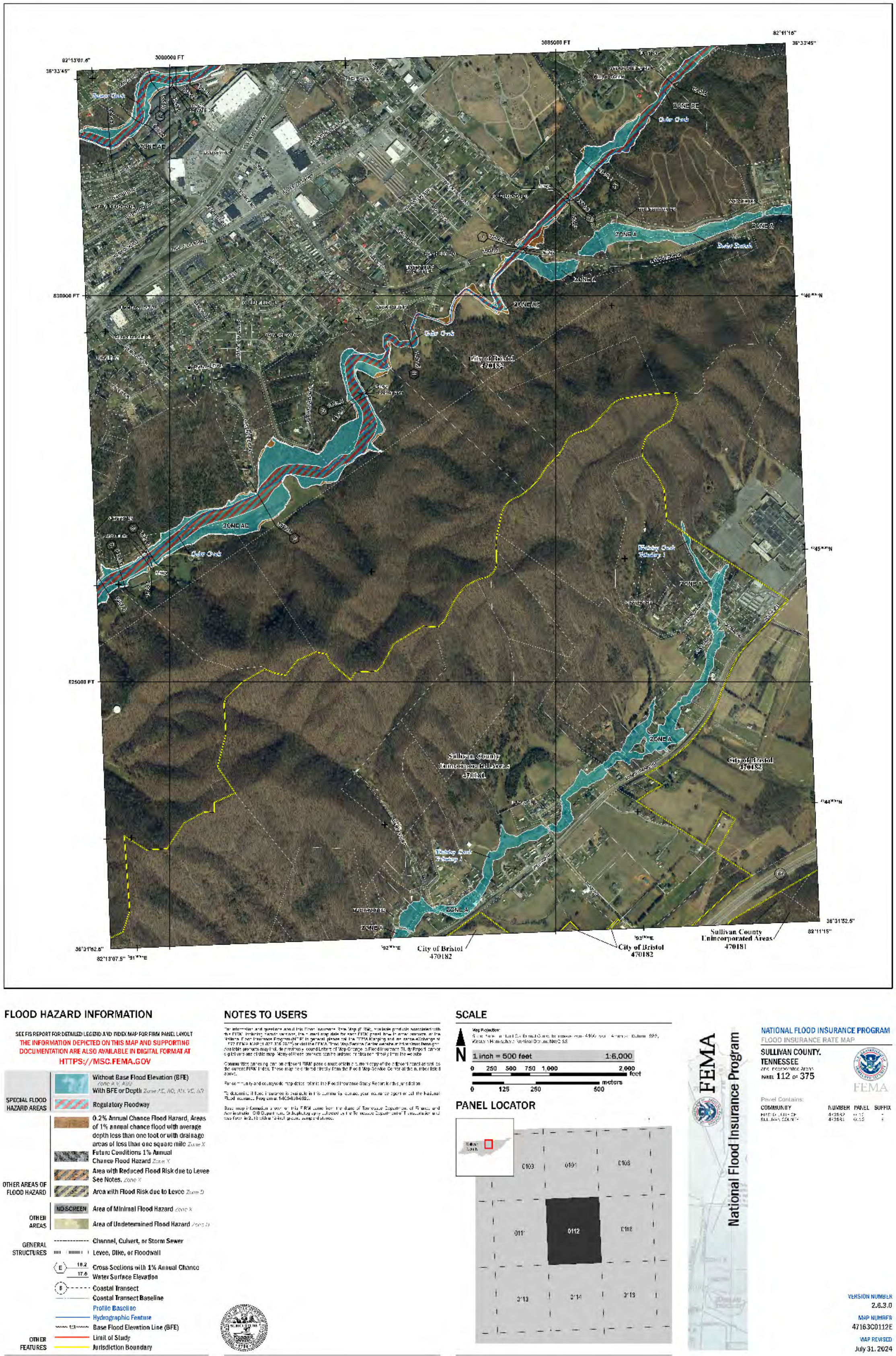

3098000 FT
3099000 FT
848000 FT
ZONE AE
City of Bristol
470182
RAILROAD
36°35'37.5"
82°09'22.5"
82°11'18"
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee See Notes. Zone X
OTHER AREAS OF FLOOD HAZARD
Area with Flood Risk due to Levee Zone D
NO SCREEN
Area of Minimal Flood Hazard Zone X
OTHER AREAS
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
18.2
17.5
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
N
1 inch = 500 feet
1:6,000
0 250 500 750 1,000 2,000 feet
0 125 250 500 meters
PANEL LOCATOR
0102
0106
0107
0104
0108
0109
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
PANEL 106 OF 375
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0106E
MAP REVISED
July 31, 2023

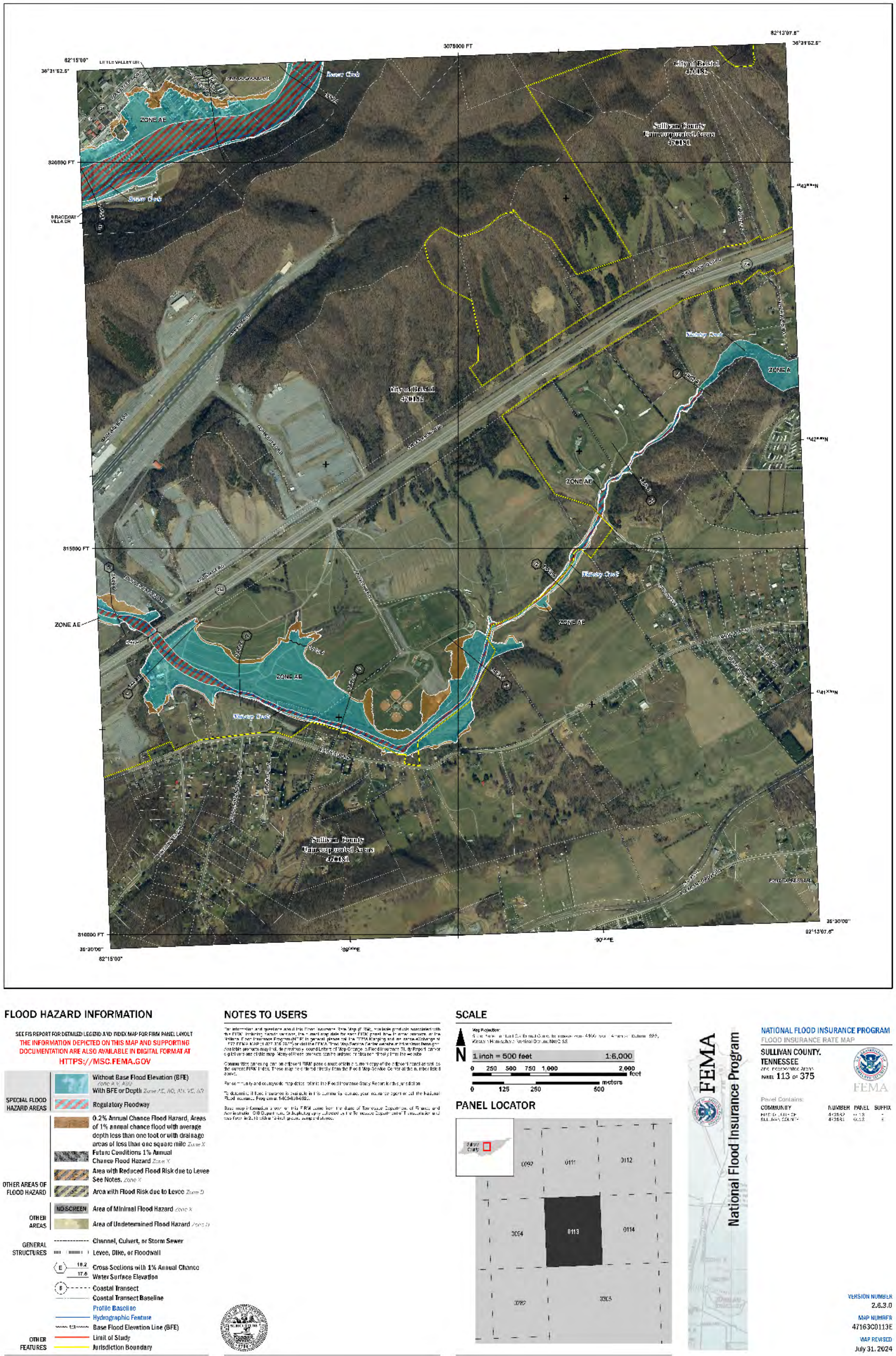

NOTES TO USERS
LEGEND
City of Bristol
470182
ZONE X
ZONE AE
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 107 OF 375
MAP NUMBER
47163C0107D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


City of Bristol
ZONE AE
Sullivan County Unincorporated Areas
WINDSOR AVE
PRIVATE DR
ZONE AE
840000 FT
835000 FT
3090000 FT
3095000 FT
WONDER VALLEY RD
36°33'45"
82°11'15"
82°09'22.5"
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee See Notes. Zone X
Area with Flood Risk due to Levee Zone D
OTHER AREAS
NO SCREEN
Area of Minimal Flood Hazard Zone X
Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
18.2
17.5
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 500 feet
1:6,000
0 250 500 750 1,000 2,000 feet
0 125 250 500 meters
PANEL LOCATOR
0102
0106
0107
0104
0108
0109
0112
0116
0117
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
and Incorporated Areas
PANEL 108 OF 375
Panel Contains:
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0108E
MAP REVISED
July 31, 2024

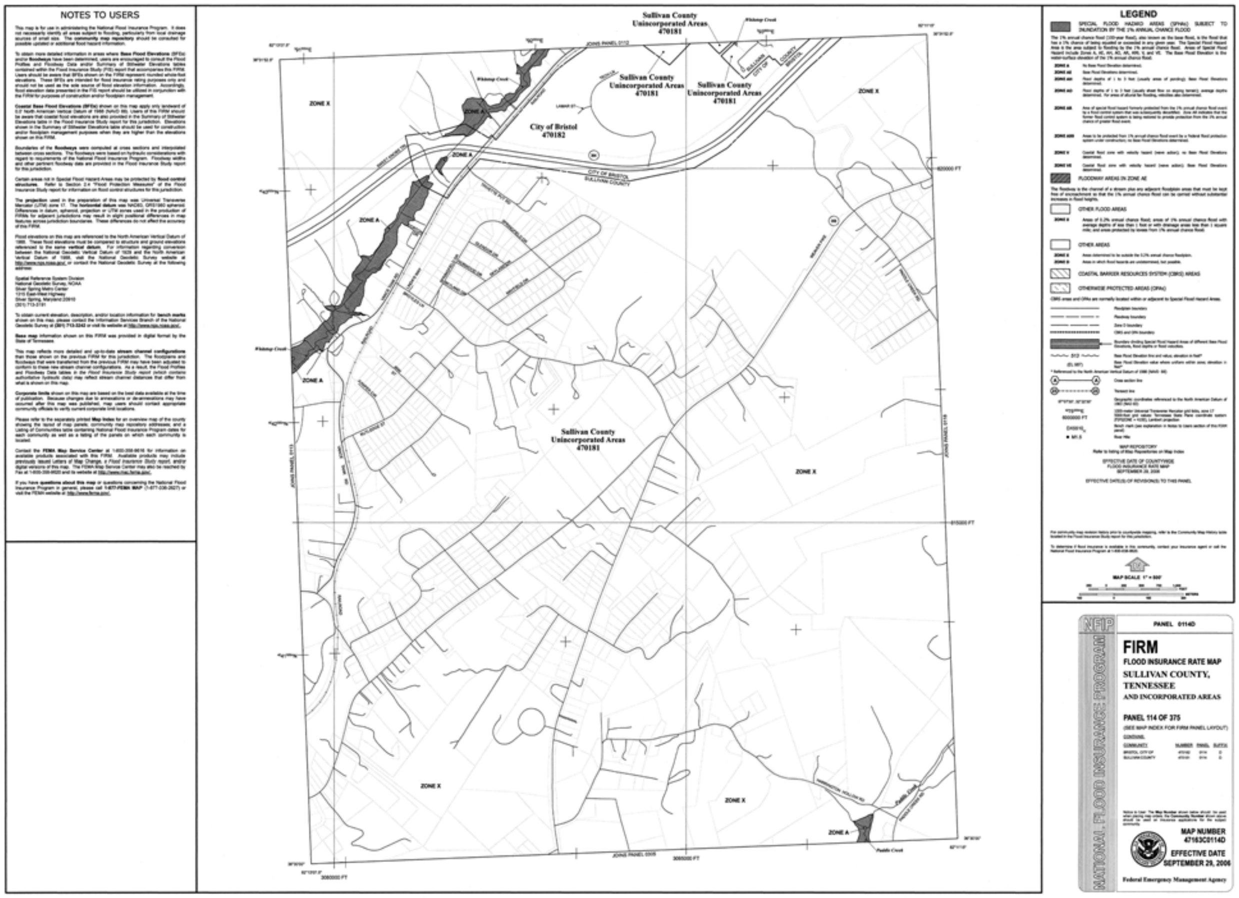

NOTES TO USERS
LEGEND
City of Bristol
470182
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0109D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 109 OF 375
MAP NUMBER
47163C0109D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

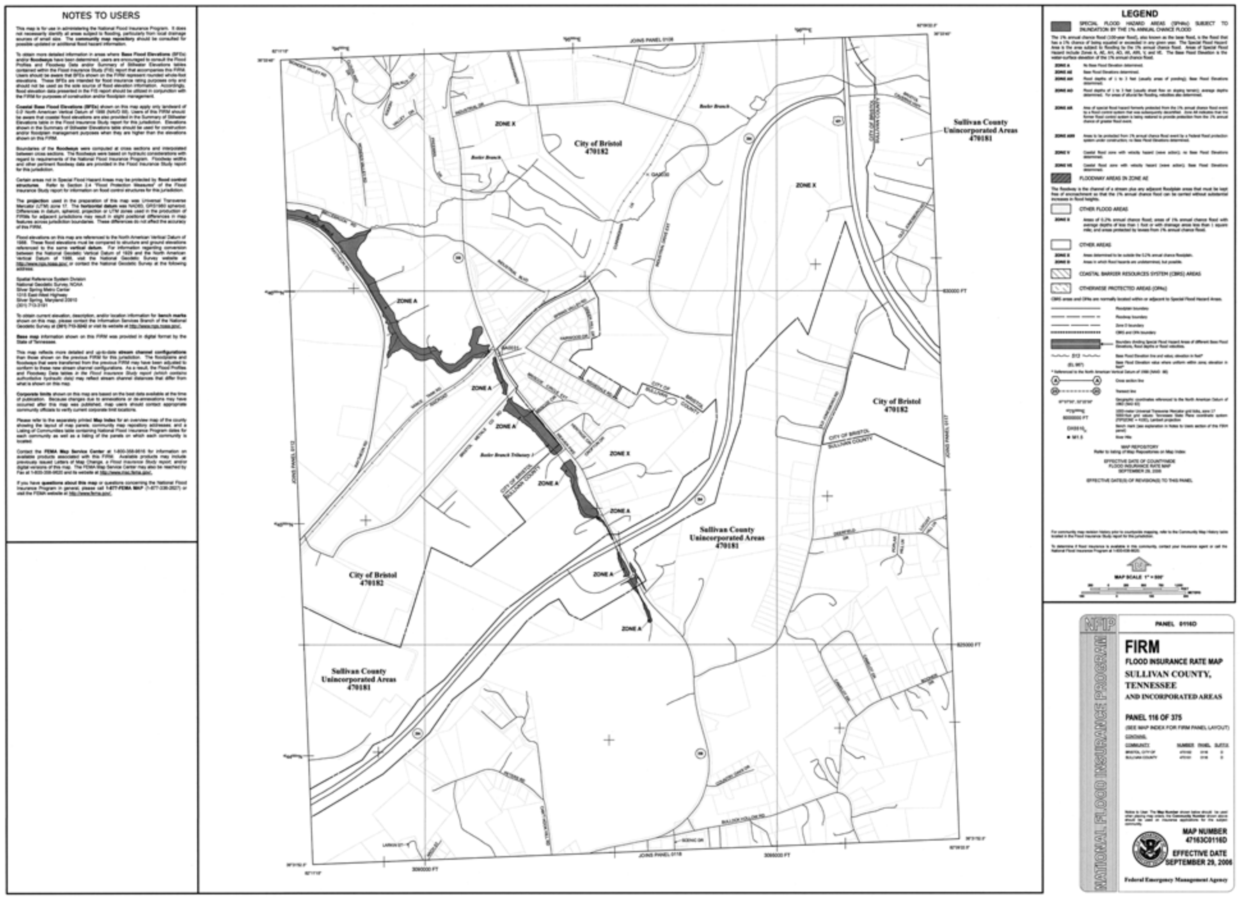

ZONE AE
ZONE A
Sullivan County
Unincorporated Areas
470181
Beaver Creek
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE) Zone A, V, A99
With BFE or Depth Zone AE, AO, AH, VE, AR
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee See Notes. Zone X
Area with Flood Risk due to Levee Zone D
OTHER AREAS
NO SCREEN Area of Minimal Flood Hazard Zone X
Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 500 feet
1:6,000
feet
meters
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
PANEL 111 OF 375
Panel Contains:
COMMUNITY NUMBER PANEL SUFFIX
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0111E
MAP REVISED
July 31, 2024

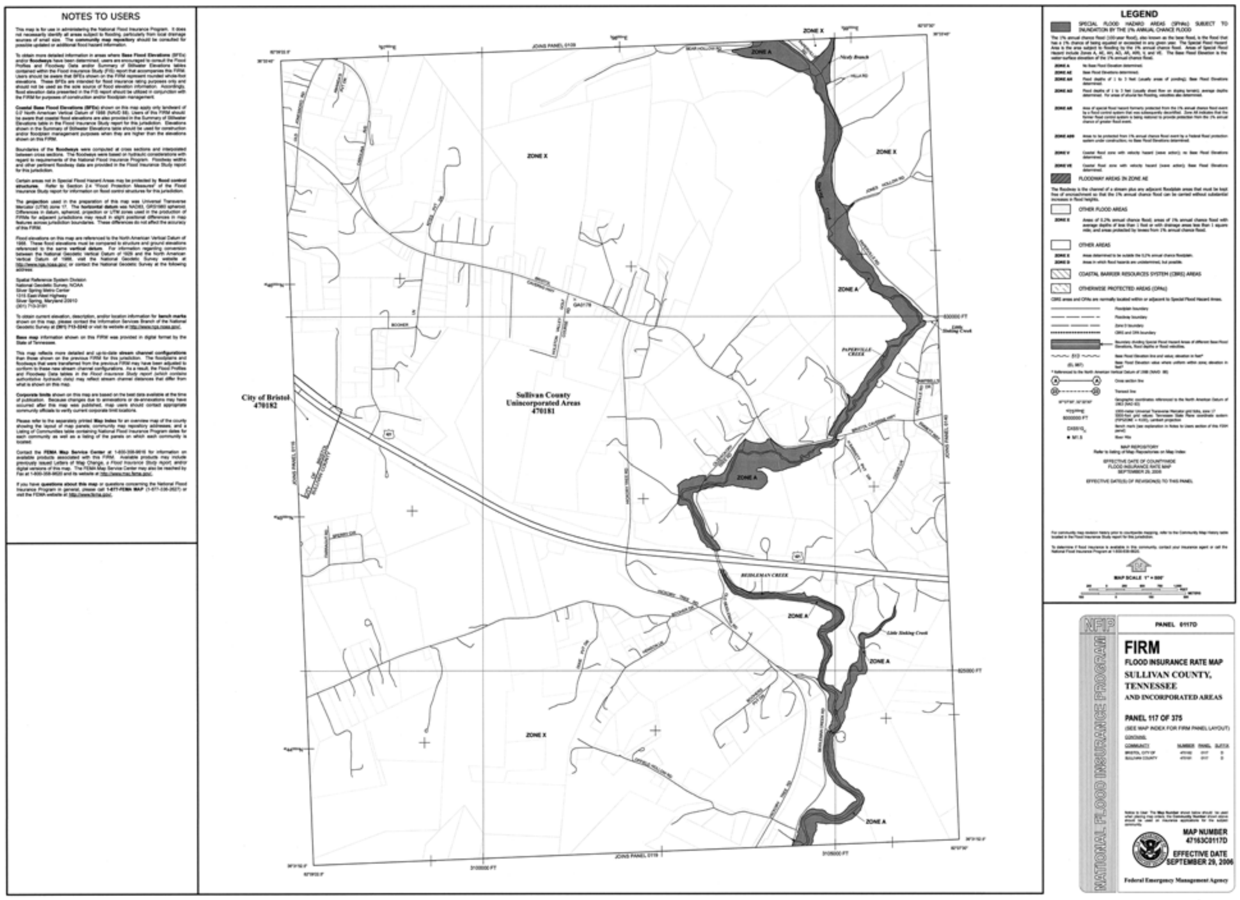

ZONE AE
ZONE A
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Flood Risk due to Levee See Notes.
Area with Flood Risk due to Levee
OTHER AREAS
NO SCREEN
Area of Minimal Flood Hazard
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
Limit of Study
Jurisdiction Boundary
OTHER FEATURES
NOTES TO USERS
SCALE
1 inch = 500 feet
1:6,000
feet
meters
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
PANEL 112 OF 375
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0112E
MAP REVISED
July 31, 2024

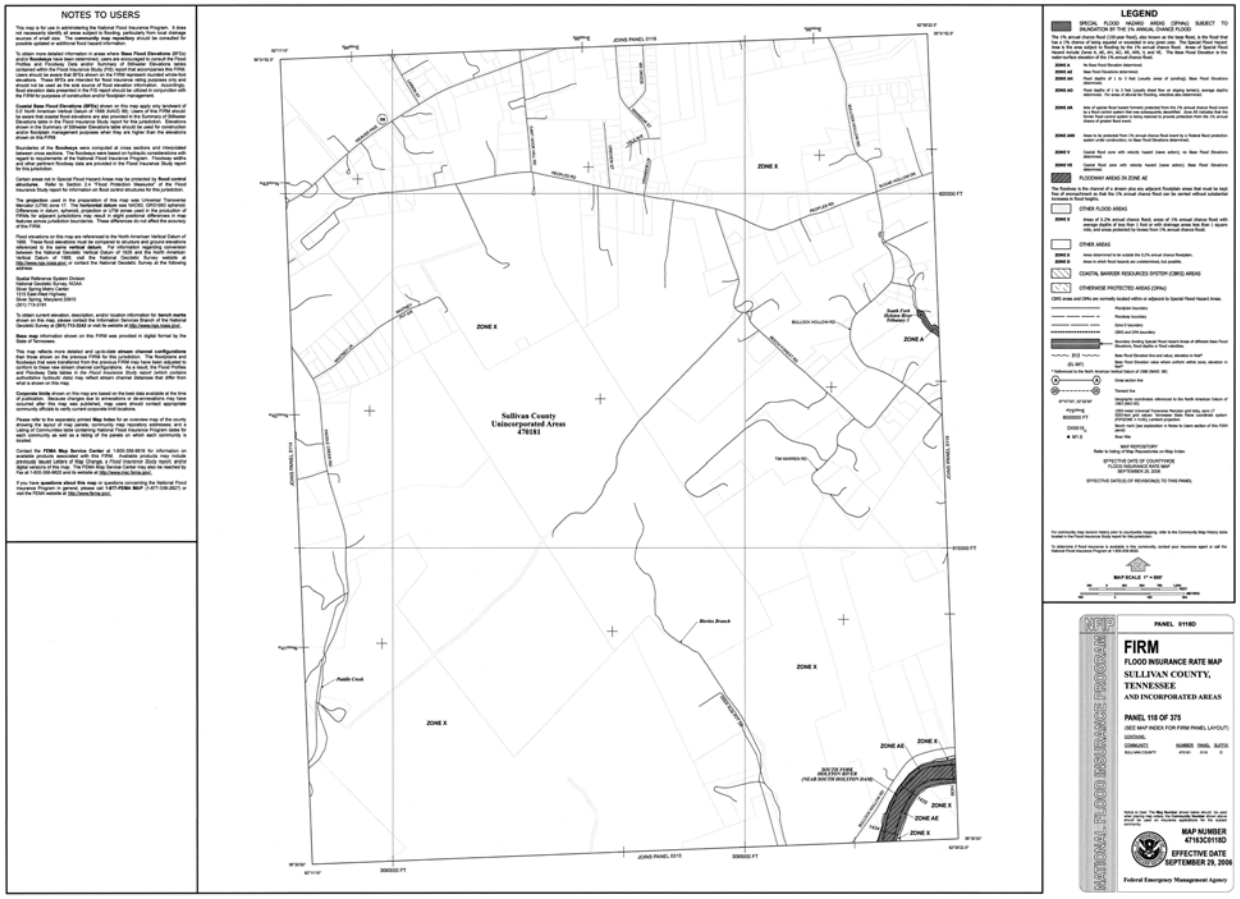


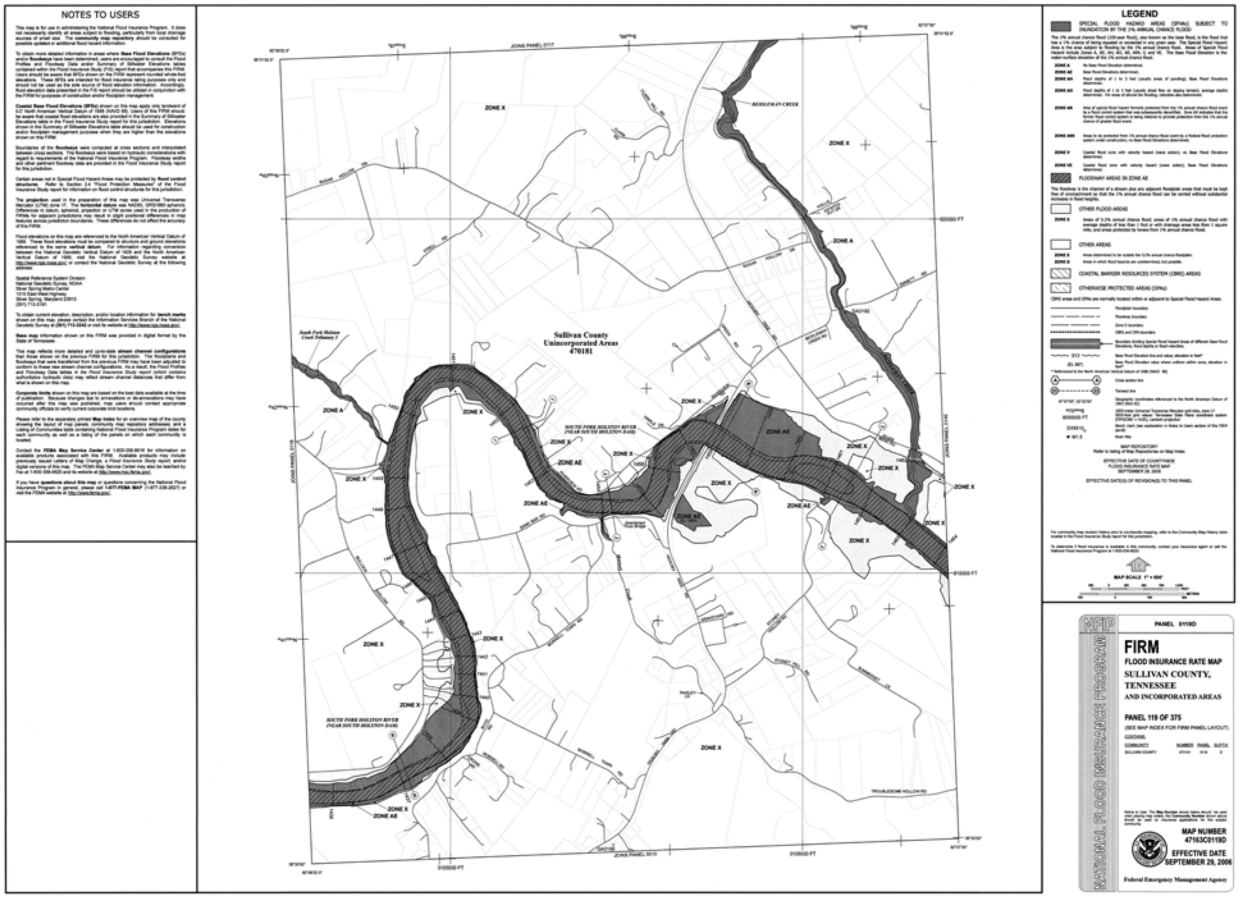
ZONE AE
City of Bristol 470182
Sullivan County Unincorporated Areas 470181
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee See Notes. Zone X
Area with Flood Risk due to Levee Zone D
OTHER AREAS
NO SCREEN
Area of Minimal Flood Hazard Zone X
Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
Map Projection:
1 inch = 500 feet
1:6,000
0 250 500 750 1,000 2,000 feet
0 125 250 500 meters
PANEL LOCATOR
0092
0111
0112
0094
0113
0114
0282
0305
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
PANEL 113 OF 375
Panel Contains:
COMMUNITY
NUMBER
PANEL
SUFFIX
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0113E
MAP REVISED
July 31, 2024

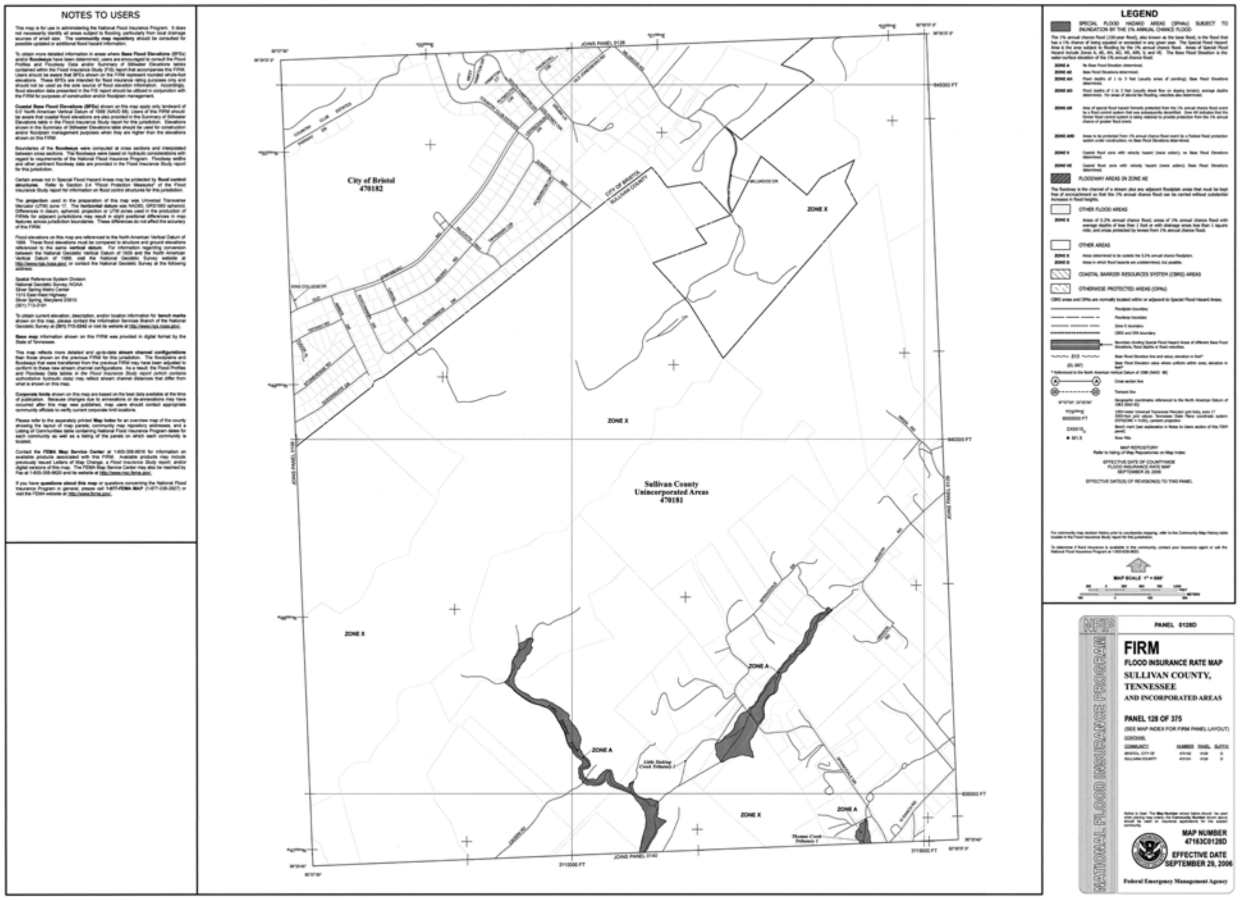

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
ZONE X
ZONE A
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 114 OF 375
MAP NUMBER
47163C0114D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

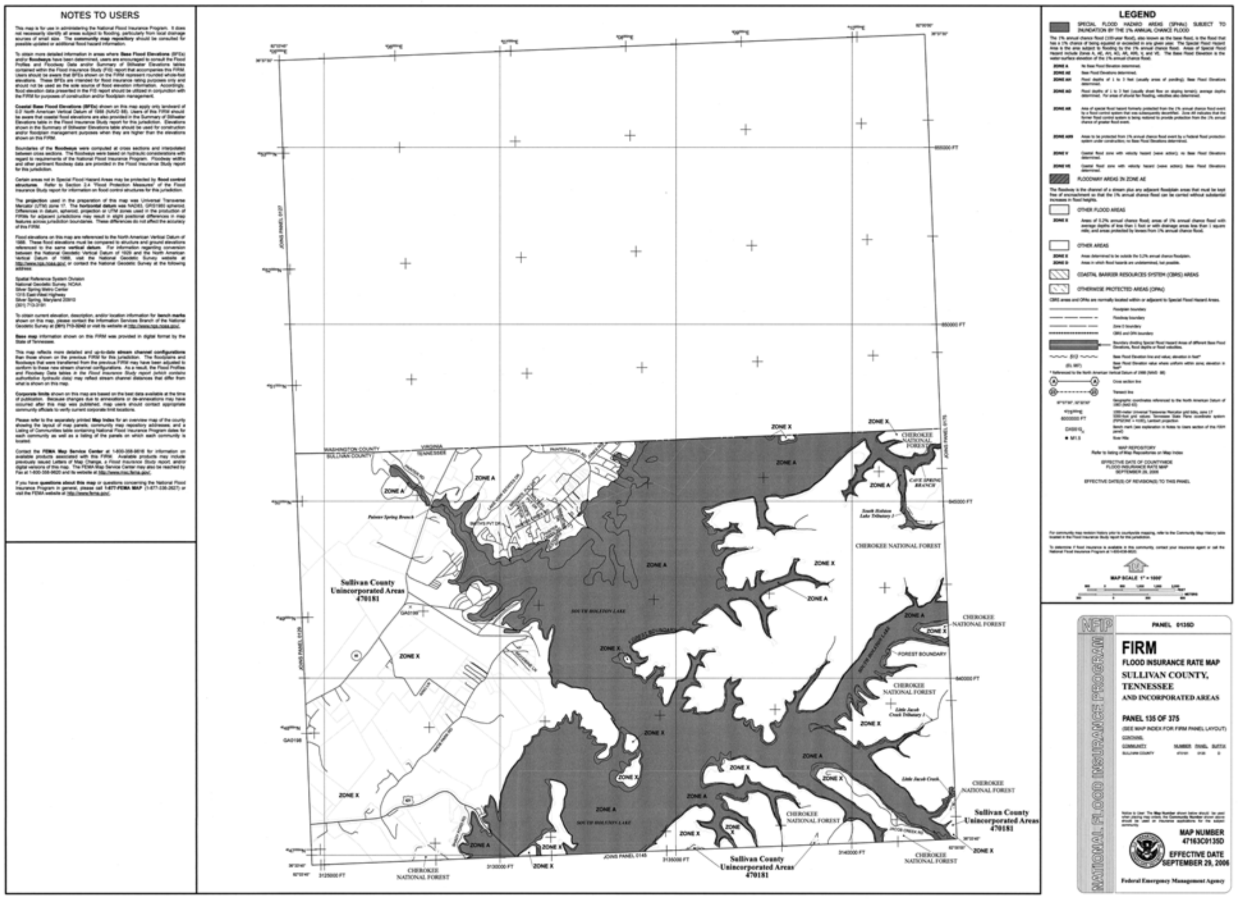

NOTES TO USERS
LEGEND
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE X
ZONE A
Boiler Branch
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0116D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 116 OF 375
MAP NUMBER
47163C0116D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

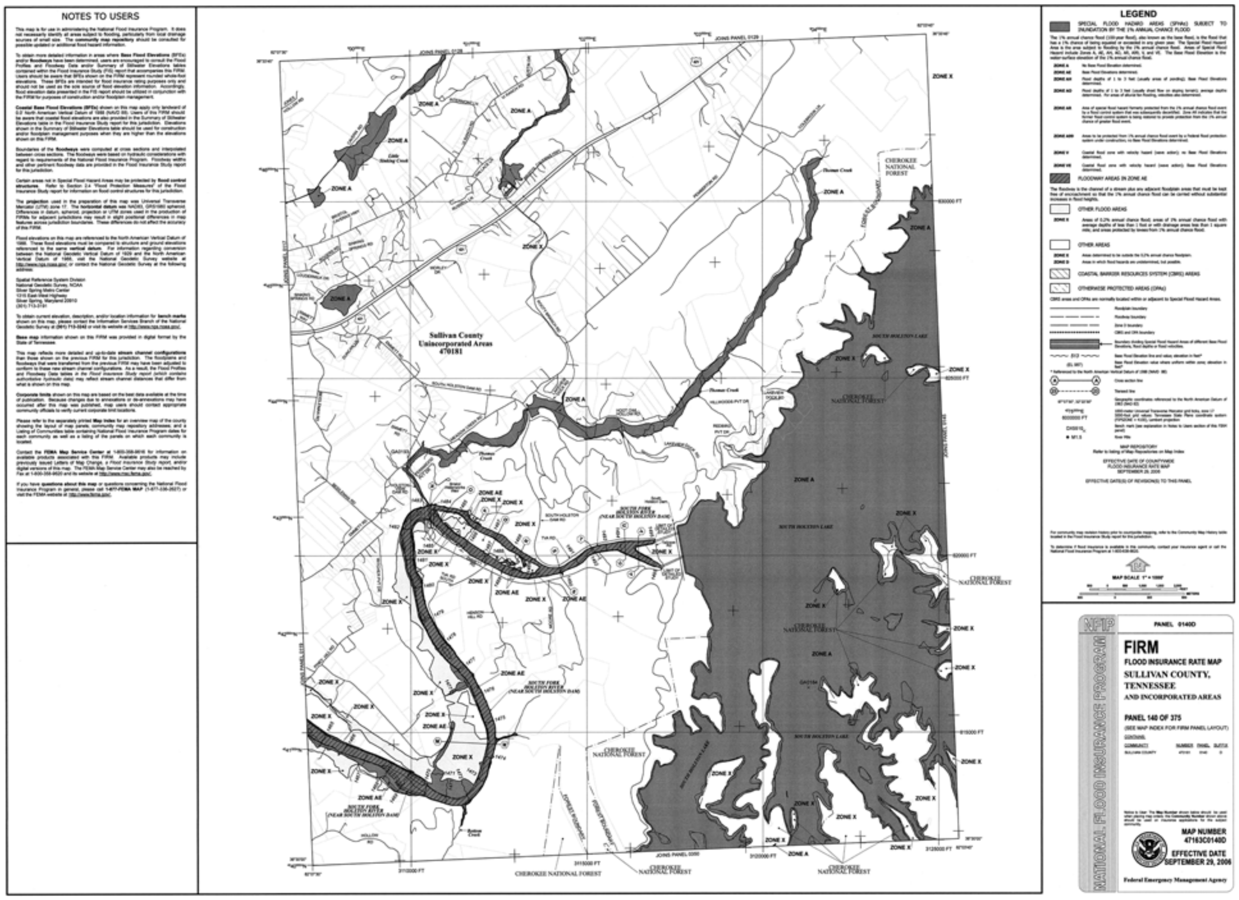

NOTES TO USERS
LEGEND
ZONE X
ZONE A
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
BEDLEMAN CREEK
Little Sinking Creek
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0117D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 117 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
47163C0117D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

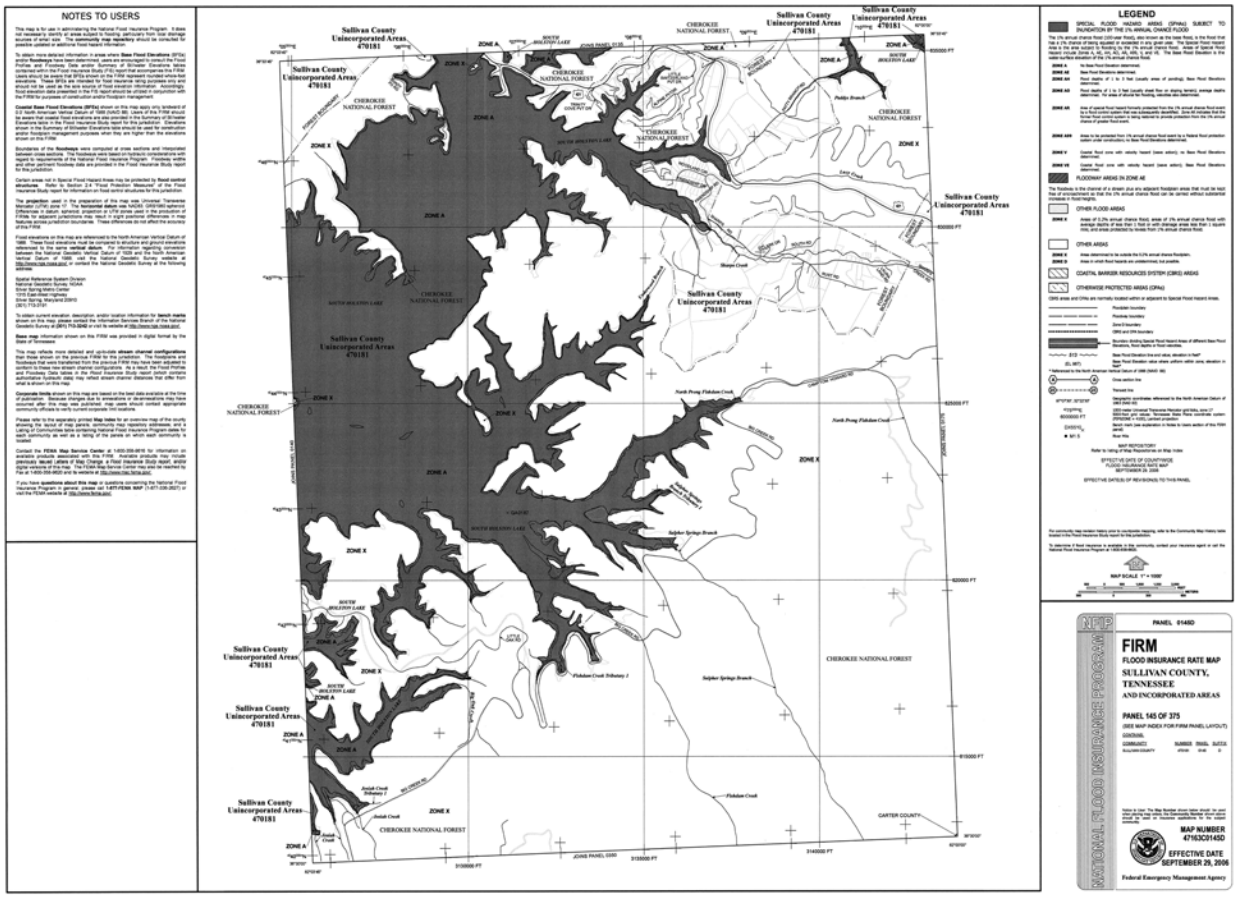

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
ZONE X
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0118D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 118 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
47163C0118D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

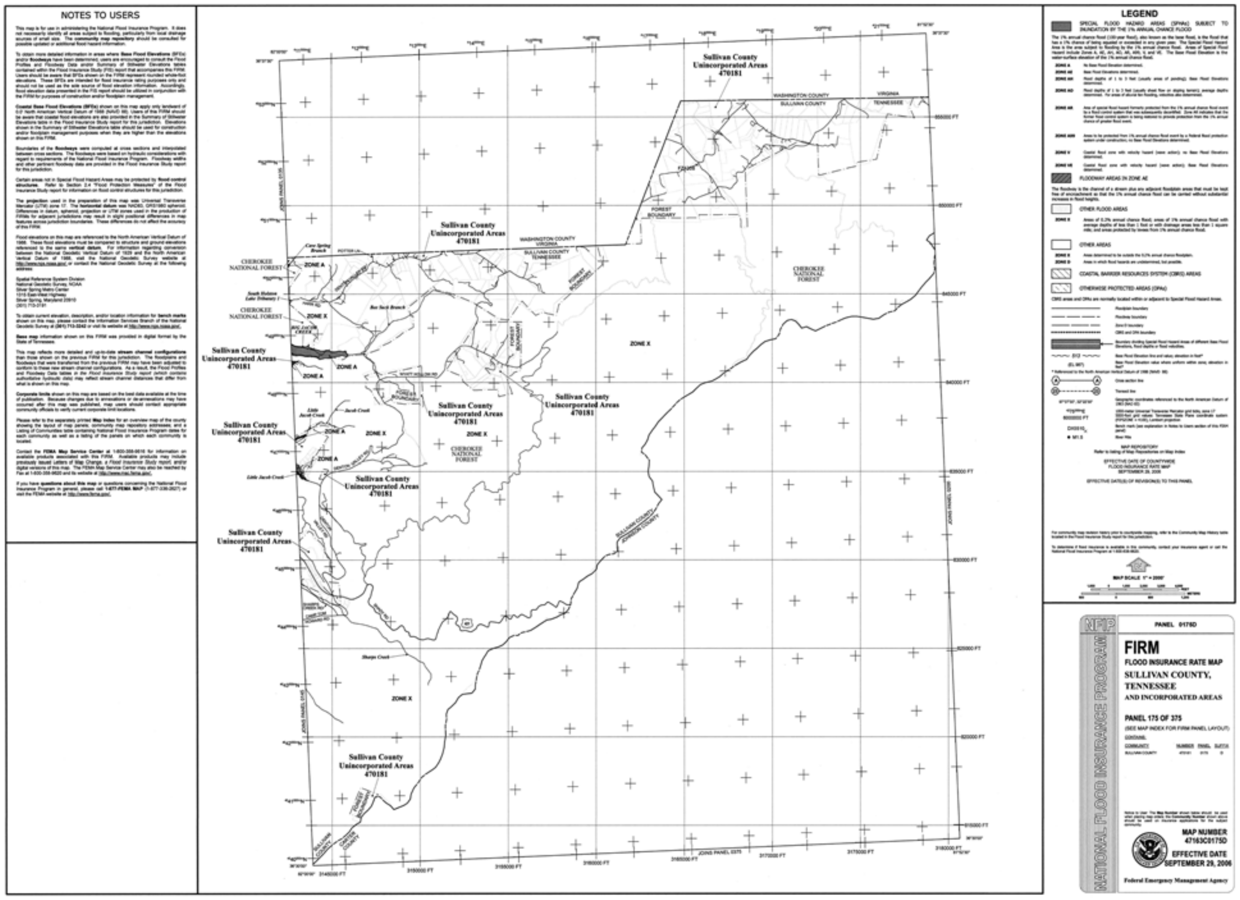

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
ZONE X
ZONE AE
ZONE A
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 119 OF 375
MAP NUMBER
47163C0119D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

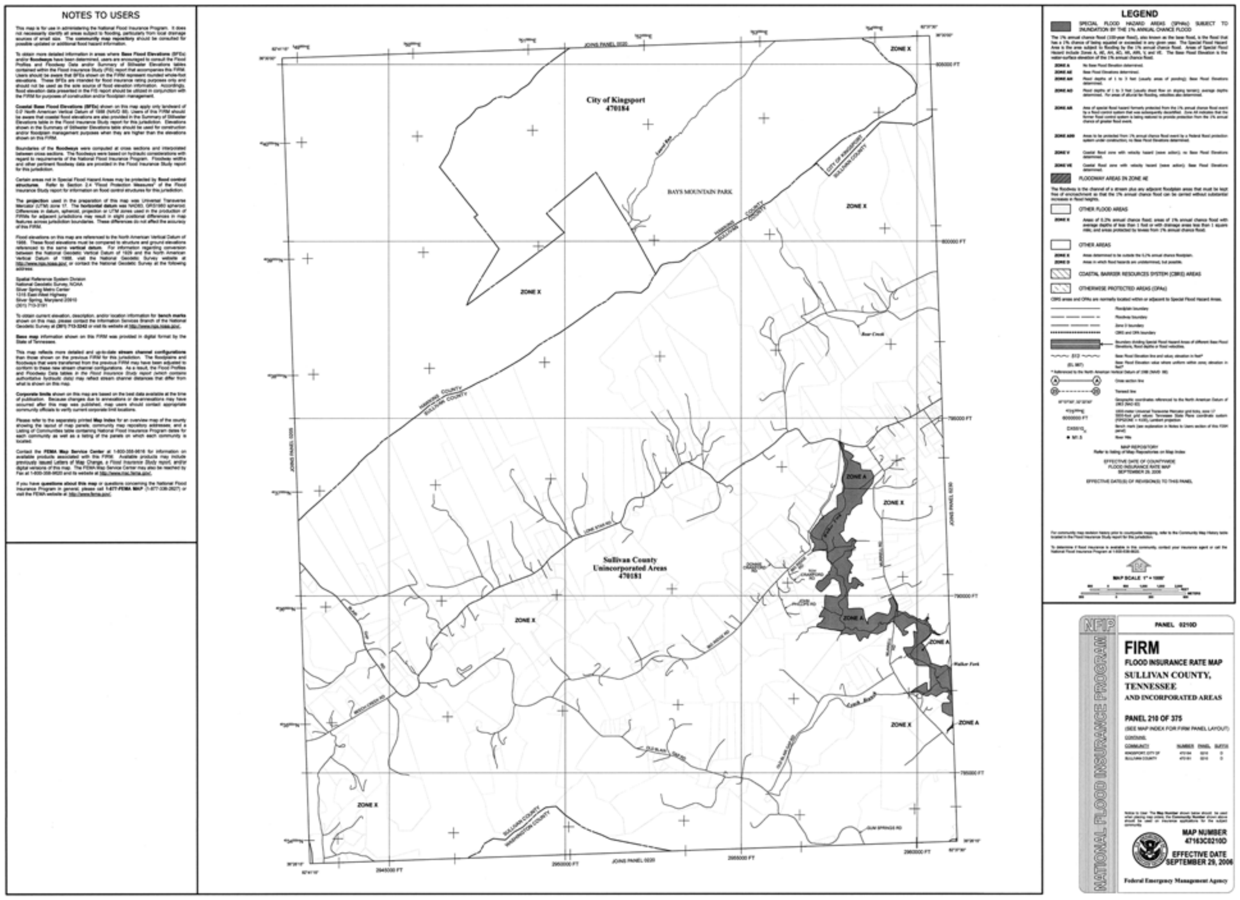

NOTES TO USERS
LEGEND
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE X
ZONE A
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0128D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 128 OF 375
MAP NUMBER
47163C0128D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

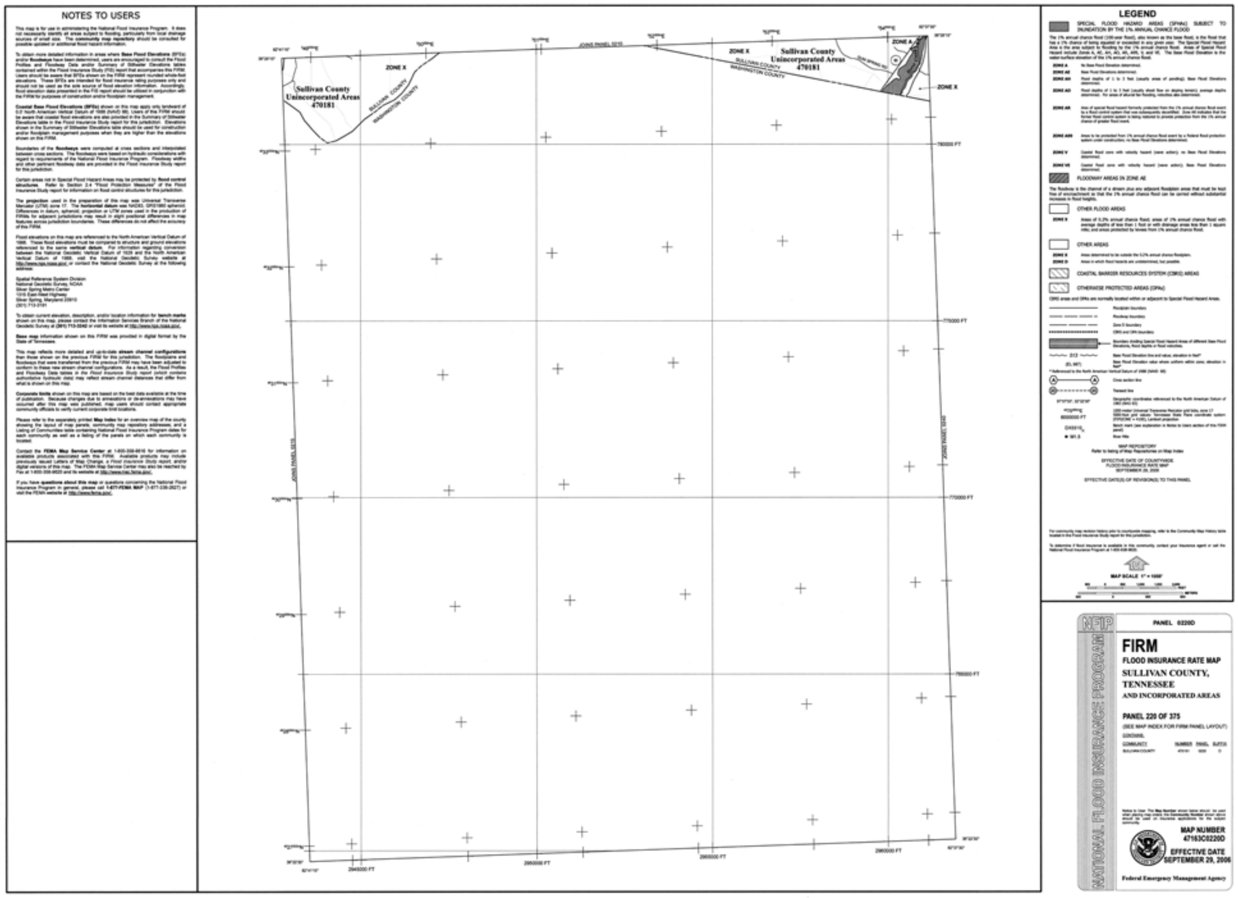

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE X
SOUTH HOLSTON LAKE
CHEROKEE NATIONAL FOREST
PANEL 0135D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 135 OF 375
MAP NUMBER
47163C0135D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM

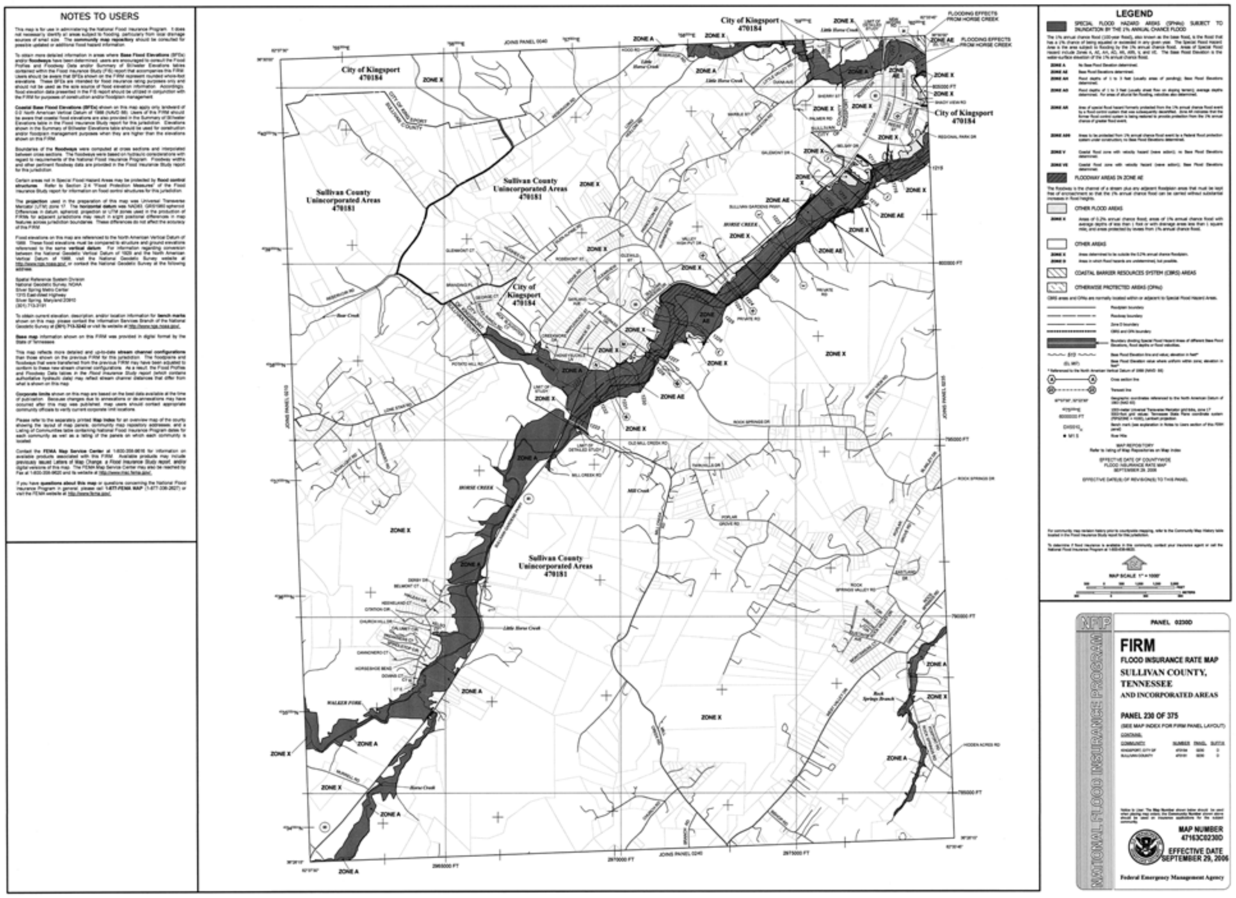

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
CHEROKEE NATIONAL FOREST
SOUTH HOLSTON LAKE
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0140D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 140 OF 375
MAP NUMBER
47163C0140D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
CHEROKEE NATIONAL FOREST
ZONE A
ZONE X
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 145 OF 375
MAP NUMBER 47163C0145D
EFFECTIVE DATE SEPTEMBER 29, 2006
Federal Emergency Management Agency

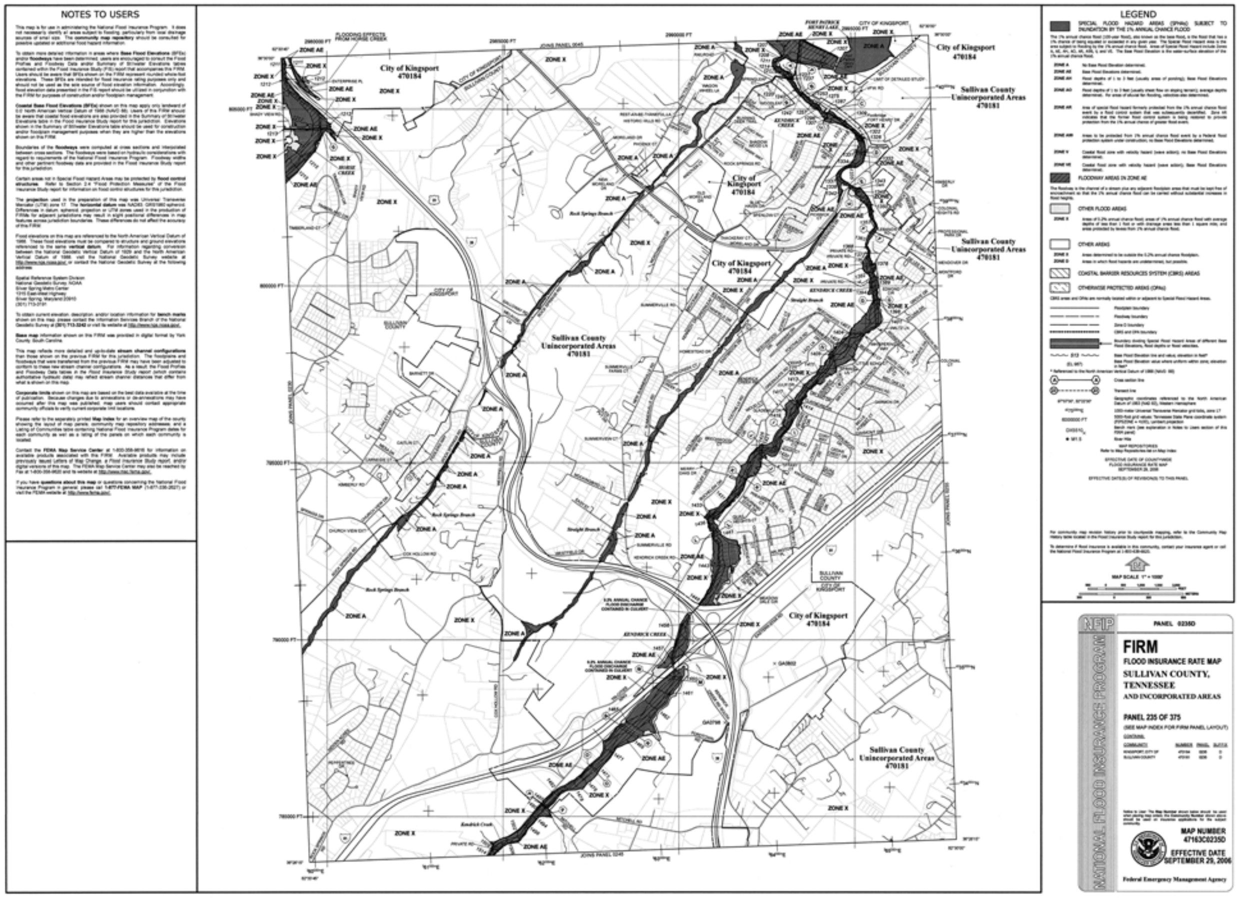

NOTES TO USERS
LEGEND
Sullivan County Unincorporated Areas 470181
CHEROKEE NATIONAL FOREST
ZONE A
ZONE X
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 175 OF 375
MAP NUMBER 47163C0175D
EFFECTIVE DATE SEPTEMBER 29, 2006
Federal Emergency Management Agency

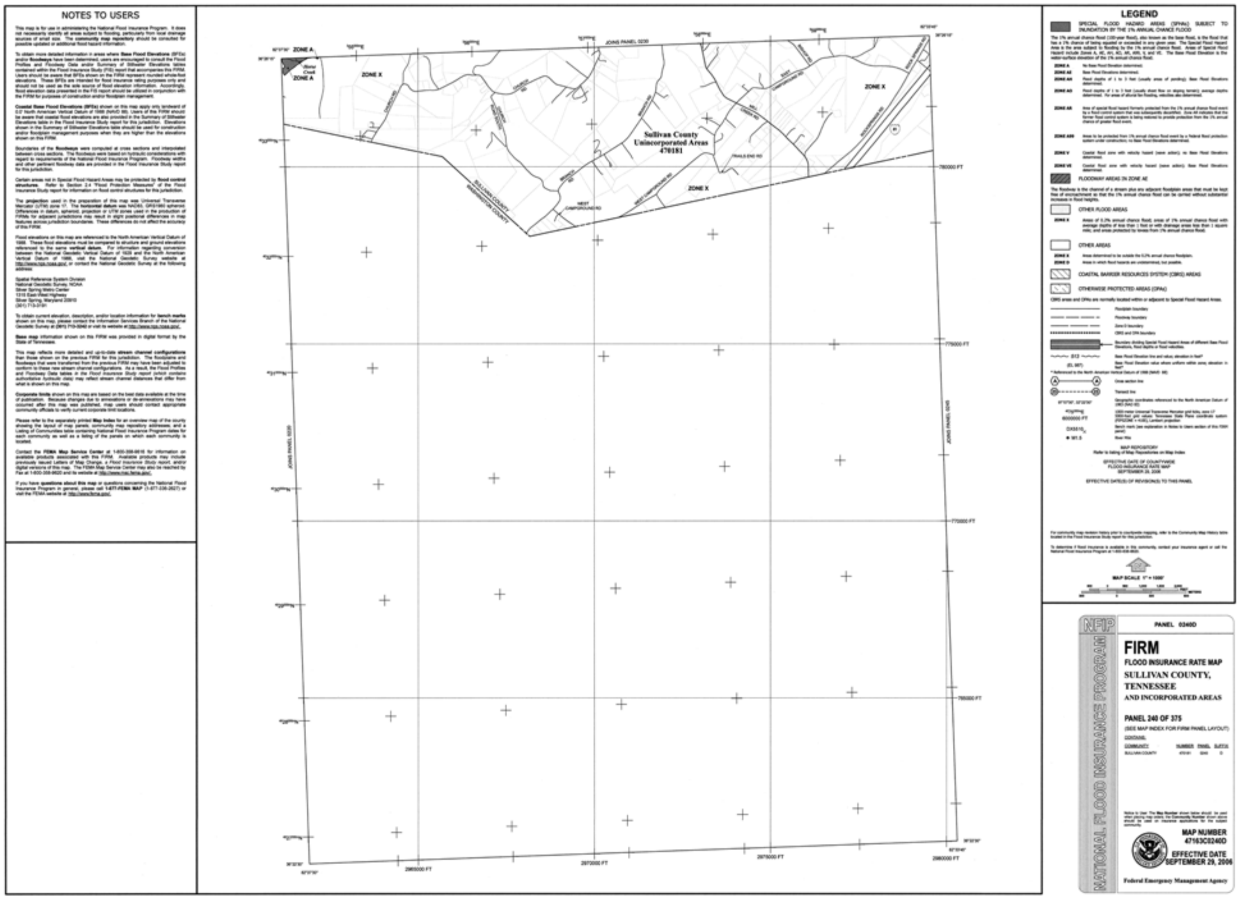

NOTES TO USERS
LEGEND
City of Kingsport
470184
BAYS MOUNTAIN PARK
ZONE X
ZONE A
Sullivan County
Unincorporated Areas
470181
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0210D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 210 OF 375
MAP NUMBER
47163C0210D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

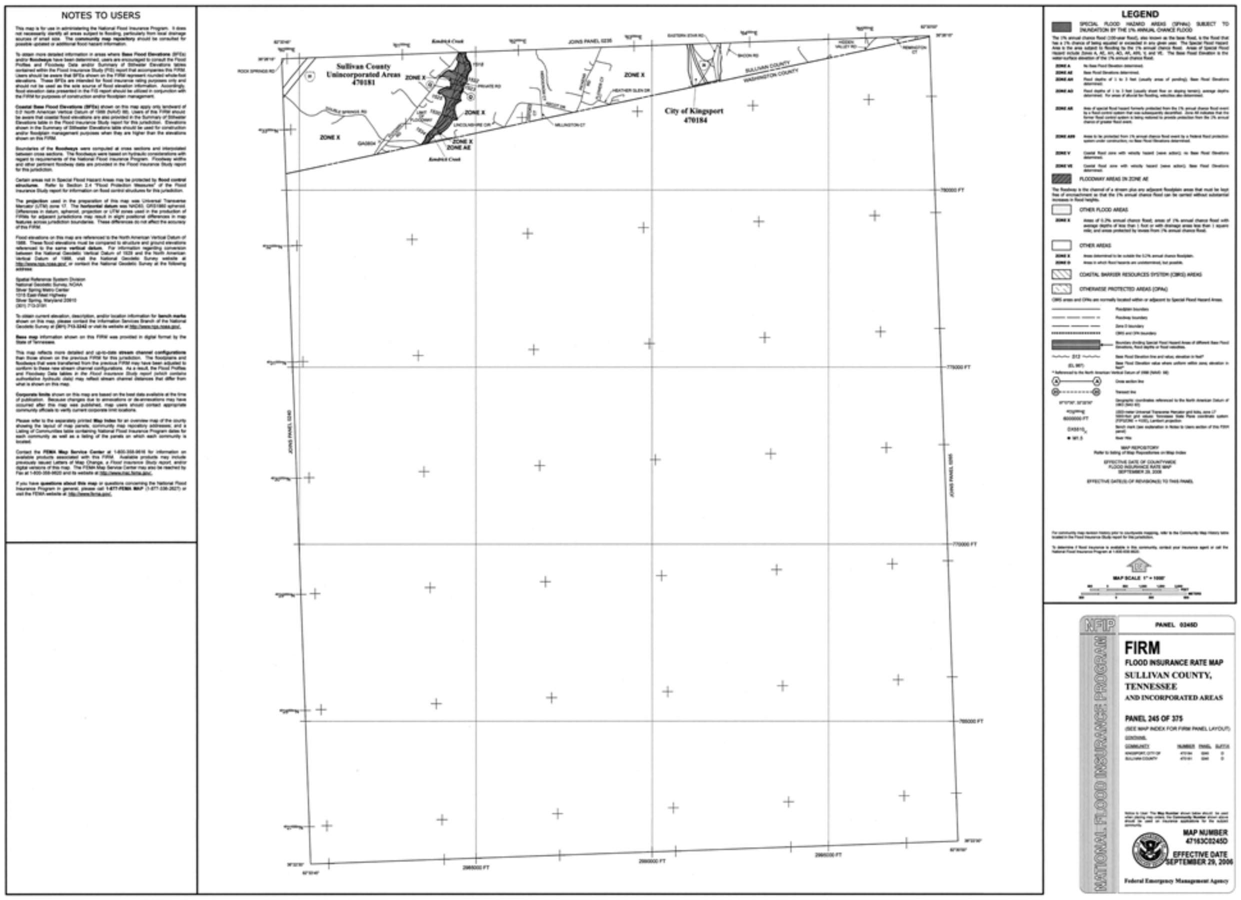

NOTES TO USERS
LEGEND
Sullivan County Unincorporated Areas 470181
ZONE X
ZONE A
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0220D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 220 OF 375
MAP NUMBER 47163C0220D
EFFECTIVE DATE SEPTEMBER 29, 2006
Federal Emergency Management Agency

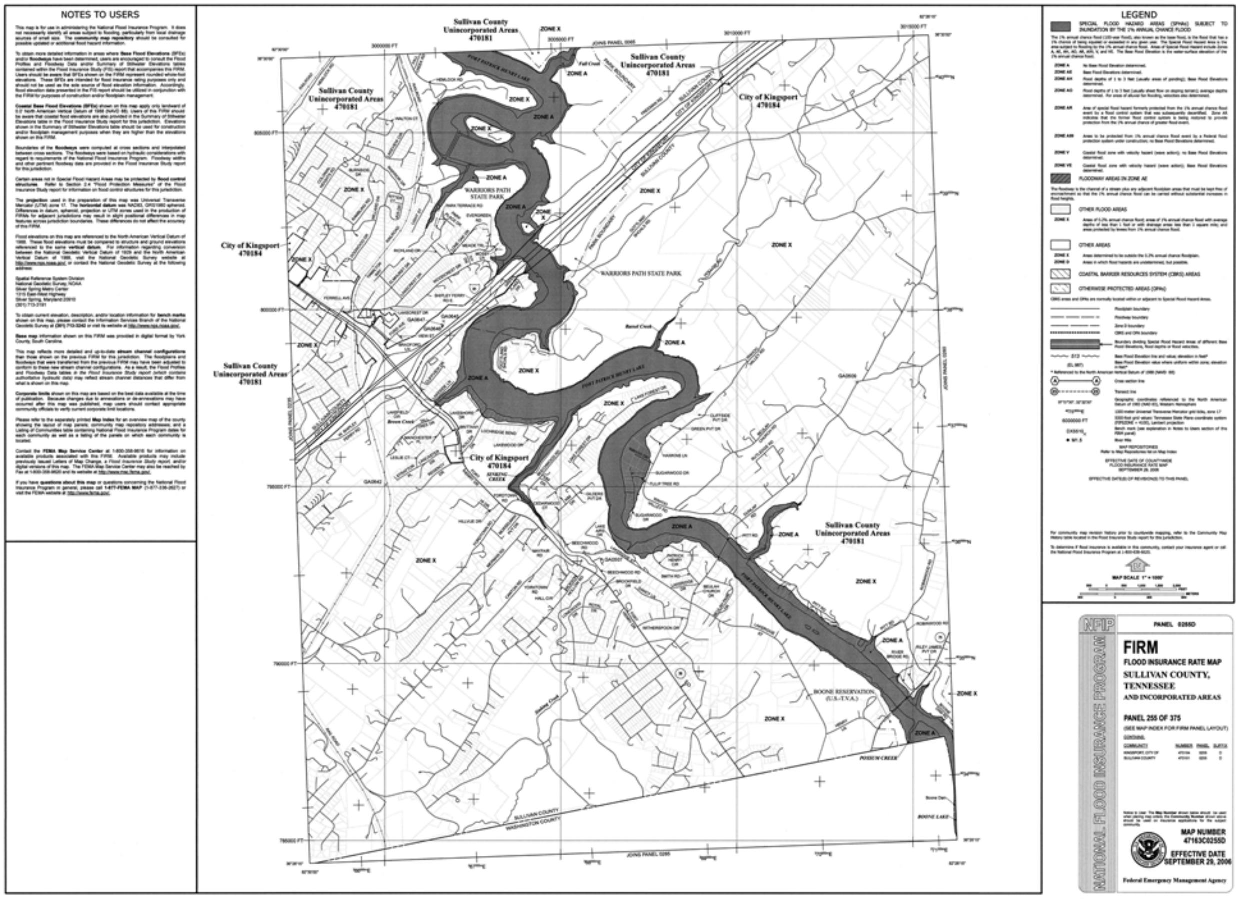


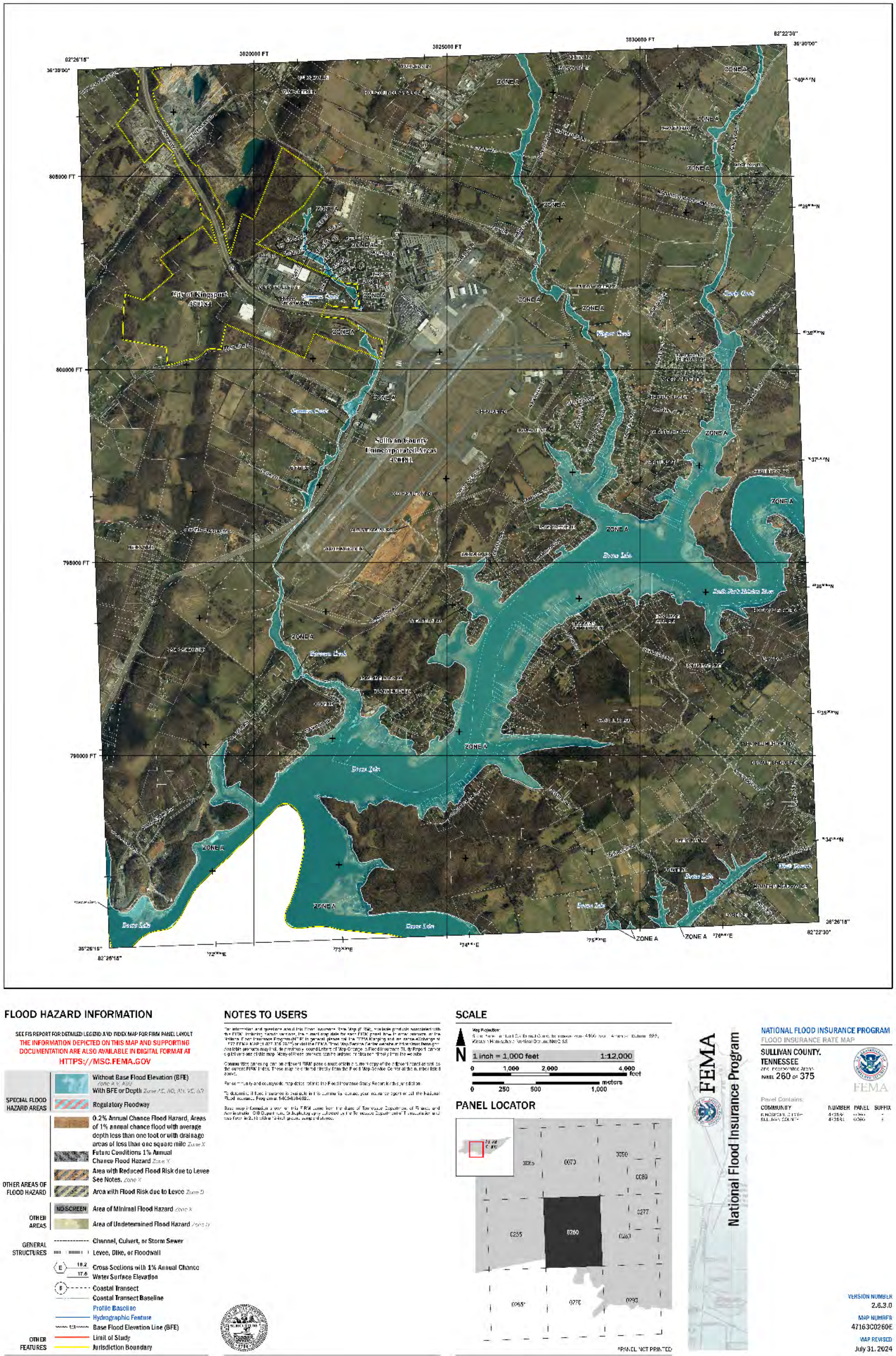
NOTES TO USERS
LEGEND
City of Kingsport 470184
Sullivan County Unincorporated Areas 470181
City of Kingsport 470184
ZONE X
ZONE A
ZONE AE
HORSE CREEK
Little Horse Creek
WALKER FORK
NATIONAL FLOOD INSURANCE PROGRAM
NFIP
PANEL 0230D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 230 OF 375
MAP NUMBER 47163C0230D
EFFECTIVE DATE SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
City of Kingsport
470184
Sullivan County
Unincorporated Areas
470181
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 235 OF 375
MAP NUMBER
47163C0235D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

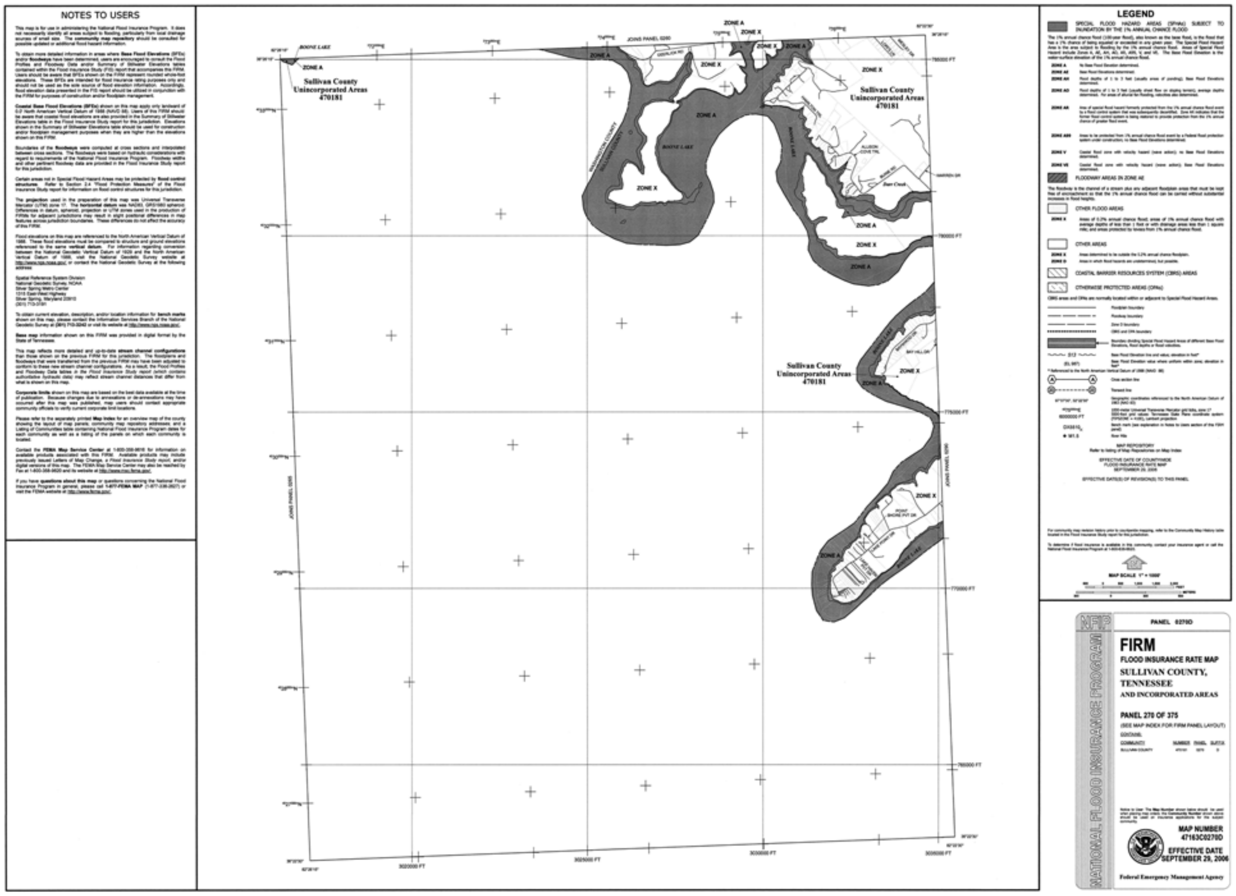

NOTES TO USERS
ZONE A
ZONE X
Sullivan County
Unincorporated Areas
470181
LEGEND
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0240D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 240 OF 375
MAP NUMBER
47163C0240D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

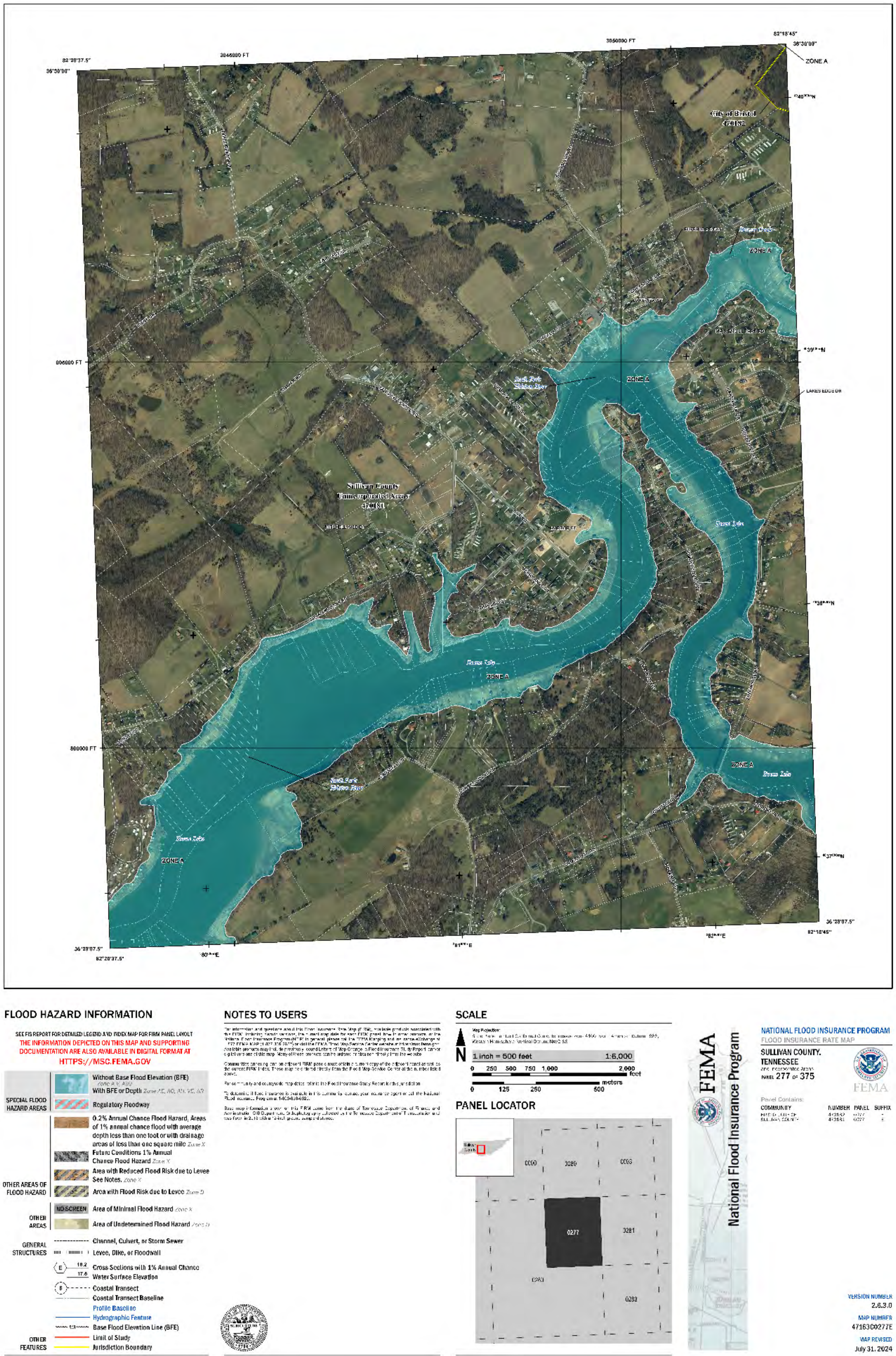

NOTES TO USERS
Sullivan County
Unincorporated Areas
470181
City of Kingsport
470184
ZONE X
ZONE AE
Kendrick Creek
LEGEND
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 245 OF 375
MAP NUMBER
47163C0245D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

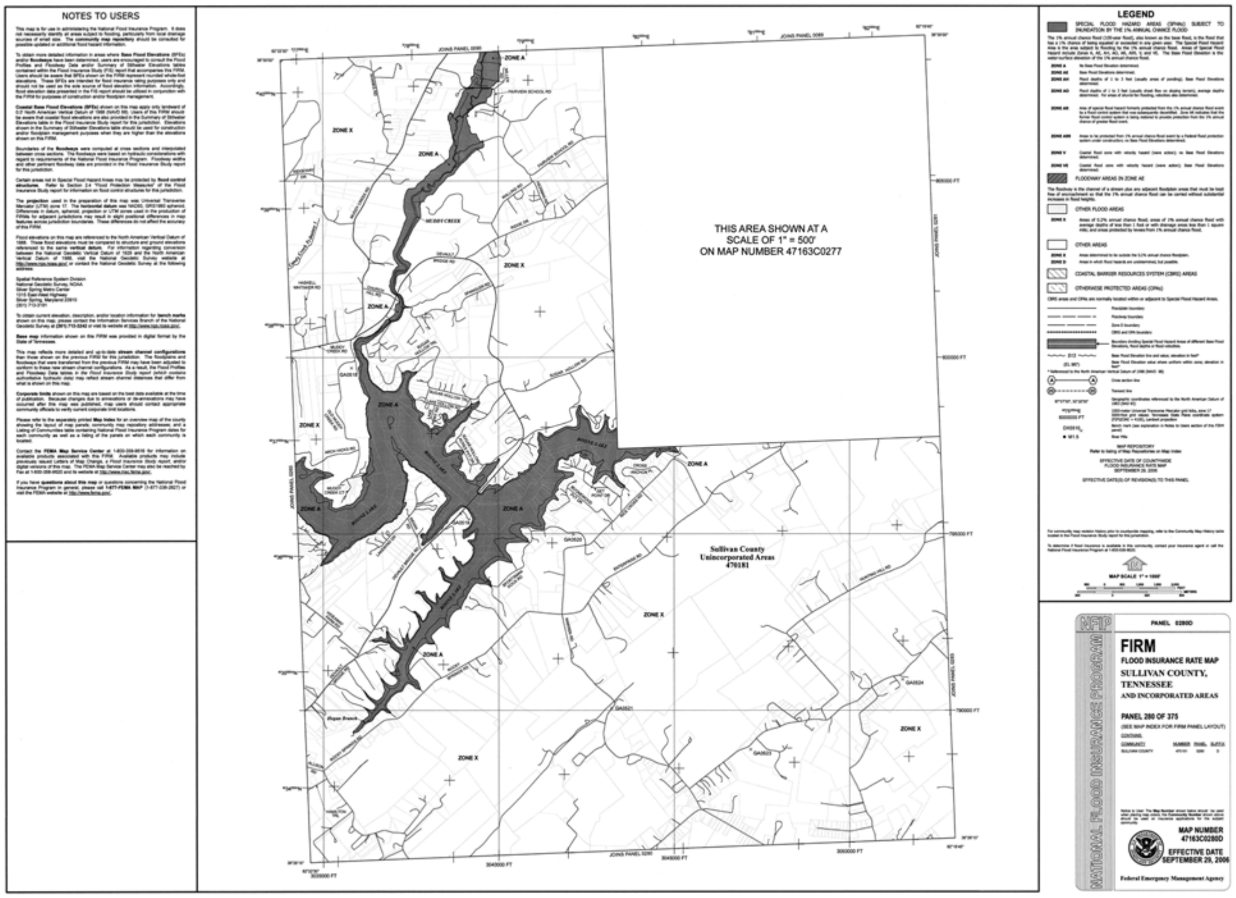

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
City of Kingsport
470184
WARRIORS PATH STATE PARK
BOONE RESERVATION
(U.S.-T.V.A.)
ZONE X
ZONE A
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0255D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 255 OF 375
MAP NUMBER
47163C0255D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

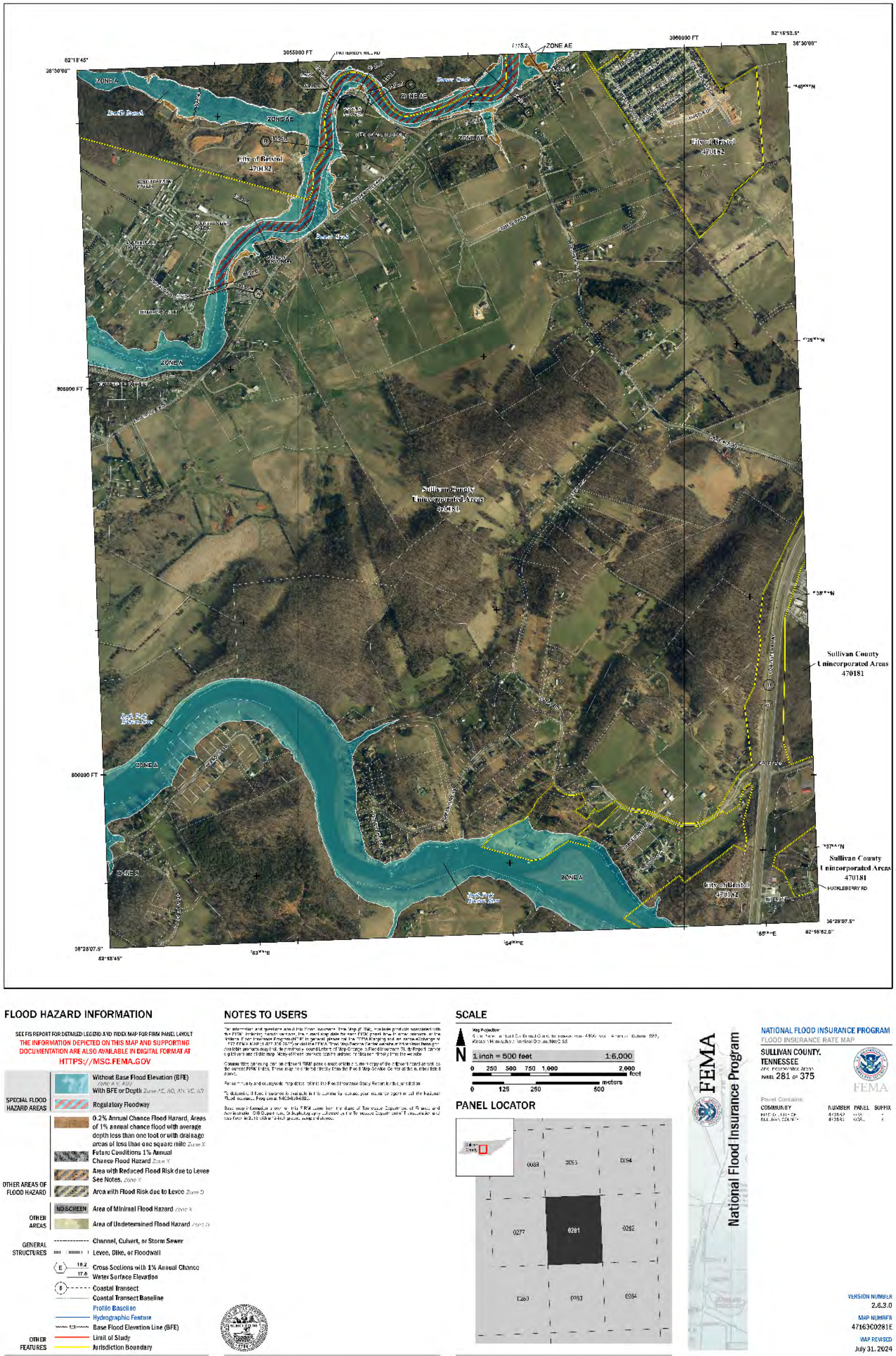


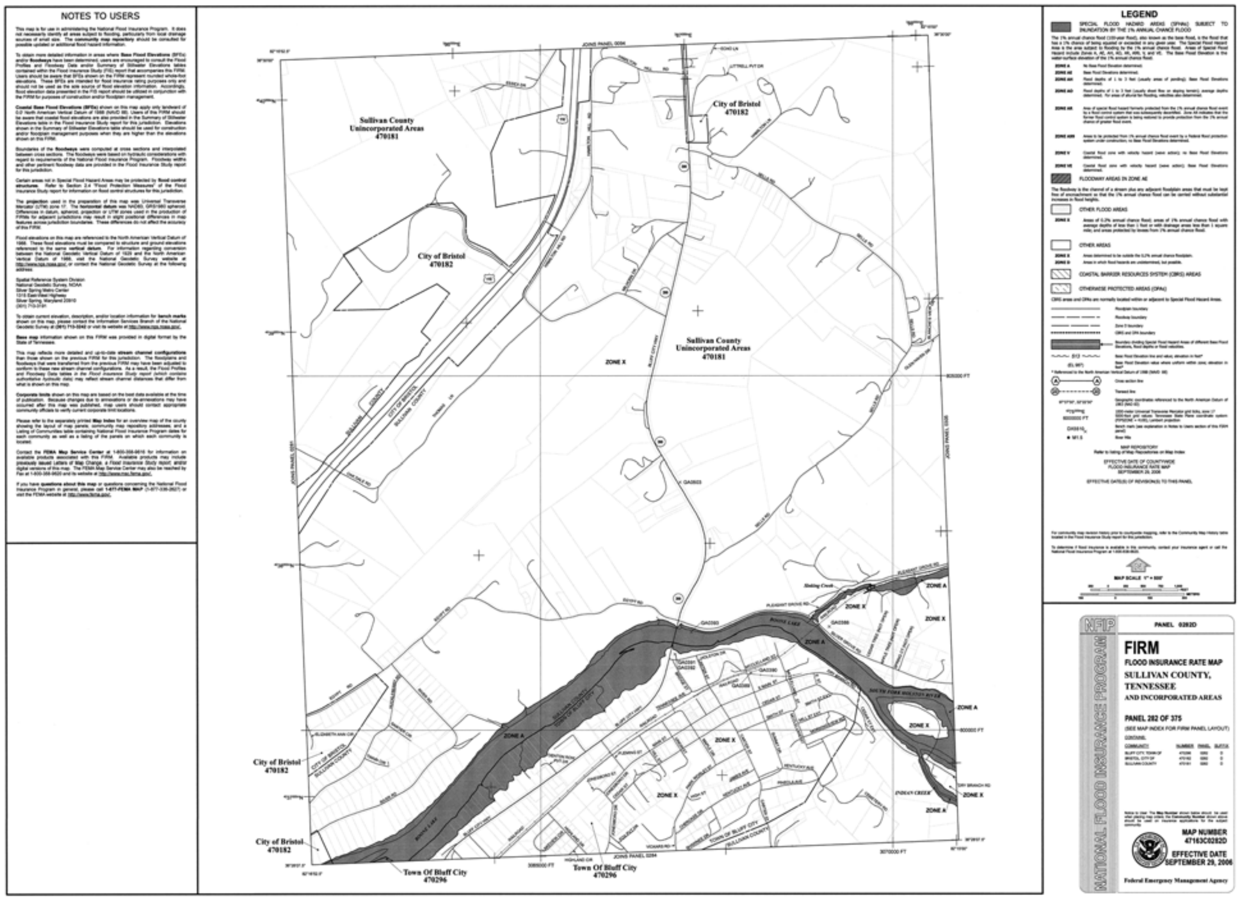
3020000 FT
3025000 FT
3030000 FT
City of Kingsport
475134
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE AE
Boone Lake
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee See Notes. Zone X
Area with Flood Risk due to Levee Zone D
OTHER AREAS
NO SCREEN
Area of Minimal Flood Hazard Zone X
Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 1,000 feet
1:12,000
PANEL LOCATOR
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
PANEL 260 OF 375
Panel Contains:
COMMUNITY NUMBER PANEL SUFFIX
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0260E
MAP REVISED
July 31, 2024

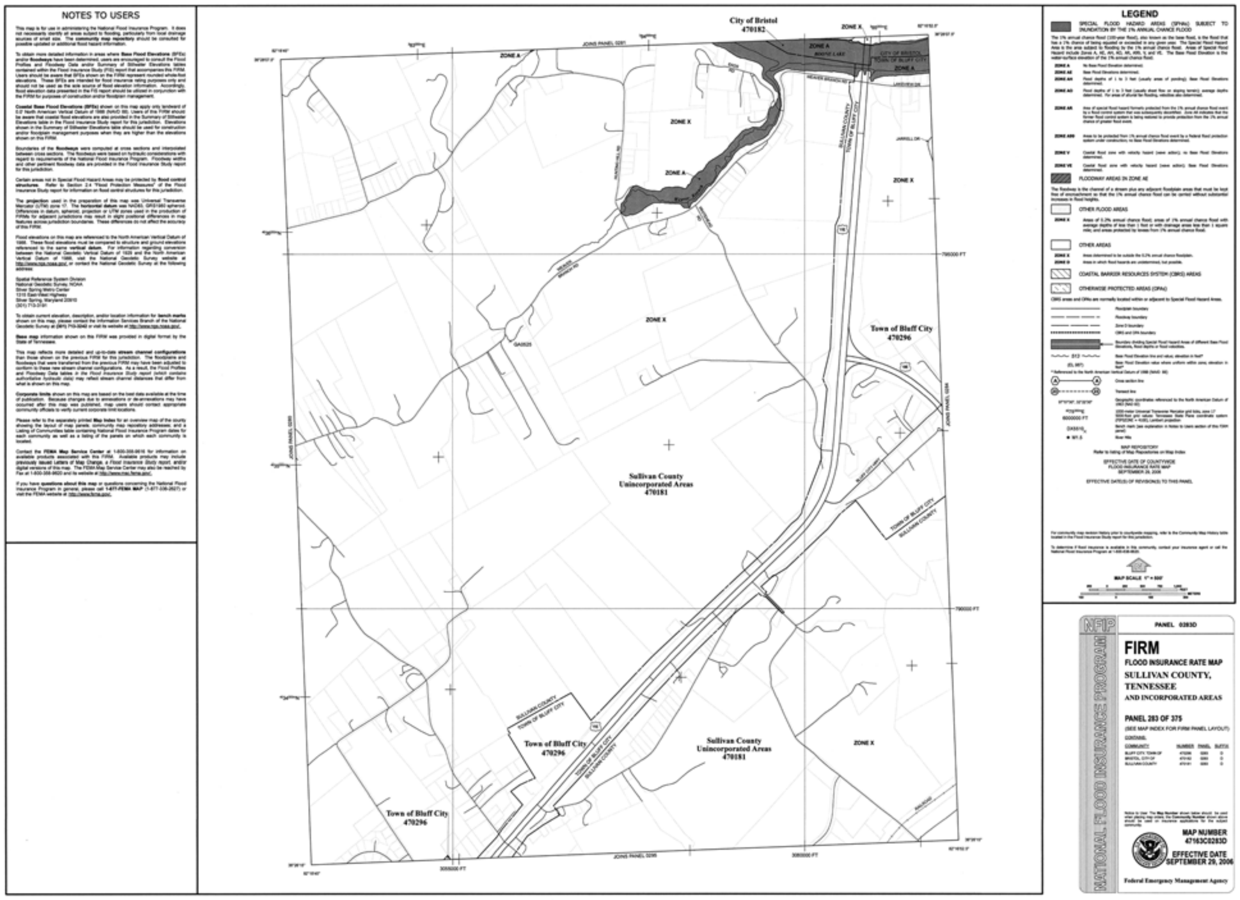

NOTES TO USERS
LEGEND
Sullivan County Unincorporated Areas 470181
ZONE A
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 270 OF 375
MAP NUMBER 47163C0270D
EFFECTIVE DATE SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM

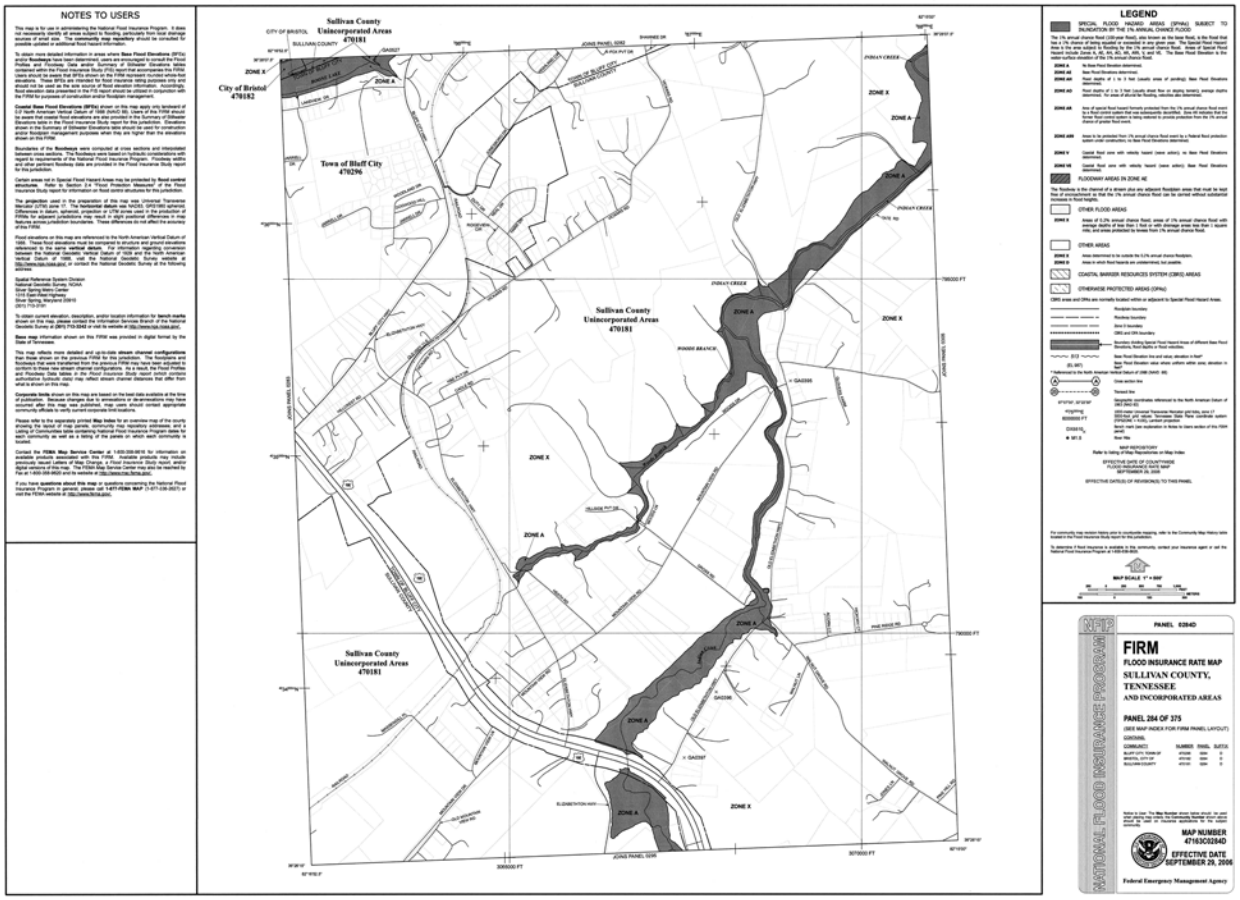

ZONE A
City of Bristol
Sullivan County Unincorporated Areas
Boone Lake
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE)
With BFE or Depth
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Flood Risk due to Levee See Notes.
Area with Flood Risk due to Levee
OTHER AREAS
NO SCREEN
Area of Minimal Flood Hazard
Area of Undetermined Flood Hazard
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
1 inch = 500 feet
1:6,000
PANEL LOCATOR
0277
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
PANEL 277 OF 375
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0277E
MAP REVISED
July 31, 2024


NOTES TO USERS
LEGEND
THIS AREA SHOWN AT A SCALE OF 1" = 500' ON MAP NUMBER 47163C0277
ZONE A
ZONE X
Sullivan County
Unincorporated Areas
470181
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 280 OF 375
MAP NUMBER
47163C0280D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

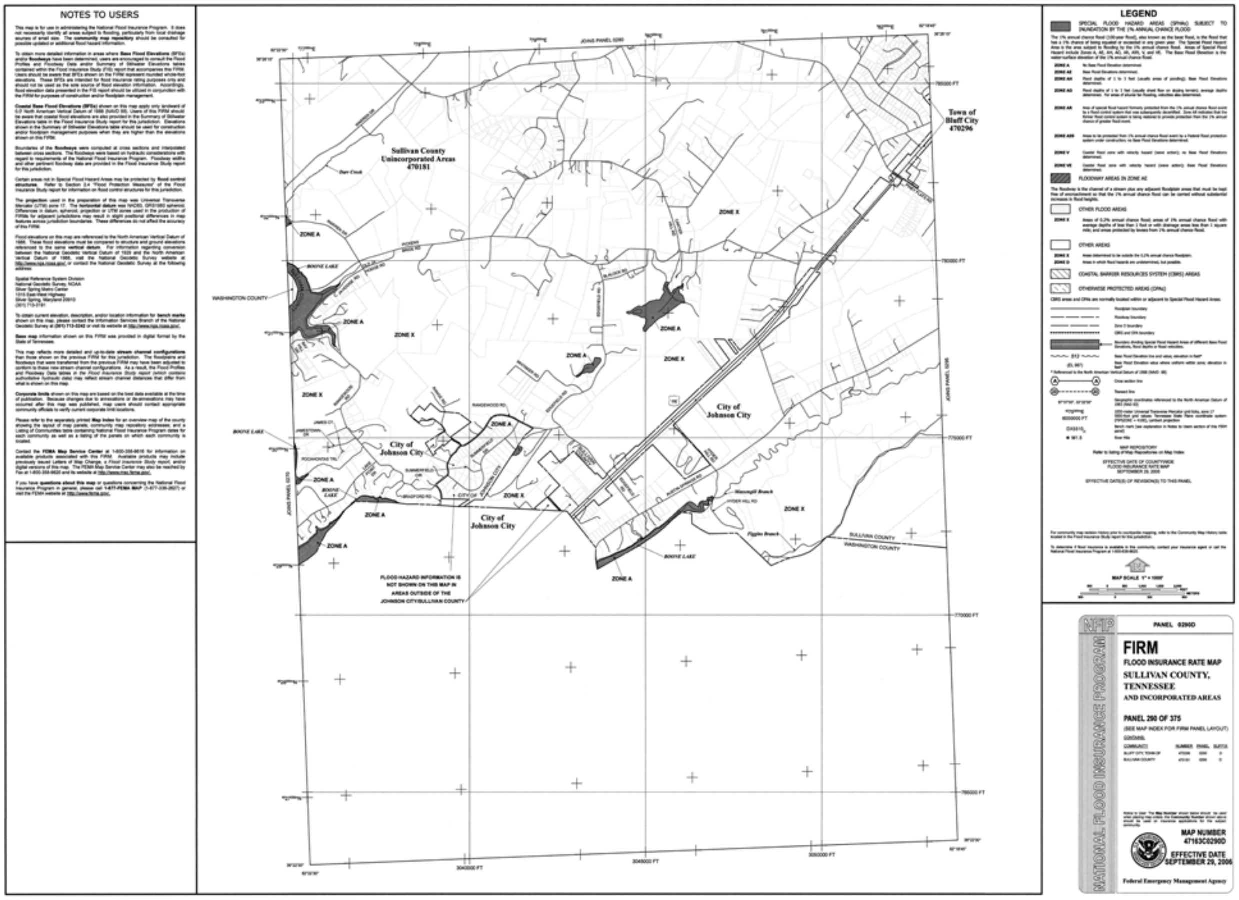

ZONE AE
ZONE A
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
HUCKLEBERRY RD
36°30'00"
82°18'45"
36°28'07.5"
82°16'52.5"
FLOOD HAZARD INFORMATION
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTPS://MSC.FEMA.GOV
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE) Zone A, V, A99
With BFE or Depth Zone AE, AO, AH, VE, AR
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee See Notes. Zone X
Area with Flood Risk due to Levee Zone D
OTHER AREAS
NO SCREEN Area of Minimal Flood Hazard Zone X
Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
18.2
17.5
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
Base Flood Elevation Line (BFE)
OTHER FEATURES
Limit of Study
Jurisdiction Boundary
NOTES TO USERS
SCALE
Map Projection:
1 inch = 500 feet
1:6,000
0 250 500 750 1,000 2,000 feet
0 125 250 500 meters
PANEL LOCATOR
0277
0281
0282
0284
FEMA
National Flood Insurance Program
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
PANEL 281 OF 375
FEMA
Panel Contains:
COMMUNITY NUMBER PANEL SUFFIX
VERSION NUMBER
2.6.3.0
MAP NUMBER
47163C0281E
MAP REVISED
July 31, 2024

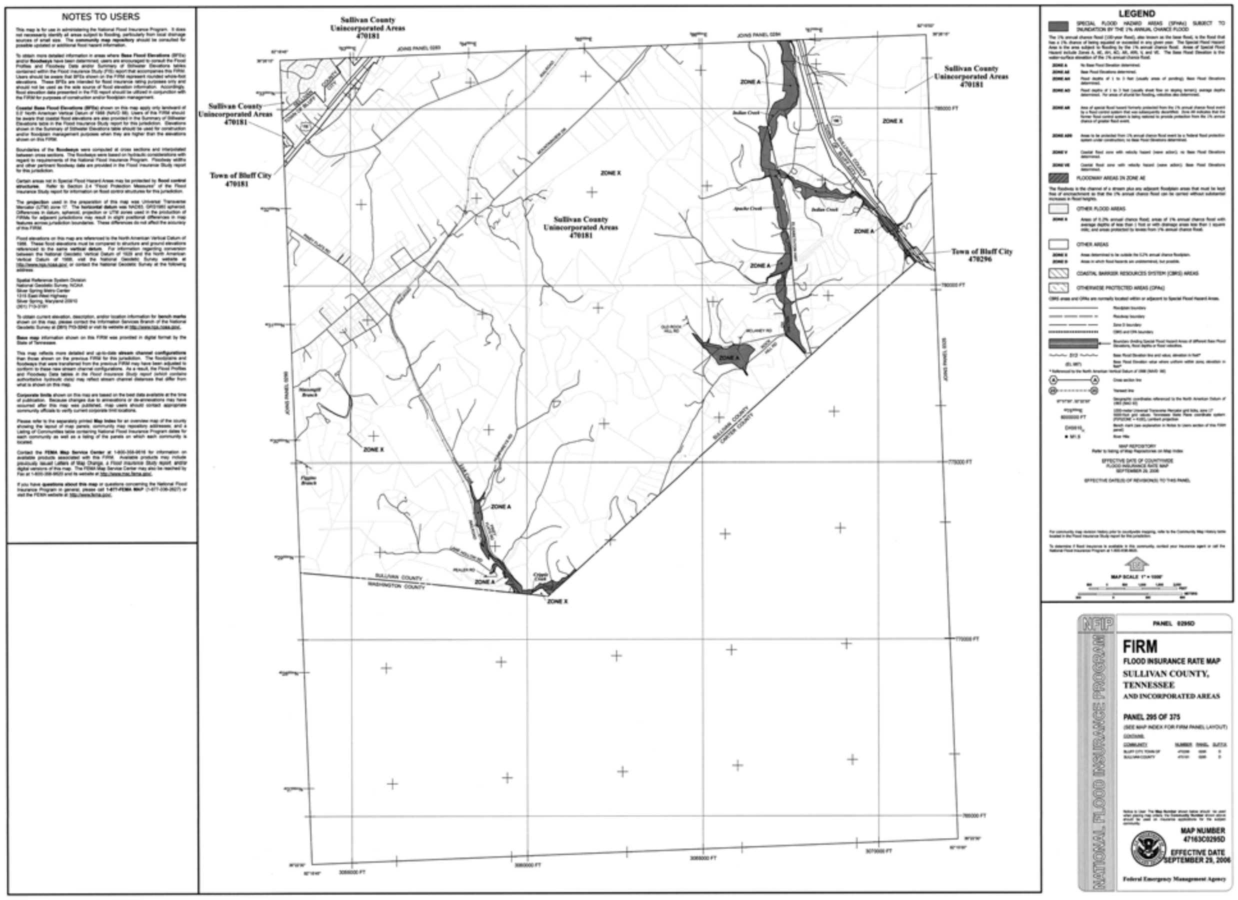

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
ZONE X
ZONE A
Town Of Bluff City
470296
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0282D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 282 OF 375
MAP NUMBER
47163C0282D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

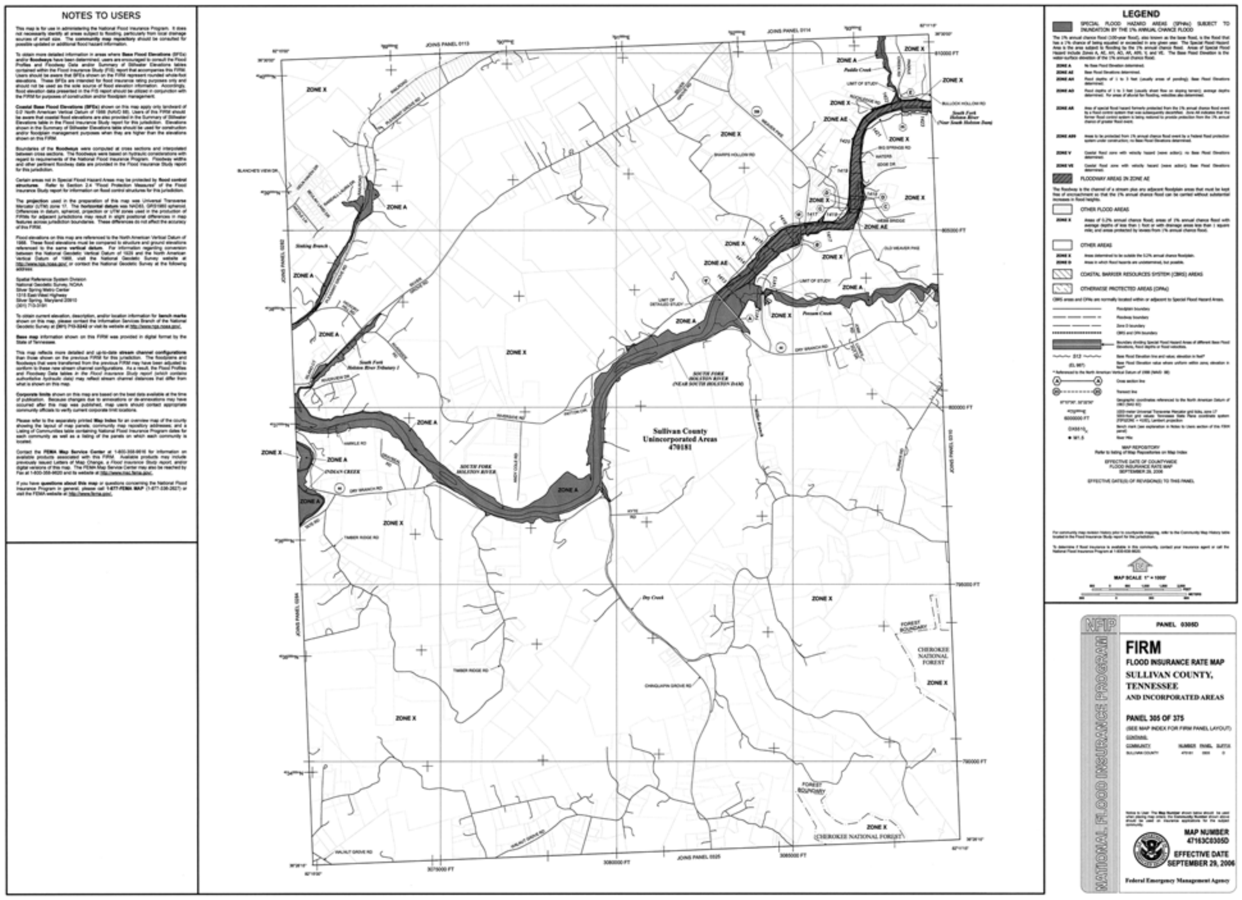

NOTES TO USERS
LEGEND
City of Bristol
470182
ZONE A
ZONE X
Town of Bluff City
470296
Sullivan County
Unincorporated Areas
470181
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0283D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 283 OF 375
MAP NUMBER
47163C0283D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

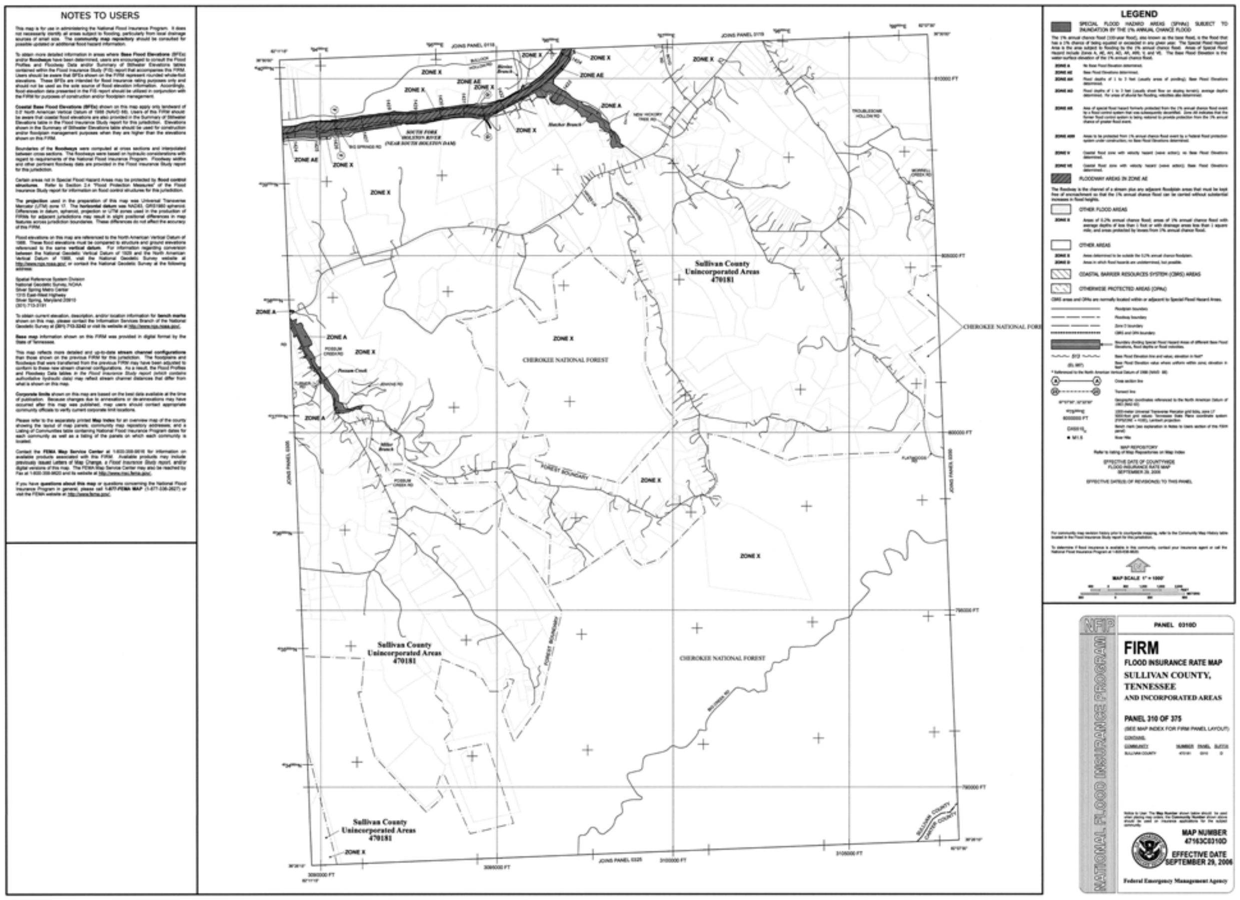


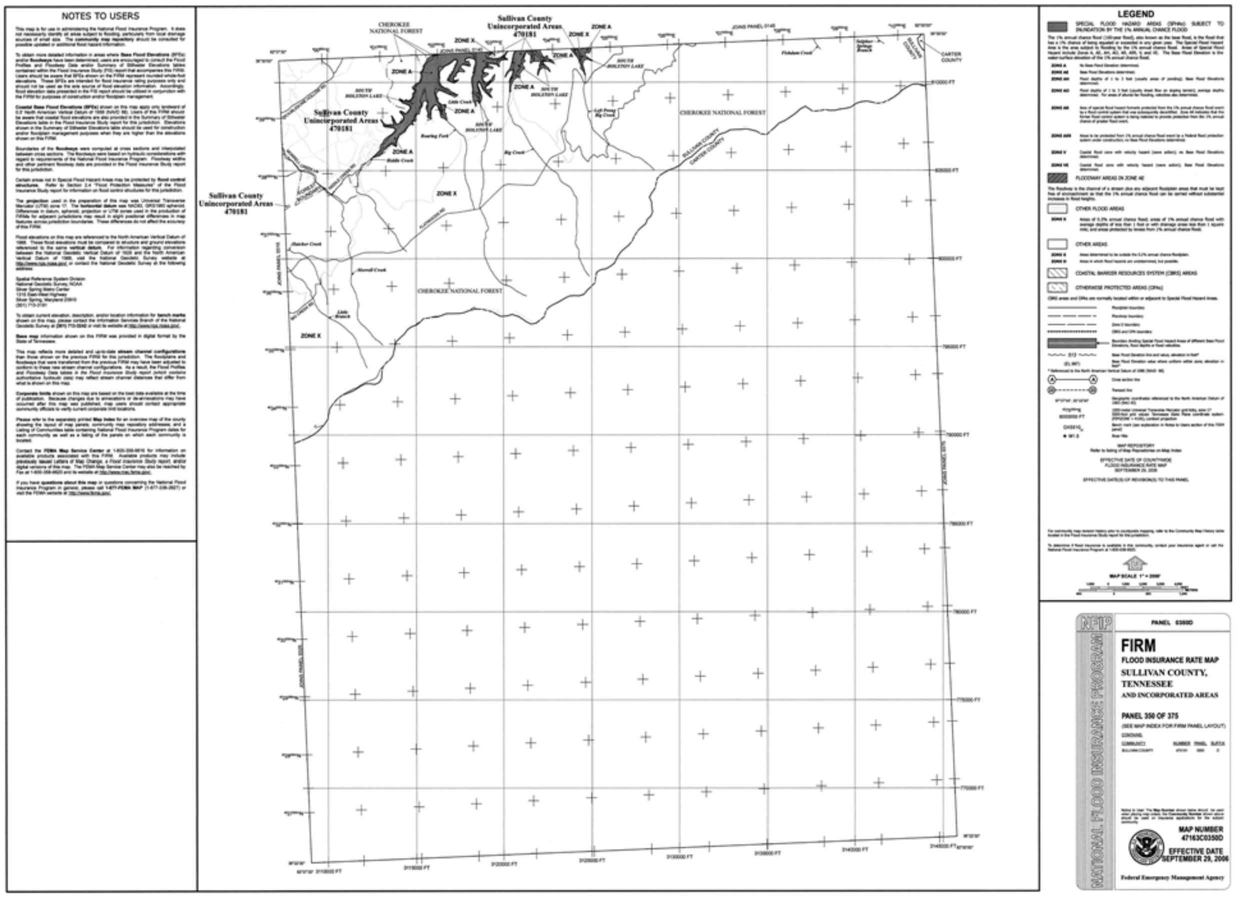
NOTES TO USERS
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
Town of Bluff City
470296
ZONE X
ZONE A
INDIAN CREEK
LEGEND
NFIP
PANEL 0284D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 284 OF 375
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER
47163C0284D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

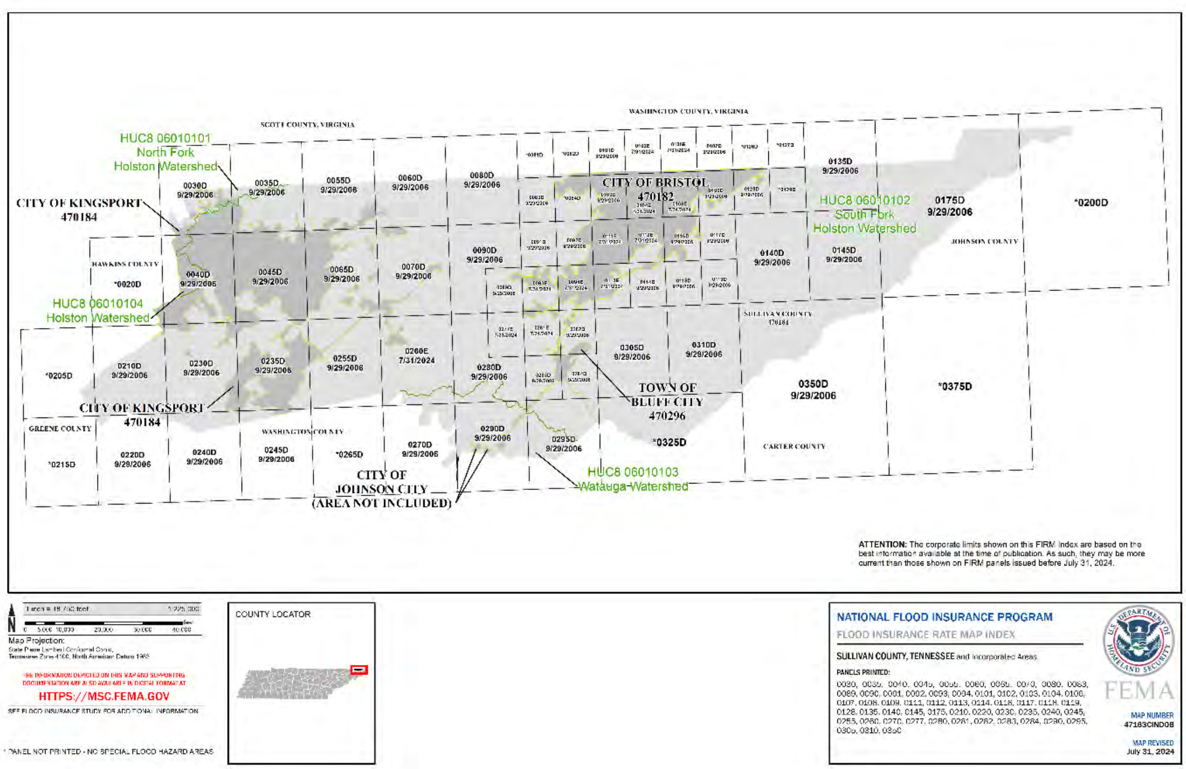

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
Town of
Bluff City
470296
City of
Johnson City
ZONE A
ZONE X
BOONE LAKE
WASHINGTON COUNTY
SULLIVAN COUNTY
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 290 OF 375
MAP NUMBER
47163C0290D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
Sullivan County
Unincorporated Areas
470181
Sullivan County
Unincorporated Areas
470181
Town of Bluff City
470181
Sullivan County
Unincorporated Areas
470181
Sullivan County
Unincorporated Areas
470181
Town of Bluff City
470296
ZONE A
ZONE X
LEGEND
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0295D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 295 OF 375
MAP NUMBER
47163C0295D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
SOUTH FORK
HOLSTON RIVER
ZONE A
ZONE X
ZONE AE
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 305 OF 375
MAP NUMBER
47163C0305D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
CHEROKEE NATIONAL FOREST
ZONE X
ZONE A
ZONE AE
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0310D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 310 OF 375
MAP NUMBER
47163C0310D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
Sullivan County Unincorporated Areas 470181
CHEROKEE NATIONAL FOREST
ZONE A
ZONE X
SOUTH HOLSTON LAKE
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 350 OF 375
MAP NUMBER 47163C0350D
EFFECTIVE DATE SEPTEMBER 29, 2006
NATIONAL FLOOD INSURANCE PROGRAM
Federal Emergency Management Agency


SCOTT COUNTY, VIRGINIA
WASHINGTON COUNTY, VIRGINIA
HUC8 06010101
North Fork
Holston Watershed
CITY OF KINGSPORT
470184
CITY OF BRISTOL
470182
HUC8 06010102
South Fork
Holston Watershed
HAWKINS COUNTY
HUC8 06010104
Holston Watershed
JOHNSON COUNTY
SULLIVAN COUNTY
470181
TOWN OF
BLUFF CITY
470296
GREENE COUNTY
WASHINGTON COUNTY
CARTER COUNTY
CITY OF
JOHNSON CITY
(AREA NOT INCLUDED)
HUC8 06010103
Watauga Watershed
0030D 9/29/2006
0035D 9/29/2006
0055D 9/29/2006
0060D 9/29/2006
0080D 9/29/2006
0135D 9/29/2006
0175D 9/29/2006
*0200D
*0020D
0040D 9/29/2006
0045D 9/29/2006
0065D 9/29/2006
0070D 9/29/2006
0090D 9/29/2006
0140D 9/29/2006
0145D 9/29/2006
*0205D
0210D 9/29/2006
0230D 9/29/2006
0235D 9/29/2006
0255D 9/29/2006
0260E 7/31/2024
0280D 9/29/2006
0305D 9/29/2006
0310D 9/29/2006
0350D 9/29/2006
*0375D
*0215D
0220D 9/29/2006
0240D 9/29/2006
0245D 9/29/2006
*0265D
0270D 9/29/2006
0290D 9/29/2006
0295D 9/29/2006
*0325D
ATTENTION: The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before July 31, 2024.
Map Projection:
COUNTY LOCATOR
HTTPS://MSC.FEMA.GOV
* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP INDEX
SULLIVAN COUNTY, TENNESSEE and Incorporated Areas
PANELS PRINTED:
FEMA
MAP NUMBER
47163CIND0B
MAP REVISED
July 31, 2024

SULLIVAN COUNTY FIS REPORTS QR CODE