

Cumberland County Hazard Mitigation Plan

March 23, 2018

Prepared By:

**Cumberland County Hazard Mitigation Committee
Cumberland 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 successfully 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 2018 update of the Cumberland County Hazard Mitigation Plan was created to act as a well thought-out guide to be used by, and for, the people of Cumberland County. For this plan to be successful, each jurisdiction within the county participated in the drafting and preparation of the plan update. These participating jurisdictions include:

- Cumberland County (unincorporated)
- City of Crab Orchard
- City of Crossville
- Town of Pleasant Hill
- Cumberland County Schools

In reference to federal code title *44 CFR 201*, an updated hazard mitigation plan is required to be submitted to both TEMA (State) and FEMA (Federal) for review every five years for approval. 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 previous Cumberland County Hazard Mitigation Plan was created and approved by FEMA in 2013. 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 beginning of the plan's five year update process took place at a meeting between Cumberland County Emergency Management, Cumberland County, City of Crab Orchard, City of Crossville, Town of Pleasant Hill, Cumberland County Highway Department, Cumberland County Schools, and the Tennessee Emergency Management Agency (TEMA) on December 14, 2017 ([See Appendix 1](#)). At this meeting Cumberland 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 Cumberland 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 at the beginning of the update process by presenting successful strategies that have been used in updating hazard mitigation plans; (a service established as part of the newly created Tennessee Mitigation Initiative).

Prior to this meeting Cumberland 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.

Within this plan update committee all four jurisdictions remained participants, as well as a cross-section of other representatives. The Cumberland County Hazard Mitigation Committee for the plan update consists of the following members:

Member	Representation	Job Title
Rick Williams Becky Horton (Committee Chair)	Cumberland County Cumberland County	EMA Director EMA Admin Assistant
Bob Crane	TEMA	Dist Coordinator
Kenneth Carey	Cumberland County	County Mayor
Casey Cox Tim Claflin John Griffith Sheila Caldwell	Cumberland County Sheriff's Dept Cumberland County Sheriff's Dept Cumberland County Sheriff's Dept Cumberland County Sheriff's Dept	Sherriff Captain Sergeant Accounts Receivable
Scott Blaylock	Cumberland County Roads Commissioner	Road Superintendant
Bo Magnusson	Cumberland County Schools	Safety Director
Trevor Kerley	Cumberland County	Fire Chief
Greg Wood	City of Crossville	City Manager
Kevin Music	Crossville Street Department	Public works Director
David Beaty	Crossville Police Department	Police Chief
Chris Miller	Cumberland County	EMS Director
Chris South	Crossville Fire Department	City Fire Assist Chief
Lee Lawson	Crossville IT	City IT Director
Eric Ritzman	CCECD	911 Director
Emmett Sherrill	City of Crab Orchard	City Mayor
Heather Gunter	Town of Pleasant Hill	Town Clerk

Previous committee members no longer participating;

Jill Lewis	EMA
Fred Sherrill	Crossville Police Dept
John Bilbrey	Crossville Police Dept
Terry White	Crossville Police Dept
Butch Burgess	Cumberland Co Sheriff's Dept
Keith Garrison	Crab Orchard
Robin Griffin	Mayors office
Jeff Dodson	Cumberland Co Fire/EMA Director
Joe Miller	Crossville Street Dept

The Cumberland 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 six stages: **1)** analysis of the original plan (*the plan as it stood prior to the updates*), **2)** updating of the plan, **3)** Analysis of updated project list, **4)** public participation, **5)** review of the final updated plan, and **6)** adoption of the plan.

Stage 1: On December 14, 2017 during the analysis of the plan, Cumberland County Emergency Management reviewed the original county

Cumberland County Hazard Mitigation Plan April 6, 2018

plan and made notes on what sections would require the main updates. Cumberland 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. A large amount of this effort took place at the second Cumberland County Hazard Mitigation Committee meeting that was held on January 18, 2017 at the Crossville/Cumberland County EMA office. Tasks included re-evaluating the plan's hazards, re-assessing their risks, re-calculating each jurisdiction's vulnerable areas, re-establishing the county's mitigation goals, soliciting for new mitigation projects to be added to the plan, and examining the status of mitigation projects listed in the original plan. TEMA personnel were present at this meeting to answer mitigation planning and grant questions. [Appendix 2](#) provides a copy of the meeting's attendance sheet.

Stage 3: During the Third Hazard Mitigation Meeting held on February 15, 2018 a review of the two previous meetings was discussed. The mitigation projects added and original project list was handed out and then were re-assessed and ranked according to priority. It was decided that at the next meeting the public would be invited to attend.

Stage 4: To encourage public involvement, the Cumberland County Hazard Mitigation Committee advertised the third committee meeting for March 15, 2018 in a newspaper of general circulation. 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 4](#) provides a copy of the meeting's attendance sheet and [Appendix 4 A&B](#) presents a copy of the public notice for the meeting.

Although no members of the public attended the advertised meeting, public comments would have been incorporated within the plan if they did. Cumberland County will continue public outreach and comment incorporation throughout all future planning processes.

Stage 5: 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.

Stage 6: 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 Cumberland 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
- Cumberland County Building Codes
- City of Crossville Building Codes
- Cumberland County BEOP
- Cumberland County Schools Strategic Plan
- Cumberland County Regional Land Use Plan
- Jurisdictional Floodplain/Stormwater Ordinances

All of the listed plans, studies, and data sources were incorporated into the Cumberland 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 Cumberland County Hazard Mitigation Plan. Cumberland County reviewed and analyzed each section of the original plan and made updates in the following ways:

Section 1: Planning Process

Cumberland County updated the 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 2017 & 2018, and documented the last opportunities for the public to get involved. Cumberland County also compiled a new list of existing documents that they reviewed in updating the plan.

Section 2: County Profile

If there are development projects, these would likely occur on property currently owned by the City of Crossville: Interchange Business Park (off of 127 N.), Maryetta Street, or property just off of Albert Frye Road at 590 Peavine Road.

Section 3: Risk Assessment

The committee kept all of their listed hazards from the 2013 Cumberland County Hazard Mitigation Plan in the 2017 update except for 'Hazardous Materials information for public,' which was deemed to be better profiled in the county's BEOP than the hazard mitigation plan. Both FEMA & TEMA only review natural hazards in county hazard mitigation plans and 'Hazardous Materials information' doesn't fall under this category. The plan has been updated to include wildfires and sinkholes.

As part of the plan update, Cumberland County updated their previous occurrence hazard listings to cover the most recent five to ten years and re-evaluated each hazard's extent, probability, & potential impacts. The county then decided to use the SAFE-T method for determining vulnerabilities/risks as previously used. Also the plan now has a Sinkhole and Wildfire section. Cumberland County utilized a ranking system to analyze impacts, vulnerabilities, and analyze probability. Sinkholes ranking system is currently unavailable. Assessments can be viewed in Section 3.

Section 4: Mitigation Strategy

Cumberland County kept their mitigation goals from the 2013 plan the same for the 2018 plan update, and will continue to use the SAFE-T method for prioritizing mitigation projects, (thought to be superior to the previous methods). Cumberland County also has brainstormed some new mitigation projects that were added to the list and prioritized accordingly using the SAFE-T method. As new projects come to light they will be added to our project list and reviewed.

Section 5: Plan Maintenance

Cumberland 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 Cumberland 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

Cumberland County is located on the Cumberland Plateau and is home to the cities of **Crossville, Crab Orchard, and Pleasant Hill**. Cumberland County is also home to many tourist attractions such as the **Cumberland Mountain State Park, Cumberland County Playhouse, Catoosa Wildlife Management Area**, numerous Golf Courses, Museums, and shopping centers.

Cumberland County's population has increased in the past decade. Between 2000 and 2010, Cumberland County's population has increased from 46,802 (2000) to 56,053 (2010). Crossville's population increased from 8,981 (2000) to 10,795 (2010), Pleasant Hills's population increased from 544 (2000) to 563 (2010), Lake Tansi's population increased from 2,621 (2000) to 3,803 (2010), Crab Orchard's population declined from 838 (2000) to 752 (2010), and Fairfield Glade's population increased from 4,885 (2000) to 6,989 (2010). Cumberland County had an increase of 9,251 in population. The U.S. Census Bureau estimates a slight increase in population across the jurisdictions over the next decade.

Cumberland County's top employers are CoLinx with 1,000 employees, *Cumberland County BOE* with 953 employees, and Cumberland Medical Center/Covenant with 530 employees.

Future developments in Cumberland County are estimated to remain minimal. If there are development projects, these would likely occur on property currently owned by the City of Crossville: Interchange Business Park (off of 127 N.), Maryetta Street, or property just off of Albert Frye Road at 590 Peavine Road.

Currently all jurisdictions, City of Crossville as of the 1940's and Cumberland county as of Dec 2010 have no zoning codes, except subdivision regulations and zoning to lead sensible growth and land development patterns. In 2012 the city and county adopted IBC (International Building Code) and IRC (International Residential Code) for structure purposes. Additionally all jurisdictions enforce building codes to make sure structures are built in accordance to national standards and the County enforces floodplain ordinances as part of adopting into the National Flood Insurance Program (NFIP). These instituted planning mechanisms help guide growth away from floodplains and other identified hazardous areas, thus reducing vulnerabilities to the jurisdictions.

Section 3: Risk Assessment

Hazard Identification

To begin to assess Cumberland County's risk to natural hazards and identify the community's areas of highest vulnerability, the mitigation committee had to identify which hazards have or could impact the county. This hazard identification process began with researching previous hazard events that have occurred in Cumberland County by utilizing the National Weather Service datasets on weather events, United States Geological Survey on sinkholes, information obtained from Tennessee Division of Forestry, going through newspaper articles, Cumberland 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 concern by the Cumberland County mitigation committee.

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 Cumberland 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

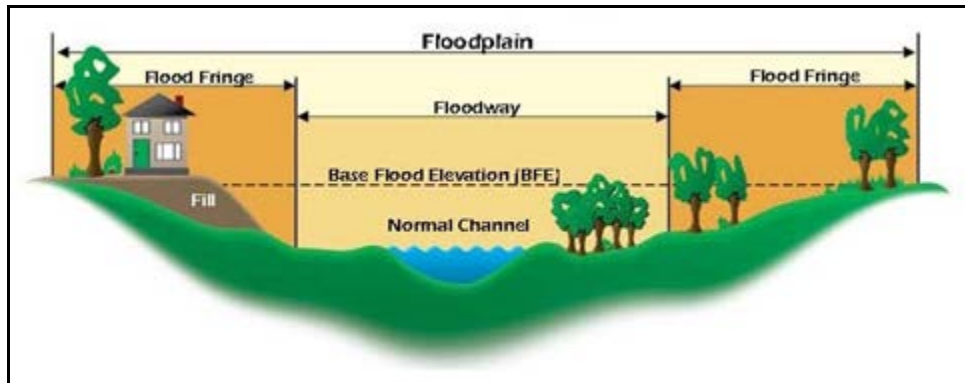
Common Causes of Flooding	
Factor	Effect on Flooding
Geology	Impermeable rocks are saturated more quickly than porous and pervious rocks. Saturation-excess overland flow is more common. Sandy soils have larger pore spaces than clay soils. Infiltration is most rapid in sandy soils.
Relief	Water reaches 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 Cumberland 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 Cumberland 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:

- Obed River Park
- Obed River including its tributaries
- Daddy's Creek
- Byrd's Creek
- One Mile Creek
- Caney Fork River
- Post Office
- Martin Elementary School
- Hwy 127 South (near Crossville Ford)

Detailed Flood Insurance Rate Maps (FIRMs) are also included in [Appendix 3](#), which shows where FEMA has placed the 100-year and 500-year floodplains for each jurisdiction.

Cumberland 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 Cumberland County from June 1, 2007 to June 30, 2017 and a list of notable flood impacts imposed on the community in recent times.

Flood Events in Cumberland County: June 1, 2007 - June 30, 2017

Location	Date	Type	Deaths	Injuries	Property Damage
RINNIE	1/24/2010	Flash Flood	0	0	35K
NEWTON	5/14/2010	Flash Flood	0	0	25K
CROSSVILLE	2/28/2011	Flash Flood	0	0	1K
CRAB ORCHARD	5/21/2013	Flash Flood	0	0	0
DRIPPING SPGS	5/19/2013	Flash Flood	0	0	1M
LINARY	7/4/2013	Flash Flood	0	0	0
WELCH	7/2/2015	Flash Flood	0	0	500K
CRAB ORCHARD	7/4/2015	Flash Flood	1	0	7K
CRAB ORCHARD	12/1/2015	Flash Flood	0	0	0
BIG LICK	4/23/2017	Flood	0	0	0
CRAB ORCHARD	4/23/2017	Flood	0	0	0
HEBBERTSBURG	6/23/2017	Flood	0	0	0
CRAB ORCHARD	11/7/2017	Flash Flood	0	0	0
CRAB ORCHARD	2/10/2018	Flood	0	0	0
CRAB ORCHARD	3/1/2018	Flash Flood	0	0	0

Flood Impacts in Cumberland County

Location	Date	Impact Description
Rinnie	1/24/2010	Some creeks risen over bridges and some flooding of County roadways.
Newton	5/14/2010	Flooding reported on Newton Rd. in Southern Cumberland County. Several inches of water on road.
Crossville	2/28/2011	Flooding was reported at the corner of Industrial Dr. and Old Jamestown Rd. Water was reported to have a depth of up to the hubcaps of a full size van.
Crab orchard	5/21/2013	Flooding reported affected Main Street, Market Street, Crab Orchard Rock Quarry Road ways. Road ways were covered from 6.2 inches of rainfall, Lhoist main source of employment, workers and trucks were affected – unable to get in or out, had to find alternate routes. Rain water flooded up 4 inches at the gas pumps.

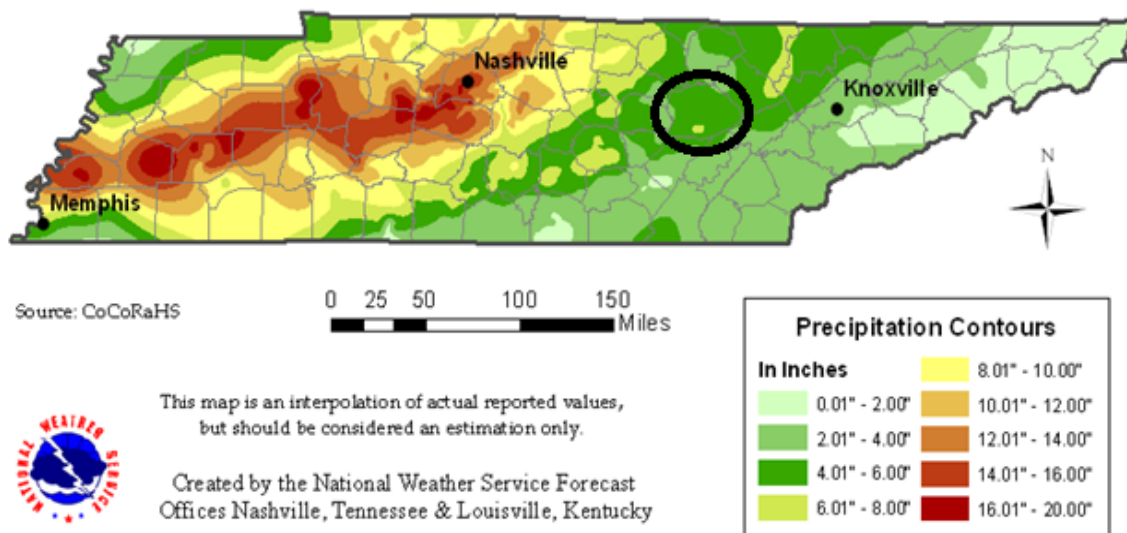
Dripping Spgs	5/16/2013	Flash flooding occurred across the entire county. There were multiple road closures as well as two homes inundated by six to eight inches of flood waters in downtown Crossville resulting in evacuations. WATE Channel 6 in Knoxville reported at least five vehicles stalled due to flooding with on such stalled vehicle resulting in a rescue of an elderly woman trapped in her vehicle.
Linary	7/4/2013	One foot of water was reported over the road at the intersection of Deep Draw and Highland Lane.
Welch	7/2/2015	Major flash flooding affected much of Cumberland County from the evening hours on July 2 into the morning hours on July 3. Numerous roads throughout the county were flooded and closed, including Southwood Drive at Lantana Road, Cow Pen Road at Mayland Road, East Cove Road, Cumberland Cove at Highway 70, Bud Tanner Road, Old Claysville Road, White Horse Road at Crazy Horse Road, and Old Flynn's Cove Road. Some roads were washed away and destroyed, including George Branch Drive at Dripping Springs Road. One 31 year old man drove into a 30 foot ravine that was caused by a washed out culvert on George Branch Drive and was killed. A CoCoRaHS observer 4.3 miles S of Monterey measured 7.94 inches of rain over the 48 hour period ending at 7am on July 3rd.
Crab Orchard	7/4/2015	9 inch rain fall caused culvert to wash out, The vehicle on the roadway washed out with it causing 1 death. Culverts were replaced with 5 Ft ones costing around 7K. Roads Shut down causing Employer/Employees at Lhoist to have to find alternate routes. Flood water up to gas pumps.
Crab Orchard	12/1/2015	Flooding of 4 inches, shut down Crab Orchard Rock Quarry Rd, Leading to Lhoist, the main employer in Crab orchard. Alternate routes had to be taken.
Big Lick	4/23/2017	Grassy Cove was closed due to flooding of the roadway. High water also covered Clint Lowe Road south of Lake Tansi where an elderly lady was trapped in her vehicle from the rising water. She was uninjured.
Crab Orchard	4/23/2017	Flood waters on Second and Adam street shut down these roads. Flood waters rose to porches on some houses.
Hebbertsburg	6/23/2017	Flood waters covered Otter Creek Road Bridge in the Devils Breakfast Table region of the Catoosa Wildlife Management Area.
Crab Orchard	11/7/2017	3-4 inch Flooding on Market St and 2 nd street, also Market St and Elizabeth Street. Shut down access to Lhoist
Crab Orchard	2/10/2018	3-4 inches shut down Crab Orchard Rock Quarry Road to Lhoist

Crab Orchard	3/1/2018	1-2 inch Rain fall caused the Cave to back up and flood Orchard Rock Quarry Road to LaHoist.
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Small localized flood events are likely to occur at least once a year in Cumberland 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 worst case scenario it is possible for the extent of a flooding event to exceed 10 inches of rainfall and cause over 3 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).

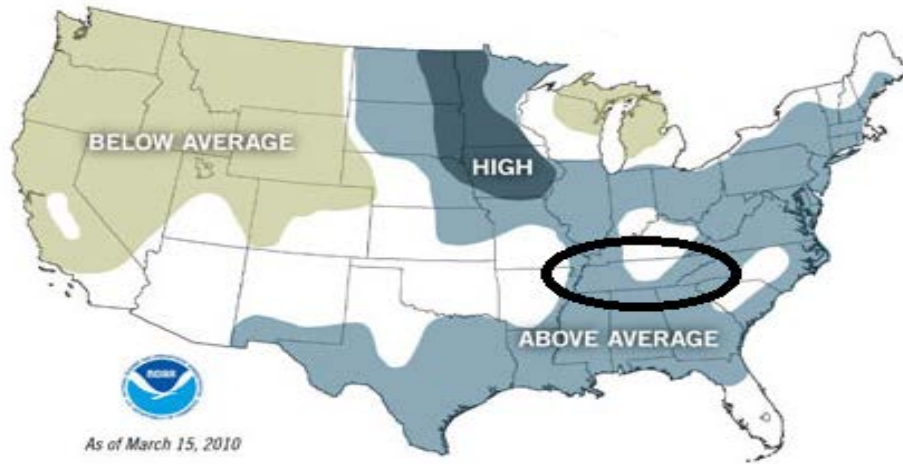
Tennessee May Flood- Precipitation for May 1st & 2nd 2010

Source: National Weather Service



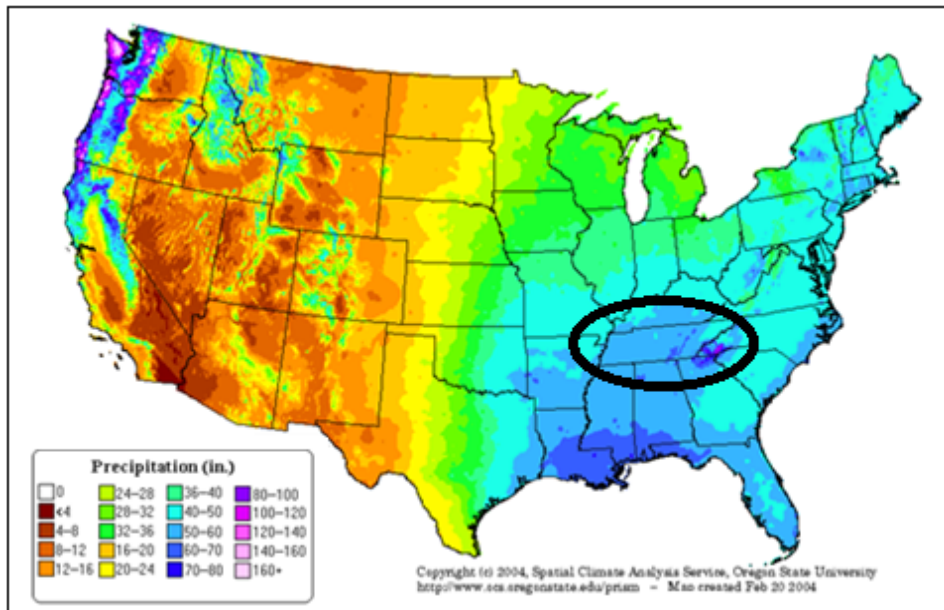
According to a NOAA Flood Risk Map (see map below), the majority of Tennessee was located in an "above average" risk of flooding zone during spring 2010. This proposed vulnerability is coupled with the fact that on average Tennessee usually acquires over 50-60 inches of rainfall a year (see following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

Flood Risk Map



Source: NOAA

Average Annual Precipitation per Year (1971-2000)



Source: Spatial Climate Analysis Service, Oregon State University

Cumberland 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.

Flood Ranking Scale

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	$H+P+B=\#; \#/3=V$
Cumberland County	1	3	1	1.67
Crab Orchard	1	2	2	1.67
Crossville	1	2	2	1.67
Pleasant Hill	1	3	1	1.67
Cumberland County Schools	1	3	3	2.33

Jurisdiction	Vulnerability	Probability	Risk
			$V+P=R$
Cumberland County	1.67	5	6.67 Medium
Crab Orchard	1.67	4	5.67 Medium
Crossville	1.67	5	6.67 Medium
Pleasant Hill	1.67	2	3.67 Moderate
Cumberland County Schools	2.33	5	7.33 High

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

Property	
<i>Amount of residential property damage associated from the hazard</i>	
1	Less than \$500 in damages
2	\$500-\$10,000 in damages
3	\$10,000-\$500,000 in damages
4	\$500,000-\$2,000,000 in damages
5	More than \$2,000,000 in damages

Business	
<i>Amount of business damage associated from the hazard</i>	
1	Less than 3 businesses closed for only a day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top-10 local employer closed indefinitely

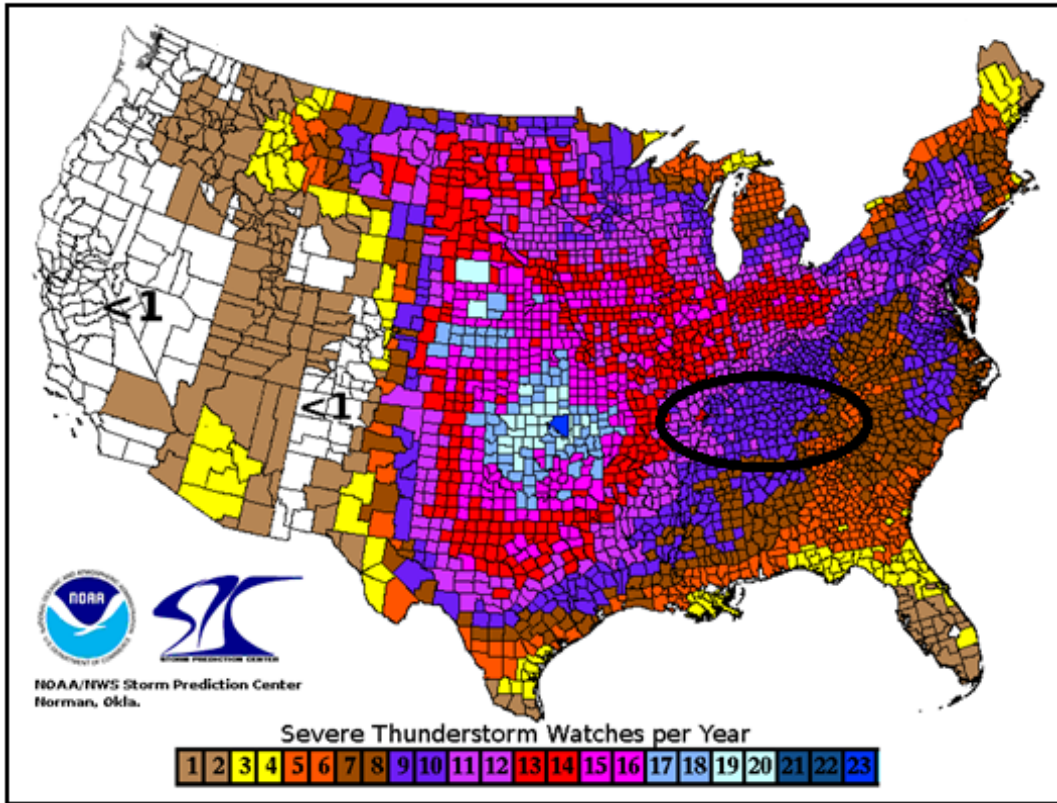
Probability	
<i>Likelihood of the hazard occurring within a given span of years</i>	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

For further information about flooding hazards in Cumberland County, see the HAZUS vulnerability study in [Appendix 4](#).

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 $\frac{3}{4}$ of an inch or greater in diameter, or produce tornadoes. On average, a typical county in Tennessee has about 10 severe storm watches per year (see map below).

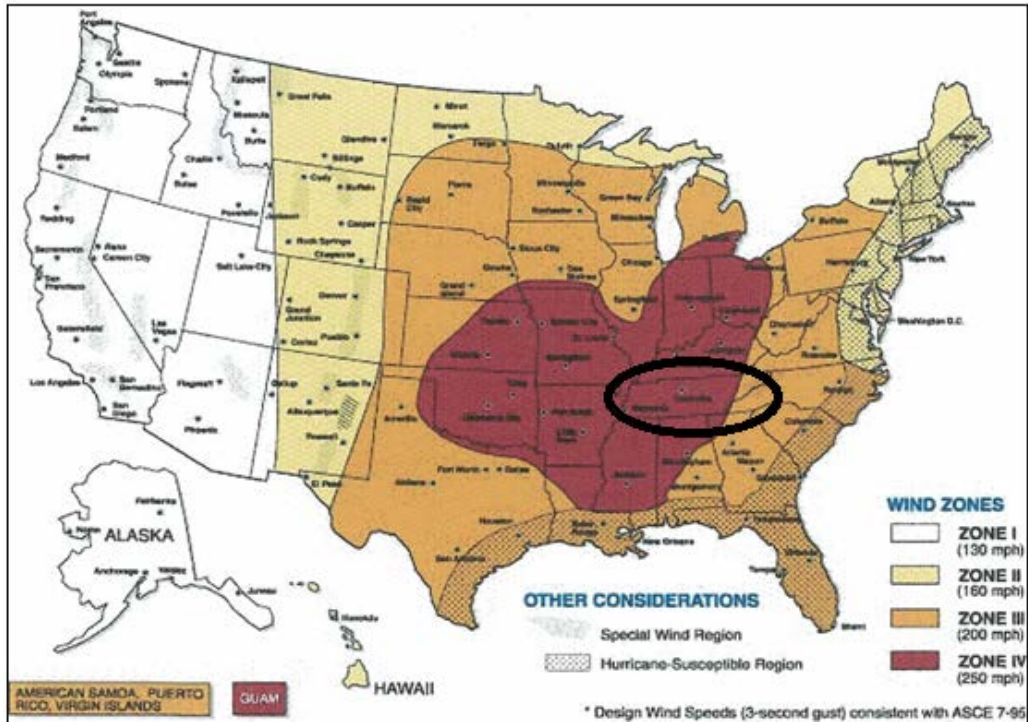
Average Severe Storm Watches Per Year (1999-2008)



Source: 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 Cumberland 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

Cumberland 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 Cumberland County from June 1, 2007 to June 30, 2017 and a description of each tornado's impacts within the county.

Tornado Events in Cumberland County: June 1, 2007 to June 30, 2017

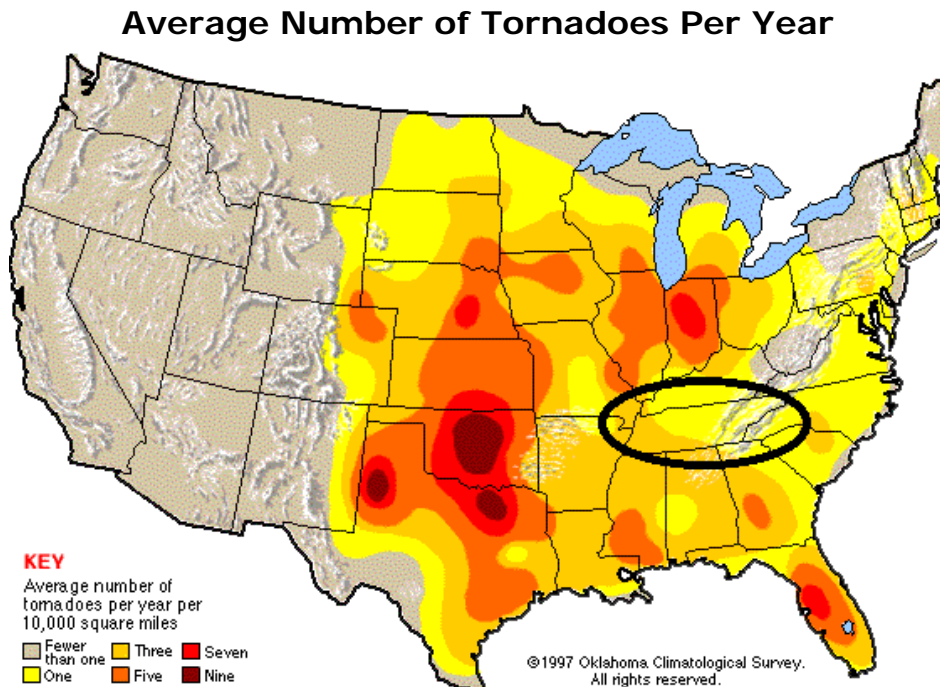
Location	Date	Extent	Deaths	Injuries	Property Damage
CROSSVILLE MEM	5/3/2009	EF1	0	0	125K
BAKER XRDS	4/27/2011	EF0	0	0	15K
PLATEAU	2/29/2012	EF2	2	7	1M
FAIRFIELD GLADE	5/27/2017		0	0	0

Tornado Events in Cumberland County: June 1, 2007 to June 30, 2017

Location	Date	Impact Description
Crossville Mem	5/3/2009	This EF1 Tornado, with maximum estimated wind speed at 100 mph, touched down along Taylors Chapel Road, or about 4.1 miles southwest of Downtown Crossville. Numerous trees were uprooted and snapped along the path along with several power lines down. Some homes sustained roof damage due to fallen trees. The area that suffered the most damage extended from Locksley Circle Road, northeast across Black Oak Lane and along Oak Drive. Newspaper reported that the Laurelwood subdivision was one of the hardest hit areas also. This tornado lifted just east of the intersection of Myrtle Avenue and Fourth Street, just southwest of the Cumberland County High School. This was 9 tenths of a mile southwest of the downtown area. No injuries were reported with this storm. Newspaper reports also mentioned that several vehicles were also damaged.
Baker Xrds	4/27/2011	EF-0 tornado with maximum winds 70 to 80 mph touched down near the intersection of Pomona Road and U.S Highway 70N. Damage continued northeast approximately 4.5 miles to near the intersection of Potato Farm Road and U.S Highway 127. Numerous trees were snapped and twisted along the 50 to 100 yard wide path.
Plateau	2/29/2012	An EF2 tornado with maximum wind speeds around 125 mph touched down along Castro-Pugh Road just north of Plateau Road in northern Cumberland County. Intermittent damage continued to the east-northeast for approximately 1 mile before the damage became continuous along Clear Creek Road. Hundreds of trees were uprooted and snapped and a home suffered roof damage in this area. The tornado continued east-northeast and reached EF2 intensity in the Rinnie community along Highway 127. A brick home slid off its foundation and was completely destroyed, killing one woman, and another nearby home lost its entire roof. A double wide mobile home along Hollow Road was also completely destroyed, killing another woman, with debris tossed hundreds of yards. At least a thousand trees were uprooted or snapped around this location. New aerial imagery from Google Earth released in Spring 2013 indicated the tornado continued eastward and widened to 1/2 mile, blowing down thousands of more trees as it moved across inaccessible forested areas of northern Cumberland County. Damage was apparent eastward to past Roy Taylor Road.

Fairfield Glade	5/27/2017	Due to the widespread wind damage, a Presidential Disaster Declaration was made for Putnam, Cumberland, and Smith Counties in June 2017. Photo showed a funnel cloud in Fairfield Glade.
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Based on previous occurrences, tornado events are likely to occur at least once every three years in Cumberland County (see the following map for other probability information).



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 historical events, in a worst 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 twice a year in Cumberland County. The severity of hail is measured by the diameter of the hail itself, commonly using the TORRO Hail Index (see following chart). One of the largest hail events in Cumberland County was recorded on May 14, 2010, where golf ball size hail (H5) was reported causing damages.

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 Cumberland County between June 1, 2007 and June 30, 2017.

Hail Events in Cumberland County: June 1, 2007 to June 30, 2017

Location	Date	Extent	Deaths	Injuries	Property Damage
CROSSVILLE	6/24/2007	0.75 in	0	0	0
CROSSVILLE	7/25/2007	0.75 in	0	0	0
CROSSVILLE	7/25/2007	0.88 in	0	0	0
FAIRFIELD GLADE	2/11/2009	0.75 in	0	0	0
OAK HILL	2/18/2009	0.75 in	0	0	0
FAIRFIELD GLADE	2/18/2009	0.88 in	0	0	0
FAIRFIELD GLADE	2/18/2009	1 in	0	0	0
LANTANA	5/3/2009	0.75 in	0	0	0
WESTEL	5/14/2010	1.75 in	0	0	25K
DORTON	6/15/2010	1 in	0	0	0
OAK HILL	3/23/2011	1 in	0	0	0
LANTANA	6/5/2011	1 in	0	0	0
ELMORE	6/15/2011	1 in	0	0	0
CROSSVILLE	6/15/2011	1 in	0	0	0
CROSSVILLE	6/19/2011	0.75 in	0	0	0
CROSSVILLE	6/19/2011	1.75 in	0	0	0
CROSSVILLE	6/19/2011	1 in	0	0	0
OLD WINESAP	2/22/2012	0.88 in	0	0	0
LANTANA	3/2/2012	1 in	0	0	0
FAIRFIELD GLADE	4/26/2012	1 in	0	0	0
POMONA RD	4/26/2012	1 in	0	0	0
POMONA RD	4/26/2012	0.75 in	0	0	0
CAMP NAKAWANA	4/26/2012	0.75 in	0	0	0
OLD WINESAP	4/26/2012	1 in	0	0	0
CROSSVILLE	8/1/2012	0.88 in	0	0	0
PLEASANT HILL	7/1/2013	1 in	0	0	0
BIG LICK	10/6/2014	0.88 in	0	0	0
CROSSVILLE	10/6/2014	1.75 in	0	0	0
CROSSVILLE	4/3/2015	1 in	0	0	0
OAK HILL	4/3/2015	0.88 in	0	0	0
PLEASANT HILL	5/27/2017	1 in	0	0	0
LINARY	5/27/2017	2.25 in	0	0	0

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 twice a year in Cumberland County. The severity of severe storm winds is commonly measured by wind speed (knots or mph). Based on past experiences, it is possible for wind speeds to reach over 65 knots.

The following chart provides some severe storm wind event information for Cumberland County in recent years (this is by no means an all-inclusive listing).

Wind Events in Cumberland County

Location	Date	Extent in Knots	Deaths	Injuries	Property Damage
CROSSVILLE	7/25/2007	50	0	0	1K
CROSSVILLE	1/29/2008	50	0	0	1K
COUNTYWIDE	2/17/2008	45	0	0	2K
CROSSVILLE	4/11/2008	55	0	0	5K
CRESTON	6/1/2008	50	0	0	1K
CROSSVILLE	7/22/2008	50	0	0	100
CROSSVILLE	2/11/2009	55	0	0	12K
CROSSVILLE	6/11/2009	55	0	0	25K
CROSSVILLE	5/1/2010	53	0	0	1K
FAIRFIELD GLADE	6/11/2010	55	0	0	25K
OAK HILL	6/11/2010	55	0	0	25K
CROSSVILLE	8/5/2010	55	0	0	50K
LANTANA	10/26/2010	55	0	0	25K
CROSSVILLE	2/25/2011	55	0	0	25K
OAK HILL	4/4/2011	55	0	0	25K
OAK HILL	4/27/2011	55	0	0	10K
LANTANA	4/27/2011	55	0	0	10K
LANTANA	4/27/2011	55	0	0	25K
BIG LICK	6/21/2011	52	0	0	2K
VOLUNTEER HGTS	6/21/2011	52	0	0	5K
NEW ERA	7/2/2012	55	0	0	10K
MAYLAND	1/30/2013	55	0	0	10K
COUNTYWIDE	2/26/2013	52	0	0	5K

COUNTYWIDE	2/26/2013	51	0	0	0
CAMPBELL JCT	4/4/2014	52	0	0	5K
PLEASANT HILL	4/28/2014	52	0	0	3K
MAYLAND	6/10/2014	61	0	0	10K
PLEASANT HILL	6/10/2014	52	0	0	5K
DRIPPING SPGS	6/10/2014	52	0	0	2K
OAK HILL	4/3/2015	52	0	0	3K
CROSSVILLE	7/3/2016	52	0	0	5K
CROSSVILLE	7/6/2016	50	0	0	2K
RINNIE	7/7/2016	48	0	0	3K
CRESTON	7/7/2016	48	0	0	1K
TODD TOWN	7/8/2016	50	0	0	1K
CROSSVILLE	3/1/2017	52	0	0	3K
CAMP NAKAWANA	5/27/2017	56	0	0	5K
MAYLAND	5/27/2017	56	0	0	3K
LANTANA	5/27/2017	85	0	0	250K
POMONA	5/27/2017	55	0	0	5K
RINNIE	5/27/2017	60	0	0	5K
POMONA	5/27/2017	55	0	0	3K
DORTON	5/27/2017	50	0	0	1K

Cumberland 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	$H+P+B=\#; \#/3=V$
Cumberland County	4	3	3	3.33
Crab Orchard	3	2	2	2.33
Crossville	4	4	4	4.00
Pleasant Hill	3	3	3	3.00
Cumberland County Schools	4	3	4	3.67

Jurisdiction	Vulnerability	Probability	Risk
	$V+P=R$		
Cumberland County	3.33	4	7.33 High
Crab Orchard	2.33	3	5.33 Medium
Crossville	4.00	3	7.00 High
Pleasant Hill	3.00	3	6.00 Medium
Cumberland County Schools	3.67	3	6.67 Medium

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

Property	
<i>Amount of residential property damage associated from the hazard</i>	
1	Less than \$500 in damages
2	\$500-\$10,000 in damages
3	\$10,000-\$500,000 in damages
4	\$500,000-\$2,000,000 in damages
5	More than \$2,000,000 in damages

Business	
<i>Amount of business damage associated from the hazard</i>	
1	Less than 3 businesses closed for only a day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top-10 local employer closed indefinitely

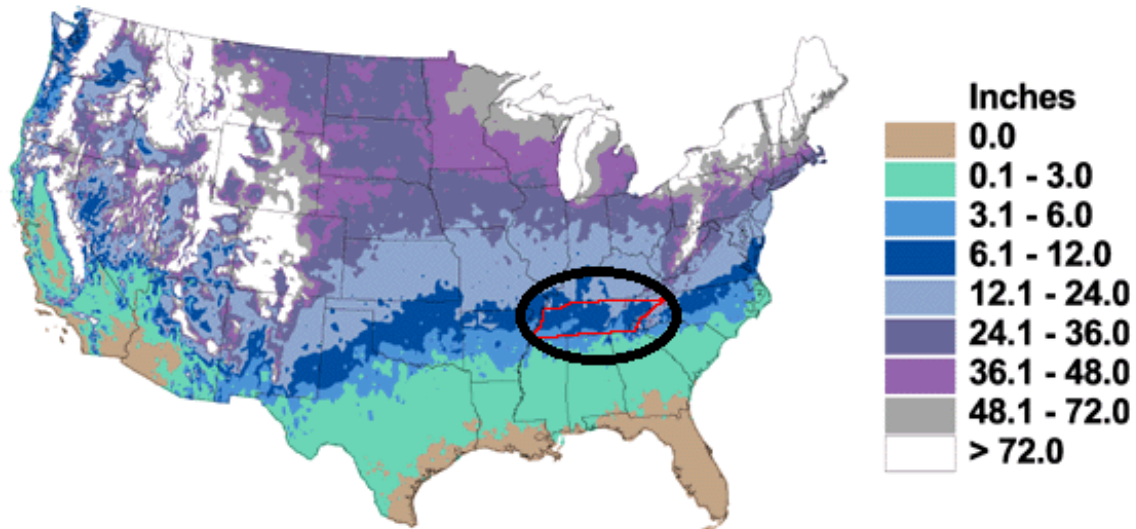
Probability	
<i>Likelihood of the hazard occurring within a given span of years</i>	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

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 Cumberland 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, Cumberland County usually experiences one major winter storm event every 2 years. The severity of winter storms is commonly measured by inches of snowfall. It is possible for snowfall to accumulate over 5 inches in Cumberland County. The average mean snowfall per year in Cumberland County is between 6 to 12 inches (as seen on the map below).

Average Mean Snowfall Per Year

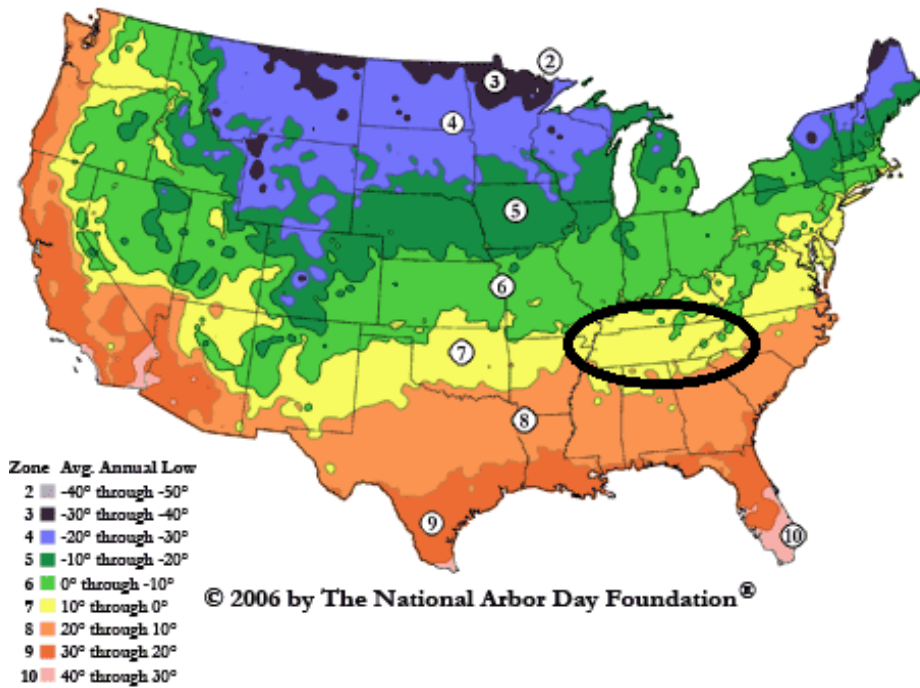


National Oceanic and Atmospheric Administration

Source: NOAA

Cumberland 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

A total of 56 events were reported between June 1, 2007 and June 30, 2017. The following chart provides information on the most notable events occurring during this timeframe.

Winter Impacts in Cumberland County: Jan. 1994 – Mar. 2011

Date	Type	Impact Description
3/7/2008	Winter Storm	A mixture of sleet, snow and freezing rain hit the county. Snow accumulations were about 2 inches across the county by noon. Driving was treacherous.
1/17/2009	Winter Weather	A light drizzle fell on frozen roads resulting in black ice across the county. On Interstate 40, 55 cars and trucks were involved in a chain-reaction crash on a five mile stretch of Interstate 40 between mile marker 329 and 334. There were over a dozen accidents with injuries scattered across all ends of the county. One woman suffered serious injuries. The Cumberland County Chapter of the American Red Cross opened an emergency shelter at the Crab Orchard Church of God of Prophecy and 22 travelers spent the night there.
12/18/2009	Winter Weather	Total snowfall accumulations approaching three inches with snow sticking to all exposed surfaces. A newspaper reported that one woman driving a 2003 Jeep SUV was killed and one woman who was a passenger in the same vehicle was injured after the vehicle hit a patch of snow at mile marker 309 on Interstate 4.

Cumberland County Hazard Mitigation Plan April 6, 2018

2/14/2010	Winter Weather	Total snowfall accumulation, estimated at six inches, occurred twelve miles northwest of Crossville.
12/15/2010	Ice Storm	Roads across the county were covered with at least one quarter of an inch of ice, with locally higher amounts reported near the Cumberland/Putnam County line north of Interstate 40. This resulted in multiple roads being declared impassable, along with multiple wrecks being reported across the county.
12/25/2010	Winter Weather	Two inches of total snowfall accumulation occurred across the county. A newspaper also reported that a 20 year old women died when her car that she was driving on ice and snow covered Vandever Road in Crossville.
1/11/2011	Heavy Snow	Four and one half inches of total snowfall accumulation occurred across the county.
12/29/2012	Winter Weather	Light snow with accumulations up to one inch fell during the afternoon and evening hours across Cumberland County. Several roadways were covered in snow and icy mainly above 1900 feet.
1/25/2013	Winter Weather	Secondary roads were icy with bridges and overpasses on these roads also ice covered with estimated ice accumulation due to freezing rain of 0.10 inch. Some residents trying to turn their cars into their driveways on occasions slide past them and their cars became stuck in ditches, resulting in minor accidents. Trees were downed in the Maryland Community and also across State Highway 68 in the southeastern part of the county due to these ice accumulations. A power line was also reported downed in the Tansi area also due to these ice accumulations.
3/25/2013	Winter Weather	Around three and one half inches of total snowfall accumulation occurred in Crossville and the surrounding area.
2/12/2014	Winter Storm	6 inches of snow fell across Cumberland County.
2/16/2015	Winter Storm	Precipitation totals across Cumberland County ranged from 0.5 to 1.5 of combined ice, sleet, and snow. Scattered trees and power lines were knocked down, and many roads and schools were closed.
2/20/2015	Winter Storm	Snow and sleet accumulations up to 0.5 fell during the late afternoon on February 20, followed by freezing rain with ice accumulations ranging from 0.75 to 1 on February 20 into the early morning hours on February 21. The ASOS at Crossville Memorial Airport measured 0.70 of ice accumulation along with a peak wind gust of 41 mph before being knocked offline. Emergency management reported thousands of trees, power lines and power poles snapped and knocked down throughout the county, with some trees falling on homes and many roadways blocked. Power was out to 22,000 customers in the first few days after the ice storm, with most of the county seeing power outages for up to 2 weeks and 130 customers without power for nearly 1 month. The 1,014 feet radio tower for 105.7 FM in Crab Orchard collapsed under the weight of ice. Caused 9.5 million dollars in damage to their 17-county utility system. Cleanup efforts from the ice storm took several months and lasted into May 2015. Cumberland County was declared a Presidential disaster area on April 2, 2015.
2/25/2015	Winter Storm	Snow amounts up to 4 inches were reported across Cumberland County.

3/4/2015	Winter Weather	Precipitation totals across Cumberland County reached up to 1.0 of combined ice, sleet and snow.
1/21/2016	Winter Storm	Snow totals between 3 and 6 inches were measured across Cumberland County.
2/14/2016	Winter Weather	A mix of snow, sleet, and freezing rain fell across Cumberland County. Around 1/4 inch of freezing rain accumulated in far eastern Cumberland County. Knocked down several trees and power lines, with a few road closures and 321 reported power outages. Cumberland County Schools were closed.

Cumberland 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	$H+P+B=\#;$ $\#/3=V$
Cumberland County	2	4	2	2.66
Crab Orchard	2	3	2	2.33
City of Crossville	2	4	2	2.67
Pleasant Hill	3	3	2	2.66
Cumberland Co schools	1	4	3	2.66

Jurisdiction	Vulnerability	Probability	Risk $V+P=R$	
CumberlandCounty	2.66	5	7.66	High
Crab Orchard	2.33	5	7.33	High
City of Crossville	2.67	5	7.67	High
Pleasant Hill	2.66	5	7.66	High
Cumberland co schools	2.66	5	7.66	High

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

Property	
<i>Amount of residential property damage associated from the hazard</i>	
1	Less than \$500 in damages
2	\$500-\$10,000 in damages
3	\$10,000-\$500,000 in damages
4	\$500,000-\$2,000,000 in damages
5	More than \$2,000,000 in damages

Business	
<i>Amount of business damage associated from the hazard</i>	
1	Less than 3 businesses closed for only a day
2	More than 3 businesses closed for a week
3	More than 3 businesses closed for a few months
4	More than 3 businesses closed indefinitely or relocated
5	A top-10 local employer closed indefinitely

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

Wildfires

Forested and Heavily wooded areas cover a large portion of Cumberland County's total land area. However, wildfires are not only in forested areas. Many occur in Pastures, yards and grassland areas. When the conditions are right, all these areas become vulnerable to devastating wildfires. In the last few decades, Cumberland County's wildfire hazard risk has increased due to the increase in urban development in and around forested areas.

According to the TN Division of Forestry, arson and debris burning 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 twigs, dead tree needles, branches, dead standing trees, to 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 relative humidity, wind, lightning, and temperature; 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

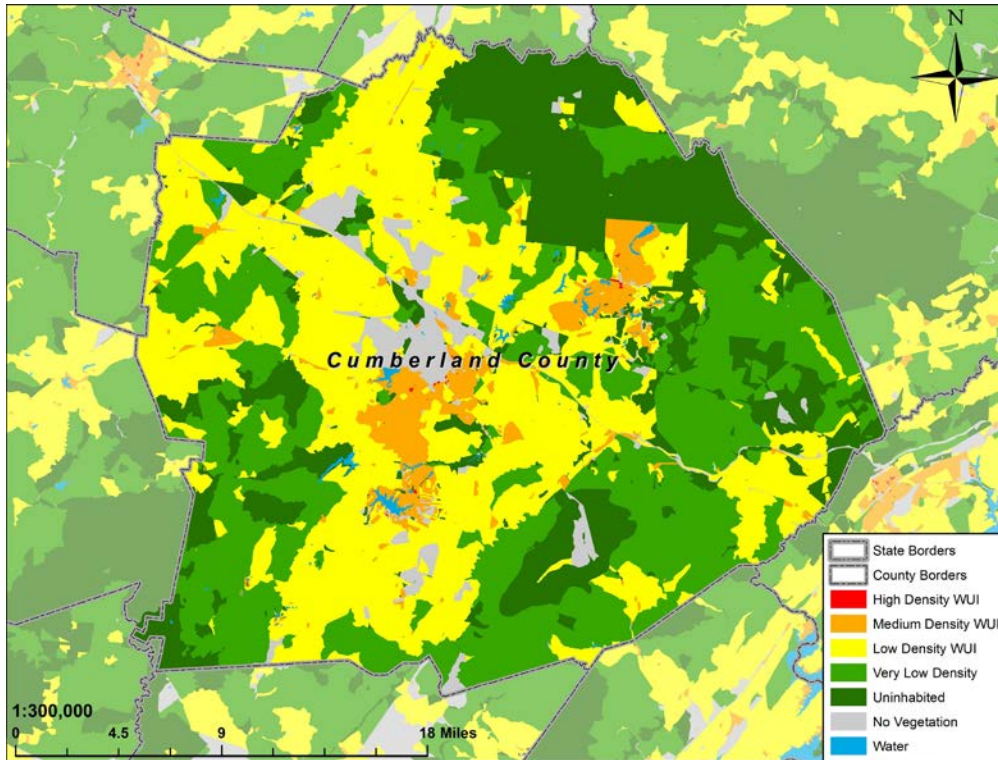
Around October 15, when the leaves begin to fall and usually ends December 15th due to shorter, cooler, wetter days. Still, wildland fires occur year round. A burning permit is required for outdoor burning between October 15th and May 15th.



Cumberland County is located in the Cumberland District of the TN Division of Forestry. The TN Division of Forestry provides statistics for each region, summarizing wildfire events. Below are the statistics for Cumberland County from 2007 to 2016.

Year	# of Fires Forested	# of Fires Non-Forested	Total	# of Acres Forested	# of Acres Non-Forested	Total	Size	Area
2016	33	7	40	1,690.9	96.4	1,787.3	44.7	0.007
2015	9	4	13	861.5	126.0	987.5	76.0	0.004
2014	19	6	25	203.1	92.2	295.3	11.8	0.001
2013	13	2	15	2,553.6	41.5	2,595.1	173.0	0.010
2012	21	5	26	555.5	71.8	627.2	24.1	0.002
2011	12	10	22	207.4	50.4	257.8	11.7	0.001
2010	26	9	35	296.3	67.4	363.7	10.4	0.001
2009	14	0	14	391.8		391.8	28.0	0.001
2008	26	2	28	362.8	25.0	387.8	13.9	0.001
2007	44	2	46	1,086.2	92.7	1,178.9	25.6	0.004

Wildland and Urban Interface (WUI) for Cumberland County



The wildland-urban interface (WUI) is the area where houses meet or intermingle with undeveloped wildland vegetation.

Cumberland County utilized a ranking system to analyze potential impacts to determine vulnerabilities and then to analyze the probability of an event occurring to calculate a risk ranking for each jurisdiction as it relates to wildfires.

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	$H+P+B= \#;$ $\#/3=V$
Cumberland County	2	4	2	2.66
Crab Orchard	2	3	2	2.33
City of Crossville	2	4	2	2.67
Pleasant Hill	2	4	2	2.66
Cumberland Co schools	2	4	2	2.66

Jurisdiction	Vulnerability	Probability	Risk
			$V+P=R$
CumberlandCounty	2.66	5	7.66 High
Crab Orchard	2.33	3	5.33 Medium
City of Crossville	2.67	4	6.67 Medium
Pleasant Hill	2.66	3	5.66 Medium
Cumberland co schools	2.66	3	5.66 Medium

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

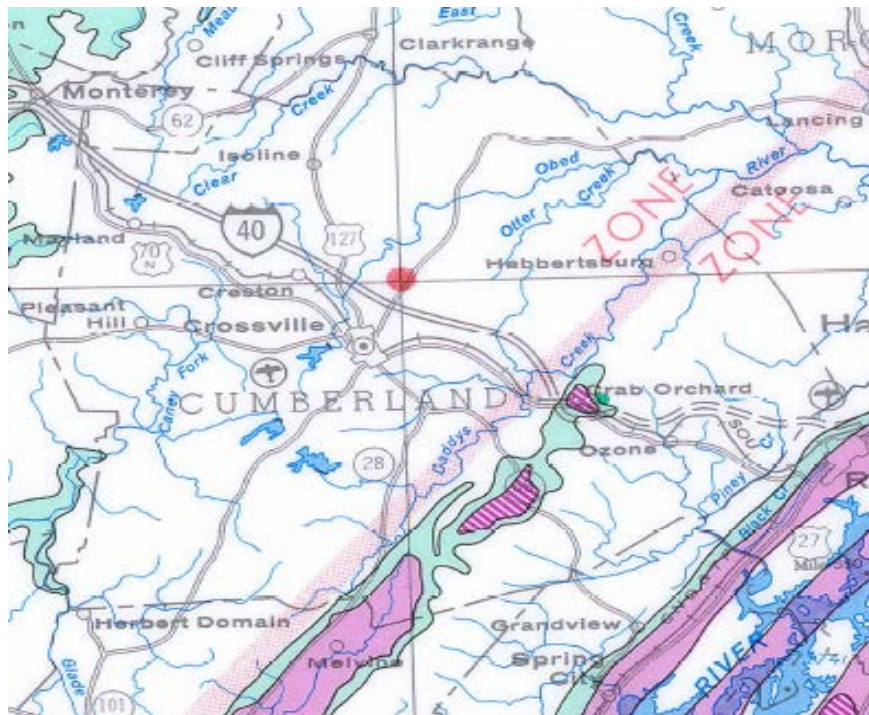
Sinkholes

Both the City of Crossville and Cumberland County have not seen a rise in the occurrence of sink holes in recent years.

**Historical information on grassy cove and any other sink holes
Picture of cove , how it was created, largest sink hole & and
historical info on - crab orchard, hinch mtn and Sequatchie valley**

The following map was retrieved by the Geologic Hazards Map of Tennessee.

As you can see by the map below the only documented Karst areas in the county are Grassy Cove, Crab Orchard, Hinch Mountain, and Sequatchie Valley. Grassy Cove at six miles long and three miles wide is one of the largest sinkholes in North America.





Karst areas (areas with caves, sinkholes and disappearing streams)



Areas with a high density of karst features

Accurate data on the extent of sinkholes, in units of measurement, is not currently available. That type of data is not recorded during repair of sinkholes. Units of measurement aren't gathered by those who remediate sinkholes because there is yet to be a standard established in reference to the overall documentation of the issue.

At this time, Cumberland County acknowledges the sinkhole issue because of our Karst features and history of sinkholes. We have identified this hazard with uncertainty as to the level of risk due to the lack of data collection and documentation. We have added it to this plan to remain mindful of the extensiveness of the Grassy Cove sinkhole. At this time, the only solution to obtain a clear picture on the seriousness of this hazard is to have our County geologically studied.

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Cumberland County	1	1	1	1
Crab Orchard	1	1	1	1
City of Crossville	1	1	1	1
Pleasant Hill	1	1	1	1
Cumberland Co schools	1	1	1	1

Jurisdiction	Vulnerability	Probability	Risk V+P=R
CumberlandCounty	1	1	2 Low
Crab Orchard	1	1	2 Low
City of Crossville	1	1	2 Low
Pleasant Hill	1	1	2 Low
Cumberland co schools	1	1	2 Low

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

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 Cumberland 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

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

The Cumberland 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 Cumberland County Hazard Mitigation Project List.

Cumberland County Project List

The following Project List provides an overview of all the Cumberland 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.

Mitigation Projects							
Priority Rank	Action/Project	Hazard Mitigated	Jurisdictions Benefitted & Represented	Addresses New or Existing Buildings/Infra	Responsible Agency	Possible Funding Source(s)	Time frame
14	5 ft Culverts thro city	Flooding	Cumberland County	2nd, Market & Elizabeth Streets	City of Crab Orchard	HMGP, PDM	1-3 yrs
14	Flood Control	Flooding	City of Crossville	Frog Hollow 4th Street	Crossville	HMGP, PDM	1-3 yrs
14	Build up Road	Flooding	Cumberland County	Frost Rd	Cumberland County	HMGP,PDM	1-2 yrs
14	Build up Road	Flooding	Cumberland County	Jason Barnwell's Pomona Rd	Cumberland County	HMGP,PDM	1-2 yrs
14	Reconstruct Hallways at Schools for shelters	Tornado/Severe Stormes	All	Existing/New	All	HMGP, PDM	1-5 yrs
14	Ditch/Canal Cleanup	Flooding	City of Crab Orchard	Flood Plain	City of Crab Orchard	HMGP, PDM	1-2 yrs
13	Impact Resistant Window Coverings -all Schools	Tornado/Severe Stormes	All	Both	All	HMGP, PDM	1-5 yrs
12	Firewise	Wildfire	Crossville/ Cumberland County	Existing/New	Crossville/County	HMGP, PDM	1-10 yrs
11	Flood Control for Schools	Flooding	Cumberland County Schools	Existing	Cumberland County Schools	HMGP, PDM	1-2 yrs
11	Flooding/Road Damage Culverts/U Channel	Flooding	Town of Pleasant Hill	351 East Main St	Town of Pleasant Hill	HMGP, PDM	1-3 yrs
10	Residential Drainage Project	Flooding	City of Crab Orchard	N/A	City of Crab Orchard	HMGP, PDM	1-3 yrs
9	Road Drainage Improvements	Flooding	Cumberland Co/City of Crossville/ P Hill	Existing	Cumberland Co/City of Crossville/ P Hill	HMGP, PDM	1-3 yrs
9	Tree Limb removal on Public Right of Ways	Freezes/Winter Storms/Wildfire	All	Existing	All	HMGP, PDM	1-3 yrs
9	More Natural Landscaping	Freezes/Winter Storm/Wildfire	All	Existing/New	All	HMGP, PDM	3-5 yrs
5	Engineering Study to address Public Right of Ways and Public Property Sinkholes*	Sink Hole	All	New/ Existing	All	HMGP, PDM	5 yrs

Project List Update

After reviewing the original list of mitigation projects seen in the 2013 Cumberland County Hazard Mitigation Plan, the mitigation committee has determined that providing public information is rather “preparedness”, not mitigation and was taken it off the project list. Preparedness projects assist people to react or respond more efficiently to threats (*example: putting a fire extinguisher in a room so someone could use it to react to a fire threat*) **whereas** mitigation projects are meant to be long-term projects that utilizes the built environment in a way that doesn't necessarily require people to react because the project itself does the reacting (*example: putting fire retardant material in the walls of a room*). Cumberland County has thus decided to **delete** the preparedness project and not include it in the updated mitigation action list. This project will still be worked on in the community, just not through the means of mitigation planning.

Cumberland County has transferred five projects from the original plan to the updated plan (**deferred** projects): there are two projects (School Storm Shutters and Road drainage Improvements) that have had nothing done on them at this time and three projects that include (Martin School Flooding, an increase in drainage on the side and back of the school has been added, but this has been offset by new construction across the road and remains incomplete. Crab Orchard drain project, they have dredged a portion of the canal and plan to continue updates as monetary funds become available, and Pleasant Hill's limb removal, where the Ice Storm of 2015 helped correct some of their issues though there is still work needing done to improve right a ways). These projects have remained deferred because of funding difficulties.

Cumberland County at this time has **not completed** one project listed in whole but have worked on three individual projects and made some progress on each.

In addition to the deleted, deferred, and completed projects, Cumberland County has also added a number of new projects as shown on the project list.

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, Cumberland County unincorporated, the City of Crab Orchard, and the City of Crossville are NFIP participants. FEMA has listed these three jurisdictions to have a current effective flood map date as of 11/16/2007, with Cumberland County having its initial FIRM (flood insurance rate map) performed in 2007, Crab Orchard in 1986, and Crossville in 1986. The Town of Pleasant Hill is currently not participating in the NFIP but is looking into the process of becoming a member. The following chart gives an overview of NFIP policy data for Cumberland County.

NFIP Policy Data for Cumberland County			
Jurisdiction	Policies In-Force	Insurance In-Force Whole \$	Written Premium In-Force
Cumberland County, Unincorporated	8	5,040,000	6,482
City of Crossville	19	1,840,200	4,908

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 Cumberland County					
Jurisdiction	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
City of Crossville	1	0	0	0	7,780.48

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

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. As of this time, no jurisdictions in Cumberland County have had any repetitive loss properties.

To continue compliance with the NFIP, the jurisdictions have identified, analyzed, and prioritized four 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.
4. Securing floodplain maps that include detailed elevation markings.

Section 5: Plan Maintenance

Monitoring, Evaluating, and Updating

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

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

Five months prior to the plan's expiration date, Cumberland 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 Cumberland 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 Cumberland 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 strengthened stance of mitigation implementation and awareness within the county and its jurisdictions.

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

- Cumberland County Building Codes
- City of Crossville Building Codes
- Cumberland County BEOP
- Cumberland County Schools Strategic Plan
- Cumberland County Regional Land Use Plan
- Jurisdictional Floodplain/Storm water Ordinances

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

Exercise: Hazard Mitigation Planning Meeting		
Location: ECC Conference Room Date: 12/14/17		
Name	Organization	Email/Phone Number
Rick Williams	CCEMA	planners@ccema.org / 931-510-5817
Kevin D Music	City of Crossville	Kevin.Music@crossville.tn.gov
EMMETT SKLETZEL	CITY OF CROSSVILLE	THE ORCHARD AT FRONTIER AER.NET
Heather Gunter	Town of Pleasant Hill	hgunter @ frontier.net
BOB CRAVE	TEMA	BOB.CRAVE@TN.GOV 865-414-1393
Tim Austin	CCSO	TCRAVE@ccslevi.tn.gov
Chris South	Crossville Fire	chris.south@crossville.tn.gov / 931-200-1448
Eric Ritzman	CCED	eric.ritzman@cumberlandtn.gov
Bo Magnusson	CC Schools	magnussonb@ccschools.net
Rocky Horstel	CCEMA	planners@ccema.org

Crossville Chronicle Official Notification 4B

16831

State of Tennessee,
Cumberland County: }

Pauline D. Sherrer

being duly sworn, upon her oath says, that she is the publisher of the CROSSVILLE CHRONICLE, a tri-weekly newspaper published in the State and County aforesaid; that the annexed and foregoing advertisement was published in said newspaper for One consecutive weeks;

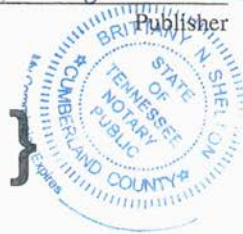
Publication Dates Are:

3/16/18

2018

Pauline D. Sherrer
Publisher

Subscribed and sworn to before me, this
8th day of March, 20 18
Buttamy Shelton
My commission expires, 7/9, 20 19



Public Notice for meeting #5 A

in Tansi ha Manor, ph Mark record at . The lien closed is , and is of 21, page

22. Being Unit Week No. 24, Unit 5, Block L, in Tansi Resort, Inc.'s Hiawatha Manor I, acquired by James C. Sawyer by deed of record at Book 1032, page 174. The lien which will be foreclosed is dated March 5, 2018, and is of record at Book 1521, page 354-355.

The street or mailing address of this property is Country Club Drive, Crossville, Tennessee 38572. The property is identified in the records of the Assessor of Property for Cumberland County, Tennessee as Map 150, Parcel 25.00.

All recording references are to the Register's Office of Cumberland County, Tennessee.

Other interested parties are: None.

The sale of this property will be made expressly subject to (i) the Declaration of Horizontal Property Regime and Master Deed for Hiawatha Manor, of record at Deed Book 216, page 209, and as amended at Deed Book 361, page 501; Book 1399, page 716; and, Book 1413, page 1768, et seq., Register's Office, Cumberland County, Tennessee, (Item Nos. 1-12) and (ii) the Declaration of Horizontal Property Regime for Hiawatha Manor I of record at Deed Book 231, page 215 as amended at Deed Book 361, page 503 (Item Nos. 13-22). 4

This sale will be made in bar of the equity and right of redemption without warranty as to title or encumbrances for the purpose of paying the debt obligation. Said sale shall be subject to any restrictions, reservations, conditions and liens of record applicable to said property.

In the event the high bidder at the foreclosure sale should fail to comply with the submitted bid, the Trustee shall have the option to accept the next highest bid in which the bidder is able to comply or to re-advertise and sell at a later date.

Pursuant to Tennessee Code Annotated §35-5-104, as of the date of this Notice, there were no unreleased tax liens filed by the United States of America with respect to which the provisions of 26 U.S.C. §7425

bury. It appears that ordinary process of law cannot be served upon you because your whereabouts are unknown. You are hereby ORDERED to serve upon Jill Marsee, Attorney for the Tennessee Department of Children Services, 600 Hearthwood Court, Cookeville, Tennessee 38506, (931) 646-3010, an Answer to the Petition for Termination of Parental Rights filed by the Tennessee Department of Children Services, within five (5) days of the last day of publication of this notice, and pursuant to Rule 39(e)(1) of the Tenn. R. Juv. P. you must also appear in the Juvenile Court of Cumberland County, Tennessee at Crossville, Tennessee on the 8th day of August, 2018, at 8:30 a.m., for the Hearing on the Petition for Termination of Parental Rights by the State of Tennessee, Department of Children's Services. If you fail to do so, a default judgment will be taken against you pursuant to Tenn. Code Ann. § 36-1-117(n) and Rule 55 of the Tenn. R. of Civ. P. for the relief demanded in the Petition. You may view and obtain a copy of the Petition and any other subsequently filed legal documents at the Juvenile Court Clerk's Office, Crossville, Tennessee.

Public Notice

Crossville/Cumberland County Hazard Mitigation Planning Committee will meet on June 21, 2018, 1:00pm at City Hall, 392 N Main St, 4th Floor Training Rm.

The purpose of the meeting is to gather input from the public on the final draft of the CCC Hazard Mitigation Plan. This meeting is open to the public.

This plan includes:
Cumberland County
City of Crab Orchard
City of Crossville
Town of Pleasant Hill
Cumberland County Schools

115 AUCTIONS

GET THE WORD OUT about your next auction! Save Time & \$\$\$. One Call For All. Your ad can appear in this newspaper + 96 other TN newspapers. For more info, contact this newspaper's classified dept. or call 931-905-4465 (TnScan)

1536 Genesis Rd.
Crossville, TN 38555
No Phone Calls Please
CoLinX is an equal opportunity employer



Make a difference in your community by becoming a Direct Professional or Community Support Professional. Go home tonight knowing you made a difference in a person's life by teaching, encouraging, and supporting people with disabilities to live real lives. FT starting pay \$10/hr with full benefits, personal time, health care contribution, free life insurance, 9 paid holidays, agency furnished vehicles. Like us on Facebook.
Apply: www.pacesetterstn.com

215 DRIVERS
Owner Operators, Drivers, Fleet Owners for DEDICATED Local/Regional routes. Weekly Settlements. Minimum 12 months 48-53 tractor trailer experience. 800-832-7036 ext 1626, cwsapps@ilgi.com. www.cwsdedicated.com (TnScan)

225 GENERAL HELP WANTED
Church/Pastor Secretary
Part-time Mon-Thur, 8:00-2:00. MS Word and Excel required, QuickBooks preferred.
More info: Bethlehemonline.org
Submit Resume: bhccpersonnelcrossville@gmail.com

F.D.A. Regulated facility in need of plant maintenance technician. Responsible for repairing and carrying out the preventative maintenance for production equipment, system and facility structures including HVAC, lighting, plumbing. Strong trouble shooting skills. Accurate record keeping of preventative maintenance. Manage spare parts inventory and order replacement parts. Smoke free environment. Four day work week. No health insurance offered at this time. Call 423-881-3231.

Help Wanted in Crossville Area - Immediately, Wrecker Driver Call 423-837-5995 or 423-290-2166

Good Samaritan Society
FAIRFIELD GL

We are hiring!
Accepting Applications/Resumes
The Following Positions:

- Dietary Aide - Full Time and
- Cook - Full Time
- RN's / LPN's - PRN
- CNA's - PRN
- SL / Assisted Living - LPN

All qualified applicants will receive consideration for employment without regard to gender, orientation, gender identity, race, color, national origin, citizenship, age, disability status, genetic information, marital status, protected status. Apply on-line at www.good-sam.com

Someone who can weld, do some fabricator work & is mechanically minded. Call 931-484-2041.
Classifieds Really Work!
Call 484-5...
Place yo...

Crossville Chronicle Official Notification #5 B

17080

State of Tennessee, } William Atkinson
Cumberland County: } being duly sworn, upon her

oath says, that she is the publisher of the CROSSVILLE CHRONICLE, a tri-weekly newspaper published in the State and County aforesaid; that the annexed and foregoing advertisement was published in said newspaper for one consecutive weeks;

Publication Dates Are:

6.5.18

2018

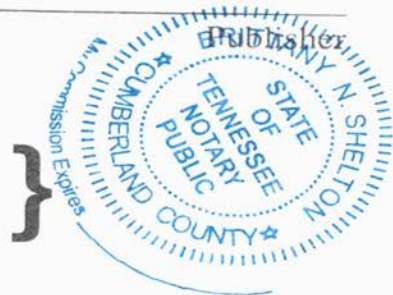
W. Atkinson

Subscribed and sworn to before me, this

6th day of June, 20 18

Bullammy Shelton }

My commission expires, 7/9, 20 19



FEMA APPROVAL LETTER

U.S. Department of Homeland Security
FEMA Region IV
3003 Chamblee Tucker Road
Atlanta, GA 30341



May 24, 2018

Mr. Doug Worden
State Hazard Mitigation Officer
Tennessee Emergency Management Agency
3041 Sidco Drive
Nashville, Tennessee 37204

Reference: Multi-jurisdictional Hazard Mitigation Plan: Cumberland County Hazard Mitigation Plan

Dear Ms. Worden:

This is to confirm that we have completed a Federal review of the Cumberland County Hazard Mitigation Plan Update for compliance with the Federal hazard mitigation planning requirements contained in 44 CFR 201.6(b)-(d). Based on our review and comments, the Cumberland County Hazard Mitigation Plan developed and submitted all the necessary revisions. Our staff has reviewed and approved these revisions. We have determined that the Cumberland County Hazard Mitigation Plan update is compliant with Federal requirements, subject to formal community adoption.

In order for our office to issue formal approval of the plan, Cumberland County must submit adoption documentation and document that the final public meeting occurred. Upon submittal of these items to our office, we will issue formal approval of the Cumberland County Hazard Mitigation Plan. Please have Cumberland County submit a final copy of their Plan, without draft notations and track changes.

For further information, please do not hesitate to contact Harlie Clark, of the Hazard Mitigation Assistance Branch, at (770) 220-5219 or Lillian Huffman, of my staff, at (770) 220-5322.

Sincerely,

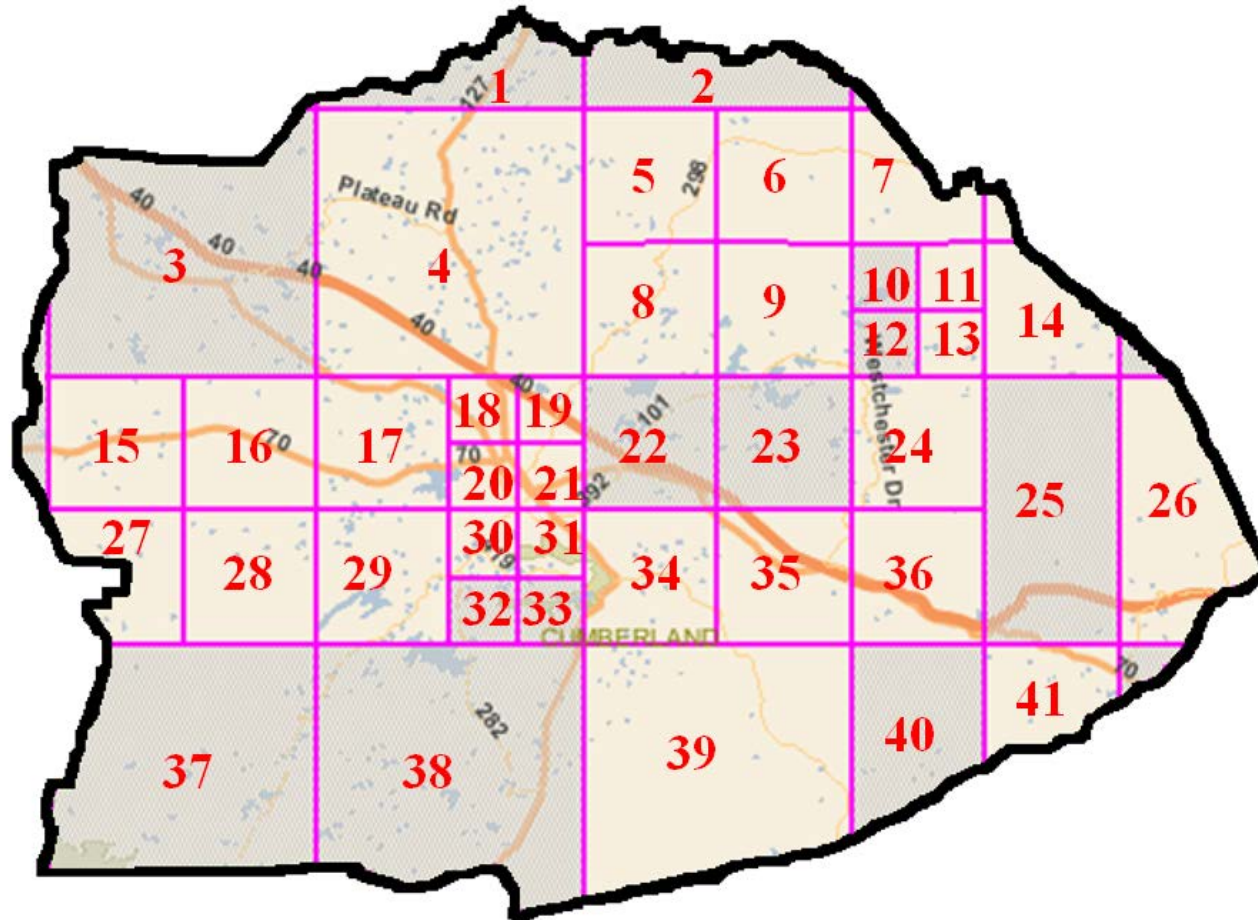
Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV

Appendix 6
Attendance Sheet Meeting #6

PENDING

Appendix 7

Flood Insurance Rate Maps for Cumberland County



The above map shows Cumberland 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 November 16, 2007 and are available from the FEMA Map Service Center.

PANEL 0180D


**FIRM
FLOOD INSURANCE RATE MAP
CUMBERLAND COUNTY,
TENNESSEE
AND INCORPORATED AREAS**

PANEL 180 OF 575
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CUMBERLAND COUNTY	470037	0180	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
47035C0180D

EFFECTIVE DATE
NOVEMBER 16, 2007

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.

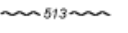
 Floodplain Boundary

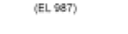
 Floodway Boundary

 Zone D Boundary


 CBRS and OPA boundary


 Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

 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

 Cross section line

 Transect line

45° 02' 08", 93° 02' 12"
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

Appendix 8

Panel 1

Map not available at this time

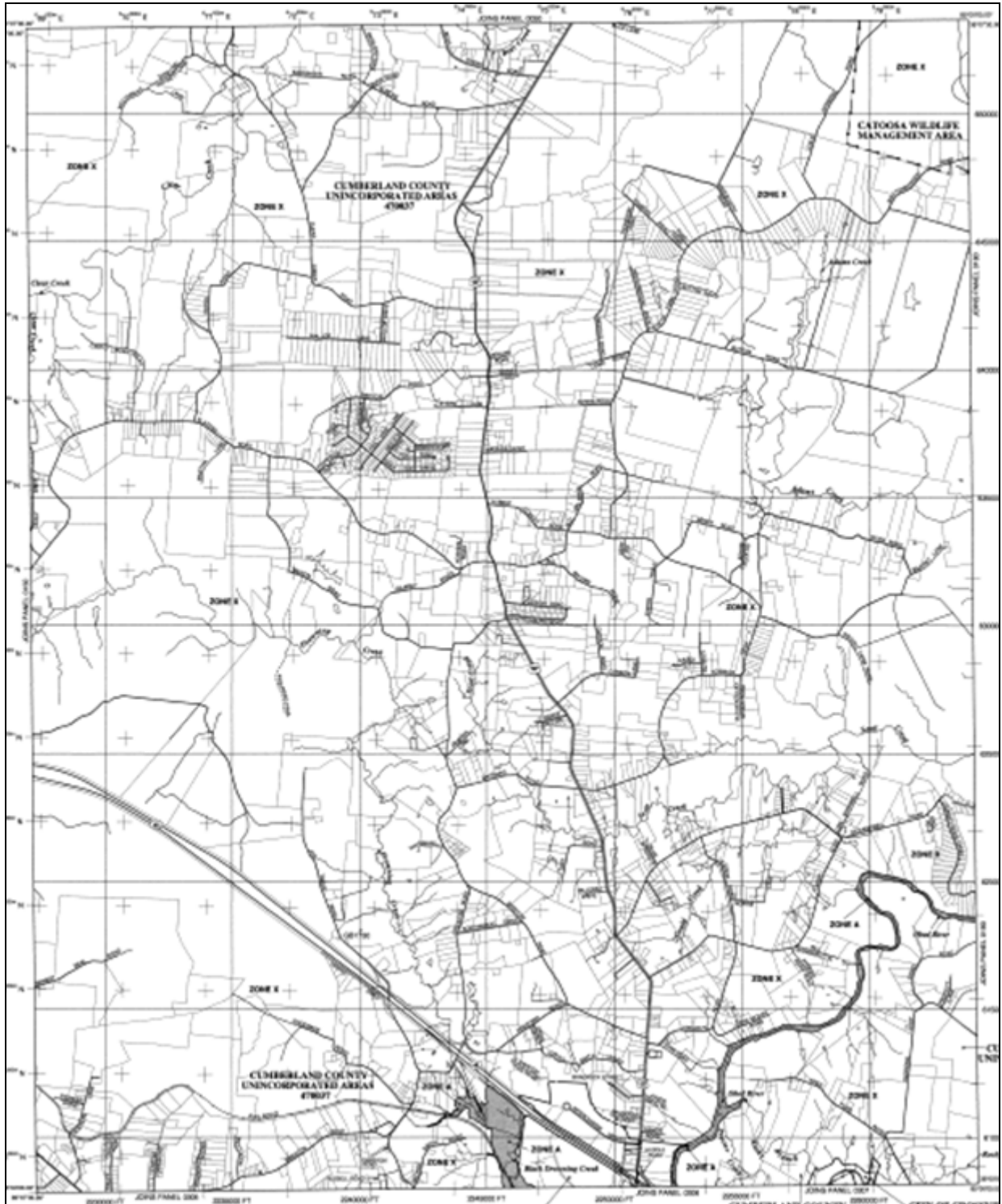
Panel 2

Map not available at this time

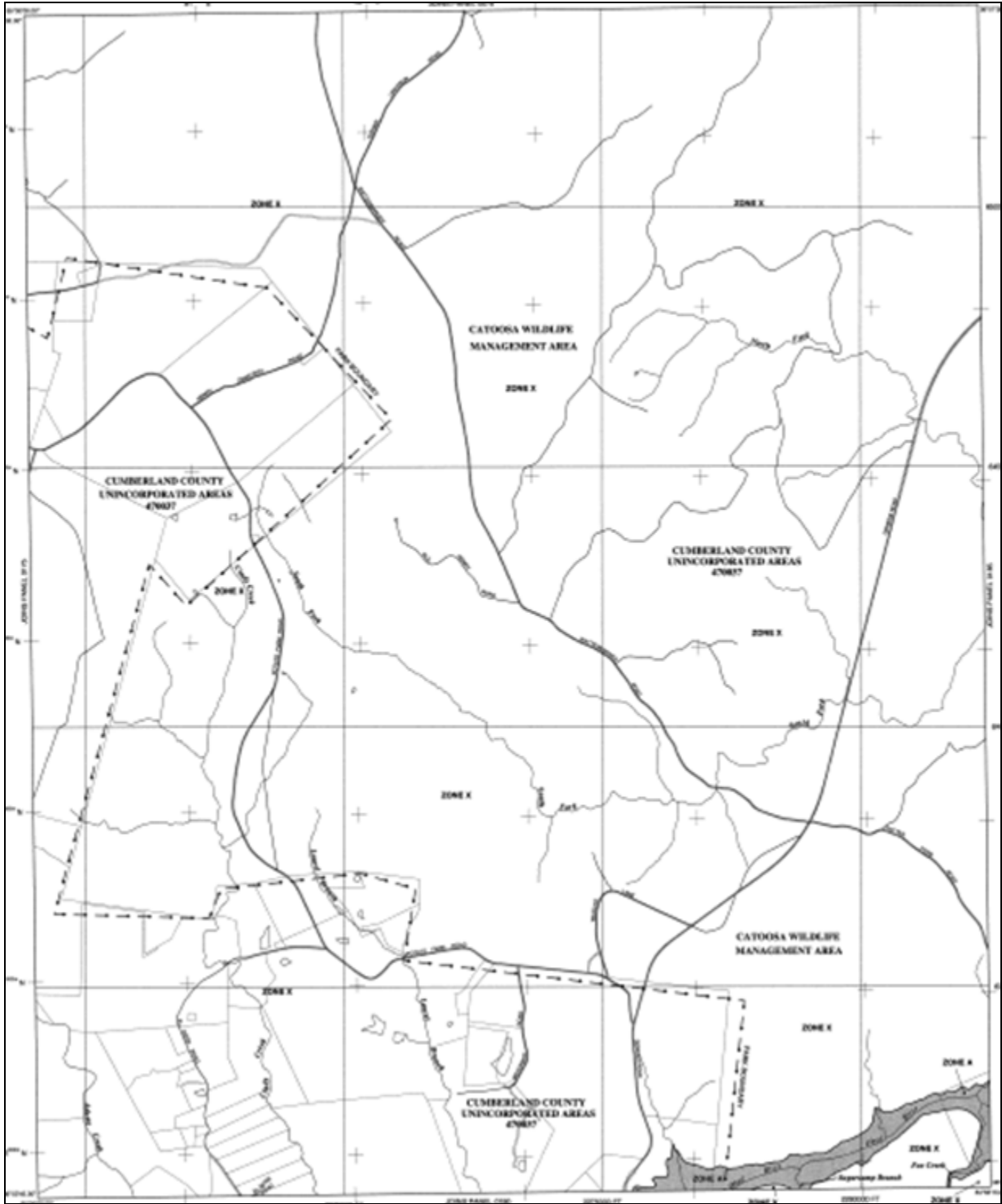
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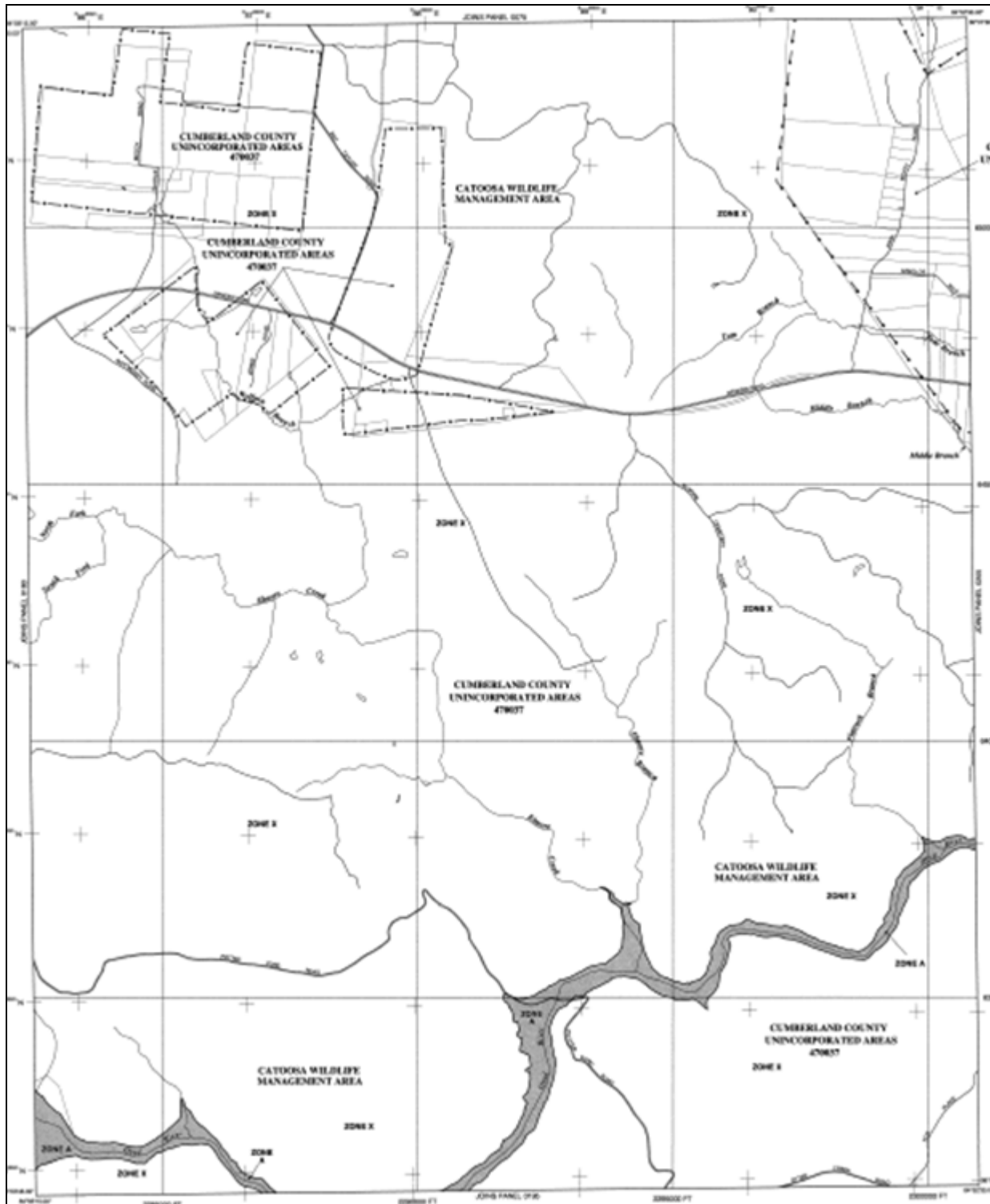
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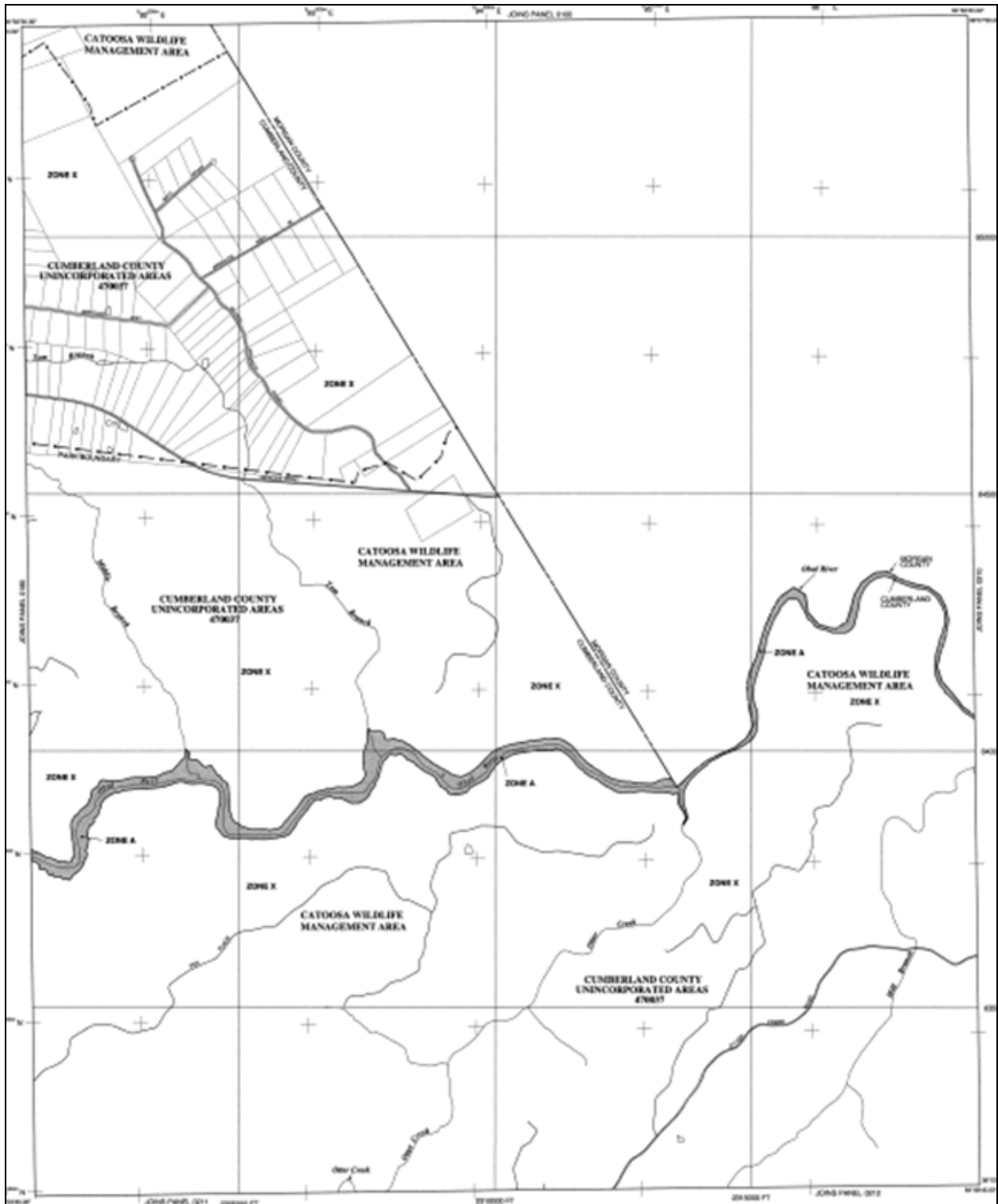
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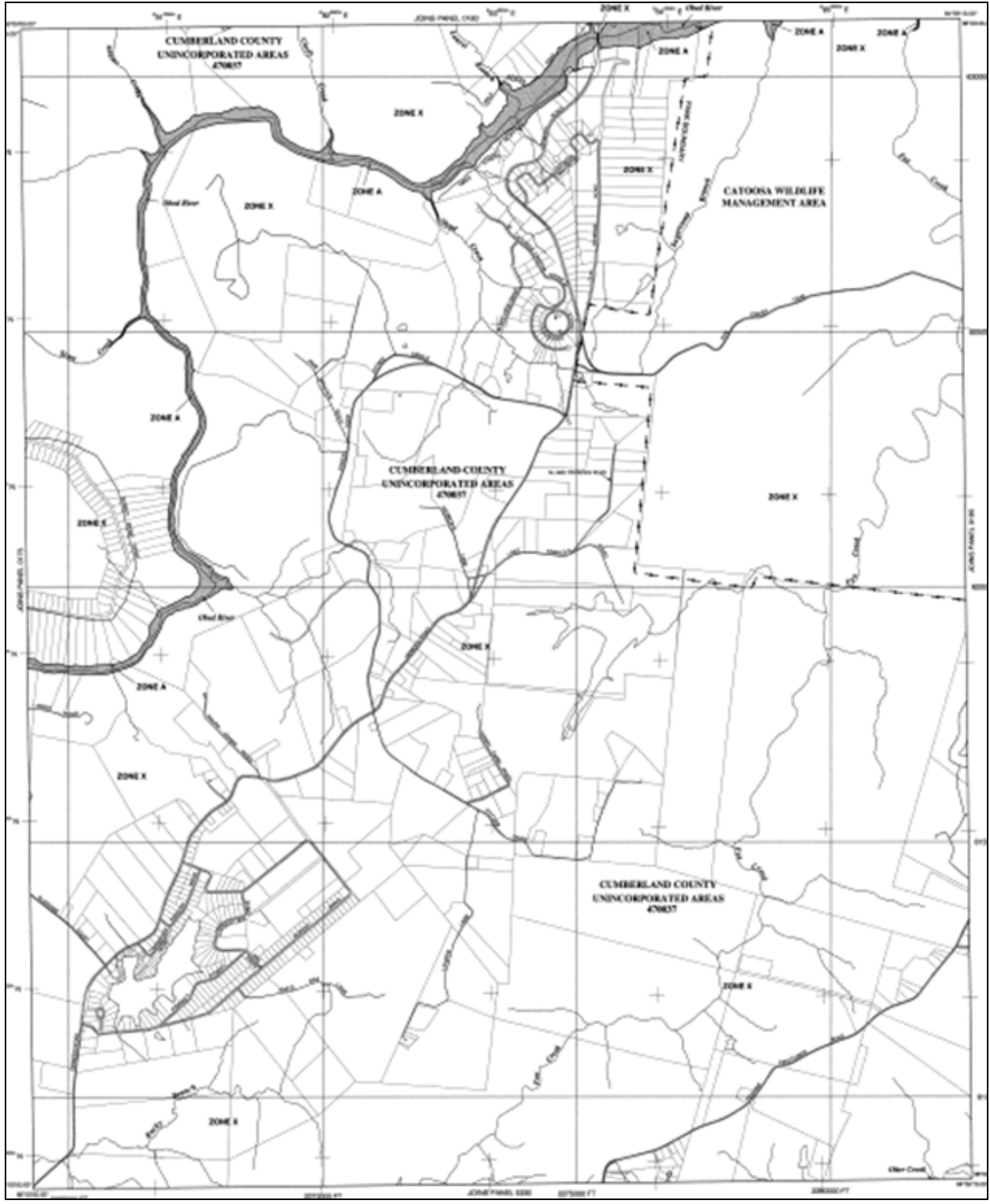


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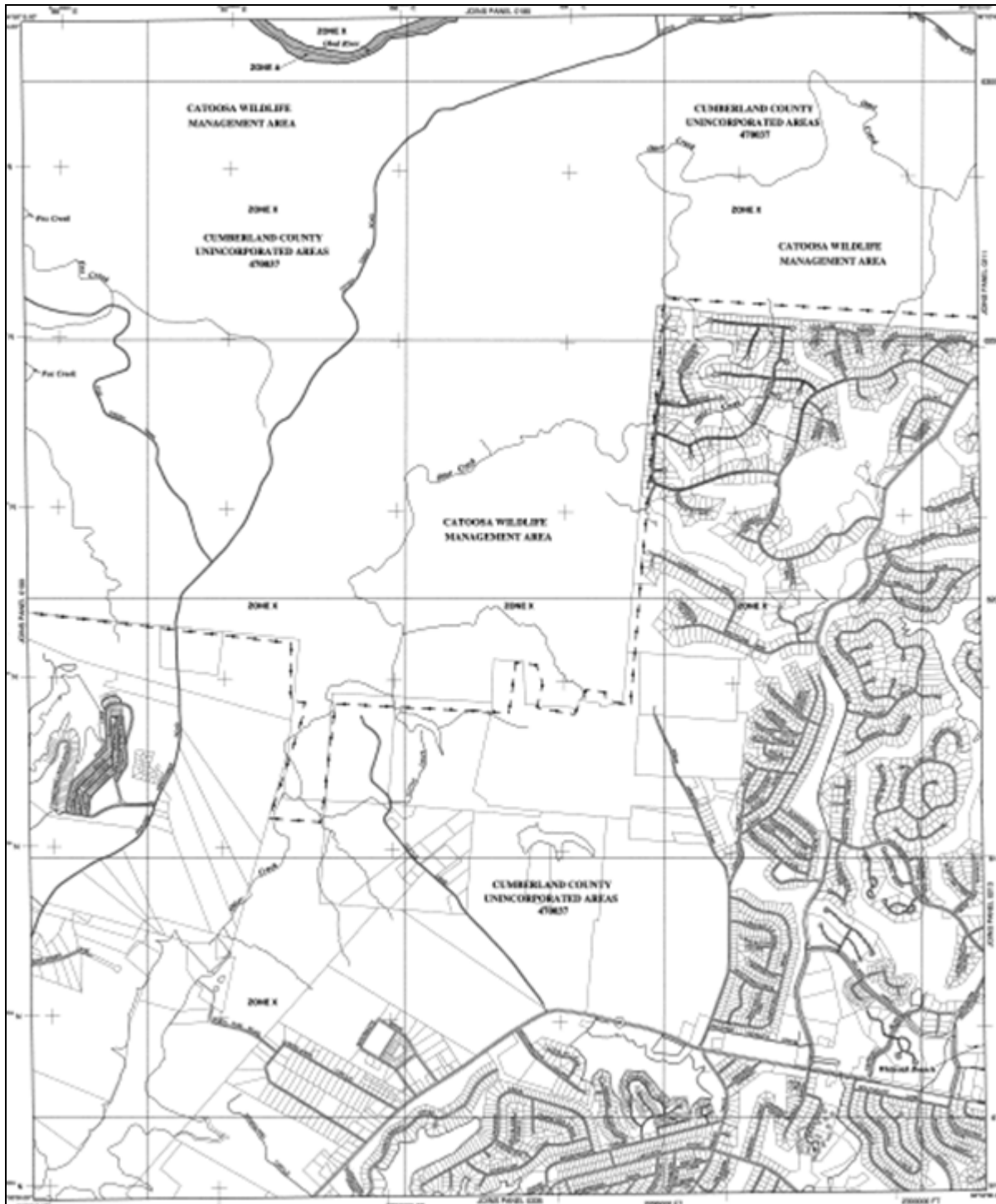


Panel 8

Cumberland County Hazard Mitigation Plan April 6, 2018



Panel 9

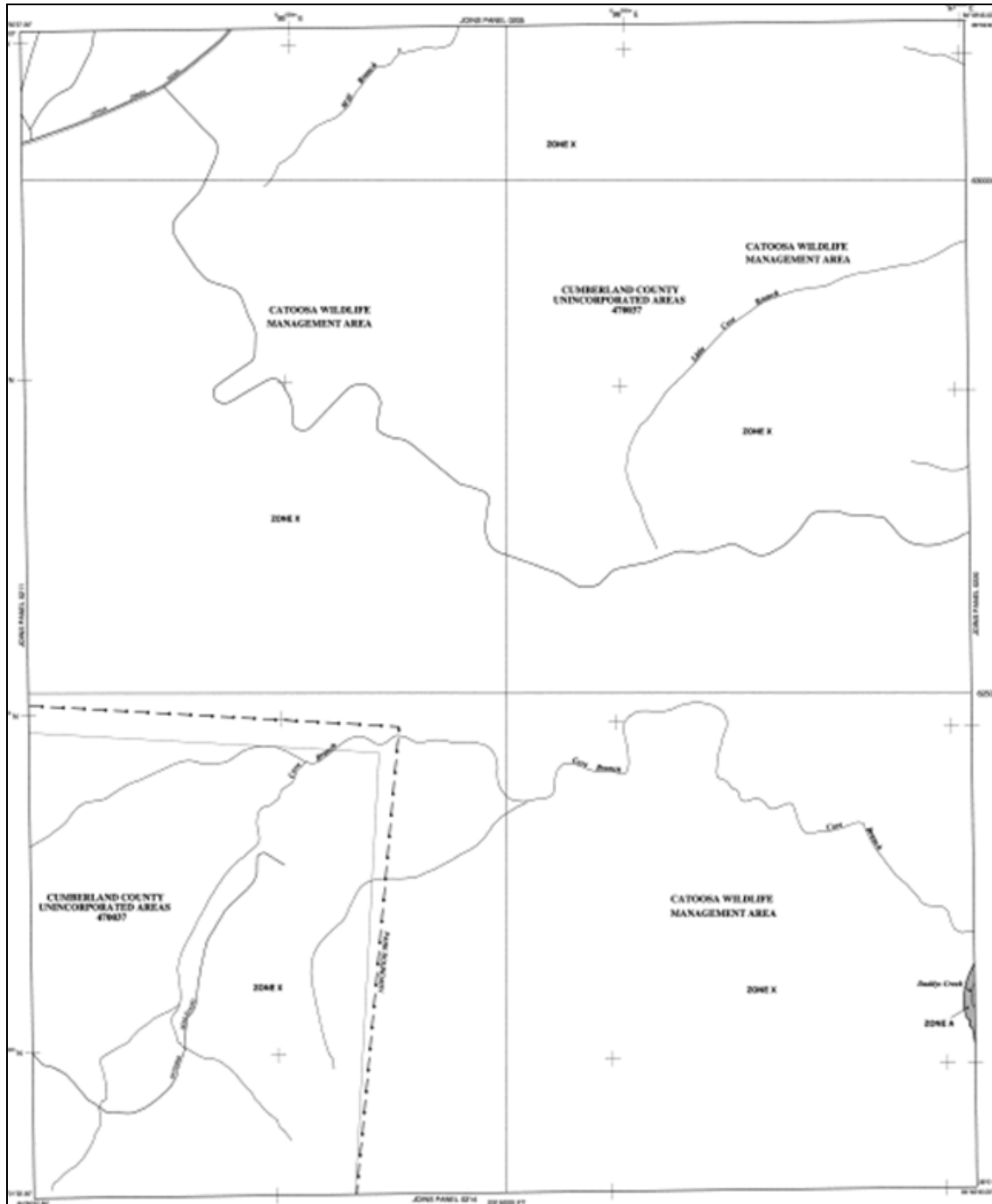


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Cumberland County Hazard Mitigation Plan April 6, 2018

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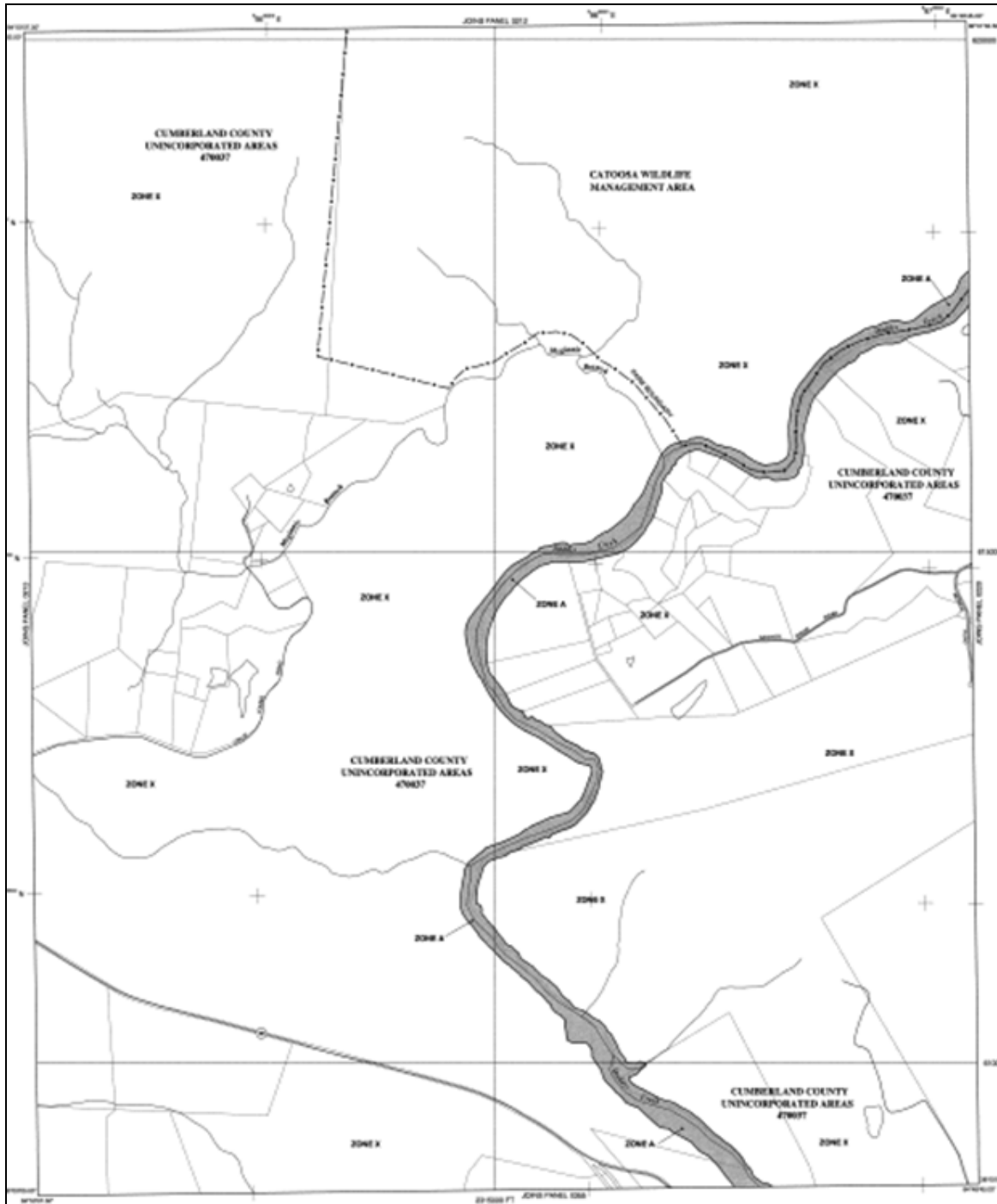
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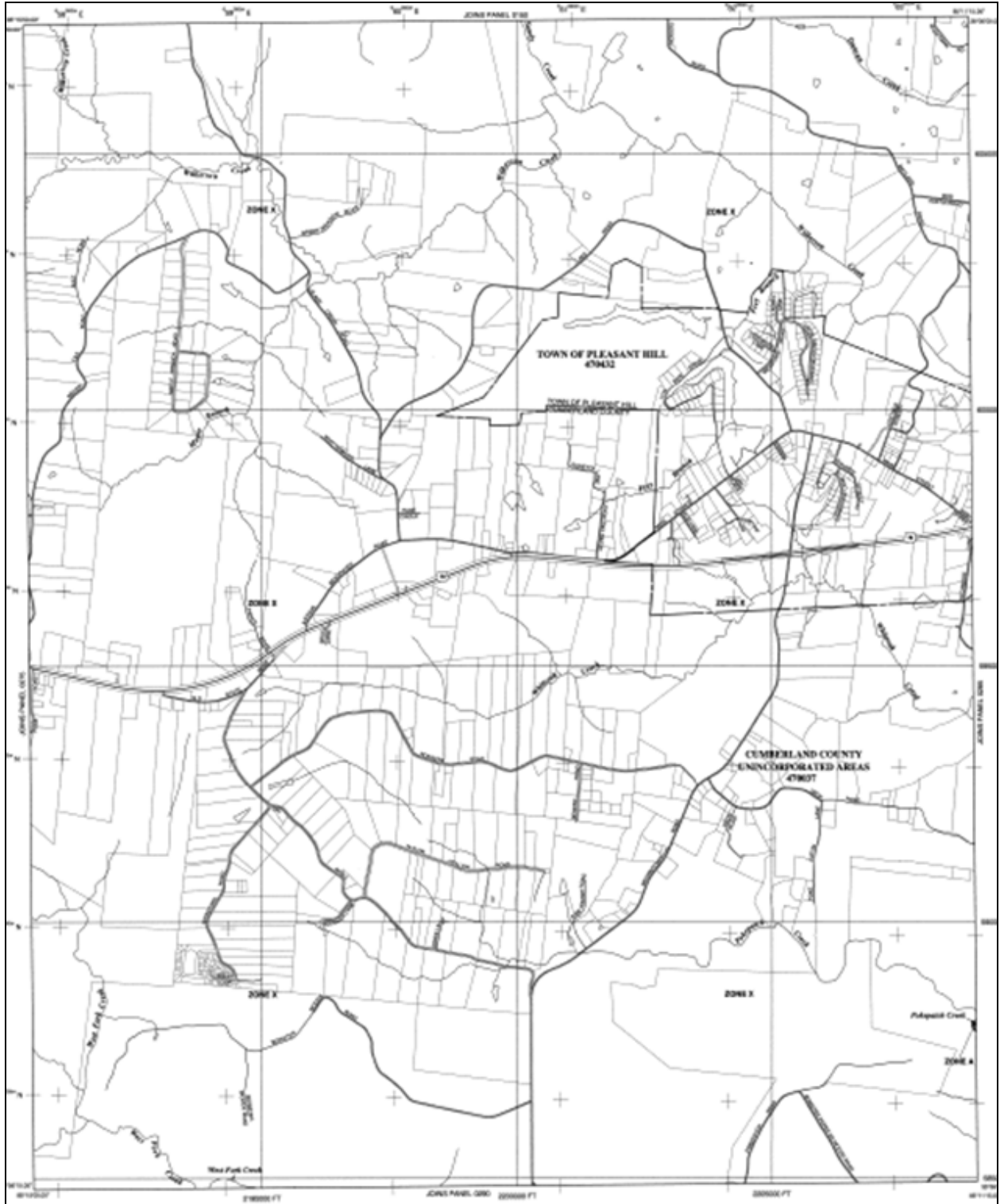
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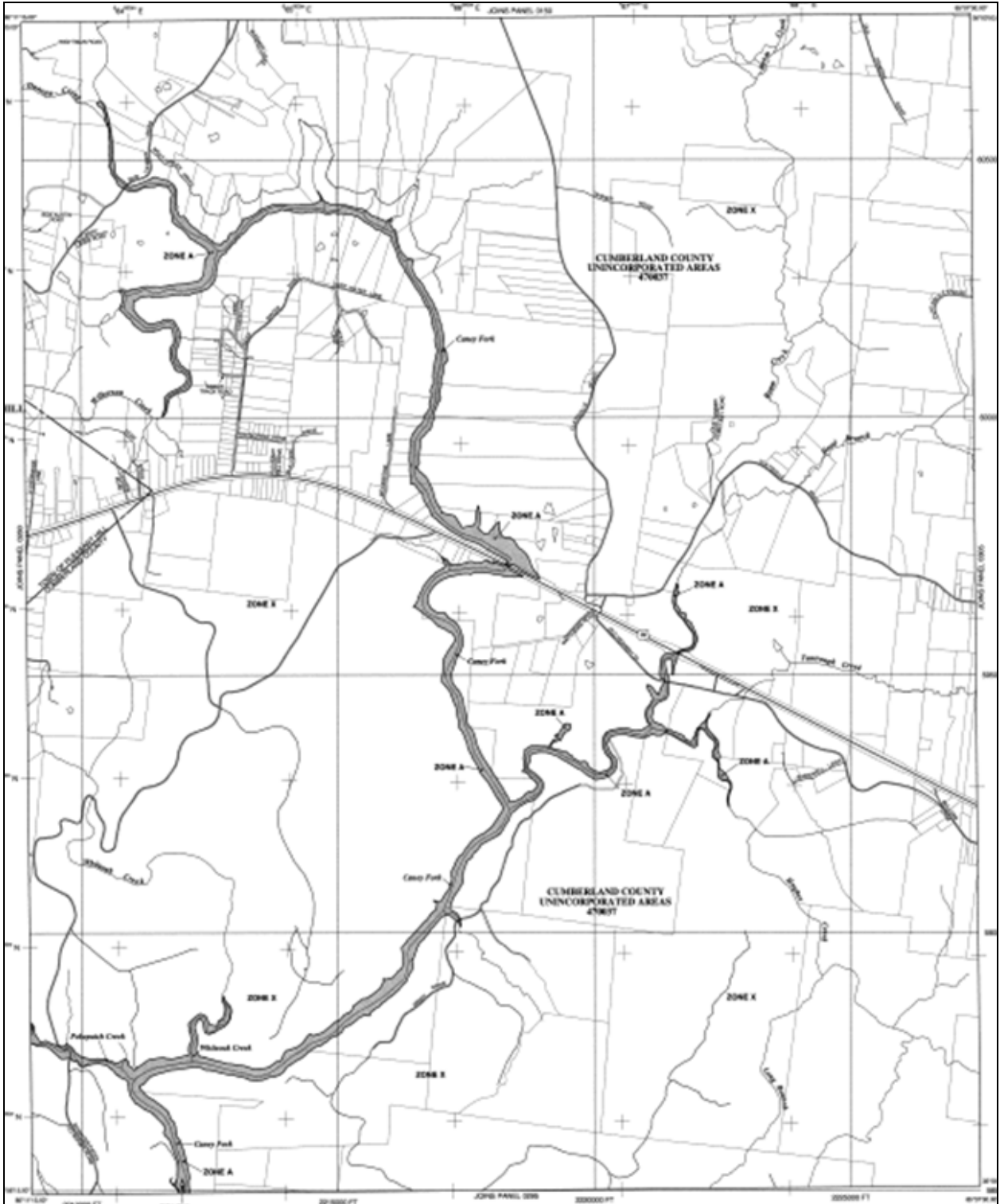
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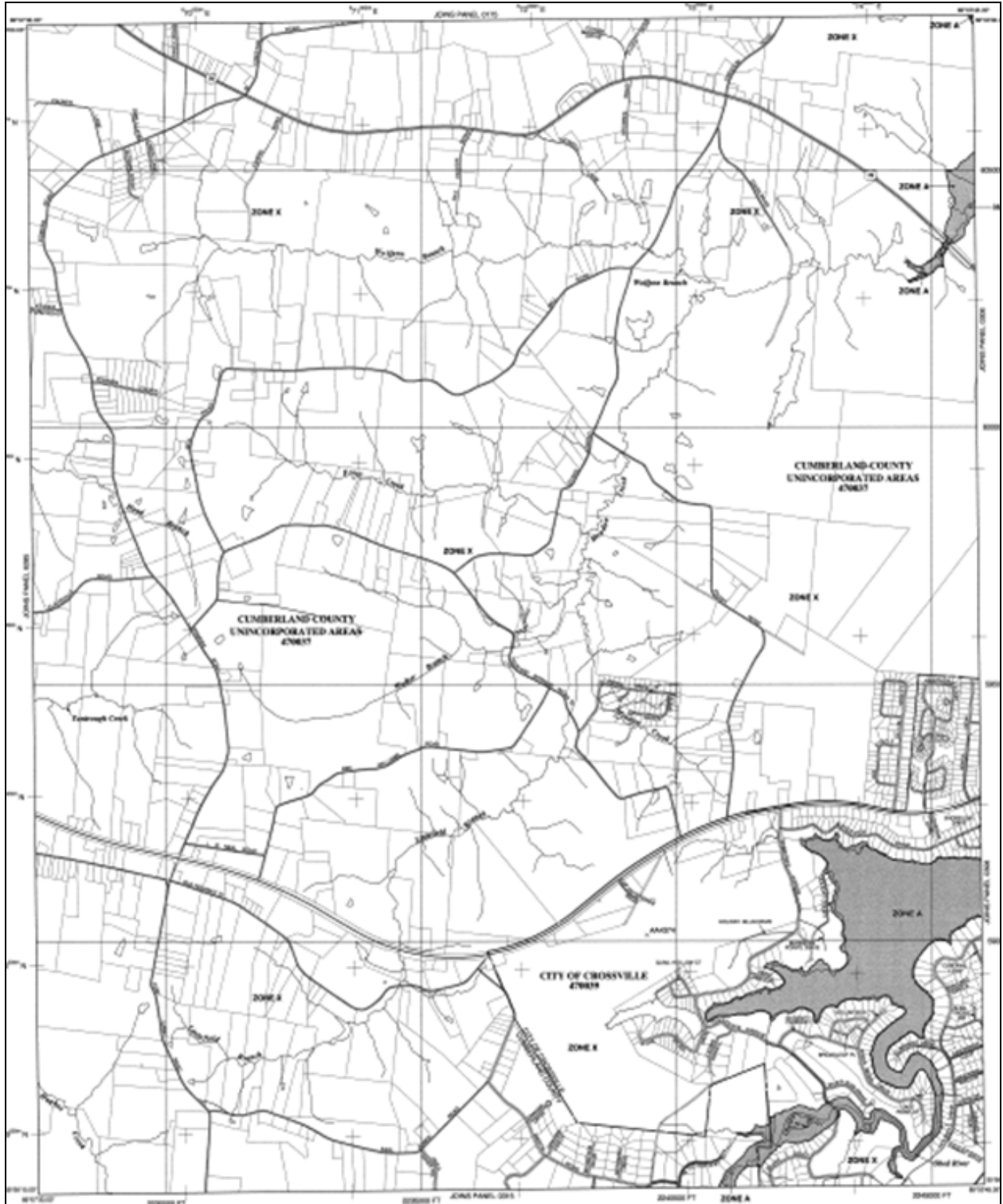
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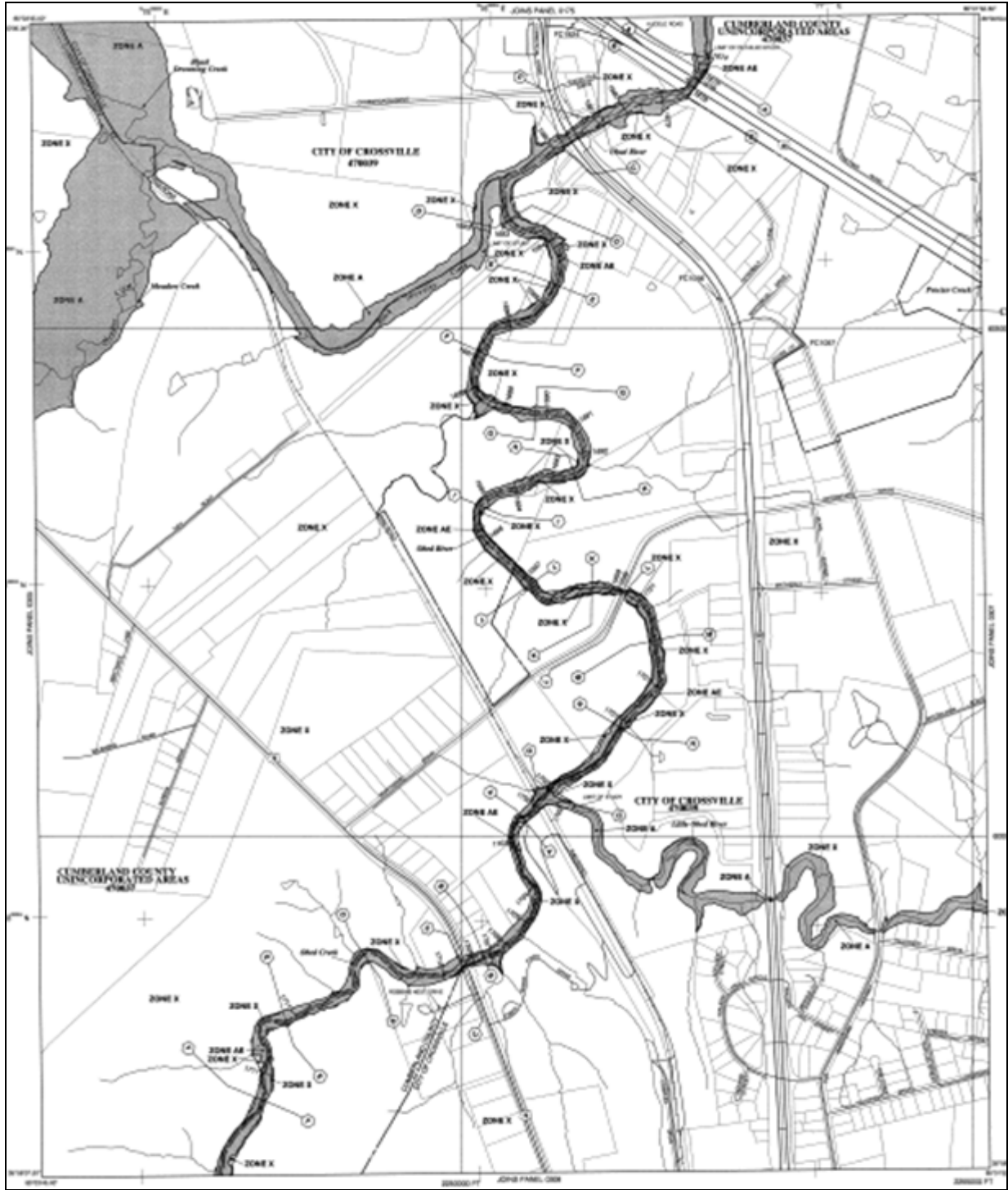
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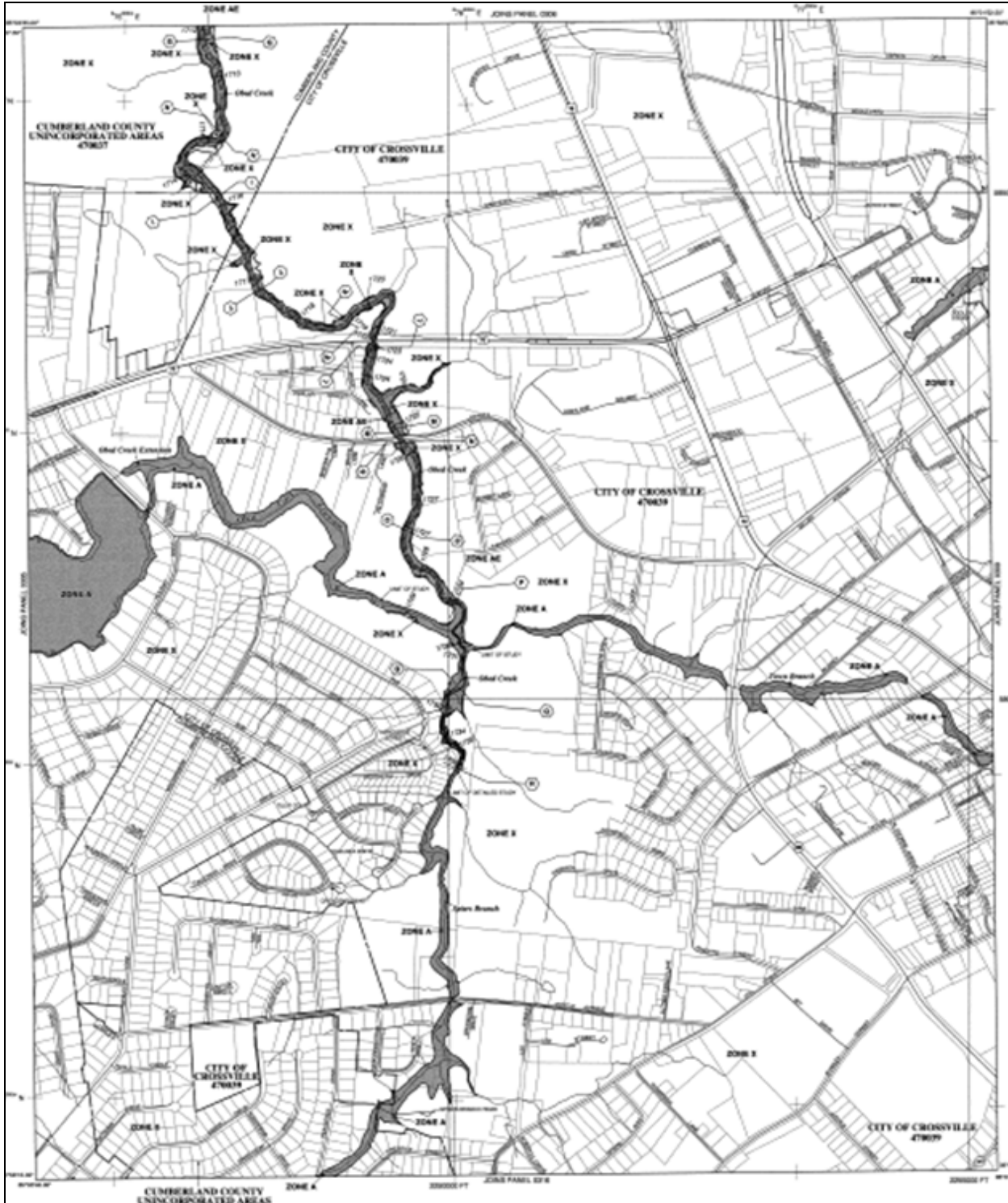
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Panel 20



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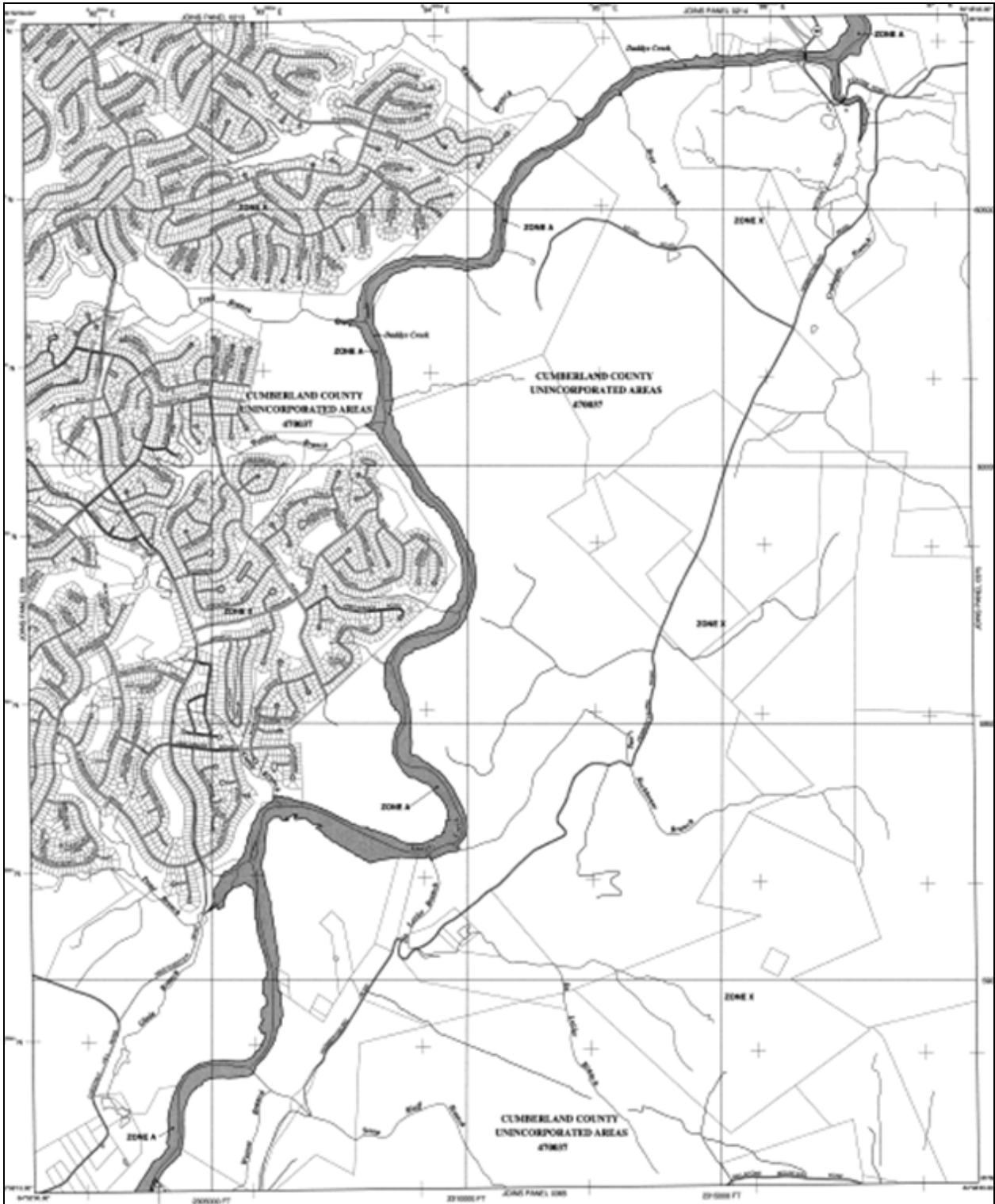
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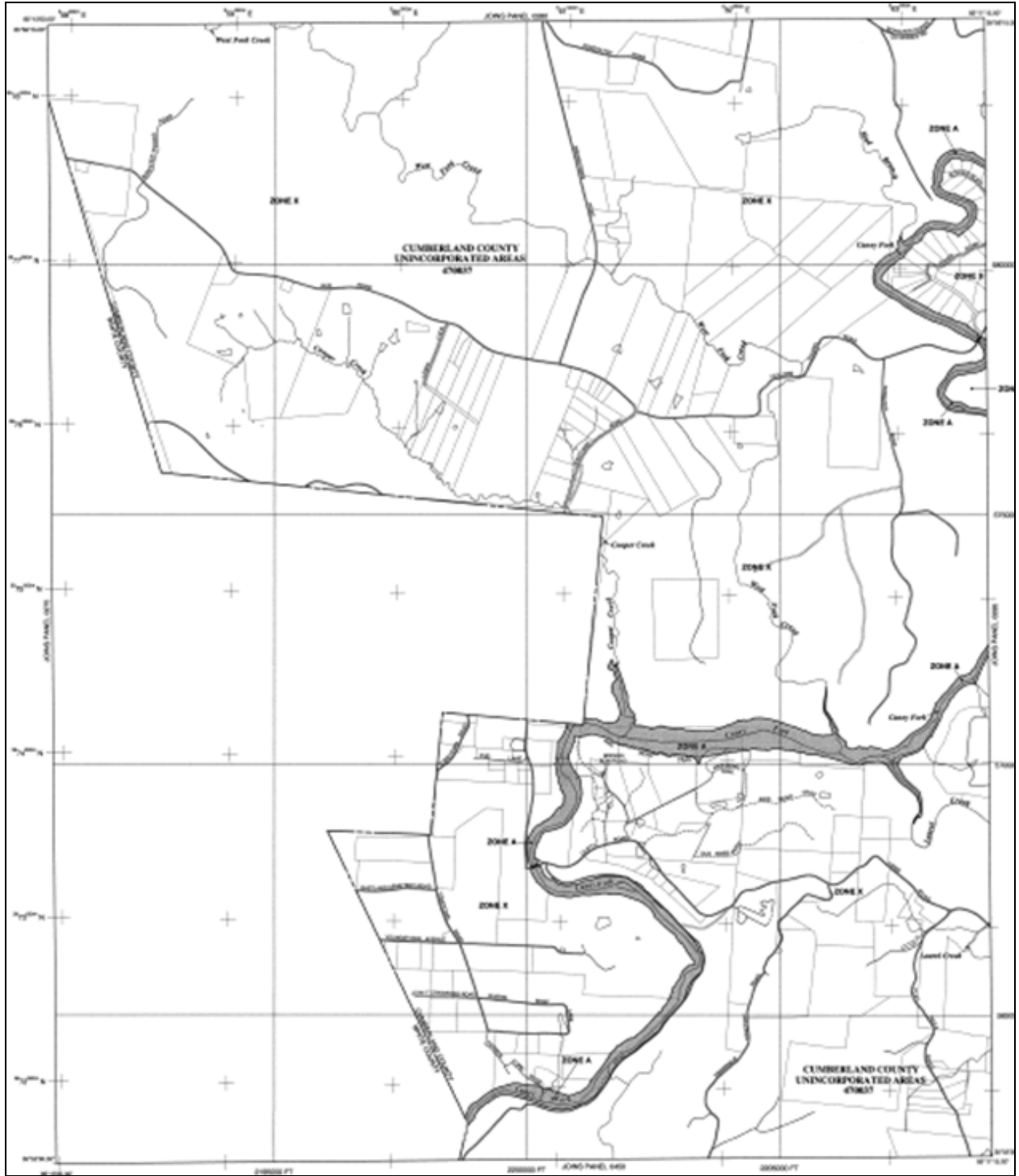
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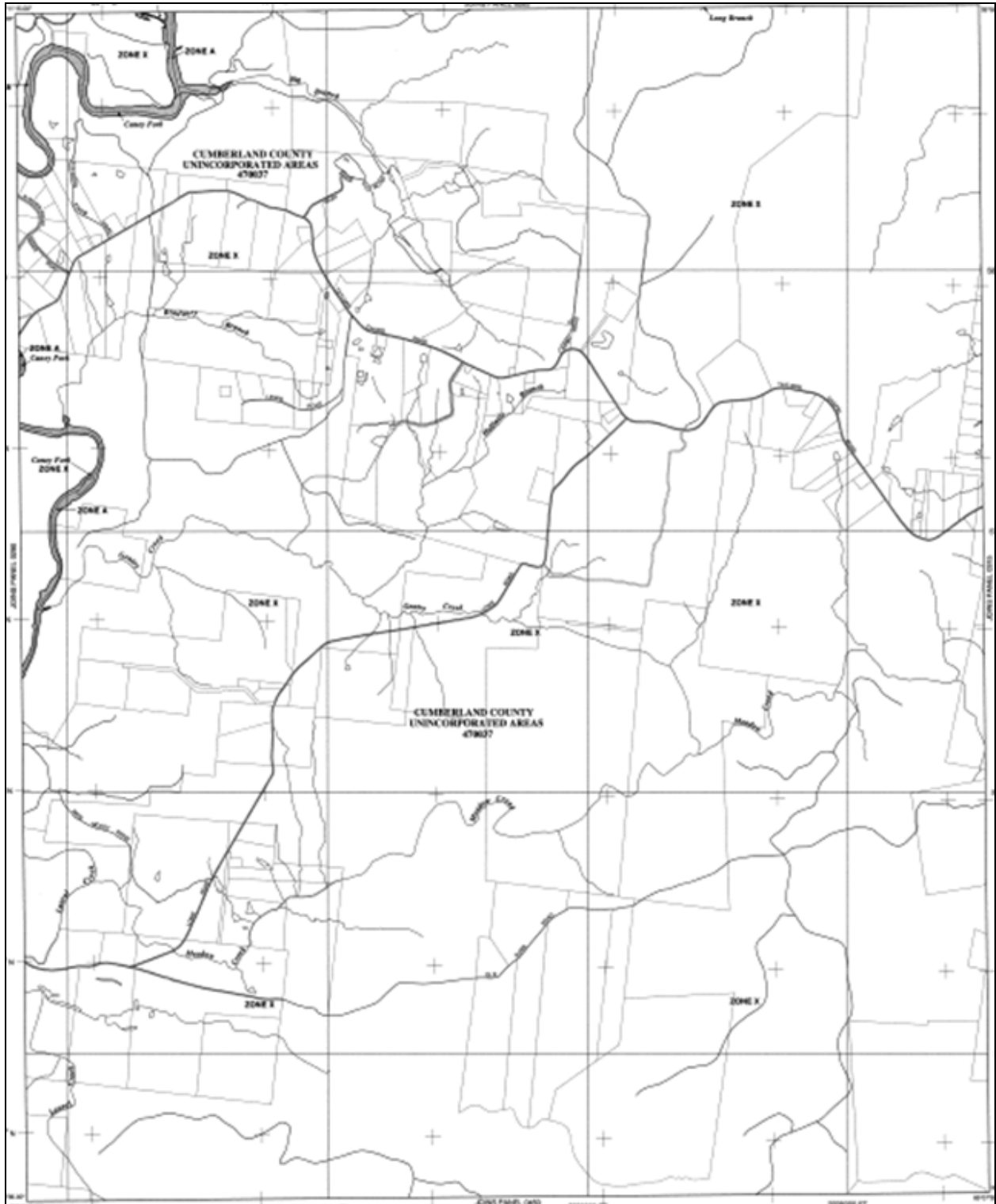


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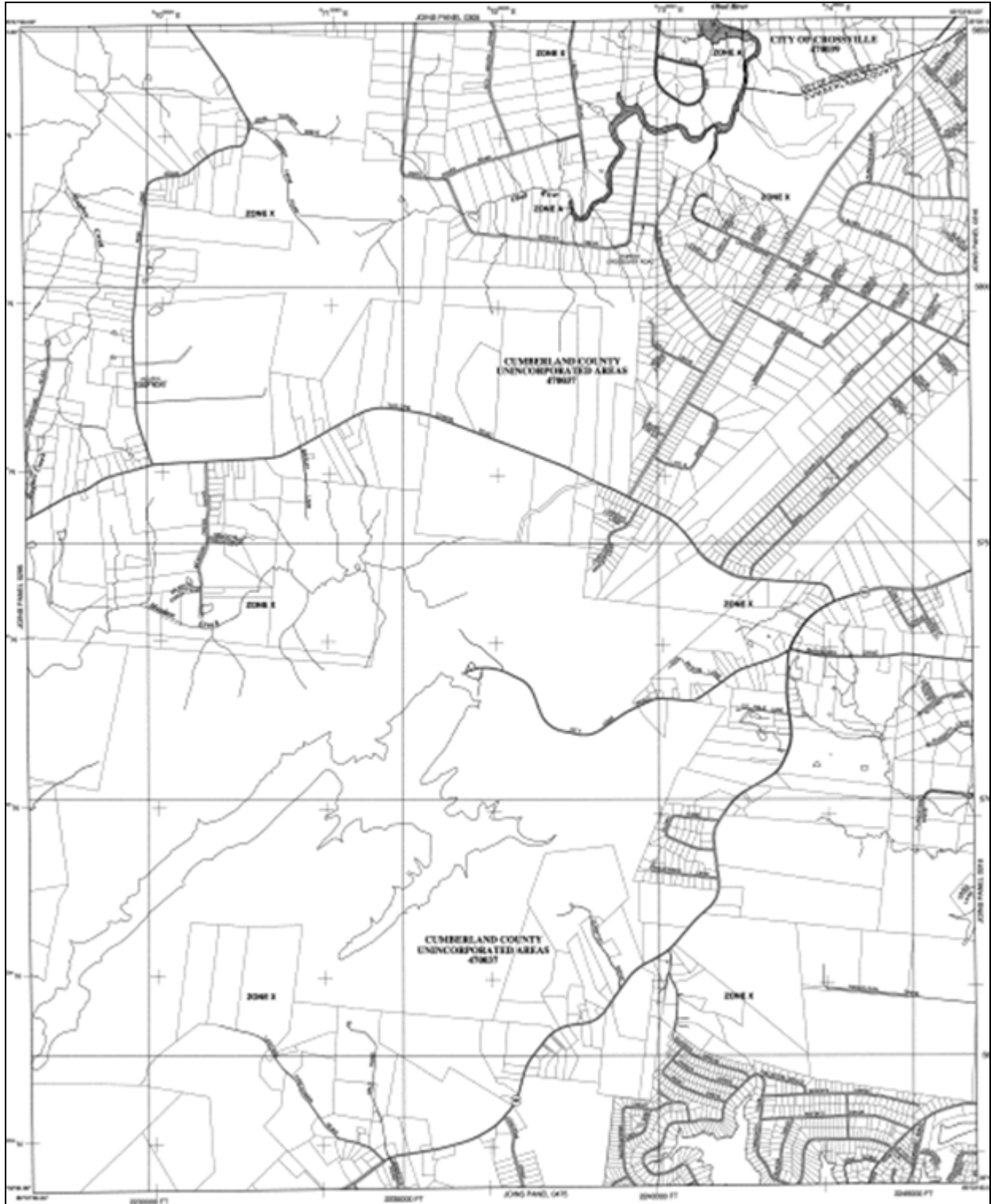
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Cumberland County Hazard Mitigation Plan April 6, 2018

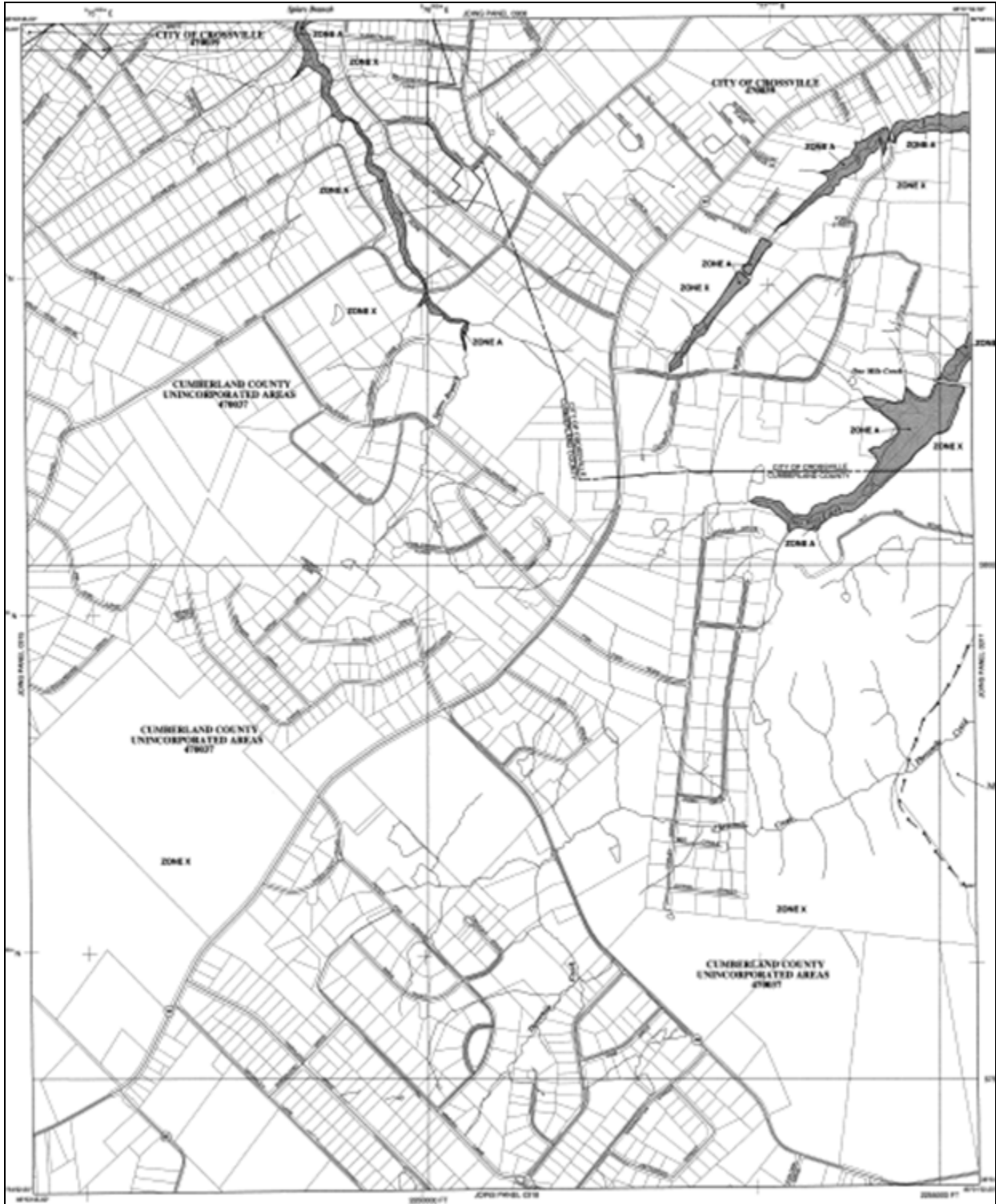


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Cumberland County Hazard Mitigation Plan April 6, 2018

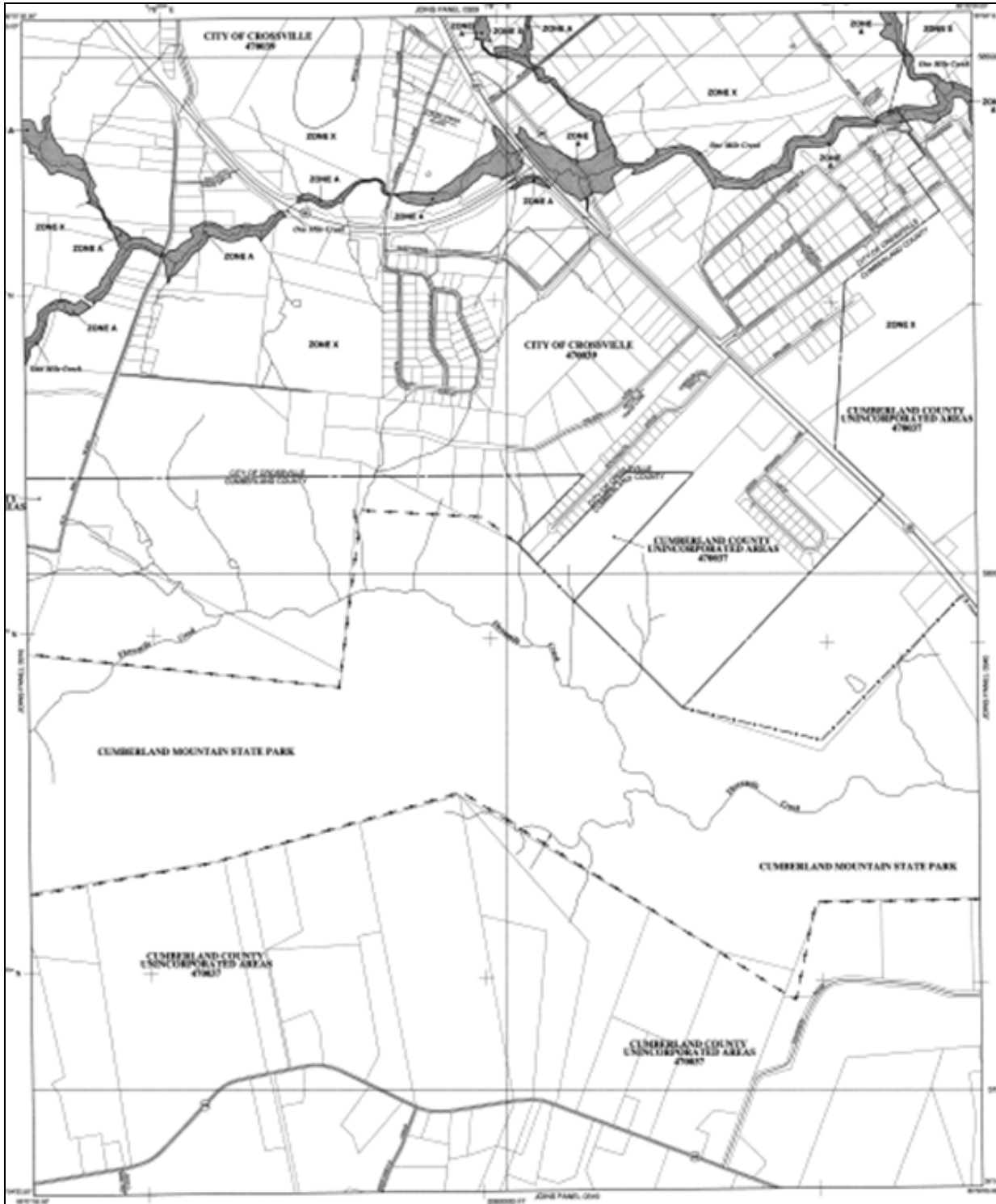


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Panel 31

Cumberland County Hazard Mitigation Plan April 6, 2018



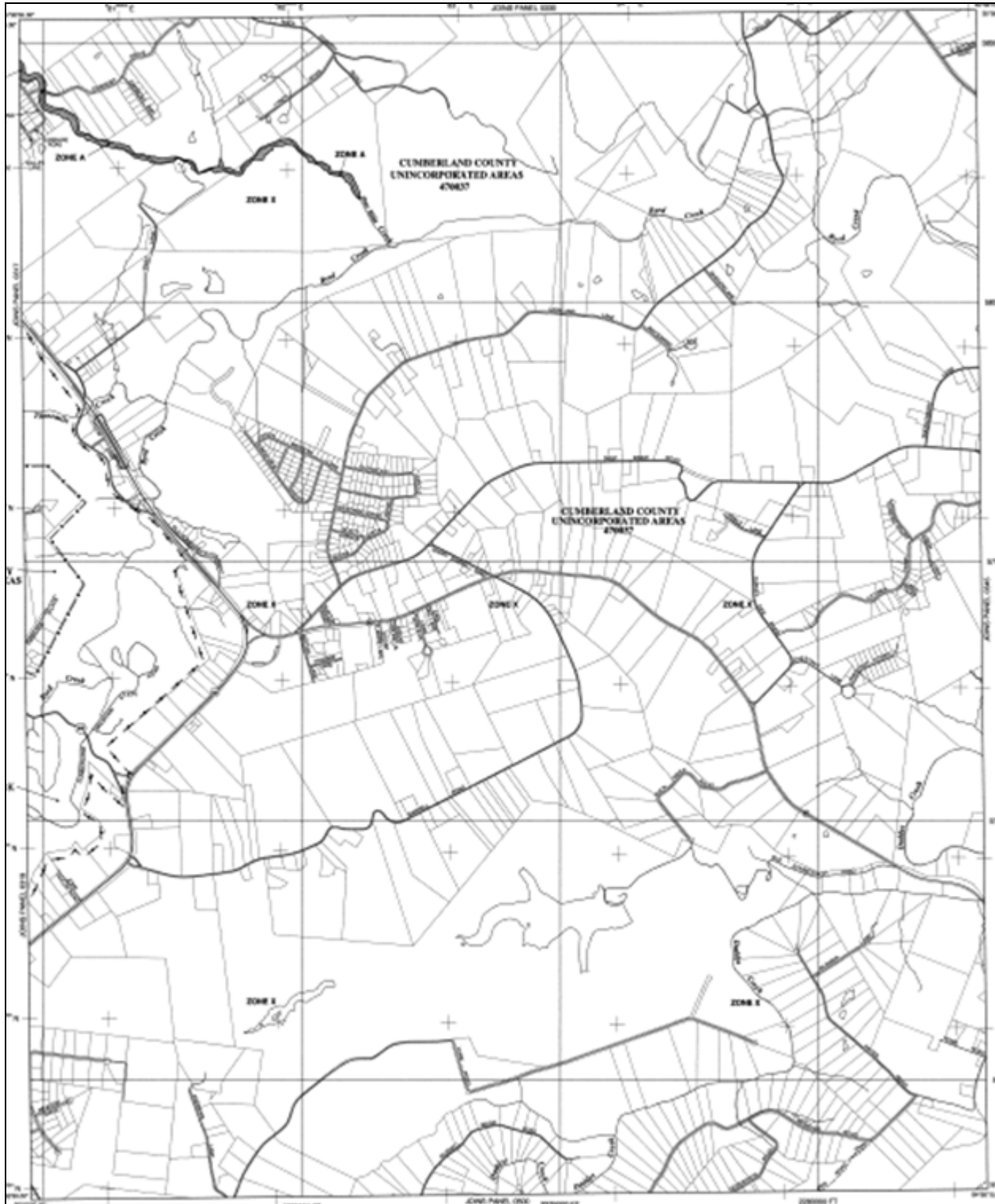
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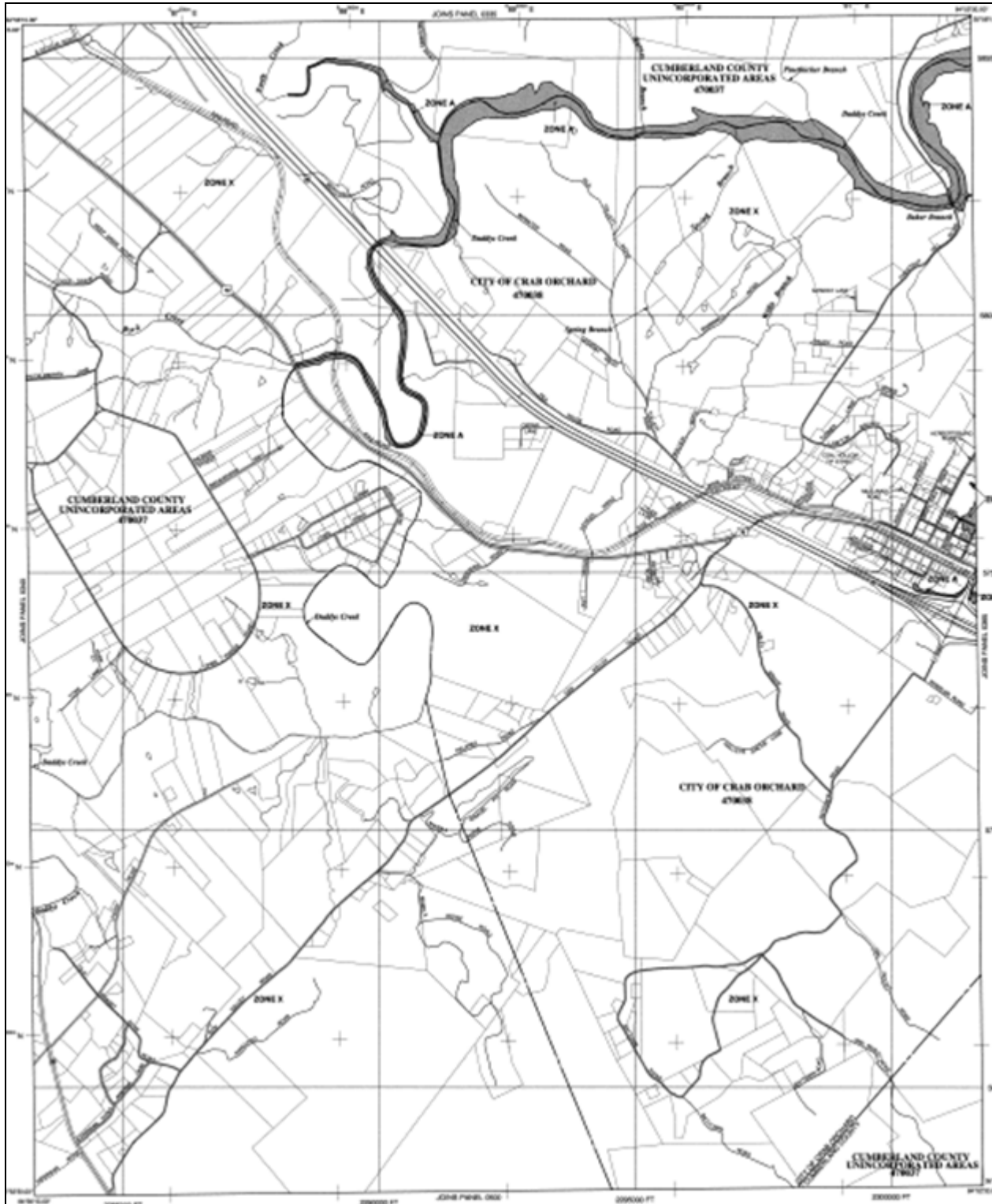
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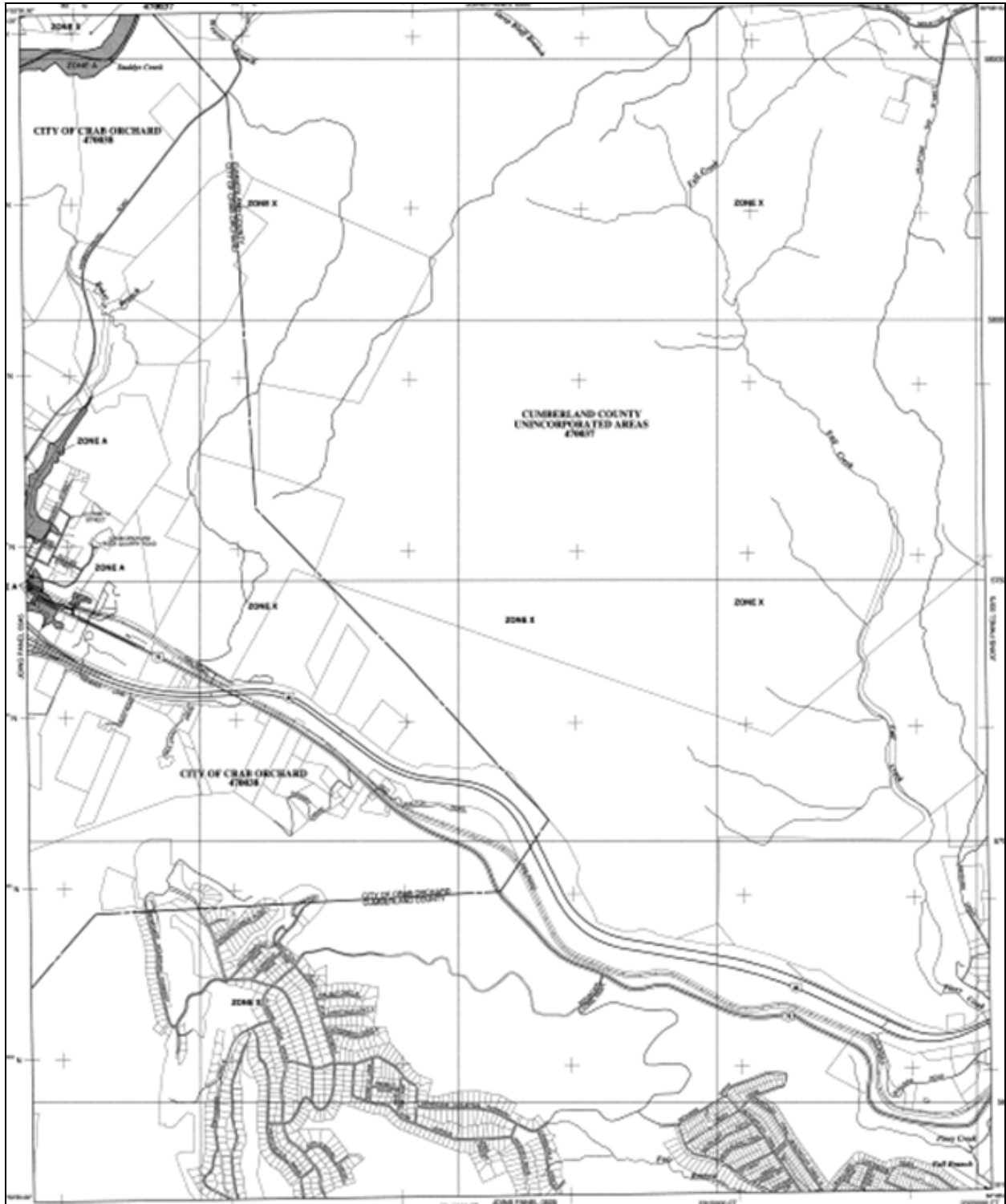
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Panel 35



Panel 36



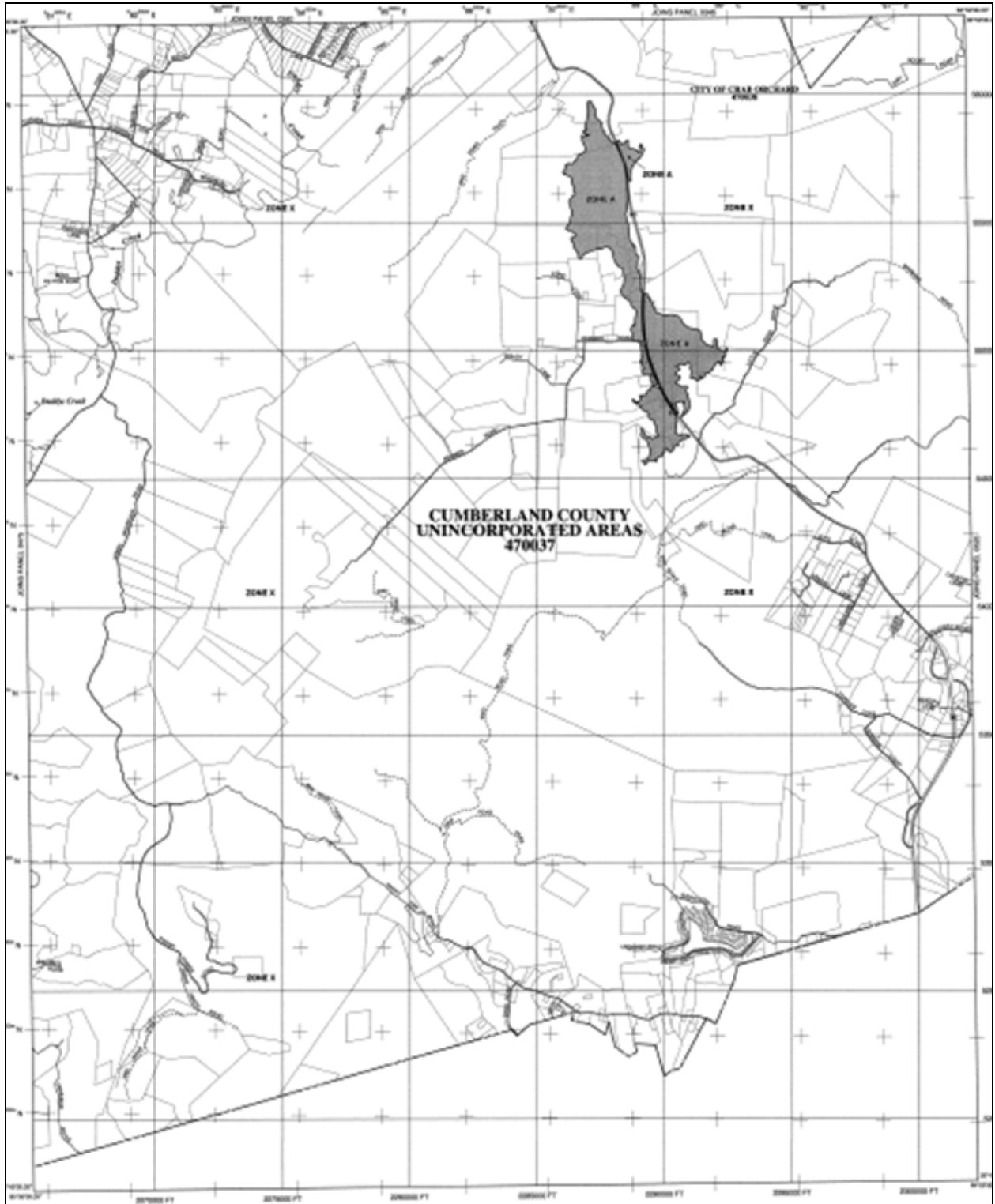
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Panel 39



Appendix 4

HAZUS: Flood Model

Hazus-MH: Flood Event Report

Region Name: CumberlandCounty2
Flood Scenario: 100-year flood study
Print Date: Wednesday, October 04, 2017

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

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

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

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General Description of the Region

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

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

- Tennessee

Note:

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

The geographical size of the region is 685 square miles and contains 3,404 census blocks. The region contains over 24 thousand households and has a total population of 58,050 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 28,006 buildings in the region with a total building replacement value (excluding contents) of 5,272 million dollars (2010 dollars). Approximately 93.33% of the buildings (and 75.84% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 28,036 buildings in the region which have an aggregate total replacement value of 5,272 million (2010 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	4,143,000	78.6%
Commercial	702,852	13.3%
Industrial	235,631	4.5%
Agricultural	25,893	0.5%
Religion	84,832	1.6%
Government	25,621	0.5%
Education	37,625	0.7%
Total	5,271,880	100.00%

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure (\$1000)	Percent of Total
Residential	569,525	84.1%
Commercial	59,146	8.7%
Industrial	31,301	4.6%
Agricultural	3,925	0.6%
Religion	10,031	1.5%
Government	112	0.0%
Education	2,885	0.4%
Total	670,925	100.00%

Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 144 beds. There are 15 schools, 17 fire stations, 3 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:	CumberlandCounty2
Scenario Name:	100-year flood study
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-ifs

Building Damage

General Building Stock Damage

Hazus estimates that about 14 buildings will be at least moderately damaged. This is over 51% of the total number of buildings in the scenario. There are an estimated 9 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of 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.

Table 3: Expected Building Damage by Occupancy

Occupancy	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	3	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	3	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	3	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	3	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	3	0.00	0	0.00	0	0.00	0	0.00
Religious	0	0.00	0	0.00	3	0.00	0	0.00	0	0.00	0	0.00
Residential	1	6.67	3	20.00	1	6.67	1	6.67	0	0.00	9	60.00
Total	1		3		1		1		0		9	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Multi-Housing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	0	0.00	0	0.00	3	3.00	0	0.00	0	0.00
Steel	0	0.00	0	0.00	3	0.00	0	0.00	0	0.00	0	0.00
Wood	1	6.67	3	20.00	1	6.67	1	6.67	0	0.00	9	60.00

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 144 hospital beds available for use. On the day of the scenario flood event, the model estimates that 144 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

Classification	Total	At Facilities		Loss of Use
		At Least Moderate	At Least Substantial	
Fire Stations	17	0	0	0
Hospitals	1	0	0	0
Police Stations	3	0	0	0
Schools	15	0	0	0

* This report displays a zero or is blank; two possibilities can explain this:

- (1) None of your facilities were flooded. This can be confirmed by running the inventory within the desktop tool.
- (2) The analysis did not run. This can be tested by checking the message box of 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) Structure (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 2,300 tons of debris will be generated. Of the total amount, Finishes comprises 26% of the total, Structure comprises 36% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 96 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 84 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 42 people (out of a total population of 56,053) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 18.06 million dollars, which represents 2.35 % 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 18.06 million dollars. 5% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 66.58% of the total loss. Table 8 below provides a summary of the losses associated with the building damage.

Table 8: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<u>Building Loss</u>						
	Building	8.43	0.40	0.15	0.30	9.28
	Content	4.43	0.31	0.37	0.16	5.27
	Inventory	0.00	0.33	0.05	0.30	0.68
	Subtotal	13.86	1.04	0.57	0.76	16.23
<u>Business Interruption</u>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental Income	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00
ALL	Total	13.86	1.04	0.57	0.76	16.23

Appendix A: County Listing for the Region

Tennessee
- Cumberland

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
Tennessee				
Cumberland	58,063	4,143,035	1,125,824	5,271,859
Total	58,063	4,143,035	1,125,824	5,271,859
Total Study Region	65,063	4,146,065	1,128,324	5,274,389