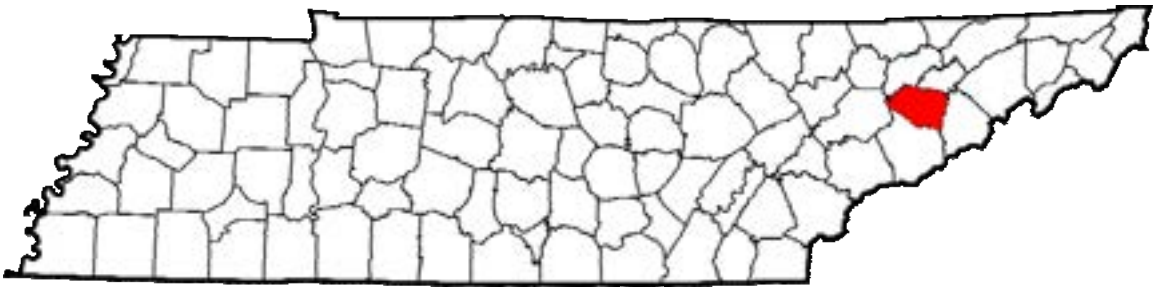
Jefferson County Multi-Jurisdictional Hazard Mitigation Plan



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Prepared By:

Jefferson County Hazard Mitigation Committee
Jefferson County Emergency Management

Assistance Provided By:

Tennessee Emergency Management Agency
as part of the Tennessee Mitigation Initiative

Executive Summary

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

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

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

The 2019 update of the Jefferson County Hazard Mitigation Plan was created to act as a well thought-out guide to be used by, and for, the people of Jefferson County. For this plan to be successful, the following jurisdictions participated in the drafting and preparation of the plan update. The City of Baneberry, the Town of New Market and the Town of White Pine decided to not participate in this update. The participating jurisdictions include:

- Jefferson County (unincorporated)
- Town of Dandridge
- City of Jefferson City

In reference to federal code title *44 CFR 201*, the plan is required to be submitted to both TEMA (State) and FEMA (Federal) for review to be approved. When the plan is deemed "approval pending adoption" by FEMA

(44 CFR 201.6(c)5), each of the participating jurisdictions will adopt the plan through a local resolution.

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Section 1: Planning Process

Planning Process Update

The original Jefferson County Hazard Mitigation Plan was created and approved by FEMA on August 30, 2012. Per federal requirements stated in *44 CFR 201*, all local hazard mitigation plans are required to go through a FEMA update review every 5 years to remain eligible for hazard mitigation grants. This update methodology was developed to assure that local governments are continuing to re-evaluate their risks and to regularly implement mitigation projects that can reduce community vulnerabilities.

The kick off to the Hazard Mitigation Planning process was initially attempted on September 19, 2019. However, 3 individuals came which essentially halted the process because there was no fully developed committee. The County Mayor felt it best to meet with the elected officials for all jurisdictions within Jefferson County face to face to gain understanding and interest into the Hazard Mitigation Planning process. Jefferson County Emergency Management did provide valuable feedback and rated the Hazards identified in the Risk Assessment section of this plan during this meeting. It's important to note the County Mayor and Emergency Management tried their very best to get participation in this process in face to face meetings, emails and phone calls.

Once the County Mayor was able to gain interest in this process, a second meeting was held between Jefferson County Emergency Management, Jefferson City Streets, Dandridge Police Department, and the Tennessee Emergency Management Agency (TEMA) on November 11, 2019 (***See Appendix 1***). At this meeting Jefferson County Emergency Management stated that they would continue the role of leading staff and interested persons in updating their mitigation plan. The tasks to be undertaken by Jefferson County Emergency Management consisted of continuing to get agencies and the public involved in the county's mitigation efforts, performing the written plan's required 5-year update, and soliciting for new mitigation actions/projects to be added to the plan. TEMA provided requested technical assistance throughout the update process by presenting successful strategies that have been used in updating hazard mitigation plans, facilitating each meeting and guiding the committee on planning requirements; (a service established as part of the Tennessee Mitigation Initiative). Additional activities during this meeting include reviewing past incidents, disasters and data to gain a complete understanding of the hazards faced by Jefferson County and all jurisdictions within. The committee proceeded to rate each hazard to evaluate risk. This rating of each hazard is incorporated into the plan

under Risk Assessment. The mitigation goals were established and reviewed.

Prior to these meetings, Jefferson County began reorganizing the 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; invites to be a part of this plan update included 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. These invites included email, phone and face to face contact by the Emergency Management staff and the County Mayor.

Within this plan update, three jurisdictions participated as outlined in the Executive Summary. The Jefferson County Hazard Mitigation Committee for the plan update consists of the following members:

Member	Representation
Tim Wilder **(Committee Chair)**	Jefferson County EMA Deputy Director
Brad Phillips	Jefferson County EMS/EMA Director
Mark Potts	Jefferson County Mayor
Keith Bunch	Town of Dandridge Police Department, Detective
Brian Rhodes	Jefferson City Streets Supervisor

The Jefferson County Hazard Mitigation Committee continues to be 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 plan update were broken down into five stages: **1)** analysis of the original plan *(the plan as it stood prior to the updates)*, **2)** updating of the plan, **3)** public participation, **4)** review of the final updated plan, and **5)** adoption of the plan.

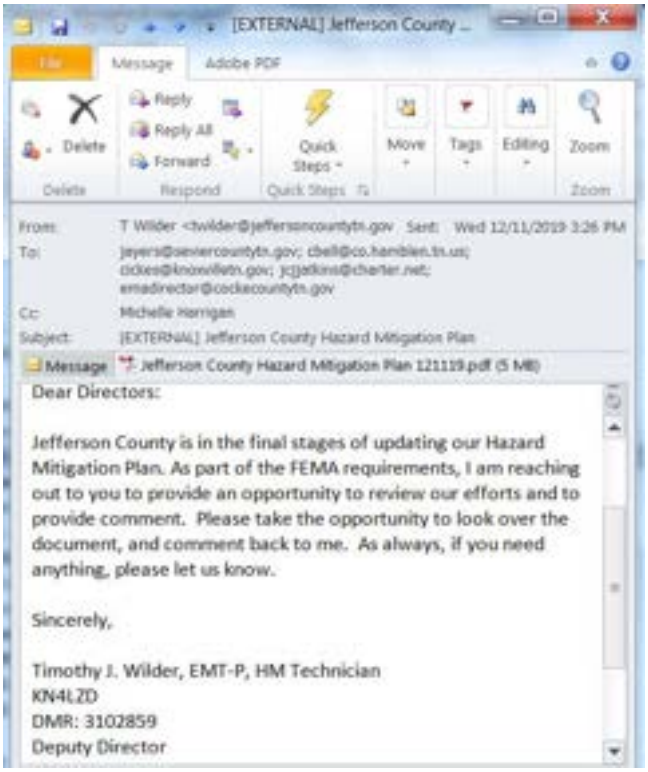
Stage 1: During the analysis of the plan, Jefferson County Emergency Management, with assistance from TEMA, reviewed the original county plan and made notes on what sections would require the main updates. Jefferson County Emergency Management suggested that the two core areas for needed updates were in the risk/vulnerability assessment and in the restructuring of the county's listed hazard mitigation projects.

Stage 2: From there the committee started making the updates to the plan. Tasks included soliciting for new mitigation projects to be added to the plan, and examining the status of mitigation projects listed in the original plan.

Stage 3: To encourage public involvement, the Jefferson County Hazard Mitigation Committee advertised the second committee meeting for November 15, 2019 in the Jefferson County Post (newspaper). This notice presents 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 the update drafting stage, to contribute in project proposals, and to participate in project reprioritization. ***Appendix 2*** provides a copy of the meeting's attendance sheet and ***Appendix 3*** presents a copy of the public notice for the meeting.

Stage 4: Next the committee evaluated the written updates of the plan against FEMA's crosswalk requirements via email correspondence. This also included having the jurisdictions review the drafts that specifically addressed aspects of their jurisdiction before the plan is sent to FEMA for review.

Also, Jefferson County Emergency Management invited the surrounding jurisdictions to comment on the plan via email. The email was addressed to the surrounding County's Emergency Managers which included Sevier County, Knox County, Grainger County, Hamblen County and Jefferson County. The screenshot of the invite is below.



Stage 5: Upon receiving the "Approval Pending Adoption" designation from FEMA's review, the public will be given a chance to comment on the final draft of the update plan prior to its adoption by each local jurisdiction. This opportunity will take place at a local board meeting for each jurisdiction before the updated 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 Jefferson 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:

- 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
- Jefferson County BEOP
- Jefferson County, Dandridge, Jefferson City Land Use Plans
- Jefferson County, Dandridge, Jefferson City, Building Codes and Zoning Ordinances

All of the listed plans, studies, and data sources were incorporated into the Jefferson 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.

Updates within the Plan

It is important to note that this countywide plan was entirely reorganized and updated head-to-toe from the original Jefferson County Hazard Mitigation Plan. Jefferson County reviewed and analyzed each section of the original plan and made updates in the following ways:

Section 1: Planning Process

Jefferson County updated the original plan's description of the planning process to include the new or no longer participating committee members, updated the plan's description of the most recent countywide mitigation meetings that took place in 2019, and documented the lasts opportunities for the public to get involved.

Jefferson County also compiled a new list of existing documents that they reviewed in updating the plan.

Section 2: County Profile

Jefferson County created a new development trends section in this plan update.

Section 3: Risk Assessment

The committee kept all of their listed hazards from the original 2014 Jefferson County Hazard Mitigation Plan in the 2019 update and added Wildfire.

As part of the plan update, Jefferson County updated their previous occurrence hazard listings to going back to 1950 with the exception of Wildfires allowing for re-evaluation of each hazard's extent, probability, and potential impacts. The county then decided to use a different method for determining vulnerabilities/risks because this new method was considered superior to the older plan's method. Also the plan now has a HAZUS-flood model study and simplified countywide floodplain maps (as seen in the plan's appendices).

Section 4: Mitigation Strategy

Jefferson County kept their mitigation goals from the 2014 plan the same for the 2019 plan update, but has utilized a new method for prioritizing mitigation projects, (thought to be superior to the previous method). Jefferson County also has brainstormed many new mitigation projects that were added to the list, used a new chart method to profile project details, and developed a system to describe where their previous plan's projects are in terms of being implemented.

Section 5: Plan Maintenance

Jefferson County updated how they would work with the other jurisdictions in monitoring, evaluating, and updating the plan, provided an updated list of mechanisms they could incorporate mitigation within, stated that Jefferson County Basic Emergency Operations Plan has mitigation concepts incorporated within it, and updated how all the jurisdictions would keep the public involved in updating processes.

Section 2: County Profile

Development Trends

According to the U.S. Census Bureau, the county has a total area of 314 square miles, of which 274 square miles is land and 40 square miles (13%) is water. The county is affected by two artificial lakes: Douglas Lake, created by the damming of the French Broad River in the south, and Cherokee Lake, created by the damming of the Holston River in the north. As of the census of 2000, there were 51,407 people, 17,155 households, and 12,608 families residing in the county. The population density was 187.6 people per square mile. There were 19,319 housing units at an average density of 71 per square mile.

According the U.S. Census Bureau, the estimated 2018 statistics state population growth within Jefferson County is 4.5% at 54,6012 persons.

Located in the historic 1845 courthouse in Dandridge, the Jefferson County Courthouse Historical Museum offers a unique glimpse into the region's past. Permanent displays capture the daily lives of the people who have called Jefferson County home. Exhibit cases contain the 1806 marriage bond of Davy Crockett and Polly Finley, a replica of Davy Crockett's long rifle, military artifacts dating from the Civil War era through the Gulf War, Native American tools and weapons, photographs, textiles, fashions, and a variety of small vintage eclectic relics.
In addition, the courthouse museum proudly honors the military servicemen and women of the country. An extensive listing of deceased veterans, The Roll of Honor, is featured in a large display case in the courthouse foyer.

The museum reflects the compassion of the local Jefferson County residents who have continued to donate items to the museum since its opening in 1957.

Jefferson County and all jurisdictions within are growing in population, industry, retail and tourism. Jefferson County, the City of Baneberry, Town of Dandridge, Jefferson City, Town of New Market, and the Town of White Pine all have Planning Commissions. The County is experiencing residential growth. Jefferson City is soon to market a new Industrial Park. The County currently invests greater than 300k in tourism each year. The county and municipalities are planning and prepared for future growth.

Jurisdictional & School District Capabilities

The following chart indicates the legal and regulatory adherence of each of the jurisdictions within Roane County: Y = yes; N = no.

Jurisdictional Tools, Plans, & Capabilities	Jefferson County	Dandridge	Jefferson City
Building Codes	Y	Y	Y
Zoning	Y	Y	Y
Emergency Response Plan	Y	Y	Y
National Flood Insurance Program Participant	Y	Y	Y
Post-Disaster Recovery Plan	Y	N	N
Law Enforcement	Y	Y	Y
Full Time Fire Services	N	N	Y
Grant Writer	N	N	N
Public Information Officer	N	N	N

School District Tools, Plans, & Capabilities	Jefferson County Schools
Emergency Response Plan	Y
Post-Disaster Recovery Plan	Y
Law Enforcement/SRO	Y
Grant Writer	N
Public Information Officer	Y
Capital Improvement Funding	Y
Bond Funding	Y
Private Contributions	N
State/Federal Funding	Y
Emergency Notification System	Y

Expanding & Improving Mitigation Programs

Jefferson County, Dandridge and Jefferson City have continued to work together in the identification of vulnerable areas and the pursuit of projects. Both have sought additional funding whether it be mitigation funding, and other means, to complete mitigation projects. Finding the match funds is difficult but not impossible. It requires focused effort on the budget for each jurisdiction along with buy-in on the mitigation program/project. Financial means to complete mitigation projects is a concern for Jefferson County, Dandridge and Jefferson City. Meeting match requirements may be difficult.

Section 3: Risk Assessment

Hazard Identification

To begin to assess Jefferson County, Dandridge and Jefferson City'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 Jefferson County by going through newspaper articles, Jefferson 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. The following hazards have been identified as hazards of prime concern by the Jefferson County mitigation committee. In some cases, sources of data is restricted to the Tennessee Hazard Mitigation Plan and state agencies to ensure continuity of reporting into future years. Consideration has been paid to local needs, input and sensitivities to ensure state and federal input doesn't influence the needs or desires, as deemed appropriate by the committee, of this local plan.

Flooding

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 Jefferson 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**
Overland Flow **(a) Infiltration** **(b) Saturation**	-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.
Throughflow	-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.
Baseflow	-Rainwater which has percolated to the aquifer can seep into the river channel. This is the slowest process.

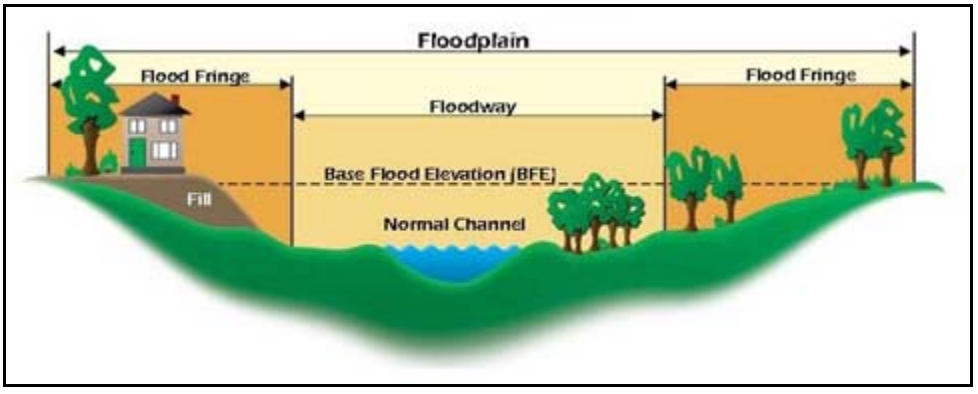
Source: The Field Studies Council

Common Causes of Flooding	
Factor	**Effect on Flooding**
Geology	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.
Relief	Water reaches the channel more rapidly in a steeper basin as water is travelling more quickly downhill.
Vegetation	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.
Meteorological Factors	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.
Catchment Shape	It takes less time for water to reach the channel in a circular basin as all extremities are roughly equidistant from the channel.
Land Use	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.
Catchment Size	Water reaches the channel more rapidly in a smaller basin as water has a shorter distance to travel.
Antecedent Conditions	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 Jefferson 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 Jefferson 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:

- Old Dandridge Pike at Blue Springs
- Northgate at Hwy 92 and Old Jefferson City Highway
- Hwy 139 at Briarwood
- Lost Creek at New Market
- Excess Water in Baneberry Ditches
- Poor Drainage in the West Hills Subdivision
- South Montcastle
- Rocky Valley

Detailed Flood Insurance Rate Maps (FIRMs) are also included in ***Appendix 4****, which shows where FEMA has placed the 100-year and 500-year floodplains for each jurisdiction.*

Jefferson County historically has had many flood events in the past. Based on NOAA NCDC data, the following charts provide a list of flood events occurring in Jefferson County from 1950 to 2019 and a list of each flood's description of impacts imposed on the community. No flood was listed for Jefferson County prior to 1997. The 2011 flood cost more than $2 million in damages.

The following information was obtained by accessing the NOAA database. https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Flooding hazard experienced by Jefferson County, including the jurisdictions located within, and is the only source of data accessible. The information provided for Jefferson County also applies to the school district due to the geographic distribution of the schools throughout the County.

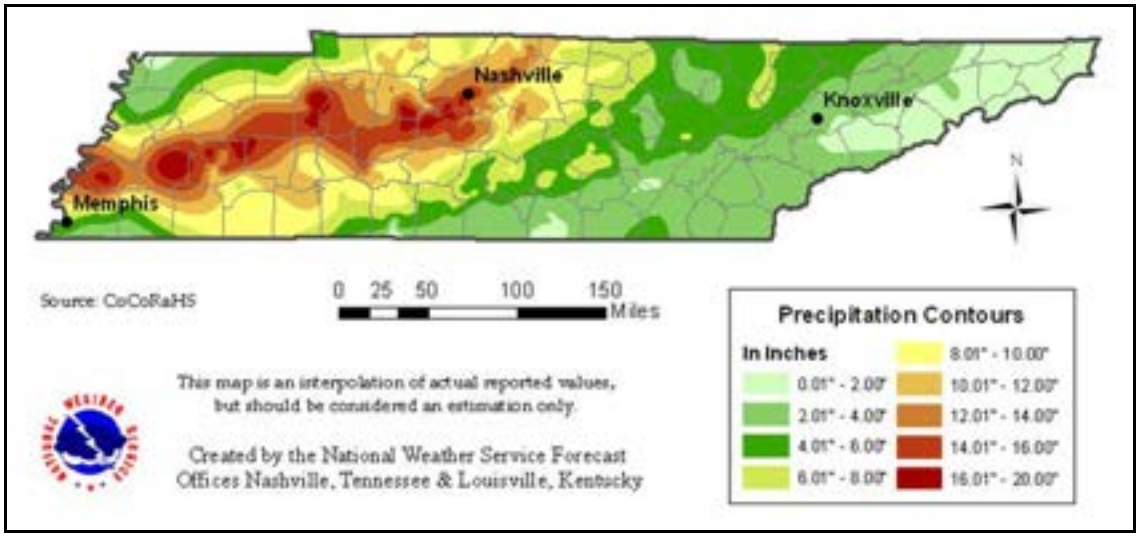
Flood Events in Jefferson County: 1950 to 2019

Location	Date	Event Type	Deaths	Injuries	Property Damage	Extent/Impact Description
Jefferson City	6/14/1997	Flash Flood	0	0	0	Four feet of water reported on Valley Field Road. Four trailers flooded on Branch Way. Part of Bacon Road caving in due to flash flooding.
Countywide	7/11/1999	Flash Flood	0	0	0	Widespread showers and thunderstorms with heavy rain caused flooding problems throughout much of East Tennessee. Numerous incidents of minor flooding were reported around the remainder of the region.
Countywide	3/17/2002	Flood	0	0	0	Widespread flooding occurred across most of East Tennessee. Rainfall totals between five and eight inches were reported in 36 hours. Numerous major rivers flooded including the Clinch, Powell, Sequatchie, and Pigeon Rivers. Total damage estimates were calculated to be over 5 million dollars.
Countywide	3/17/2002	Flash Flood	0	0	0	Widespread flooding occurred across most of East Tennessee. Rainfall totals between five and eight inches were reported in 36 hours. Total damage estimates were calculated to be over 5 million dollars.
Countywide	2/14/2003	Flood	0	0	58000	Four day rainfall totals of two to eight inches fell across east Tennessee. This rainfall combined with a melting snowpack (reports of up to a foot in the higher elevations) to produce widespread flooding of rivers and streams with numerous mudslides also reported
Countywide	2/16/2003	Flash Flood	0	0	0	One house evacuated due to flooding.
Countywide	2/21/2003	Flood	0	0	0	With the ground already saturated from the previous week's rainfall, three day rainfall totals of one to three inches created some flooding of streams and rivers as well as several mudslides across east Tennessee. Rivers which rose above their flood stages included the South Chickamauga, Clinch, Powell, Holston, Pigeon, French Broad and Sequatchie rivers.

Countywide	4/10/2003	Flood	0	0	0	Seven day rainfall totals (4th through the 10th) of three to five inches were reported across central east Tennessee and northeast Tennessee, with one to three inches occurring on the 10th. Several secondary roads across the area were flooded with several rivers experiencing some minor flooding including the Clinch, French Broad, Holston, Pigeon and Powell rivers.
Jefferson City	9/26/2009	Flood	0	0	0	Areal flooding occurred along highway 92 from near Jefferson City to near Gravelly Hill, Tennessee. Several inches to nearly a foot of water was over the road, with several areas briefly impassable due to the flooding.
Jefferson City	2/28/2011	Flood	0	0	2190000	Continuous heavy rainfall from thunderstorms caused extensive flooding countywide. 50 homes and five mobile homes in the county suffered minor to major damage due to the flooding. Two local businesses also had minor damage due to the flood waters.
Jefferson City	1/30/2013	Flood	0	0	1000	Twelve county roads are closed. Hwy 341 and Hwy 139 are impassable in places.

Small localized flood events are likely to occur at least once every two years in Jefferson County. 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 worse case scenario it is possible for the extent of a flooding event to exceed 12 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).

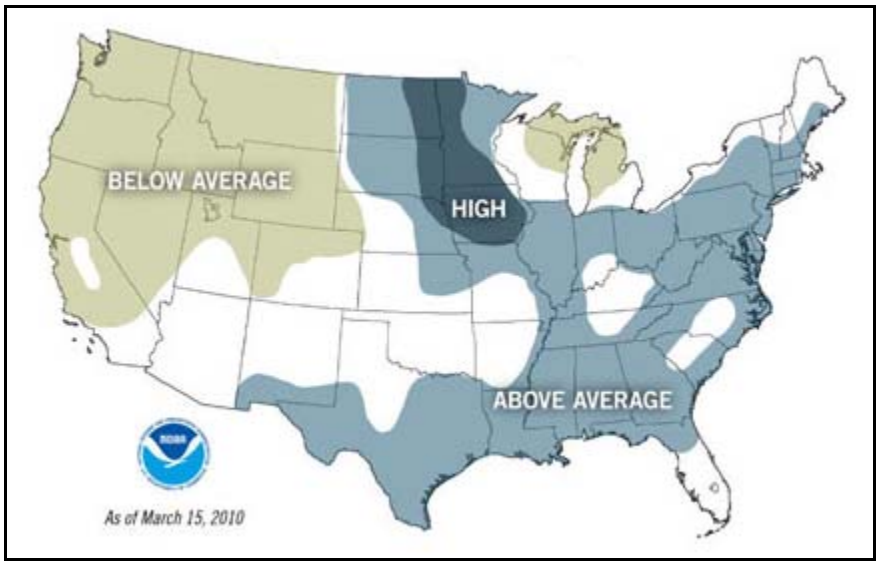
Tennessee May Flood- Precipitation for May 1st & 2nd 2010



Source: National Weather Service

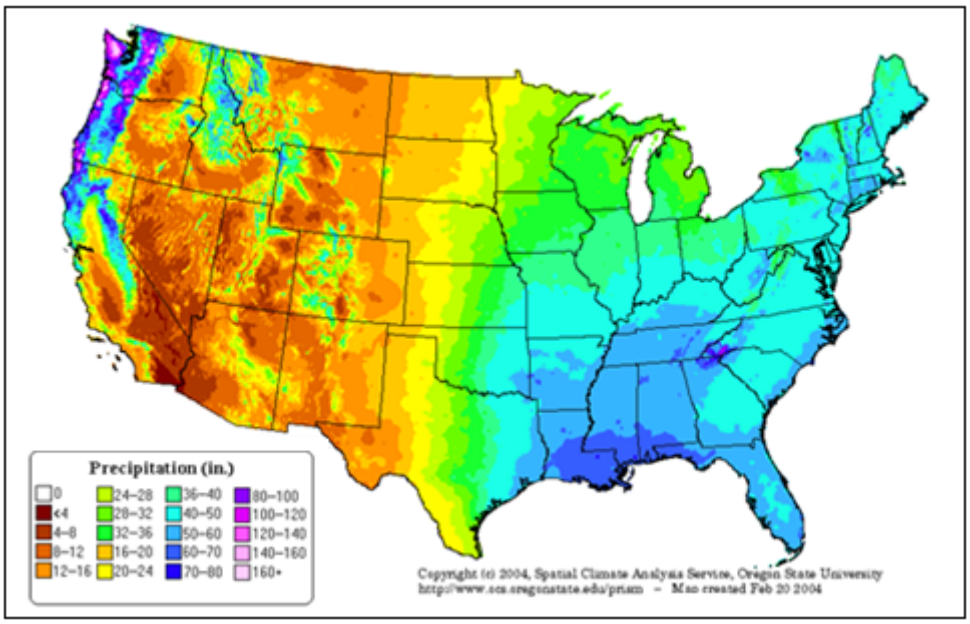
According to a NOAA Flood Risk Map (see map below), the majority of Tennessee was located in an "above average" risk of flooding zone during spring 2010. This proposed vulnerability is coupled with the fact that on average Tennessee usually acquires over 50-60 inches of rainfall a year (see following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

Flood Risk Map



Source: NOAA

Average Annual Precipitation per Year (1971-2000)



Source: Spatial Climate Analysis Service, Oregon State University

Jefferson County uses a ranking system to determine each jurisdiction's vulnerability to flooding events. This system is based off simple arithmetic which analysis's potential impacts to determine vulnerabilities and then analysis's the probability of a flood event occurring to calculate a flood risk ranking for each jurisdiction.

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Jefferson County Unincorporated	2.00	4.00	2.00	2.67
City of Jefferson	2.00	3.00	2.00	2.33
Town of Dandridge	1.00	2.00	1.00	1.33

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Jefferson County Unincorporated	2.67	3.00	5.67
City of Jefferson	2.33	3.00	5.33
Town of Dandridge	1.33	3.00	4.33

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

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

Property	
Amount of residetial property damage associated from the hazard	
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	
Amount of business damage associated from the hazard	
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 indefinitly or relocated
5	A top-10 local employer closed indefinitly

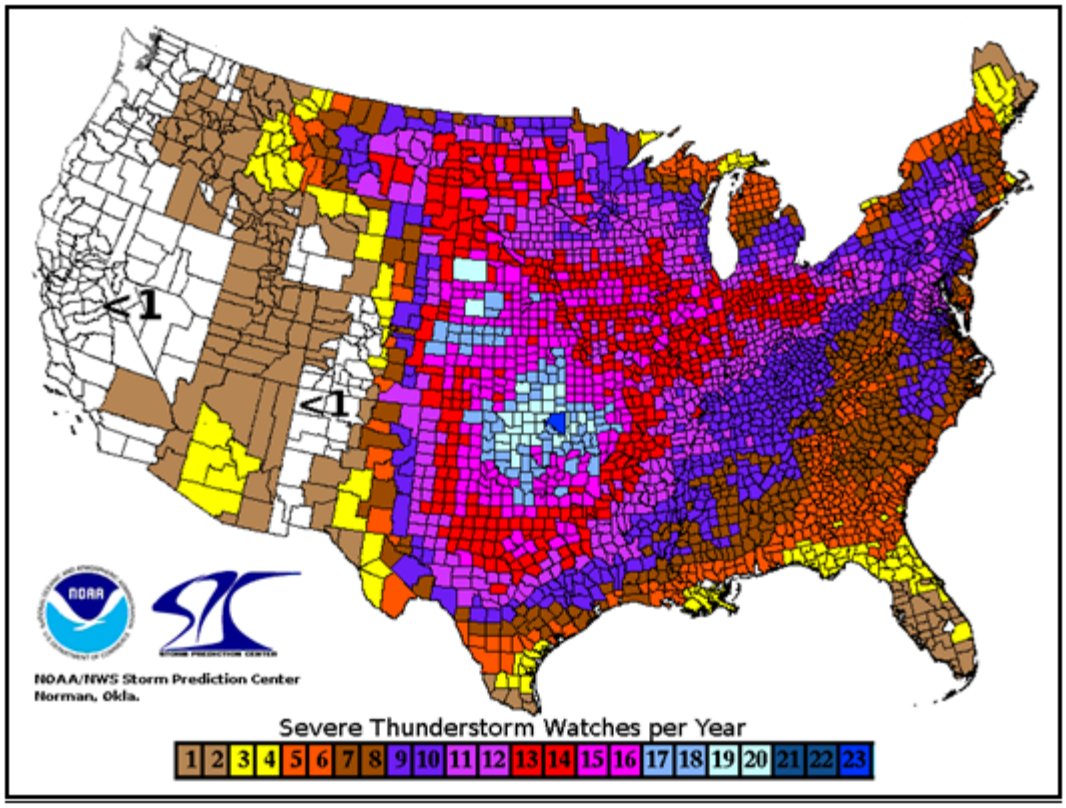
Probability	
Likelihood of the hazard occurring within a given span of years	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

For further information about flooding hazards in Jefferson County, see the HAZUS vulnerability study in ***Appendix 5***.

Tornadoes/Severe Storms

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 ¾ 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).

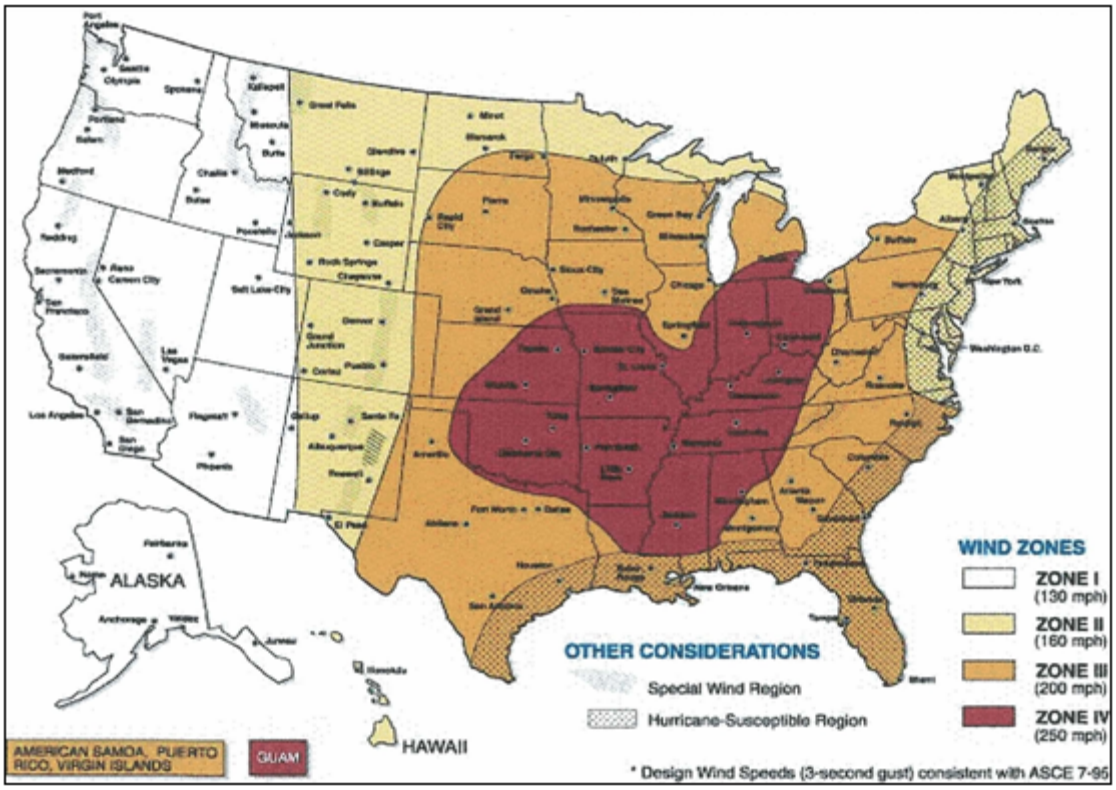
Average Severe Storm Watches Per Year (1999-2008)



Source: NOAA/NWS Storm Prediction Center

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 Jefferson County, all jurisdictions are vulnerable to tornado threats. The following map places much of Tennessee in the highest wind zone (see following map).

Wind Zones in the United States



Source: FEMA

Jefferson County historically has had a few tornadoes in the past. Based on NOAA NCDC data, the following charts provide a list of tornado events occurring in Jefferson County from 1950 to 2019 and a description of recent impacts. The largest tornado occurred in 1955 at an EF2. However, the most costly tornado occurred in 1974 and 1997.

The following information was obtained by accessing the NOAA database. https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Tornado hazard experienced by Jefferson County, including the jurisdictions located within, and is the only source of data accessible. The information provided for Jefferson County also applies to the school district due to the geographic distribution of the schools throughout the County.

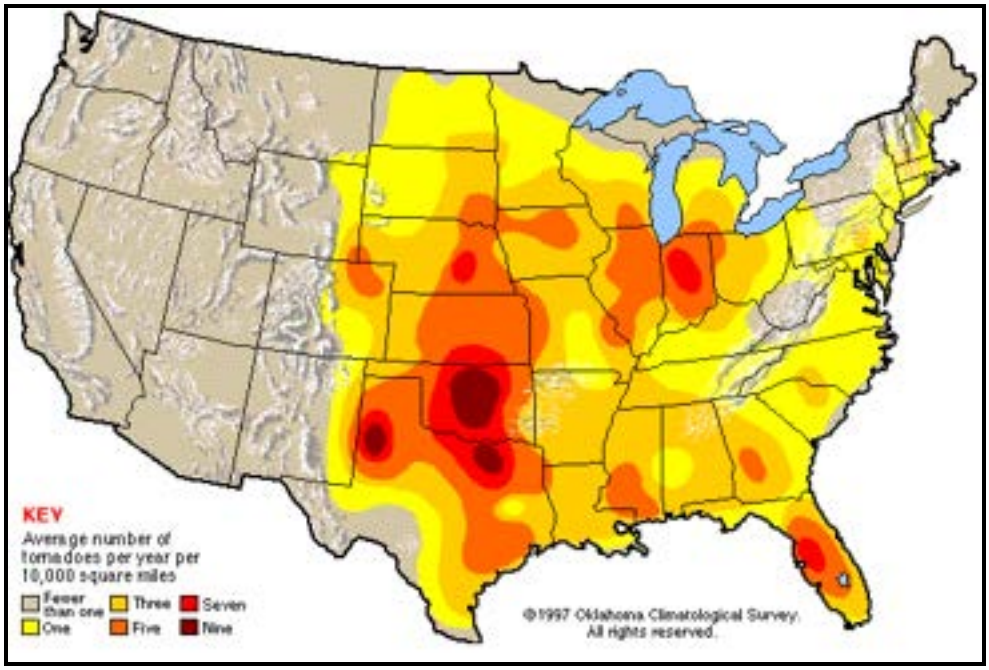
Tornado Events in Jefferson County: 1950 to 2019

Location	Date	Extent	Deaths	Injuries	Property Damage	Extent/Impact Description
Not provided	3/25/1955	F2	0	0	2500	No information
Not provided	4/4/1974	F0	0	0	25000	No information
New Market	7/4/1997	F0	0	0	25000	Small tornado between New Market and Jefferson City twisted and knocked down telephone poles as well as many trees.
New Market	6/16/2009		0	0	0	A NWS employee reported a funnel cloud in New Market.
Kansas	4/27/2011	EF0	0	0	20000	A NWS Storm Survey reported an EF0 tornado touched down near White Pine. It formed near Rankin Road then tracked to the southern portions of White Pine where it dissipated. The max wind of 80 mph caused minor roof damage on a few homes and downed several trees. Favorable atmospheric conditions resulted in a deadly tornado outbreak across east Tennessee on the 27th. The thunderstorms produced more than 50 tornadoes across the east Tennessee area with 32 deaths and more than 200 injured. The tornadoes produced from light to heavy damage to hundreds of homes and businesses. Hail as large as baseballs was also reported.
Jefferson City	4/27/2011	EF0	0	0	20000	A NWS Storm Survey reported an EF0 tornado touched down near Jefferson City. It formed near and caused damage at the American Book Company. It had a path width of 50 yards and a path length of 0.3 miles. The max wind of 80 mph snapped...twisted and downed a few trees along the path. Favorable atmospheric conditions resulted in a deadly tornado outbreak across east Tennessee on the 27th. The thunderstorms produced more than 50 tornadoes across the east Tennessee area with 32 deaths and more than 200 injured. The tornadoes produced from light to heavy damage to hundreds of homes and businesses. Hail as large as baseballs was also reported.

Oakland	4/27/2011	EF0	0	0	5000	A NWS Storm Survey reported an EF0 tornado touched down near the Patriot Hills Golf Course area. It formed near the subdivision behind Patriot Hills Golf Course and tracked to just northeast of Highway 92 where it dissipated. It had a path width of 50 yards and a path length of 0.8 miles. The max wind of 65 mph downed a few trees. Favorable atmospheric conditions resulted in a deadly tornado outbreak across east Tennessee on the 27th. The thunderstorms produced more than 50 tornadoes across the east Tennessee area with 32 deaths and more than 200 injured. The tornadoes produced from light to heavy damage to hundreds of homes and businesses. Hail as large as baseballs was also reported.
Chestnut Hill	4/27/2011	EF0	0	0	5000	McGaha Hollow Tornado. A NWS storm survey reported an EF0 touched down near McGaha Hollow in Sevier County. It quickly tracked into Jefferson County and dissipated just southeast of the Bush Beans Plant. The wind speed at 70 mph downed numerous trees along its path. Favorable atmospheric conditions resulted in a deadly tornado outbreak across east Tennessee on the 27th. The thunderstorms produced more than 50 tornadoes across the east Tennessee area with 32 deaths and more than 200 injured. The tornadoes produced from light to heavy damage to hundreds of homes and businesses. Hail as large as baseballs was also reported.
Hodges	6/13/2013	EF1	0	0	50000	The NWS storm survey team concluded that an EF1 tornado tracked across Jefferson County on the 13th of June. It formed 4.7 miles northwest of New Market and lifted 3.1 west-northwest of New Market. It had a path length of 2.0 miles and a path width of 120 yards. The max wind of 100 mph snapped and uprooted numerous trees along its damage path, as well as causing roof damage to a home.

Based on previous occurrences, tornado events are likely to occur at least once every 10 years in Jefferson County (see the following map for other probability information).

Average Number of Tornadoes Per Year



Source: Oklahoma Climatological Survey

The severity of tornadoes that may occur in the county is measured using the Enhanced Fujita Scale for tornadoes (see chart below). Based on tornado events in other East Tennessee counties, in a worse case scenario it is possible for the extent of a tornado to exceed an EF4 ranking.

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 once a year in Jefferson County. The severity of hail is measured by the diameter of the hail itself, commonly using the TORRO Hail Index (see following chart). Jefferson County's largest hail extent is reported at 2.00 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

The following chart provides hail event information for Jefferson County between 1950 to 2019. The following information was obtained by accessing the NOAA database. https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Hail hazard experienced by Jefferson County, including the jurisdictions located within, and is the only source of data accessible. The information provided for Jefferson County also applies to the school district due to the geographic distribution of the schools throughout the County.

Hail Events in Jefferson County: 1950 to 2019

Location	Date	Extent in Inches	Deaths	Injuries	Property Damages	Extent/Impact Description
Not provided	5/24/1986	1	0	0	0	No information
Talbott	5/13/1995	1	0	0	1000	No information
Jefferson City	3/29/1997	0.75	0	0	0	3/4 inch hail in Jefferson City
New Market	9/11/1997	0.75	0	0	0	Hail fell from 11:30 am to 11:40 am with a light covering of the ground before ending.
White Pine	5/7/1998	1.75	0	0	0	No information
Dandridge	5/7/1998	1.75	0	0	0	No information
Dandridge	5/7/1998	1	0	0	0	No information
Strawberry Plains	5/21/1998	1	0	0	0	No information
New Market	6/22/1998	0.88	0	0	0	No information
New Market	6/24/1998	0.75	0	0	0	No information
Chestnut Grove	7/19/1998	0.88	0	0	0	No information
Jefferson City	1/18/1999	0.75	0	0	0	No information
New Market	4/23/1999	0.75	0	0	0	No information
New Market	5/7/1999	0.75	0	0	0	No information
White Pine	5/13/1999	1.75	0	0	0	No information
New Market	6/2/1999	0.75	0	0	0	Hail covered the ground.
Jefferson City	7/29/1999	1	0	0	0	Hail reported at Cherokee Dam.
New Market	7/29/1999	0.75	0	0	0	No information
White Pine	10/4/1999	0.75	0	0	0	3/4 hail reported near the intersection of highway 341 and I-81.
Jefferson City	4/28/2000	1	0	0	0	No information
Strawberry	4/28/2000	0.75	0	0	0	No information

Plains						
White Pine	7/14/2000	0.75	0	0	0	No information
Strawberry Plains	7/12/2003	1	0	0	0	Quarter size hail reported by spotter.
Jefferson City	4/22/2005	1.75	0	0	0	Golfball-size hail in Jefferson City.
Jefferson City	4/22/2005	0.88	0	0	0	Nickel-size hail
Jefferson City	4/8/2006	0.75	0	0	0	Penny-size hail in Jefferson City.
Keister	7/19/2007	0.88	0	0	0	Nickel size hail was reported two miles northeast of Jefferson City.
Four Points	7/21/2008	0.75	0	0	0	Penny size hail occurred ten miles west of Dandridge.
Jefferson City	6/17/2009	0.88	0	0	0	A NWS employee reported thunderstorms produced nickel-size hail in Jefferson City.
Dandridge	9/9/2009	0.75	0	0	0	Penny size hail was reported near Dandridge.
Jefferson City	5/28/2010	1	0	0	0	Quarter size hail was reported.
New Market	5/28/2010	1	0	0	0	Quarter size hail was reported.
Jefferson City	6/19/2010	1	0	0	0	A trained spotter reported thunderstorms produced quarter-size hail northwest of Jefferson City at Cherokee Dam near Mill Spring.
Dandridge	4/27/2011	1	0	0	0	A trained spotter reported thunderstorms produced quarter-size hail in Dandridge.
White Pine	4/27/2011	1.75	0	0	0	An NWS employee reported thunderstorms produced golfball-size hail in White Pine.
White Pine	4/27/2011	1.75	0	0	0	The public reported thunderstorms produced golfball-size hail on Leadvale Road in White Pine.
Dandridge	4/27/2011	2	0	0	0	A trained spotter reported thunderstorms produced 2 inch-size hail 3 miles southwest of Dandridge.
Jefferson City	5/26/2011	1	0	0	0	Quarter size hail was reported.
Dandridge	5/26/2011	1.5	0	0	0	Ping Pong ball size hail was reported.
White Pine	5/26/2011	0.88	0	0	0	Nickel size hail was reported.

Jefferson City	6/9/2013	1	0	0	0	The public reported thunderstorms produced quarter-size hail 4 miles south-southwest of Jefferson City.
Chestnut Grove	7/14/2015	1	0	0	0	Quarter size hail was reported five miles southeast of Jefferson City near Chestnut Grove.
Sugar Forks	4/22/2017	1	0	0	0	Quarter sized hail was reported.

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 four times a year in Jefferson County. The severity of severe storm winds is commonly measured by wind speed (knots or mph). It is not unusual for Jefferson County to experience winds speeds up to 60 mph causing structural damage, power outages and trees down.

The following chart provides severe storm wind event information for Jefferson County between 1950 and 2019. The following information was obtained by accessing the NOAA database. https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Severe Storm Wind hazard experienced by Jefferson County, including the jurisdictions located within, and is the only source of data accessible. The information provided for Jefferson County also applies to the school district due to the geographic distribution of the schools throughout the County.

Wind Events in Jefferson County: 1950 to 2019

Location	Date	Extent in Knots	Deaths	Injuries	Property Damage	Extent/Impact Description
Not Provided	5/26/1957	0	0	0	0	No information
Not Provided	6/21/1971	0	0	0	0	No information
Not Provided	3/30/1977	0	0	0	0	No information
Not Provided	6/6/1977	0	0	0	0	No information
Not Provided	7/23/1979	0	0	0	0	No information
Not Provided	6/16/1980	0	0	0	0	No information
Not Provided	8/25/1985	0	0	0	0	No information
Not Provided	8/25/1985	0	0	0	0	No information
Not Provided	5/24/1986	0	0	0	0	No information
Not Provided	6/18/1987	0	0	0	0	No information
Not Provided	6/26/1988	0	0	0	0	No information
Not Provided	7/25/1989	0	0	1	0	No information
Not Provided	5/17/1990	0	0	0	0	No information
Not Provided	5/28/1990	0	0	0	0	No information
Not Provided	4/9/1991	0	0	0	0	No information
Piedmont	5/9/1995	0	0	0	10000	Numerous trees and power lines were knocked down.
Piedmont	5/9/1995	0	0	0	7000	A storage building was destroyed in Piedmont. A large tree was also uprooted. Several trees and power lines were blown down in Dandridge.
Dandridge	5/14/1995	0	0	0	2000	Some trees were blown down.
Strawberry Plains	5/27/1995	0	0	0	1000	A few large tree limbs were knocked down.

Jefferson City	5/27/1995	0	0	0	2000	A few trees were blown down.
New Market	8/1/1995	0	0	0	5000	Some trees were blown down.
Dumplin	5/24/1996	Not provided	0	0	100000	Numerous trees were uprooted and power lines were knocked down. A fire caused by a lightning strike heavily damaged a victorian-style farmhouse in Dumplin Valley.
Jefferson City	6/13/1996	Not provided	0	0	4000	Several trees were downed countywide. Powerlines were downed in Jefferson City.
Jefferson City	6/24/1996	Not provided	0	0	2000	A tree blew down across Hodge Road.
Not Provided	12/17/1996	45	0	0	0	High wind after the passage of a cold front blew down trees and tree limbs resulting in scattered power outages.
White Pine	1/5/1997	Not provided	0	0	0	Large tree limbs downed on power lines.
Countywide	3/3/1997	Not provided	0	0	0	Tree down on Highway 139. Several trees down throughout the county.
Countywide	5/13/1997	Not provided	0	0	0	Trees Down
Countywide	6/13/1997	Not provided	0	0	14000	Numerous trees and powerlines down throughout the county.
Dandridge	6/13/1997	Not provided	0	0	10000	Trees down near Dandridge on Chestnut Grove. Powerlines down in New Market.
Strawberry Plains	8/4/1997	Not provided	0	0	0	Trees down.
Jefferson City	2/17/1998	Not provided	0	0	70000	One barn was damaged and another totally demolished. Around 2000 customers were without power following the storm.

Chestnut Hill	6/15/1998	Not provided	0	0	0	Trees down
Jefferson City	11/25/1998	Not provided	0	0	0	Trees down in Jefferson City and throughout the county.
White Pine	1/18/1999	Not provided	0	0	0	Trees downed
Jefferson City	5/6/1999	Not provided	0	0	0	Trees down on Dumplin Valley Road.
White Pine	5/13/1999	Not provided	0	0	50000	Damage was confined to the area of Highway 113 and Nina Road. Two barns were completely destroyed. Harvest Temple Baptist Church sustained roof damage. Twelve mobile homes in the Spring Park mobile home park sustained damage to their underpinnings. Several trees were also blown down in this area. A storm survey shortly after the event estimated the winds at 80 to 100 mph.
Jefferson City	6/2/1999	Not provided	0	0	10000	Trees and power lines down on and along Highway 92 in Jefferson City.
New Market	6/2/1999	Not provided	0	0	18000	Trees down.
Jefferson City	7/6/1999	Not provided	0	0	5000	Trees down.
Countywide	7/24/1999	Not provided	0	0	20000	Trees down.
Leadvale	8/1/1999	Not provided	0	0	5000	Trees down.
Strawberry Plains	8/23/1999	Not provided	0	0	500	Several large tree limbs down.

White Pine	10/4/1999	Not provided	0	0	50000	Widespread damage near and along Main Street. Numerous trees, powerlines and signs blown down. Minor damage to a few homes in the area and a chainlink fence blown down at a ball field. Around 800 customers were without power for about 2 1/2 hours after the storm. Industrial Carving on Zimmerman and Mill Streets had the roof blown off and a rear wall knocked down. Part of the roof at White Pine Lumber and Planing was blown off.
Countywide	2/13/2000	Not provided	0	0	20000	Trees and power lines down.
Countywide	5/23/2000	Not provided	0	0	0	Trees down.
Countywide	5/27/2000	Not provided	0	0	25000	Trees and powerlines down across the county.
Dandridge	7/29/2000	Not provided	0	0	0	Trees down.
Dandridge	7/29/2000	Not provided	0	0	0	Trees down near Indian Park.
Dandridge	7/30/2000	Not provided	0	0	9000	Trees and power lines down.
Jefferson City	8/10/2000	Not provided	0	0	0	Trees down.
Countywide	11/9/2000	Not provided	0	0	0	Trees down.

Countywide	5/21/2001	Not provided	0	0	20000	Trees down. A large tree fell on a car as the couple inside was driving down Russell Avenue in Jefferson City. EMS crews took around 20 minutes to cut away the tree and cut open the car. They sustained minor injuries, but their 1999 Oldsmobile was totaled.
Strawberry Plains	6/29/2001	Not provided	0	0	0	Trees down.
Countywide	7/4/2001	Not provided	0	0	0	Trees down.
Countywide	10/24/2001	Not provided	0	0	250000	Trees and power lines down. A building in downtown Jefferson City, winds caused the roof of a vacant building to buckle, the upper half of the front wall falling onto Main Street.
Dandridge	4/28/2002	Not provided	0	0	5000	Four trees reported down in the eastern part of the county.
Dandridge	5/2/2002	Not provided	0	0	10000	Trees reported down in Dandridge.
White Pine	11/10/2002	Not provided	0	0	5000	A few trees were reported down across a road one mile south of White Pine.
White Pine	11/11/2002	Not provided	0	0	20000	Numerous trees and power lines were downed in an area stretching from White Pine and Dandridge (around Goose Creek Road) east to the Leadville community.
Countywide	4/5/2003	60	0	0	5000	One tree reported down in Dandridge and one tree reported down near Talbott. Pea size hail also reported in Dandridge along Interstate 40.
Jefferson City	5/2/2003	60	0	0	6000	Several trees were reported down in Jefferson City.

Jefferson City	5/11/2003	55	0	0	8000	A few trees were reported down in Jefferson City.
Jefferson City	5/17/2003	55	0	0	3000	One tree was reported down near the intersection of Buffalo Road and Chucky Pike.
White Pine	5/17/2003	55	0	0	3000	One tree was reported down on Bell Road.
New Market	5/17/2003	55	0	0	3000	One tree was reported down on Noe Circle in New Market.
White Pine	5/17/2003	55	0	0	3000	One tree was reported down on interstate 81 two miles northwest of White Pine.
Jefferson City	6/11/2003	55	0	0	10000	A few trees were reported down along highway 92 between Jefferson City and Cherokee Dam.
Countywide	6/11/2003	55	0	0	12000	A few trees were reported down across the county.
Countywide	8/31/2003	60	0	0	0	Numerous trees reported down countywide by 911 dispatch, but mainly from Jefferson City to the Knox/Sevier county line.
Dandridge	5/26/2004	60	0	0	3000	Two trees were reported down in Dandridge.
Jefferson City	5/31/2004	60	0	0	12000	A few trees were reported down across the county.
Dandridge	5/31/2004	60	0	0	5000	A few trees were reported down in Dandridge.
New Market	6/12/2004	65	0	0	2000	One tree and powerlines down on Beaver Creek Road
New Market	6/12/2004	65	0	0	5000	One tree and powerlines down near Grainger County border
New Market	7/10/2004	65	0	0	15000	Numerous trees were reported down in southern Jefferson county between Strawberry Plains and New Market.

Strawberry Plains	7/12/2004	60	0	0	6000	Two large trees were reported down in Strawberry Plains.
New Market	7/13/2004	60	0	0	4000	One tree was reported down in Green Hill and another in New Market at 1230 am EDT on 07/14.
Countywide	5/20/2005	60	0	0	25000	Trees were reported down across the county.
Jefferson City	7/1/2005	55	0	0	3000	A tree was reported down on Clover Brook Drive in Jefferson City.
Jefferson City	7/1/2005	55	0	0	3000	A tree was reported down on Valley Home Road.
Jefferson City	7/1/2005	55	0	0	3000	A tree was reported down on Liberty Road.
Dandridge	7/31/2005	55	0	0	3000	A tree was reported down on Briggs Road.
White Pine	8/6/2005	60	0	0	10000	Two trees down near White Pine.
Countywide	10/21/2005	65	0	0	20000	Several trees and powerlines downed in the Strawberry Plains and New Market areas.
Central Portion	12/28/2005	60	0	0	5000	Two trees down on Hwy 92 near Cherokee Dam.
Jefferson City	4/2/2006	60	0	0	12000	Numerous trees down countywide.
Dandridge	4/3/2006	60	0	0	5000	A few trees down on east side of county
Jefferson City	4/3/2006	60	0	0	8000	A few trees down in the east half of the county.
Countywide	4/21/2006	60	0	0	10000	A few trees down countywide.
New Market	5/20/2006	60	0	0	8000	A few trees were reported down in New Market.
New Market	6/2/2006	60	0	0	10000	Several trees down in the New Market area.
White Pine	7/21/2006	60	0	0	12000	A few trees were reported down in White Pine and vicinity.

Dandridge	7/28/2006	60	0	0	3000	A tree was reported down on Highway 92 at the approach to the bridge across the French Broad River.
Dandridge	7/28/2006	60	0	0	3000	A tree was reported down near interstate 40 and the highway 92 intersection.
Jefferson City	8/4/2006	60	0	0	8000	A few trees down near Cherokee Dam.
Countywide	8/6/2006	60	0	0	12000	Numerous trees down countywide.
Countywide	8/10/2006	60	0	0	15000	Numerous trees down countywide.
Jefferson City	9/28/2006	60	0	0	3000	One tree was reported down on Columbia Road.
Not Provided	12/1/2006	60	0	0	20000	Numerous trees and powerlines down countywide.
Dandridge	4/3/2007	50	0	0	25000	Numerous trees were reported down from White Pine and Dandridge to Chestnut Hill along highway 92.
Jefferson City	6/8/2007	60	0	0	10000	Spotter reported a few trees downed by thunderstorm winds around Cherokee Dam near Jefferson City.
Dandridge	6/24/2007	55	0	0	15000	Several trees downed by thunderstorm winds countywide.
Jefferson City	6/25/2007	55	0	0	15000	Several trees were downed by thunderstorm winds in Jefferson City and the rest of the county.
Dandridge	6/28/2007	55	0	0	5000	A few large limbs were downed by thunderstorm winds near Gary Hills subdivision in Dandridge.
Dandridge	6/28/2007	55	0	0	10000	A few trees were downed by thunderstorm winds on Upper Rinehart Road near Dandridge.

Fielden Store	7/18/2007	60	0	0	0	A few trees were reported down along Highway 92 near Cherokee Dam.
Dandridge	7/25/2007	55	0	0	0	Three trees were reported down on Cherokee Drive in Dandridge. At the same residence, penny sized hail was reported along with a measured wind speed of 63 mph.
Dandridge	7/25/2007	60	0	0	0	A few trees and power lines were reported down in the Dandridge vicinity.
Dandridge	1/10/2008	50	0	0	0	Several trees were reported down across the county.
New Market	1/29/2008	50	0	0	0	Between 1145 pm and 1200 am, more than 50 trees were reported down. Also, numerous power lines were downed across the county.
Jefferson City	3/4/2008	50	0	0	0	Three trees were reported down across the county around 330 pm edt.
New Market	3/19/2008	55	0	0	0	Several trees were reported down across the county.
Dandridge	6/11/2008	52	0	0	10000	Power company reported a few trees and powerlines downed by thunderstorm winds in the southeast portion of the county.
New Market	6/11/2008	52	0	0	15000	Dispatch reported several trees and powerlines downed by thunderstorm winds in and around New Market.
Jefferson City	6/28/2008	55	0	0	10000	Dispatch reported several trees and powerlines downed by thunderstorm winds countywide.
White Pine	6/28/2008	55	0	0	8000	Dispatch reported a few trees and powerlines downed by thunderstorm winds in the White Pine area.

Dandridge	7/6/2008	55	0	0	0	Numerous trees were reported down across the southern half of the county.
Dandridge	2/18/2009	55	0	0	10000	Law enforcement personnel reported several trees downed by thunderstorm winds in the Dandridge area.
New Market	4/10/2009	53	0	0	4000	Law enforcement personnel reported two trees downed by thunderstorm winds in the New Market area.
Dandridge	5/15/2009	50	0	0	0	A few trees were reported down in Dandridge.
Chestnut Hill	6/3/2009	55	0	0	5000	Law enforcement officials reported several trees downed by thunderstorm winds in the Chestnut Hill area.
Jefferson City	6/11/2009	60	0	0	25000	The newspaper reported numerous trees and powerlines downed by thunderstorm winds in Jefferson City and countywide. A few outbuildings were also damaged by the winds.
Kimbrough XRD	6/16/2009	55	0	0	5000	Emergency management personnel reported a few trees downed by thunderstorm winds west of White Pine.
White Pine	6/17/2009	52	0	0	2000	NWS employee reported one tree downed by thunderstorm winds southwest of White Pine.
White Pine	6/17/2009	52	0	0	2000	Law enforcement officials reported one tree downed by thunderstorm winds near White Pine.
Jefferson City	6/17/2009	55	0	0	8000	Law enforcement officials reported several trees downed by thunderstorm winds in Jefferson City.
Dandridge	6/17/2009	52	0	0	3000	Law enforcement officials reported two trees downed by thunderstorm winds in Dandridge.

Chestnut Grove	6/17/2009	55	0	0	15000	Law enforcement officials reported a large tree downed by thunderstorm winds on a home north of Dandridge on Old Stage Road.
Dandridge	6/18/2009	55	0	0	8000	Law enforcement personnel reported several trees downed by thunderstorm winds in Dandridge.
Jefferson City	6/18/2009	55	0	0	15000	Law enforcement personnel reported several trees downed by thunderstorm winds in Jefferson City. In addition, winds damaged a car parked in Jefferson City after a tree fell on it.
Jefferson City	8/4/2009	52	0	0	5000	Law enforcement personnel reported a few trees downed by thunderstorm winds countywide.
Dandridge	6/14/2010	60	0	0	12000	Law enforcement personnel reported numerous trees downed by thunderstorm winds in Dandridge.
Dandridge	6/14/2010	60	0	0	12000	Law enforcement personnel reported numerous trees downed by thunderstorm winds in Dandridge.
New Market	6/15/2010	60	0	0	12000	A trained spotter reported numerous trees downed by thunderstorm winds on Russell Gap Road southwest of New Market.
Jefferson City	6/19/2010	55	0	0	10000	The Standard Banner newspaper in Jefferson City reported 2 trees downed onto 2 utility poles and powerlines by thunderstorms winds in Jefferson City.
New Market	7/20/2010	50	0	0	0	Several trees were reported down in New Market.

Dandridge	8/5/2010	55	0	0	20000	Law enforcement personnel reported several trees and powerlines downed by thunderstorm winds in the Dandridge area. A few buildings were also damaged.
White Pine	8/5/2010	58	0	0	15000	Law enforcement personnel reported several trees and powerlines downed by thunderstorm winds in White Pine.
New Market	8/5/2010	55	0	0	8000	Law enforcement personnel reported several trees downed by thunderstorm winds around New Market and the western portions of the county.
Dandridge	8/5/2010	60	0	0	25000	The public reported numerous trees and powerlines downed by thunderstorm winds near Dandridge. A few structures were also damaged.
Dandridge	9/11/2010	50	0	0	0	One tree was reported down.
Dandridge	4/27/2011	60	0	0	0	Amateur radio personnel reported numerous trees downed by thunderstorms wind at the Douglas campground in Dandridge.
Dandridge	4/27/2011	60	0	0	0	Amateur radio personnel reported numerous trees downed by thunderstorms wind at the Douglas campground in Dandridge.
Piedmont	5/26/2011	50	0	0	0	A mobile home was heavily damaged due to thunderstorm wind gusts.
Jefferson City	5/26/2011	50	0	0	0	A tree and a few power lines were reported down.
White Pine	5/26/2011	50	0	0	0	A barn was severely damaged when most of its roof was removed by thunderstorm wind gusts.

White Pine	5/26/2011	55	0	0	0	Numerous trees and power lines were reported down.
Dandridge	6/24/2011	55	0	0	5000	Law enforcement personnel reported several trees downed by thunderstorm wind across the southern third of the county.
Dandridge	6/24/2011	60	0	0	20000	Law enforcement personnel reported numerous trees downed by thunderstorm wind across the southern third of the county.
Jefferson City	8/3/2011	52	0	0	10000	Law enforcement personnel reported a tree and powerlines downed on Mills Spring Road by thunderstorm wind near Jefferson City. Powerlines also knocked down in Jefferson City by the wind.
Dandridge	8/8/2011	55	0	0	10000	Law enforcement personnel reported several trees and powerlines downed by thunderstorm wind in Dandridge.
Mill Spring	8/8/2011	50	0	0	3000	Highway department personnel reported a few trees downed by thunderstorm wind in the Cherokee Dam area south of Rutledge.
French Mill	7/5/2012	60	0	0	0	Several trees were reported down near the intersection of East Dumplin Valley Road and highway 92.
Sugar Forks	7/31/2012	50	0	0	0	One tree was reported down on Oak Grove Road three miles northeast of Dandridge.
Dandridge	5/21/2013	50	0	0	0	Several trees were downed across the county with a concentration near Dandridge.
Jefferson City	5/21/2013	50	0	0	0	A few trees were reported down near East Dumplin Valley Road.

White Pine	6/13/2013	50	0	0	5000	Law enforcement personnel reported several trees downed by thunderstorm wind in the White Pine area.
Jefferson City	6/27/2013	50	0	0	2000	A NWS employee reported 1 tree downed by thunderstorm wind along old AJ highway in Jefferson City.
Jefferson City	2/19/2014	50	0	0	5000	The public reported trees were downed by thunderstorm wind on Hicks Road in Jefferson City.
Jefferson City	2/19/2014	50	0	0	12000	Law enforcement personnel reported trees and powerlines were downed by thunderstorm wind on Branner Avenue in Jefferson City.
White Pine	6/10/2014	55	0	0	5000	A NWS employee reported a couple of trees downed on the property by thunderstorms wind 3 miles northwest of White Pine. A large tree fell on the house.
Dandridge	6/10/2014	55	0	0	10000	Law enforcement personnel reported many trees downed by thunderstorms wind countywide.
Oakland	7/27/2014	55	0	0	0	Several trees were reported down across the southern part of Jefferson County.
New Market	4/26/2015	55	0	0	15000	Dispatch personnel reported several trees and a some powerlines downed by thunderstorm wind in New Market. Some structural damage was also reported.
Kimbrough XRD	6/18/2015	50	0	0	0	Six trees were reported down on Highway 66 in the vicinity of Mansfield Gap and one tree was downed on Highway 341.

Jefferson City	5/12/2016	50	0	0	0	Several trees were reported down across the county.
Keister	7/7/2016	50	0	0	0	Several trees were reported down across Northern Jefferson County.
Jefferson City	7/7/2016	50	0	0	0	Numerous trees were reported down county-wide.
Dandridge	7/12/2016	50	0	0	0	A few trees were reported down near Dandridge and New Market.
Dandridge	11/30/2016	50	0	0	0	Several trees were reported down.
Strawberry Plains	4/5/2017	50	0	0	0	Several trees were reported down.
Jefferson City	5/4/2017	50	0	0	0	A power pole was broken into two pieces in downtown Jefferson City.
Jefferson Estate	4/4/2018	50	0	0	0	One tree was downed on Old Andrew Johnson Highway.
Jefferson City	4/4/2018	50	0	0	0	Several trees were reported down in the county.
Jefferson City	5/31/2018	50	0	0	0	Trees and power lines were reported down across the county.
New Market	6/24/2018	50	0	0	0	A few trees were reported down near the dispatch center.
Dandridge	8/8/2018	50	0	0	0	A few trees were reported down.
Kimbrough XRD	9/2/2018	50	0	0	0	Two trees were reported down between White Pine and Talbott.
New Market	11/6/2018	50	0	0	0	Trees were reported down at many locations throughout the county.

Jefferson 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 analysis's potential impacts to determine vulnerabilities and then analysis's the probability of a severe storm event occurring to calculate a risk ranking for each jurisdiction.

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Jefferson County Unincorporated	3.00	4.00	2.00	3.00
City of Jefferson	3.00	3.00	3.00	3.00
Town of Dandridge	1.00	2.00	1.00	1.33

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Jefferson County Unincorporated	3.00	4.00	7.00
City of Jefferson	3.00	3.00	6.00
Town of Dandridge	1.33	3.00	4.33

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

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

Property	
Amount of residetial property damage associated from the hazard	
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	
Amount of business damage associated from the hazard	
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 indefinitly or relocated
5	A top-10 local employer closed indefinitly

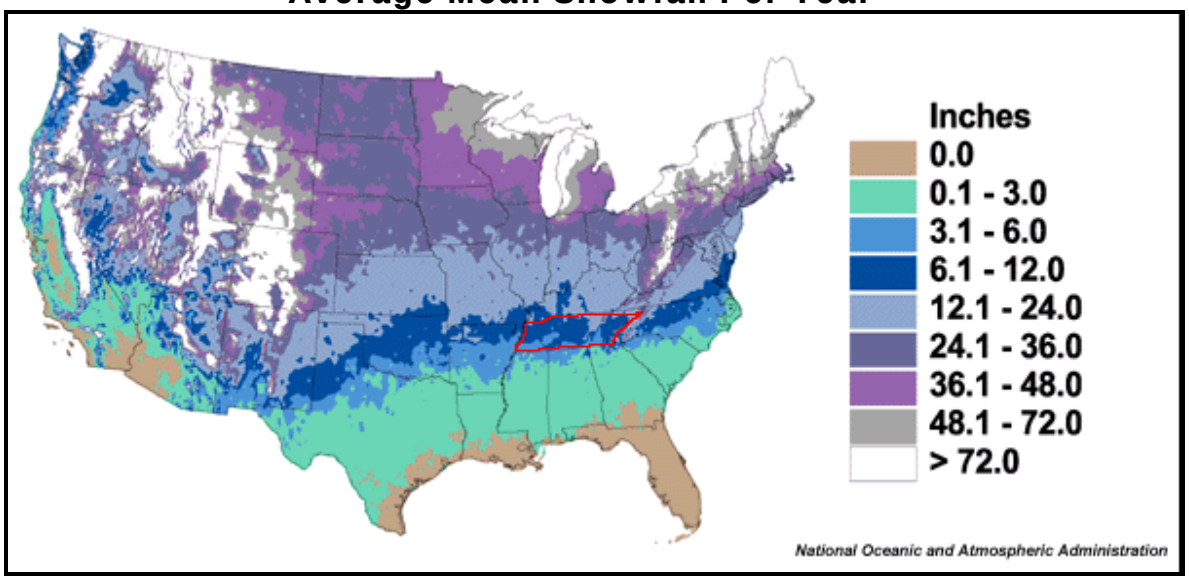
Probability	
Likelihood of the hazard occurring within a given span of years	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

Freezes/Winter Storms

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 Jefferson County, all jurisdictions are vulnerable to freezes and moderate winter storms, but not to the severity level seen in much of the northern U.S.

Based on previous occurrences, Jefferson County 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 up to 8 inches in Jefferson County and/or ice accumulations to cause for hazardous conditions. The average mean snowfall per year in Jefferson County is between 6 to 12 inches (as seen on the map below).

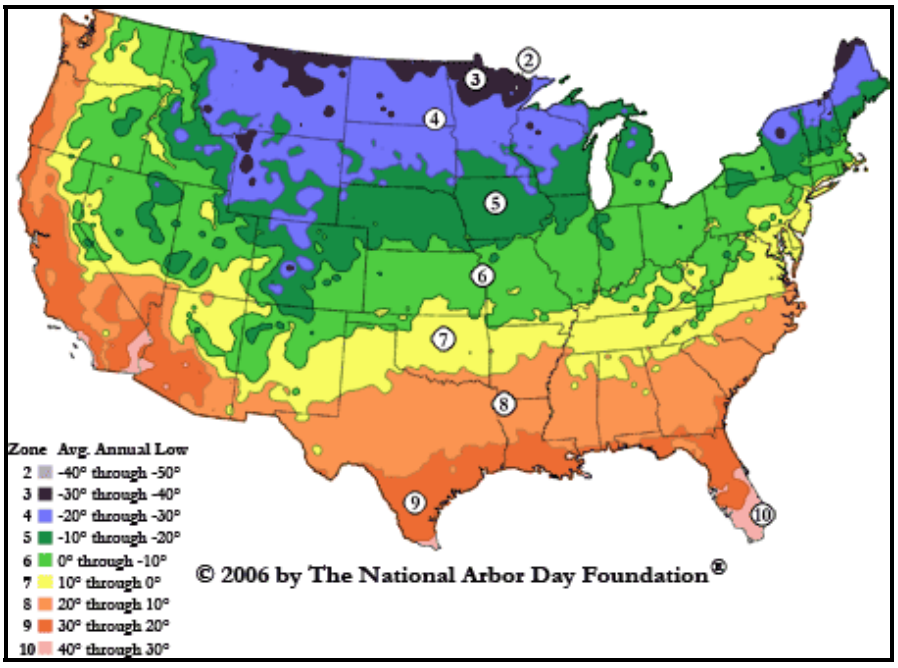
Average Mean Snowfall Per Year



Source: NOAA

Jefferson 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

The following chart provides winter storm event information for Jefferson County between 1950 and 2019. The following information was obtained by accessing the NOAA database.
https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Winter Weather hazard experienced by Jefferson County County, including the jurisdictions located within, and is the only source of data accessible. The information provided for Jefferson County also applies to the school district due to the geographic distribution of the schools throughout the County.

Winter Storm Impacts in Jefferson County: 1950 - 2019

Date	Event Type	Deaths	Injuries	Property Damage	Extent/Impact Description
1/6/1996	Winter Storm	0	0	0	A strong low pressure system from the Gulf Coast region brought up to one foot of snow to parts of East Tennessee. Numerous trees and power lines fell. Many roads became impassable shutting down schools and businesses across the area. Numerous auto accidents occurred. There were also isolated incidents of collapsed roofs.
1/11/1996	Winter Storm	0	0	0	Heavy snow accumulations of 4 to 8 inches caused numerous power outages and car accidents. Numerous trees fell as well. Schools and businesses were closed.
2/2/1996	Winter Storm	0	0	0	Snowfall amounts across the region ranged from 4 inches in Southeast Tennessee to nearly 24 inches in parts of Middle East Tennessee. Numerous minor traffic accidents were reported though no major accidents.
12/18/1996	Winter Storm	0	0	0	5" was recorded at Mountain City
1/10/1997	Winter Storm	0	0	0	An arctic cold front and associated upper level disturbance swept through the southern Appalachians. Snowfall amounts 3-5 inches in northeast Tennessee.
12/30/1997	Winter Storm	0	0	0	A series of fast-moving upper level disturbances caused heavy snow shower activity across East Tennessee. Amounts were generally 2 to 5"
12/22/1998	Ice Storm	0	0	0	The ice storm left minor accumulations of ice in valley locations due to warm ground temperatures. Most of the ice was on trees and bridges. Most roads were only wet. In higher elevations, the ice was much heavier.
1/6/1999	Winter Storm	0	0	0	Generally less than 2 inches of snow fell across East Tennessee, resulting in numerous school closings and traffic accidents.
3/3/1999	Winter Storm	0	0	0	Jefferson Co.-4 inches at Chestnut Hill (elev. 2000 ft.) near the base of English Mtn.

3/13/1999	Winter Storm	0	0	0	A very wet weather system brought heavy amounts of rain to East Tennessee. Heavy rain began early Saturday morning, changed to heavy snow in some places during the day Saturday, back to rain Saturday night, then finally to snow Sunday night. There were also isolated reports of freezing rain. The snow was confined to northeast Tennessee, generally northeast of Knoxville. Rainfall amounts across much of East Tennessee was 1-2 inches. Snowfall amounts in northeast Tennessee averaged 1-3 inches.
3/26/1999	Winter Storm	0	0	0	A very early spring snowstorm brought a wide range of snowfall amounts to the central valley counties of East Tennessee.
1/22/2000	Winter Storm	0	0	0	Generally 2-4 inches of snow fell across central and northeast portions of East Tennessee, with only a few reports of amounts in the 1-2 inch range and 4-5 inch range.
12/2/2000	Winter Storm	0	0	0	Widespread snow fell across East Tennessee. Amounts varied widely. In northeast Tennessee, snowfall amounts averaged 1 to 3 inches, with a few spots in the mountains reporting 2 to 4 inches.
12/18/2000	Winter Storm	0	0	0	Widespread light snow fell across East Tennessee. Amounts in counties in the valley generally ranged from 1 to 2 inches. In the higher mountain elevations, amounts were a bit higher, averaging 2 to 4 inches.
1/1/2001	Winter Storm	0	0	0	Amounts were generally 1/2 inch to 2 inches of snow.
1/20/2001	Winter Storm	0	0	0	Light snow to the region. 1 to 3 inches fell in the higher elevations of the mountain counties
1/5/2002	Winter Storm	0	0	0	Across northeast Tennessee, amounts average between a dusting and a half inch. In central East Tennessee, amounts were generally 2-4 inches, with a few spots recieving as much as 5 inches, and as little as a half inch.
1/16/2003	Winter Storm	0	0	0	2 to 8 inches across eastern Tennessee.
1/22/2003	Winter Storm	0	0	0	Snowfall amounts ranged from 2 to 5 inches in the lower elevations while higher elevations across the region picked up totals ranging from 5 to 8 inches.
1/9/2004	Winter	0	0	0	Most of East Tennessee averaged 2-3 inches of snow

	Storm				
1/29/2005	Ice Storm	0	0	0	Much of the region ended up with ice accumulation around one quarter inch with some locations measuring as much as one half inch of ice. Trees and power lines were downed across parts of the region due to ice accumulation.
12/16/2010	Ice Storm	0	0	20000	A storm system moving through the region produced an initial burst of two to four inches at several locations. As warmer air moved into the region, freezing rain followed the snowfall, resulting in a quarter to half of an inch of icing at most locations.
2/17/2015	Winter Storm	0	0	0	The highest peaks had up to 6 inches of snow while ice accumulations had up to an inch.

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

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Jefferson County Unincorporated	2.00	3.00	2.00	2.33
City of Jefferson	2.00	2.00	2.00	2.00
Town of Dandridge	1.00	2.00	1.00	1.33

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Jefferson County Unincorporated	2.33	5.00	7.33
City of Jefferson	2.00	4.00	6.00
Town of Dandridge	1.33	3.00	4.33

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

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

Property	
Amount of residetial property damage associated from the hazard	
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	
Amount of business damage associated from the hazard	
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 indefinitly or relocated
5	A top-10 local employer closed indefinitly

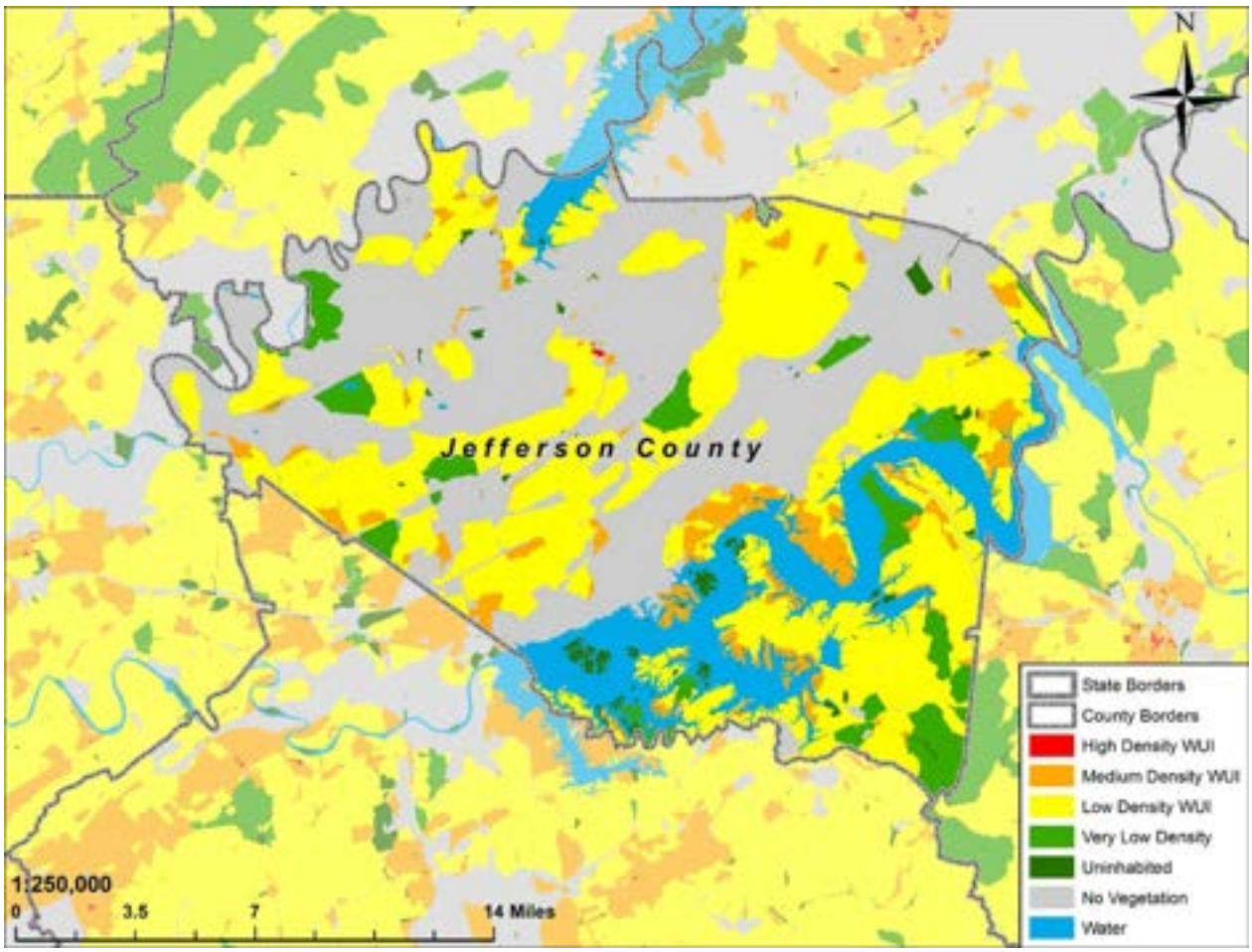
Probability	
Likelihood of the hazard occurring within a given span of years	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

Wildfire

A search for news reports on wildfires in Jefferson County didn't reveal a lot of information. There was one and as reported by The Gazette on August 15, 2019, A fire burning in Jefferson County's Deer Creek Canyon Park has prompted evacuations and closed the park.

According to the Jefferson County Sheriff's Office, 44 homes are in the evacuation zone and large animals are being evacuated to the Jefferson County Fairgrounds. The evacuation zone includes Samson Road, Mill Hollow Road, Suburst Drive and Hunter's Ridge Road.

Jefferson County is mostly no vegetation and low density areas with sections with very low density. Wildfires are not only in forested areas. Many occur in grassland areas such as yards and pastures. When the conditions are right, all these areas become vulnerable to devastating wildfires. Below is the Wildland Urban Interface for Jefferson County.



According to the TN Division of Forestry, debris burning and arson are the two main causes of wildfires. Generally, there are three major factors that sustain wildfires and allow for predictions of a given area's potential to burn. These factors include:

- Fuel;
- Topography; and
- Weather.

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

An area's topography (terrain and land slopes) affects its susceptibility to wildfire spread. Fire intensities and rates of spread increase as slope

increases due to the tendency of heat from a fire to rise via convection and radiation. The natural arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes

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

East Tennessee typically has two fire seasons. The spring fire season, prompted by warming weather, begins about February 15 and ends near May 15th, when the forest has "greened up". Fall fire season begins around October 15, when the leaves begin to fall and usually ends December 15th due to shorter, cooler, wetter days. Still, wildland fires occur year round. A burning permit is required for outdoor burning between October 15th and May 15th.

The committee was asked to provide feedback on injuries, deaths or property damage that occurred in Jefferson County and/or the jurisdictions within. The committee shared that a fire occurred on English Mountain during the years 2000 or 2001. The exact date could not be shared with the committee. A state forestry seasonal worker was injured by a falling tree during firefighting efforts.

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

are the statistics for Jefferson County from 2007 to 2016. These statistics also provide extent of the Wildfire Hazard. For Area, the total number of acres for the East TN District is 6,245,119.29. The percentage is calculated by taking the percentage and calculating the total area by percentage within the entire district. Size is calculated by total number of acres divided by total number of fires.

Year	# of Fires Forested	# of Fires Non-Forested	Total	# of Acres Forested	# of Acres Non-Forested	Total	Size	Area
2016	0	1	1		1.0	1.0	1.0	0.000
2015	NO INFO							
2014	4	1	5	73.0	64.5	137.5	27.5	0.001
2013	NO INFO							
2012	NO INFO							
2011	1	0	1	3.0		3.0	3.0	0.000
2010	1	0	1	10.0		10.0	10.0	0.000
2009	1	0	1	1.0		1.0	1.0	0.000
2008	NO INFO							
2007	8	0	8	53.4	1.4	54.8	6.9	0.000

Jefferson County uses a ranking system to determine each jurisdiction's vulnerability to wildfire events. This system is based off simple arithmetic which analyzes potential impacts to determine vulnerabilities and then analyzes the probability of a wildfire event occurring to calculate a risk ranking for each jurisdiction.

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Jefferson County Unincorporated	4.00	4.00	2.00	3.33
City of Jefferson	1.00	1.00	1.00	1.00
Town of Dandridge	1.00	1.00	1.00	1.00

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Jefferson County Unincorporated	3.33	3.00	6.33
City of Jefferson	1.00	1.00	2.00
Town of Dandridge	1.00	1.00	2.00

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

Presidential Disaster Declarations

The source of this information came from https://www.fema.gov/disasters. All disasters included in the table below that were provided on this website.

FEMA DR	Date	Hazards				PA	IA
4427	4/17/2019	Flooding	Landslide	Mudslide		yes	no
4320	6/23/2017	Severe Storms	Straight Line Winds	Flooding		yes	no
4211	4/2/2015	Winter Storm	Flooding			yes	no
1974	5/1/2011	Severe Storms	Tornadoes	Straight Line Winds	Flooding	yes	no
1965	3/31/2011	Severe Storms	Tornadoes	Flooding		yes	no
3095	3/14/1993	Winter Storm				yes	no
3217	9/5/2005	Hurricane Katrina				yes	no
424	4/4/1974	Tornadoes				yes	Yes
366	5/15/1972	Heavy Rains	Flooding			yes	Yes
708	5/25/1984	Severe Storms	Flooding			yes	no
1022	4/14/1994	Heavy Rains	Flooding			yes	Yes
1464	5/8/2003	Severe Storms	Tornadoes	Flooding		No	Yes
1215	4/20/1998	Severe Storms	Tornadoes	Flooding		yes	Yes
1197	1/13/1998	Severe Storms	Flooding			yes	no

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 Jefferson 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

Jefferson County has developed a comprehensive range of mitigation projects. These projects were solicited and identified by the different entities whom make up the Jefferson County Hazard Mitigation Committee. 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, Jefferson County was able to determine when and which projects should be implemented based on available funding and time.

The Jefferson 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.

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

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. All the project rankings can be seen on the Jefferson County Hazard Mitigation Project List. Also, the committee tally for the rating of each project is in the following table.

Action No.	Action Title	Hazard Rated Priority	Social	Administrative	Financial	Environmental	Technical	Total
1	Public Education and Materials (All)	9	2.0	2.0	1.5	2.5	2.5	2.1
2	Ashley Oaks Catch Basin (County)	7	2.5	1.8	2.5	2.3	2.5	2.3
3	Byrd Springs Drainage (County and Jefferson City)	5	2.5	1.8	2.3	2.8	2.5	2.4
4	Lost Creek/Beaver Creek Drainage (County)	4	2.8	1.5	2.3	2.5	2.5	2.3
5	White Pine School Safe Room (County)	9	2.5	2.3	2.0	2.5	2.3	2.3
6	Maury School Safe Room (County)	2	2.5	2.3	2.0	2.8	2.3	2.4
7	Generator for Community Center (County and Jefferson City)	1	2.5	1.8	2.3	3.0	2.5	2.4
8	Generator for Chestnut Hill Ambulance Station (County)	3	2.3	1.8	2.3	3.0	2.5	2.4
9	Generator for Jefferson County Rescue Squad (County)	6	2.3	1.8	2.3	3.0	2.5	2.4
10	Generator for County, School, Courthouse Annex (County)	9	2.5	1.8	2.3	3.0	2.5	2.4
11	Nursing Home Buffer Zone (County and Dandrige)	7	2.5	2.3	2.0	2.5	2.3	2.3
12	Dandridge Elementary Buffer Zone (County and Dandridge)	9	2.5	2.5	2.0	2.5	2.3	2.4
13	Justice Center Buffer Zone (County)	9	2.5	2.5	1.8	2.5	2.3	2.3
14	Ruritan Building Buffer Zone (County and Dandridge)	9	2.5	2.5	1.8	2.5	2.3	2.3
15	Parrets Chapel Buffer Zone (County)	9	2.3	2.5	1.8	2.5	2.3	2.3
16	Tredway Dr. (Dandridge) Flood Issue	9	2.5	2.0	2.0	2.8	2.5	2.4
17	Generator for law enforcement and public works (Dandridge)	9	2.3	2.0	2.0	3.0	2.3	2.3
18	Generator for Public Works (Jefferson City)	9	2.0	2.0	2.0	3.0	2.5	2.3
19	Public Works Buffer Zone (Jefferson City)	9	2.7	2.3	1.7	2.0	2.3	2.2
20	Community Center Buffer Zone (Jefferson City)	9	3.0	2.5	2.0	2.0	2.5	2.4
21	Community Center Safe Room	9	3.0	3.0	2.0	2.0	2.0	2.4

Jefferson County Project List

The following Project List provides an overview of all the Jefferson County Hazard Mitigation Committee projects. This includes potential funding sources, implementation timeframes, the project's responsible agency, and other information. This list is to remain active and updated.

Jefferson County Project List

Hazard Mitigated	Project #	Jefferson County (Unincorporated) Action/Project Name	Priority Rank	Addresses New or Existing Buildings/Infra?	Responsible Agency	Possible Funding Source(s)	Timeframe
Flooding	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	2	Ashley Oaks Catch Basin	7	New	EMA	HMPG, PDM	1-5 years
	3	Byrd Springs Drainage	5	Existing	Jefferson City Public Works/County Highway	HMPG, PDM	1-5 years
	4	Lost Creek/Beaver Creek Drainage	4	Existing	County Highway	HMPG, PDM	1-5 years
Tornado/Severe Storms (Hail, Wind, Lightning)	5	White Pine School Safe Room	9	Existing	County Schools	HMPG, PDM	1-5 years
	6	Maury School Safe Room	2	Existing	County Schools	HMPG, PDM	1-5 years
	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	8	Generator for Chestnut Hill Ambulance Station	3	Existing	EMA	HMPG, PDM	1-5 years
	9	Generator for Jefferson County Rescue Squad	6	Existing	EMA	HMPG, PDM	1-5 years
	10	Generator for County, School & Courthouse Annex	9	Existing	County Mayor	HMPG, PDM	1-5 years
Winter Weather	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	8	Generator for Chestnut Hill Ambulance Station	3	Existing	EMA	HMPG, PDM	1-5 years
	9	Generator for Jefferson County Rescue Squad	6	Existing	EMA	HMPG, PDM	1-5 years
	10	Generator for County, School &	9	Existing	County Mayor	HMPG,	1-5 years

		Courthouse Annex				PDM	
Wildfires	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	Jefferson County Emergency Management felt it important to leave this as the project for Wildfire as a priority in order to provide this to all jurisdictions within the County appropriately. This is the reason why no other projects were added.						

Hazard Mitigated	Project #	Dandridge Action/Project Name	Priority Rank	Addresses New or Existing Buildings/Infra?	Responsible Agency	Possible Funding Source(s)	Timeframe
Flooding	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	16	Treadway Dr. Culverts	9	Existing	Dandridge Public Works	HMPG, PDM	1-5 years
Tornado/Severe Storms (Hail, Wind, Lightning)	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	17	Generator for law enforcement and public works.	9	Existing	Dandridge Public Works	HMPG, PDM	1-5 years
Winter Weather	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	17	Generator for law enforcement and public works.	9	Existing	Dandridge Public Works	HMPG, PDM	1-5 years
Wildfires	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	11	Nursing Home Buffer Zone	7	Existing	City Manager	HMPG, PDM	1-5 years
	12	Dandridge Elementary Buffer Zone	9	Existing	City Manager	HMPG, PDM	1-5 years
	14	Ruritan Building Buffer Zone	9	Existing	City Manager	HMPG, PDM	1-5 years
	13	Justice Center Buffer Zone	9	Existing	City Manager	HMPG, PDM	1-5 years
	14	Ruritan Building Buffer Zone	9	Existing	City Manager	HMPG, PDM	1-5 years
	15	Parrets Chapel Buffer Zone	9	Existing	City Manager	HMPG, PDM	1-5 years

Hazard Mitigated	Project #	Jefferson City Action/Project Name	Priority Rank	Addresses New or Existing Buildings/Infra?	Responsible Agency	Possible Funding Source(s)	Timeframe
Flooding	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	3	Byrd Springs Drainage	5	Existing	Jefferson City Public Works/County Highway	HMPG, PDM	1-5 years
Tornado/Severe Storms (Hail, Wind, Lightning)	21	Community Center Safe Room	9	Existing	Jefferson City Recreation Dept.	HMPG, PDM	1-5 years
	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	7	Generator for Community Center	1	Existing	Jefferson City Recreation Dept.	HMPG, PDM	1-5 years
	18	Generator for Public Works	9	Existing	Jefferson City Public Works	HMPG, PDM	1-5 years
Winter Weather	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	7	Generator for Community Center	1	Existing	Jefferson City Recreation Dept.	HMPG, PDM	1-5 years
	18	Generator for Public Works	9	Existing	Jefferson City Public Works	HMPG, PDM	1-5 years
Wildfires	1	Public Education and Materials	9	Existing	EMA	HMPG, PDM	1-5 years
	20	Community Center Buffer Zone	9	Existing	Public Works	HMPG, PDM	1-5 years
	19	Public Works Building Buffer Zone	9	Existing	Public Works	HMPG, PDM	1-5 years

Project List Update

After reviewing the original list of mitigation projects seen in the 2014 Jefferson County Hazard Mitigation Plan, the mitigation committee has determined which projects to keep, remove or edit. No projects from the 2014 plan were completed. The following provides an update to the 2014 projects.

Mitigation Projects							
Priority Rank	**Action/Project**	**Hazard Mitigated**	**Jurisdictions Benefitted & Represented**	**Addresses New or Existing Buildings/Infra**	**Responsible Agency**	**Possible Funding Source(s)**	**Timeframe**
14	Saferooms in Govt Buildings &/or Schools	Tornado/Severe Storms	All	Existing & New	Jefferson County & Towns/Cities	HMGP	1-5 years
13	Provide Mitigation Info Materials at Public Agencies and Offices	All	All	Existing & New	Jefferson County EMA	Local	Continuous
13	Residential Drainage Project	Floods	White Pine	Existing	White Pine	HMGP, FMA	1-3 years
13	Generators in Critical Infrastructure	All	All	Exisiting & New	Jefferson County & Towns/Cities	Local	3-5 years
9	Buyout of Floodprone Property	Floods	Jefferson County Unincorporated	Existing	Jefferson County	HMGP, FMA	5 Years
13	Tree Limb Removal on Public Right of Ways	Winter Storms	All	n/a	Jefferson County Cities	Local	Continuous
13	APS on Traffic Signals	All	Jefferson City	Existing	Jefferson City	Local	1-2 years
14	Create Catch Basin	Floods	Dandridge	New	Dandridge	HMGP	1-3 years

- Saferooms is a project identified in the 2019 plan with specific location added.
- Provide Mitigation Materials was kept in the 2019 project list.
- Residential Drainage Project was resolved by other means.
- Generators in Critical Infrastructure was brought forth to the 2019 plan with specific locations added.
- Buyout of Flood prone Property – It was determined that the property in question is not in the flood plain.
- Tree limb removal is not an eligible hazard mitigation project. Therefore, it was removed.
- APS on Traffic signals is not an eligible hazard mitigation project. Therefore, it was removed.
- Create catch basin was brought forth to the 2019 plan with specific location added.

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, Jefferson County unincorporated, the Town of Dandridge, the City of Jefferson City, the Town of New Market, and the Town of White Pine are NFIP participants. FEMA has listed these five jurisdictions to have a current effective map date as of 12/6/2008, with Jefferson County having its initial FIRM (flood insurance rate map) performed in 1990, Dandridge in 1986, Jefferson City in 1971, New Market in 1987, and White Pine in 1987. The City of Baneberry is currently not apart of the NFIP but is taking steps to join. Below are two charts that give an overview of NFIP policy and loss data for Jefferson County.

It is important to note the data provided in the previous plan which is below. The most recent information provided by FEMA on NFIP Policy and Loss does not include Dandridge but rather includes Kingsport. Kingsport is not located in Jefferson County but is located in Hawkins and Sullivan Counties in TN. Following the previous plan tables includes the most recent information released by FEMA in July 2019. Because there is no active proof that Dandridge is a part of NFIP, their resolution is included in this section.

NFIP Policy Data for Jefferson County (as of 4/30/2011)

Jurisdiction	Policies In-Force	Insurance In-Force Whole $	Written Premium In-Force
Jefferson Unincorp.	18	3,776,400	9,323
Dandridge	2	192,000	1,086
Jefferson City	5	1,023,500	3,239
New Market	5	953,600	3,540
White Pine	31	3,629,300	26,628

Policies In-force: number of NFIP flood insurance policies
Insurance In-force whole $: value of building and contents insured by the NFIP
Written Premium In-force: total premiums paid for NFIP insurance policies

NFIP Loss Data for Jefferson County (as of 4/30/2011)

Jurisdiction	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
Jefferson Unincorp.	2	2	0	0	25,503.14
Jefferson City	4	2	0	2	21,547.76
New Market	6	4	1	1	83,704.53
White Pine	3	3	0	0	2,005.03

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

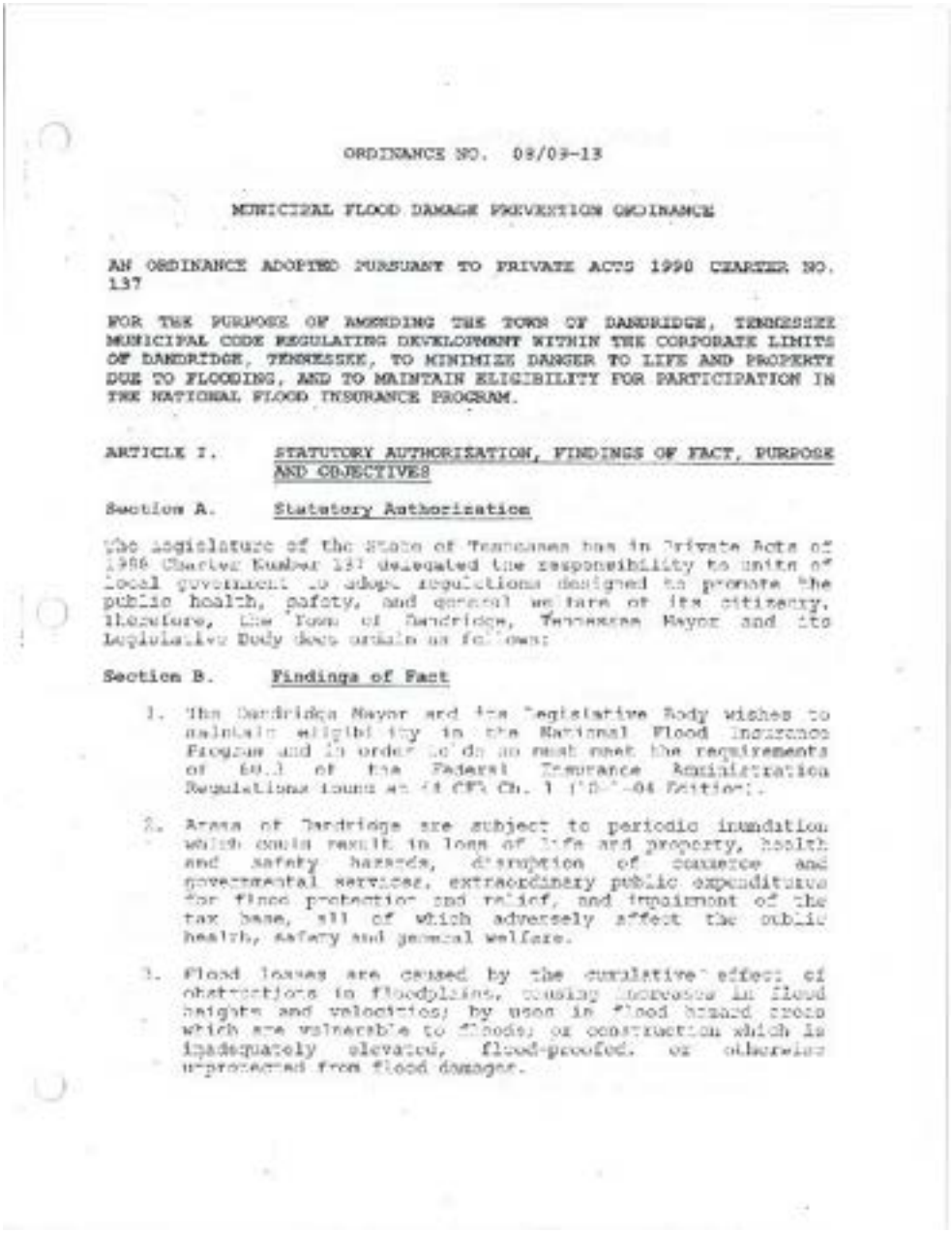
Community Name (Number)	Direct Premium and FPF	WYO Premium and FPF	Total Premium and FPF	Direct Policy Count	WYO Policy Count	Total Policy Count	Direct Coverage (in Thousands)	WYO Coverage (in Thousands)
JEFFERSON CITY, TOWN OF (475430)	$ -	$ 7,872	$ 7,872	-	10	10	$ -	$ 2,740
JEFFERSON COUNTY* (470097)	$ 2,083	$ 15,017	$ 17,100	1	32	33	$ 100	$ 7,866
KINGSPORT, CITY OF (470184)	$ 399	$ -	$ 399	1	-	1	$ 350	$ -
NEW MARKET, TOWN OF (470385)	$ 731	$ 6,276	$ 7,007	1	3	4	$ 50	$ 949
WHITE PINE, CITY OF (470332)	$ 4,925	$ 39,524	$ 44,449	4	33	37	$ 443	$ 4,513

Community Name (Number)	Total Coverage (in Thousands)	Direct Losses	WYO Losses	Total Losses	Direct Dollars Paid	WYO Dollars Paid	Total Dollars Paid	Adjuster Expense
JEFFERSON CITY, TOWN OF (475430)	$ 2,740	2	4	6	$ 19,148	$ 30,376	$ 49,524	$ 3,468
JEFFERSON COUNTY* (470097)	$ 7,966	-	5	5	$ -	$ 99,665	$ 99,665	$ 7,145
KINGSPORT, CITY OF (470184)	$ 350	-	-		$ -	$ -	$ -	$ -
NEW MARKET, TOWN OF (470385)	$ 999	2	4	6	$ 744	$ 83,440	$ 84,184	$ 9,773
WHITE PINE, CITY OF (470332)	$ 4,957	3	2	5	$ 2,005	$ 6,573	$ 8,578	$ 1,467

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. According to FEMA databases, Jefferson County and its jurisdictions don't have any repetitive loss properties as of July 2019.

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.



ORDINANCE NO. 08/09-13

MUNICIPAL FLOOD DAMAGE PREVENTION ORDINANCE

AN ORDINANCE ADOPTED PURSUANT TO PRIVATE ACTS 1990 CHARTER NO. 137

FOR THE PURPOSE OF AMENDING THE TOWN OF DANDRIDGE, TENNESSEE MUNICIPAL CODE REGULATING DEVELOPMENT WITHIN THE CORPORATE LIMITS OF DANDRIDGE, TENNESSEE, TO MINIMIZE DANGER TO LIFE AND PROPERTY DUE TO FLOODING, AND TO MAINTAIN ELIGIBILITY FOR PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM.

ARTICLE I. STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND OBJECTIVES

Section A. Statutory Authorization

The Legislature of the State of Tennessee has in Private Acts of 1990 Charter Number 137 delegated the responsibility to units of local government to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the Town of Dandridge, Tennessee Mayor and its Legislative Body does ordain as follows:

Section B. Findings of Fact

1. The Dandridge Mayor and its Legislative Body wishes to maintain eligibility in the National Flood Insurance Program and in order to do so must meet the requirements of 60.3 of the Federal Insurance Administration Regulations found at 44 CFR Ch. 1 (10-1-04 Edition).

2. Areas of Dandridge are subject to periodic inundation which could result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

3. Flood losses are caused by the cumulative effect of obstructions in floodplains, causing increases in flood heights and velocities; by uses in flood hazard areas which are vulnerable to floods; or construction which is inadequately elevated, flood-proofed, or otherwise unprotected from flood damages.

Section 5: Plan Maintenance

Monitoring, Evaluating, and Updating

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

Monitoring activities will involve Jefferson County Emergency Management setting up a committee meeting to be held on an annual basis. Jefferson 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, Jefferson County Emergency Management will notify the jurisdictional governments and the Jefferson 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 Jefferson 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 Jefferson County Emergency Management.

Five months prior to the plan's expiration date, Jefferson 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 Jefferson 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

By incorporating the Jefferson County Hazard Mitigation Plan into other planning documents and mechanisms, information contained in the mitigation plan can help fill-in missing gaps in existing documents, can contribute to already existing mitigation-based projects, and can create a strengthen stance of mitigation implementation and awareness within the county and its jurisdictions.

Some of the mechanisms that the Jefferson County Hazard Mitigation Plan could be incorporated into include:

- Jefferson County BEOP
- Jefferson County, Baneberry, Dandridge, Jefferson City, New Market, White Pine Land Use Plans
- Jefferson County, Baneberry, Dandridge, Jefferson City, New Market, White Pine Building Codes and Zoning Ordinances

The process of incorporating the hazard mitigation plan into other plans will begin during the other plan's update cycles. Jefferson 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 Jefferson 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 Jefferson 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.

Appendix 1

Attendance Sheet Meeting #1

JEFFERSON COUNTY

HAZARD MITIGATION PLANNING COMMITTEE

01 NOVEMBER 2019

SIGN IN SHEET

	NAME	JURISDICTION
1.	Tim Wilcox	Jefferson Co.
2.	Michelle Harrigan	TEMA
3.	Kevin Bench	Town of Dunbridge
4.	Brian Rhodes	City of Jefferson
5.	Jack Gaines	TEMA
6.	Brad Phillips	Jefferson Co
7.	Mark Potts	Jefferson Co
8.		
9.		
10.		

Appendix 2

Attendance Sheet Meeting #2

JEFFERSON COUNTY

HAZARD MITIGATION PLANNING COMMITTEE

15 NOVEMBER 2019

SIGN IN SHEET

	NAME	JURISDICTION
1.	Michelle Harrigan	TEMA
2.	Brian Rhodes	Jeff. City P.W.
3.	Josh Gainer	TEMA
4.	Brad Phillips	Jefferson Co
5.	Mark Potts	Jefferson Co
6.	Tim Wilcox	Jefferson Co
7.	Kevin Bunch	Dandridge
8.		
9.		
10.		

Appendix 3

Jefferson County Post
Jefferson County's Newspaper Online

White Pine School Locks Down Under Threat Of Student Carrying Gun

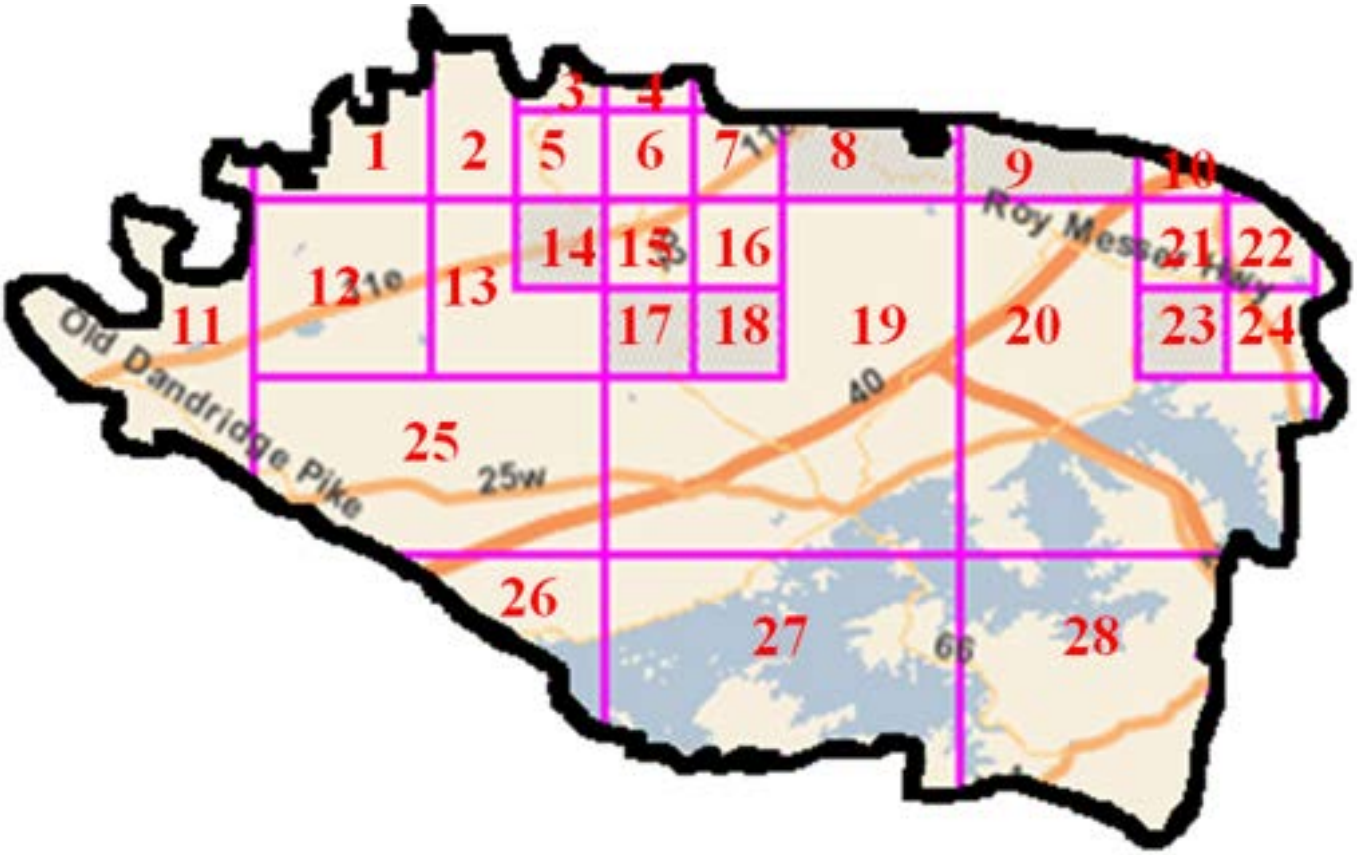
Jefferson County Emergency Management Agency Meeting, November 15, 2019

Share This Article

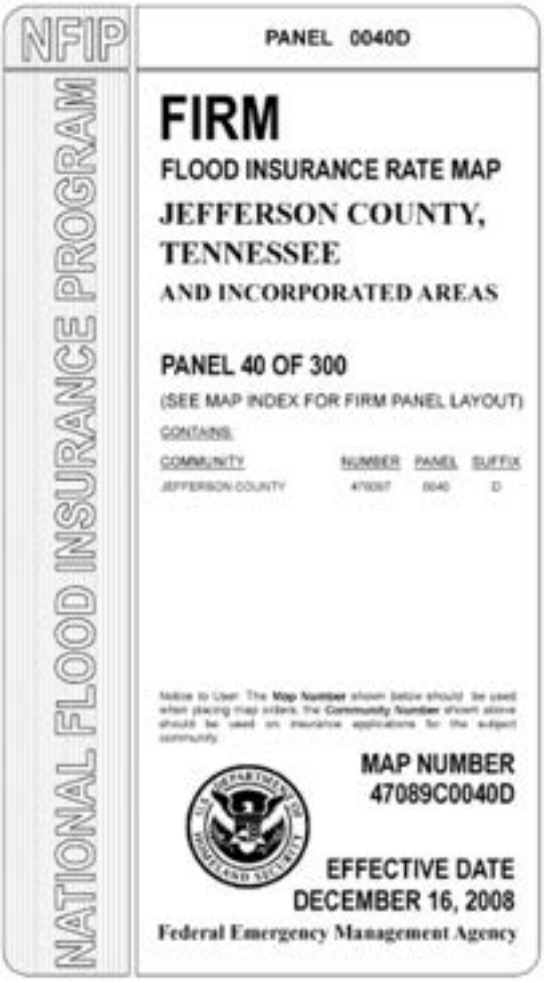
The Jefferson County Emergency Management Agency will be hosting a public meeting for review for the proposed revision of the Jefferson County Hazard Mitigation Plan. This meeting will be held on November 15th at 9AM in the main courtroom of the Historic Jefferson County Courthouse.

Appendix 4

Flood Insurance Rate Maps for Jefferson County

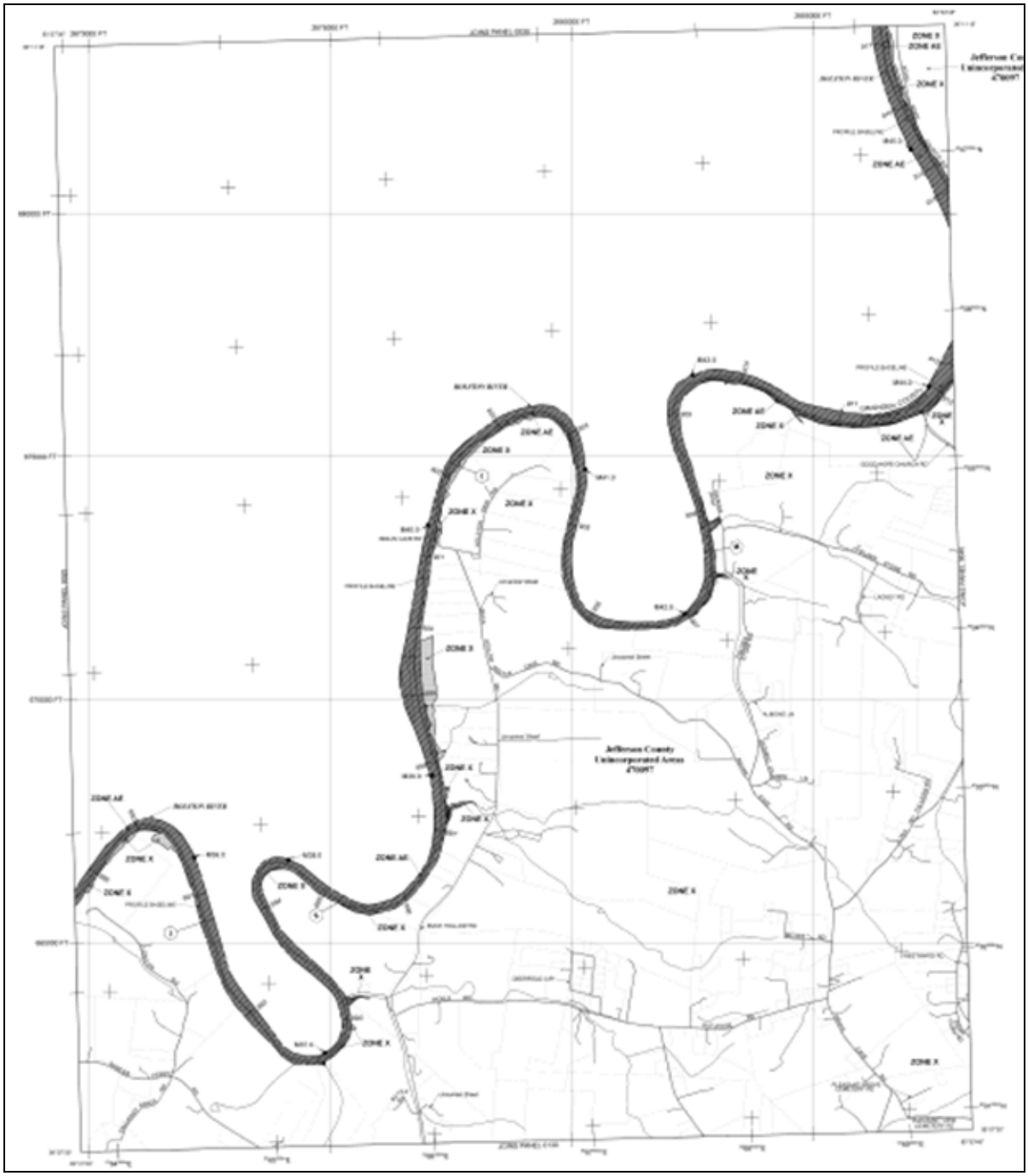


The above map shows Jefferson County broken into FIRM Panels with numeric labeling. The following maps show a close-up of each Panel Label indicating the area's 100 year floodplains through shading. These maps were produced on December 16, 2008 and are available from the FEMA Map Service Center.

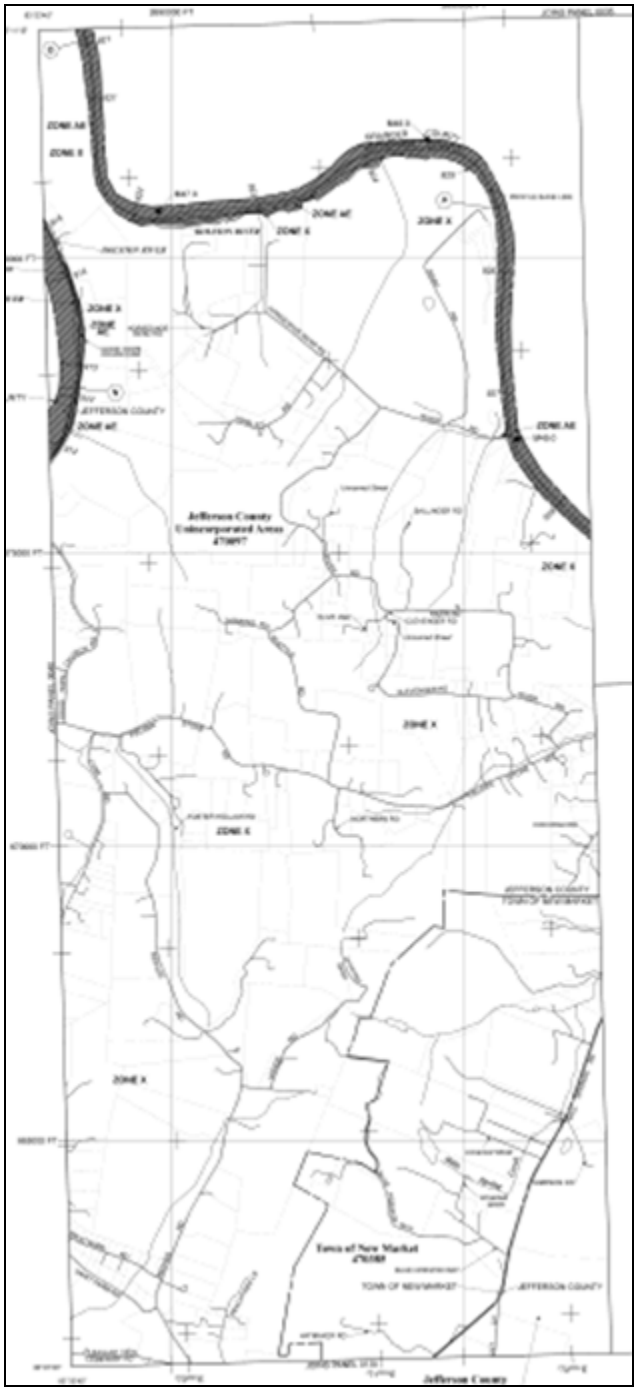

NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0040D
FIRM
FLOOD INSURANCE RATE MAP
JEFFERSON COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 40 OF 300
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
JEFFERSON COUNTY 470097 0040 D
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
47089C0040D
EFFECTIVE DATE
DECEMBER 16, 2008
Federal Emergency Management Agency


LEGEND
SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
OTHER FLOOD AREAS
ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
OTHER AREAS
ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.
Floodplain Boundary
Floodway Boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513
Base Flood Elevation line and value; elevation in feet*
(EL 987)
Base Flood Elevation value where uniform within zone; elevation in feet*
*Referenced to the North American Vertical Datum of 1988
A
Cross section line
23
Transect line
45° 02' 08", 93° 02' 12"
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

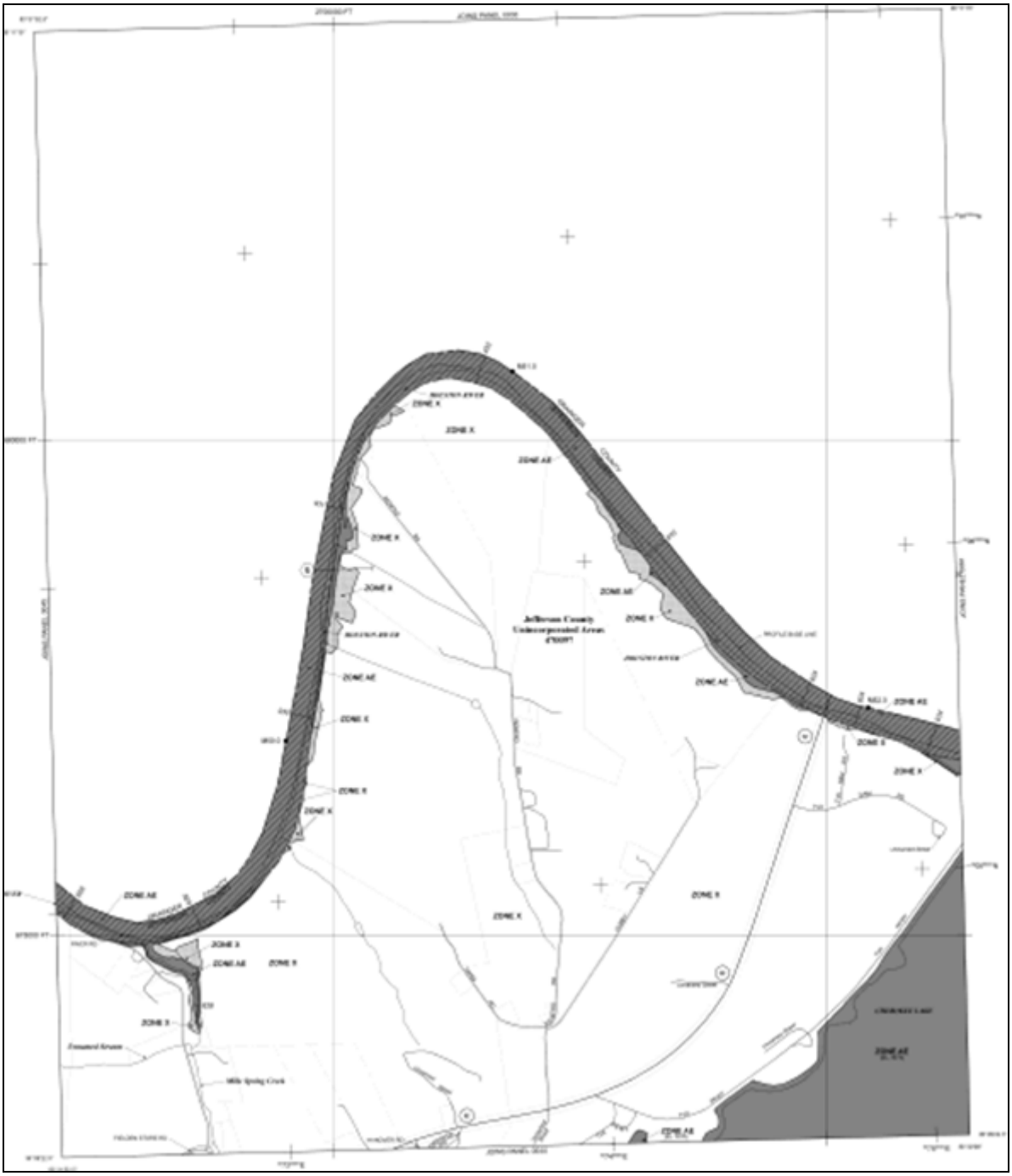
Panel 1


ZONE X
ZONE AE
ZONE A
ZONE AH
ZONE AO
ZONE VE
Jefferson County
Unincorporated Areas
475007

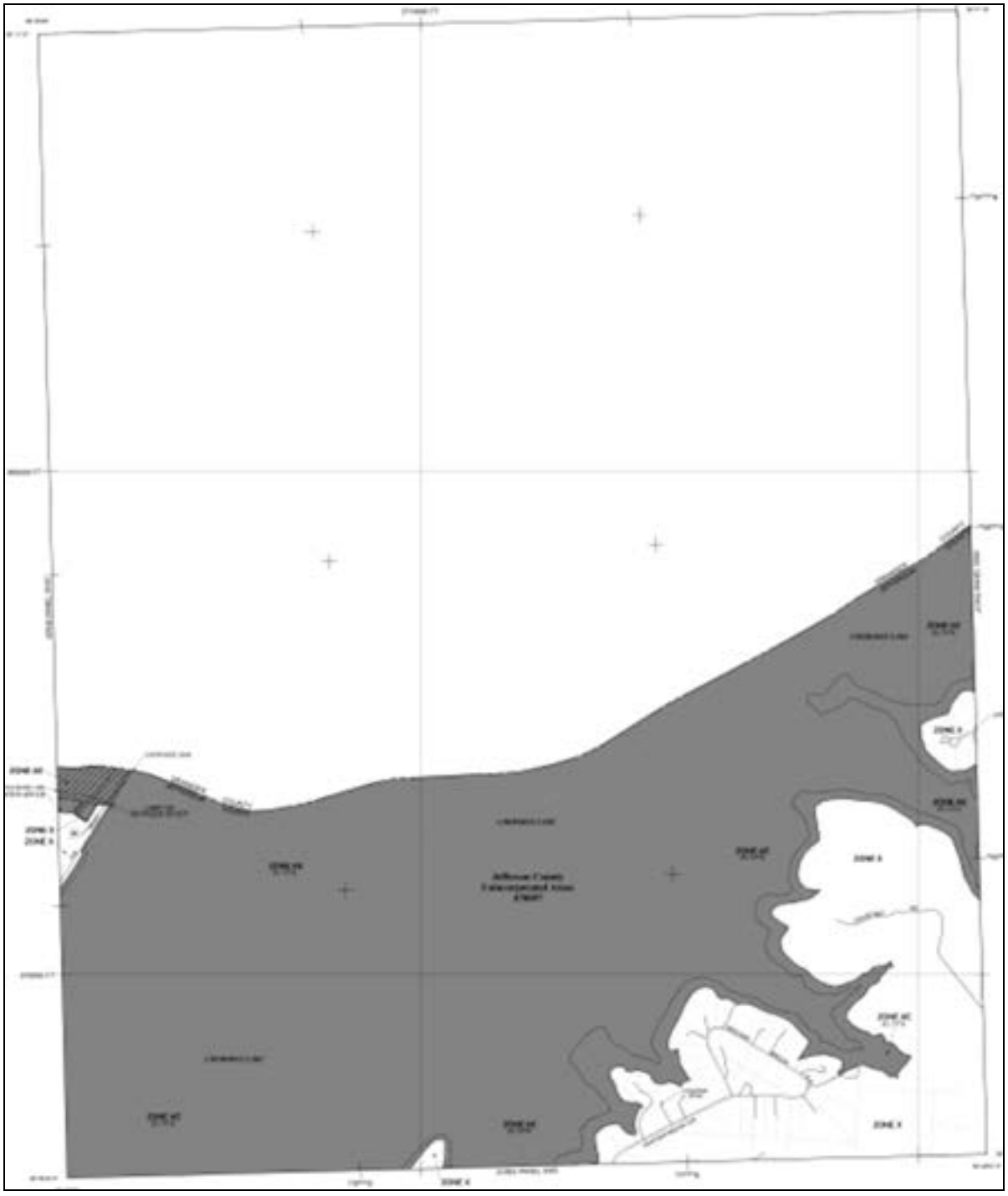
Panel 2


ZONE AE
ZONE X
ZONE AE
ZONE X
ZONE X
ZONE AE
ZONE AE
Jefferson County
Unincorporated Areas
ZONE X
ZONE X
ZONE X
ZONE X
Town of New Market
Jefferson County

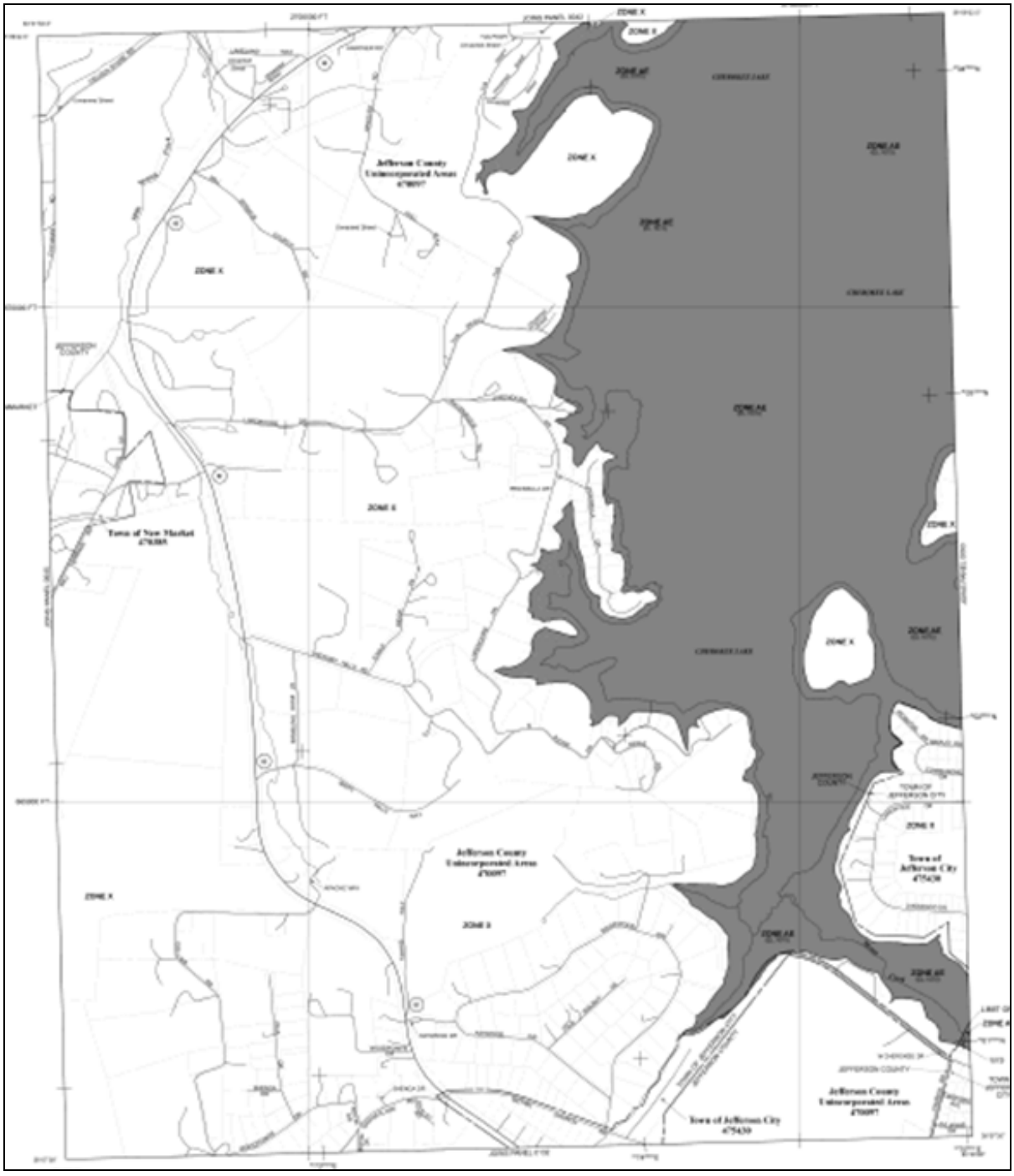
Panel 3


ZONE X
ZONE AE
ZONE A
Jefferson County
Unincorporated Areas
Mills Spring Creek

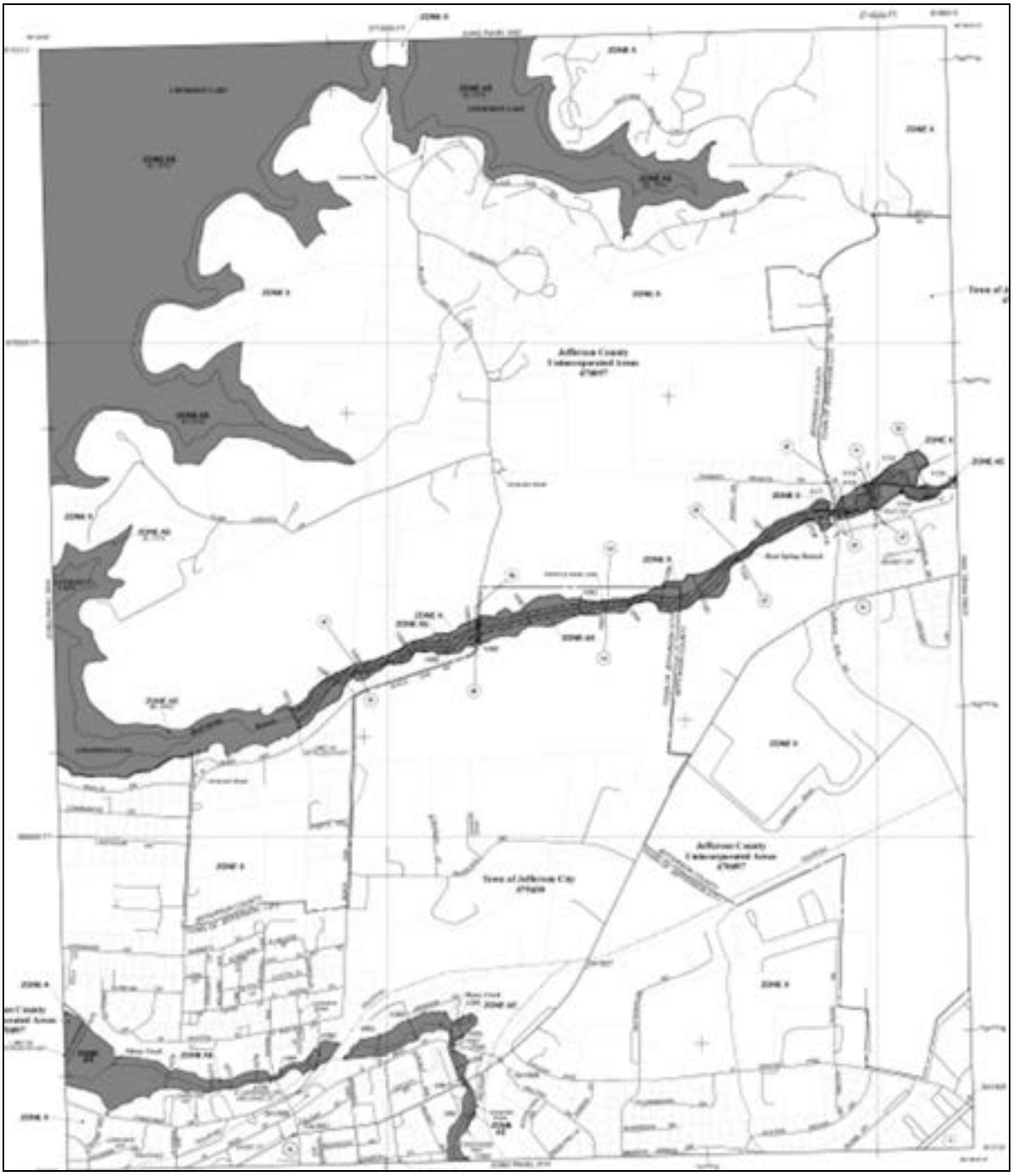
Panel 4



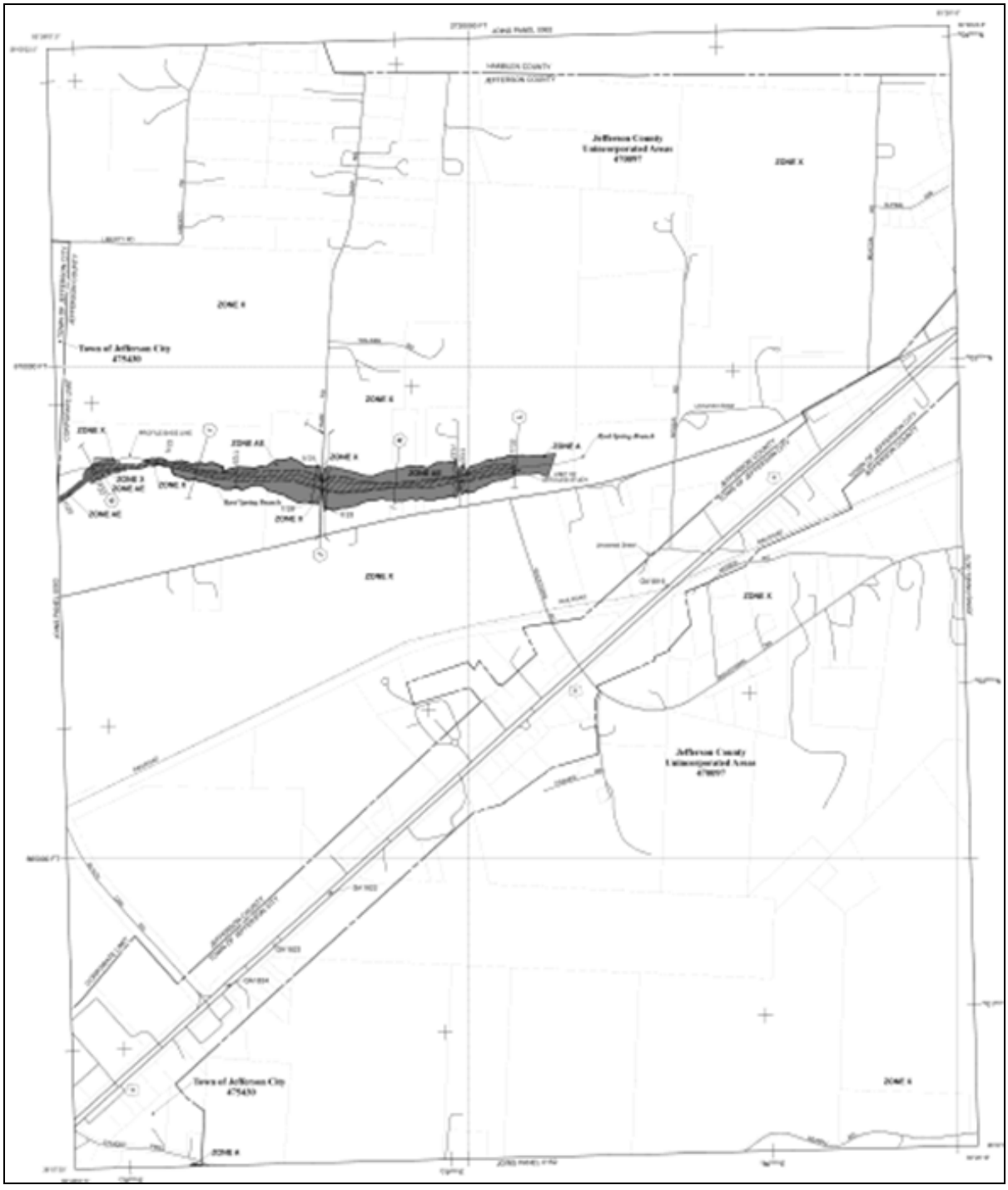
Panel 5


Jefferson County
Unincorporated Areas
Town of New Market
Jefferson County
Unincorporated Areas
Town of
Jefferson City
Jefferson County
Unincorporated Areas
Town of Jefferson City

Panel 6



Panel 7


Jefferson County
Unincorporated Areas
470097
ZONE X
ZONE A
Town of Jefferson City
475430
ZONE AE
ZONE AE
ZONE X
ZONE X
Jefferson County
Unincorporated Areas
470097
Town of Jefferson City
475430
ZONE A

Panel 8

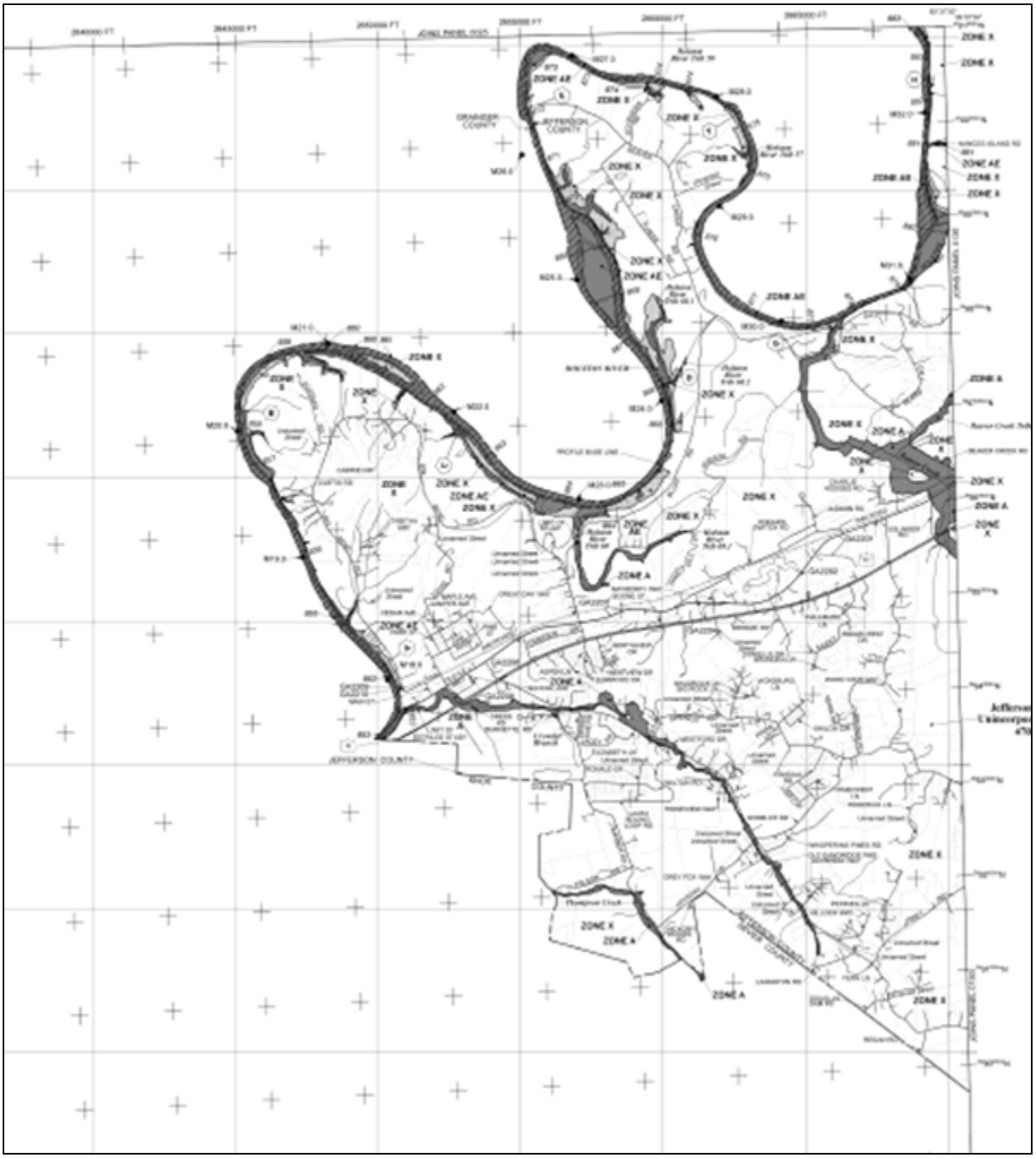
Map not available at this time

Panel 9

Map not available at this time

Panel 10

Panel 11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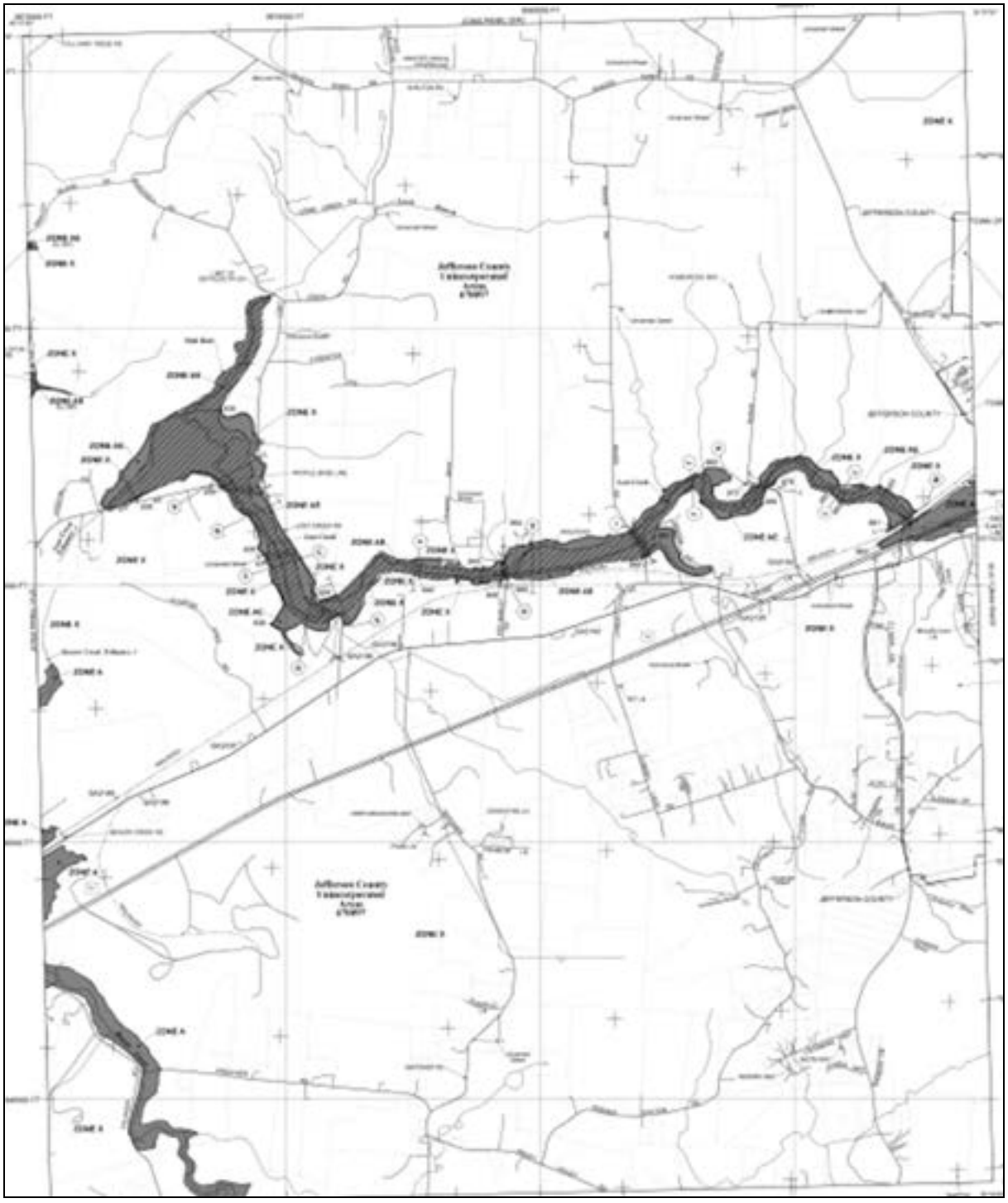
ZONE AE
ZONE A
ZONE AH
ZONE AO
JEFFERSON COUNTY
GRUNDY COUNTY

Panel 12



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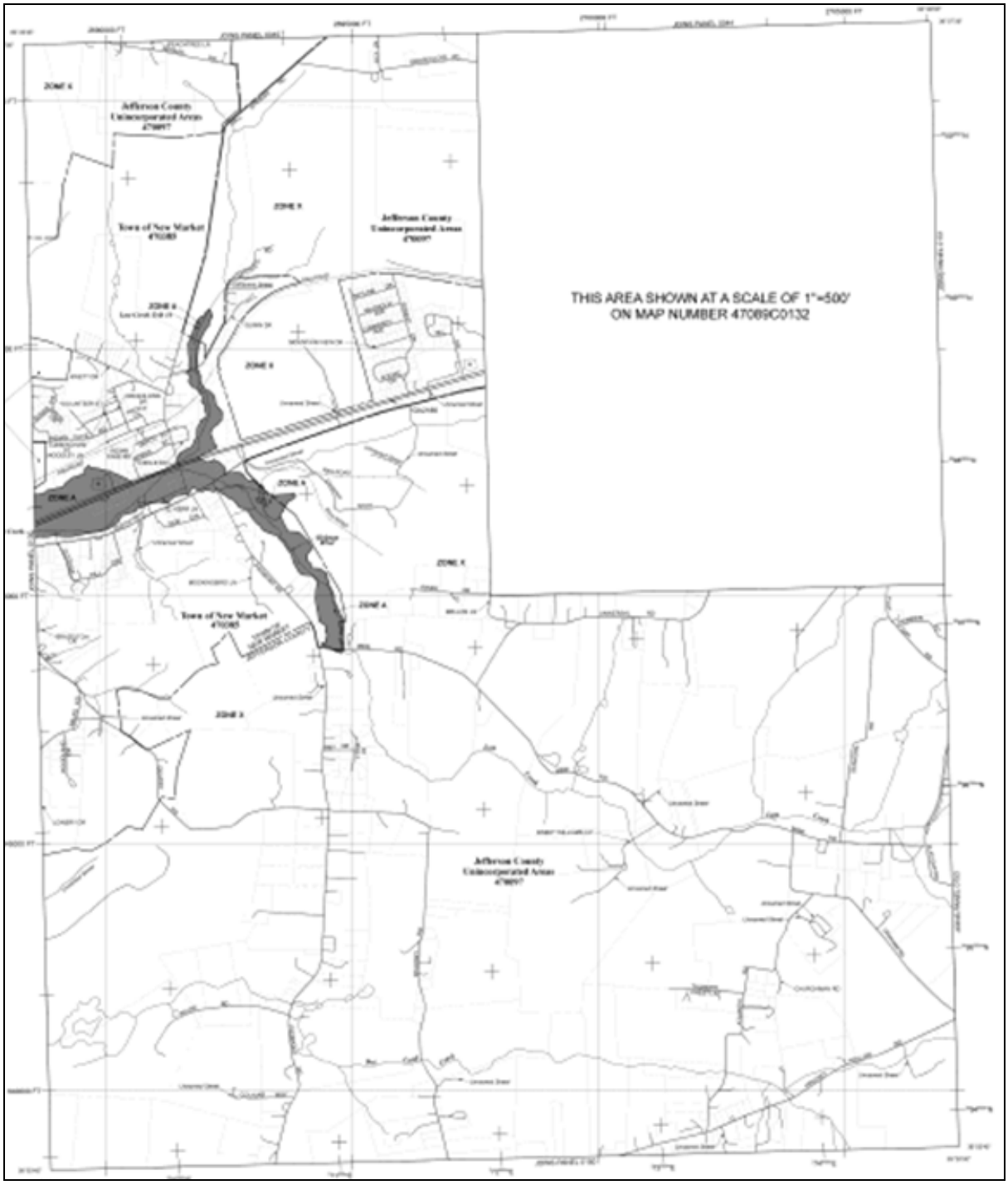
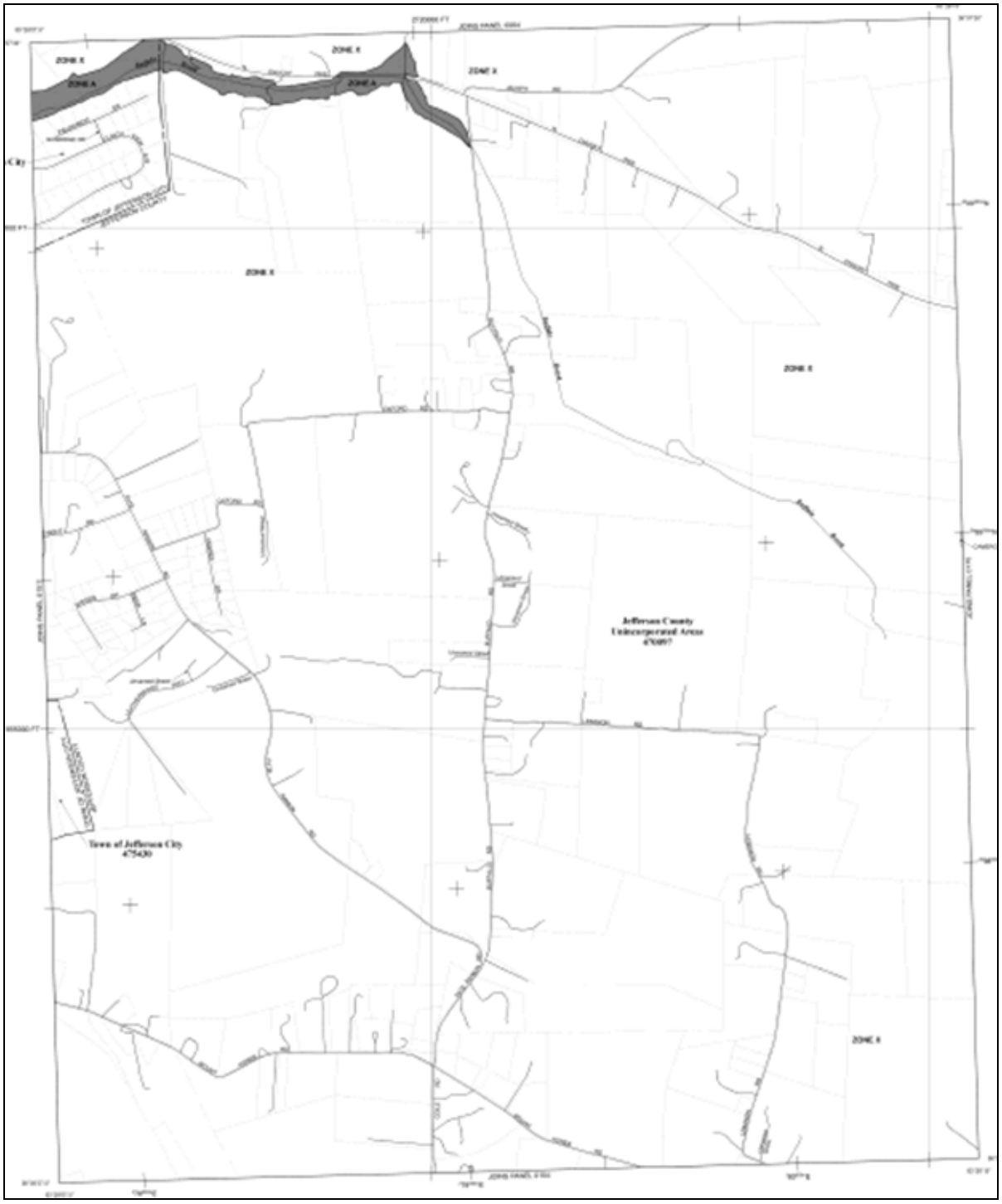

THIS AREA SHOWN AT A SCALE OF 1"=500'
ON MAP NUMBER 47069C0132
Jefferson County
Unincorporated Areas
Town of New Market
Jefferson County
Unincorporated Areas
Town of New Market
Jefferson County
Unincorporated Areas

Panel 14

Map not available at this time

Panel 15

Panel 16


ZONE X
ZONE A
ZONE X
ZONE A
ZONE X
ZONE X
ZONE X
Jefferson County
Unincorporated Areas
Town of Jefferson City
ZONE X

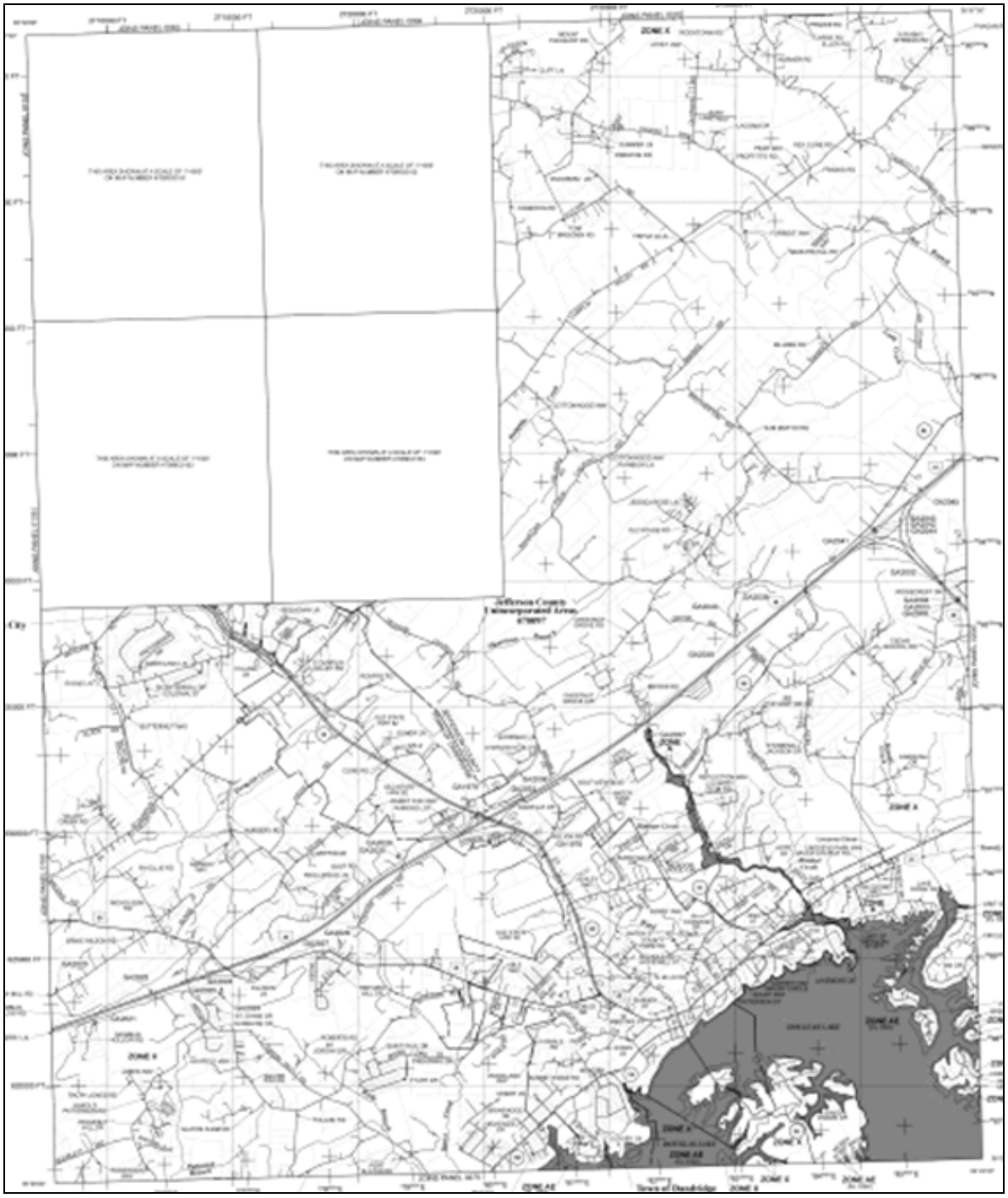
Panel 17

Map not available at this time

Panel 18

Map not available at this time

Panel 19



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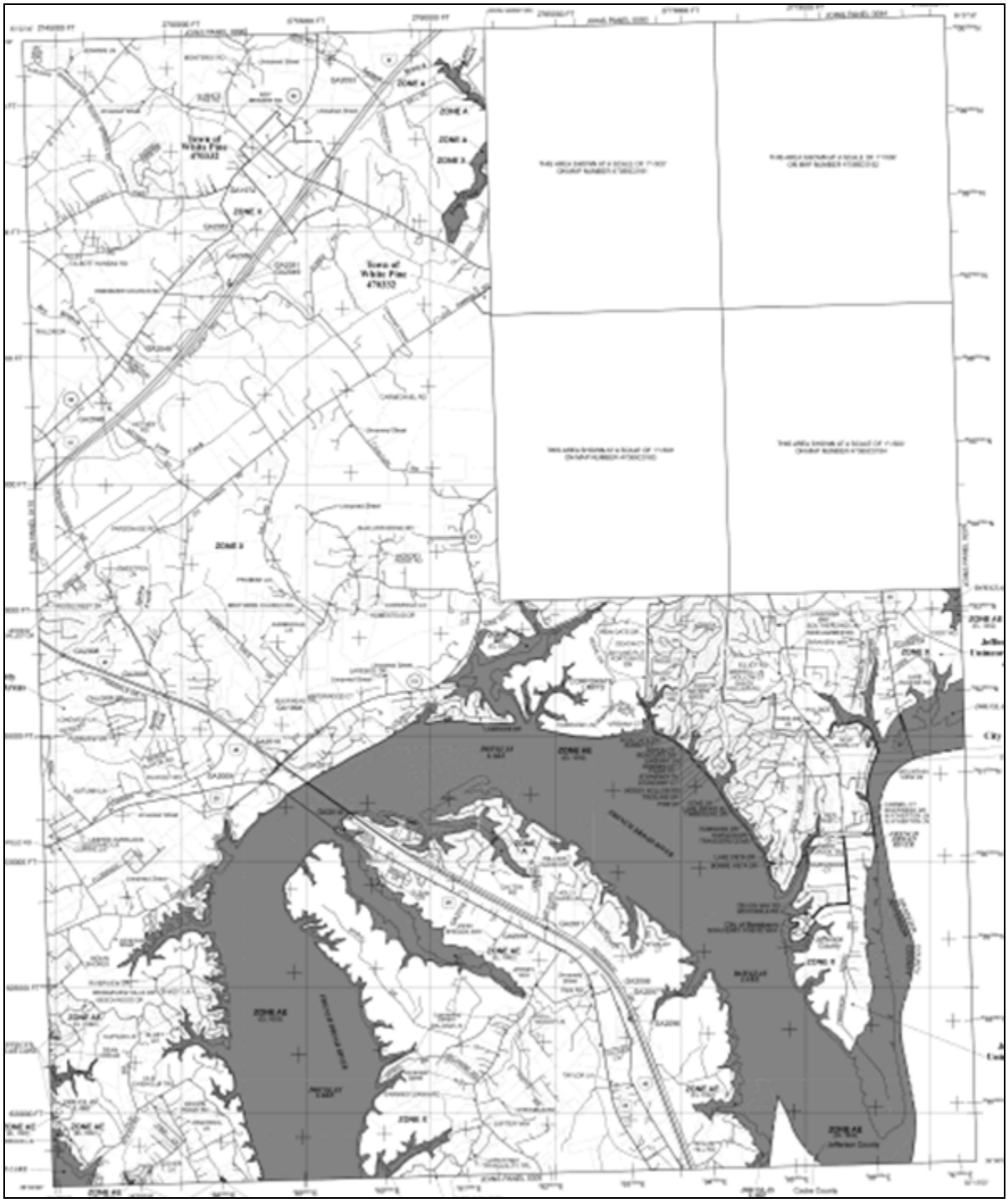
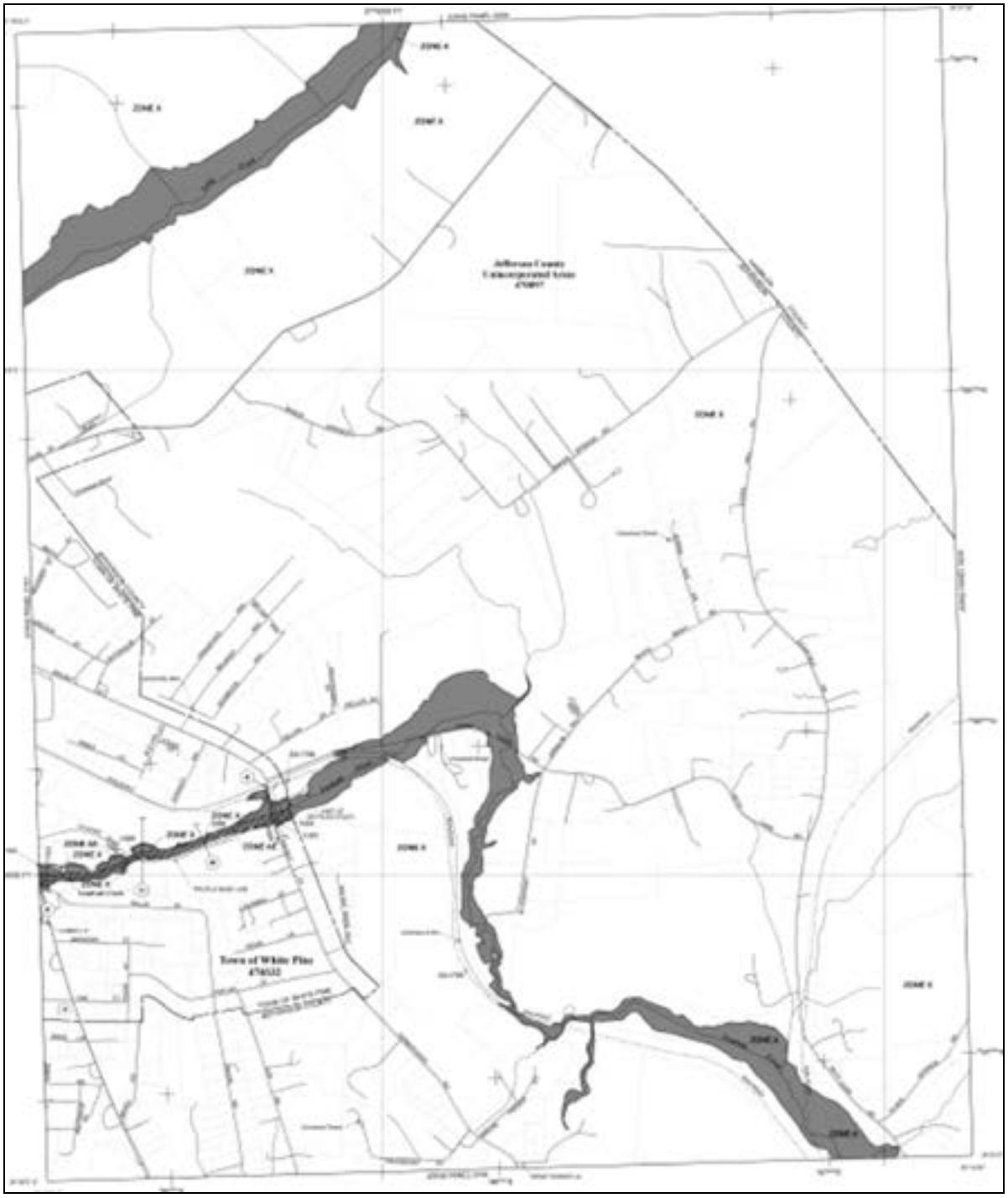


Panel 21

Panel 22

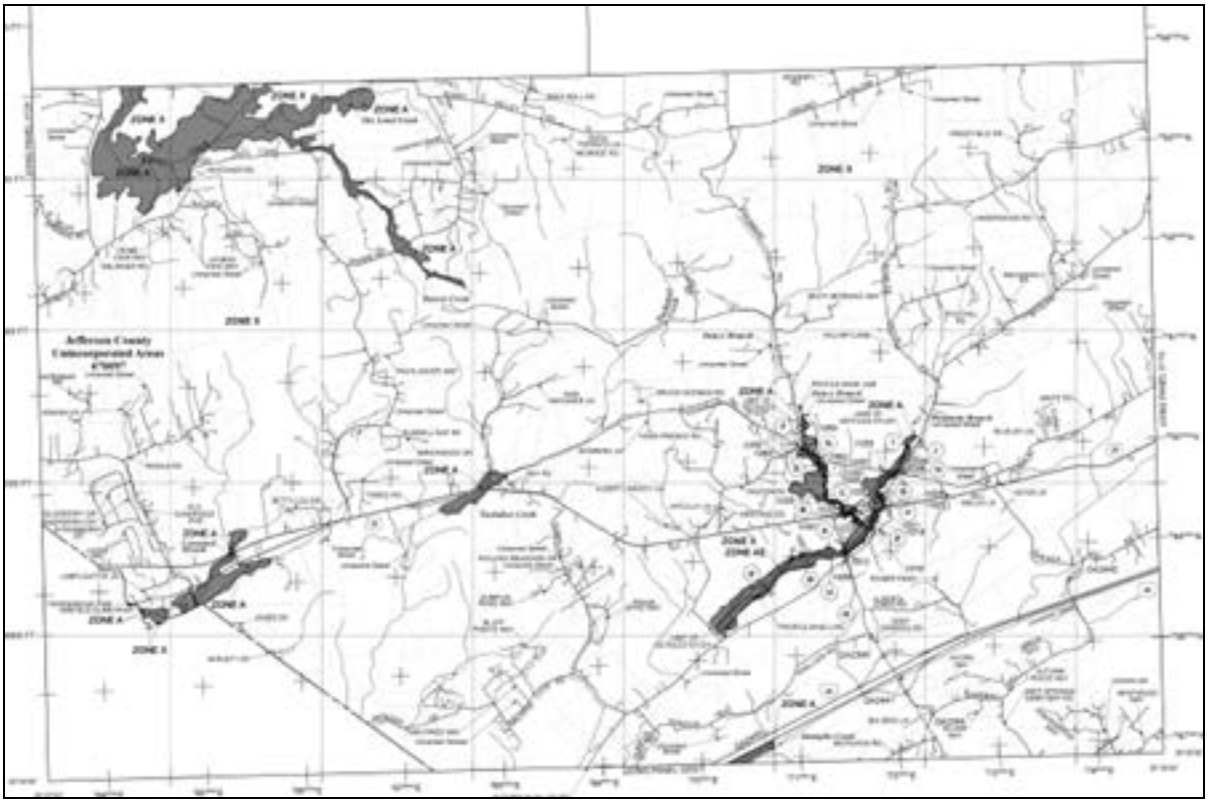


Panel 23

Map not available at this time

Panel 24

Panel 25



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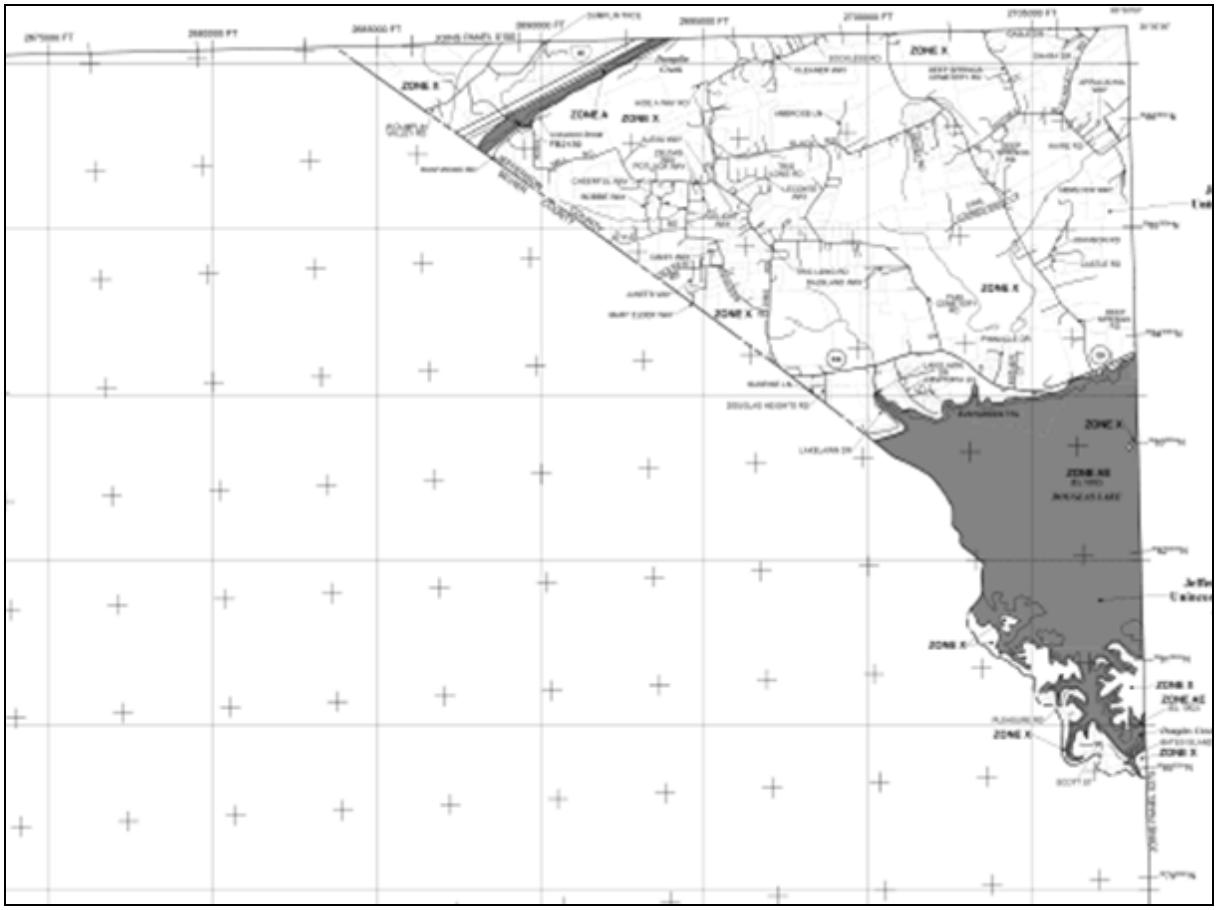


Panel 27

Map not available at this time

Panel 28

Appendix 5
HAZUS: Flood

Hazus: Flood Global Risk Report

Region Name: Jefferson_County

Flood Scenario: Jefferson_County_500yr_Flood

Print Date: Monday, August 26, 2019

Disclaimer:

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

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

RiskMAP
Increasing Resilience Together

FEMA

Table of Contents

General Description of the Region

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

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

- Tennessee

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

The geographical size of the region is approximately 314 square miles and contains 2,535 census blocks. The region contains over 20 thousand households and has a total population of 51,407 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 23,763 buildings in the region with a total building replacement value (excluding contents) of 4,249 million dollars. Approximately 93.45% of the buildings (and 76.36% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 23,763 buildings in the region which have an aggregate total replacement value of 4,249 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	3,244,620	76.4%
Commercial	596,701	14.0%
Industrial	230,776	5.4%
Agricultural	15,871	0.4%
Religion	85,003	2.0%
Government	31,334	0.7%
Education	44,667	1.1%
Total	**4,248,972**	**100%**

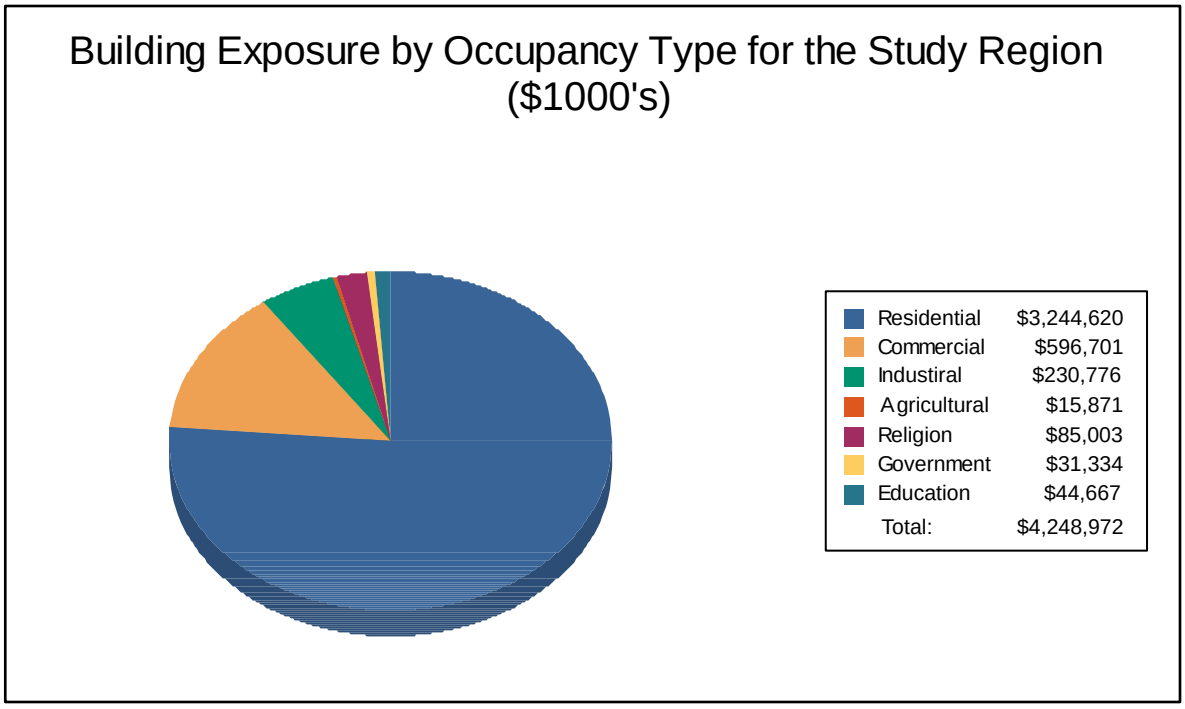
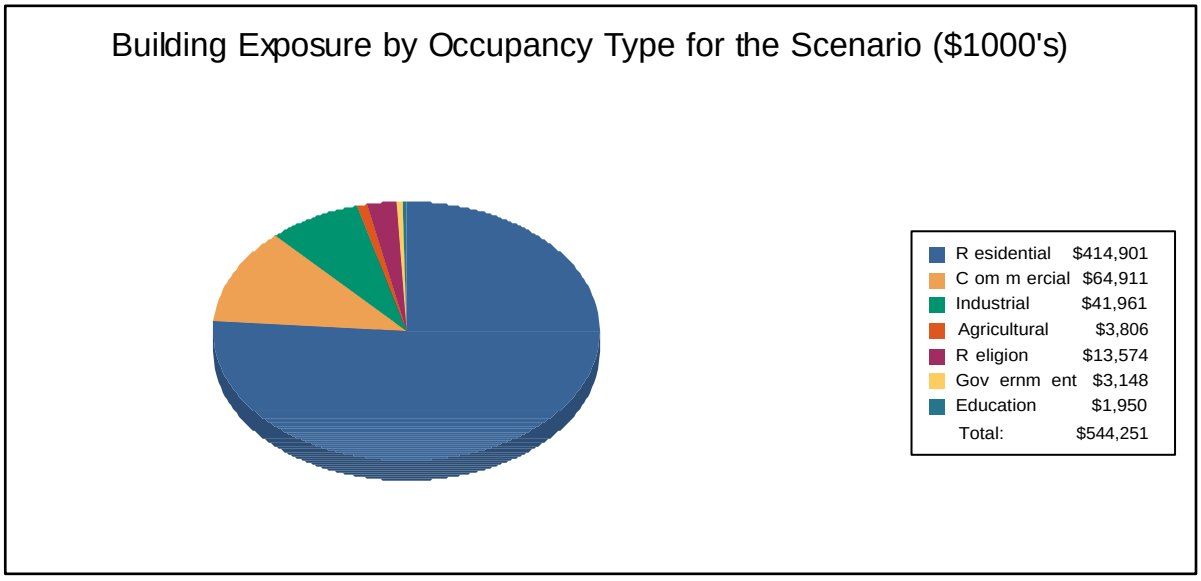


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	414,901	76.2%
Commercial	64,911	11.9%
Industrial	41,961	7.7%
Agricultural	3,806	0.7%
Religion	13,574	2.5%
Government	3,148	0.6%
Education	1,950	0.4%
Total	**544,251**	**100%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 31 beds.
There are 11 schools, 7 fire stations, 4 police stations and no emergency operation centers.

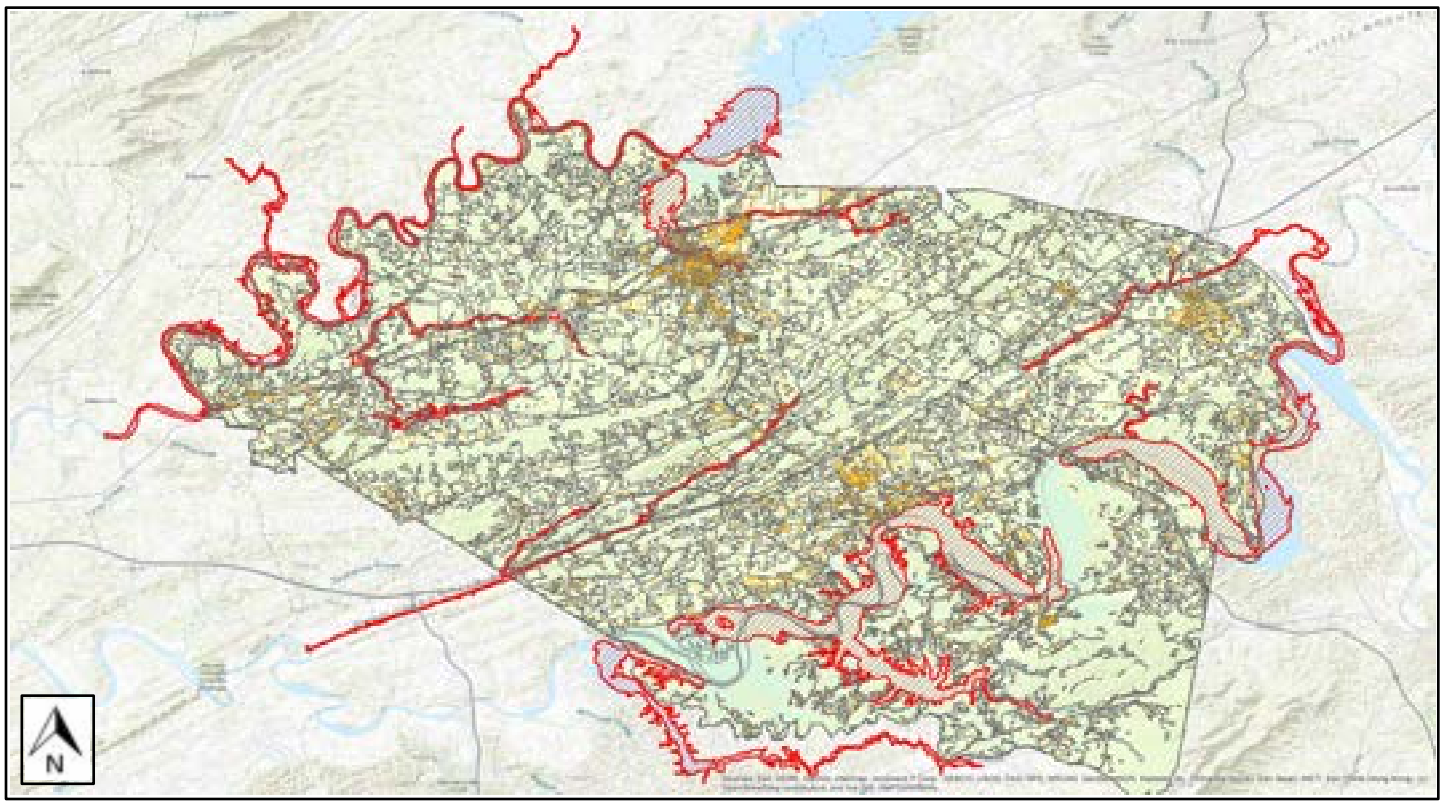
Flood Scenario Parameters

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

Study Region Name:	Jefferson_County
Scenario Name:	Jefferson_County_500yr_Flood
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

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



Building Damage

General Building Stock Damage

Hazus estimates that about 4 buildings will be at least moderately damaged. This is over 67% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

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

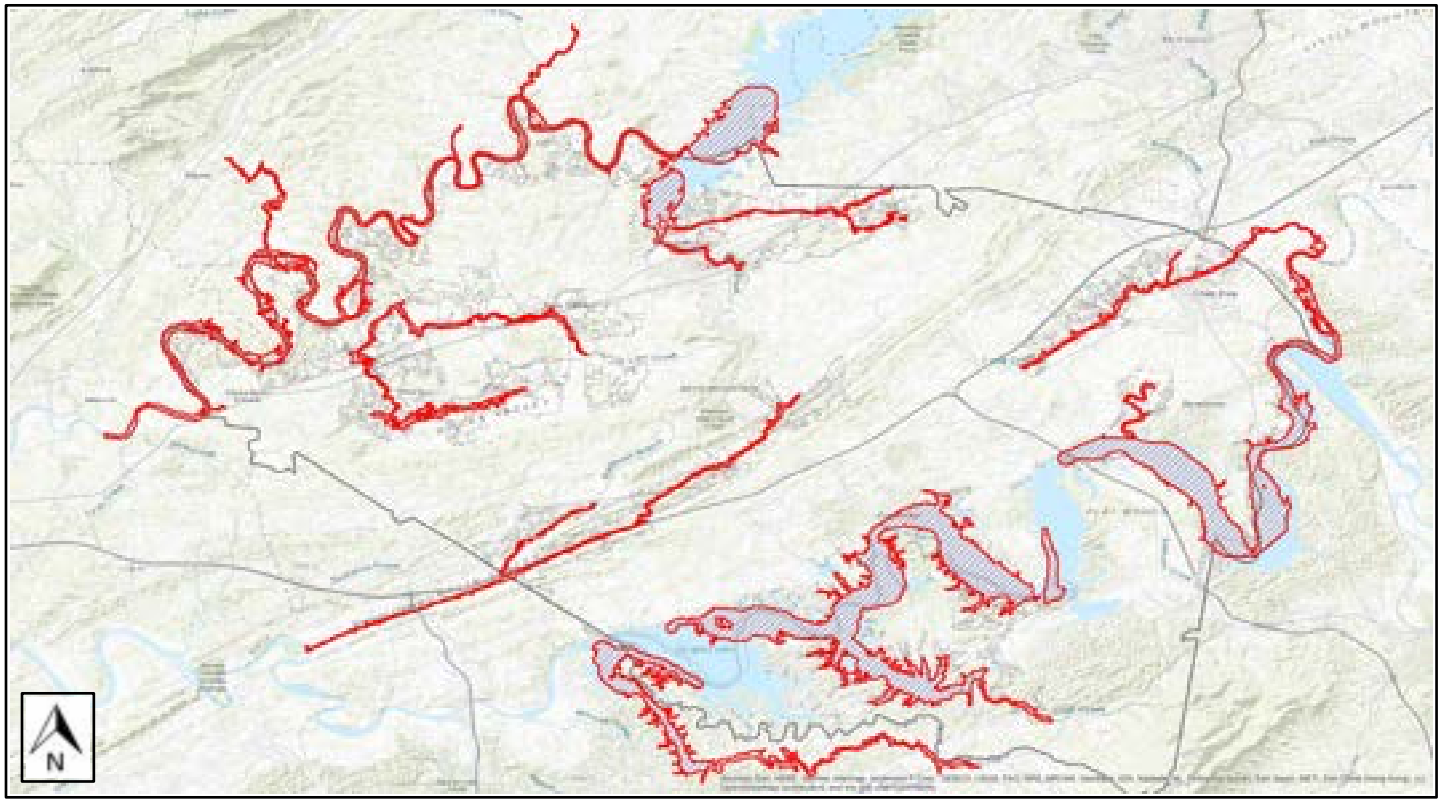


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	1	20	2	40	1	20	1	20	0	0	0	0
Total	**1**		**2**		**1**		**1**		**0**		**0**	

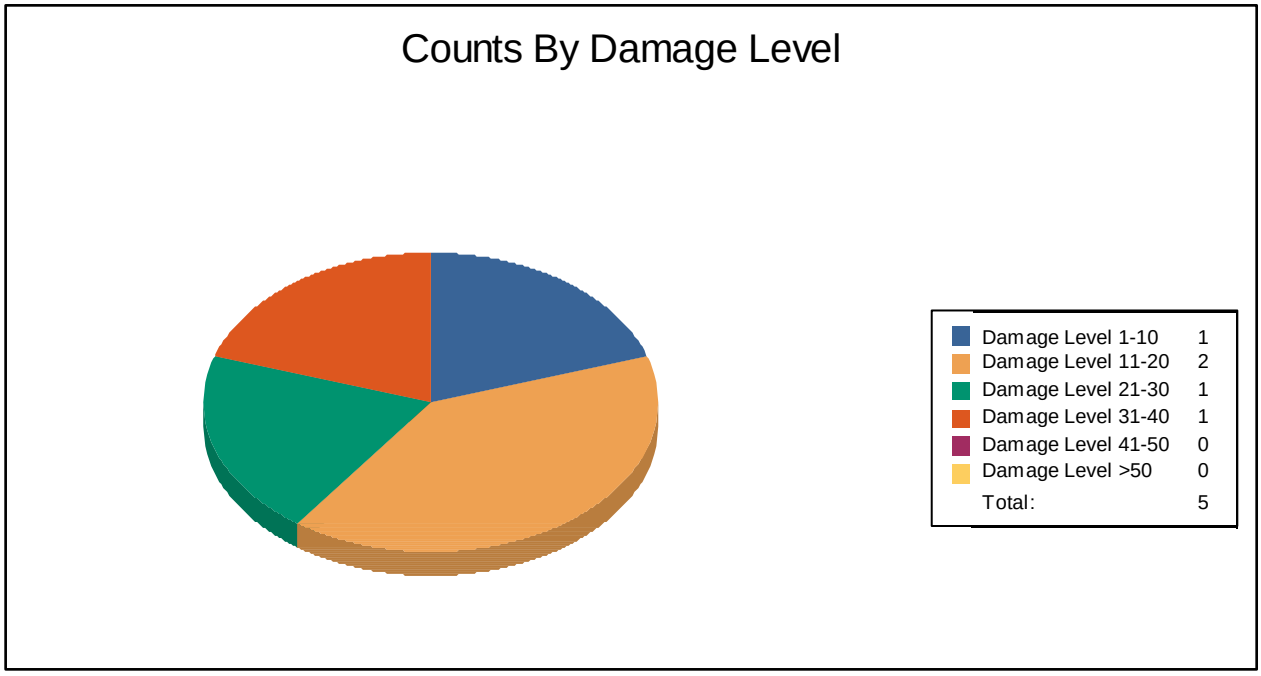


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	1	20	2	40	1	20	1	20	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 31 hospital beds available for use. On the day of the scenario flood event, the model estimates that 31 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	0	0	0	0
Fire Stations	7	1	0	0
Hospitals	1	0	0	0
Police Stations	4	0	0	0
Schools	11	0	0	0

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

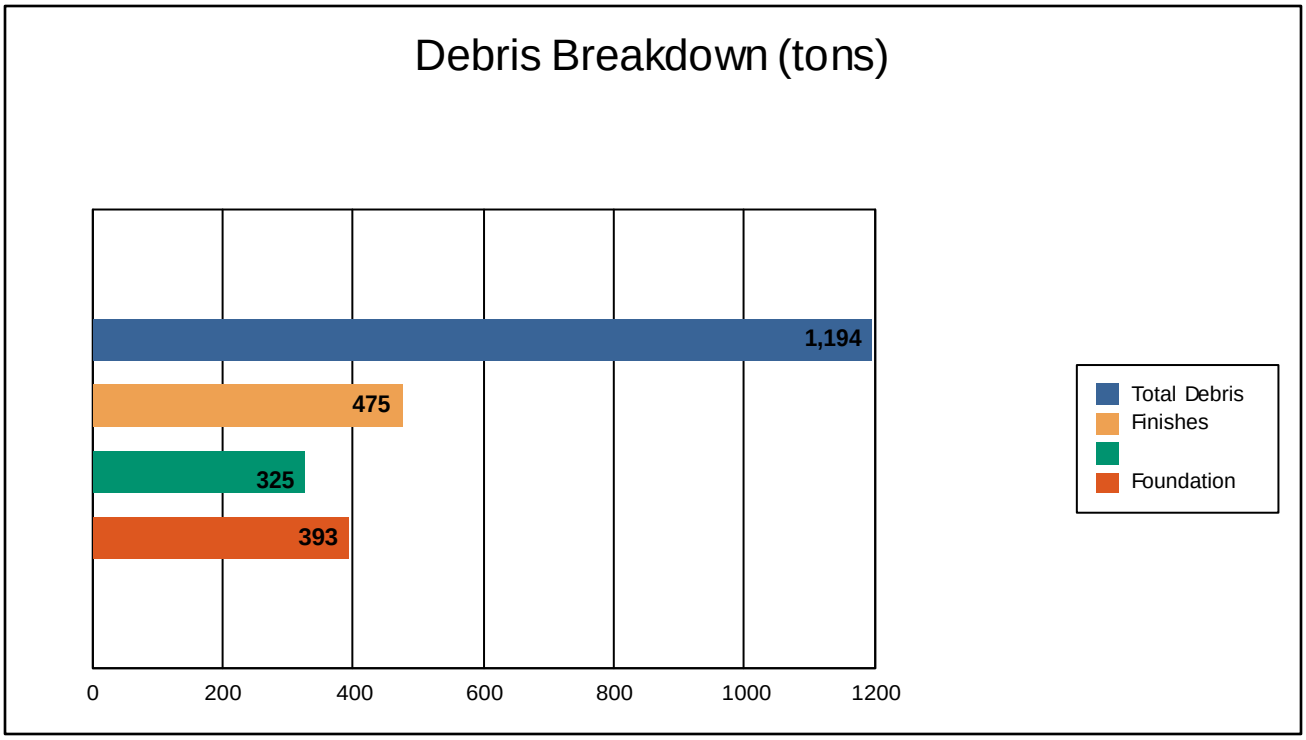
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

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

Induced Flood Damage

Debris Generation

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

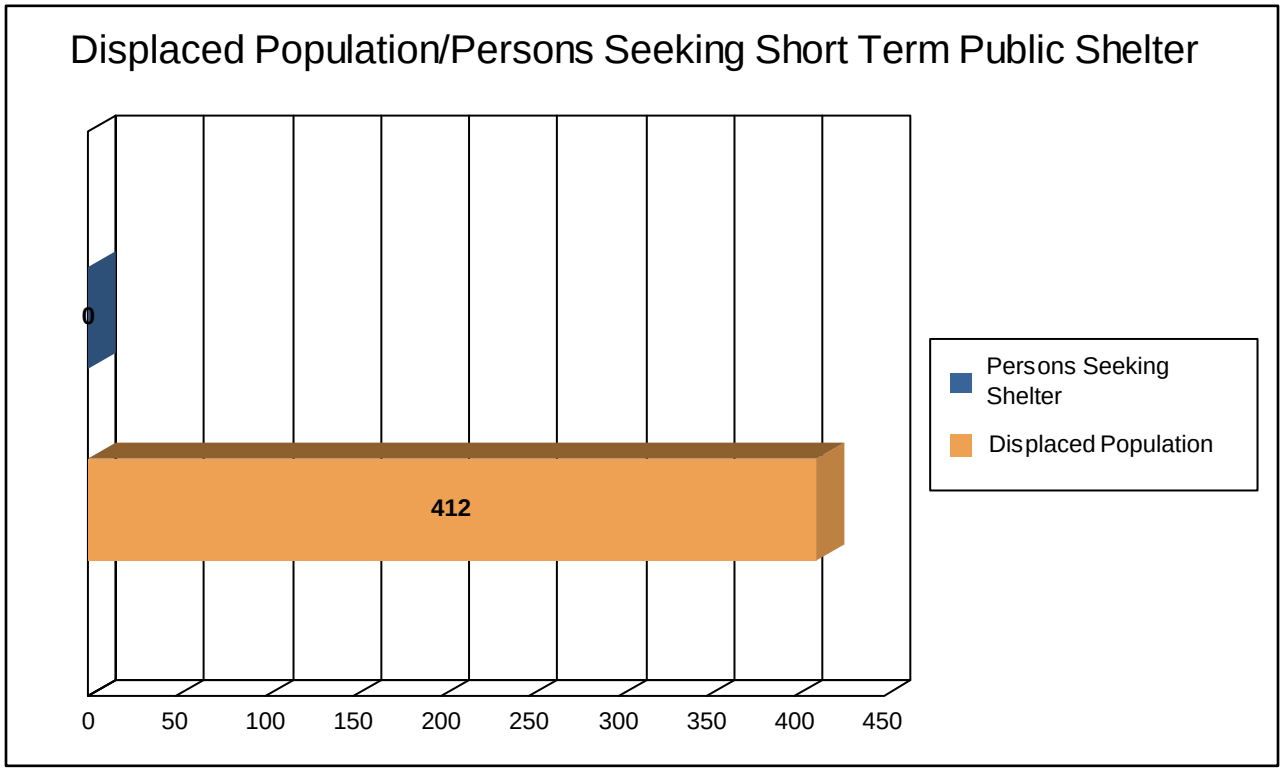


The model estimates that a total of 1,194 tons of debris will be generated. Of the total amount, Finishes comprises 40% of the total, Structure comprises 27% of the total, and Foundation comprises 33%. If the debris tonnage is converted into an estimated number of truckloads, it will require 48 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 137 households (or 412 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 0 people (out of a total population of 51,407) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 37.01 million dollars, which represents 6.80 % of the total replacement value of the scenario buildings.

Building-Related Losses

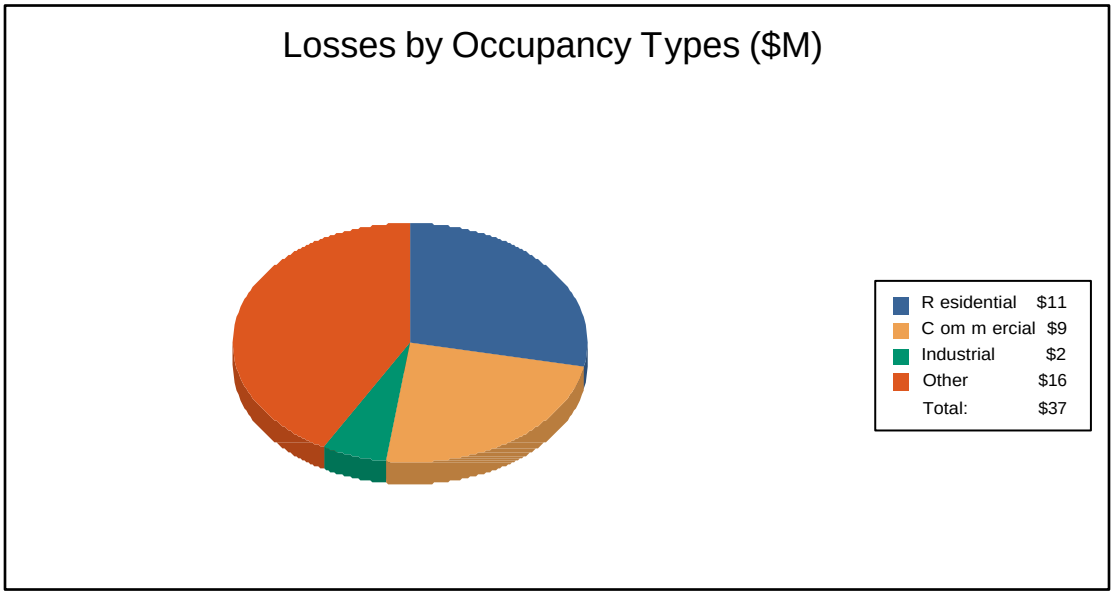
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability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

The total building-related losses were 16.11 million dollars. 56% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 28.42% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	6.04	0.90	0.48	0.32	7.74
	Content	2.89	2.53	1.27	1.34	8.03
	Inventory	0.00	0.05	0.28	0.01	0.34
	Subtotal	**8.93**	**3.48**	**2.03**	**1.67**	**16.11**
Business Interruption						
	Income	0.00	2.21	0.03	0.43	2.67
	Relocation	1.24	0.43	0.03	0.24	1.93
	Rental Income	0.35	0.33	0.01	0.01	0.69
	Wage	0.01	2.39	0.06	13.16	15.61
	Subtotal	**1.59**	**5.36**	**0.12**	**13.83**	**20.91**
ALL	**Total**	**10.52**	**8.84**	**2.16**	**15.50**	**37.01**



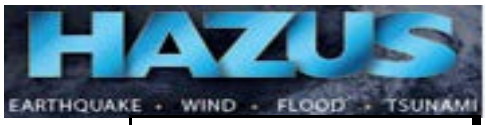
Appendix A: County Listing for the Region

Tennessee

- Jefferson

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total



Tennessee

Jefferson	51,407	3,244,620	1,004,352	4,248,972
Total	**51,407**	**3,244,620**	**1,004,352**	**4,248,972**
Total Study Region	**51,407**	**3,244,620**	**1,004,352**	**4,248,972**