

# Coffee County Hazard Mitigation Plan



**2019**

**Prepared By:**  
**Coffee County Hazard Mitigation Committee**  
**Coffee County Emergency Management**

**Includes the Cities of:**  
Manchester  
Tullahoma

**Assistance Provided By:**  
**Tennessee Emergency Management Agency**  
*as part of the Tennessee Mitigation Initiative*

2 **Executive Summary**

3 Over the past two decades, hazard mitigation has gained increased national attention due to the  
4 large number of natural disasters that have occurred throughout the U.S. and the rapid rise in  
5 costs associated with those disaster recoveries. It has become apparent that money spent  
6 mitigating potential impacts of a disaster event can result in substantial savings of life and  
7 property. With these benefit cost ratios being extremely advantageous, the Disaster Mitigation  
8 Act of 2000 was developed as U.S. Federal legislation that reinforces the importance of pre-  
9 disaster mitigation planning by calling for local governments to develop mitigation plans (*44 CFR*  
10 *201*).

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

16 The advantages of developing a local hazard mitigation plan are numerous including improved  
17 post-disaster decision making, education on mitigation approaches, an organizational method  
18 for prioritizing mitigation projects, etc. It has been noted that communities who successful  
19 complete and maintain a mitigation plan receive larger amounts of Federal and State funding to  
20 be used on mitigation projects, and receive these funds faster, than communities who do not  
21 have a plan. Such funding sources that the plan caters to are Pre-Disaster Mitigation, Flood  
22 Mitigation Assistance, Severe Repetitive Loss, and Hazard Mitigation Grant Programs.

23 The 2016 Coffee County Hazard Mitigation Plan was created to act as a well thought-out guide  
24 to be used by, and for, the people of Coffee County. For this plan to be successful, each  
25 jurisdiction within the county participated in the drafting and preparation of the plan. These  
26 participating jurisdictions include:

- 27
- 28 • Coffee County (unincorporated)
  - 29 • City of Manchester
  - 30 • City of Tullahoma
- 31

32 In reference to federal code title *44 CFR 201*, the plan is required to be submitted to both TEMA  
33 (State) and FEMA (Federal) for review to be approved. When the plan is deemed “approval  
34 pending adoption” by FEMA (*44 CFR 201.6(c)5*), each of the participating jurisdictions will adopt  
35 the plan through a local resolution

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## Section 1: Planning Process

### Planning Process

The process of creating this plan began after the August 2010 (*FEMA-1937-DR*) Tennessee Severe Storm & Flooding events, in which Coffee County was declared as a disaster area. Realizing that this disaster event provided a window of opportunity to incorporate mitigation actions into the recovery process, Coffee County initiated a local hazard mitigation plan.

The initial start of the planning process took place at a meeting between Coffee County Emergency Management and the Cities of Manchester and Tullahoma government officials, and the Tennessee Emergency Management Agency (TEMA) on April 16, 2018 (See [Appendix A](#)). At this meeting Coffee County Emergency Management was designated the role of leading staff and interested persons through the development of the plan. Tasks to be undertaken by Coffee County Emergency Management consisted of getting agencies and the public involved in the county’s mitigation efforts, setting up and coordinating the Coffee County Hazard Mitigation Committee, performing the written plan drafts, and soliciting for mitigation actions/projects. TEMA provided requested technical assistance at the beginning of the planning process by presenting successful strategies that have been used in developing a mitigation plan and a mitigation planning committee as part of the newly established Tennessee Mitigation Initiative.

At this meeting Coffee County started organizing a county-wide hazard mitigation committee. Realizing that a successful mitigation committee includes a number of representatives, specialists, and individuals who can give valuable/unique insights that local emergency management staff may not have considered; during a regularly scheduled Local Emergency Planning Committee (LEPC) meeting, an invitation to be a part of this committee included an open invitation to elected officials, county and city staff, representatives of the jurisdictions, neighboring counties, local businesses, state agencies, private organizations, academia, non-profits, and other noticeable persons. Additional stakeholders were invited by phone or e-mail. In addition to public advertisements, adjacent counties were invited to participate via announcements at the Middle Tennessee Regional Emergency Management quarterly meetings. Despite multiple notices regarding the seeking of public input, there were no members of the public present at any meetings, so not public input was incorporated into the plan.

Based on the invited responses of interest, the Coffee County Hazard Mitigation Committee was formed. Within this committee all jurisdictions are participants, as well as a cross-section of other representatives. The Coffee County Hazard Mitigation Committee consists of:

Member	Representation	Title/Role
Allen Lendley ( <b>Chair</b> )	Coffee County Emergency Management	Director
Matt Aussiker	Coffee County Emergency Management	Deputy Director

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Brittany Fiske	Manchester Planning and Codes	Assistant Director
Kevin Raney	Manchester Water and Sewer	Project Manager
Phil Henderson	Tulahoma Police Department	Lieutenant Services
George Gannon	Manchester Public Works	Director
Richard Shasteen	Tulahoma Fire Department	Chief
Brian Gavitt	Tulahoma Planning and Codes	Building Inspector

The Coffee County Hazard Mitigation Committee was deemed the county’s lead in all mitigation efforts and in the development of the county’s mitigation plan. The committee member’s efforts in the development of the plan were broken down into two stages: the brainstorming/drafting stage and the reviewing stage. During the brainstorming/drafting stage the committee identified hazards, evaluated risks, calculated and located each jurisdiction’s vulnerable areas, identified the county’s critical facilities, determined the county’s mitigation goals/objectives, created and sponsored mitigation projects, and prioritized those mitigation projects. During the review stage the committee evaluated the written drafts of the plan. Also, in this process each jurisdiction reviewed written drafts that specifically addressed aspects of their jurisdiction (i.e., each jurisdiction’s individual risks and vulnerabilities).

The second Coffee County Hazard Mitigation Committee meeting was held on April 17, 2018 at the Coffee County EMA Office. At this meeting the committee reviewed the Hazard Mitigation planning process and discussed steps to complete the Hazard Mitigation Plan in a timely manner. Several committee members had participated in Hazard Mitigation Planning meetings in 2011 although that plan was never approved. TEMA personnel were present at this meeting to answer mitigation planning and grant questions. [Appendix B](#) provides a copy of the meeting’s attendance sheet.

The third Coffee County Hazard Mitigation Committee meeting was held on June 21, 2018 at the Coffee County EMA Office. At this meeting the committee evaluated risks, determined community vulnerabilities, began discussing created mitigation projects. At this meeting the committee discussed new and previous mitigation projects and prioritized them. EMA personnel were present at this meeting to answer mitigation planning and grant questions. [Appendix C](#) provides a copy of the meeting’s attendance sheet.

**Public Participation**

To encourage public involvement, the Coffee County Hazard Mitigation Committee advertised their second committee meeting at the Coffee County Emergency Operational Center, which is accessible to everyone in the Coffee County as well as neighboring counties. This notice presented the purpose of the meeting, the time and date of the meeting, the exact location of the meeting, and stated that all are invited to attend. This meeting provided a great opportunity for the public to comment on the plan during drafting stages, to contribute in project proposals,

and to participate in project prioritization. [Appendix B](#) and [Appendix C](#) provides documentation of the meeting’s attendance sheet and present a copy of the public notice for the meeting.

Upon receiving the “Approval Pending Adoption” designation from FEMA, the public will be given a chance to comment on the final draft of the plan prior to its adoption by each local jurisdiction. This opportunity will take place at a local board meeting for each jurisdiction before the plan adoption decision takes place. The opportunity for final public comment will therefore be documented through the receipt of a signed adoption resolution.

### **Review of Existing Information**

A preliminary review of existing plans, reports, and information was conducted during the initial phase of creating the Coffee County Hazard Mitigation Plan. The primary purpose of reviewing this information was to identifying local hazards, recognizing local risks, and understanding different local vulnerabilities. The following list of sources identifies some of the existing studies that were reviewed:

- Coffee County School Safety Plan
- Coffee County Basic Emergency Operations Plan (BEOP)
- City of Manchester Zoning Ordinance
- City of Tullahoma Zoning Ordinance
- City of Manchester Floodplain Ordinance
- City of Tullahoma Floodplain Ordinance
- State of Tennessee Hazard Mitigation Plan
- Tennessee Emergency Management Plan (TEMP)
- U.S. Census Bureau
- FEMA Mitigation “How to” Guides
- NOAA National Climatic Data Center (NCDC) storm reports

All of the listed plans, studies, and data sources were incorporated into the Coffee County Hazard Mitigation Plan. These sources developed the plan’s hazard, risk, and vulnerability assessment sections that in return led to the establishment of meaningful mitigation actions.

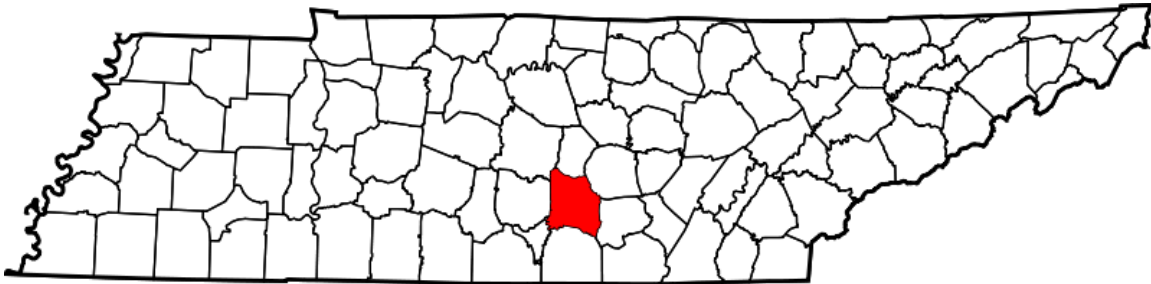


## Section 2: County Profile

### Development Trends

Coffee County is a county located in the southern part of Tennessee, in the United States. Coffee County is part of the Tullahoma-Manchester, TN Micropolitan Statistical Area. As of the 2010 census, the county's population was 52,796 and its recognized cities are Manchester and Tullahoma, with Manchester being the county seat. Unincorporated communities are: Beechgrove, Belmont, Fudgearound, Noah, Pocahontas, Shady Grove, and Summitville.

Coffee County was formed in 1836 from parts of Bedford, Warren, and Franklin counties. It was named for John Coffee, a prominent planter, land speculator, and militia officer. Similar to other counties in this area of the state, planters here cultivated mostly tobacco and hemp, produced by the labor of enslaved African Americans.



**Figure 1: Coffee County Location**

The quiet, rural nature of Coffee County has allowed the sustainment of twelve Century Farms, the classification for farms that have been operating for more than 100 years. The oldest Century Farm is Shamrock Acres, founded in 1818. Other Century Farms include:

- Beckman Farm
- Brown Dairy Farm
- Carden Ranch
- Crouch-Ramsey Farm
- Freeze Farm
- The Homestead Farm
- Jacobs Farm
- Long Farm
- Shamrock Acres
- Sunrise View Farm
- Thomas Farm, site of the Farrar Distillery

It also encompasses the following State protected areas:

- Arnold Engineering Development Complex Wildlife Management Area (jointly managed by TWRA and USAF)
- Bark Camp Barrens Wildlife Management Area
- Hickory Flats Wildlife Management Area

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- Maple Hill Wildlife Management Area
- May Prairie State Natural Area
- Normandy Wildlife Management Area (part)
- Old Stone Fort State Archaeological Park
- Short Springs State Natural Area

As of the census of 2000, there were 48,014 people, 18,885 households, and 13,597 families residing in the county. The population density was 112 people per square mile (43/km<sup>2</sup>). There were 20,746 housing units at an average density of 48 per square mile (19/km<sup>2</sup>). The racial makeup of the county was 93.43% White, 3.59% Black or African American, 0.30% Native American, 0.74% Asian, 0.03% Pacific Islander, 0.91% from other races, and 1.00% from two or more races. 2.19% of the population were Hispanic or Latino of any race.

Of the 18,885 households, 32.40% have children under the age of 18 living with them, 56.90% are married couples living together, 11.10% have a female householder with no husband present, and 28.00% are non-families. 24.30% of all households are made up of individuals and 10.30% have someone living alone who was 65 years of age or older. The average household size is 2.50 and the average family size is 2.96. 25.10% are under the age of 18; 8.30% are ages 18 to 24; 28.40% are 25 to 44; 23.60% are from 45 to 64; and 14.60% are 65 years of age or older. The median age is 38 years. The median income for a household in the county is approximately \$34,898, and the median income for a family is \$40,228. The per capita income for the county is \$18,137. About 10.90% of families and 14.30% of the population are below the poverty line, including 17.80% of those under age 18 and 15.20% of those age 65 or over.

Located 67 miles from Nashville, it is beginning to experience growth from the influx of people moving to the area preferring a more rural lifestyle. Future job growth over the next ten years is predicted to be 34.7%, which is slightly lower than the US average of 38.0%. There has been an increase in residential development in the area but there has been no known affect of increased flooding in the area. Tullahoma is growing exponentially faster than the other communities, however, there has been no direct correction to an increase or decrease in natural hazards. While the US average unemployment rate is 5.2%, Coffee County has an unemployment rate of 4.9%. This area is well suited to support local business, such as the Black Rifle Coffee Company (BRCC), a company that recently announced it will locate its new operations in Manchester. The coffee roaster and distributor will invest \$6 million and create 52 new jobs over the next five years. BRCC is a veteran-owned and operated coffee company that specializes in roasting and distributing premium, small-batch, roast-to-order coffee to its customers around the globe:  
<https://www.tn.gov/ece/news/2018/5/21/black-rifle-coffee-company-to-locate-new-operations-in-coffee-county.html>

If you've ever heard of Coffee County, it's probably been in connection to the annual Bonnaroo festival. The Bonnaroo Music and Arts Festival is an annual four-day music festival first held in 2002, and held at what is now Great Stage Park on a 700-acre farm in Manchester. The festival is typically held in June and lasts four days. Main attractions of this festival are the multiple stages featuring live music with a diverse array of musical styles including indie rock, classic rock, world music, hip hop, jazz, americana, bluegrass, country music, folk, gospel, reggae, pop, electronic, and other alternative music. Bonnaroo Music Festival was largely influenced by rock concerts of the late 1960s and early 1970s, as well as the massive Phish festivals of the late 1990s. The

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festival is a nod to the Woodstock Music & Art Fair (1969) and was ranked in 2003 by *Rolling Stone* magazine as one of the "50 Moments That Changed Rock & Roll", "Festival of the Decade" by *Consequence of Sound*, and among the 10 Best Festivals by *GQ Magazine*.



The founders chose "bonnaroo" (Creole slang meaning a really good time) for its literal meaning and to honor the rich New Orleans music tradition they had enjoyed in college. Bonnaroo was popularized by New Orleans R&B singer Dr. John with his 1974 album *Desitively Bonnaroo*. Bonnaroo is derived from the French "bonne" /bɔn/ the feminine agreement of "bon" /bɔ̃/ meaning "good," and the French "rue" /ry/ meaning "street," translating roughly to "the best on the streets". They found a site in Manchester, Tennessee that had facilities and good highway access. Using only their website for ticket sales, they sold out the festival in about two weeks. By 2003, the festival had been named by *Rolling Stone* magazine as one of the 'top 50 moments in rock & roll.' Comedy acts such as Jim Breuer were first added in 2005. In 2007, Bonnaroo purchased the land for the festival, creating Great Stage Park with all of its iconic features. They installed a permanent main stage in 2010. The campgrounds are known as Tent City; they include 10 pods organized by the producers with activities and services for the campers. Each pod has an information and medical booth and a community art project.



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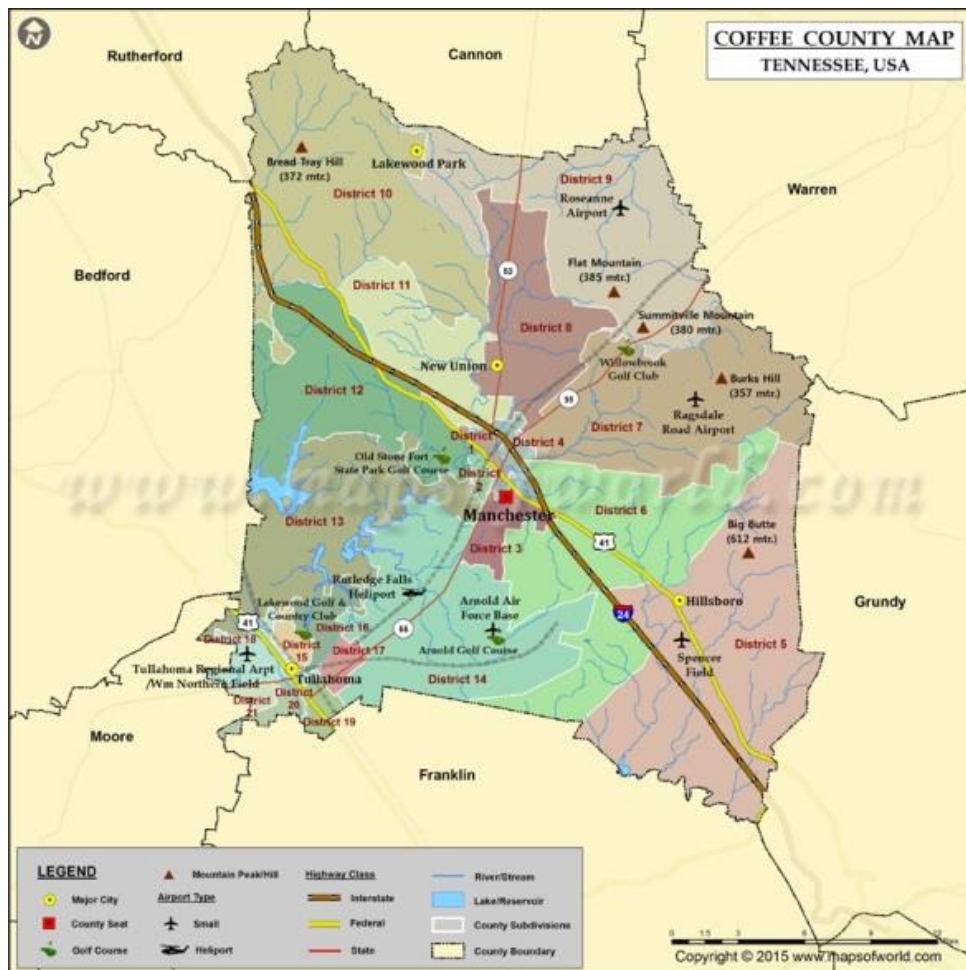
## Local Government

Coffee County is governed by a Mayor, with a County Commission made up of twenty-one District Board Members. Its mission statement is: Committed to providing direction, leadership and model excellence in local government to ensure professional accountability to the community. We strive daily to address the many needs of our community in an effective, courteous, efficient and fiscally responsible manner. We are dedicated to enhancing the quality of life through planning and visionary leadership, continually improving and increasing our efficiency while providing extraordinary service to the citizens of Coffee County. Additional information, including meeting agendas and minutes, are available at:

<http://www.coffeecountytn.org/207/Elected-Appointed-Officials>

## Major highways

- State Highways: 41 and 41A
- Nearest Interstate: I-24



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## **Critical Infrastructure**

For some facilities, even the slightest chance of a hazard impact is too great of a threat. These types of critical facilities need to be given special consideration when developing a hazard mitigation plan. A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the County, or fulfills important public safety, emergency response, and/or disaster recovery functions.

The critical facilities identified in Coffee County are shelters; hospital and other health care facilities; gas, electric, and communication utilities; water and wastewater treatment plants; facilities with flammable or toxic materials; schools; fire and police stations and government services.

## **Jurisdictional Capabilities**

Coffee County is governed by an elected County Executive and Board of Commissioners (eighteen members). Hohenwald is the city and county seat of Coffee County and is governed by an elected Mayor. The county Mayor serves as the chief financial officer for Coffee County. As CFO, the county Mayor is responsible for compiling a budget for all county departments, offices and agencies, which he then presents to the Board of Commissioners for approval. Once the budget is approved, the County Mayor routinely examines the accounts of all county offices to ensure they are being properly managed. The county Mayor serves as a non-voting, ex-officio member of the eighteen member Board of Commissioners and on each committee of the Board of Commissioners, in addition to each board, commission, or authority of the county government. The county Mayor has a large role of leadership throughout the community, and has the care and custody of all county property, unless it is placed with another officer.

Currently, the city of Hohenwald enforces building codes to make sure structures are built in accordance to national standards. Coffee County and the Cities of Manchester and Tullahoma enforce floodplain ordinances as part of adopting into the National Flood Insurance Program (NFIP). Additionally, all jurisdictions have zoning codes to lead to sensible growth and land development patterns. These instituted planning mechanisms help guide growth away from floodplains and other identified hazardous areas, thus reducing vulnerabilities to the jurisdictions.

**Legal & Regulatory Capability**

Regulatory Tools/Plans	Regulatory Type: Ordinance Resolution Codes Plans, Etc.	Coffee County	City of Manchester	City of Tullahoma
Building Codes	Municipal Code	Y	Y	Y
Zoning		Y	Y	Y
Emergency Response Plan	Basic Emergency Operations Plan (BEOP)	Y	Y	Y
National Flood Insurance Program Participant		Y	Y	Y
Post-Disaster Recovery Plan	BEOP	Y	Y	Y

**Expanding & Improving Mitigation Programs**

Coffee County has continued to work together in the identification of vulnerable areas and the pursuit of projects. However, the small community has been hindered from applying for mitigation funds due to a struggle to find funding to meet match requirements.

The major spring 2019 flood highlighted some of the major issues that Coffee County is looking to mitigate in future projects. The highway department estimated 300-400k in damage to rural infrastructure, which is crucial for the residents in the county. To ensure the expansion of the county’s capabilities, hazard mitigation projects are becoming a priority in order to improve public infrastructures ability to withstand natural hazards.

## **Section 3: Risk Assessment**

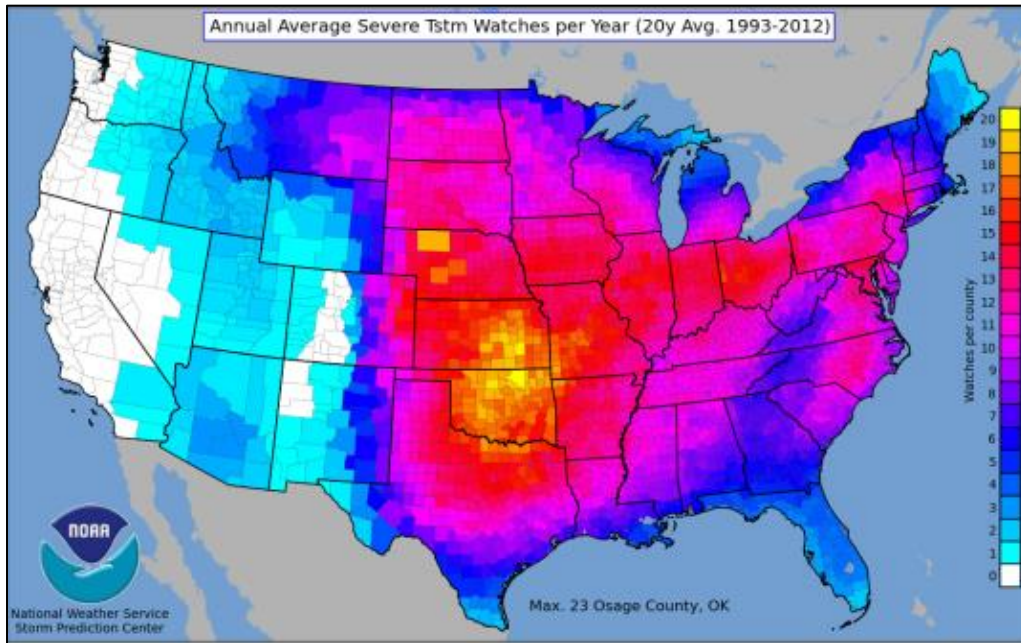
### **Hazard Identification**

To begin to assess Coffee County's risk to natural hazards and identify the community's areas of highest vulnerability, the mitigation committee had to identify which hazards have or could impact the county. This hazard identification process began with researching previous hazard events that have occurred in Coffee County by going through newspaper articles, Coffee County Emergency Management records, and recalling personal experiences. From there Emergency Management staff also analyzed hazard events that could occur in the county by reviewing scientific studies and the State of Tennessee Hazard Mitigation Plan. Jurisdictionally specific information is unavailable. County information is consistent for flooding and drought for the City of Hohenwald. In alignment with the State of Tennessee Hazard Mitigation Plan, sinkholes were not added to this Plan update, as data has only recently become available to the State on this hazard. The Committee agreed that since there have been limited minor incidents. Sinkholes would be excluded from this Plan update until the State Hazard Mitigation Plan has been approved and the State can provide additional guidance. The following hazards have been identified as hazards of concern by the Coffee County mitigation committee. The following hazards have been identified as hazards of concern by the Coffee County mitigation committee.

### **Tornadoes/Severe Storms**

The Coffee County Hazard Mitigation Committee identified Wind Events as the County's highest risk priority, followed by Tornadoes as the second highest risk priority. According to the National Weather Service, to consider a storm severe it must encompass one of three traits: produce winds greater than 58 miles per hour (50.4 knots), produce hail  $\frac{3}{4}$  of an inch or greater in diameter, or produce tornadoes. On average, a typical county in Tennessee has about 10 severe storm watches per year (see map below).

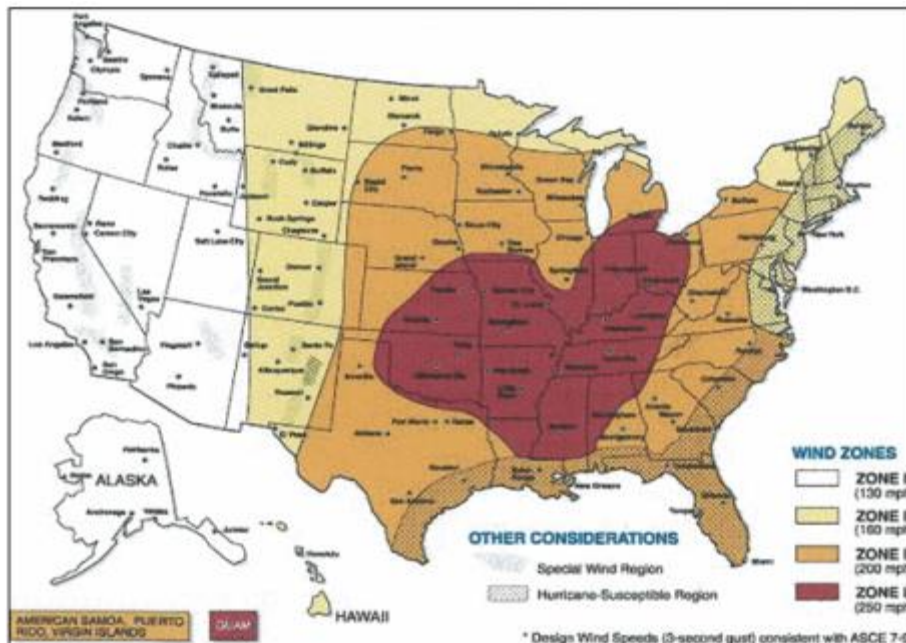
**Average Severe Storm Watches Per Year (1999-2008)**



Source: <http://www.spc.noaa.gov/wcm/20ysvra.png>

A tornado is a violently rotating column of air that extends from a thunderstorm, etc. down to the ground, and can reach wind speeds of 40 mph to 250 mph and higher. Tornadoes paths, lengths, and widths can vary greatly. In Coffee County, all jurisdictions are vulnerable to tornado threats. Much of Tennessee is in the highest wind zone (see map, below).

**Wind Zones in the United States**



Source: FEMA

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Coffee County historically has had a few tornadoes in the past. Based on NOAA NCD data, the following charts provide a list of tornado events occurring in Coffee County from January 1997 to December 2017 and a description of each tornado’s impacts within the county.

**Tornado Events in Coffee County: January 2000 – December 2017**

Location	County/ Zone	State	Date	Time	T.Z.	Type
TULLAHOMA	COFFEE CO.	TN	11/29/2016	21:05	CST-6	Tornado
RED HILL	COFFEE CO.	TN	11/29/2016	21:24	CST-6	Tornado
BETSY WILLIS	COFFEE CO.	TN	2/20/2014	22:29	CST-6	Tornado
MANCHESTER	COFFEE CO.	TN	1/30/2013	5:25	CST-6	Tornado
RAGSDALE	COFFEE CO.	TN	4/27/2011	5:45	CST-6	Tornado
FOREST MILL	COFFEE CO.	TN	4/13/2009	19:45	CST-6	Tornado
HILLSBORO	COFFEE CO.	TN	4/10/2009	13:18	CST-6	Tornado
BEECH GROVE	COFFEE CO.	TN	4/11/2008	12:30	CST-6	Tornado
FREDONIA	COFFEE CO.	TN	11/10/2002	17:42	CST	Tornado
FREDONIA	COFFEE CO.	TN	11/10/2002	17:50	CST	Tornado
FREDONIA	COFFEE CO.	TN	11/10/2002	18:52	CST	Tornado
MANCHESTER	COFFEE CO.	TN	10/24/2001	20:28	CST	Tornado

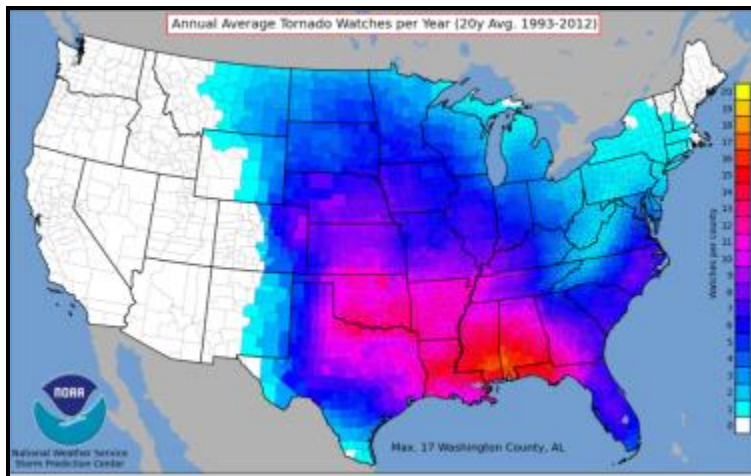
**Tornado Impacts in Coffee County: January 2000 – December 2017**

Location	Date	Time	Type	Magnit	Death	Injurie	Property Damag	Crop Damag
TULLAHOMA	11/29/2016	21:05	Tornado	EF1	0	1	750.00K	0.00K
RED HILL	11/29/2016	21:24	Tornado	EF1	0	0	250.00K	0.00K
BETSY WILLIS	2/20/2014	22:29	Tornado	EF1	0	0	200.00K	0.00K
MANCHESTER	1/30/2013	5:25	Tornado	EFO	0	0	50.00K	10.00K
RAGSDALE	4/27/2011	5:45	Tornado	EFO	0	0	5.00K	5.00K
FOREST MILL	4/13/2009	19:45	Tornado	EFO	0	0	12.00K	0.00K
HILLSBORO	4/10/2009	13:18	Tornado	EFO	0	0	0.00K	0.00K
BEECH GROVE	4/11/2008	12:30	Tornado	EFO	0	0	50.00K	0.00K
FREDONIA	11/10/2002	17:42	Tornado	F1	0	0	0.00K	0.00K
FREDONIA	11/10/2002	17:50	Tornado	F2	0	0	50.00K	0.00K
FREDONIA	11/10/2002	18:52	Tornado	F2	2	24	250.00K	0.00K
MANCHESTER	10/24/2001	20:28	Tornado	F2	0	0	3.000M	0.00K

Source: <http://www.ncdc.noaa.gov/>

Based on previous occurrences, tornado events are likely to occur approximately every one or two years or so in Coffee County; (see the following map for other probability information).

**Average Number of Tornadoes Per Year**



Source: <http://www.spc.noaa.gov/wcm/20ytora.png>

The severity of tornadoes that may occur in the county is measured using the Enhanced Fujita Scale for tornadoes (see chart below). Based on historical events, in a worse case scenario it is possible for the extent of a tornado to exceed an EF3 ranking. The EF2 tornado that moved through the county on March 22, 1991 is the largest tornado event ever recorded in Coffee County.

**Fujita Scale/Enhanced Fujita Scale for Tornadoes**

Fujita Scale/Enhanced Fujita Scale for Tornadoes				
F-Scale	Fastest Quarter Mile Wind Speed	Typical Impacts	Enhanced Scale: 3 Sec Wind Gust Speed	Enhanced F-Scale
F0	40-72 mph	Some damage to chimney; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.	65-85 mph	EF0
F1	73-112 mph	Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.	86-110 mph	EF1
F2	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.	111-135 mph	EF2
F3	158-206 mph	Roof and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted.	136-165 mph	EF3
F4	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.	166-200 mph	EF4
F5	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel reinforced concrete structures badly damaged.	Over 200 mph	EF5

Source: [NOAA National Weather Service; The Tornado Project](#)

Hail is the frozen form of precipitation, falling as small spheres of solid ice. Even though the risk from hail is relatively low, all jurisdictions have the possibility of hail causing some window and roof damage. Historically, hail events occur about twice a year in Coffee County. The severity of

hail is measured by the diameter of the hail itself, commonly using the TORRO Hail Index (see following chart). Coffee County’s largest hail extent is reported at 2.0 inches (H5). Most of the county’s hail events only were reported causing minor roof damage to several homes and vehicles.

**TORRO Hail Index**

TORRO Hail Index			
Scale	Max Diameter	Comparisons	Typical Impacts
H0	5-9mm	Pea	No damage.
H1	10-15mm	Mothball	Slight general damage to plants, crops.
H2	16-20mm	Marble	Significant damage to fruit, crops, vegetation.
H3	21-30mm	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored.
H4	31-40mm	Pigeon's Egg	Widespread glass damage, vehicle bodywork damage.
H5	41-50mm	Golf Ball	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries.
H6	51-60mm	Hen's Egg	Bodywork of grounded aircraft dented, brick walls pitted.
H7	61-75mm	Tennis Ball	Severe roof damage, risk of serious injuries.
H8	76-90mm	Soft Ball	Severe damage to aircraft bodywork.
H9	91-100mm	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open.

*Source: The Tornado & Storm Research Organization (<http://www.torro.org.uk/hscale.php>)*

Throughout the county all buildings and infrastructure are vulnerable to tornadoes and severe storm impacts. Coffee County’s building stock can be broken down into the following percentage categories: 70.6% residential, 17.4% commercial, 6.9% industrial, .04% agricultural, 1.0% governmental, .24% religious, and 1.2% educational (source: Coffee County Hazus Flood Study – table 1 in [Appendix E](#)).



The following chart provides hail event information for Coffee County between January 2000 and December 2017.

**Hail Events in Coffee County: January 2000 – December 2017**

Location	County/ Zone	State	Date	Time	T.Z.	Type
MANCHESTER	COFFEE CO.	TN	9/21/2017	14:25	CST-6	Hail
CALHOUN	COFFEE CO.	TN	4/5/2017	15:18	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/5/2017	15:21	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/5/2017	15:26	CST-6	Hail
RAGSDALE	COFFEE CO.	TN	4/5/2017	15:32	CST-6	Hail
TULLAHOMA	COFFEE CO.	TN	4/5/2017	15:58	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/5/2017	16:07	CST-6	Hail
FREDONIA	COFFEE CO.	TN	3/21/2017	16:12	CST-6	Hail
TULLAHOMA	COFFEE CO.	TN	3/9/2017	23:03	CST-6	Hail
ARNOLDS AFS	COFFEE CO.	TN	3/1/2017	12:38	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	7/14/2015	15:51	CST-6	Hail
GNAT HILL	COFFEE CO.	TN	5/19/2012	15:40	CST-6	Hail
CALHOUN	COFFEE CO.	TN	3/2/2012	14:52	CST-6	Hail
NOAH	COFFEE CO.	TN	3/2/2012	14:55	CST-6	Hail
NOAH	COFFEE CO.	TN	3/2/2012	18:07	CST-6	Hail
NOAH	COFFEE CO.	TN	3/2/2012	18:10	CST-6	Hail
TULLAHOMA	COFFEE CO.	TN	10/18/2011	14:00	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	10/18/2011	14:20	CST-6	Hail
BEECH GROVE	COFFEE CO.	TN	8/3/2011	20:05	CST-6	Hail
ARNOLDS AFS	COFFEE CO.	TN	6/24/2011	12:10	CST-6	Hail
ARNOLDS AFS	COFFEE CO.	TN	6/24/2011	12:10	CST-6	Hail
HILLSBORO	COFFEE CO.	TN	6/24/2011	12:21	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	6/24/2011	12:55	CST-6	Hail
TULLAHOMA	COFFEE CO.	TN	6/5/2011	14:44	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/20/2011	2:08	CST-6	Hail
WINTON TOWN	COFFEE CO.	TN	4/4/2011	14:48	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	3/26/2011	16:53	CST-6	Hail
BARNES STORE	COFFEE CO.	TN	10/26/2010	12:42	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	6/11/2009	9:05	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/13/2009	19:40	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/10/2009	13:05	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/10/2009	13:10	CST-6	Hail

Location	County/ Zone	State	Date	Time	T.Z.	Type
MANCHESTER	COFFEE CO.	TN	5/9/2008	18:07	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/11/2008	13:25	CST-6	Hail
MANCHESTER	COFFEE CO.	TN	4/11/2008	13:34	CST-6	Hail
BEECH GROVE	COFFEE CO.	TN	4/3/2007	20:58	CST-6	Hail
TULLAHOMA ARPT	COFFEE CO.	TN	5/28/2006	12:05	CST	Hail
MANCHESTER	COFFEE CO.	TN	5/28/2006	12:25	CST	Hail
MANCHESTER	COFFEE CO.	TN	4/7/2006	18:26	CST	Hail
BEECH GROVE	COFFEE CO.	TN	4/22/2005	16:15	CST	Hail
TULLAHOMA	COFFEE CO.	TN	4/22/2005	16:48	CST	Hail
TULLAHOMA	COFFEE CO.	TN	4/22/2005	17:00	CST	Hail
MANCHESTER	COFFEE CO.	TN	12/10/2004	13:36	CST	Hail
MANCHESTER	COFFEE CO.	TN	7/14/2004	12:42	CST	Hail
MANCHESTER	COFFEE CO.	TN	7/14/2004	13:00	CST	Hail
TULLAHOMA	COFFEE CO.	TN	7/14/2004	13:03	CST	Hail
TULLAHOMA	COFFEE CO.	TN	7/12/2004	16:00	CST	Hail
TULLAHOMA	COFFEE CO.	TN	5/5/2003	17:38	CST	Hail
TULLAHOMA	COFFEE CO.	TN	5/5/2003	17:40	CST	Hail
NORTH PORTION	COFFEE CO.	TN	4/25/2003	16:20	CST	Hail
TULLAHOMA	COFFEE CO.	TN	4/25/2003	16:52	CST	Hail
HILLSBORO	COFFEE CO.	TN	4/25/2003	17:18	CST	Hail
BEECH GROVE	COFFEE CO.	TN	11/10/2002	17:29	CST	Hail
MANCHESTER	COFFEE CO.	TN	11/10/2002	18:56	CST	Hail
SUMMITVILLE	COFFEE CO.	TN	6/4/2001	15:05	CST	Hail

Source: <http://www.ncdc.noaa.gov/>

**Hail Impacts in Coffee County: January 2000 – December 2017**

Location	Date	Type	Magnitu	Death	Injuri	Property Damag	Crop Damag
MANCHESTER	9/21/2017	Hail	1.00 in.	0	0	0.00K	0.00K
CALHOUN	4/5/2017	Hail	1.75 in.	0	0	0.00K	0.00K
MANCHESTER	4/5/2017	Hail	0.88 in.	0	0	0.00K	0.00K
MANCHESTER	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
RAGSDALE	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
TULLAHOMA	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
FREDONIA	3/21/2017	Hail	1.00 in.	0	0	0.00K	0.00K
TULLAHOMA	3/9/2017	Hail	1.25 in.	0	0	0.00K	0.00K
ARNOLDS AFS	3/1/2017	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	7/14/2015	Hail	0.88 in.	0	0	0.00K	0.00K
GNAT HILL	5/19/2012	Hail	1.00 in.	0	0	0.00K	0.00K
CALHOUN	3/2/2012	Hail	1.75 in.	0	0	0.00K	0.00K
NOAH	3/2/2012	Hail	1.75 in.	0	0	0.00K	0.00K
NOAH	3/2/2012	Hail	1.00 in.	0	0	0.00K	0.00K
NOAH	3/2/2012	Hail	1.00 in.	0	0	0.00K	0.00K
TULLAHOMA	10/18/2011	Hail	2.75 in.	0	0	1.000M	0.00K
MANCHESTER	10/18/2011	Hail	1.75 in.	0	0	5.00K	0.00K
BEECH GROVE	8/3/2011	Hail	0.75 in.	0	0	0.00K	0.00K
ARNOLDS AFS	6/24/2011	Hail	1.00 in.	0	0	0.00K	0.00K
ARNOLDS AFS	6/24/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HILLSBORO	6/24/2011	Hail	0.88 in.	0	0	0.00K	0.00K
MANCHESTER	6/24/2011	Hail	0.88 in.	0	0	0.00K	0.00K
TULLAHOMA	6/5/2011	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	4/20/2011	Hail	1.00 in.	0	0	0.00K	0.00K
WINTON TOWN	4/4/2011	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	3/26/2011	Hail	1.75 in.	0	0	0.00K	0.00K
BARNES STORE	10/26/2010	Hail	1.50 in.	0	0	0.00K	0.00K
MANCHESTER	6/11/2009	Hail	0.75 in.	0	0	0.00K	0.00K
MANCHESTER	4/13/2009	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	4/10/2009	Hail	0.75 in.	0	0	0.00K	0.00K
MANCHESTER	4/10/2009	Hail	0.75 in.	0	0	0.00K	0.00K

Location	Date	T.Z.	Type	Magnitu	Death	Injurie	Property Damag	Crop Damag
MANCHESTER	5/9/2008	CST-6	Hail	1.75 in.	0	0	0.00K	0.00K
MANCHESTER	4/11/2008	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	4/11/2008	CST-6	Hail	1.00 in.	0	0	0.00K	0.00K
BEECH GROVE	4/3/2007	CST-6	Hail	1.75 in.	0	0	0.00K	0.00K
TULLAHOMA ARPT	5/28/2006	CST	Hail	0.88 in.	0	0	0.00K	0.00K
MANCHESTER	5/28/2006	CST	Hail	1.75 in.	0	0	0.00K	0.00K
MANCHESTER	4/7/2006	CST	Hail	0.75 in.	0	0	0.00K	0.00K
BEECH GROVE	4/22/2005	CST	Hail	0.75 in.	0	0	0.00K	0.00K
TULLAHOMA	4/22/2005	CST	Hail	0.88 in.	0	0	0.00K	0.00K
TULLAHOMA	4/22/2005	CST	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	12/10/2004	CST	Hail	0.75 in.	0	0	0.00K	0.00K
MANCHESTER	7/14/2004	CST	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	7/14/2004	CST	Hail	0.88 in.	0	0	0.00K	0.00K
TULLAHOMA	7/14/2004	CST	Hail	0.88 in.	0	0	0.00K	0.00K
TULLAHOMA	7/12/2004	CST	Hail	0.88 in.	0	0	0.00K	0.00K
TULLAHOMA	5/5/2003	CST	Hail	0.88 in.	0	0	0.00K	0.00K
TULLAHOMA	5/5/2003	CST	Hail	1.00 in.	0	0	0.00K	0.00K
NORTH PORTION	4/25/2003	CST	Hail	0.75 in.	0	0	0.00K	0.00K
TULLAHOMA	4/25/2003	CST	Hail	0.75 in.	0	0	0.00K	0.00K
HILLSBORO	4/25/2003	CST	Hail	1.00 in.	0	0	0.00K	0.00K
BEECH GROVE	11/10/2002	CST	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	11/10/2002	CST	Hail	1.00 in.	0	0	0.00K	0.00K
SUMMITVILLE	6/4/2001	CST	Hail	0.75 in.	0	0	0.00K	0.00K

Source: <http://www.ncdc.noaa.gov/>

Severe storm winds most commonly occur as straight-line winds; a downburst of wind created by an area of significantly rain-cooled air that spreads out in all directions after hitting the ground. All jurisdictions are vulnerable to receiving damage from these severe storm winds. Historically, severe storm wind events occur about five times a year in Coffee County. The severity of severe storm winds is commonly measured by wind speed (knots or mph). The following chart provides severe storm wind event information for Coffee County between January 2000 and December 2017.

**Wind Events in Coffee County: January 2000 – December 2017**

Location	County/ Zone	State	Date	Time	T.Z.	Type
FREDONIA	COFFEE CO.	TN	7/1/2017	11:30	CST-6	Thunderstorm Wind
RAGSDALE	COFFEE CO.	TN	7/1/2017	11:37	CST-6	Thunderstorm Wind
RILEY CREEK	COFFEE CO.	TN	5/27/2017	19:35	CST-6	Thunderstorm Wind
HICKERSON	COFFEE CO.	TN	3/21/2017	16:08	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	3/21/2017	16:09	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	3/21/2017	16:09	CST-6	Thunderstorm Wind
SUMMITVILLE	COFFEE CO.	TN	3/21/2017	16:13	CST-6	Thunderstorm Wind
PRAIRIE PLAINS	COFFEE CO.	TN	3/21/2017	16:17	CST-6	Thunderstorm Wind
HILLSBORO	COFFEE CO.	TN	3/21/2017	16:18	CST-6	Thunderstorm Wind
SUMMITVILLE	COFFEE CO.	TN	3/10/2017	0:00	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	3/10/2017	0:01	CST-6	Thunderstorm Wind
FREDONIA	COFFEE CO.	TN	3/9/2017	23:54	CST-6	Thunderstorm Wind
FREDONIA	COFFEE CO.	TN	3/9/2017	23:56	CST-6	Thunderstorm Wind
RUTLEDGE FALLS	COFFEE CO.	TN	3/1/2017	12:23	CST-6	Thunderstorm Wind
MANCHESTER SPENCER	COFFEE CO.	TN	3/1/2017	12:46	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	12/18/2016	1:52	CST-6	Thunderstorm Wind
HICKERSON	COFFEE CO.	TN	12/18/2016	1:56	CST-6	Thunderstorm Wind
GNAT HILL	COFFEE CO.	TN	8/18/2016	5:06	CST-6	Thunderstorm Wind
RED HILL	COFFEE CO.	TN	7/14/2016	13:00	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	7/8/2016	21:20	CST-6	Thunderstorm Wind
RILEY CREEK	COFFEE CO.	TN	6/15/2016	16:31	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	6/15/2016	16:35	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	6/15/2016	16:35	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	6/15/2016	16:45	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	4/27/2016	18:13	CST-6	Thunderstorm Wind
BLANTON CHAPEL	COFFEE CO.	TN	4/27/2016	18:30	CST-6	Thunderstorm Wind
BLANTON CHAPEL	COFFEE CO.	TN	4/27/2016	18:31	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	9/9/2015	16:25	CST-6	Thunderstorm Wind
FOREST MILL	COFFEE CO.	TN	7/14/2015	15:46	CST-6	Thunderstorm Wind
HILLSBORO	COFFEE CO.	TN	7/14/2015	16:05	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	7/1/2015	12:45	CST-6	Thunderstorm Wind
RILEY CREEK	COFFEE CO.	TN	4/19/2015	15:25	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	4/28/2014	19:50	CST-6	Thunderstorm Wind
BEECH GROVE	COFFEE CO.	TN	2/20/2014	21:45	CST-6	Thunderstorm Wind
NOAH	COFFEE CO.	TN	2/20/2014	21:47	CST-6	Thunderstorm Wind
RUTLEDGE HILL	COFFEE CO.	TN	2/20/2014	22:27	CST-6	Thunderstorm Wind

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Location	County/ Zone	State	Date	Time	T.Z.	Type
MANCHESTER	COFFEE CO.	TN	12/21/2013	23:50	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	7/10/2013	18:29	CST-6	Thunderstorm Wind
POCAHONTAS	COFFEE CO.	TN	6/17/2013	14:30	CST-6	Thunderstorm Wind
GOSSBURG	COFFEE CO.	TN	6/10/2013	14:45	CST-6	Thunderstorm Wind
FOREST MILL	COFFEE CO.	TN	6/10/2013	15:06	CST-6	Thunderstorm Wind
SUMMITVILLE	COFFEE CO.	TN	6/10/2013	15:15	CST-6	Thunderstorm Wind
BEECH GROVE	COFFEE CO.	TN	6/1/2013	17:04	CST-6	Thunderstorm Wind
BEECH GROVE	COFFEE CO.	TN	4/28/2013	1:05	CST-6	Thunderstorm Wind
RED HILL	COFFEE CO.	TN	4/19/2013	1:39	CST-6	Thunderstorm Wind
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/26/2013	1:00	CST-6	High Wind
CALHOUN	COFFEE CO.	TN	9/17/2012	15:25	CST-6	Thunderstorm Wind
NOAH	COFFEE CO.	TN	9/17/2012	15:28	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	8/16/2012	22:55	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	8/16/2012	23:05	CST-6	Thunderstorm Wind
GNAT HILL	COFFEE CO.	TN	8/9/2012	9:30	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	8/1/2012	19:30	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	7/16/2012	18:10	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	7/5/2012	17:25	CST-6	Thunderstorm Wind
SUMMITVILLE	COFFEE CO.	TN	7/5/2012	17:35	CST-6	Thunderstorm Wind
FREDONIA	COFFEE CO.	TN	7/5/2012	18:00	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	5/29/2012	18:25	CST-6	Thunderstorm Wind
POCAHONTAS	COFFEE CO.	TN	5/19/2012	15:00	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	8/7/2011	19:50	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	6/28/2011	4:40	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	6/28/2011	4:45	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	6/18/2011	12:45	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	5/26/2011	0:05	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	5/26/2011	7:55	CST-6	Thunderstorm Wind
FREDONIA	COFFEE CO.	TN	5/25/2011	23:45	CST-6	Thunderstorm Wind
SUMMITVILLE	COFFEE CO.	TN	4/27/2011	5:35	CST-6	Thunderstorm Wind
MANCHESTER RAGS	COFFEE CO.	TN	4/27/2011	6:32	CST-6	Thunderstorm Wind
HICKERSON	COFFEE CO.	TN	4/27/2011	16:30	CST-6	Thunderstorm Wind
HILLSBORO	COFFEE CO.	TN	4/27/2011	17:53	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	4/4/2011	13:55	CST-6	Thunderstorm Wind
RED HILL	COFFEE CO.	TN	4/4/2011	14:45	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	3/26/2011	16:53	CST-6	Thunderstorm Wind
MANCHESTER SPENCER	COFFEE CO.	TN	3/23/2011	18:55	CST-6	Thunderstorm Wind
FREDONIA	COFFEE CO.	TN	2/28/2011	9:35	CST-6	Thunderstorm Wind
FLOWERTOWN	COFFEE CO.	TN	2/24/2011	23:25	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	10/24/2010	23:47	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	8/21/2010	17:43	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	8/12/2010	11:15	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	8/5/2010	13:55	CST-6	Thunderstorm Wind
PRAIRIE PLAINS	COFFEE CO.	TN	7/9/2010	13:50	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	6/28/2010	18:00	CST-6	Thunderstorm Wind

**Coffee County Hazard Mitigation Plan**

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Location	County/ Zone	State	Date	Time	T.Z.	Type
BLANTON CHAPEL	COFFEE CO.	TN	6/15/2010	14:10	CST-6	Thunderstorm Wind
BETSY WILLIS	COFFEE CO.	TN	5/28/2010	12:05	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	7/12/2009	15:00	CST-6	Lightning
GNAT HILL	COFFEE CO.	TN	7/12/2009	20:05	CST-6	Thunderstorm Wind
FAIRVIEW	COFFEE CO.	TN	7/12/2009	20:05	CST-6	Thunderstorm Wind
FREDONIA	COFFEE CO.	TN	6/11/2009	9:05	CST-6	Lightning
SUMMITVILLE	COFFEE CO.	TN	6/11/2009	9:15	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	7/12/2008	7:45	CST-6	Lightning
TULLAHOMA	COFFEE CO.	TN	6/2/2008	18:15	CST-6	Thunderstorm Wind
HILLSBORO	COFFEE CO.	TN	5/26/2008	15:15	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	5/9/2008	18:07	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	4/11/2008	13:25	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	2/6/2008	4:03	CST-6	Thunderstorm Wind
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/29/2008	20:30	CST-6	High Wind
TULLAHOMA	COFFEE CO.	TN	1/10/2008	16:15	CST-6	Thunderstorm Wind
FREDONIA	COFFEE CO.	TN	10/19/2007	0:05	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	8/24/2007	20:50	CST-6	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	4/3/2007	21:50	CST-6	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	4/3/2006	1:00	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	3/13/2006	17:45	CST	Lightning
COFFEE (ZONE)	COFFEE (ZONE)	TN	11/28/2005	15:00	CST	High Wind
MANCHESTER	COFFEE CO.	TN	8/6/2005	14:00	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	7/3/2005	12:50	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	6/6/2005	14:00	CST	Thunderstorm Wind
BEECH GROVE	COFFEE CO.	TN	2/21/2005	9:35	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	10/19/2004	2:00	CST	Lightning
TULLAHOMA	COFFEE CO.	TN	10/19/2004	1:55	CST	Thunderstorm Wind
COFFEE (ZONE)	COFFEE (ZONE)	TN	9/16/2004	17:08	CST	High Wind
MANCHESTER	COFFEE CO.	TN	7/13/2004	21:09	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	7/12/2004	15:55	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	7/6/2004	14:50	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	5/31/2004	0:30	CST	Thunderstorm Wind
COUNTYWIDE	COFFEE CO.	TN	5/31/2004	0:30	CST	Thunderstorm Wind
COUNTYWIDE	COFFEE CO.	TN	8/22/2003	19:52	CST	Thunderstorm Wind
SUMMITVILLE	COFFEE CO.	TN	7/13/2003	15:20	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	6/10/2003	16:30	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	5/17/2003	11:15	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	5/11/2003	3:30	CST	Thunderstorm Wind

**Coffee County Hazard Mitigation Plan**

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Location	County/ Zone	State	Date	Time	T.Z.	Type
MANCHESTER	COFFEE CO.	TN	5/1/2003	15:45	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	11/10/2002	18:01	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	8/18/2002	17:00	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	5/13/2002	10:40	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	5/1/2002	0:10	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	5/1/2002	0:34	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	5/1/2002	0:45	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	11/24/2001	13:45	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	10/24/2001	20:25	CST	Thunderstorm Wind
TULLAHOMA	COFFEE CO.	TN	7/4/2001	15:30	CST	Thunderstorm Wind
HILLSBORO	COFFEE CO.	TN	5/22/2001	0:00	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	2/25/2001	2:30	CST	Thunderstorm Wind
BEECH GROVE	COFFEE CO.	TN	8/17/2000	18:30	CST	Thunderstorm Wind
SHADY GROVE	COFFEE CO.	TN	8/7/2000	16:20	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	4/20/2000	18:38	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	4/20/2000	18:38	CST	Thunderstorm Wind
EAST PORTION	COFFEE CO.	TN	4/20/2000	18:41	CST	Thunderstorm Wind
MANCHESTER	COFFEE CO.	TN	2/18/2000	19:40	CST	Thunderstorm Wind
EAST PORTION	COFFEE CO.	TN	1/3/2000	22:50	CST	Thunderstorm Wind

Source: <http://www.ncdc.noaa.gov/>

**Wind Impacts in Coffee County: January 2000 – December 2017**

Location	Date	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
MANCHESTER	9/21/2017	Hail	1.00 in.	0	0	0.00K	0.00K
CALHOUN	4/5/2017	Hail	1.75 in.	0	0	0.00K	0.00K
MANCHESTER	4/5/2017	Hail	0.88 in.	0	0	0.00K	0.00K
MANCHESTER	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
RAGSDALE	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
TULLAHOMA	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	4/5/2017	Hail	1.00 in.	0	0	0.00K	0.00K
FREDONIA	3/21/2017	Hail	1.00 in.	0	0	0.00K	0.00K
TULLAHOMA	3/9/2017	Hail	1.25 in.	0	0	0.00K	0.00K
ARNOLDS AFS	3/1/2017	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	7/14/2015	Hail	0.88 in.	0	0	0.00K	0.00K
GNAT HILL	5/19/2012	Hail	1.00 in.	0	0	0.00K	0.00K
CALHOUN	3/2/2012	Hail	1.75 in.	0	0	0.00K	0.00K
NOAH	3/2/2012	Hail	1.75 in.	0	0	0.00K	0.00K
NOAH	3/2/2012	Hail	1.00 in.	0	0	0.00K	0.00K
NOAH	3/2/2012	Hail	1.00 in.	0	0	0.00K	0.00K
TULLAHOMA	10/18/2011	Hail	2.75 in.	0	0	1.000M	0.00K
MANCHESTER	10/18/2011	Hail	1.75 in.	0	0	5.00K	0.00K
BEECH GROVE	8/3/2011	Hail	0.75 in.	0	0	0.00K	0.00K
ARNOLDS AFS	6/24/2011	Hail	1.00 in.	0	0	0.00K	0.00K
ARNOLDS AFS	6/24/2011	Hail	1.00 in.	0	0	0.00K	0.00K
HILLSBORO	6/24/2011	Hail	0.88 in.	0	0	0.00K	0.00K
MANCHESTER	6/24/2011	Hail	0.88 in.	0	0	0.00K	0.00K
TULLAHOMA	6/5/2011	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	4/20/2011	Hail	1.00 in.	0	0	0.00K	0.00K
WINTON TOWN	4/4/2011	Hail	1.00 in.	0	0	0.00K	0.00K
MANCHESTER	3/26/2011	Hail	1.75 in.	0	0	0.00K	0.00K
BARNES STORE	10/26/2010	Hail	1.50 in.	0	0	0.00K	0.00K

Section 2: County Profile

Location	Date	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
MANCHESTER	12/21/2013	Thunderstorm Wind	52 kts. EG	0	0	3.00K	0.00K
MANCHESTER	7/10/2013	Thunderstorm Wind	50 kts. EG	0	0	20.00K	0.00K
POCAHONTAS	6/17/2013	Thunderstorm Wind	48 kts. EG	0	0	1.00K	0.00K
GOSSBURG	6/10/2013	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
FOREST MILL	6/10/2013	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
SUMMITVILLE	6/10/2013	Thunderstorm Wind	56 kts. EG	0	0	15.00K	0.00K
BEECH GROVE	6/1/2013	Thunderstorm Wind	52 kts. EG	0	0	3.00K	0.00K
BEECH GROVE	4/28/2013	Thunderstorm Wind	52 kts. EG	0	0	1.00K	0.00K
RED HILL	4/19/2013	Thunderstorm Wind	48 kts. EG	0	0	2.00K	0.00K
COFFEE (ZONE)	2/26/2013	High Wind	52 kts. EG	0	0	5.00K	0.00K
CALHOUN	9/17/2012	Thunderstorm Wind	55 kts. EG	0	0	1.00K	0.00K
NOAH	9/17/2012	Thunderstorm Wind	55 kts. EG	0	0	1.00K	0.00K
MANCHESTER	8/16/2012	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
TULLAHOMA	8/16/2012	Thunderstorm Wind	52 kts. EG	0	0	1.00K	0.00K
GNAT HILL	8/9/2012	Thunderstorm Wind	65 kts. EG	0	0	25.00K	0.00K
TULLAHOMA	8/1/2012	Thunderstorm Wind	52 kts. EG	0	0	10.00K	0.00K
TULLAHOMA	7/16/2012	Thunderstorm Wind	55 kts. EG	0	0	50.00K	0.00K
MANCHESTER	7/5/2012	Thunderstorm Wind	55 kts. EG	0	0	15.00K	0.00K
SUMMITVILLE	7/5/2012	Thunderstorm Wind	55 kts. EG	0	0	2.00K	0.00K
FREDONIA	7/5/2012	Thunderstorm Wind	55 kts. EG	0	0	2.00K	0.00K
TULLAHOMA	5/29/2012	Thunderstorm Wind	55 kts. EG	0	0	25.00K	0.00K
POCAHONTAS	5/19/2012	Thunderstorm Wind	56 kts. EG	0	0	0.00K	0.00K
MANCHESTER	8/7/2011	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
MANCHESTER	6/28/2011	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
MANCHESTER	6/28/2011	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
TULLAHOMA	6/18/2011	Thunderstorm Wind	52 kts. EG	0	0	2.00K	0.00K
MANCHESTER	5/26/2011	Thunderstorm Wind	55 kts. EG	0	0	2.00K	0.00K
MANCHESTER	5/26/2011	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
FREDONIA	5/25/2011	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
SUMMITVILLE	4/27/2011	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
MANCHESTER RAGS	4/27/2011	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
HICKERSON	4/27/2011	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
HILLSBORO	4/27/2011	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
TULLAHOMA	4/4/2011	Thunderstorm Wind	55 kts. EG	0	0	30.00K	0.00K
RED HILL	4/4/2011	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
MANCHESTER	3/26/2011	Thunderstorm Wind	55 kts. EG	0	0	25.00K	0.00K
MANCHESTER SPENCER	3/23/2011	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
FREDONIA	2/28/2011	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
FLOWERTOWN	2/24/2011	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
TULLAHOMA	10/24/2010	Thunderstorm Wind	55 kts. EG	0	0	50.00K	0.00K
TULLAHOMA	8/21/2010	Thunderstorm Wind	55 kts. EG	0	0	50.00K	0.00K
MANCHESTER	8/12/2010	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
TULLAHOMA	8/5/2010	Thunderstorm Wind	55 kts. EG	0	0	25.00K	0.00K
PRAIRIE PLAINS	7/9/2010	Thunderstorm Wind	55 kts. EG	0	0	1.00K	0.00K
MANCHESTER	6/28/2010	Thunderstorm Wind	55 kts. EG	0	0	15.00K	0.00K

Section 2: County Profile

Location	Date	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
BLANTON CHAPEL	6/15/2010	Thunderstorm Wind	55 kts. EG	0	0	10.00K	0.00K
BETSY WILLIS	5/28/2010	Thunderstorm Wind	50 kts. EG	0	0	1.00K	0.00K
TULLAHOMA	7/12/2009	Lightning		0	0	10.00K	0.00K
GNAT HILL	7/12/2009	Thunderstorm Wind	60 kts. EG	0	0	5.00K	0.00K
FAIRVIEW	7/12/2009	Thunderstorm Wind	55 kts. EG	0	0	1.50K	0.00K
FREDONIA	6/11/2009	Lightning		0	0	25.00K	0.00K
SUMMITVILLE	6/11/2009	Thunderstorm Wind	50 kts. EG	0	0	5.00K	0.00K
TULLAHOMA	7/12/2008	Lightning		0	0	1.00K	0.00K
TULLAHOMA	6/2/2008	Thunderstorm Wind	50 kts. EG	0	0	30.00K	0.00K
HILLSBORO	5/26/2008	Thunderstorm Wind	50 kts. EG	0	0	0.50K	0.00K
MANCHESTER	5/9/2008	Thunderstorm Wind	52 kts. EG	0	0	5.00K	0.00K
TULLAHOMA	4/11/2008	Thunderstorm Wind	50 kts. EG	0	0	0.50K	0.00K
MANCHESTER	2/6/2008	Thunderstorm Wind	50 kts. EG	0	0	3.00K	0.00K
COFFEE (ZONE)	1/29/2008	High Wind	50 kts. EG	0	0	20.00K	0.00K
TULLAHOMA	1/10/2008	Thunderstorm Wind	55 kts. EG	0	0	5.00K	0.00K
FREDONIA	10/19/2007	Thunderstorm Wind	60 kts. EG	0	0	35.00K	0.00K
MANCHESTER	8/24/2007	Thunderstorm Wind	65 kts. EG	0	0	556.00K	0.00K
TULLAHOMA	4/3/2007	Thunderstorm Wind	50 kts. EG	0	0	0.10K	0.00K
MANCHESTER	4/3/2006	Thunderstorm Wind	60 kts. EG	0	0	10.00K	0.00K
TULLAHOMA	3/13/2006	Lightning		0	0	1.00K	0.00K
COFFEE (ZONE)	11/28/2005	High Wind	50 kts. EG	0	0	0.00K	0.00K
MANCHESTER	8/6/2005	Thunderstorm Wind	65 kts. EG	0	0	500.00K	0.00K
MANCHESTER	7/3/2005	Thunderstorm Wind	65 kts. EG	0	0	0.00K	0.00K
MANCHESTER	6/6/2005	Thunderstorm Wind	55 kts. EG	0	0	1.00K	0.00K
BEECH GROVE	2/21/2005	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
TULLAHOMA	10/19/2004	Lightning		0	0	10.00K	0.00K
TULLAHOMA	10/19/2004	Thunderstorm Wind	50 kts. EG	0	0	50.00K	0.00K
COFFEE (ZONE)	9/16/2004	High Wind	40 kts. ES	0	0	0.00K	0.00K
MANCHESTER	7/13/2004	Thunderstorm Wind	52 kts. EG	0	0	0.00K	0.00K
TULLAHOMA	7/12/2004	Thunderstorm Wind	55 kts. EG	0	0	30.00K	0.00K
MANCHESTER	7/6/2004	Thunderstorm Wind	90 kts. EG	0	0	10.00K	0.00K
TULLAHOMA	5/31/2004	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
COUNTYWIDE	5/31/2004	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
COUNTYWIDE	8/22/2003	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
SUMMITVILLE	7/13/2003	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
TULLAHOMA	6/10/2003	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
MANCHESTER	5/17/2003	Thunderstorm Wind	55 kts. EG	0	0	0.00K	0.00K
TULLAHOMA	5/11/2003	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K

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Location	Date	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
MANCHESTER	5/1/2003	Thunderstorm Wind	50 kts. EG	0	0	0.00K	0.00K
MANCHESTER	11/10/2002	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
MANCHESTER	8/18/2002	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
TULLAHOMA	5/13/2002	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
MANCHESTER	5/1/2002	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
MANCHESTER	5/1/2002	Thunderstorm Wind	65 kts. E	0	0	0.00K	0.00K
MANCHESTER	5/1/2002	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
TULLAHOMA	11/24/2001	Thunderstorm Wind	55 kts. E	0	0	0.00K	0.00K
TULLAHOMA	10/24/2001	Thunderstorm Wind	57 kts. E	0	0	0.00K	0.00K
TULLAHOMA	7/4/2001	Thunderstorm Wind	55 kts. E	0	0	0.00K	0.00K
HILLSBORO	5/22/2001	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
MANCHESTER	2/25/2001	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
BEECH GROVE	8/17/2000	Thunderstorm Wind	50 kts. E	0	0	1.00K	0.00K
SHADY GROVE	8/7/2000	Thunderstorm Wind	60 kts. E	0	0	1.00K	0.00K
MANCHESTER	4/20/2000	Thunderstorm Wind	60 kts. E	0	0	0.00K	0.00K
MANCHESTER	4/20/2000	Thunderstorm Wind	60 kts. E	0	0	0.00K	0.00K
EAST PORTION	4/20/2000	Thunderstorm Wind	60 kts. E	0	0	0.00K	0.00K
MANCHESTER	2/18/2000	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K
EAST PORTION	1/3/2000	Thunderstorm Wind	50 kts. E	0	0	0.00K	0.00K

Source: <http://www.ncdc.noaa.gov/>

Throughout the county all buildings and infrastructure are vulnerable to tornadoes and severe storm impacts. Coffee County’s building stock can be broken down into the following percentage categories: 70.6% residential, 17.4% commercial, 6.9% industrial, .04% agricultural, 1.0% governmental, .24% religious, and 1.2% educational (source: Coffee County Hazud Flood Study – table 1 in [Appendix E](#)). Coffee County uses a ranking system to determine each jurisdiction’s vulnerability to severe storm events (with a focus on tornadoes). This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of a severe storm event occurring to calculate a risk ranking for each jurisdiction.

Event:	Human	Property	Business	Sub-Total	Probability	Risk Score =	
Wind Event	1-5	1-5	1-5	Average	1-5	[(H+P+B)/3] + P	7.2
Coffee County	2	3	1	2.00	5	7.00	
City of Manchester	2	3	2	2.33	5	7.33	
City of Tullahoma	2	3	1	2.00	5	7.00	

Event:	Human	Property	Business	Sub-Total	Probability	Risk Score =	
Tornado	1-5	1-5	1-5	Average	1-5	[(H+P+B)/3] + P	6.2
Coffee County	4	4	1	3.00	3	6.00	
City of Manchester	3	4	3	3.33	3	6.33	
City of Tullahoma	3	4	2	3.00	3	6.00	

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Source: Calculation of Planning Committee Input using the [Vulnerability Calculator](#).

Human		Scale	
<i>Risk of injuries and deaths from the hazard</i>		Low	2-3.6
1	Death very unlikely, injuries are unlikely	Moderate	3.7-5.2
2	Death unlikely, injuries are minimal	Medium	5.3-6.8
3	Death unlikely, injuries may be substantial	High	6.9-8.4
4	Death possible, injuries may be substantial	Severe	8.5-10
5	Deaths probable, injuries will likely be substantial		
Property			
<i>Amount of residential property damage associated from the hazard</i>			
1	Less than \$500 in damages		
2	\$500-\$10,000 in damages		
3	\$10,000-\$500,000 in damages		
4	\$500,000-\$2,000,000 in damages		
5	More than \$2,000,000 in damages		
Business			
<i>Amount of business damage associated from the hazard</i>			
1	Less than 3 businesses closed for only a day		
2	More than 3 businesses closed for a week		
3	More than 3 businesses closed for a few months		
4	More than 3 businesses closed indefinitely or relocated		
5	A top-10 local employer closed indefinitely		
Probability			
<i>Likelihood of the hazard occurring within a given span of years</i>			
1	Less than once every 10 years		
2	About once every 5-10 years		
3	About once every 2-5 years		
4	About once a year		
5	More than once a year		

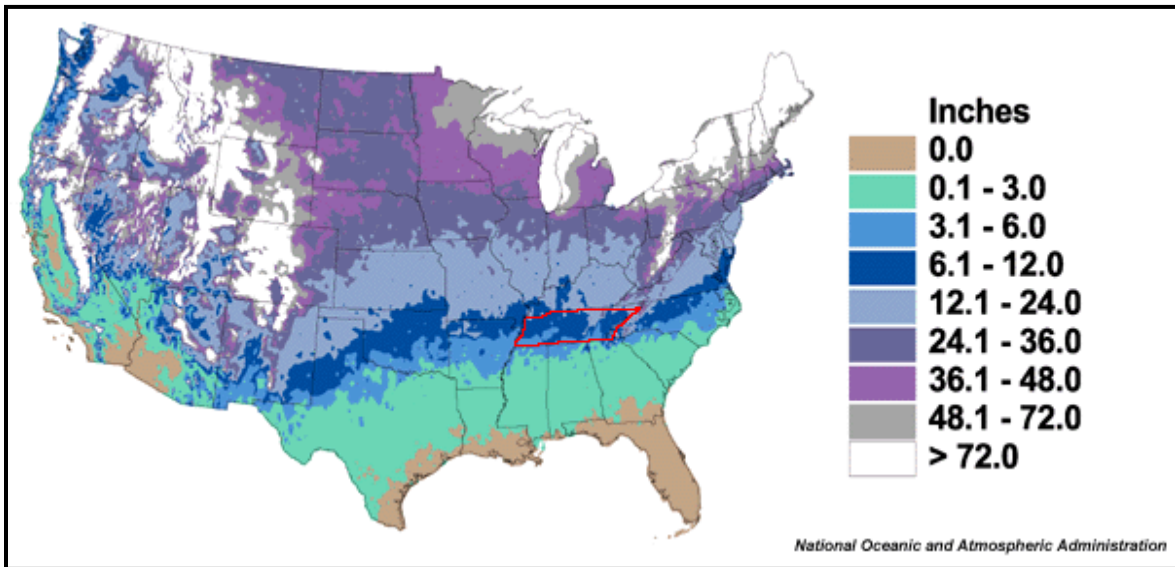
### Freezes/Winter Storms

The Coffee County Hazard Mitigation Committee identified Winter Weather Events as the County’s third highest risk event.

A freeze occurs when temperatures are below 32 degrees Fahrenheit for a period of time. These temperatures can damage agricultural crops, burst water pipes, and create layers of “black ice.” Winter storms are events that can range from a few hours of moderate snow to blizzard-like circumstances that can affect driving conditions and impact communications, electricity, and other services. In Coffee 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, Coffee County usually experiences one major winter storm event every 2 years. The severity of winter storms is commonly measured by inches of snowfall. It is possible for snowfall to accumulate over 5 inches in Coffee County. The average mean snowfall per year in Coffee County is between 6 to 12 inches (as seen on the map below).

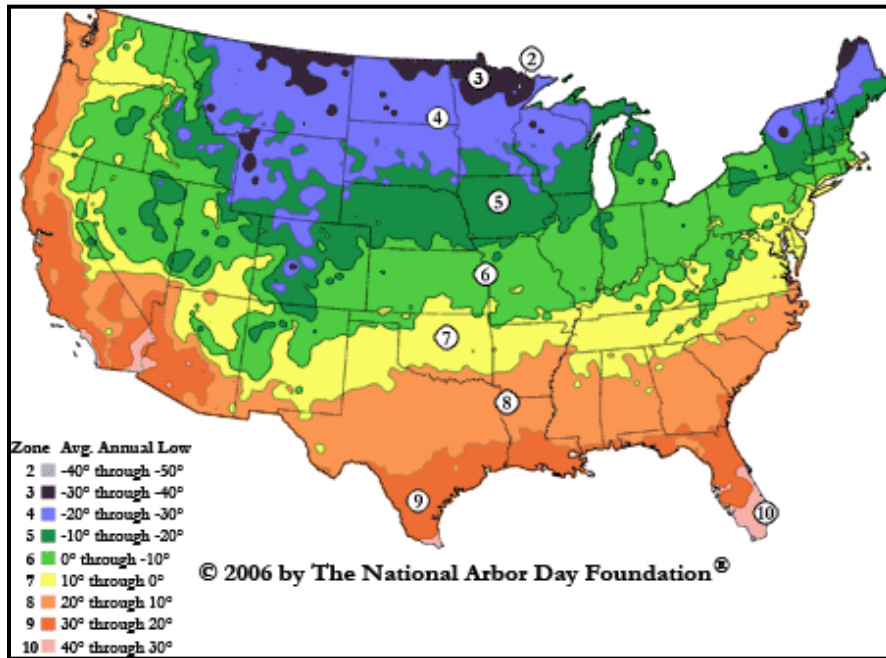
#### Average Mean Snowfall Per Year



*Source: NOAA*

Coffee County can experience temperatures between 15 to 5 degrees Fahrenheit, thus causing multiple freeze conditions during the winter months (see the following map for other average lows).

### Average Annual Low Temperatures



Source: NOAA

Throughout the county all buildings and infrastructure are vulnerable to winter weather events. Coffee County’s building stock can be broken down into the following percentage categories: 70.6% residential, 17.4% commercial, 6.9% industrial, .0.4% agricultural, 1.0% governmental, .2.4% religious, and 1.2% educational (source: Coffee County Hazus Flood Study – table 1 in [Appendix E](#)).



The following chart provides winter storm event information for Coffee County between January 2000 and December 2017.

### Coffee County Hazard Mitigation Plan

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**Winter Events in Coffee County: January 2000 – December 2017**

Location	County/ Zone	State	Date	Time	T.Z.	Type	Magnitude
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/11/2017	18:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/6/2017	6:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/8/2016	12:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/21/2016	21:00	CST-6	Winter Storm	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/20/2016	0:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/4/2015	17:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/25/2015	12:00	CST-6	Winter Storm	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/20/2015	12:00	CST-6	Winter Storm	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/18/2015	1:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/16/2015	0:00	CST-6	Winter Storm	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/12/2014	6:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/21/2014	12:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/5/2014	20:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/1/2013	18:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/12/2012	17:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/7/2011	8:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/9/2011	16:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/20/2011	16:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/9/2011	23:00	CST-6	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/25/2010	1:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/12/2010	8:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/2/2010	5:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/14/2010	11:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/29/2010	9:00	CST-6	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/29/2010	15:30	CST-6	Ice Storm	
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/5/2009	1:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/1/2009	0:00	CST-6	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/1/2009	0:00	CST-6	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/1/2009	0:00	CST-6	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/15/2008	16:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/15/2008	16:00	CST-6	Winter Weather	
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/7/2008	20:00	CST-6	Winter Storm	
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/22/2004	21:00	CST	Winter Storm	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/15/2004	13:00	CST	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/9/2003	21:00	CST	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/16/2003	11:00	CST	Heavy Snow	
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/6/2002	3:30	CST	Heavy Snow	

Source: <http://www.ncdc.noaa.gov/>

### Winter Impacts in Coffee County: January 1997 – December 2017

Location	Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
COFFEE (ZONE)	3/11/2017	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/6/2017	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	2/8/2016	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/21/2016	Winter Storm		0	0	0.00K	0.00K
COFFEE (ZONE)	1/20/2016	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	3/4/2015	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	2/25/2015	Winter Storm		0	0	0.00K	0.00K
COFFEE (ZONE)	2/20/2015	Winter Storm		0	0	1.000M	0.00K
COFFEE (ZONE)	2/18/2015	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	2/16/2015	Winter Storm		0	0	10.00K	0.00K
COFFEE (ZONE)	2/12/2014	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/21/2014	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/5/2014	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	3/1/2013	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/12/2012	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	12/7/2011	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	2/9/2011	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/20/2011	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/9/2011	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	12/25/2010	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	12/12/2010	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	3/2/2010	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	2/14/2010	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	1/29/2010	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	1/29/2010	Ice Storm		0	0	50.00K	0.00K
COFFEE (ZONE)	12/5/2009	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	3/1/2009	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	3/1/2009	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	3/1/2009	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	12/15/2008	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	12/15/2008	Winter Weather		0	0	0.00K	0.00K
COFFEE (ZONE)	3/7/2008	Winter Storm		0	0	0.00K	0.00K
COFFEE (ZONE)	12/22/2004	Winter Storm		0	0	0.00K	0.00K
COFFEE (ZONE)	2/15/2004	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	2/9/2003	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	1/16/2003	Heavy Snow		0	0	0.00K	0.00K
COFFEE (ZONE)	1/6/2002	Heavy Snow		0	0	0.00K	0.00K

Source: <http://www.ncdc.noaa.gov/>



Coffee County uses a ranking system to determine each jurisdiction’s vulnerability to freezes/winter storm events. This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of a freeze/winter storm event occurring to calculate a risk ranking for each jurisdiction.

Event: Winter Weather	Human 1-5	Property 1-5	Business 1-5	Sub-Total Average	Probability 1-5	Risk Score = $\frac{H+P+B}{3} + P$	4.5
Coffee County	1	2	2	1.67	3	4.67	
City of Manchester	1	1	2	1.33	3	4.33	
City of Tullahoma	1	2	2	1.67	2	3.67	

**Coffee County Hazard Mitigation Plan**

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Source: Calculation of Planning Committee Input using the [Vulnerability Calculator](#)

Human	
<i>Risk of injuries and deaths from the hazard</i>	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Deaths probable, injuries will likely be substantial
Property	
<i>Amount of residential property damage associated from the hazard</i>	
1	Less than \$500 in damages
2	\$500-\$10,000 in damages
3	\$10,000-\$500,000 in damages
4	\$500,000-\$2,000,000 in damages
5	More than \$2,000,000 in damages
Business	
<i>Amount of business damage associated from the hazard</i>	
1	Less than 3 businesses closed for only a day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top-10 local employer closed indefinitely
Probability	
<i>Likelihood of the hazard occurring within a given span of years</i>	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

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

## **Flooding**

The Coffee County Hazard Mitigation Committee identified flooding as the County's fourth highest risk event.

The Duck River is widely considered North America's richest river in variety of freshwater animals. The Lower Duck River Watershed is located in Middle Tennessee and includes parts of Dickson, Giles, Hickman, Humphreys, Lawrence, Coffee, Maury, Perry, and Williamson Counties. 8.6% of the Duck Watershed is in Coffee County.

The Buffalo River is the longest unimpounded river in Middle Tennessee in the United States, flowing 125 miles (201 km) through the southern and western portions of that region. It is the largest tributary of the Duck River and is used for canoeing, especially in its middle section. The river is named for the Buffalo fish which was abundant when the first European settlers arrived. From the confluence, the Buffalo River trends basically northwest for several miles, crossing into Coffee County, where it is crossed by the Natchez Trace Parkway. The confluence with the Little Buffalo River is in Coffee County as well, along with that of several other more minor tributaries. The stream is paralleled for a distance and then crossed by State Route 99 while flowing through the broad Texas Bottoms. In Coffee County, although meandering, the course of the stream is basically westward. The Buffalo River Watershed is located in Middle Tennessee and includes parts of Hickman, Humphreys, Lawrence, Coffee, Perry, and Wayne Counties. 19.5% of the Buffalo Valley River Watershed is in Coffee County.



Generally, flooding events occur when excess water from rivers and other bodies of water overflow onto riverbanks and adjacent floodplains. In addition, lower lying regions can collect water from rainfall and poorly drained land can accumulate rainfall through ponding on the surface. Floods in Coffee County are usually caused by rainfall, but may also be caused by snowmelt and man-made incidents. The below charts explain common ways flooding occurs and common factors that contribute toward the severity of floods.

Common Ways Flooding Occurs	
Methods	Description
<b>Overland Flow</b> <b>(a) Infiltration</b> <b>(b) Saturation</b>	-Excess overland flow occurs when the rain is falling more rapidly than it infiltrates into the soil. -Excess overland flow occurs when soil spaces are so full of water that no more rain can be absorbed.
<b>Throughflow</b>	-Rainwater which has infiltrated into unsaturated soil can move horizontally to the river channel. This process is slower than overland flow but faster than baseflow.
<b>Baseflow</b>	-Rainwater which has percolated to the aquifer can seep into the river channel. This is the slowest process.

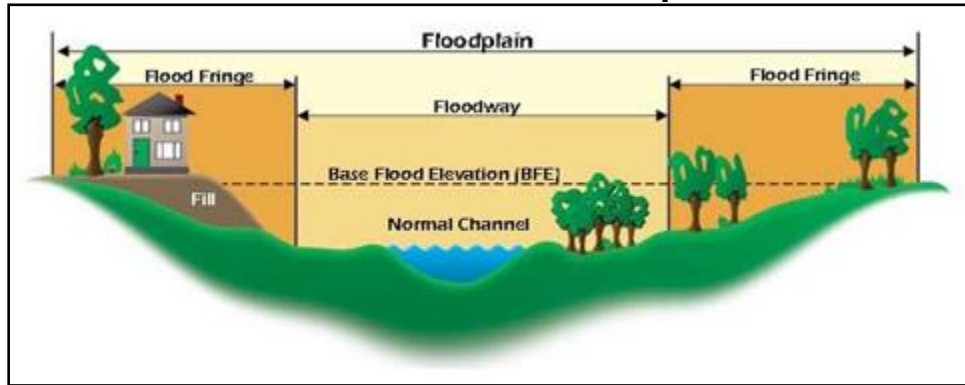
*Source: The Field Studies Council*

Common Causes of Flooding	
Factor	Effect on Flooding
<b>Geology</b>	Impermeable rocks are saturated more quickly than porous and pervious rocks. Saturation-excess overland flow is more common. Sandy soils have larger pore spaces than clay soils. Infiltration is most rapid in sandy soils.
<b>Relief</b>	Water reaches the channel more rapidly in a steeper basin as water is travelling more quickly downhill.
<b>Vegetation</b>	Vegetation intercepts a large proportion of rainfall. Where trees are deciduous, discharge is higher in a forested basin in winter as there is less interception.
<b>Meteorological Factors</b>	Where rain is falling faster than the infiltration rate there is infiltration-excess overland flow. This is common after a summer storm. Snow does not reach the channel but is stored on the ground surface. As snow melts, the meltwater will reach the channel quickly as infiltration is impeded if the ground is still frozen.
<b>Catchment Shape</b>	It takes less time for water to reach the channel in a circular basin as all extremities are roughly equidistant from the channel.
<b>Land Use</b>	Surface runoff is higher in urban areas because there are more urban surfaces (concrete & tarmac) and sewers take water rapidly to rivers. There is less interception and evapotranspiration and more surface runoff in a deforested catchment.
<b>Catchment Size</b>	Water reaches the channel more rapidly in a smaller basin as water has a shorter distance to travel.
<b>Antecedent Conditions</b>	The level of discharge before the storm is called the antecedent discharge. Even a small amount of rain can lead to flooding.

*Source: The Field Studies Council*

In Coffee County some areas are more flood-prone than others. One of the ways of identifying these flood-prone areas is through determining the county’s 100- and 500-year floodplains. 100-year floods are calculated to be the level of flood water expected to be equaled or exceeded every 100 years on average, meaning a flood that has a 1% chance of being equaled or exceeded in magnitude in any single year. A 500-year floodplain has a 0.2% chance. A 100-year floodplain would include the areas adjoining a stream, river, or watercourse that would be covered by water in the event of a 100-year flood (see diagram below).

### Characteristics of a Floodplain



*Source: FEMA*

In Coffee County, all jurisdictions have 100-year floodplains located within their boundaries and all jurisdictions are susceptible to smaller localized flooding outside of the 100-year floodplains. Areas in the county known to flood more often include:

- Parker Road
- Duncan Road
- Goose Pond Road
- Rock Road
- Sherrill and Rutledge Hill Roads
- Pocahontas Road
- Belmont Road
- Blue Springs Road
- New Bushy Branch Road
- Riddle Road
- Stephenson Road
- Lumley Stand Road
- Crouch Summitville Pike
- Betsy Willis Road



Coffee County is underlain predominantly by rocks of Mississippian age. Rock exposures of Silurian and Ordovician age only occur in the major drainage valleys in the county. The most prominent rock formation is the Fort Payne Formation (Mississippian age). This formation is characterized by bedded and disseminated chert, shale, and siltstone and by limey and dolomitic zones. At the base of the Fort Payne Formation is the Chattanooga Shale. The Chattanooga Shale is used throughout the southeast region as a regional marker bed. The Chattanooga Shale is also important because of its influence on ground-water quality and quantity throughout central and eastern Tennessee.

Another major geologic factor in the survey area is the Tuscaloosa Gravel (Cretaceous age). Remnants of the Tuscaloosa Formation only exist in a few places across Tennessee. However, the influence of the Tuscaloosa Gravel can be seen in the colluvial deposits throughout Coffee County. The chert gravel occurring at the base of hillslopes and on valley floors is a combination of the Tuscaloosa Gravel and chert from the Mississippian age rocks. The source for the Tuscaloosa Gravel is thought to be Cambrian-age and Ordovician-age formations of the Pascola Arch, an eastward-sloping extension of the Ozark Dome. During the late Cretaceous age, approximately 70 million years ago, material eroded from the formations of the Pascola Arch were deposited in a shallow sea that covered most of middle Tennessee. The remnants of those deposits are the Tuscaloosa Gravel. Important mineral resources in Coffee County are chert gravel, iron, and phosphate. An excellent report of the iron industry in the county is available in the Tennessee Division of Geology Bulletin 39. There has been a minimum of oil and gas exploration in Coffee County.

**Flood Events in Coffee County: January 2000 – December 2017**

Location	County/ Zone	State	Date	Time	T.Z.	Type
TULLAHOMA	COFFEE CO.	TN	6/27/2016	14:45	CST-6	Flood
RUTLEDGE HILL	COFFEE CO.	TN	4/1/2016	6:00	CST-6	Flood
TULLAHOMA ARPT	COFFEE CO.	TN	12/25/2015	10:30	CST-6	Flood
BETSY WILLIS	COFFEE CO.	TN	10/1/2015	15:30	CST-6	Flash Flood
FLOWERTOWN	COFFEE CO.	TN	5/31/2015	19:00	CST-6	Flood
MANCHESTER	COFFEE CO.	TN	7/10/2013	19:15	CST-6	Flash Flood
TULLAHOMA ARPT	COFFEE CO.	TN	11/30/2010	9:00	CST-6	Flash Flood
FOREST MILL	COFFEE CO.	TN	10/9/2009	22:38	CST-6	Heavy Rain
BEECH GROVE	COFFEE CO.	TN	9/26/2009	10:54	CST-6	Flash Flood
BEECH GROVE	COFFEE CO.	TN	5/2/2009	6:05	CST-6	Flash Flood
MANCHESTER	COFFEE CO.	TN	4/2/2009	20:31	CST-6	Flash Flood
TULLAHOMA	COFFEE CO.	TN	10/19/2004	2:50	CST	Flash Flood
MANCHESTER	COFFEE CO.	TN	10/19/2004	2:54	CST	Flash Flood
MANCHESTER	COFFEE CO.	TN	7/11/2004	21:00	CST	Flash Flood
TULLAHOMA	COFFEE CO.	TN	3/5/2004	21:40	CST	Flash Flood
TULLAHOMA	COFFEE CO.	TN	5/6/2003	7:48	CST	Flash Flood
TULLAHOMA	COFFEE CO.	TN	5/5/2003	18:00	CST	Flash Flood
EAST CENTRAL PORTION	COFFEE CO.	TN	3/19/2003	12:00	CST	Flash Flood
SOUTH PORTION	COFFEE CO.	TN	2/14/2003	19:51	CST	Flash Flood
COUNTYWIDE	COFFEE CO.	TN	3/18/2002	6:00	CST	Flash Flood
COUNTYWIDE	COFFEE CO.	TN	1/24/2002	8:00	CST	Flash Flood
COUNTYWIDE	COFFEE CO.	TN	1/23/2002	9:00	CST	Flash Flood
TULLAHOMA	COFFEE CO.	TN	8/10/2001	11:10	CST	Flash Flood
MANCHESTER	COFFEE CO.	TN	12/16/2000	17:30	CST	Flash Flood
MANCHESTER	COFFEE CO.	TN	6/25/2000	20:00	CST	Flash Flood
MANCHESTER	COFFEE CO.	TN	3/19/2000	14:30	CST	Flash Flood

Source: <http://www.ncdc.noaa.gov/>

**Flood Impacts in Coffee County: January 2000 – December 2017**

Location	Date	Time	Type	Deaths	Injuries	Property Damage	Crop Damage
TULLAHOMA	6/27/2016	14:45	Flood	0	0	0.00K	0.00K
RUTLEDGE HILL	4/1/2016	6:00	Flood	0	0	3.00K	0.00K
TULLAHOMA ARPT	12/25/2015	10:30	Flood	0	0	0.00K	0.00K
BETSY WILLIS	10/1/2015	15:30	Flash Flood	0	0	5.00K	0.00K
FLOWERTOWN	5/31/2015	19:00	Flood	0	0	10.00K	0.00K
MANCHESTER	7/10/2013	19:15	Flash Flood	0	0	0.00K	0.00K
TULLAHOMA ARPT	11/30/2010	9:00	Flash Flood	0	0	100.00K	1.00K
FOREST MILL	10/9/2009	22:38	Heavy Rain	0	0	100.00K	0.00K
BEECH GROVE	9/26/2009	10:54	Flash Flood	0	0	50.00K	0.00K
BEECH GROVE	5/2/2009	6:05	Flash Flood	0	0	10.00K	0.00K
MANCHESTER	4/2/2009	20:31	Flash Flood	0	0	5.00K	0.00K
TULLAHOMA	10/19/2004	2:50	Flash Flood	0	0	50.00K	0.00K
MANCHESTER	10/19/2004	2:54	Flash Flood	0	0	1.00K	0.00K
MANCHESTER	7/11/2004	21:00	Flash Flood	0	0	1.00K	0.00K
TULLAHOMA	3/5/2004	21:40	Flash Flood	0	0	0.00K	0.00K
TULLAHOMA	5/6/2003	7:48	Flash Flood	0	0	0.00K	0.00K
TULLAHOMA	5/5/2003	18:00	Flash Flood	0	0	0.00K	0.00K
EAST CENTRAL PORTION	3/19/2003	12:00	Flash Flood	0	0	0.00K	0.00K
SOUTH PORTION	2/14/2003	19:51	Flash Flood	0	0	0.00K	0.00K
COUNTYWIDE	3/18/2002	6:00	Flash Flood	0	0	0.00K	0.00K
COUNTYWIDE	1/24/2002	8:00	Flash Flood	0	0	0.00K	0.00K
COUNTYWIDE	1/23/2002	9:00	Flash Flood	0	0	0.00K	0.00K
TULLAHOMA	8/10/2001	11:10	Flash Flood	0	0	0.00K	0.00K
MANCHESTER	12/16/2000	17:30	Flash Flood	0	0	0.00K	0.00K
MANCHESTER	6/25/2000	20:00	Flash Flood	0	0	0.00K	0.00K
MANCHESTER	3/19/2000	14:30	Flash Flood	0	0	0.00K	0.00K

Source: <http://www.ncdc.noaa.gov/>

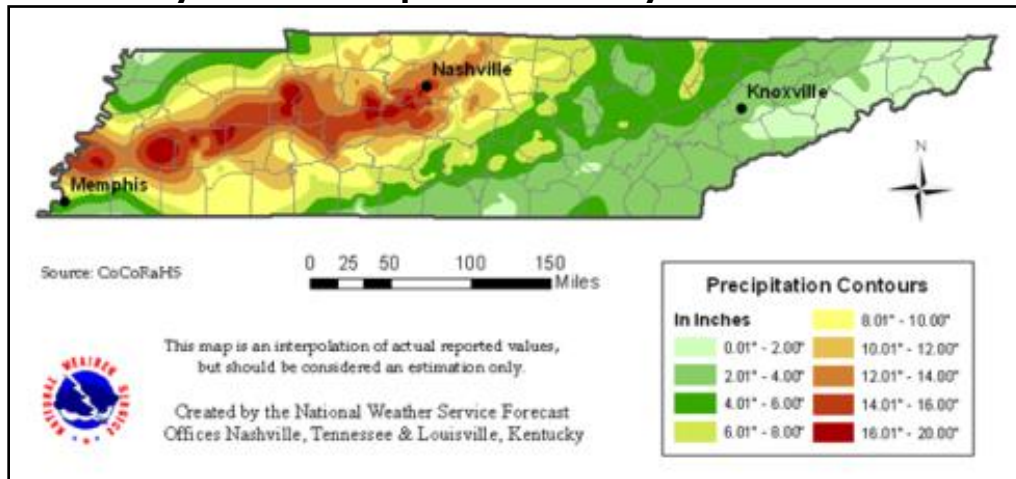
Small localized flood events are likely to occur frequently in Coffee County. In spring 2019, Elk and Duck River experienced severe flooding, especially low lying areas. The Coffee County Emergency Management Agency had to rescue a family affected from the flooded areas. There was a long duration of heavy rains including, 13 inches in February and 8 inches in March. There was a significant amount of public infrastructure and agricultural damage during this time. This resulted in a delay in the farming season which is one of the top five economic contributors for the county.

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The severity of flooding that may occur in the county is measured by inches of rainfall and by feet of flooding. Based on previous occurrences, in a worst case scenario it is possible for the extent of a flooding event to exceed 6 inches of rainfall and cause over 4 feet of localized flooding in the span of two days. As seen with the May 2010 Tennessee Flood Event (*DR-1909*), it is possible for 20 inches or more of rainfall to amass within two days (see following map).

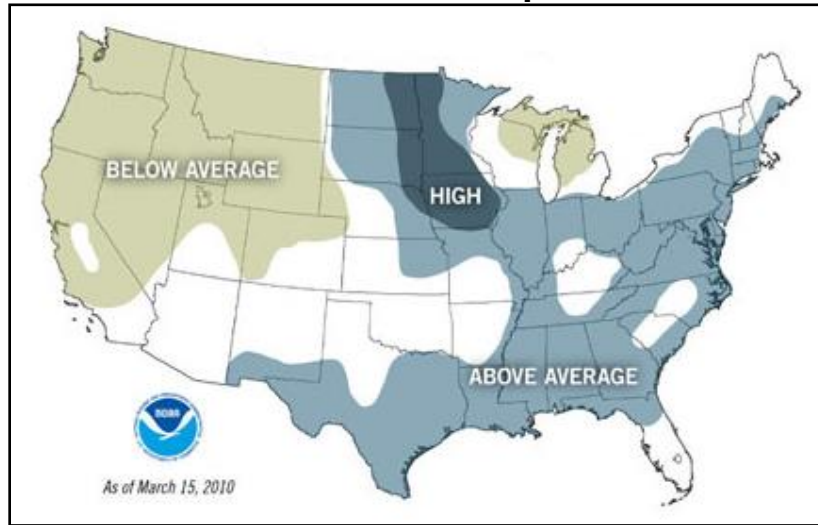
**Tennessee May Flood- Precipitation for May 1<sup>st</sup> & 2<sup>nd</sup> 2010**



Source: National Weather Service <http://www.srh.noaa.gov/ohx/?n=may2010epicfloodevent>

According to a NOAA Flood Risk Map (see map below), the majority of Tennessee was located in an “above average” risk of flooding zone during spring 2010. This proposed vulnerability is coupled with the fact that on average Tennessee usually acquires over 50-60 inches of rainfall a year (see following map).

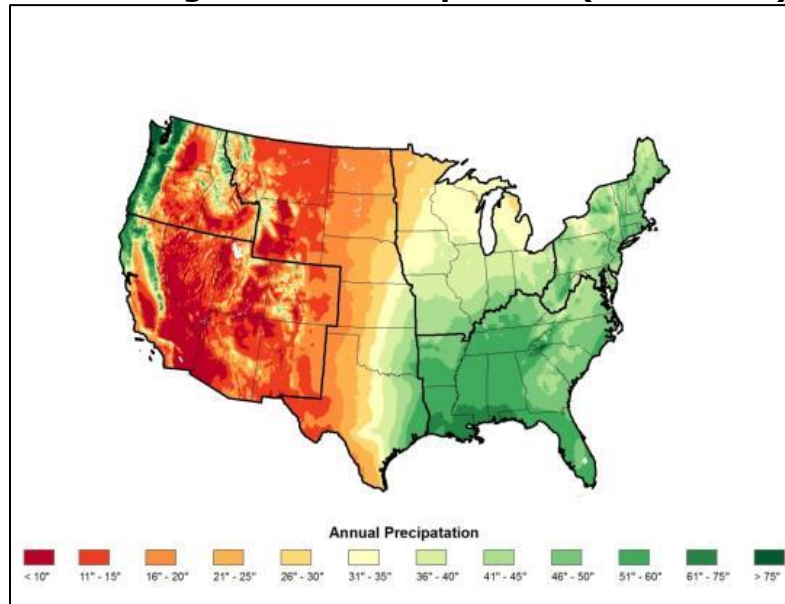
### Flood Risk Map



Source: NOAA

<https://www.climate.gov/news-features/featured-images/above-average-flood-risk-forecast-one-third-us>

### Average Annual Precipitation (1981-2010)



Source:

[http://scenarios.globalchange.gov/sites/default/files/b/figures/UnitedStates/US\\_Annual\\_Precipitation.jpg](http://scenarios.globalchange.gov/sites/default/files/b/figures/UnitedStates/US_Annual_Precipitation.jpg)

Throughout the county all buildings and infrastructure are vulnerable to tornadoes and severe storm impacts. Coffee County’s building stock can be broken down into the following percentage categories: 70.6% residential, 17.4% commercial, 6.9% industrial, .04% agricultural, 1.0% governmental, .24% religious, and 1.2% educational (source: Coffee County Hazus Flood Study – table 1 in [Appendix E](#)). For further information about flooding hazards in Coffee County, see the HAZUS vulnerability study in [Appendix E](#). Coffee County uses a ranking system to determine each jurisdiction’s vulnerability to flooding events. This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of a flood event occurring to calculate a flood risk ranking for each jurisdiction.

Event: Flood	Human 1-5	Property 1-5	Business 1-5	Sub-Total Average	Probability 1-5	Risk Score = $\frac{H+P+B}{3} + P$	<b>4.3</b>
Coffee County	1	2	1	1.33	3	<b>4.33</b>	
City of Manchester	1	2	1	1.33	3	<b>4.33</b>	
City of Tullahoma	1	2	1	1.33	3	<b>4.33</b>	

**Source:** Calculation of Planning Committee Input using the [Vulnerability Calculator](#)

<b>Human</b>	
<i>Risk of injuries and deaths from the hazard</i>	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Deaths probable, injuries will likely be substantial
<b>Property</b>	
<i>Amount of residential property damage associated from the hazard</i>	
1	Less than \$500 in damages
2	\$500-\$10,000 in damages
3	\$10,000-\$500,000 in damages
4	\$500,000-\$2,000,000 in damages
5	More than \$2,000,000 in damages
<b>Business</b>	
<i>Amount of business damage associated from the hazard</i>	
1	Less than 3 businesses closed for only a day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top-10 local employer closed indefinitely
<b>Probability</b>	
<i>Likelihood of the hazard occurring within a given span of years</i>	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

<b>Scale</b>	
Low	2-3.6
Moderate	3.7-5.2
Medium	5.3-6.8
High	6.9-8.4
Severe	8.5-10

## Drought

Drought is being added to this plan revision to document changes in conditions statewide that could potentially result in hazards requiring mitigation. Extended periods of drought contributed to wildfires in East Tennessee on November 28, 2016, resulting in 14 fatalities and damage to more than 2,400 structures in Sevier County.

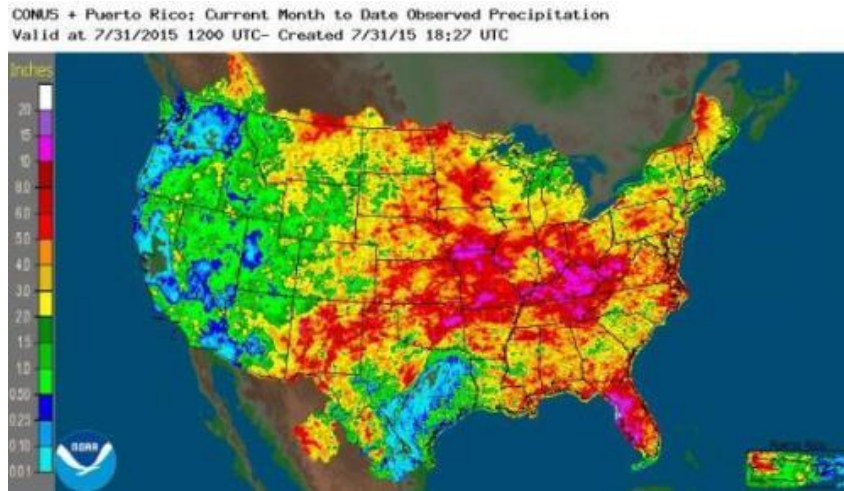
Although historical data in Coffee County is limited, drought is being added to this plan revision since the rural nature of the county creates an economic dependence related to this hazard. Since 2007 Coffee County has experienced no deaths, injuries or property damage as a result of drought. Since rainfall in Coffee County and Tennessee in general has recently been above average and County historical data shows occurrences averaging every 2-5 years, consensus of the Committee is that the probability of drought is likely low. Probability of drought can best be determined approximately eleven months in advance:

<https://onlinelibrary.wiley.com/doi/full/10.1111/1752-1688.12562>.

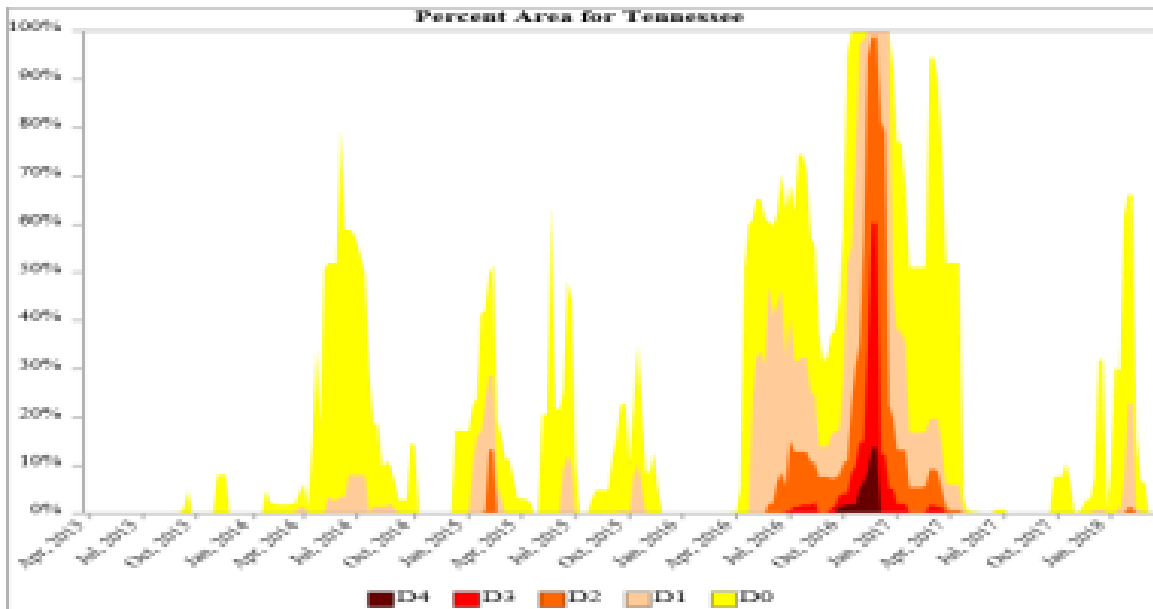
A drought is a period of unusually constant dry weather that persists long enough to cause deficiencies in water supply (surface or underground). Droughts are slow-onset hazards, but, over time, they can severely affect crops, municipal water supplies, recreational resources, and wildlife.

If drought conditions extend over a number of years, the direct and indirect economic impacts can be significant. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. In addition, human actions and demands for water resources can accelerate drought-related impacts.

Throughout the county all buildings and infrastructure are vulnerable to drought and wildfires. Coffee County's building stock can be broken down into the following percentage categories: 70.6% residential, 17.4% commercial, 6.9% industrial, .0.4% agricultural, 1.0% governmental, .2.4% religious, and 1.2% educational (source: Coffee County Hazus Flood Study – table 1 in [Appendix E](#)).



Source: NOAA



Source: <https://www.drought.gov/drought/states/tennessee>

The following chart provides drought event information for Coffee County between January 1, 2000 – December 31 2017:

Location	County/ Zone	State	Date	Time	T.Z.	Type
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/1/2016	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	11/1/2016	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	10/1/2016	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	8/1/2016	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	7/1/2016	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	7/1/2012	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	6/26/2012	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	5/15/2010	15:00	CST-6	Excessive Heat
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	11/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	10/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	9/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	8/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	7/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	6/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	5/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	4/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	3/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	2/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	1/1/2008	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	12/1/2007	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	11/1/2007	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	10/1/2007	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	9/1/2007	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	8/1/2007	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	7/1/2007	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	6/1/2007	0:00	CST-6	Drought
COFFEE (ZONE)	COFFEE (ZONE)	TN	5/1/2007	0:00	CST-6	Drought

**The following chart provides drought impact information for Coffee County between January 1, 2000 – December 31 2017:**

Location	Date	Type	Deaths	Injuries	Property Damage	Crop Damage
COFFEE (ZONE)	12/1/2016	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	11/1/2016	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	10/1/2016	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	8/1/2016	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	7/1/2016	Drought	0	0	0.00K	5.00K
COFFEE (ZONE)	7/1/2012	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	6/26/2012	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	5/15/2010	Excessive Heat	0	0	0.00K	0.00K
COFFEE (ZONE)	12/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	11/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	10/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	9/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	8/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	7/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	6/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	5/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	4/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	3/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	2/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	1/1/2008	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	12/1/2007	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	11/1/2007	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	10/1/2007	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	9/1/2007	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	8/1/2007	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	7/1/2007	Drought	0	0	0.00K	0.00K
COFFEE (ZONE)	6/1/2007	Drought	0	0	0.00K	10.000M
COFFEE (ZONE)	5/1/2007	Drought	0	0	0.00K	0.00K

Coffee County uses a ranking system to determine each jurisdiction’s vulnerability a Drought Event. This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of an earthquake event occurring to calculate a risk ranking for each jurisdiction.

Event: Drought	Human 1-5	Property 1-5	Business 1-5	Sub-Total Average	Probability 1-5	Risk Score = $[(H+P+B)/3] + P$	2.8
Coffee County	1	1	3	1.67	2	3.67	
City of Manchester	1	1	1	1.00	1	2.00	
City of Tullahoma	1	1	1	1.00	1	2.00	

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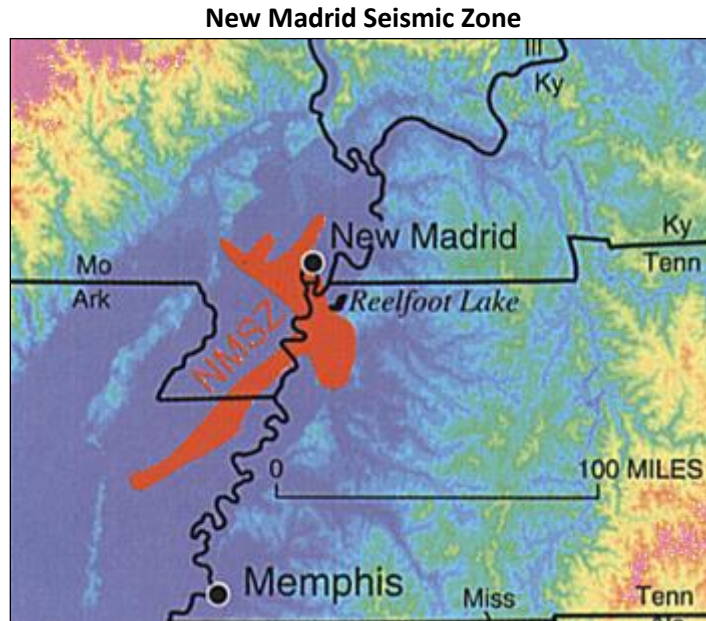
Source: Calculation of Planning Committee Input using the [Vulnerability Calculator](#)

Human	
<i>Risk of injuries and deaths from the hazard</i>	
1	Death very unlikely, injuries are unlikely
2	Death unlikely, injuries are minimal
3	Death unlikely, injuries may be substantial
4	Death possible, injuries may be substantial
5	Deaths probable, injuries will likely be substantial
Property	
<i>Amount of residential property damage associated from the hazard</i>	
1	Less than \$500 in damages
2	\$500-\$10,000 in damages
3	\$10,000-\$500,000 in damages
4	\$500,000-\$2,000,000 in damages
5	More than \$2,000,000 in damages
Business	
<i>Amount of business damage associated from the hazard</i>	
1	Less than 3 businesses closed for only a day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top-10 local employer closed indefinitely
Probability	
<i>Likelihood of the hazard occurring within a given span of years</i>	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

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

**Earthquakes**

Coffee County is in close proximity to 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.



Source: [http://earthquake.usgs.gov/learn/topics/mag\\_vs\\_int.php](http://earthquake.usgs.gov/learn/topics/mag_vs_int.php)

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

<b>Magnitude / Intensity Comparison</b>	
<b>Magnitude (Richter)</b>	<b>Typical Maximum Modified Mercalli Intensity</b>
1.0 - 3.0	I
3.0 - 3.9	II - III
4.0 - 4.9	IV - V
5.0 - 5.9	VI - VII
6.0 - 6.9	VII - IX
7.0 and higher	VIII or higher

Source: <http://earthquake.usgs.gov/learn/topics/mercalli.php>

<b>The Modified Mercalli Intensity Scale</b>		
<b>Intensity</b>	<b>Shaking</b>	<b>Description/Damage</b>
I	<i>Not felt</i>	Not felt except by a very few under especially favorable conditions.
II	<i>Weak</i>	Felt only by a few persons at rest, especially on upper floors of buildings.

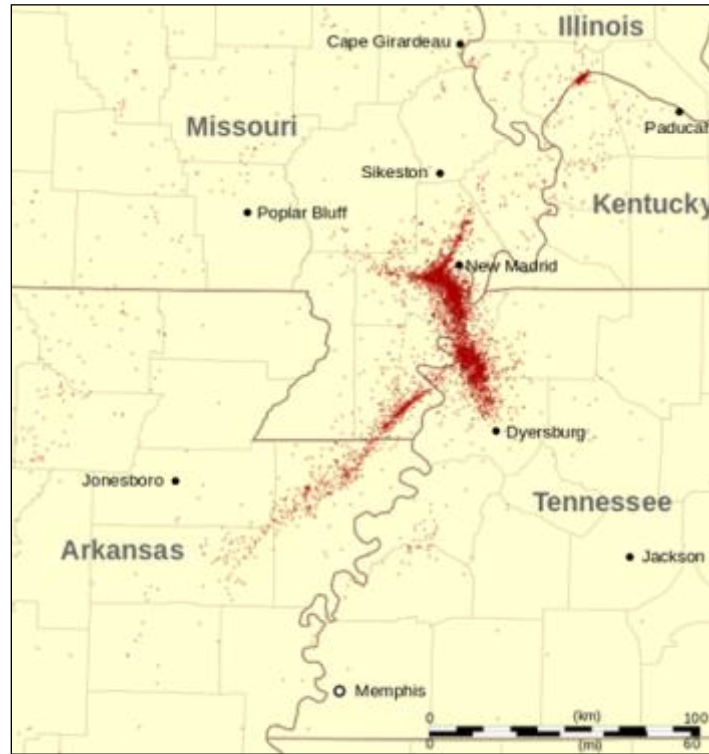
III	<i>Weak</i>	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	<i>Light</i>	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	<i>Moderate</i>	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	<i>Strong</i>	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	<i>Very strong</i>	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	<i>Severe</i>	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	<i>Violent</i>	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	<i>Extreme</i>	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Since the 1812 earthquakes, the largest recorded quakes from this zone were the October 1895, 6.6 magnitude quake (epicenter Charleston, MO) and the November 1968, 5.5 magnitude quake (epicenter in Dale, IL). From the time when seismic measurement instruments were installed in and around the zone in the 1970's, more than 4,000 small earthquakes have been recorded, with the vast majority being too small to be felt.

### **NMSZ Earthquakes Recorded Since 1974**

### **Coffee County Hazard Mitigation Plan**

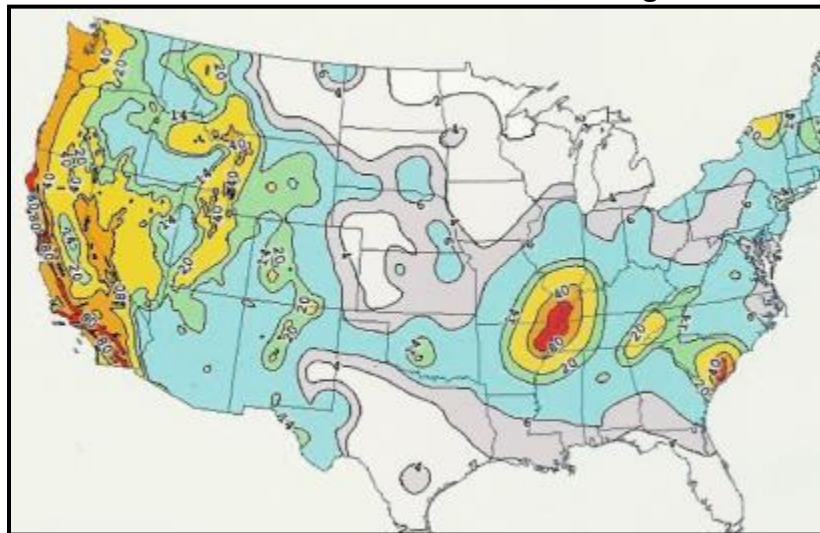
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According to a FEMA report filed in 2008, a serious earthquake in the NMSZ could result in the highest economic loss due to a natural disaster in U.S. history, causing widespread and catastrophic damage across a seven-state radius with most of the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

Although Tennessee is considered to be at risk of a major earthquake <http://wkrn.com/2016/01/28/could-tennessee-experience-an-earthquake-similar-to-one-in-1800s/>, no historical data is available for Coffee County and consensus of the committee is that Coffee County would likely be less affected than West Tennessee and other Middle Tennessee counties. No projects have been identified for this hazard,

**National Seismic Hazard Map  
Ground Motions with a 2% Chance of Occurring in 50 Years**



Source: <http://earthquake.usgs.gov/hazards/products/>

The current lack of apparent land movement along the NMSZ has long puzzled scientists. Currently GPS measurements show that the NMSZ faults are moving no more than 0.0079 inches a year. In contrast the San Andreas Fault in California moves up to 1.5 inches a year. This has led some researchers to believe that the fault may be “shutting down” while others say it is a “sleeping giant.” These differing views have made it difficult for public policy makers to decide on if, how, and how much to prepare for and spend on mitigating a potential large scale earthquake.

Throughout the county all buildings and infrastructure are vulnerable to tornadoes and severe storm impacts. Coffee County’s building stock can be broken down into the following percentage categories: 75.7% residential, 11.3% commercial, 7.8% industrial, .2% agricultural, 3.2% governmental, .7% religious, and 1.1% educational (source: Coffee County Hazus Flood Study – table 1 in [Appendix G](#)). Coffee County uses a ranking system to determine each jurisdiction’s vulnerability a large NMSZ earthquake. This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of an earthquake event occurring to calculate a risk ranking for each jurisdiction.

Event: Earthquake	Human 1-5	Property 1-5	Business 1-5	Sub-Total Average	Probability 1- 5	Risk Score = [(H+P+B)/3] + P	<b>2.0</b>
Coffee County	1	1	1	1.00	1	2.00	
City of Manchester	1	1	1	1.00	1	2.00	
City of Tullahoma	1	1	1	1.00	1	2.00	

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Source: Calculation of Planning Committee Input using the [Vulnerability Calculator](#)

Human		Scale	
<i>Risk of injuries and deaths from the hazard</i>		Low	2-3.6
1	Death very unlikely, injuries are unlikely	Moderate	3.7-5.2
2	Death unlikely, injuries are minimal	Medium	5.3-6.8
3	Death unlikely, injuries may be substantial	High	6.9-8.4
4	Death possible, injuries may be substantial	Severe	8.5-10
5	Deaths probable, injuries will likely be substantial		
Property			
<i>Amount of residential property damage associated from the hazard</i>			
1	Less than \$500 in damages		
2	\$500-\$10,000 in damages		
3	\$10,000-\$500,000 in damages		
4	\$500,000-\$2,000,000 in damages		
5	More than \$2,000,000 in damages		
Business			
<i>Amount of business damage associated from the hazard</i>			
1	Less than 3 businesses closed for only a day		
2	More than 3 businesses closed for a week		
3	More than 3 businesses closed for a few months		
4	More than 3 businesses closed indefinitely or relocated		
5	A top-10 local employer closed indefinitely		
Probability			
<i>Likelihood of the hazard occurring within a given span of years</i>			
1	Less than once every 10 years		
2	About once every 5-10 years		
3	About once every 2-5 years		
4	About once a year		
5	More than once a year		

## **Coffee County Presidential Declared Disaster Chart:**

<b>2000</b>		<b>2007</b>	
<b>2001</b>		<b>2008</b>	DR-1745; Severe Storms, Flooding, Tornados & Straight Line Winds
<b>2002</b>	DR-1441; Individual & PA Severe Storms, Tornados & Flooding	<b>2009</b>	
<b>2003</b>	DR-1456; Individual & PA Severe Storms & Flooding DR-1464; Individual & PA Severe Storms, Flooding & Tornados	<b>2010</b>	DR-1909; Individual & PA Severe Storms, Flooding, Tornados & Straight Line Winds
<b>2004</b>		<b>2011</b>	DR-1974 & DR-1979; PA Severe Storms, Flooding, Tornados & Straight Line Winds
<b>2005</b>	DR-3217; Individual & PA Hurricane Katrina Evacuation	<b>2011</b>	DR-889; Individual & PA Flooding & Severe Storms
<b>2006</b>		<b>2012</b>	
<b>2007</b>		<b>2013</b>	
<b>2008</b>		<b>2014</b>	DR-4189; Public Assistance Severe Storms, Flooding, Tornados & Straight Line Winds
<b>2015</b>	DR-4211; Individual & PA Severe Winter Storm & Flooding	<b>2016</b>	

### Section 4: Mitigation Strategy

#### **Mitigation Goals**

The purpose for developing a set of Goals is to clearly state the community's overall vision for hazard mitigation and to provide a path towards building a safer, more resilient community. The Coffee County Hazard Mitigation Committee identified the following goals to be the forefront in the overall development of this plan. All actions/projects recommended as mitigation efforts for the Hazard Mitigation Plan must first meet or further at least one of these goals. The goals are provided in a ranked order where the first goal is paramount.

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

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

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

**Identification and Prioritization of Mitigation Projects**

Coffee County has developed a comprehensive range of mitigation projects. These projects were solicited and identified by the different entities that make up the Coffee County Hazard Mitigation Committee. Each jurisdiction considered multiple options to mitigate specific vulnerabilities for the hazards identified and projects relevant to multiple jurisdictions are noted, including those applicable to all jurisdictions. Consensus of the Committee was to not include projects for dam failure, drought or earthquake, though the public education project will address all hazards. Once the proposed projects attained a sponsoring agency and the details of the projects were discussed by the committee, the committee then proceeded to prioritize the mitigation projects.

The prioritization process was important since most mitigation projects represent a large investment of financial and personal resources. By evaluating each project’s degree of feasibility and the level of costs versus benefits, Coffee County was able to determine when and which projects should be implemented based on available funding and time.

The Coffee County Hazard Mitigation Committee used the SAFE-T method to prioritize these projects. This approach was adopted from the successful methodology used by other counties in FEMA Region 4. This rating system uses five variables to evaluate the overall feasibility and appropriateness: Societal, Administrative, Financial, Environmental, and Technical. A focus on this methodology emphasizes the use of a cost-benefit review to maximize benefits.

Committee members ranked the projects as a group by determining the value for each variable and then by adding the variables rates up for a project sum value. Additional calculations were completed on the sum value to include the hazard rankings as seen in the tables under each hazard. This allowed for a more defined priority for each project. All the project rankings can be seen on the Coffee County Hazard Mitigation Project List.

It is important to note, during meeting facilitation, TEMA representatives advised the committee to contact the TEMA Regional Office and/or the TEMA Grants Office to obtain information on how to apply for a grant if there is interest in obtaining a grant to mitigate a project listed. The committee will need to discuss which project(s) need to move forward through the grant process as priorities may change over time. All the project rankings can be seen on the Coffee County Hazard Mitigation Project List.

<b>Project Prioritization Method: SAFE-T</b>		
<b>Variable</b>	<b>Rank</b>	<b>Description</b>

<b>S</b>	<b>Societal:</b> The public must support the overall implementation strategy and specified mitigation actions. The projects will be evaluated in terms of community acceptance and societal benefits.	<b>1</b>	Low community support or few societal benefits
		<b>2</b>	Moderate community support or some societal benefits
		<b>3</b>	High community support or many societal benefits
<b>A</b>	<b>Administrative:</b> 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.	<b>1</b>	High staff requirements - outside staffing required
		<b>2</b>	Some outside staffing may be needed
		<b>3</b>	Low staffing requirements – no outside staffing required
<b>F</b>	<b>Financial:</b> The projects will be evaluated on general cost-effectiveness and whether additional outside funding will be required.	<b>1</b>	Low cost-effectiveness <i>or</i> mostly outside funding required
		<b>2</b>	Moderate cost-effectiveness <i>or</i> some outside funding required
		<b>3</b>	High cost-effectiveness <i>or</i> no outside funding required
<b>E</b>	<b>Environmental:</b> The projects will be evaluated for any immediate or long-term negative environmental impacts caused by their construction or operation.	<b>1</b>	Many negative environmental impacts, some long-term
		<b>2</b>	Some negative environmental impacts, possibly long-term
		<b>3</b>	Few negative environmental impacts, none long-term
<b>T</b>	<b>Technical:</b> The projects will be evaluated on their ability to reduce losses in the long-term, whether there are secondary impacts, and whether the proposed project solves the associated problem or if additional components are necessary.	<b>1</b>	Additional actions will be needed or short-term fix
		<b>2</b>	Additional actions may be needed
		<b>3</b>	Long-term fix or no other actions needed

No projects from the previous plan were completed due to limited funding; therefore, they are being carried over into the new project list. The county project list is still relevant due to the action still needing to be address to mitigate natural hazards. The Project List will remain active and may be updated throughout the five-year life-cycle of the plan. Please note that sinkholes

and earthquakes were discussed, but due to priority the funding was discussed to be used elsewhere in each city and town participating in the committee. There are currently no proposed projects directly addressing sinkholes or earthquakes due to the low probability of these events impacting Coffee County. However, should this change, the changes will be reflected during the five-year life-cycle of the plan.

Updating the Project List to add or remove a project may be necessary after a disaster or other event. Updates could include adding or modifying projects to address unforeseen issues or removing projects that are no longer feasible or relevant. The Mitigation Committee will notify TEMA of additions or changes to the Project List. TEMA will notify FEMA to ensure that official copies of the Coffee County Hazard Mitigation Plan on file with TEMA and FEMA are updated appropriately.

The following Project List provides an overview of all the Coffee County Hazard Mitigation Committee projects. Since 1950 Coffee County has experienced no deaths, injuries or property damage as a result of drought. No projects are currently identified specific to drought or earthquake, although the public education project will address all hazards. This includes potential funding sources, implementation timeframes, the project's responsible agency, and other information. This list is to remain active and update.

**Coffee County Project List**

Priority Rank (High, Moderate, Low)	Action/Project	Hazard Mitigated	Jurisdictions Benefitted & Represented	Addresses New or Existing Buildings Infrastructure	Estimated Cost	Responsible Agency	Possible Funding Source(s)	Population Affected	Timeframe
1	Replace/Enlarge Water Culverts	Flooding	All	Existing	\$ 1,000	County & City Highway Department	HMGP, Local	48,014	1-3 years
2	Add address numbers to all houses in all jurisdictions	All	All	Both	40,000.00	EMA	Local	48,014	2 Years
3	Purchase plotter for printing large maps for multi-agency collaboration	All	All	Both	40,000.00	EMA	Local	48,014	2 Years
4	Public Safe Space Projects for Schools	Tornado, Severe storms	County	Both	\$ 2,000,000	Coffee County Board of Education	HMGP, PDM	19,257	1-4 Years
5	Public Safe Space Projects for Public Buildings	Tornado, Severe storms	County	Both	\$ 1,500,000	EMA	HMGP, PDM	19,257	1-4 Years

Priority Rank (High, Moderate, Low)	Action/Project	Hazard Mitigated	Jurisdictions Benefitted & Represented	Addresses New or Existing Buildings/ Infrastructure	Estimated Cost	Responsible Agency	Possible Funding Source(s)	Population Affected	Timeframe
6	Property Acquisition Projects	Flooding	City of Manchester & City of Tullahoma	Existing	\$ 350,000	City of Manchester & City of Tullahoma	HMGP, PDM	28,757	1-3 years
7	Early Warning System	All	All	Existing	\$ 100,000	County & City Government	HMGP, PDM	48,014	1-3 Years
8	Raise elevation on various roads in the county	Flooding	All	Existing	\$ 1,500,000	Coffee County Highway Department	Local	48,014	1-4 Years
9	Compile list of public and private safe shelters available for public use and distribute through fire departments, local schools, radio stations, newspapers, cable TV and public meetings	Severe Storms	All	Both	1,000	Coffee County EMA	HMGP, Local	48,014	1-3 Years
10	Provide mitigation info materials at public agencies & offices	All	All	Both	\$ 1,000	Coffee County EMA		48,014	Continuous

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## National Flood Insurance Program Compliance

The National Flood Insurance Program (NFIP) is a pre-disaster flood hazard mitigation and insurance protection program which has reduced the increasing cost of disasters. The intent of the program is to: require new and substantially improved structures be designed and constructed to minimize or eliminate future flood damage; provide floodplain residents and business owners with financial insurance assistance in the form of insurance after floods; and it transfers most of the cost of private property flood losses from the taxpayers to floodplain property owners through flood insurance premiums. Participation in the NFIP is based on an agreement between communities and FEMA.

Currently Coffee County unincorporated and the Cities of Manchester and Tullahoma are NFIP participants. Below is an overview of NFIP policy and loss data for Coffee County:

Policies In-force: 187  
Insurance In-force whole \$: 31,725,700  
Written Premium In-force: \$ 197,389

Total Losses: 16  
Closed Losses: 11  
Open Losses: 0  
CWOP Losses: 5  
Total Payments: \$ 83,313.62

According to the National Flood Insurance Program, repetitive flood loss is defined as a facility or structure that has experienced two or more insurance claims of at least \$1,000 in any given 10 year period since 1978. Within the NFIP, repetitive flood loss properties are usually considered the most vital structures to mitigate. There are no current repetitive loss properties for Coffee County.

To continue compliance with the NFIP, the jurisdictions have identified, analyzed, and prioritized three mitigation strategies to stay active with the program.

1. Continue to evaluate improved standards that are proven to reduce flood damage.
2. Maintaining supplies of FEMA/NFIP materials to help homeowners evaluate measures to reduce damage.
3. Maintaining a map of areas that flood frequently and prioritizing those areas for inspection immediately following heavy rains or flooding event.

## Section 5: Plan Maintenance

### Monitoring, Evaluating, and Updating

The Coffee County Hazard Mitigation Committee is designated to monitor and evaluate the mitigation plan. This committee is chaired by Coffee County Emergency Management who leads the monitoring, evaluating, and updating process.

Monitoring activities will involve Coffee County Emergency Management setting up a committee meeting to be held on an annual basis. Coffee County Emergency Management will prepare a brief annual report of the meeting's findings by addressing mitigation progress and shortfalls within the county.

The plan is to be evaluated annually and after any significant disaster causing human, infrastructure, and property losses. Following each annual informal evaluation of the plan by emergency management staff, any proposed revisions or recommendations will be brought before the Mitigation Committee to be incorporated into the plan. Potential updates to the plan will address changes to the hazard assessment, the critical facilities list, the repetitive loss list, the committee membership list, and the project priority list.

The plan will be formally updated every five years in accordance to 44 CFR 201.6(d)3, which states that the plan shall be reviewed, revised, and resubmitted for approval within five years to continue eligibility for HMGP grant funding. For the five year update, Coffee County Emergency Management will notify the jurisdictional governments and the Coffee County Hazard Mitigation Committee approximately one year prior to the plan's expiration date. The review of the plan will include updating the planning process, the hazard profiles, the risk assessment, the vulnerability assessment, the mitigation strategies, and the plan maintenance descriptions.

The five year plan update will also include soliciting other interested persons/agencies to join the Mitigation Committee and a review of what has been accomplished in the past 5 years. The Coffee County Hazard Mitigation Committee's goal is to have at least 5 meetings within this time span; dates, public notices, and objectives for these meetings will be determined by Coffee County Emergency Management.

Five months prior to the plan's expiration date, Coffee County Emergency Management will submit the revised plan to the Tennessee Emergency Management Agency for preliminary review. Upon approval by the state, TEMA will submit the updated plan to FEMA for review.

Once Coffee County has attained the designation of the plan's approval pending adoption, each jurisdiction will adopt the plan through a resolution within a year.

### **Incorporation into Planning Mechanisms**

Because of the length of time since approval of the last Coffee County Hazard Mitigation Plan, it has not been actively incorporated into other planning documents in the past five years. However, by incorporating the Coffee County Hazard Mitigation Plan into other planning documents and mechanisms, information contained in the mitigation plan can help fill-in

#### ***Coffee County Hazard Mitigation Plan***

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missing gaps in existing documents, can contribute to already existing mitigation-based projects, and can create a strengthened stance of mitigation implementation and awareness within the county and its jurisdictions.

Coffee County Hazard Mitigation Plan intends to incorporate its Hazard Mitigation Plan into the following documents, including, but not limited to:

- Coffee County Basic Emergency Operations Plan (BEOP)
- City of Manchester Zoning Ordinance
- City of Tullahoma Zoning Ordinance
- City of Manchester Floodplain Ordinance
- City of Tullahoma Floodplain Ordinance
- Coffee County School Safety Plan

The process by which Coffee County will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate will begin during after receiving FEMA approval. Coffee County Emergency Management will first review the plans side-by-side, and where deemed necessary, Emergency Management will make notes on how mitigation concepts and actions can be incorporated into the other plans. These recommendations will be submitted to the lead agencies of the other planning mechanisms for them to place relevant information within the documents.

### **Continued Public Participation**

The Coffee County Mitigation Committee will strive to involve the public in future mitigation activities. This will be accomplished by continuing to post Mitigation Committee Meeting dates in the local newspaper, by attempting to have a public mitigation meeting once a year, by providing public access to copies of the Coffee County Hazard Mitigation Plan in the local emergency management office, and by soliciting other interested persons to participate in the mitigation planning process. By implementing these methods, the public will have an opportunity to comment on the plan during the update drafting stage and prior to plan approval.

## ***APPENDICES***

- A. Planning Meeting 1 information**
  - i. Sign-In Sheet**
  - ii. Minutes**
- B. Planning Meeting 2 information**
  - i. Sign-In Sheet**
  - ii. Public Notices**

### ***Coffee County Hazard Mitigation Plan***

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- iii. Minutes
- C. Planning Meeting 3 information
  - i. Sign-In Sheet
  - ii. Minutes
- D. Planning Meeting 4 information
  - i. Sign-In Sheet
  - ii. Minutes
- E. Planning Meeting 5 information
  - i. Sign-In Sheet
  - ii. Minutes
- F. HAZUS Flood Model – Coffee County

## Appendix A:

### A: Planning Meeting 1 Information

#### i. Sign-in Sheet – Meeting 1

Sign-In Sheet  
Coffee County Hazard Mitigation Planning April 16, 2018

Name	Title	Department	Email Address
Allen Lendley	Director	Coffee Co. EMA	a.lendley@coffeetnema.com
Matt Aussiker	Deputy Director	Coffee Co. EMA	M.aussiker@coffeetnema.com
Brandon Gunn	Operations Officer	Coffee Co. EMA	B.gunn@coffeetnema.com
ALLEN SLATER	DISTRICT COORDINATOR	TEMA	ALLEN.SLATER@TN.GOV
Tracey Davis	Planner	TEMA	tracey.davis@tn.gov

#### ii. Minutes – Meeting 1

EMA Director Allen Lendley opened the meeting.

Challenges with previous Hazard Mitigation Committee planning were discussed. Tracey Davis, TEMA Regional Planner, reviewed the planning process, steps to be taken to ensure successful development and review, and expected timeline for completion.. Potential committee members were discussed, and

a date of May 17, 2018 was set for Meeting # 2.

Meeting was adjourned.

## Appendix B:

### B: Planning Meeting 2 Information

#### i. Sign-in Sheet – Meeting 2

Sign-In Sheet  
Coffee County Hazard Mitigation Planning May 17, 2018

Name	Title	Department	Email Address
Brian Granitt	Building Insp	Tallahoma Planning & Codes	bgranitt@tallahomactn.gov
George Gannon	Asst Dir	Manchester Public Works	g.gannon@cityofmanchestertn.com
Brittany Fiske	Assistant Codes Director	Manchester Codes	blfiske@cityofmanchestertn.com
PHIL HENDERSON	LT. SERVICES DIV.	TULLAHOMA P.D.	phenderson@tallahomactn.gov
Allen Lendley	FEMA Director	Coffee Co. EMA	a.lendley@coffee.tn.ema.com
Tracey Davis	Planner	TEMA	tracey.davis@tn.gov
Kevin Raney	Project Manager	MWSD	raney333@cityofmanchestertn.com
MIKE FOSTER	Assistant Water Plant	MWSD	mfooster@cityofmanchestertn.com
George Chambers	Chief	Manchester Fire Rescue	gchambers@cityofmanchestertn.com
RICHARD G. SHASTEEN	CHIEF	TULLAHOMA FIRE	rshasteen@tallahomactn.gov
Tracey Davis	Planner	TEMA	tracey.davis@tn.gov

#### ii. Minutes – Meeting 2

EMA Director Allen Lendley opened the meeting.

Copies of FEMA planning documents were provided to members. Tracey Davis, TEMA Regional Planner, gave a PowerPoint presentation of the hazard mitigation planning process and suggested a course of action for effective use of the committee’s time.

Committee members were given printed copies of examples of hazard mitigation best practices from the FEMA website (<https://www.fema.gov/best-practice-stories>) in preparation for the next meeting, and a date of June 21, 2018 was set for Meeting # 3.

Meeting was adjourned.

# Appendix C:

## C: Planning Meeting 3 Information

### i. Sign-in Sheet – Meeting 3

Sign-In Sheet  
Coffee County Hazard Mitigation Planning June 21, 2018

Name	Title	Department	Email Address
Allen Lendley	Director OEM	Coffee County OEM	a.lendley@coffeetnema.com
Brian Gravitt	Building Inspector	Tulahoma Planning & Codes	bgravitt@tulahomatorn.gov
PAUL HENDERSON	LT. - SERVICES	TULLAHOMA P.D.	phenderson@tulalowatorn.gov
Kevin Raney	Project Manager	Manchester Water & Sewer	raney333@cityofmanchestertn.com
George Gannon	Asst Director Public Works	Public Works	g.gannon@cityofmanchestertn.com
Jamie Sain	Codes/Safety Director	Manchester Planning & Codes	jsain@cityofmanchestertn.com
George Chambers	Manchester Fire Rescue Chief	MFR	gchambers@cityofmanchestertn.com
Tracey Davis	Planner	TEMA	tracey.davis@tn.gov

### iii. Minutes – Meeting 3

EMA Director Allen Lendley opened the meeting.

Copies of the historical hazard event data from the National Oceanic and Atmospheric Administration Storm Events database (<https://www.ncdc.noaa.gov/stormevents/>) and the [Vulnerability Calculator](#) were provided to members for discussion. Event hazard probability was then discussed and ranked by the Committee. The project list from previous Hazard Mitigation Committee planning was provided to members, who were encouraged to discuss with their respective agencies in preparation for the next Hazard Mitigation Committee meeting. Copies of the priority list and SAFE-T project prioritization method were provided to members.

Items on the priority list were discussed, then rated using the SAFE-T methodology.

When the committee did not immediately agree on a score there was a discussion, with

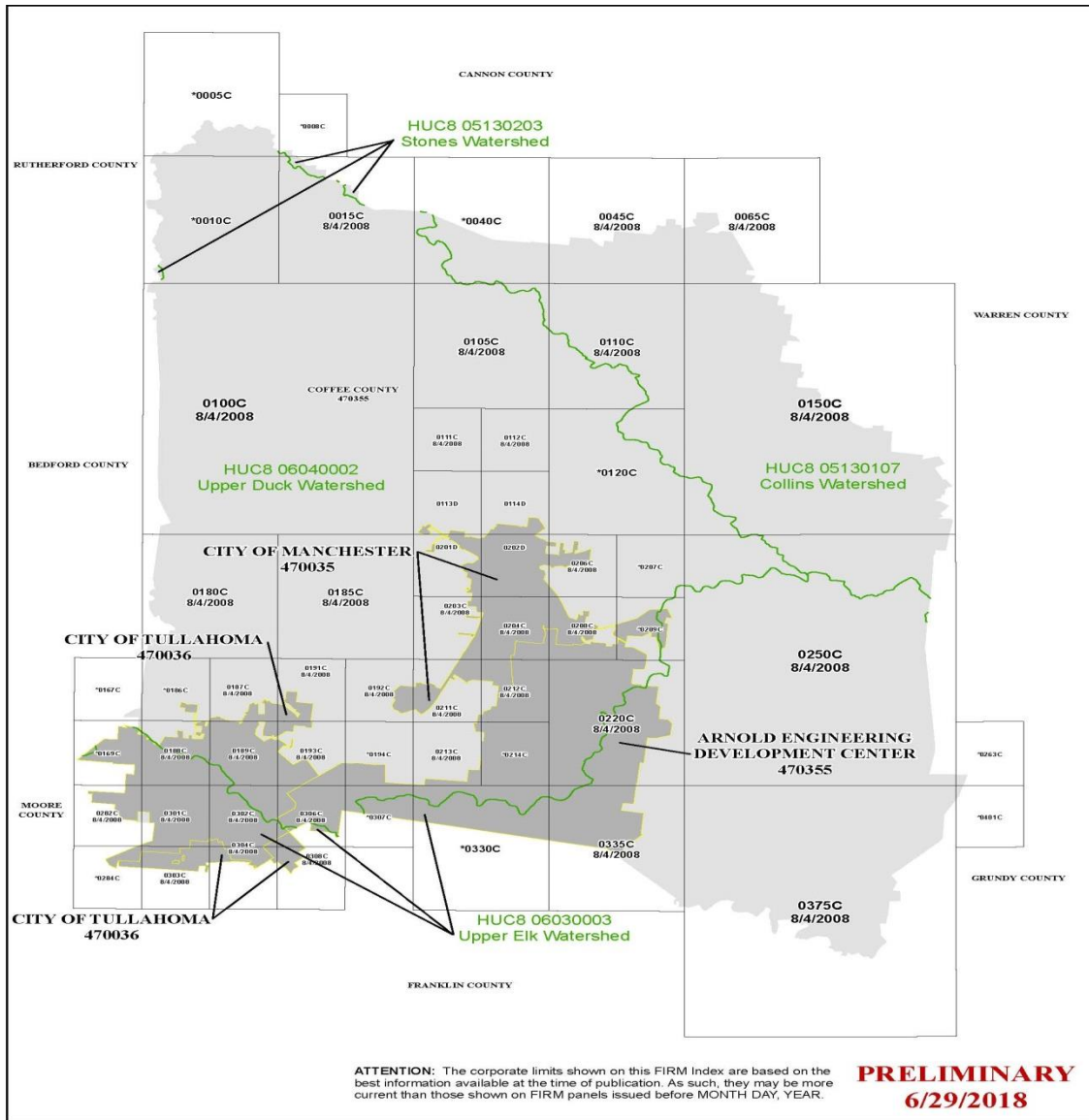
the final rating deferred by the committee to representatives of that jurisdiction.

Consensus was reached on the scoring and prioritization of each project.

Meeting was adjourned.

## **Appendix D:**

### **Flood Insurance Rate Maps (FIRMS) – Coffee County**



1 inch = 15,000 feet  
1:150,000

Map Projection:  
State Plane Lambert Conformal Conic,  
Tennessee Zone, North American Datum 1983;  
Western Hemisphere; Vertical Datum: NAVD 88

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

\*PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS



**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP INDEX

COFFEE COUNTY, TENNESSEE and Incorporated Areas

PANELS PRINTED:

0015, 0045, 0065, 0100, 0105, 0110, 0111, 0112, 0113, 0114, 0150, 0180, 0185, 0187, 0188, 0189, 0191, 0192, 0193, 0201, 0202, 0203, 0204, 0206, 0208, 0211, 0212, 0213, 0220, 0250, 0282, 0301, 0302, 0303, 0304, 0306, 0308, 0335, 0375

**FEMA**  
U.S. DEPARTMENT OF HOMELAND SECURITY

MAP NUMBER  
47031GIND08

MAP REVISED



**FLOOD HAZARD INFORMATION**

SEE THIS 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  
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

	Without Base Flood Elevation (BFE)
	With BFE or Depth Zone AE, AO, AH, VE, AR
	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
	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
	Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
	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

**NOTES TO USERS**

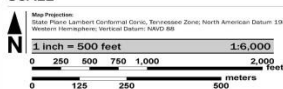
For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information Center at 1-877-FEMA-MAP (1-877-368-5277) or visit the FEMA Flood Map Service Center website at [msc.fema.gov](http://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 receiving and/or adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM data. These may be ordered directly from the Flood Map Service Center at the number listed above.

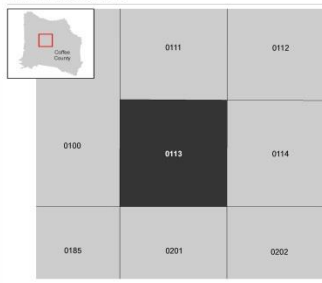
For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction. To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-658-6000.

Base map information shown on this FIRM was provided by the State of Tennessee, Department of Finance & Administration, Strategic Technology Solutions, GIS Services, as shown to your County, may vary slightly from products produced by the National Agriculture Imagery Program in 2016 and has a 1-meter ground sample distance.

**SCALE**



**PANEL LOCATOR**



**NATIONAL FLOOD INSURANCE PROGRAM  
 FLOOD INSURANCE RATE MAP**

**COFFEE COUNTY, TENNESSEE**  
 Panel 113 of 401

Panel Contact: COMMUNITY COFFEE COUNTY MANCHESTER, CITY OF

NUMBER	PANEL	SUFFIX
470355	0113	5

**PRELIMINARY  
 6/29/2018**

VERSION NUMBER 2.3.4.5  
 MAP NUMBER 47031C0113D  
 MAP REVISED



**FLOOD HAZARD INFORMATION**

SEE THIS REPORT FOR DETAILED LEGENDS AND INDEX MAP FOR FIRM PANEL LAYOUT  
 THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING  
 DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT  
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

	Without Base Flood Elevation (BFE)
	With BFE or Depth Zone AE, AO, AH, VE, AR
	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
	Area with Flood Risk due to Levee Zone D
	Area of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
	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

**NOTES TO USERS**

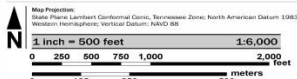
For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information Hotline at 1-877-476-6747 (1-877-476-6747) or visit the FEMA Flood Risk Service Center website at [map.fema.gov](http://map.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 obtained or purchased directly from the website.

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

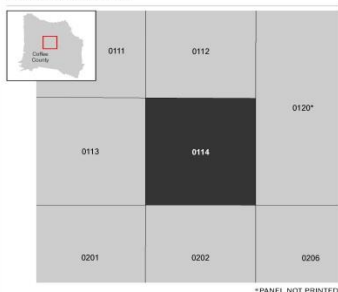
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-435-8622.

Base map information shown on this FIRM was provided by the State of Tennessee, Department of Finance & Administration, Strategic Technology Solutions, GIS Services at "map-tnmap.gov". Other imagery was originally provided by the National Agriculture Imagery Program in 2010 and has a 1-meter ground sample distance.

**SCALE**



**PANEL LOCATOR**



**NATIONAL FLOOD INSURANCE PROGRAM**  
**FLOOD INSURANCE RATE MAP**  
**COFFEE COUNTY, TENNESSEE**  
 AND INCORPORATED AREAS

PANEL 114 of 401

Panel Contains:  
 COMMUNITY: COFFEE COUNTY, MANAGER, CITY OF  
 NUMBER: 470305  
 PANEL: 0114  
 SUFFIX: D

**PRELIMINARY**  
 6/29/2018

VERSION NUMBER: 2.3.4.5  
 MAP NUMBER: 47031C0114D  
 MAP REVISED



**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 [HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

	Without Base Flood Elevation (BFE)
	With BFE or Depth Zone AE, AO, AH, VE, AR
	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
	Area with Flood Risk due to Levee, Zone D
	NO SCREEN
	Area of Minimal Flood Hazard, Zone X
	Area of Undetermined Flood Hazard, Zone D
	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

**NOTES TO USERS**

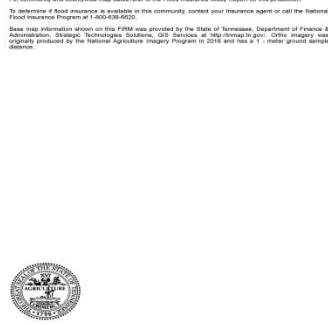
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Communities receiving data on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Flood Map Service Center at the number listed below.

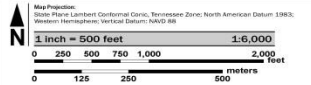
For community and countywide map sales refer to the Flood Insurance Study Report for the jurisdiction.

If no coverage is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-426-6622.

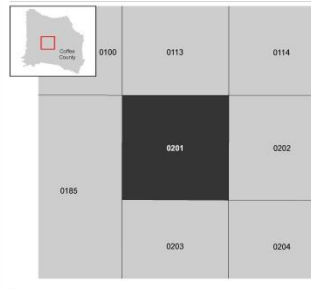
How map information about this FIRM was provided by the State of Tennessee, Department of Finance & Administration, Strategic Technologies Solutions, GIS Services at <http://itnmap.it.gov>. City imagery was originally produced by the National Agriculture Imagery Program in 2016 and has a 1-meter ground sample distance.



**SCALE**



**PANEL LOCATOR**



**NATIONAL FLOOD INSURANCE PROGRAM**  
FLOOD INSURANCE RATE MAP  
COFFEE COUNTY, TENNESSEE  
PANEL 201 OF 401

Panel Contains:  
COMMUNITY: COFFEE COUNTY, MANCHESTER, CITY OF  
NUMBER: 470355  
PANEL: 0201  
SUFFIX: 0

**PRELIMINARY**  
6/29/2018

VERSION NUMBER: 2.3.4.5  
MAP NUMBER: 470310201D  
MAP REVISED:



# **Appendix E:**

## **HAZUS Flood Model – Coffee County**

