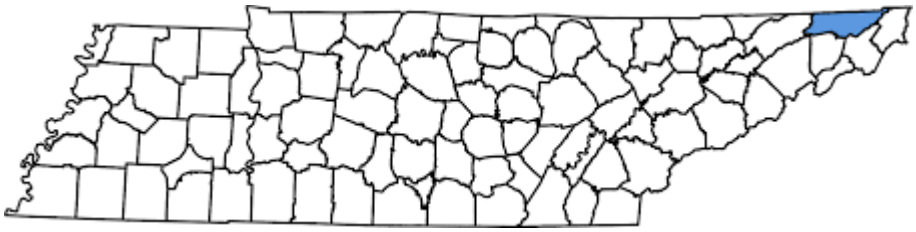
Sullivan County Multi-Jurisdictional Hazard Mitigation Plan



March 19, 2020

Prepared By:

Sullivan County Hazard Mitigation Committee
Sullivan 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 2020 update of the Sullivan County Hazard Mitigation Plan was created to act as a well-thought-out guide to be used by, and for, the people of Sullivan County. For this plan to be successful, the following jurisdictions participated in the drafting and preparation of the plan update. The participating jurisdictions include:

- Sullivan County (unincorporated)
- Town of Bluff City
- City of Bristol
- City of Kingsport

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

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

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Section 1: Planning Process

Planning Process Update

The last Sullivan County Hazard Mitigation Plan was approved by FEMA on August 11, 2015. 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 Sullivan County Emergency Management, Sullivan County Planning & Codes, etc. and the Tennessee Emergency Management Agency (TEMA) on February 18, 2020 (***See Appendix 1***). At this meeting, Sullivan 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 Sullivan County Emergency Management consisted of continuing to get agencies and the public involved in the county's mitigation efforts, performing the written plans 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, facilitating the meeting and guiding the committee on planning requirements; (a service established as part of the Tennessee Mitigation Initiative). Additional activities during this meeting include reviewing past incidents, disasters and data to gain a complete understanding of the hazards faced by Sullivan County and all jurisdictions within. The committee proceeded to rate each hazard to evaluate risk. This rating of each hazard is incorporated into the plan under Risk Assessment. The mitigation goals were established and reviewed.

Prior to these meetings, Sullivan County began reorganizing the county-wide hazard mitigation committee. Realizing that a successful mitigation committee includes a number of representatives, specialists, and individuals who can give valuable/unique insights that local emergency management staff may not have considered; invites to be a part of this plan update included open invitation to elected officials, county and city staff, representatives of the jurisdictions, neighboring counties, local businesses, state agencies, private organizations, academia, non-profits,

and other noticeable persons. These invites included email, phone and face to face contact by Emergency Management staff.

Within this plan update, the participating jurisdictions are outlined in the Executive Summary. The Sullivan County Hazard Mitigation Committee for the plan update consists of the following members:

Member	Representation
Jim Bean **(Committee Chair)**	Sullivan County EMA Deputy Director
Scott Boyd - Chief	Kingsport Fire Department
Terry Arnold - Deputy Chief	Kingsport Fire Department
Jacob Chandler - Engineer	City of Bristol
Jeff Harrison - Engineering Const Inspector	City of Bristol
Tina Wright - Admin Assistant	Sullivan County EMA
Steve Perry - Logistics Chief	Sullivan County EMA
Savannah Garland - Planning Department	City of Kingsport
Mike Carrier - Chief	Bristol Tennessee Fire Department
Ambre Torbett - Planning Director	Sullivan County Planning & Codes
Greg Depew - Chief	Bluff City Police Department

The Sullivan County Hazard Mitigation Committee continues to be the county's lead in all mitigation efforts and in the development of the county's mitigation plan. The committee member's efforts in the plan update were broken down into five stages: **1)** analysis of the 2015 plan **2)** updating of the plan, **3)** public participation, **4)** review of the final updated plan, and **5)** adoption of the plan.

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

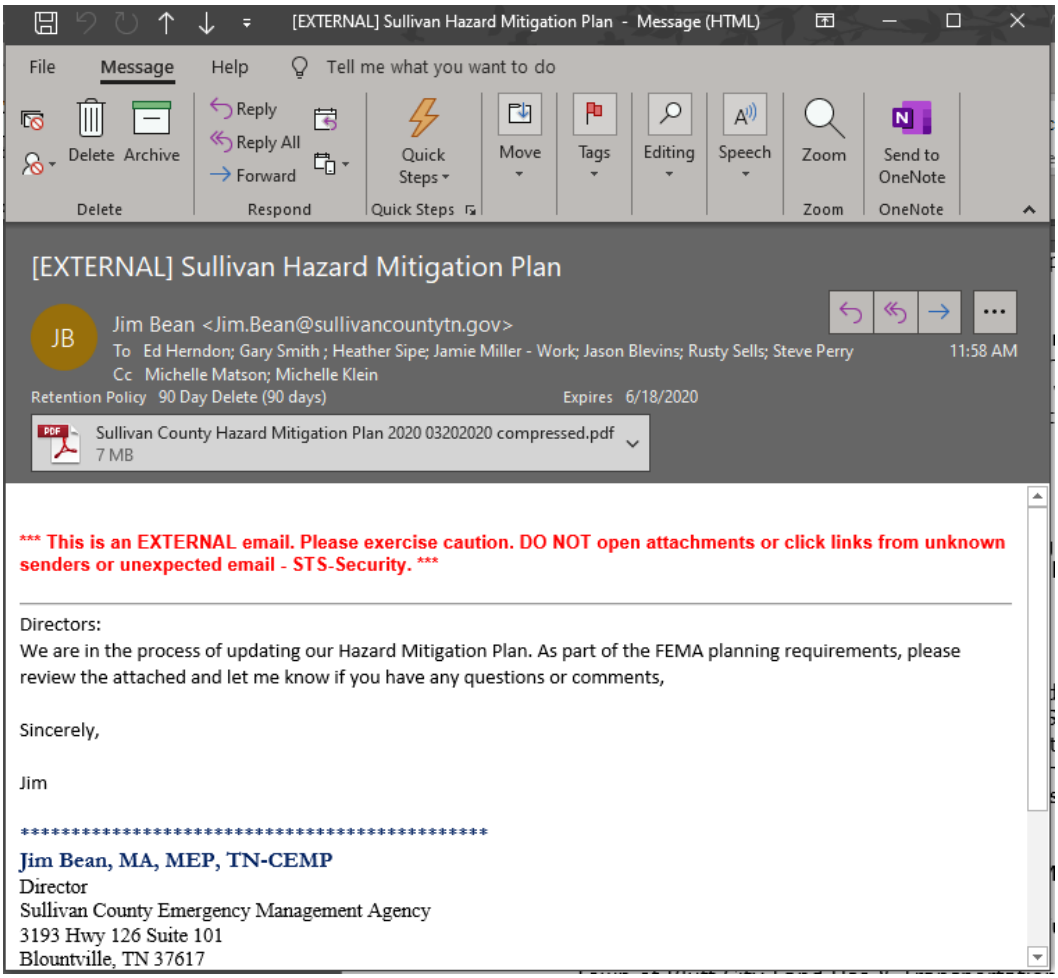
Stage 2: From there the committee started making the updates to the plan. Tasks included soliciting for new mitigation projects to be added to the plan and examining the status of mitigation projects listed in the 2015 plan.

Stage 3: To encourage public involvement, the Sullivan County Hazard Mitigation Committee advertised the second committee meeting for February 25, 2020 on the Sullivan County Emergency Management's Facebook page. This notice presents the purpose of the meeting, the time and date of the meeting, the exact location of the meeting, and stated that all are invited to attend. This meeting provided a great opportunity

for the public to comment on the plan during the update drafting stage, to contribute in project proposals, and to participate in project reprioritization. ***Appendix 2*** provides a copy of the meeting's attendance sheet and ***Appendix 3*** presents a copy of the public notice for the meeting.

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

Also, Sullivan County Emergency Management invited the surrounding jurisdictions to comment on the plan via email. The email was addressed to the surrounding County's Emergency Managers which included Hawkins County, Greene County, Washington County, Carter County and Johnson County. The screenshot of the invite is below.



Stage 5: Upon receiving the "Approval Pending Adoption" designation from FEMA's review, adoption/resolution will be obtained for each participating jurisdiction.

Review of Existing Information

A preliminary review of existing plans, reports, and information was conducted during the initial phase of creating the Sullivan 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:

- Sullivan County Multi-Jurisdictional Hazard Mitigation Plan, 2015
- Sullivan County Emergency Operations Plan
- Sullivan County Regional Plan: A Guide for Future Land Use & Transportation Development, 2006-2026
- Town of Bluff City Land Use & Transportation Plan, 2008-2028
- City of Bristol Future Land Use Plan, 2006-2025
- City of Bristol Capital Improvements Plan, 2015-2019
- City of Kingsport Capital Improvements Plan, FY2013-2014
- City of Kingsport Long Range Transportation Plan, 2035
- Sullivan County, TN Flood Insurance Study, 2006 and
- State of Tennessee Standard Hazard Mitigation Plan.

All the listed plans, studies, and data sources were incorporated into the Sullivan County Multi-Jurisdictional 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 projects (aka: 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 Sullivan County Multi-Jurisdictional Hazard Mitigation Plan. Sullivan County reviewed and analyzed each section of the original plan and made updates in the following ways:

Section 1: Planning Process

Sullivan County updated the original plan's description of the planning process to include the new or no longer participating committee members, updated the plan's description of the most recent countywide mitigation meetings that took place in 2020, and documented the lasts opportunities for the public to get involved.

Sullivan County also reviewed the list of existing documents from the 2015 plan and updated accordingly.

Section 2: County Profile

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

Section 3: Risk Assessment

The committee reviewed their hazards from the 2015 plan and decided to focus more on hazards of prime concern. This shift was made to allow for more meaningful mitigation actions/projects. These hazards include: Flooding, Severe Storms (Hail, Wind, Tornado), Winter Weather, Wildfire and Drought.

As part of the plan update, Sullivan County updated their previous occurrence hazard listings going back to 1950 except for Wildfires and Drought allowing for re-evaluation of each hazard's extent, probability, and potential impacts. The source for this data was NOAA's National Centers for Environmental Information, Storm Events Database (NCDC). In some instances, this data did not go back to 1950 but all documented events from the NCDC are included. The county then decided to use a different method for determining vulnerabilities/risks because this new method was considered superior to the older plan's method. Also, the plan now has a HAZUS-flood model study and simplified countywide floodplain maps (as seen in the plan's appendices).

Section 4: Mitigation Strategy

Sullivan County changed their mitigation goals from the 2015 plan to allow for a broader focus and the likely shift in priorities as the 5 years progress. Additionally, Sullivan County has utilized a new method for prioritizing mitigation projects, (thought to be superior to the previous method). Sullivan County also has brainstormed many new mitigation projects that were added to the list, used a new chart method to profile project details, and developed a system to describe where their previous plan's projects are in terms of being implemented.

Section 5: Plan Maintenance

Sullivan 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 Sullivan 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

Sullivan County is bordered by four Tennessee counties in northeastern Tennessee (Hawkins to the west, Washington, Carter to the south and Johnson to the east) and two Virginia Counties (Scott and Washington) to the north. Sullivan County encompasses approximately 429.7 square miles, 17 of which are water. The terrain ranges from smooth rolling hills and valleys to mountain ranges. Elevations range from about 1,200 feet along the Holston River to 3,800 feet in the Holston Mountain Range near the Carter, Johnson and Sullivan County lines. Other spot elevations are:

- Blountville - 1,595 feet; Kingsport - 1,220 feet; Bristol - 1,650 feet; High Point on Bays
- Mountain - 2,405 feet; and Overlook at Boone Dam - 1,420 feet.

Sullivan County is in the Holston River drainage basin. The floodplains of the Holston River, Reedy Creek, Horse Creek, and Beaver Creek are fairly wide and flat. The floodplains of most of the other streams in the county are narrow. The terrain is hilly to mountainous. The 2015 Sullivan County Hazard Mitigation Plan stated the 2010 U.S. Census population for the County was 156,823 persons (density of 379.4/sq mi) with an estimated population in 2011 of 157,419 persons. The estimated population for 2018 Sullivan County is 157,668.

The Town of Bluff City is situated in Sullivan County approximately 9 miles southwest of the City of Bristol. The 2010 population of Bluff City was 1,733 persons with population estimates for 2018 being 1,665.

The City of Bristol is situated in Sullivan County bordering the Tennessee-Virginia state line with an area of 30.6 square miles. It is directly adjacent to its twin city, Bristol, Virginia. The 2010 population of Bristol, Tennessee, was 26,702 persons with population estimates for 2018 being 26,881.

The City of Kingsport is located on the north bank of the South Fork Holston River, just south of the Tennessee-Virginia state line and Weber City, Virginia. Kingsport is a city in Sullivan and Hawkins counties. Kingsport is the home of large industrial and commercial development. The 2010 population of Kingsport was 48,205 persons and the 2018 population estimate is 54,076.

Kingsport and Bristol represent a recognized trade center for a two-state area and are located very near to the Virginia state line. Kingsport-Bristol, TN (includes Bristol, VA) is the center of a Metropolitan Statistical Area (MSA). The MSA title corresponds to the name of the largest central

city(s) in the area. Additionally, the Kingsport-Bristol MSA and the Johnson City MSA constitute the Johnson City-Kingsport-Bristol Combined Statistical Area (CSA). These three cities are commonly referred to as the Tri-Cities region.

Agriculture is an economic component in Sullivan County and the jurisdictions within. According to the United States Department of Agriculture's information gathered in 2017, there are 1,183 farms in Sullivan County, and the jurisdictions within, which is an increase from 2012 of +10 farms. The market value of products sold is $21,999,000 which in average of $18,596 per farm. The total land in farms is 83,847 acres with 38% being cropland, 38% being pastureland, 19% being woodland, and 5% being other. 65 acres are irrigated.

Future growth

The committee was asked to provide feedback and information on future trends. The specific question asked was, "List the areas in your jurisdiction (region, subdivision, etc.) that have experienced growth in the past 10 years or are anticipated to have significant growth in the near future, as well as any potential complications from natural hazards due to the development."

The committee's answers is as follows. Industrial growth includes Eastman Chemical Administrative Building, HSN Distribution Center in Piney Flats and Aerospace Park in Blountville. Commercial growth includes Pinnacle in Bristol, Fort Henry Mall remodeling in Kingsport and Miracle Field in Kingsport. Residential growth includes Sullivan County has had a steady growth over the past 10 years, and single family dwellings and apartment complexes being constructed in what was once farmland.

Resource Capabilities

	YES	NO
Does your jurisdiction enforce building code ordinances? (Inside City jurisdictions only)	X	
Does your jurisdiction enforce zoning code ordinances?	X	
Is your jurisdiction a member of the National Flood Insurance Program?	X	
Does your jurisdiction have the following resources in place?		
Law enforcement	X	
Full-time fire services (Inside City jurisdictions only)	X	
Grant writer		X
Public information officer	X	

Expanding & Improving Mitigation Programs

Sullivan County, Bluff City, Bristol and Kingsport have continued to work together in the identification of vulnerable areas and the pursuit of projects especially through the Hazard Mitigation Plan updates of 2014 and 2020. Both have sought additional funding whether it be mitigation funding, and other means, to complete mitigation projects. Finding the match funds is difficult but not impossible. It requires focused effort on the budget for each jurisdiction along with buy-in on the mitigation program/project. Financial means to complete mitigation projects is a concern. Additional challenges include buy-in from elected officials will be needed along with matching funds that are required along with community support for projects that will not show the results until during a disaster.

The committee was asked, “In what ways do you see opportunity to expand or enhance mitigation programs in your community?” The response was, “Grants for generators in emergency service locations such as fire/EMS/Police Stations. There is a need for generators especially in lieu of potential tornadoes and severe winter weather.” The other was public education for all the county and cities.

Section 3: Risk Assessment

Hazard Identification

To begin to assess Sullivan County, and all jurisdictions within, 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 Sullivan County by going through newspaper articles, Sullivan County Emergency Management records, the 2015 Sullivan County Hazard Mitigation Plan, and recalling personal experiences. From there Emergency Management staff also analyzed hazard events that could occur in the county by reviewing scientific studies and the State of Tennessee Hazard Mitigation Plan. The following hazards have been identified as hazards of prime concern by the Sullivan County mitigation committee. There is a change in focus from the 2015 plan to the 2020 plan to allow for balancing of priorities. The 2015 plan risk assessment was too overwhelming to allow for identification of the prime hazards. By focusing on hazards that are a top priority for the committee, it allowed for better committee discussion and awareness. In some cases, sources of data are restricted to the State of Tennessee Hazard Mitigation Plan and state agencies to ensure continuity of reporting into future years. Consideration has been paid to local needs, input and sensitivities to ensure state and federal input doesn't influence the needs or desires, as deemed appropriate by the committee, of this local plan.

Flooding

Flooding events occur when excess water from rivers and other bodies of water overflow onto riverbanks and adjacent floodplains. In addition, lower lying regions can collect water from rainfall and poorly drained land can accumulate rainfall through ponding on the surface. Floods in Sullivan 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.

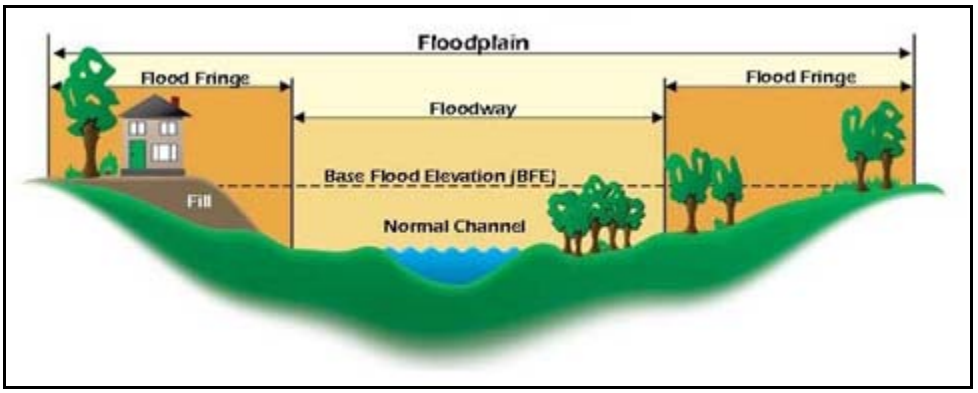
Source: The Field Studies Council

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 Sullivan 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 Sullivan 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:

- Austin Springs Road
- Bancroft Chapel Road
- Barnette Road Underwood Spring Branch Road
- Bethel Drive
- Beulah Church Road
- Big Arm Road
- Big Hollow Road
- Big Springs Road
- Buncombe Road
- Evergreen Drive
- Glen Alpine Road (at Ridge Rd, Princeton Rd, Rushmore Rd Intersections)
- HarrTown Road
- Hawley Road
- Mount Holston Road
- Murrell Road (at Creek Crossing just past Old Blairs Gap Rd)
- OIlis Bowers Hill Road (at bridge)
- Packing House Road (at city line)
- Paperville Road
- Pemberton Road
- Pickens Bridge Road
- Pleasant Grove Road
- Princeton Road (between Little Valley Rd & Hinkle Rd)
- Reservoir Road (at Glen Alpine Rd, also between Diana Rd & Long Hollow Rd)
- Riley Hollow Road
- Ryder Church Road
- Sky Wa Mo Road

- Springdale Drive
- Tate Road

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

Sullivan 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 Sullivan County from 1950 to 2020 and a list of each flood's description of impacts imposed on the community. No flood was listed for Sullivan County prior to 1996.

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

Flood Events in Sullivan County: 1950 to 2020

Location	Date	Deaths	Injuries	Property Damage	Extent/Impact Description
Countywide	1/19/1996	0	0	0	Two to over three inches of rain Friday night into Saturday morning combined with melting snow resulted in flooded roads, homes and farmlands.
Countywide	3/15/1996	0	0	0	Heavy rain flooded the Glenn-Aline Road causing a school bus to stall. Children were forced to evacuate the bus.
Blountville	5/24/1996	0	0	20000	Between 1.5 and 3 inches of rain fell in one hour. Several roads were closed and at least one home was heavily damaged.
Bristol	5/24/1996	0	0	0	Numerous streets and secondary roads were flooded. Several Bristol residents were evacuated.
Bloomingdale	5/25/1996	0	0	0	There was extensive flooding near Bloomingdale. Homes and streets were flooded and vehicles were reported to be afloat. Hail up to Quarter size also occurred.
Countywide	5/26/1996	0	0	0	Strong thunderstorms with heavy rains moved across areas where the ground was completely saturated from previous rains. Numerous roads were closed or washed out and mudslides were reported.
Countywide	5/26/1997	0	0	0	In Sullivan county, Bloomingdale Road blocked by high water. 8 to 10 inches of water on the road in north part of Kingsport.
Kingsport	7/22/1997	0	0	0	Widespread street flooding in downtown Kingsport.
Kingsport	6/22/1998	0	0	0	Flooding reported in Kingsport, Colonial Heights and Bloomingdale.
Sullivan Gardens	6/24/1998	0	0	0	Creek out of banks and roads flooded around Sullivan Gardens, Mitchell Road and Fordtown Road.
Countywide	7/11/1999	0	0	0	Widespread showers and thunderstorms with heavy rain caused flooding problems throughout much of East Tennessee. Numerous incidents of minor flooding were reported around the remainder of the region. Water began to recede across the region by late afternoon/early evening Monday.
Kingsport	7/24/1999	0	0	0	Flooding on Chadwell Road east of Kingsport. Road closed for a short time.
Countywide	7/3/2001	0	0	0	Several homes, streets and roads flooded across the county.
Blountville	7/29/2001	0	0	0	Water in businesses and two vehicles submerged in a parking lot.
Bristol	7/29/2001	0	0	0	Water entered a home on Wyatt Hollow Road.
Countywide	7/29/2001	0	0	0	High water problems continued with a few roads closed and homes flooded.

not provided	3/17/2002	0	0	0	Widespread flooding occurred across most of East Tennessee. Rainfall totals between five and eight inches were reported in 36 hours. Total damage estimates were calculated to be over 5 million dollars.
not provided	2/14/2003	0	0	0	Four day rainfall totals of two to eight inches fell across east Tennessee. This rainfall combined with a melting snowpack (reports of up to a foot in the higher elevations) to produce widespread flooding of rivers and streams with numerous mudslides also reported.
not provided	2/21/2003	0	0	0	With the ground already saturated from the previous week's rainfall, three day rainfall totals of one to three inches created some flooding of streams and rivers as well as several mudslides across east Tennessee. Rivers which rose above their flood stages included the South Chickamauga, Clinch, Powell, Holston, Pigeon, French Broad and Sequatchie rivers.
not provided	4/10/2003	0	0	0	Seven day rainfall totals (4th through the 10th) of three to five inches were reported across central east Tennessee and northeast Tennessee, with one to three inches occurring on the 10th. Several secondary roads across the area were flooded with several rivers experiencing some minor flooding including the Clinch, French Broad, Holston, Pigeon and Powell rivers.
Bloomingdale	6/11/2003	0	0	0	Flooding around Bloomingdale from streams out of banks and clogged storm drains. Some road closures.
Emmett	6/15/2007	0	0	10000	Highway 421 at Pemberton Road washed out.
Bristol	9/24/2009	0	0	0	Flash flooding was occurring with several inches of water flooding across Highway 11 east in Bristol, Tennessee. Several areas of thunderstorms continued to train over northeast Tennessee, resulting in flash flooding across portions of the area.
Howard Hill	9/25/2009	0	0	0	Flash flooding occurred along highway 11 west and along Sullivan road in the Kingsport, Tennessee area. Several inches of water was over the listed roads and flowing, resulting in flash flooding.
Howard Hill	9/26/2009	0	0	0	Areal flooding occurred along highways 36 and 11 west in Kingsport, Tennessee. Several inches of water was over the road, with a few areas briefly impassable due to the flooding. A nearly stationary front across the Tennessee valley region continued to aid in the development of very heavy rainfall that contributed to flash flooding that evolved into a large areal flood event across southeast through northeast Tennessee.

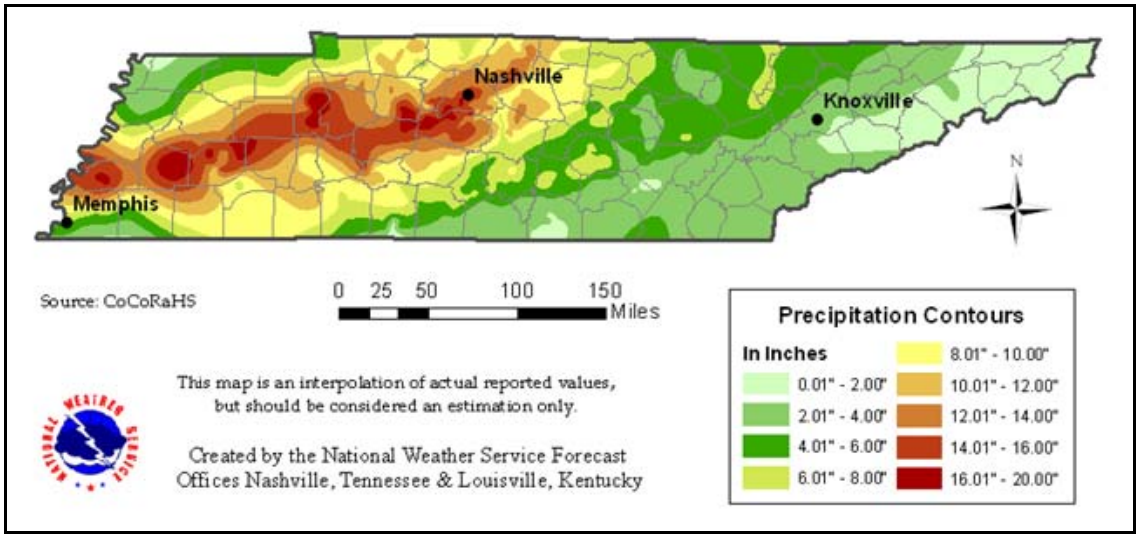
Bristol	12/9/2009	0	0	0	Widespread flooding occurred across the county with water over several roads up to three feet deep. A strong low pressure tracked across east Tennessee bringing damaging non-thunderstorm winds to the area late in the day on the 8th and continued into the overnight hours on the 9th. The strongest winds occurred over the higher elevations. Flash flooding was also reported in the overnight hours.
Kingsport	4/25/2011	0	0	0	Law enforcement personnel reported Carters Valley Road flooded by heavy rain from a thunderstorm near Kingsport. A boundary across the area triggered thunderstorms in east Tennessee during the afternoon and evening hours. A few became severe producing large hail and damaging thunderstorm wind.
Silvacola	7/10/2012	0	0	1000	Several roads were reported to be closed due to high water between Blountville and Bristol. A slow low pressure system over the lower Mississippi valley fed deep moisture from the Gulf into the area. Several rounds of thunderstorms were produced. Localized heavy rain produced flooding during the morning round.
Kingsport	1/15/2013	0	0	1000	Many roads flooded around Kingsport. Significant synoptic scale event produced several inches of rain over much of the area.
Kingsport	7/17/2013	0	0	50000	Widespread flash flooding across the county including city of Kingsport. Several roads closed. Several home and vehicle rescues. Severe thunderstorms formed in a moist and moderately to strongly unstable air mass situated on the periphery of a large Upper Level High Pressure System over the Ohio Valley. The storms produced mostly wind damage. However, training convective cells produced some major flash flooding across the Tri-Cities area.
Bluff City	4/23/2017	0	0	2000	Campgrounds and parking lots at Bristol Motor Speedway were flooded by Beaver Creek and Back Creek coming out of their banks.
Thomas Bridge	4/15/2018	0	0	1000	Parking lot at Bristol Motor Speedway flooded, with water entering a few souvenir tents set up for a race event. Low pressure tapping Gulf moisture produced rainfall areawide. Rain was heavier and more persistent during the evening over the mountainous terrain of the northeast tip of Tennessee.
Sullivan Gardens	2/7/2019	0	0	0	State Road 93 closed at SR 347 due to flooding.
Kingsport	7/22/2019	0	0	0	Street flooding occurred near Dobyns-Bennett High School.

The committee shared their personal experiences of flooding events that have occurred in Sullivan County, Town of Bluff City, City of Bristol and City of Kingsport. The following is transcribed from their thoughts.

- In the downtown area of Kingsport, moderate flooding has happened every few years.
- Flooding in Horse Creek and Reedy Creek areas.
- Annual flooding in the Reedy Creek and Horse Creek regions.
- Annual high water in the North and South Fork of Holston River.
- County flooding January and February 2020.
- February 2019 – Bristol had several homes with water damage that required several 1000's $ in repair.
- Bristol had a landslide on Raytheon Rd. that created a serious vehicle accident involving a citizen and police cruiser with injuries.
- February 2020 – Bristol had a landslide on Bellebrook Rd. creating road closure and now an effort to stabilize that area.
- Typically, 1 to 2 inches of rainfall in a day with saturated soil will cause basements to flood. Many houses in the area were built on lots that should have been filled or should have not had basements built. Many crawl spaces will also flood. This amount of rain will also cause some streets to be closed due to flooding or sanitary sewer overflows. Bristol, TN has had to landslides in a year due to heavy rain. Similar basement flooding occurs with high intensity short duration rainfalls. Also, trees down across roads can be common due to rainfall/storms.
- Numerous localized flooding events that had effect on property damage in minor to moderate dollar loss that may only affect a few properties in low areas near streams.
- Blountville 1996 – 1.5 to 3 inches rain in 1 hour; 20,000 people affected
- 2013 Kingsport
- 2020 – Schools closed and/or delated due to flooding – students could not get out.

Small localized flood events are likely to occur at least once every two years in Sullivan 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, mudslides and on March 2002, an event caused over $5 million in damages across East Tennessee. 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).

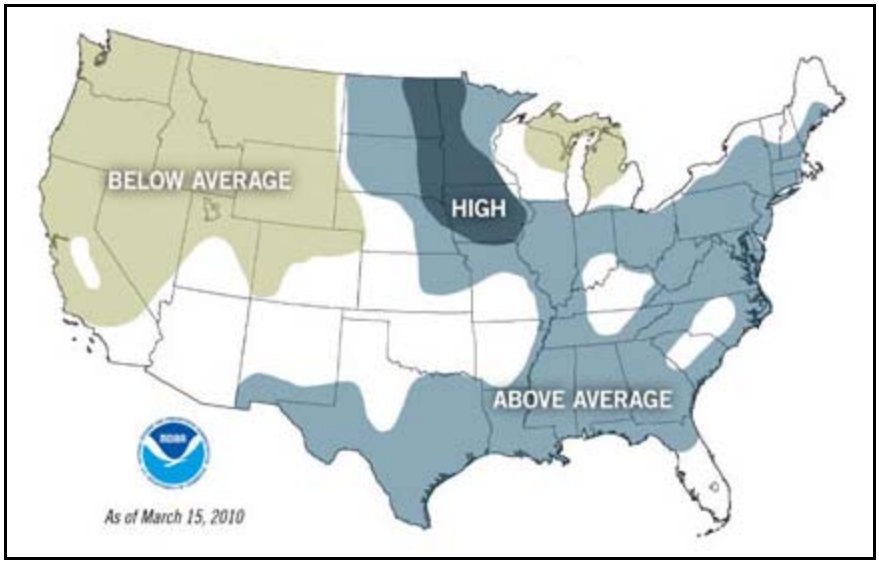
Tennessee May Flood- Precipitation for May 1st & 2nd 2010



Source: National Weather Service

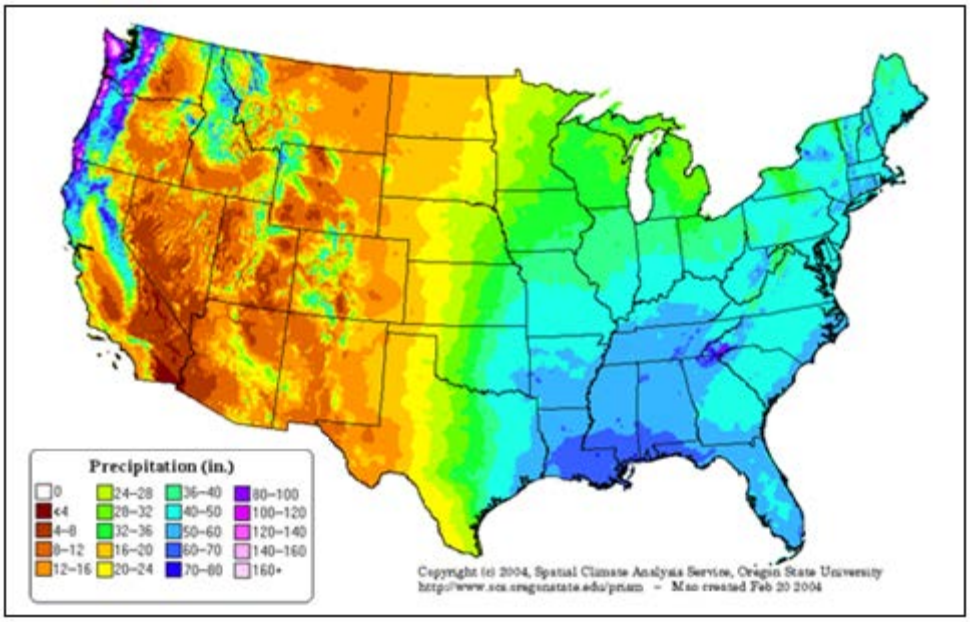
According to a NOAA Flood Risk Map (see map below), the majority of Tennessee was in an "above average" risk of flooding zone during spring 2010. This proposed vulnerability is coupled with the fact that on average Tennessee usually acquires over 50-60 inches of rainfall a year (see following map).

Flood Risk Map



Source: NOAA

Average Annual Precipitation per Year (1971-2000)



Source: Spatial Climate Analysis Service, Oregon State University

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

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Sullivan County Unincorporated	1.67	3.33	1.33	2.11
Town of Bluff City	2.00	3.00	1.00	2.00
City of Bristol	2.25	2.75	1.75	2.25
City of Kingsport	2.50	3.00	2.00	2.50

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Sullivan County Unincorporated	2.11	3.00	5.11
Town of Bluff City	2.00	3.00	5.00
City of Bristol	2.25	2.75	5.00
City of Kingsport	2.50	2.50	5.00

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

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

Property	
Amount of residetial property damage associated from the hazard	
1	Less than $500 in damages
2	$500-$10,000 in damages
3	$10,000-$500,000 in damages
4	$500,000-$2,000,000 in damages
5	More than $2,000,000 in damages

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

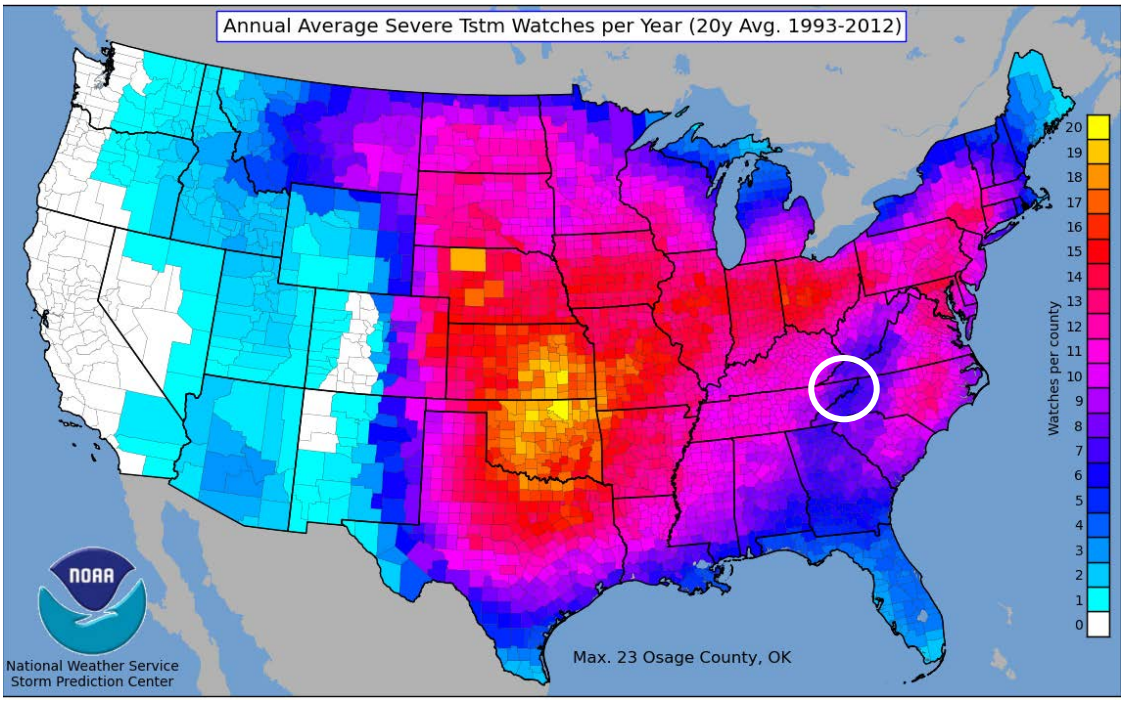
Probability	
Likelihood of the hazard occurring within a given span of years	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

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

Tornadoes/Severe Storms

According to the National Weather Service, to consider a storm severe it must encompass one of three traits: produce winds greater than 58 miles per hour (50.4 knots), produce hail ¾ of an inch or greater in diameter, or produce tornadoes. On average, a typical county in Tennessee has about 5 to 10 severe storm watches per year (see map below).

Average Severe Storm Watches Per Year (1993-2012)

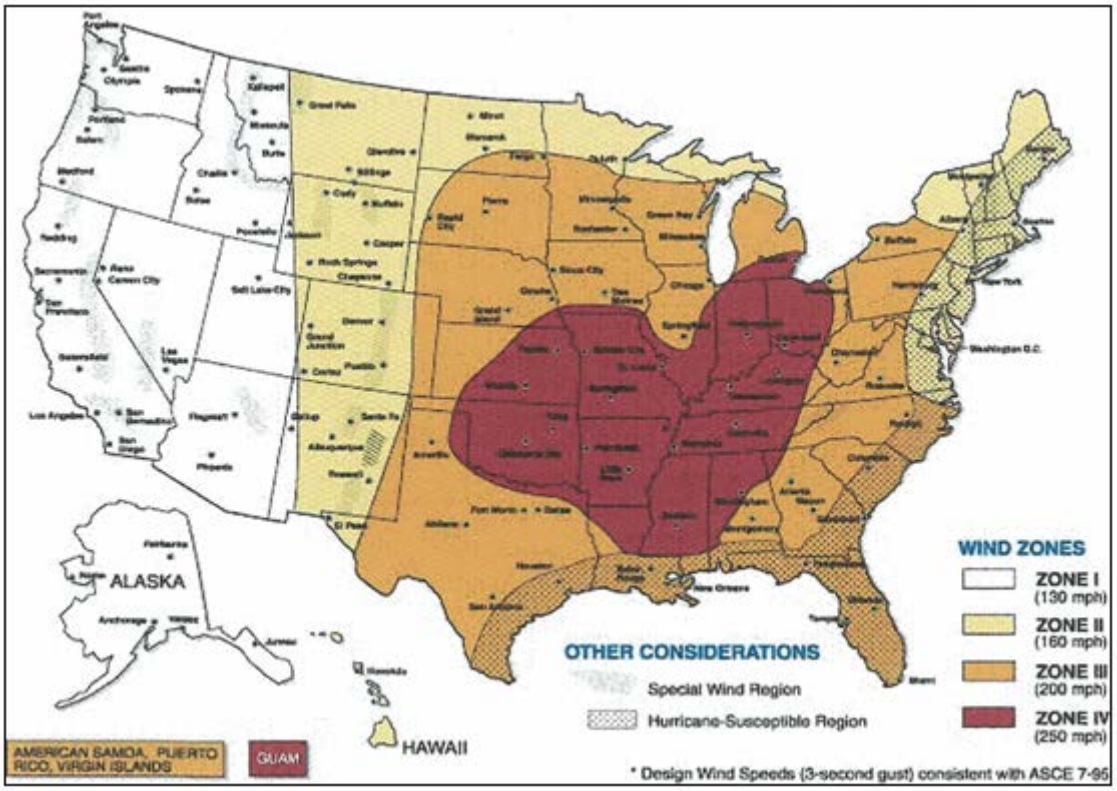


Source: NOAA/NWS Storm Prediction Center

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 Sullivan 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

Sullivan 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 Sullivan County from 1950 to 2020 and a description of recent impacts. The largest tornado occurred in 1977 and 2014 at an F1. The costliest tornado was in 1997.

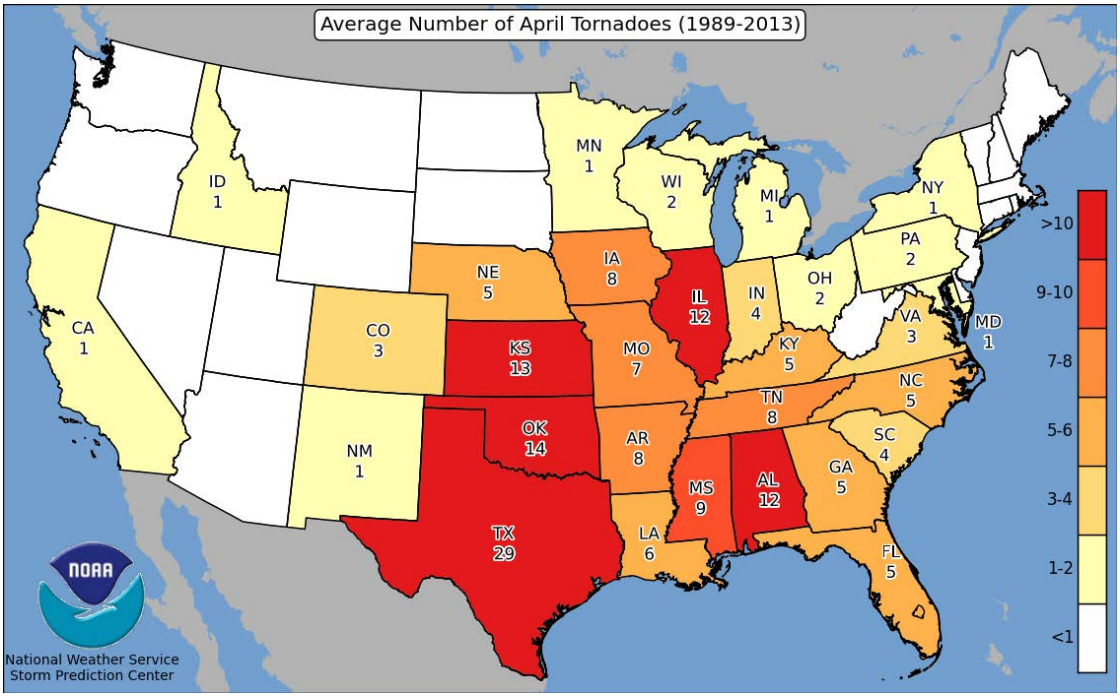
The following information was obtained by accessing the NOAA database. https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Tornado hazard experienced by Sullivan County, including the jurisdictions located within, and is the only source of data accessible.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

Tornado Events in Sullivan County: 1950 to 2020

Location	Date	Extent	Deaths	Injuries	Property Damage	Extent/Impact Description
not provided	4/4/1974	F0	0	2	250000	Not provided
not provided	10/1/1977	F1	0	10	2500000	Not provided
Rock Springs	7/27/2014	EF1	0	0	0	An EF1 tornado occurred approximately three miles west southwest of Colonial Heights. The tornado had estimated winds of 110 mph with a path length of 0.5 miles and a width of 50 yards. One house was heavily damaged and a few other houses and barns had some damage. Also, numerous trees were uprooted or snapped off. A potent upper-level storm system impacted the region on Sunday, July 27th, bringing several rounds of severe weather along with locally heavy rainfall. Three tornadoes were observed across east Tennessee; one classified as a strong, EF-3 tornado with winds of 140 mph. Additionally, there were several reports of straight-line wind damage and large hail up 2 to 3 inches in diameter! A storm system of this magnitude is highly unusual for this time of year due to the strength of the front and the record cool temperatures it produced in the middle of the Summer season.

Based on previous occurrences, tornado events are likely to occur at least once every 23 years in Sullivan County (see the following map for other probability information).

Average Number of Tornadoes Per Year



The severity of tornadoes that may occur in the county is measured using the Enhanced Fujita Scale for tornadoes (see chart below). Based on tornado events in other East Tennessee counties, in a 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 once a year in Sullivan County. The severity of hail is measured by the diameter of the hail itself, commonly using the TORRO Hail Index (see following chart). Sullivan County's largest hail extent is reported at 2.75 inches (69.85 mm = H7). In the events listed by the NCDC, there was no documentation of damages. However, dollar losses are provided indicating financial impact.

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 Sullivan County between 1950 to 2020. The following information was obtained by accessing the NOAA database. https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Hail hazard experienced by Sullivan County, including the jurisdictions located within, and is the only source of data accessible. The information provided for Sullivan County also applies to the school district due to the geographic distribution of the schools throughout the County.

Hail Events in Sullivan County: 1950 to 2020

Location	Date	Extent in Inches	Deaths	Injuries	Property Damage	Extent/Impact Description
not provided	10/8/1960	1	0	0	0	not provided
not provided	4/23/1967	1.5	0	0	0	not provided
not provided	4/23/1967	1.5	0	0	0	not provided
not provided	4/23/1968	1	0	0	0	not provided
not provided	7/25/1969	1	0	0	0	not provided
not provided	6/26/1971	0.75	0	0	0	not provided
not provided	5/5/1977	2.75	0	0	0	not provided
not provided	4/27/1989	1	0	0	0	not provided
Kingsport	5/24/1996	1.75	0	0	0	not provided
Bloomingdale	5/25/1996	1	0	0	0	not provided
Kingsport	5/25/1996	1.25	0	0	0	not provided
Kingsport	5/29/1996	0.75	0	0	0	not provided
Kingsport	8/4/1997	1.25	0	0	0	not provided
Kingsport	4/3/1998	1	0	0	0	not provided
Kingsport	4/3/1998	1.25	0	0	0	not provided
Colonial Heights	5/7/1998	1.75	0	0	0	not provided
Bristol	5/7/1998	1.75	0	0	0	not provided
Kingsport	6/3/1998	0.75	0	0	0	not provided
Kingsport	6/22/1998	1	0	0	0	not provided
Blountville	6/24/1998	0.75	0	0	0	not provided
Blountville	6/24/1998	0.75	0	0	0	not provided
Bristol	6/2/1999	1.75	0	0	0	not provided
Kingsport	8/1/1999	1	0	0	0	not provided

Tri City Airport	10/4/1999	0.88	0	0	0	not provided
Blountville	4/17/2000	1	0	0	0	not provided
Kingsport	5/28/2000	0.75	0	0	0	not provided
Kingsport	5/28/2000	1	0	0	0	not provided
Colonial Heights	7/28/2000	1.75	0	0	0	not provided
Kingsport	5/21/2001	0.88	0	0	0	not provided
Colonial Heights	5/22/2001	0.88	0	0	0	not provided
Bloomingdale	6/29/2001	0.88	0	0	0	not provided
Kingsport	6/29/2001	0.75	0	0	0	not provided
Bristol	4/28/2002	0.75	0	0	5000	Dime size hail reported near the Bristol Speedway.
Bristol	6/2/2002	0.75	0	0	0	Dime sized hail reported in the vicinity of Bristol.
Kingsport	7/2/2002	0.75	0	0	0	Dime size hail was reported 1 mile west of Kingsport.
Piney Flats	7/3/2002	1	0	0	0	Quarter size hail was reported at Piney Flats.
Bristol	8/2/2002	0.75	0	0	0	Dime sized hail reported at Bristol.
Bloomingdale	5/1/2003	0.88	0	0	0	Nickel size hail was reported at Bloomingdale.
Bristol	6/16/2003	0.75	0	0	0	Penny size hail occurred approximately ten miles southwest of Bristol on interstate 81.
Countywide	9/27/2003	0.88	0	0	0	Nickel sized hail was reported across the county.
Tri City Airport	4/13/2004	1	0	0	0	not provided
Kingsport	6/14/2004	0.88	0	0	0	Nickel size hail in East Kingsport
Sullivan Gardens	4/22/2005	0.88	0	0	0	Nickel-size hail.
Kingsport	5/13/2005	0.75	0	0	0	Penny sized hail was reported at Kingsport.
Kingsport	5/18/2006	1	0	0	0	Quarter size hail was reported in Kingsport.
Kingsport	5/18/2006	0.88	0	0	0	Nickle size hail was reported in Lynn Garden.
Blountville	5/18/2006	0.75	0	0	0	Penny size hail was reported in Blountville.
Kingsport	5/26/2006	1	0	0	0	Quarter size hail was reported at Kingsport.

Kingsport	5/26/2006	1	0	0	0	Quarter size hail was reported five miles south southeast of Kingsport.
Bristol	6/11/2006	0.75	0	0	0	Penny-size hail in Bristol.
Sullivan Gardens	9/28/2006	1.75	0	0	0	Golfball size hail was reported at Sullivan Gardens.
Piney Flats	6/15/2007	1	0	0	0	A spotter reported quarter-size hail in Piney Flats.
Springdale	7/16/2007	0.88	0	0	0	Nickel size hail was reported in Kingsport.
Kingsport	8/29/2007	0.75	0	0	0	A spotter reported penny-size hail along Highway 11W in Kingsport.
Bristol	6/11/2008	0.75	0	0	0	Dispatcher reported penny-size hail in Blountville.
Springdale	7/4/2008	1	0	0	0	Quarter size hail was reported in the Colonial Heights area of Kingsport on Wilcox Drive.
Springdale	4/10/2009	0.88	0	0	0	A trained spotter reported nickel-size hail fell in the Kingsport area.
Springdale	9/16/2010	1	0	0	0	Quarter sized hail was reported in the vicinity of Kingsport.
Galloway Mill	3/24/2011	1	0	0	0	Quarter size hail was reported.
Kingsport	4/25/2011	1	0	0	0	A trained spotter reported thunderstorms produced quarter-size hail in Kingsport.
Sullivan Gardens	4/27/2011	2.75	0	0	0	NWS storm survey team reported thunderstorms produced baseball-size hail around Sullivan Gardens.
Bristol	4/27/2011	2.75	0	0	0	A trained spotter reported thunderstorms produced baseball-size hail 7 miles southeast of Bristol.
Bristol	4/27/2011	1.25	0	0	0	A trained spotter reported thunderstorms produced half-dollar-size hail in Bristol.
Blountville	4/27/2011	1.75	0	0	0	Amateur radio personnel reported thunderstorms produced golfball-size hail near Blountville.
Bristol	4/27/2011	2.75	0	0	0	A trained spotter reported thunderstorms produced baseball-size hail 9 miles southeast of Bristol.
Bristol	4/27/2011	2.75	0	0	0	Amateur radio personnel reported thunderstorms produced baseball-size hail in Bristol.

Rock Springs	5/22/2011	1	0	0	0	Quarter sized hail and some flooding was reported on Rock Springs Road in Kingsport.
Bristol	5/24/2011	1	0	0	0	Quarter size hail was reported.
Springdale	5/26/2011	1	0	0	0	Quarter size hail was reported.
Colonial Heights	5/26/2011	1.5	0	0	0	Ping pong ball size hail was reported.
Galloway Mill	5/26/2011	1	0	0	0	Quarter size hail was reported.
Blountville	5/26/2011	1	0	0	0	Quarter size hail was reported.
Galloway Mill	5/26/2011	1.75	0	0	0	Golf ball size hail was reported.
Bristol	5/26/2011	1	0	0	0	Quarter size hail was reported on Volunteer Parkway north of Bristol Motor Speedway.
Bristol	5/26/2011	1.25	0	0	0	Half dollar size hail occurred at the Bristol Country Club.
Galloway Mill	5/21/2013	1	0	0	0	Quarter size hail was reported in Bluff City.
Galloway Mill	5/21/2013	1	0	0	0	Quarter size hail was reported in Bluff City.
Vance	5/22/2013	1	0	0	0	Quarter size hail was reported in Piney Flats.
Weaver	7/17/2013	1	0	0	0	Quarter sized hail was reported at the intersection of Weaver Pike and Old Jonesboro Road.
Ridgefield	7/27/2014	1.75	0	0	0	Golf ball sized hail was reported three miles west of Kingsport.
Springdale	7/27/2014	2.75	0	0	0	Baseball size hail was reported in Kingsport.
Harr	5/12/2017	1	0	0	0	Quarter size hail was reported.
Rock Springs	3/17/2018	1	0	0	0	Quarter size hail was reported at the I-26 welcome center.

Severe storm winds most commonly occur as straight-line winds; a downburst of wind created by an area of significantly rain-cooled air that spreads out in all directions after hitting the ground. All jurisdictions are vulnerable to receiving damage from these severe storm winds. Historically, severe storm wind events occur about four times a year in Sullivan County. The severity of severe storm winds is commonly measured by wind speed (knots or mph). It is not unusual for Sullivan County to experience winds speeds up to 78 knots (89.7 mph) causing structural damage, power outages and trees down.

The following chart provides severe storm wind event information for Sullivan County between 1950 and 2020. The following information was obtained by accessing the NOAA database. https://www.ncdc.noaa.gov/stormevents/. This information represents all the events and extent of the Severe Storm Wind hazard experienced by Sullivan County, including the jurisdictions located within, and is the only source of data accessible. The information provided for Sullivan County also applies to the school district due to the geographic distribution of the schools throughout the County.

Wind Events in Sullivan County: 1950 to 2020

NP = not provided

Location	Date	Extent in Knots	Deaths	Injuries	Property Damage	Extent/Impact Description
not provided	6/16/1957	0	0	0	0	no information
not provided	6/17/1957	0	0	0	0	no information
not provided	9/14/1957	0	0	0	0	no information
not provided	6/3/1962	0	0	0	0	no information
not provided	8/3/1964	50	0	0	0	no information
not provided	5/8/1967	52	0	0	0	no information
not provided	4/23/1968	0	0	0	0	no information
not provided	7/22/1968	0	0	0	0	no information
not provided	6/24/1969	0	0	0	0	no information
not provided	6/24/1969	0	0	0	0	no information
not provided	6/28/1969	0	0	0	0	no information
not provided	7/25/1969	0	0	0	0	no information
not provided	5/16/1970	0	0	0	0	no information
not provided	6/5/1970	70	0	0	0	no information
not provided	9/16/1971	0	0	0	0	no information
not provided	5/23/1973	52	0	0	0	no information
not provided	1/28/1974	0	0	0	0	no information
not provided	4/4/1974	0	0	0	0	no information
not provided	4/4/1974	0	0	0	0	no information
not provided	4/8/1974	0	0	0	0	no information
not provided	12/5/1977	60	0	0	0	no information
not provided	7/20/1983	61	0	0	0	no information
not provided	7/24/1983	76	0	0	0	no information
not provided	8/11/1983	0	0	0	0	no information
not provided	8/11/1983	0	0	0	0	no information
not provided	9/3/1984	0	0	0	0	no information

not provided	7/16/1988	0	0	0	0	no information
not provided	5/6/1989	0	0	0	0	no information
not provided	6/2/1989	0	0	0	0	no information
not provided	6/12/1989	0	0	0	0	no information
not provided	5/28/1990	0	0	0	0	no information
not provided	6/22/1990	0	0	0	0	no information
not provided	4/9/1991	55	0	0	0	no information
not provided	4/29/1991	0	0	0	0	no information
not provided	7/10/1991	0	0	0	0	no information
not provided	8/29/1991	0	0	0	0	no information
Kingsport	8/20/1993	0	0	0	500	A highway sign and a few trees were blown down.
Kingsport	8/26/1993	45	0	0	5000	A tree was knocked down and fell on a house.
Kingsport	6/11/1995	0	0	0	20000	A mobile home on display was flipped over. A metal sign was bent over. Numerous trees and power lines were knocked down. One tree fell on a van, crushing the van's top.
Southern Sullivan Co	6/11/1995	0	0	0	2000	Some trees were blown down.
Bristol/Kingsport	6/26/1995	0	0	0	5000	An apartment building had a portion of its roof lifted off in Bristol. Several trees were knocked down.
Bristol	7/10/1995	0	0	0	5000	Several trees and power lines were knocked down.
Kingsport	7/25/1995	0	0	0	10000	Two businesses had their signs damaged. Several trees and power lines were blown down.
Kingsport / Bloomingdale	8/11/1995	0	0	0	10000	Some trees were blown down.
Kingsport	4/13/1996	52	0	0	0	no information
Kingsport	5/21/1996	NP	0	0	0	A few trees were downed causing power outages near Kingsport.
Countywide	5/24/1996	NP	0	0	5000	Numerous trees were reported down along with large hail in the Stoney Creek area.
Indian Springs	6/24/1996	NP	0	0	4000	Several trees were knocked down.
Bristol	7/2/1996	NP	0	0	0	Trees were downed on highways 33 and 37 as well as in the Christian Bend area.

Countywide	7/14/1996	NP	0	0	15000	Numerous trees and powerlines were downed. Some trees fell onto cars. A few houses were damaged.
Bristol	8/7/1996	NP	0	0	0	Numerous trees and powerlines were downed.
Countywide	1/5/1997	NP	0	0	0	Trees down across entire county. Reported by local dispatch.
Bristol	6/13/1997	52	0	0	0	no information
East half of County	7/16/1997	NP	0	0	0	Numerous trees down across east half of county, mostly around Highway 421.
Bristol	2/17/1998	55	0	0	0	no information
Kingsport	4/16/1998	NP	0	0	0	Trees down in the Kingsport area.
Kingsport	5/25/1998	NP	0	0	1500000	Downburst winds estimated near 120 mph caused extensive damage in the city of Kingsport. Numerous roofs blown off, windows blown out and trees and powerlines blown down. Approximately 100 downtown businesses and 70 residences sustained some type of storm damage. Immediately following the storm, as many as 19,000 customers were without power.
Kingsport	6/24/1998	NP	0	0	0	Tree down on Summerville Road.
Kingsport	7/19/1998	NP	0	0	15000	Trees and power lines down throughout the city.
Bluff City	7/19/1998	NP	0	0	0	Trees down.
Bristol	6/2/1999	NP	0	0	15000	Trees down.
South Holston Lake	6/2/1999	NP	0	0	11000	Trees down.
Kingsport	7/24/1999	NP	0	0	2000	Large tree limbs down.
Blountville	7/24/1999	NP	0	0	10000	Trees down.
Kingsport	8/1/1999	NP	0	0	5000	Trees down.
Blountville	8/18/1999	NP	0	0	1000	Large tree limbs down.
Bluff City	10/4/1999	NP	0	0	10000	A few trees blown down.
Countywide	2/14/2000	NP	0	0	20000	Trees and power lines down.
Countywide	5/27/2000	NP	0	0	0	Trees down.
Bloomingdale	5/27/2000	NP	0	0	0	Trees down.
Bloomingdale	5/28/2000	NP	0	0	0	Trees down.
Bluff City	6/15/2000	NP	0	0	0	Trees down.
Piney Flats	6/15/2000	NP	0	0	10000	Trees and power lines down.

Bloomingdale	7/11/2000	NP	0	0	0	Large limbs down.
Piney Flats	7/28/2000	NP	0	0	20000	Trees and power lines down.
Kingsport	8/3/2000	NP	0	0	0	Trees down.
Countywide	8/9/2000	NP	0	0	0	Trees down, mainly north part of county.
Countywide	8/10/2000	NP	0	0	0	Trees down.
Countywide	11/9/2000	NP	0	0	0	Trees down.
Kingsport	11/9/2000	NP	0	0	0	Trees down.
Kingsport	5/21/2001	NP	0	0	18000	Trees down, one reportedly on a car.
Countywide	5/21/2001	NP	0	0	0	Trees down.
Colonial Heights	5/21/2001	NP	0	0	0	Trees down.
Kingsport	5/21/2001	NP	0	0	0	Trees down.
Bluff City	5/22/2001	NP	0	0	0	Trees down.
Bluff City	6/25/2001	NP	0	0	0	Three trees down
Countywide	7/4/2001	NP	0	0	0	Trees down.
Kingsport	7/8/2001	NP	0	0	0	Trees down.
Bristol	8/23/2001	NP	0	0	0	Trees down.
Blountville	8/23/2001	NP	0	0	0	Trees down.
Kingsport	8/23/2001	NP	0	0	0	Trees down.
Bristol	8/23/2001	NP	0	0	0	Trees down.
Blountville	8/23/2001	NP	0	0	0	Trees down.
Bristol	5/1/2002	NP	0	0	10000	Trees reported down east of Bristol.
Bristol	5/2/2002	NP	0	0	10000	Trees reported down in Bristol.
Blountville	5/2/2002	NP	0	0	10000	Trees reported down in Blountville.
Blountville	5/13/2002	NP	0	0	10000	Trees reported down on Shadow Town Road in Blountville.
Kingsport	7/2/2002	NP	0	0	20000	Numerous trees and power lines were reported down in Kingsport.
Kingsport	7/3/2002	NP	0	0	15000	Numerous trees were reported down in the Kingsport vicinity.
Piney Flats	7/4/2002	NP	0	0	10000	Numerous trees were reported down at Piney Flats and Bluff City.
Jacob	7/23/2002	NP	0	3	20000	Wind downed a tree onto a van carrying juveniles near Jacobs Creek Camp. Several persons were injured and transported to the hospital. Other trees were downed at Little Oak Campground near Friendship.

Blountville	7/30/2002	NP	0	0	15000	Trees down on powerlines.
Blountville	8/1/2002	NP	0	0	5000	Trees were reported down on King College Road.
Paperville	8/2/2002	NP	0	0	5000	Two trees were reported down on Old Jonesboro Road.
Blountville	8/24/2002	NP	0	0	3000	Two trees were downed along Isley Road in Blountville.
Kingsport	11/10/2002	NP	0	0	25000	Numerous trees and power lines were downed in and around Kingsport.
not provided	2/3/2003	40	0	0	1000	Strong winds (with gusts up to 40 mph) associated with a band of showers caused numerous reports of fallen trees and power outages across east Tennessee.
Kingsport	5/2/2003	60	0	0	12000	Numerous trees and power lines were reported down in Kingsport.
Blountville	5/9/2003	57	0	0	0	no information
Kingsport	6/11/2003	55	0	0	15000	Several trees were reported down across the west half of the county.
Bristol	6/11/2003	55	0	0	8000	A few trees were reported down in Bristol.
Countywide	7/9/2003	60	0	0	0	Numerous trees and power lines reported down by 911 dispatch.
Countywide	7/10/2003	60	0	0	0	Several trees reported down by sheriff's office.
Bluff City	7/16/2003	60	0	0	0	Several two to three inch diameter tree limbs reported down on highway by sheriff's office.
Bristol	8/4/2003	60	0	0	0	A few trees reported down by 911 dispatch along highway 11W.
Piney Flats	8/16/2003	60	0	0	0	A few trees reported down by 911 dispatch.
Bristol	8/28/2003	60	0	0	0	A few trees and power lines reported down by utility company in the Kings College area.
Blountville	9/27/2003	55	0	0	6000	Two trees were reported down in Blountville.
Kingsport	5/26/2004	78	0	0	300000	One home was destroyed and eighteen others suffered severe damage in Kingsport.
Bloomingdale	5/26/2004	78	0	0	1500000	A downburst with 90 mph winds demolished a portable classroom and broke 30 windows in the main building at Kingsley Elementary School. The classroom roof was lifted off and struck a parked car. Also, another classroom in the area, Ketron Middle School; lost part of its roof, numerous windows. In addition, the school's scoreboard and outdoor lights were knocked down, and the sign at the main

						entrance was destroyed by a fallen tree.
Bloomingdale	5/26/2004	70	0	0	1000	An 80 mph wind gust was measured by a trained spotter in Bloomingdale.
Countywide	5/31/2004	60	0	0	25000	Several trees and power lines were reported down across the county.
Bristol	6/14/2004	65	0	0	15000	Numerous trees down countywide
Kingsport	7/5/2004	60	0	0	15000	Several trees were reported down in Kingsport while a few trees were reported down elsewhere across the western part of the county.
Holston Valley	7/10/2004	45	0	2	0	A woman and her daughter were injured when thunderstorm winds caused a tree to fall onto their tent at Observation Knob Park near South Holston Lake.
Bluff City	4/22/2005	50	0	0	2000	One tree down in Bluff City on Dry Branch Road.
Piney Flats	5/14/2005	60	0	0	15000	Several trees were reported down around the Piney Flats area.
Kingsport	7/1/2005	55	0	0	6000	A tree was reported down on Fordtown and Lebanon Road.
Kingsport	7/1/2005	55	0	0	6000	Two trees were reported down; one on Bancroft Chapel Road and another on Bloomingdale Road.
Blountville	7/2/2005	60	0	0	30000	Numerous trees were reported down across the western half of the county from 305 pm through 315 pm EDT.
Bristol	7/19/2005	45	0	0	15000	A few trees were reported down across the county. A 45 mph wind gust was recorded at the Tri-Cities Airport in association with this event.
Bristol	8/3/2005	45	0	0	10000	A few trees and powerlines reported down in the neighborhoods surrounding the Bristol Country Club area.
Blountville	4/25/2006	65	0	0	12000	Numerous trees down in Blountville and across the county.
Countywide	6/11/2006	60	0	0	8000	Several trees and large limbs down countywide.
Countywide	6/11/2006	60	0	0	10000	Several trees and powerlines down countywide.
Countywide	6/11/2006	60	0	0	8000	A few trees and large limbs down countywide.
Kingsport	7/4/2006	60	0	0	12000	Trees were reported down in the vicinity of Kingsport and Fall Branch.

Bloomingdale	7/28/2006	60	0	0	15000	Trees and power lines were reported down in the Bloomingdale area.
Blountville	8/6/2006	60	0	0	12000	Numerous trees down in and around Blountville and Bloomingdale.
Countywide	8/8/2006	55	0	0	5000	A few trees down in the eastern half of the county.
not provided	12/1/2006	60	0	0	30000	Numerous trees and powerlines down countywide. A section of roof on a home in Kingsport was damaged.
Springdale	4/3/2007	50	0	0	20000	Several trees were reported down across the county.
Blountville	6/8/2007	60	0	0	15000	Thunderstorm winds downed several trees countywide.
Blountville	8/1/2007	55	0	0	5000	Dispatch reported several trees down near Blountville.
Allison Mill	3/4/2008	50	0	0	0	A few trees were reported down at Piney Flats.
Galloway Mill	6/9/2008	52	0	0	5000	Dispatch reported a few trees downed by thunderstorm winds in Bluff City.
Bristol	6/9/2008	65	0	0	25000	Dispatch reported numerous trees downed by thunderstorm winds in Bristol and countywide. A garage in Bristol was destroyed when a tree fell on it from the winds.
Galloway Mill	6/10/2008	55	0	0	3000	Dispatch reported powerlines downed by thunderstorm winds near Bluff City.
Bristol	6/11/2008	55	0	0	8000	Dispatch reported several trees downed by thunderstorm winds in Blountville.
Springdale	7/4/2008	55	0	0	0	Power lines were reported down on Brookside Drive behind Indian Path Hospital. Structural damage also occurred at the hospital.
Springdale	7/4/2008	55	0	0	0	Three trees were reported down along Inglewood Drive.
East Kingsport	7/4/2008	55	0	0	0	A few trees were reported down in Bloomingdale.
Blountville	7/4/2008	55	0	0	0	A tree was reported down on Scott Road near Boozy Creek Road.
Springdale	7/22/2008	55	0	0	0	A few trees were reported down in Kingsport.
Blountville	8/2/2008	50	0	0	1000	Dispatch reported a tree downed by thunderstorm winds on Island Road near Blountville.
Piney Flats	5/8/2009	60	0	0	0	Several trees were reported down in the vicinity of Piney Flats.
Piney Flats	6/2/2009	50	0	0	2000	Law enforcement reported one tree was downed by thunderstorm winds on Hemlock Road near Bluff City.

Blountville	6/11/2009	60	0	0	20000	Law enforcement officials reported numerous trees and powerlines downed by thunderstorm winds countywide.
Blountville	6/16/2009	60	0	0	20000	Law enforcement personnel reported numerous trees and powerlines downed by thunderstorm winds countywide.
Blountville	6/18/2009	60	0	0	20000	Law enforcement personnel reported numerous trees and powerlines downed by thunderstorm winds countywide.
Kingsport	6/18/2009	60	0	0	20000	Trained spotter reported multiple trees and powerlines downed by thunderstorm winds in Kingsport. In addition, a mother and child were injured by a falling limb at a local park in Kingsport.
Springdale	7/9/2009	50	0	0	0	Several trees were reported down.
Grey Mill	9/9/2009	50	0	0	3000	A few trees and power lines were reported down along Enterprise Road.
Colonial Heights	9/9/2009	50	0	0	0	Several large trees were downed in the area. One of the trees fell onto a roof of an apartment at 142 Lebanon Road in Kingsport.
not provided	12/9/2009	60	0	0	30000	The Kingsport Times News newspaper reported numerous trees and powerlines downed by non-thunderstorm winds countywide. Several homes and buildings in Kingsport were damaged. Around 2470 customers lost power.
not provided	12/9/2009	60	0	0	20000	The Bristol Herald Courier newspaper reported a church in Bristol was damaged by non-thunderstorm winds.
Gunnings	5/16/2010	50	0	0	0	Several trees were reported down along highway 11W between Bristol and Kingsport.
Piney Flats	6/15/2010	55	0	0	10000	Law enforcement personnel reported several trees downed by thunderstorm winds in Piney Flats.
Kingsport	6/21/2010	55	0	0	5000	A trained spotter reported several trees downed by thunderstorm winds in the Colonial Heights area of Kingsport.
Bristol	6/21/2010	55	0	0	25000	The Bristol Herald Courier newspaper reported numerous trees and powerlines downed by thunderstorm winds countywide. More than 5000 customers in Sullivan county lost power. A few buildings also sustained wind damage.

Bluff City	6/24/2010	50	0	0	2000	Law enforcement personnel reported 1 tree downed by thunderstorm winds in Bluff City.
Blountville	8/4/2010	58	0	0	10000	Law enforcement personnel reported multiple trees and powerlines downed by thunderstorm winds northwest of Blountville.
Kingsport	8/5/2010	58	0	0	15000	Law enforcement personnel reported several trees and powerlines downed by thunderstorm winds in Kingsport.
Piney Flats	8/5/2010	50	0	0	2000	Law enforcement personnel reported one tree downed by thunderstorm winds southwest of Bluff City in Piney Flats.
Bluff City	10/25/2010	60	0	0	20000	Law enforcement personnel reported trees and powerlines downed by thunderstorm wind on Hickory Tree Road and Egypt Road near Bluff City.
Bristol	10/25/2010	60	0	0	30000	The Bristol Herald Courier newspaper reported campers were damaged by thunderstorm winds at the Water's Edge campground in Bristol.
not provided	4/16/2011	45	0	1	30000	Newspaper reported one tree split and fell across two separate mobile homes by strong non-thunderstorm winds on Ridgecrest Avenue in Kingsport. A 52 year old woman was injured on her back when the tree fell through the roof of her mobile home. She was struck on her back while she was walking through her hallway when the trees crashed through her home. Powerlines were also downed by the wind.
Sullivan Gardens	4/27/2011	60	0	0	25000	NWS survey team reported several trees and powerlines downed by thunderstorm wind in and around Sullivan Gardens.
Tri City Airport	5/13/2011	50	0	0	0	The automatic surface observing system measured a wind gust of 51 knots at the Tri-Cities regional airport.
Fordtown	5/22/2011	55	0	0	0	One tree along with several large limbs and power lines were reported down near 1905 Jackson Hollow Road in Kingsport.
Boring	5/22/2011	52	0	0	0	A 52 knot wind gust was measured at the Tri-Cities Regional Airport.
Springdale	5/24/2011	50	0	0	0	A few trees were reported down in the vicinity of Kingsport.
Kingsport	6/9/2011	55	0	0	20000	Broadcast media reported several trees and powerlines downed by thunderstorm wind in Kingsport. Trees also downed on a few

						vehicles.
Colonial Heights	6/21/2011	55	0	0	10000	Law enforcement personnel reported several trees downed by thunderstorm wind in Colonial Heights.
Blountville	6/21/2011	55	0	0	10000	Law enforcement personnel reported several trees downed by thunderstorm wind in Blountville.
Vance	7/22/2011	50	0	0	0	A few trees were reported down between Bristol and Blountville.
Springdale	7/22/2011	50	0	0	0	Several trees were reported down near Kingsport.
Bloomingdale	8/8/2011	50	0	0	2000	Law enforcement personnel reported a tree downed by thunderstorm wind near Bloomingdale.
Springdale	9/3/2011	65	0	0	50000	A roof and back wall of a business located at the intersection of Eastman Road and East Stone Drive were heavily damaged due to severe thunderstorm winds. The roof was lifted up and a large portion of the back wall collapsed in.
Springdale	9/3/2011	65	0	0	0	The roof was damaged on the Model City Apartment buildings on Stonegate Road.
Harr	7/1/2012	50	0	0	0	Several trees were reported down in the vicinity of Harr.
Bristol	7/5/2012	60	0	0	0	Two miles east of Bristol a portion of a roof was damaged and one tree was reported down.
Springdale	7/5/2012	60	0	0	0	Several trees were reported down in Kingsport.
Bristol	7/24/2012	50	0	0	0	One tree was reported down on a road in Bristol.
Springdale	7/24/2012	50	0	0	0	One tree was reported down in Kingsport.
Piney Flats	7/31/2012	50	0	0	0	One tree was reported down along Allison Road.
Blountville	8/3/2012	50	0	0	5000	A trained spotter reported a couple of large trees downed by thunderstorm wind in Blountville.
not provided	2/26/2013	55	0	0	5000	Someone from the public reported high wind downed several trees along Denton Valley Road near the Jacobs Creek Job Corps site.
Bluff City	4/11/2013	52	0	0	5000	Amateur radio personnel reported several trees downed by thunderstorm wind 2 miles south of Bluff City in Piney Flats area.
Blountville	5/21/2013	50	0	0	0	Several trees were reported down across the county.
Kingsport	6/13/2013	53	0	0	15000	Dispatch personnel reported several trees and powerlines downed by thunderstorm wind in Kingsport.

Blountville	7/17/2013	50	0	0	0	Several trees were reported down across the county.
Bristol	7/18/2013	50	0	0	0	Numerous trees were reported down across the county.
Piney Flats	7/18/2013	65	0	1	0	A strong wind gust destroyed a wooden and metal shed as the roof of the structure was lifted into the air and landed on a vehicle northbound on 11E in Piney Flats. When the structure hit the vehicle a passenger was killed and the driver was injured.
Blountville	7/18/2013	60	0	0	0	A few trees were downed between Bloomingdale and Blountville.
Bristol	2/21/2014	50	0	0	8000	Law enforcement personnel reported a few trees downed by thunderstorm wind across Bristol.
Kingsport	4/28/2014	55	0	0	5000	Law enforcement personnel reported several trees downed by thunderstorm wind in Kingsport.
Bristol	4/28/2014	55	0	0	5000	Law enforcement personnel reported several trees downed by thunderstorm wind near the Bristol Motor Speedwell 7 miles southwest of Bristol.
Harr	5/13/2014	50	0	0	0	Several trees were reported down approximately one mile northwest of Harr.
Springdale	5/21/2014	50	0	0	0	Several trees were reported down around Kingsport and another tree was reported down in Bluff City.
Springdale	5/27/2014	50	0	0	0	Trees and power lines were reported down at Kingsport.
Bristol	6/29/2014	50	0	0	8000	Law enforcement personnel reported a few trees downed by thunderstorm wind near Bristol.
Blountville	7/8/2014	50	0	0	0	Several trees were reported down across the county.
Springdale	7/27/2014	70	0	0	0	Several trees were reported down in Kingsport.
Colonial Heights	6/8/2015	50	0	0	0	One tree was reported down in Colonial Heights.
Blountville	6/8/2015	51	0	0	0	The Asos unit at the Tri-Cities Regional airport recorded a 51 knot wind gust.
Thomas Bridge	6/8/2015	50	0	0	0	Two trees and a few limbs were reported down near Volunteer Parkway one mile south of the Bristol Motor Speedway.
Galloway Mill	7/13/2015	50	0	0	0	One tree was reported down.
Blountville	7/13/2015	50	0	0	0	One tree was reported down.
Bristol	7/13/2015	50	0	0	0	Numerous trees were reported down.

Colonial Heights	6/4/2016	50	0	0	0	Trees were blown down near Colonial Heights and Kingsport. Also, part of a roof was blown off a barn in Fall Branch.
Springdale	6/23/2016	50	0	0	0	A tree was reported down in Kingsport while another was downed near Piney Flats.
Kingsport	7/4/2016	50	0	0	0	A few trees were reported down in the Bloomingdale area near Kingsport.
Blountville	7/4/2016	50	0	0	0	Power lines were reported down in Blountville.
Tri City Airport	7/8/2016	54	0	0	0	A 62 mph gust was measured at the Tri-Cities airport.
Blountville	8/16/2016	50	0	0	0	Several trees were reported down in Blountville and Piney Flats.
Bristol	8/16/2016	50	0	0	0	A few larges trees fell onto recreational vehicles and cars at the Margaret Milburn Campground.
Bristol	11/30/2016	50	0	0	0	A few trees were reported down on roadways.
Blountville	11/30/2016	50	0	0	0	Several trees were reported down.
Beidleman Mill	5/12/2017	50	0	0	0	A large tree was uprooted along Bristol Caverns Highway.
Boring	11/18/2017	52	0	0	0	A 60 mph wind gust was measured at the Tri-Cities Regional Airport.
Pettyjohns Mill	4/4/2018	50	0	0	0	A tree fell onto a home off Mountain View Avenue.
Springdale	7/20/2018	55	0	0	0	Traffic signals and wires were reported down in Kingsport.
East Kingsport	9/9/2018	50	0	0	0	Several trees and power lines were reported down.
Sullivan Gardens	11/6/2018	50	0	0	0	A tree was reported down near Bays Mountain Eastman Recreation Park.
Avoca	4/14/2019	50	0	0	0	A tree and power line was reported down on Greenfield Place Road.
South Holston Lake	6/22/2019	50	0	0	0	Several trees were reported down across the county.
Springdale	8/1/2019	50	0	0	0	A tree was reported down on Midland Drive.
Bloomingdale	8/1/2019	50	0	0	0	A few trees were reported down.
Bristol	8/1/2019	50	0	0	0	A large tree was downed in downtown Bristol.
Avoca	8/1/2019	50	0	0	0	A tree was reported down on Avoca Road.
Vance	8/1/2019	50	0	0	0	An awning was damage at condominiums at the Bristol Motor Speedway.
Galloway Mill	8/1/2019	50	0	0	0	A carport was blown into Egypt Road.

The committee shared their personal experiences of severe storm events that have occurred in Sullivan County, Town of Bluff City, City of Bristol and City of Kingsport. The following is transcribed from their thoughts.

- The City of Kingsport has suffered multiple storms over the last 10 to 12 years that were classified as straight line winds.
- Annual wind events during Kingsport (Fun Fest) time frame.
- Wind event January 2020 in Kingsport. Multiple tress down into homes.
- I remember several events that were determined to be straight line winds events that damaged out buildings or barns that were replaced by owners and did not show up on the statistics shown today.
- 1974 – 2 injuries
- A wind event caused roof to fly off and kill a girl in 2013 on Highway 11E.
- Lots of permits issued for roof replacements.

Sullivan 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 analyzes 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
Sullivan County Unincorporated	2.67	3.67	2.00	2.78
Town of Bluff City	3.00	3.00	2.00	2.67
City of Bristol	2.25	3.50	2.00	2.58
City of Kingsport	3.00	3.50	2.50	3.00

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Sullivan County Unincorporated	2.78	2.67	5.44
Town of Bluff City	2.67	3.00	5.67
City of Bristol	2.58	2.50	5.08
City of Kingsport	3.00	3.25	6.28

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

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

Property	
Amount of residetial property damage associated from the hazard	
1	Less than $500 in damages
2	$500-$10,000 in damages
3	$10,000-$500,000 in damages
4	$500,000-$2,000,000 in damages
5	More than $2,000,000 in damages

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

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

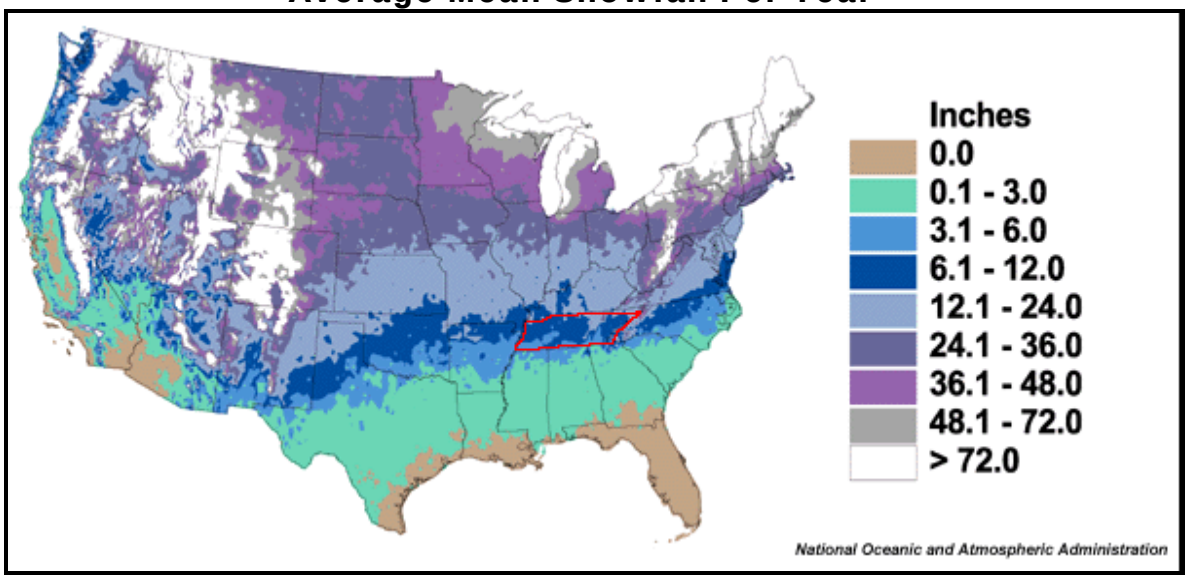
Freezes/Winter Storms

A freeze occurs when temperatures are below 32 degrees Fahrenheit for a period. 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 Sullivan County, all jurisdictions are vulnerable to freezes and moderate winter storms, but not to the severity level seen in much of the northern U.S.

Based on previous occurrences, Sullivan County can experience multiple winter weather events in one year. However, it's been rare in recent years.

The severity of winter storms is commonly measured by inches of snowfall. It is possible for snowfall to accumulate up to 12 inches in Sullivan County and/or ice accumulations to cause for hazardous conditions. The average mean snowfall per year in Sullivan County is between 6 to 12 inches (as seen on the map below).

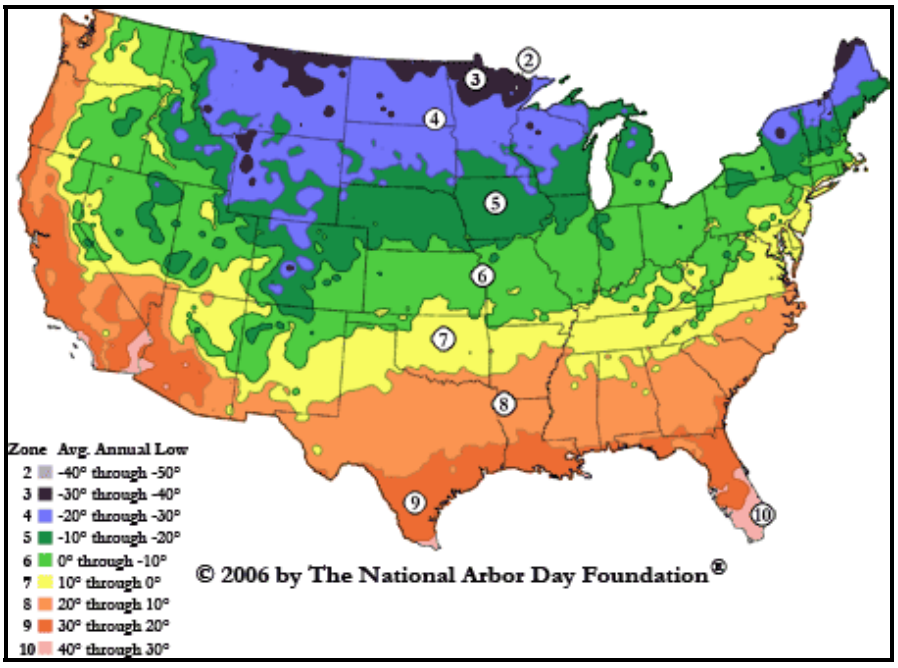
Average Mean Snowfall Per Year



Source: NOAA

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

Average Annual Low Temperatures



Source: NOAA

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

Winter Storm Impacts in Sullivan County: 1950 - 2019

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

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

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

The committee shared their personal experiences of winter weather events that have occurred in Sullivan County, Town of Bluff City, City of Bristol and City of Kingsport. The following is transcribed from their thoughts.

- The City of Bristol typically budgets $150,000 per year to purchase salt. Some years, this budget can be spent within one or two events depending on snowfall amount/duration of the event.
- The last few years (not 2019 or 2020 so far) schools were closed for 5-10 days.
- Many businesses or greenhouses were closed for over a week.
- Power outages – severe cold temps.

Sullivan 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
Sullivan County Unincorporated	2.00	2.33	1.00	1.78
Town of Bluff City	2.00	2.00	1.00	1.67
City of Bristol	2.00	2.50	1.75	2.08
City of Kingsport	2.50	2.50	1.75	2.25

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Sullivan County Unincorporated	1.78	3.33	5.11
Town of Bluff City	1.67	3.00	4.67
City of Bristol	2.08	2.75	4.83
City of Kingsport	2.25	3.50	5.75

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

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

Property	
Amount of residetial property damage associated from the hazard	
1	Less than $500 in damages
2	$500-$10,000 in damages
3	$10,000-$500,000 in damages
4	$500,000-$2,000,000 in damages
5	More than $2,000,000 in damages

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

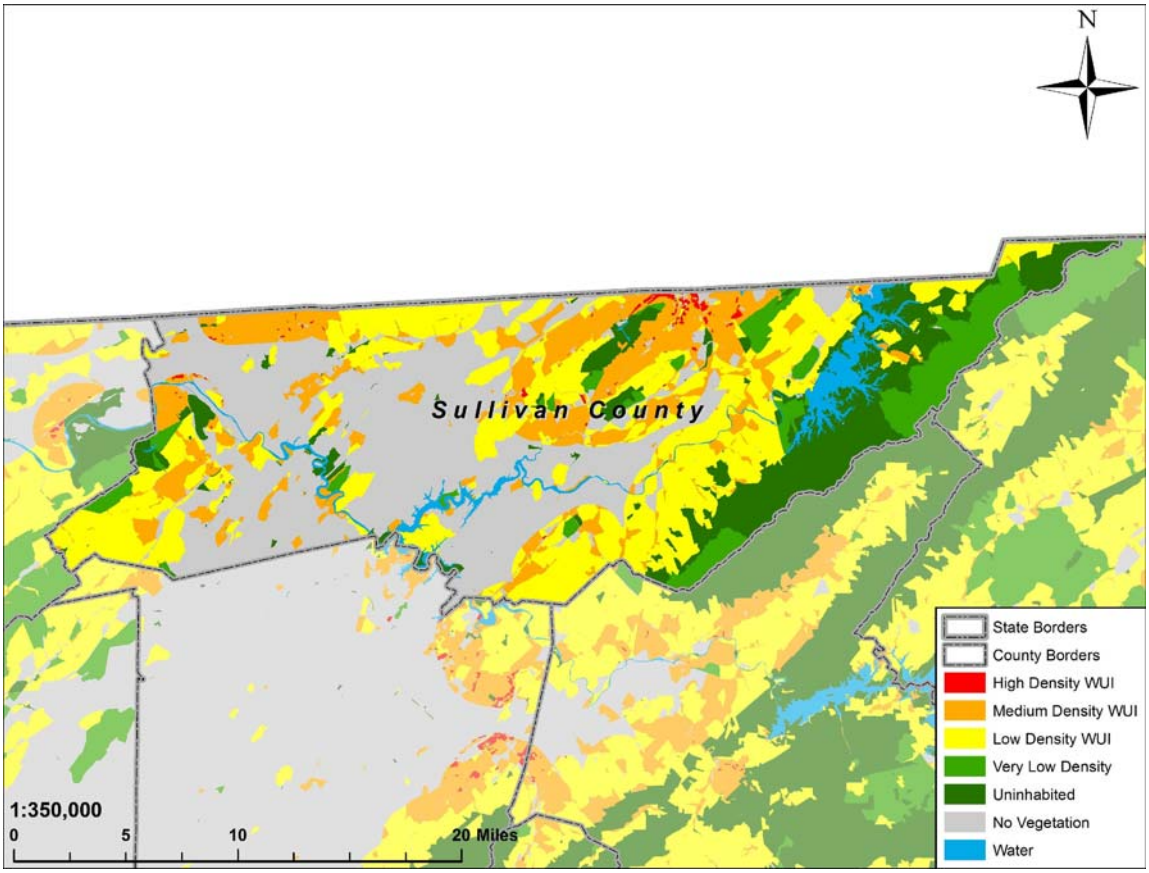
Probability	
Likelihood of the hazard occurring within a given span of years	
1	Less than once every 10 years
2	About once every 5-10 years
3	About once every 2-5 years
4	About once a year
5	More than once a year

Wildfire

There are very few news reports of Wildfires occurring in Sullivan County. As reported by wjlh.com on April 13, 2018, an out of control 3-acre brush fire destroyed cars, outbuildings, grass and trees as a result of dry conditions. One man was displaced from his home.

As reported by johnsoncitypress.com on November 14, 2016, there were numerous fires across East Tennessee causing heavy smoke conditions in the Tri Cities area causing for health concerns. There were multiple brush fires in Sullivan County. All these incidents were made worse by drought conditions.

In the eastern portion of Sullivan County, it is mostly uninhabited or very low density with a lot of vegetation. The remaining parts of the County are medium to low density wildland urban interface to no vegetation.
Many fires occur in grassland areas such as yards and pastures. When the conditions are right, all these areas become vulnerable to devastating wildfires. Below is the Wildland Urban Interface for Sullivan County.



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

- Fuel;
- Topography; and
- Weather.

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

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

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

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

The committee did not provide any feedback in reference to personal experiences.

Sullivan County is in the East TN District of the TN Division of Forestry. The TN Division of Forestry provides statistics for each region summarizing wildfire events. Due to outside data sources including federal and state land, causing confusion in wildfire data, the TN Division of Forestry will always remain the only source for Counties within the State of Tennessee for information. It is not the responsibility of Sullivan County to mitigate federal or state land. Hopefully, in the future, a more defined dataset can be provided. At this time, this is the only information Sullivan County can obtain that is consistent and confirmed. Below are the statistics for Sullivan County from 2007 to 2016. These statistics also provide extent of the Wildfire Hazard. For Area, the total number of acres for the East TN District is 6,245,119.29. The percentage is calculated by taking the percentage and calculating the total area by percentage within the entire district. Size is calculated by total number of acres divided by total number of fires.

Year	# of Fires Forested	# of Fires Non-Forested	Total	# of Acres Forested	# of Acres Non-Forested	Total	Size	Area
2016	6	1	7	325.1	1.2	326.3	46.6	0.001
2015	8	0	8	45.5	6.0	51.5	6.4	0.000
2014	11	2	13	77.0	7.5	84.5	6.5	0.000
2013	2	3	5	7.2	4.3	11.5	2.3	0.000
2012	5	0	5	27.2	3.0	30.2	6.0	0.000
2011	3	0	3	24.5		24.5	8.2	0.000
2010	6	1	7	17.0	0.1	17.1	2.4	0.000
2009	6	1	7	38.0	3.0	41.0	5.9	0.000
2008	11	0	11	276.6	0.0	276.6	25.1	0.001
2007	12	2	14	48.9	2.3	51.2	3.7	0.000

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

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Sullivan County Unincorporated	2.00	2.00	1.00	1.67
Town of Bluff City	2.00	2.00	1.00	1.67
City of Bristol	1.75	2.25	1.25	1.75
City of Kingsport	2.50	2.50	1.25	2.08

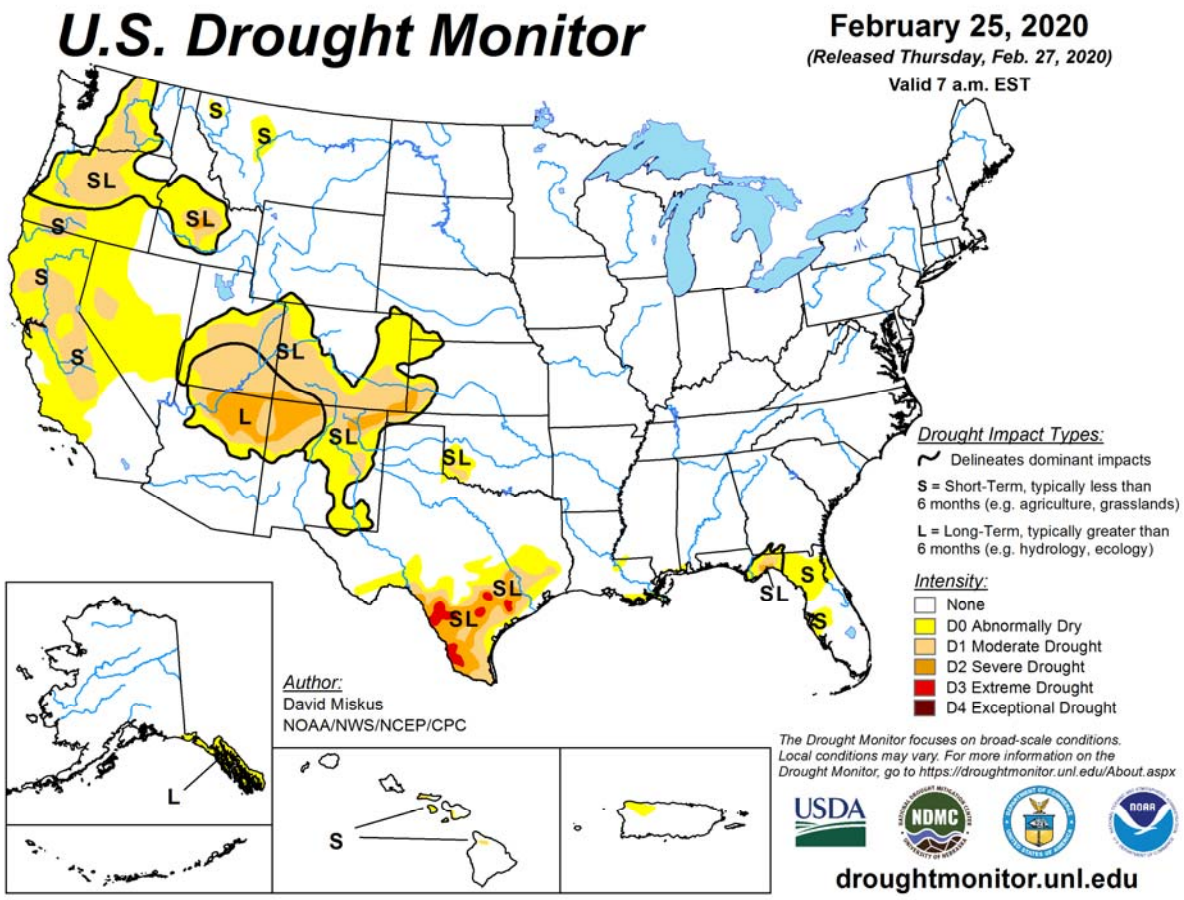
Jurisdiction	Vulnerability	Probability	Risk V+P=R
Sullivan County Unincorporated	1.67	2.33	4.00
Town of Bluff City	1.67	3.00	4.67
City of Bristol	1.75	2.00	3.75
City of Kingsport	2.08	2.50	4.58

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

Drought

Drought is a slow-onset hazard that can last for months or years. As a hazard, it has the potential to impact many aspects of life, including two of our most important needs: drinking water and food. Because of the long duration of droughts, the impacts last for years and can ripple through a community over time. When drought strikes Sullivan County, there is an increased risk of wildfires and affects the stabilization of karst structures causing for an increase of sinkhole activity. Drought can affect the viability and economic stability of Sullivan County.

The US Drought Monitor provides weekly updates by analyzing data and illustrating the issue through a map. This is the most current map.



Source: US Drought Monitor (http://droughtmonitor.unl.edu/CurrentMap.aspx).

The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC-UNL.

The map (above) provides a quick snapshot of drought conditions. The accompanying drought severity classification table (below) shows the ranges

for each indicator for each dryness level. Because the ranges of the various indicators often don't coincide, the final drought category tends to be based on what most of the indicators show and on local observations. The analysts producing the map also weigh the indices according to how well they perform in various parts of the country and at different times of the year.

The Drought Monitor summary map identifies general areas of drought and labels them by intensity. D1 is the least intense level and D4 the most intense. Drought is defined as a moisture deficit bad enough to have social, environmental or economic effects.

D0 areas are not in drought but are experiencing abnormally dry conditions that could turn into drought or are recovering from drought but are not yet back to normal.

We indicate whether primary physical effects are for short- or long-term drought:

- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically more than 6 months (e.g. hydrology, ecology)

Drought Severity Classification

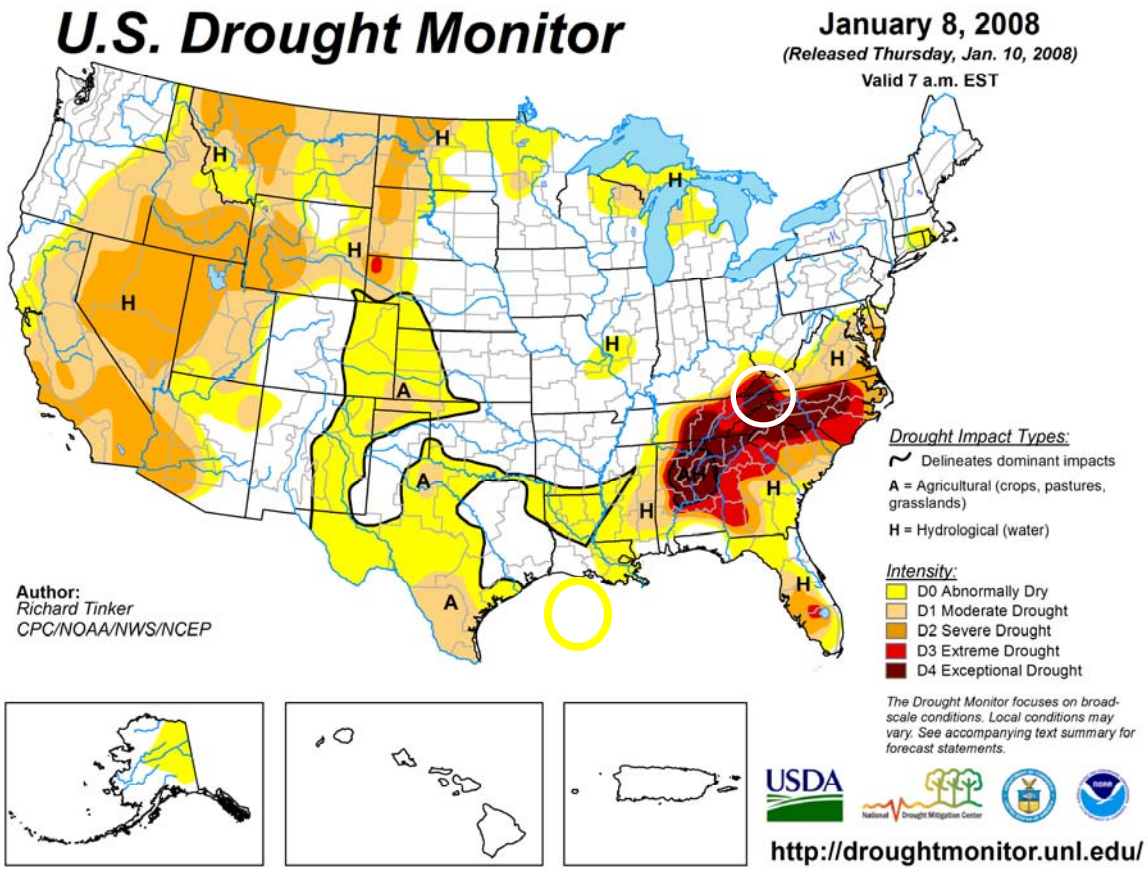
Category	Description	Possible Impacts	Ranges				
			Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: • short-term dryness slowing planting, growth of crops or pastures Coming out of drought: • some lingering water deficits • pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Short-term drought indicator blends focus on 1-3 month precipitation. Long-term blends focus on 6-60 months. Additional indices used, mainly during the growing season, include the USDA/NASS Topsoil Moisture, Keetch-Byram Drought Index (KBDI), and NOAA/NESDIS satellite Vegetation Health Indices. Indices used primarily during the snow season and in the West include snow water content, river basin precipitation, and the Surface Water Supply Index (SWSI). Other indicators include groundwater levels, reservoir storage, and pasture/range conditions.

The US Drought Monitor limits how far back data can be pulled. From January 10, 2000 to January 20, 2020, Sullivan County had experienced the following in drought conditions. With the assistance of the above legend and the below conditions, the extent is provided.

- None = 631 days
- D0 = 173 days
- D1 = 130 days
- D2 = 55 days
- D3 = 43 days
- D4 = 15 days

From October 2, 2007 to January 8, 2008, Sullivan County experienced an exceptional drought (D4). Impacts included shortage of water supply and impacts to crops.



The information provided in the summary of the drought issue located in Sullivan County, TN is the only source of information to provide a clear picture of the issue. Due to lack of resources in presentation of the issue,

the information provided is the only source. No other details are available for research or study.

The committee shared their personal experiences of winter weather events that have occurred in Sullivan County, Town of Bluff City, City of Bristol and City of Kingsport. The following is transcribed from their thoughts.

- Drought typically does not impact water service for Bristol due to the source of water is from the water plant.

Jurisdiction	Impacts			Vulnerability
	Human	Property	Business	H+P+B=#; #/3=V
Sullivan County Unincorporated	1.33	2.33	0.67	1.44
Town of Bluff City	1.00	2.00	1.00	1.33
City of Bristol	1.00	2.00	1.25	1.42
City of Kingsport	1.75	2.75	1.75	2.08

Jurisdiction	Vulnerability	Probability	Risk V+P=R
Sullivan County Unincorporated	1.44	3.00	4.44
Town of Bluff City	1.33	3.00	4.33
City of Bristol	1.42	2.00	3.42
City of Kingsport	2.08	2.25	4.33

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

Presidential Disaster Declarations

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

FEMA DR #	Date	Hazard(s)				PA	IA
1974	5/1/2011	Severe Storms	Tornadoes	Straight Line Winds	Flooding	yes	no
3095	3/14/1993	Winter Storm				yes	no
3217	9/5/2005	Hurricane Katrina				yes	no
424	4/4/1974	Tornadoes				yes	Yes
366	5/15/1972	Heavy Rains	Flooding			yes	Yes
1197	1/13/1998	Severe Storms	Flooding			yes	no

Section 4: Mitigation Strategy

Mitigation Goals

The purpose for developing a set of Goals is to clearly state the community's overall vision for hazard mitigation and to provide a path towards building a safer, more resilient community. The Sullivan 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

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

The Sullivan 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 Sullivan County Hazard Mitigation Project List. Also, the committee tally for the rating of each project is in the following table.

Action No.	Action Title	Hazard Rated Priority		Social	Administrative	Financial	Environmental	Technical	Total
1	Old Elizabethton Hwy & Weaver Branch/Tate Rd. flooding issue	16		3.0	2.0	3.0	3.0	2.0	2.6
2	Tate Rd. Flooding issue (County)	3		3.0	2.0	3.0	3.0	2.0	2.6
3	Public Education (all jurisdictions)	3		3.0	2.0	3.0	3.0	2.0	2.6
4	Reedy Creek/near 11 west flooding issue (County)	1		3.0	2.0	3.0	3.0	2.0	2.6
5	County EMS Station generators (County)	16		2.0	2.0	2.0	3.0	3.0	2.4
6	Volunteer FD Generators (County)	7		2.0	2.0	2.0	3.0	3.0	2.4
7	Sewer/water plant generators (all jurisdictions)	2		2.0	2.0	2.0	3.0	3.0	2.4
8	Become a Firewise Community (all jurisdictions)	8		3.0	2.0	1.0	3.0	2.0	2.2
9	Develop a Drought Mitigation Plan (all jurisdictions)	15		3.0	2.0	1.0	3.0	2.0	2.2
10	Ead Rd. & Weaver Branch Flooding issue (Bluff City)	16		3.0	2.0	3.0	3.0	2.0	2.6
11	Bluff City PD generator (Bluff City)	9		2.0	2.0	2.0	3.0	3.0	2.4
12	Buyout repetitive loss property 1 (Bristol)	16		3.0	3.0	2.0	2.0	2.0	2.4
13	Buyout repetitive loss property 2 (Bristol)	16		3.0	3.0	2.0	2.0	2.0	2.4
14	Vance Dr flooding contigent on repetitive loss buyout for property 1 (Bristol)	14		2.0	3.0	2.0	2.0	2.0	2.2
15	S. Hampton Dr. Culvert replacement (Bristol)	3		2.0	3.0	2.0	3.0	3.0	2.6
16	Generators for fire stations (Bristol)	3		3.0	2.0	2.0	3.0	3.0	2.6
17	Water booster stations permanent generators (Bristol)	9		3.0	1.0	3.0	3.0	2.0	2.4
18	Downtown stormwater pond (Kingsport)	9		2.0	2.0	3.0	2.0	3.0	2.4
19	Lockwood Rd. Flooding issue (Kingsport)	9		2.0	2.0	3.0	2.0	3.0	2.4
20	Bridge over Ward Place (Kingsport)	9		2.0	2.0	3.0	2.0	3.0	2.4

Sullivan County Project List

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

Sullivan County Project List

Hazard Mitigated	Project #	Sullivan County (Unincorporated) Action/Project Name	Priority Rank	Addresses New or Existing Buildings/Infra?	Responsible Agency	Possible Funding Source(s)	Timeframe
Flooding	1	Old Elizabethton Hwy & Weaver Branch/Tate Rd. flooding issue	16	existing	Hwy dept	HMGP, PDM, FMA	1-5 years
	10	Ead Rd. & Weaver Branch flooding issue	16	Existing	Hwy dept	HMGP, PDM, FMA	1-5 years
	2	Tate Rd. Flooding	3	existing	Hwy dept	HMGP, PDM, FMA	1-5 years
	3	Public Education	3	existing	EMA	HMGP, PDM,	1-5 years
	4	Reedy Creek near 11W flooding issue	1	existing	Hwy dept	HMGP, PDM, FMA	1-5 years
Tornado/Severe Storms (Hail, Wind, Lightning)	5	County EMS Station Generators	16	New and existing	EMS	HMGP, PDM	1-5 years
	6	Volunteer FD Generators	7	Existing	Individual Volunteer FD's	HMGP, PDM	1-5 years
	7	Sewer/water plant Generators	2	Existing	Utility district	HMGP, PDM	1-5 years
	3	Public Education	3	existing	EMA	HMGP, PDM	1-5 years
Winter Weather	5	County EMS Station Generators	16	New and existing	EMS	HMGP, PDM	1-5 years
	6	Volunteer FD generators	7	Existing	Individual volunteer	HMGP, PDM	1-5 years
	7	Sewer/water plant Generators	2	Existing	Utility district	HMGP, PDM	1-5 years
	3	Public Education	3	existing	EMA	HMGP, PDM	1-5 years
Wildfires	3	Public Education	3	existing	EMA	HMGP, PDM	1-5 years
	8	Become a Firewise community	8	existing	EMA/VFD	HMGP,	1-5 years

						PDM	
Drought	3	Public Education	3	existing	EMA	HMGP, PDM	1-5 years
	9	Develop a drought mitigation plan	15	existing	EMA	HMGP, PDM	1-5 years

Hazard Mitigated	Project #	Town of Bluff City Action/Project Name	Priority Rank	Addresses New or Existing Buildings/Infra?	Responsible Agency	Possible Funding Source(s)	Timeframe
Flooding	3	Public Education	3	existing	EMA/Bluff City	HMGP, PDM	1-5 years
	Due to other priorities within these projects, Town of Bluff City is limiting this to one project.						
Tornado/Severe Storms (Hail, Wind, Lightning)	3	Public Education	3	Existing	EMA/Bluff City	HMGP, PDM	1-5 years
	11	Bluff City PD Generator	16	existing	Police dept/Bluff City	HMGP, PDM	1-5 years
Winter Weather	3	Public Education	3	existing	EMA/Bluff City	HMGP, PDM	1-5 years
	11	Bluff City PD Generator	16	existing	Police dept/Bluff City	HMGP, PDM	1-5 years
Wildfires	3	Public Education	3	existing	EMA/Bluff City	HMGP, PDM	1-5 years
	8	Become a Firewise community	8	existing	EMA/Volunteer FD	HMGP, PDM	1-5 years
Drought	3	Public Education	3	Existing	EMA/Bluff City	HMGP, PDM	1-5 years
	9	Develop a drought mitigation plan	15	Existing	EMA/Bluff City	HMGP, PDM	1-5 years

Hazard Mitigated	Project #	City of Bristol Action/Project Name	Priority Rank	Addresses New or Existing Buildings/Infra?	Responsible Agency	Possible Funding Source(s)	Timeframe
Flooding	12	Buyout Repetitive Loss property 1	16	Existing	City of Bristol	HMGP, PDM, FMA	1-5 years
	13	Buyout Repetitive Loss property 2	16	Existing	City of Bristol	HMGP, PDM, FMA	1-5 years
	14	Vance Drive flooding contingent on repetitive loss buyout property 1	14	Existing	City of Bristol	HMGP, PDM, FMA	1-5 years
	15	S. Hampton Drive culvert replacement	3	Existing	City of Bristol	HMGP, PDM, FMA	1-5 years
	3	Public Education	3	Existing	EMA/City of Bristol	HMGP, PDM	1-5 years
Tornado/Severe Storms (Hail, Wind, Lightning)	3	Public Education	3	existing	EMA/City of Bristol	HMGP, PDM	1-5 years
	16	Generators for fire stations	3	Existing and new	City of Bristol	HMGP, PDM	1-5 years
	17	Water booster stations permanent generators	9	Existing and new	City of Bristol	HMGP, PDM	1-5 years
	7	sewer/water plant permanent generators	2	Existing	City of Bristol	HMGP, PDM	1-5 years
Winter Weather	3	Public Education	3	existing	EMA/City of Bristol	HMGP, PDM	1-5 years
	16	Generators for fire stations	3	Existing and new	City of Bristol	HMGP, PDM	1-5 years
	17	Water booster stations permanent generators	9	existing	City of Bristol	HMGP, PDM	1-5 years
	7	sewer/water plant generators	2	existing	City of Bristol	HMGP, PDM	1-5 years
Wildfires	3	Public Education	3	existing	EMA/City of Bristol	HMGP, PDM	1-5 years
	8	Become a Firewise community	8	existing	EMA/City of	HMGP,	1-5 years

					Bristol	PDM	
Drought	3	Public Education	3	existing	EMA/City of Bristol	HMGP, PDM	1-5 years
	9	Develop a drought mitigation plan	15	existing	EMA/City of Bristol	HMGP, PDM	1-5 years

Hazard Mitigated	Project #	City of Kingsport Action/Project Name	Priority Rank	Addresses New or Existing Buildings/Infra?	Responsible Agency	Possible Funding Source(s)	Timeframe
Flooding	3	Public Education	3	Existing	City of Kingsport/EMA	HMGP, PDM	1-5 years
	18	Downtown Stormwater Pond	9	new	City of Kingsport	HMGP, PDM, FMA	1-5 years
	19	Lockwood Rd. Flooding issue	9	Existing	City of Kingsport	HMGP, PDM, FMA	1-5 years
	20	Bridge over Ward Place	9	existing	City of Kingsport	HMGP, PDM, FMA	1-5 years
Tornado/Severe Storms (Hail, Wind, Lightning)	3	Public Education	3	existing	City of Kingsport/EMA	HMGP, PDM	1-5 years
	7	Sewer/water plant generator	2	Existing	City of Kingsport	HMGP, PDM	1-5 years
Winter Weather	3	Public Education	3	Existing	City of Kingsport/EMA	HMGP, PDM	1-5 years
	7	Sewer/water plant generator	2	Existing	City of Kingsport	HMGP, PDM	1-5 years
Wildfires	3	Public Education	3	Existing	City of Kingsport/EMA	HMGP, PDM	1-5 years
	8	Become a Firewise community	8	Existing	City of Kingsport/EMA	HMGP, PDM	1-5 years
Drought	3	Public Education	3	existing	City of Kingsport/EMA	HMGP, PDM	1-5 years
	9	Develop a drought mitigation plan	15	existing	City of Kingsport/EMA	HMGP, PDM	1-5 years

Notes: The timeframe was determined based on the required revision schedule of this plan which gives the committee the full 5 years to focus on these efforts.

Acronym definition – HMGP (Hazard Mitigation Grant Program), FMA – Flood Mitigation Assistance, PDM (Pre-Disaster Mitigation), EMA (Emergency Management Agency)

Project List Update

The Sullivan County Hazard Mitigation Planning Committee reviewed the actions/projects in the 2015 plan. Ultimately, by the end of that conversation it was determined to create a whole new set of projects that met the current priorities.

The initial review decided the following projects were preparedness, therefore, removed.

- Increase coordination and pre-staging of critical assets for disasters.
- Define “vulnerable” populations in order to better coordinate with Public Health to identify these populations.
- Continue to participate in themed drills, such as TNCAT for focused training.
- Improve communications between Emergency Management Agency and utilities.
- Continue partnering with Eastman on floodplain issues and hazard mitigation storage.
- Continue participation as a StormReady community.
- Improve emergency communication with surrounding states.
- Review and update vulnerability assessments at water treatment facilities.
- Continue disaster response training for Bristol Motor Speedway staff.
- Improve alternative route planning and equipment for Volunteer Parkway and other State roadways that are key transportation routes during race weekends.
- Generate a map of sirens and the populations that receive the alert information.

The following actions/projects were determined to be required hazard mitigation planning elements and not projects, therefore, removed.

- Identify repetitive flood prone areas.
- Map known areas of landslide incidents and potential areas for landslides. (This is also not a prime hazard of concern for the 2020 plan.)
- Coordinate annual meetings of the Sullivan County Hazard Mitigation Planning Committee to monitor, evaluate, and update the multi-hazard mitigation plan.

The following actions/projects were determined to not be hazard mitigation eligible projects, therefore, removed.

- Continue to seek ways for Tier II facilities to report electronically in a web-based format, as the current system support by a University may soon be unavailable.

- Investigate the feasibility of installing a Hazardous Materials team in the City of Bristol, TN.
- Leverage other funding sources for hazard mitigation implementation, such as the Hazard Mitigation Grant Program (HMGP) and the Flood Mitigation Assistance (FMA) Program.

The following projects were deleted due to other higher priorities.

- Participate in CRS program.
- Modify zoning in dam failure inundation zones. (Also, not a hazard of prime concern.)
- Require underground utilities in new subdivision developments.

The following action/project was brought forward to the 2020 plan but generalized. Also, the man-made and hazardous materials portion of this will no longer be considered for hazard mitigation.

1. Public Awareness Program
    a. Continue public education efforts, such as quarterly online newsletter, participation in safety fairs, and press releases/radio PSAs in coordination with the Public Health Coalition regarding natural and man-made hazards.
    b. Continue public education on shelters.
    c. Educate property owners near the Bristol Motor Speedway facility about hazard mitigation roles and responsibilities.

The following action/project was partially deleted with only Firewise being brought forward to the 2020 plan.

- Reduce Vulnerability to Wildfire Hazard.
    - Investigate improvements to ingress/egress routes for residential areas in Wildland/Urban Interface (WUI) or wildfire hazard areas.
    - Investigate improvements in water delivery to residential areas in wildfire hazard areas.
    - Develop and adopt design standards based on Firewise principles into subdivision ordinances.
    - Become a certified Firewise community.

The following project was fleshed out further in committee by determining which areas needed greatest attention due to flood risk based on previous events.

- Identify methods to reduce flooding and loss in historic districts.

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, Sullivan County unincorporated, the Town of Bluff City, the City of Bristol, and the City of Kingsport are NFIP participants. FEMA has listed these five jurisdictions to have a current effective map date as of 9/20/2006.

Unfortunately, there are several issues with the NFIP as it pertains to Johnson City and Kingsport. The below outlines these issues and a lengthy attempt was made in 2018/2019 to resolve with no resolution. This information is presented here in case future issues appear surrounding this issue.

Johnson City is located in Washington, Carter and Sullivan Counties. However, the NFIP Policy information has all of Johnson City located in Carter County as illustrated below.

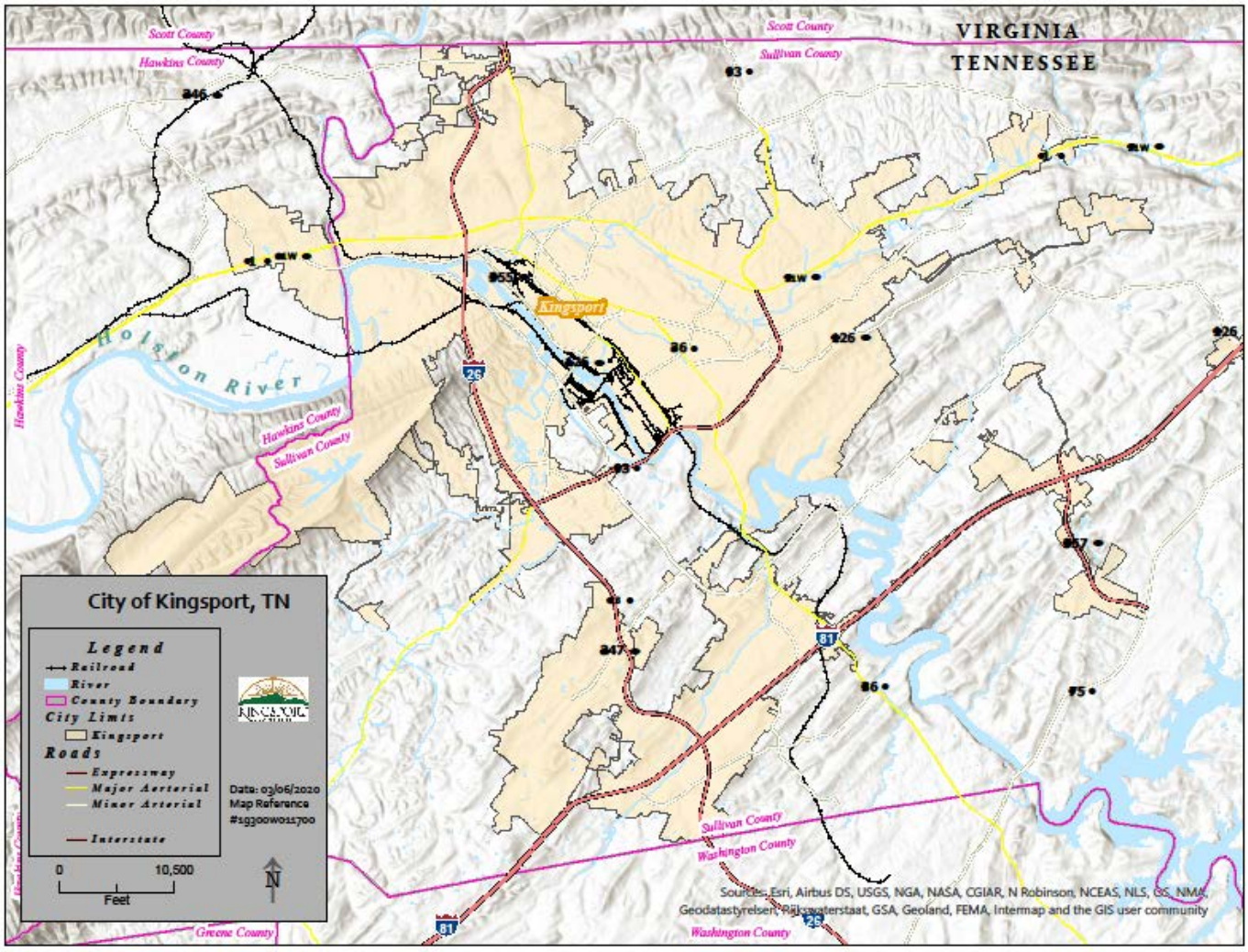
Policy Statistics
Tennessee
AS OF 06/30/2018

County Name	Community Name	Policies In-force	Insurance In-force whole $	Written Premium In-force
VAN BUREN COUNTY	VAN BUREN COUNTY *	21	4,300,200	18,718
WARREN COUNTY	MCMINNVILLE, CITY OF	19	3,907,300	20,315
	VIOLA, TOWN OF	1	105,000	362
	WARREN COUNTY*	30	4,856,700	25,226
WASHINGTON COUNTY	JONESBOROUGH, TOWN OF	13	2,166,900	13,418
	WASHINGTON COUNTY *	73	15,570,500	45,303
WAYNE COUNTY	CLIFTON, CITY OF	12	1,832,800	9,427
	WAYNE COUNTY *	47	6,502,900	40,483
	STEWART COUNTY *	47	9,873,400	30,417
SULLIVAN COUNTY	BLUFF CITY, TOWN OF	1	16,500	290
	BRISTOL, CITY OF	60	14,090,300	100,494
	SULLIVAN COUNTY *	139	27,648,500	125,269
SUMNER COUNTY	GALLATIN, CITY OF	239	71,179,300	184,182
	HENDERSONVILLE, CITY OF	397	113,948,800	258,006
	HUNTINGDON, TOWN OF	26	4,269,200	31,333
	MCKENZIE, TOWN OF	5	1,011,500	5,818
CARTER COUNTY	CARTER COUNTY *	263	34,064,700	282,710
	ELIZABETHTON, CITY OF	102	18,367,700	119,470
	JOHNSON CITY, CITY OF	200	48,816,800	275,710
	WATAUGA, CITY OF	1	500,000	9,245
CHEATHAM COUNTY	ASHLAND CITY, TOWN OF	174	48,922,400	180,408

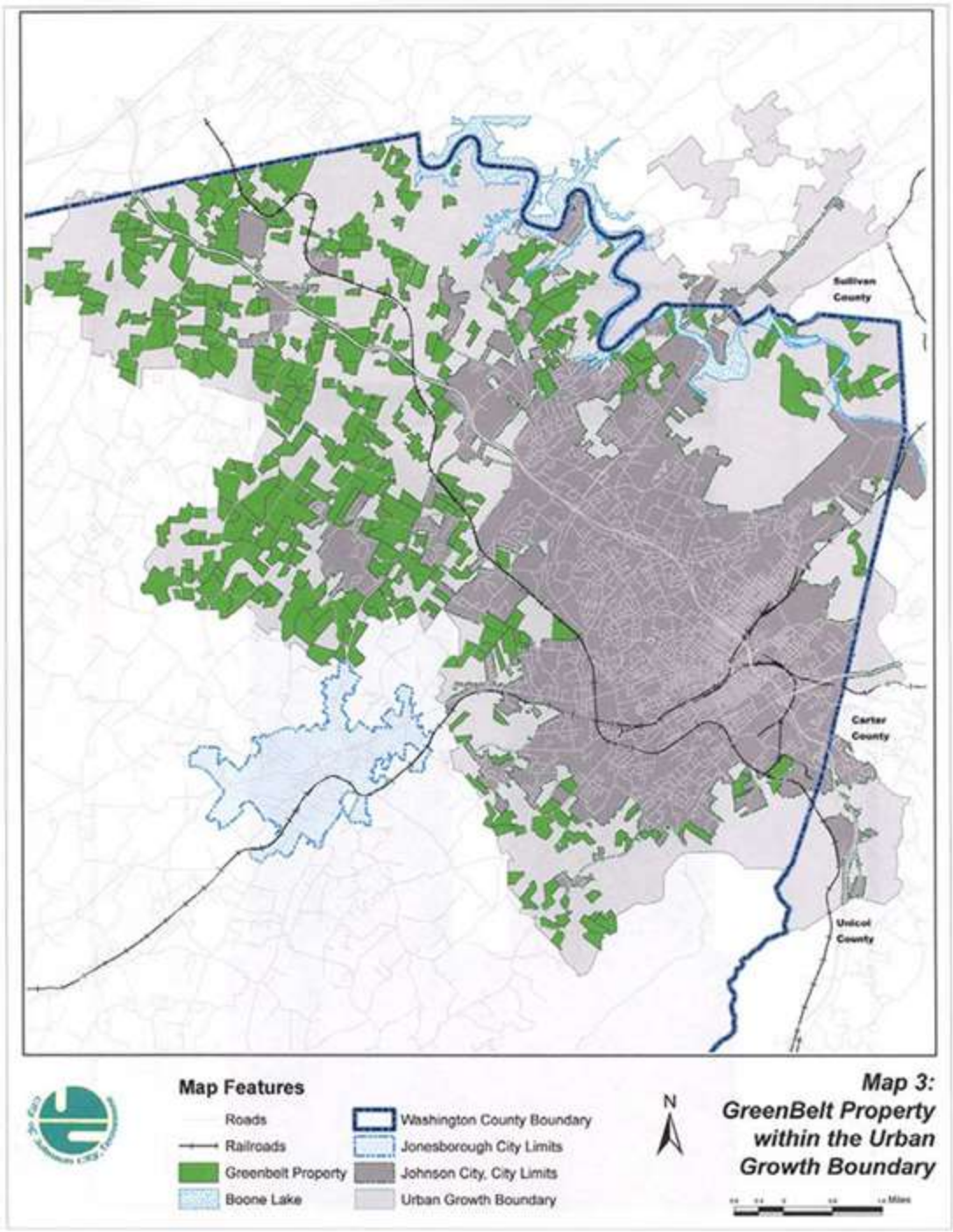
The City of Kingsport is located in Sullivan and Hawkins County with the majority of the city located in Sullivan. However, the NFIP Policy information has all of Kingsport listed in Hawkins.

	DOVER, TOWN OF	4	1,204,000	4,812
	STEWART COUNTY *	47	9,873,400	30,417
SULLIVAN COUNTY	BLUFF CITY, TOWN OF	1	16,500	290
	BRISTOL, CITY OF	60	14,090,300	100,494
	SULLIVAN COUNTY *	139	27,648,500	125,269
SUMNER COUNTY	GALLATIN, CITY OF	239	71,179,300	184,182
	HENDERSONVILLE, CITY OF	397	113,948,800	258,006
	HARDIN COUNTY*	125	25,561,300	76,311
	SALTILLO, TOWN OF	3	348,000	2,806
	SAVANNAH, CITY OF	6	2,281,500	5,231
HAWKINS	KINGSPORT, CITY OF	156	34,162,800	159,760
HAWKINS COUNTY	BULLS GAP, TOWN OF	2	466,500	8,350
	CHURCH HILL,CITY OF	10	2,528,700	9,549
	HAWKINS COUNTY*	19	3,976,200	15,384
	MOUNT CARMEL, TOWN OF	13	1,751,600	14,886
	ROGERSVILLE, CITY OF	12	2,263,000	16,840
	SURGOINSVILLE, CITY OF	1	223,000	2,066
HAYWOOD COUNTY	BROWNSVILLE, CITY OF	87	10,957,000	73,647
	HAYWOOD COUNTY*	19	2,277,400	14,403

Here is a map of the City of Kingsport with Hawkins and Sullivan County lines.



The following image shows Johnson City, which is a part of the Washington County Hazard Mitigation Plan, boundary map. Johnson City is located in Washington, Carter, and Sullivan Counties.



The following page provides details about policies within Sullivan County and all jurisdictions within. The below is a description of each column.

Adjuster Expense	The total amount paid to adjusters for all claims within the community and/or county. It includes all special expenses, allocated loss adjusted expense, and allocated ICC expense.

Building Coverage	Building coverage for a policy or claim (whole dollars)
Building Payments	The total amount paid for all losses for building,
Community Name	The official NFIP name of the community in which the claim or policy exists.
Community Number	The 6 character community ID in which the claim or policy exists.
Contents Coverage	Contents coverage for a policy or claim (whole dollars)
Contents Payments	The total amount paid for all losses for contents
County Name	The official FIPS county name for the claim or policy. It is determined by geocoding of the policy or claim address, rather than the historical method of using the community to look up the county.
Data as of Date	The date of the most recent validated data upon which the report is based.
ICC Coverage	ICC coverage for a policy or claim (whole dollars)
ICC Payments	The total amount paid for all losses for ICC
Number of Losses	The number of losses (claims) reported within that community and/or county.
State	The state in which the policy or claim exists. The value is determined by the geocoded data first, and in the absence of geocoding, by the community state.
Total Policy Count	The total number of policies reported within the community and/or county in force as of the given date. All condo units are counted for each condo master policy.
Total Premium and Policy Fee	The policy premium and associated policy fee for the policies.
WYO or Direct	An indicator of whether the policy or claim is administered by NFIP Direct ("Direct") or a Write-Your-Own Company ("WYO")

Because of the issues presented above, the following NFIP information includes Sullivan, Washington and Hawkins Counties.

Community Name (Number)	County	Direct Premium and FPF	WYO Premium and FPF	Total Premium and FPF	Direct Policy Count	WYO Policy Count	Total Policy Count	Direct Coverage (in Thousands)	WYO Coverage (in Thousands)	Total Coverage (in Thousands)	Direct Losses	WYO Losses	Total Losses	Direct Dollars Paid	WYO Dollars Paid	Total Dollars Paid	Adjuster Expense
KINGSPORT, CITY OF (470184)	HAWKINS COUNTY	$ 401	$ 8,150	$ 8,551	1	11	12	$ 350	$ 2,795	$ 3,145	-	-		$ -	$ -	$ -	$ -
BLUFF CITY, TOWN OF (470296)	SULLIVAN COUNTY	$ -	$ 322	$ 322	-	1	1	$ -	$ 18	$ 18	-	-		$ -	$ -	$ -	$ -
BRISTOL, CITY OF (470182)	SULLIVAN COUNTY	$ 5,981	$ 93,884	$ 99,865	7	52	59	$ 909	$ 13,230	$ 14,138	7	9	16	$ 14,194	$ 37,044	$ 51,239	$ 8,102
KINGSPORT, CITY OF (470184)	SULLIVAN COUNTY	$ 23,278	$ 124,212	$ 147,490	25	113	138	$ 4,048	$ 24,154	$ 28,202	26	37	63	$ 197,467	$ 343,169	$ 540,636	$ 39,520
SULLIVAN COUNTY * (470181)	SULLIVAN COUNTY	$ 24,850	$ 95,067	$ 119,917	25	103	128	$ 5,004	$ 21,132	$ 26,136	33	53	86	$ 237,570	$ 596,353	$ 833,923	$ 54,441
UNKNOWN	SULLIVAN COUNTY	$ -	$ -	$ -	-	-	-	$ -	$ -	$ -	1	-	1	$ -	$ -	$ -	$ 70
JOHNSON CITY, CITY OF (475432)	WASHINGTON COUNTY	$ 45,985	$ 243,061	$ 289,046	19	169	188	$ 4,190	$ 43,774	$ 47,964	36	55	91	$ 395,810	$ 2,834,726	$ 3,230,536	$ 109,682

According to the National Flood Insurance Program, repetitive flood loss is defined as a facility or structure that has experienced two or more insurance claims of at least $1,000 in any given 10 year period since 1978. Within the NFIP, repetitive flood loss properties are usually considered the most vital structures to mitigate. According to FEMA databases, Sullivan County has multiple repetitive and several repetitive loss properties. It's important to note the following information may be in reference to another County. However, because of the confusion within NFIP, it was decided to go ahead and place this information here.

- Sullivan County has 5 residential repetitive or severe repetitive loss properties.
- City of Kingsport has 2 other/non residential and 3 residential repetitive/severe repetitive loss properties.
- City of Bristol has 2 residential repetitive/severe repetitive loss properties.
- Johnson City (which is a part of Washington County's Hazard Mitigation Plan) has 7 other/non residential and 5 residential repetitive/severe repetitive loss properties.

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

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

Section 5: Plan Maintenance

Monitoring, Evaluating, and Updating

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

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

Five months prior to the plan's expiration date, Sullivan 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 Sullivan 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 Sullivan County Hazard Mitigation Plan into other planning documents and mechanisms, information contained in the mitigation plan can help fill-in missing gaps in existing documents, can contribute to already existing mitigation-based projects, and can create a strengthen stance of mitigation implementation and awareness within the county and its jurisdictions.

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

- Town of Bluff City - Incorporation of mitigation actions into any updates of the Land Use & Transportation Plan, 2008-2028.
- City of Bristol Future Land Use Plan, 2006-2025; and City of Bristol Capital Improvements Plan, 2015-2019.
- City of Kingsport Capital Improvements Plan, FY2013-2014 and City of Kingsport Long Range Transportation Plan, 2035.
- Sullivan County Emergency Operations Plan in 2015; Sullivan County Regional Plan: A Guide for Future Land Use & Transportation Development, 2006-2026; and Strategic Partnerships for Economic Growth and Sustainability, 2013.

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

Appendix 2

Attendance Sheet Meeting #2

Appendix 3


Sullivan County Emergency Management Agency
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Sullivan County Emergency Management Agency
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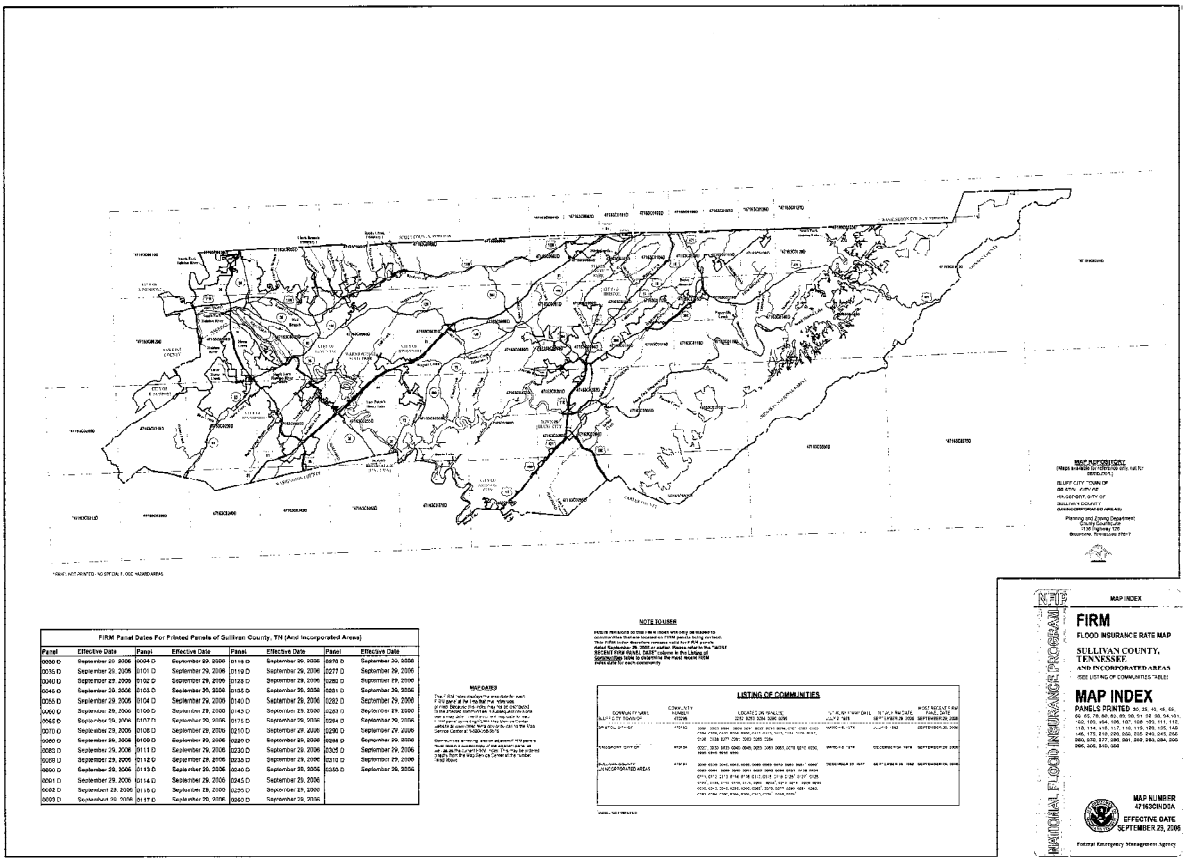
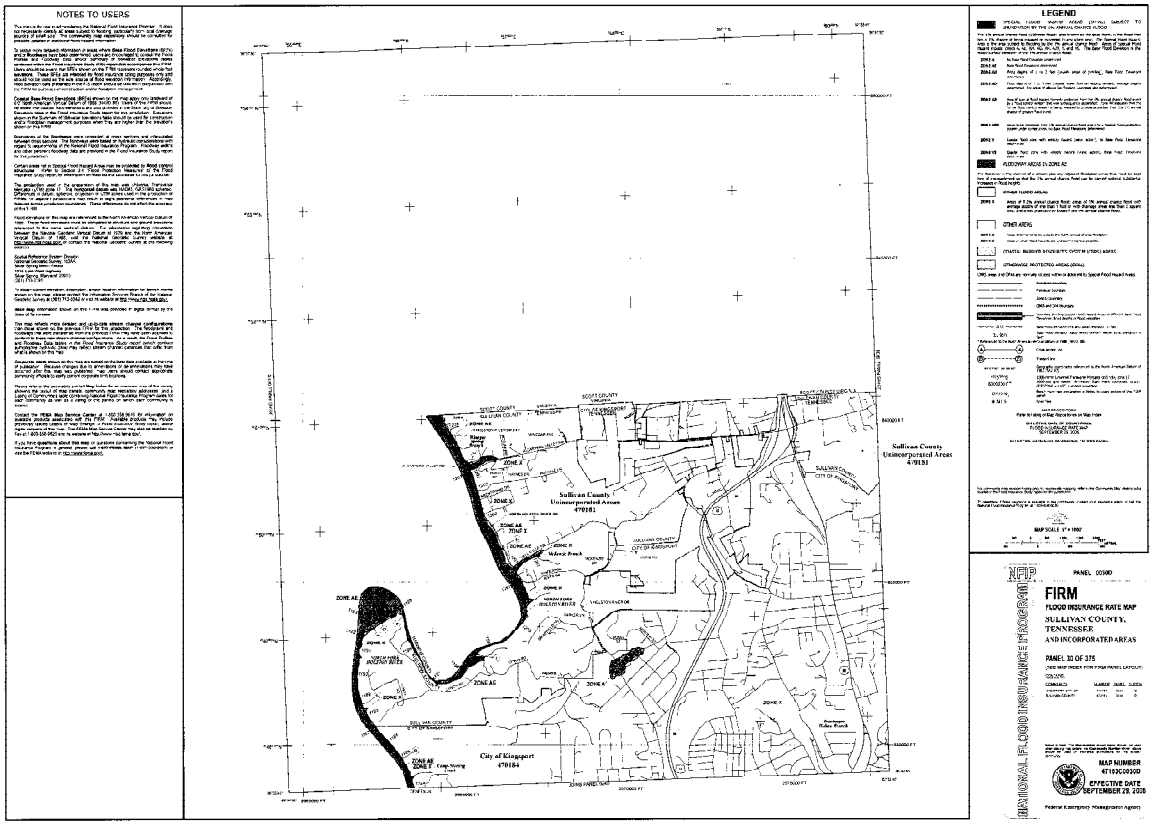
Reviews
Events
Posts
Community
Create a Page
The Cities of Bristol, Bluff City, Kingsport and county officials are meeting on Tuesday February 25, 2020 at 9:00 AM to finalize projects for the updated hazard mitigation plan. Anyone in the public is welcome to attend and share their input. The meeting is at the EMA office at 3193 Hwy 126, Blountville. Around back of building upstairs.
Community Resilience
Public Information & Warning
Long-term Vulnerability Reduction
Operational Coordination
Planning
Threats & Hazards Identification
Risk & Disaster Resilience Assessment
Mitigation
5
1 Share

Appendix 4

Flood Insurance Rate Maps for Sullivan County

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AND INCORPORATED AREAS
PANEL 30 OF 375
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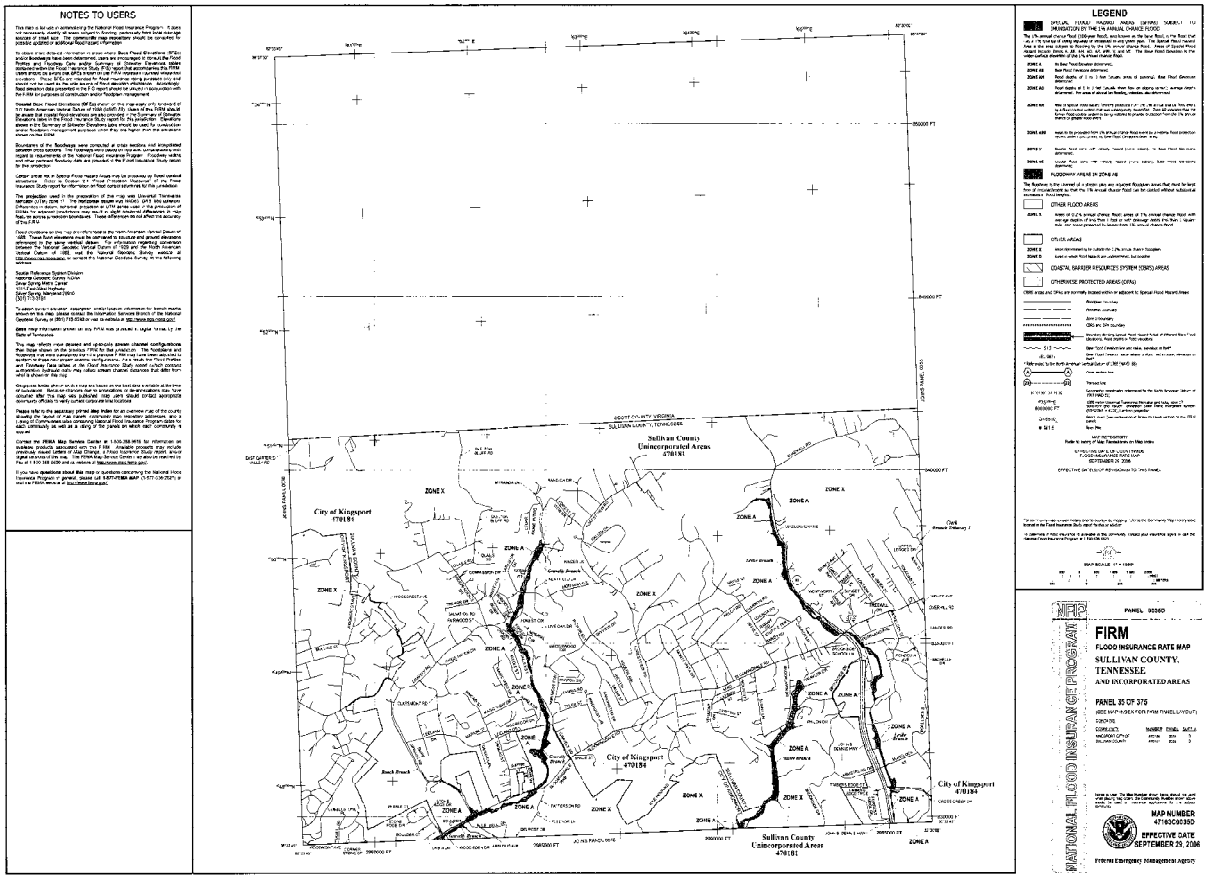
47163C0030D
EFFECTIVE DATE
SEPTEMBER 29, 2006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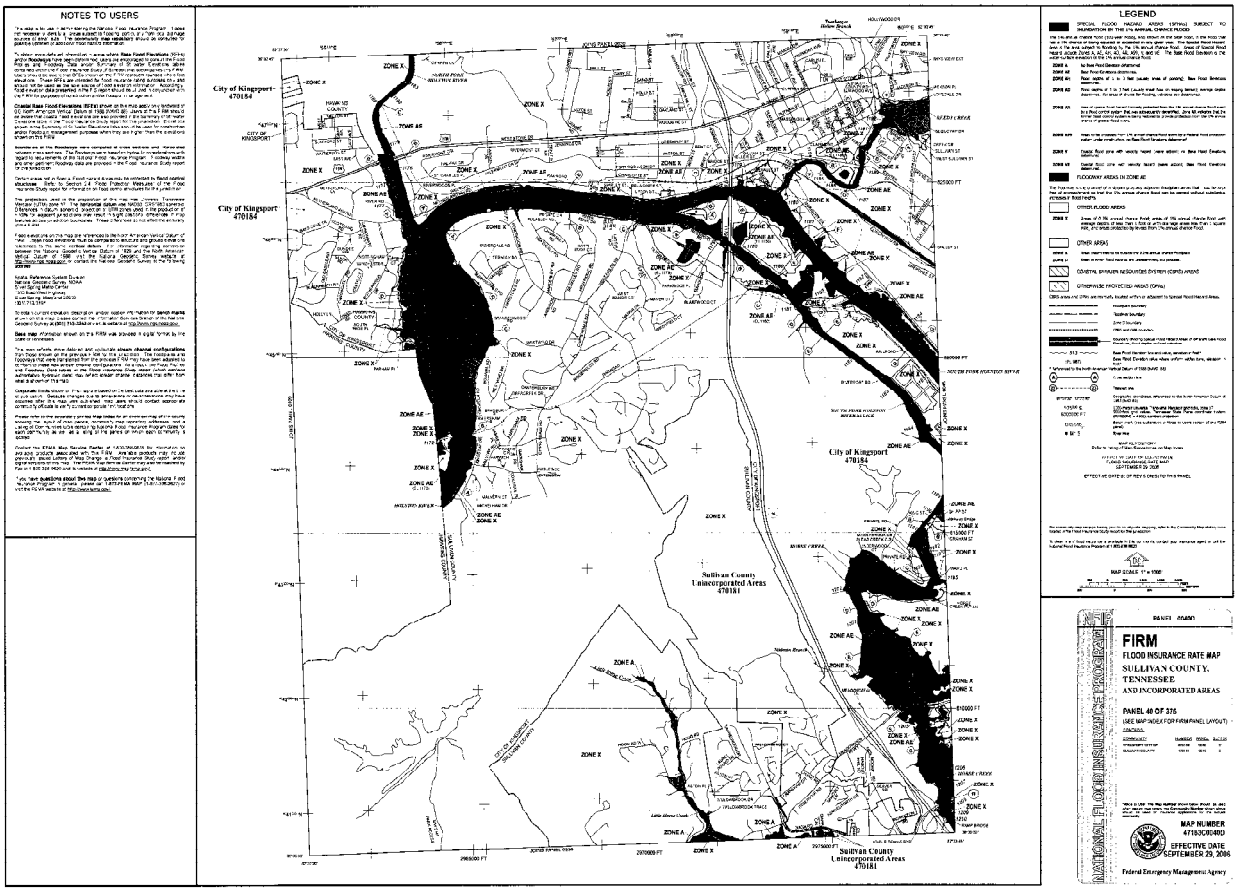
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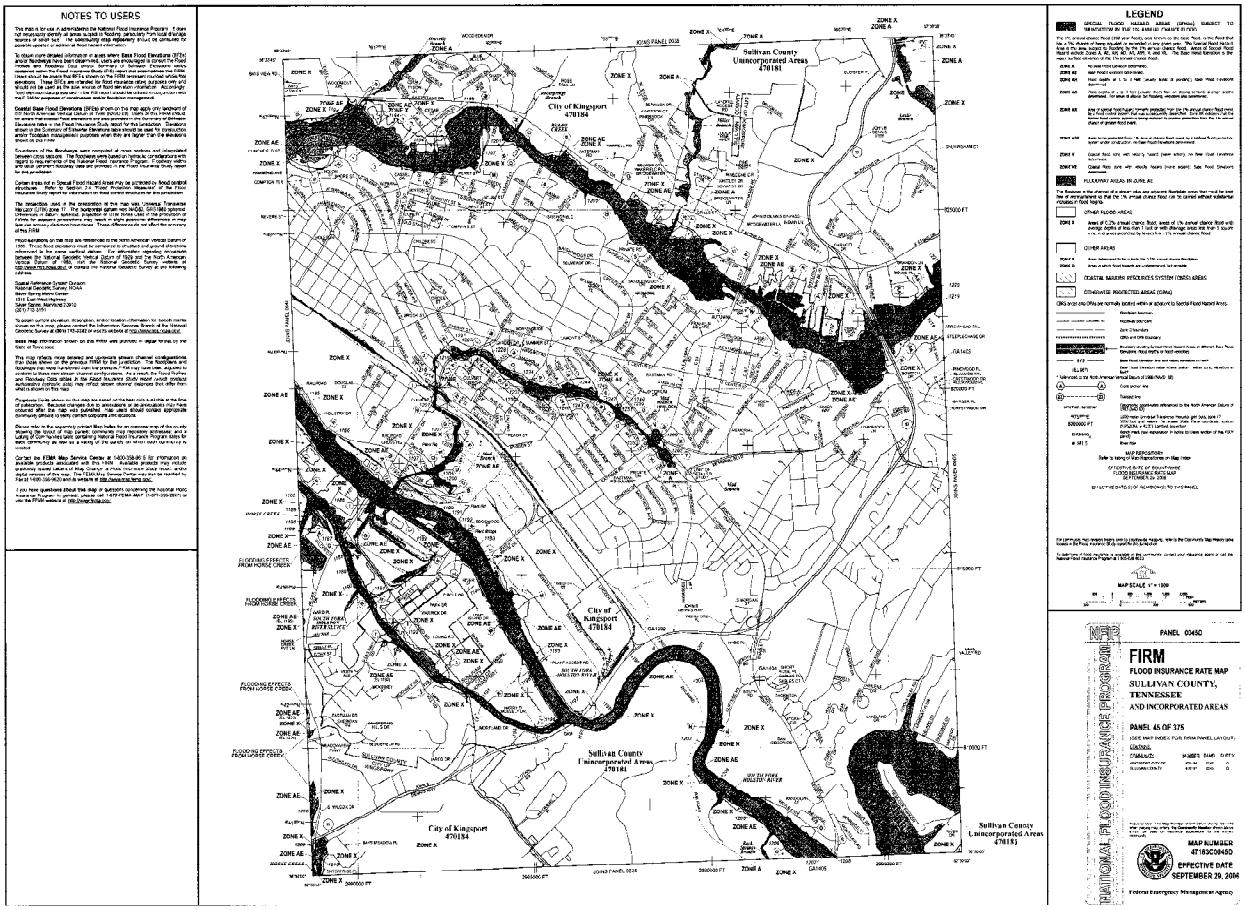
Federal Emergency Management Agency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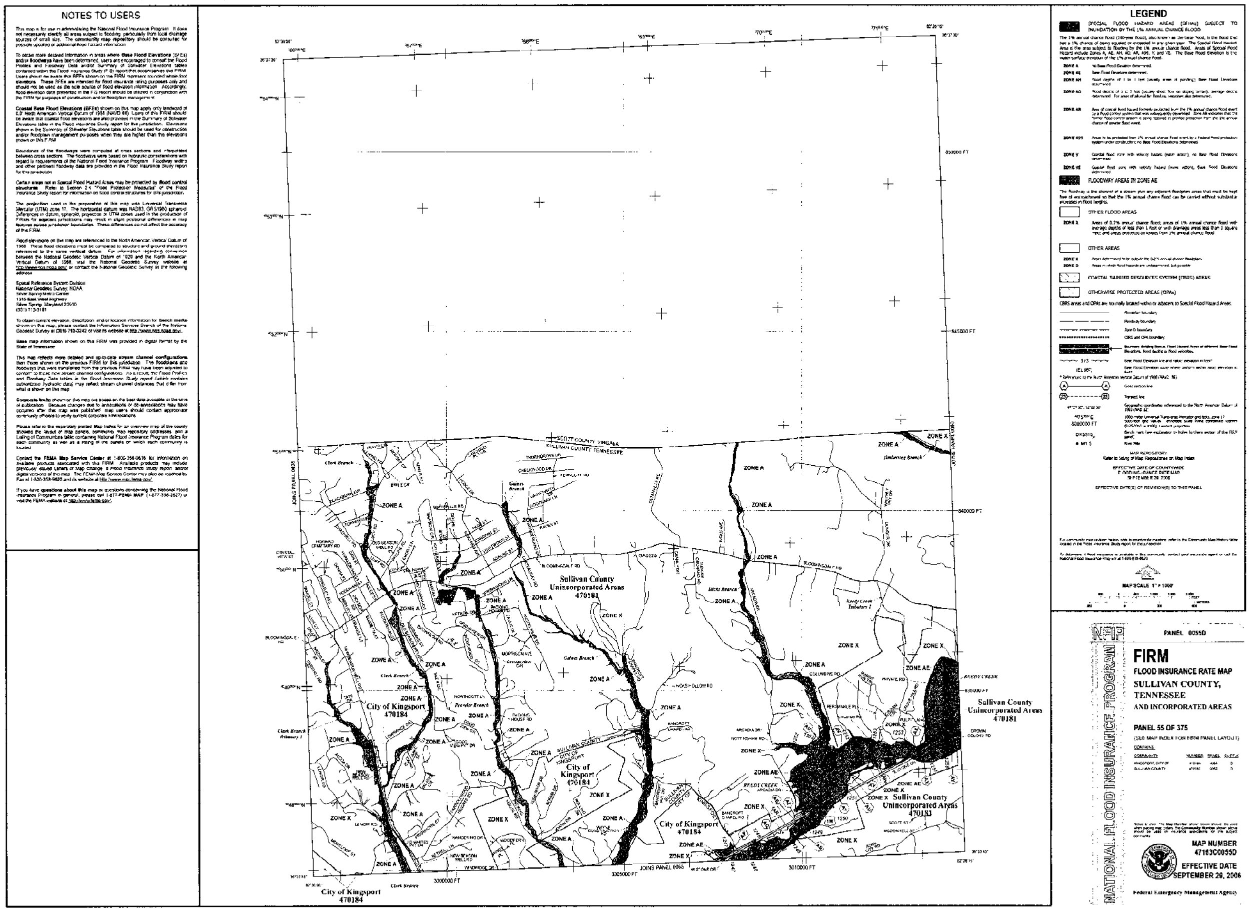
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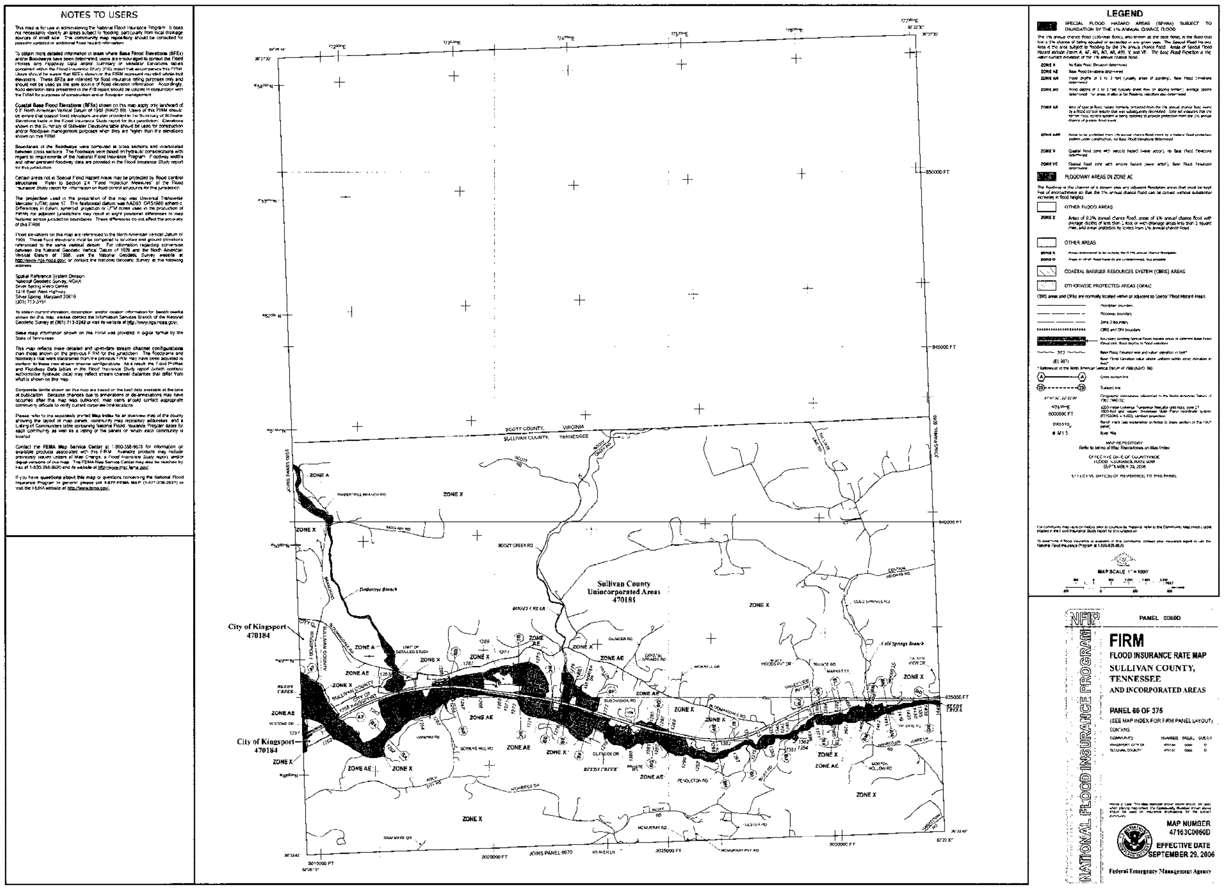
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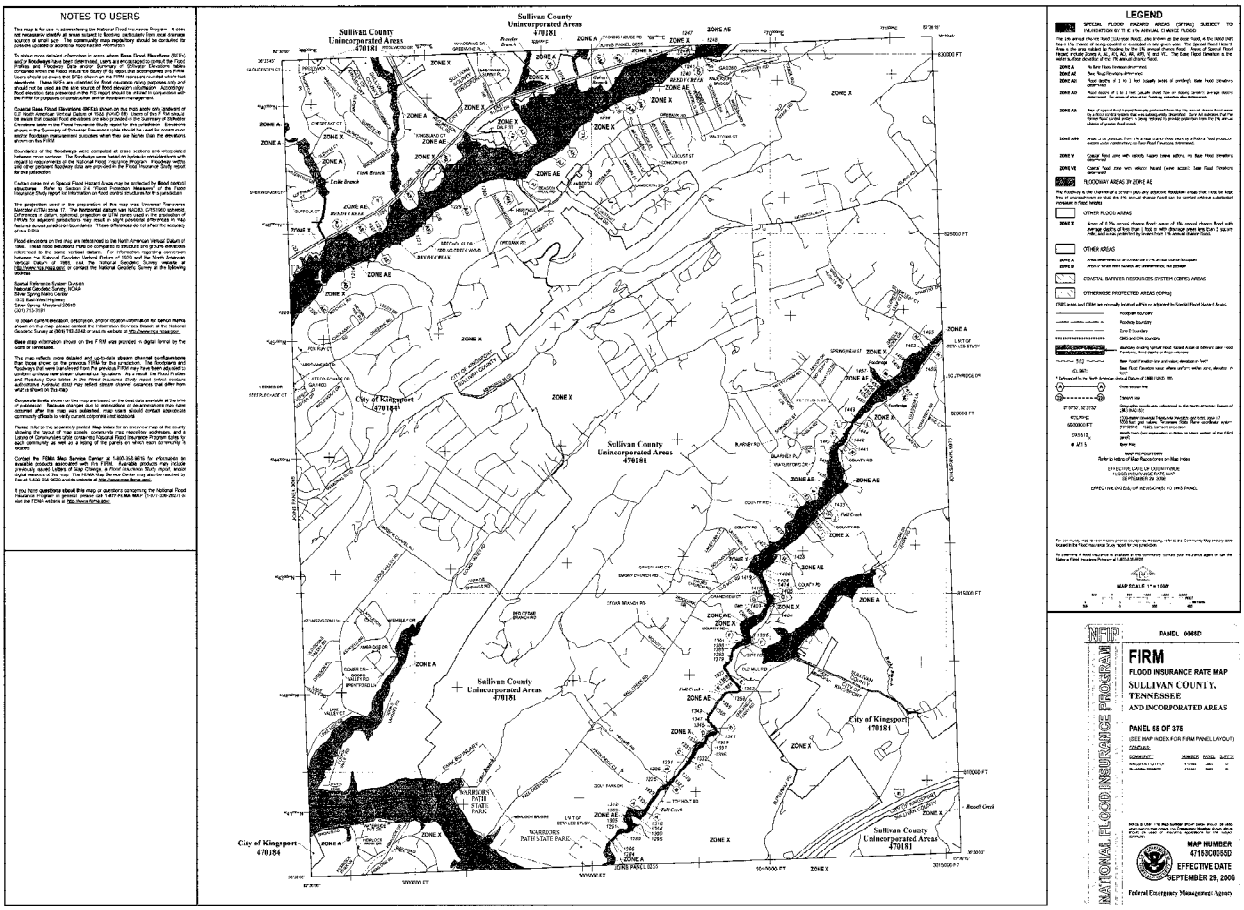
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WARRIORS PATH STATE PARK
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AND INCORPORATED AREAS
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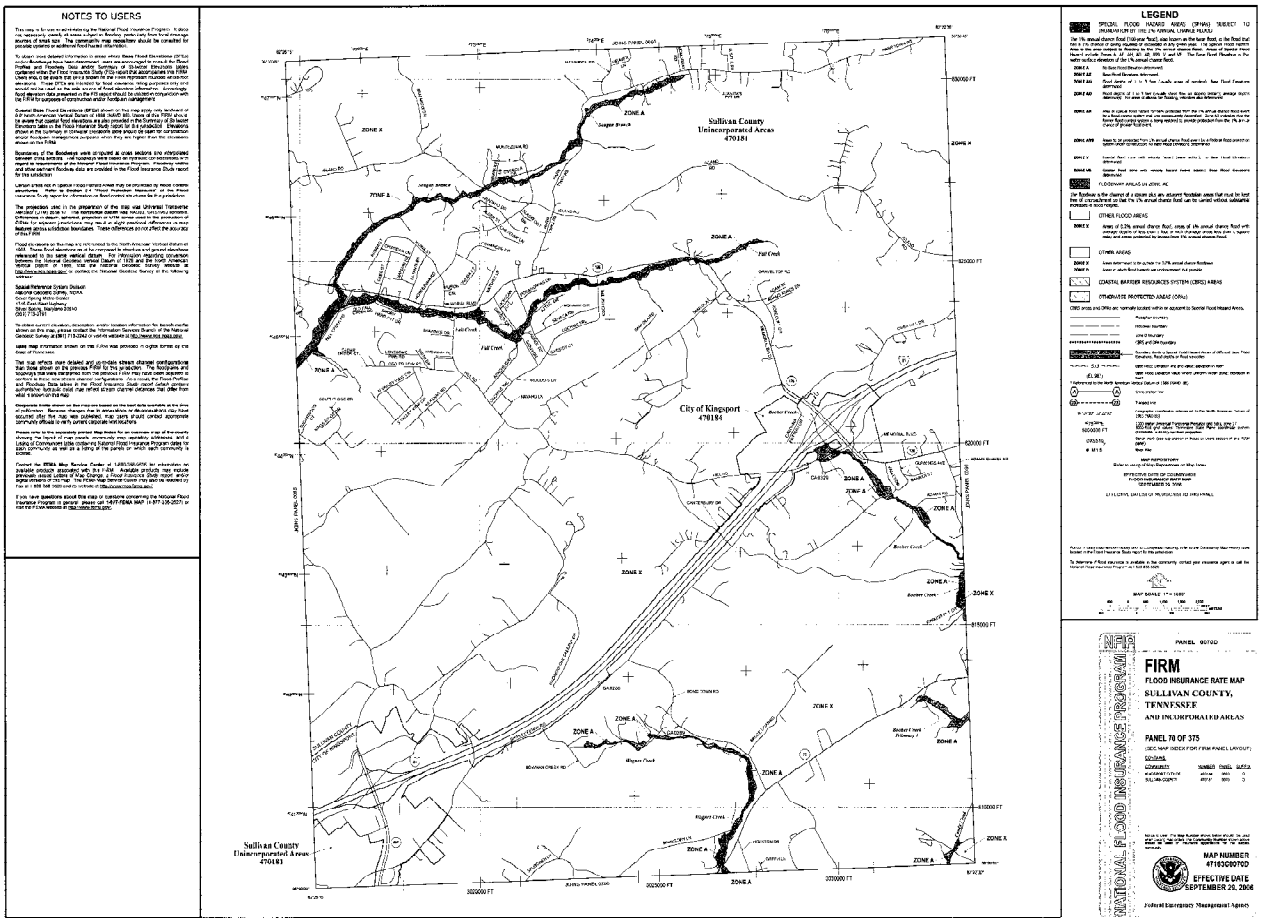
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM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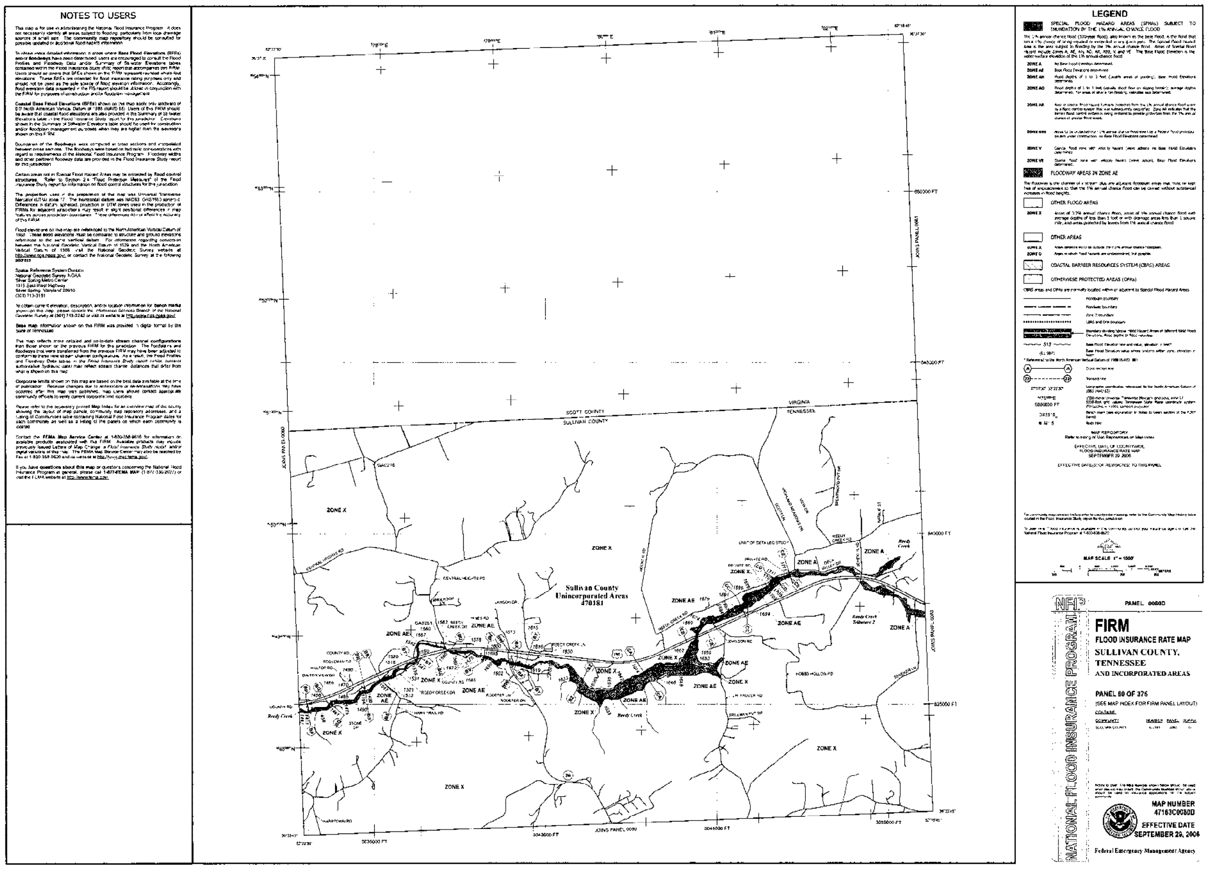
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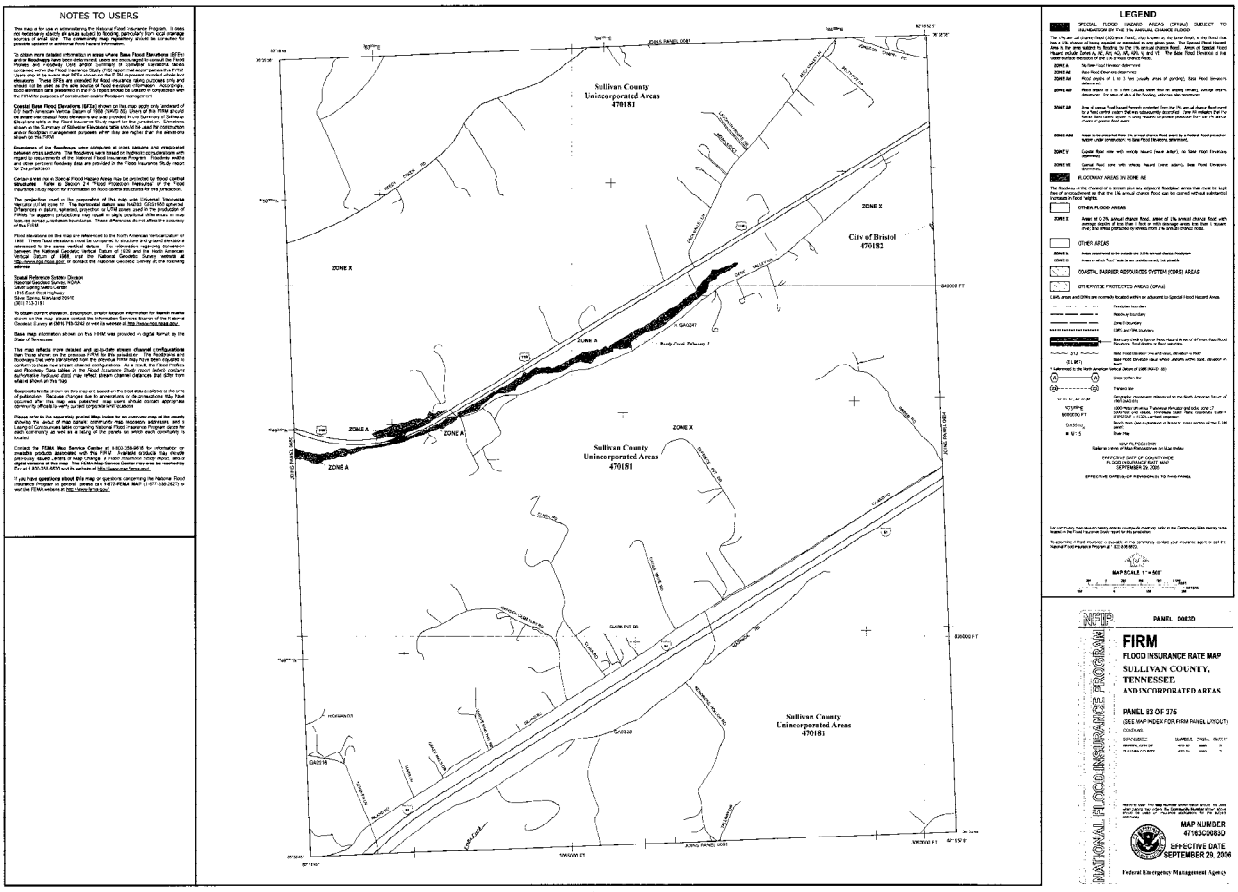
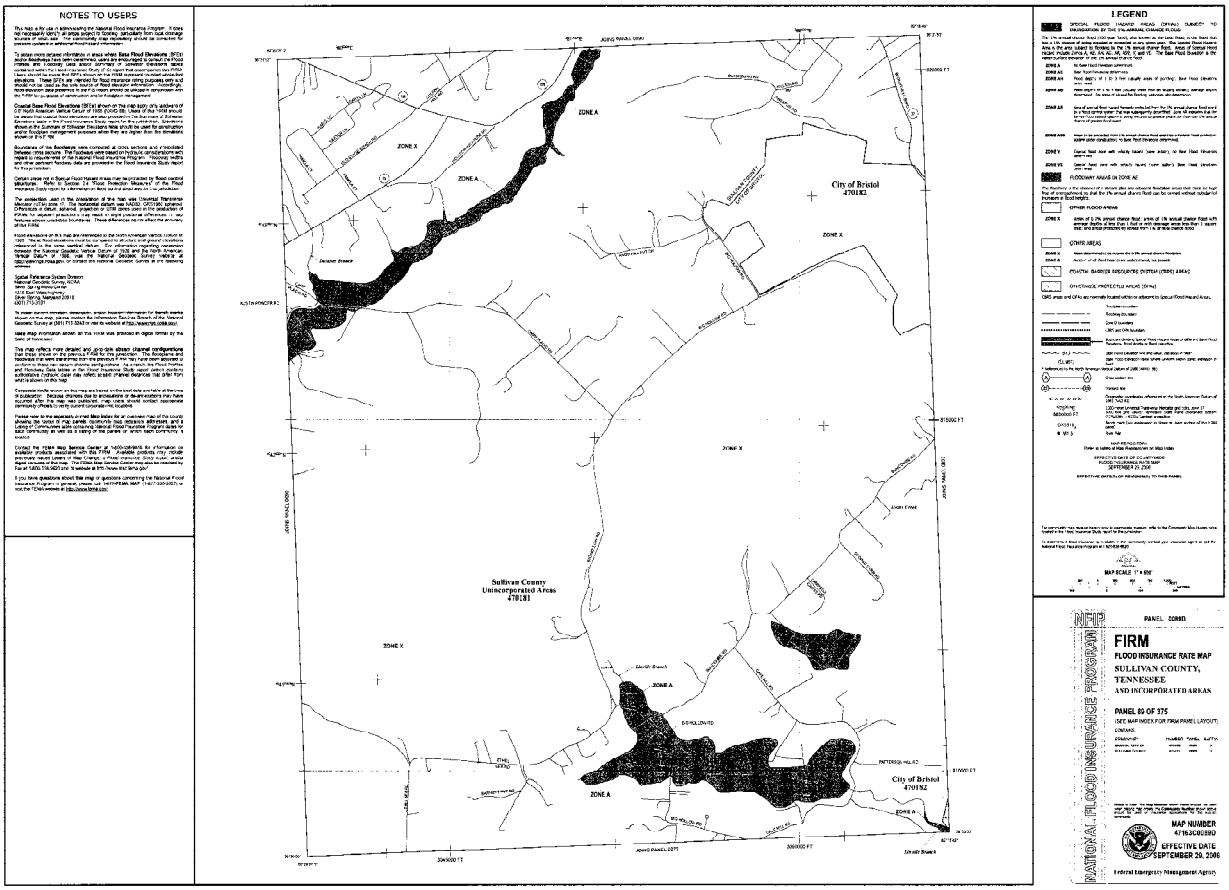
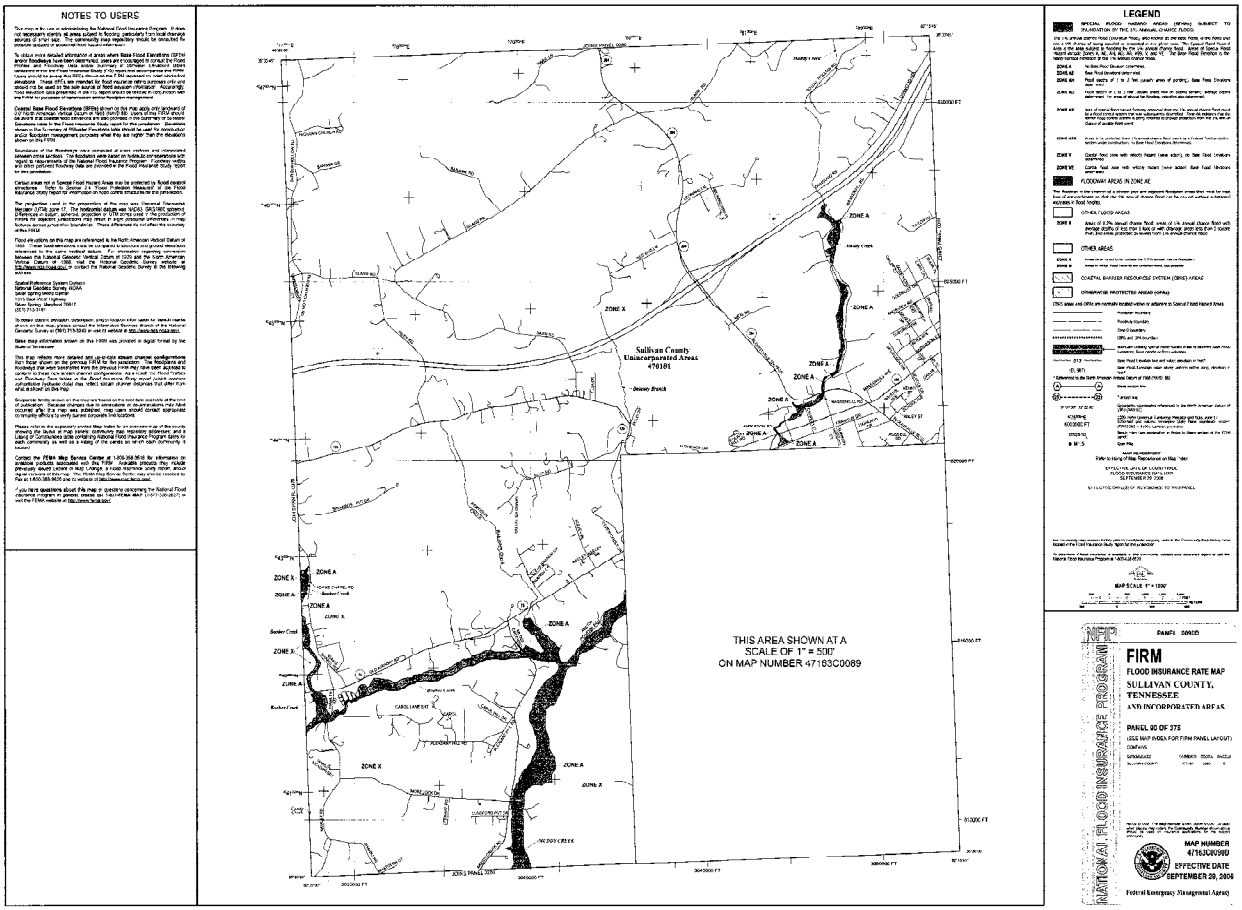
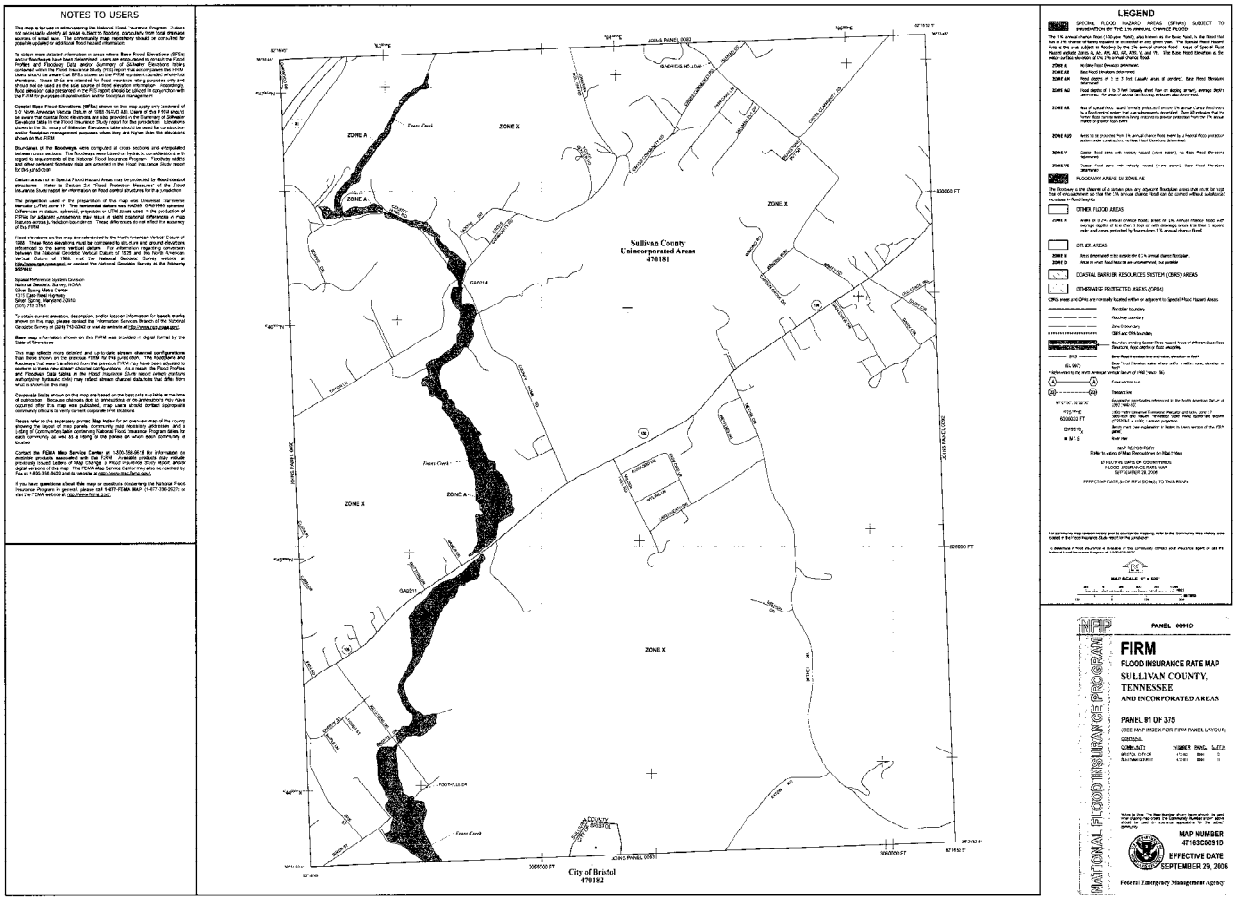
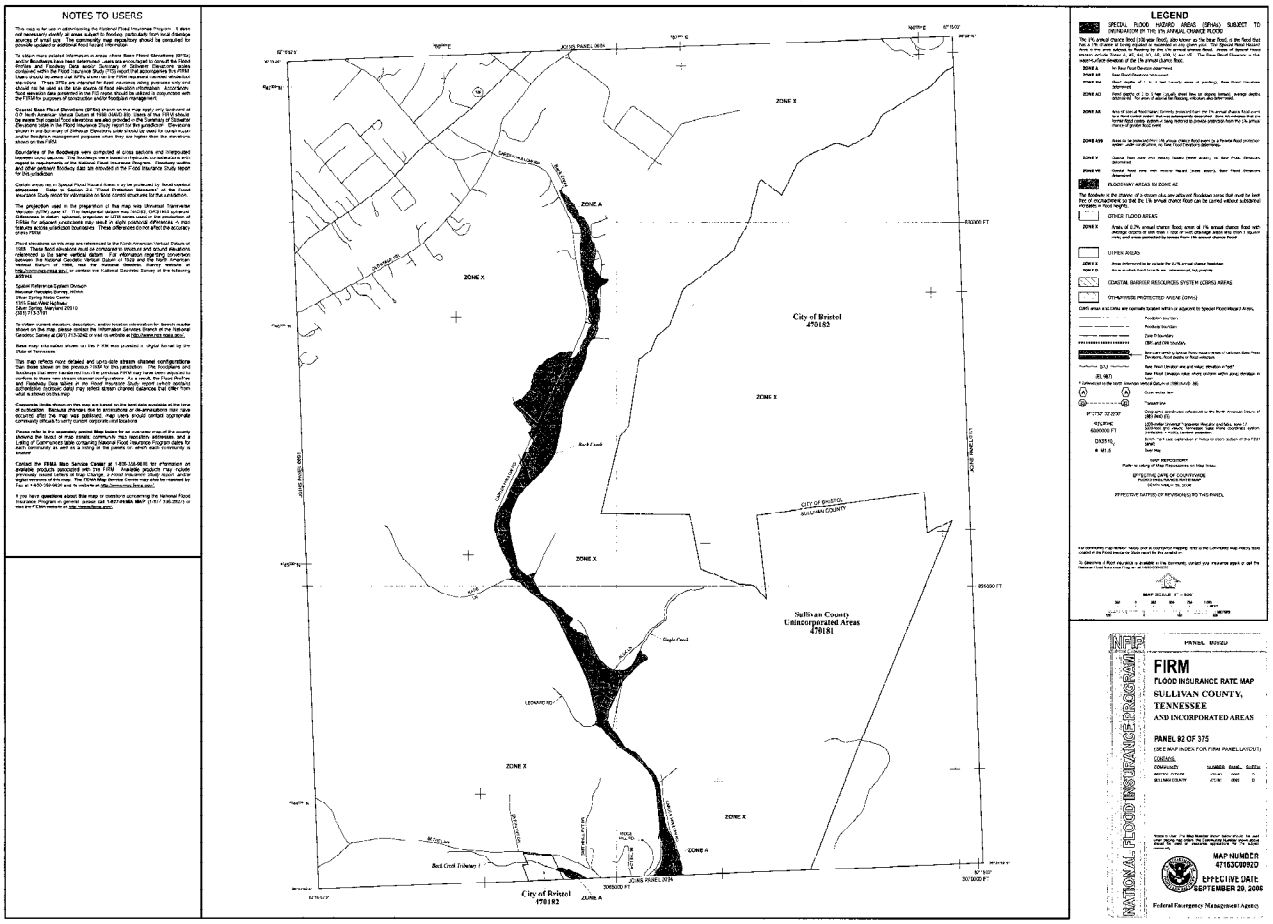
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0080D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 80 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
47163C0080D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency

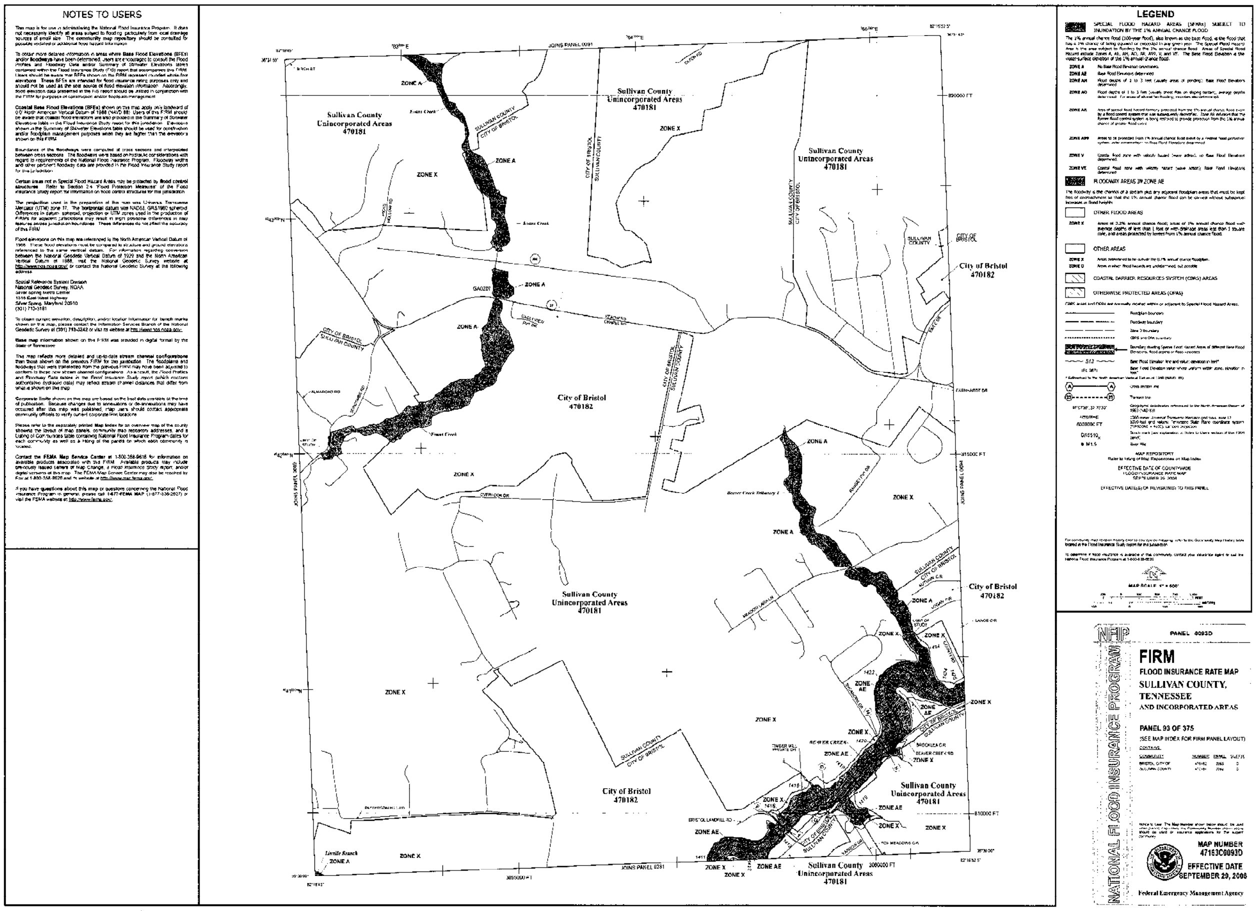

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
ZONE X
ZONE A
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE AND INCORPORATED AREAS
PANEL 93 OF 375
MAP NUMBER
47163C0093D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
LEGEND
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE X
ZONE AE
City of Bristol
470182
PANEL 0069D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 69 OF 375
MAP NUMBER
47163C0069D
EFFECTIVE DATE
SEPTEMBER 29, 2006
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
THIS AREA SHOWN AT A
SCALE OF 1" = 500'
ON MAP NUMBER 47163C0089
ZONE A
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 90 OF 375
MAP NUMBER
47163C0090
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
ZONE A
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 0010
PANEL 01 OF 375
MAP NUMBER
47163C0001D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 92 OF 375
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE X
ZONE A
MAP NUMBER
47163C0092D
EFFECTIVE DATE
SEPTEMBER 20, 2006
Federal Emergency Management Agency


NOTES TO USERS
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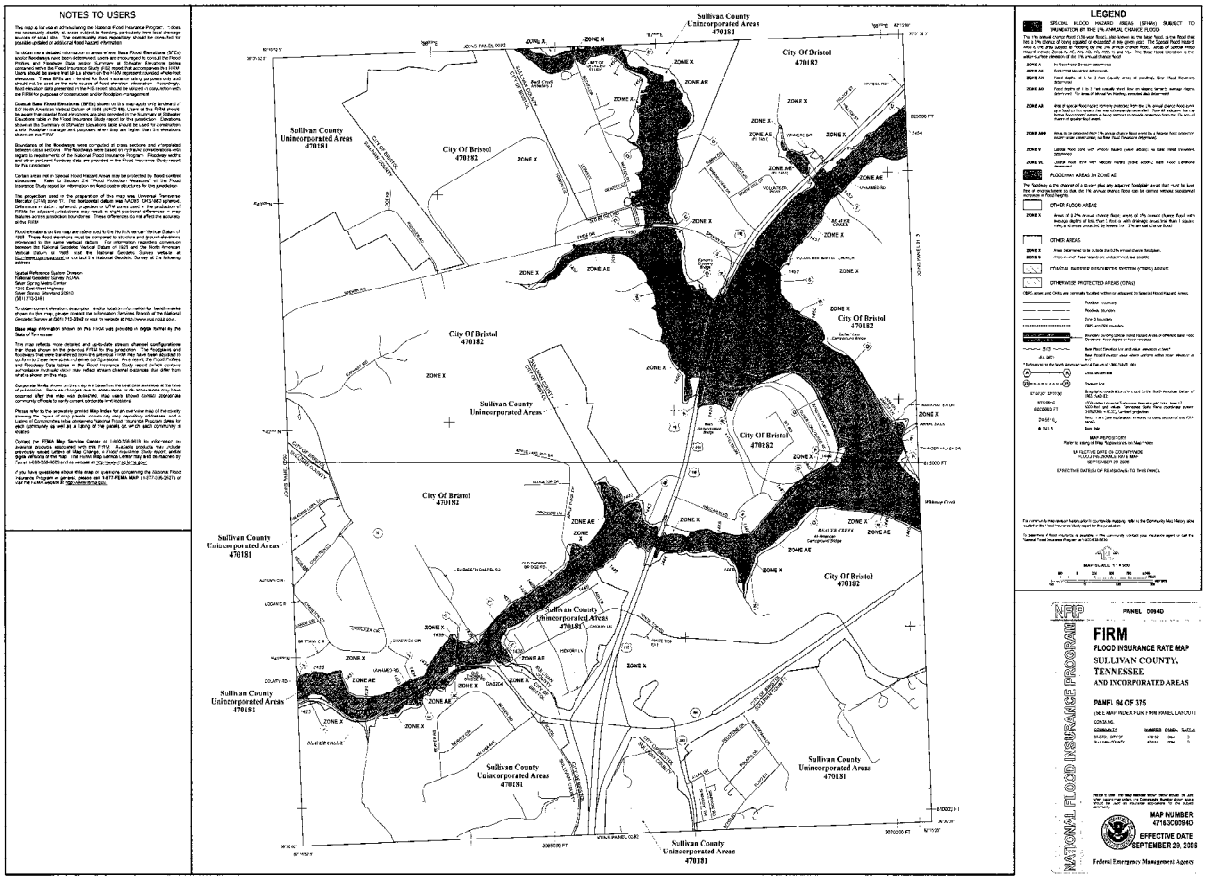
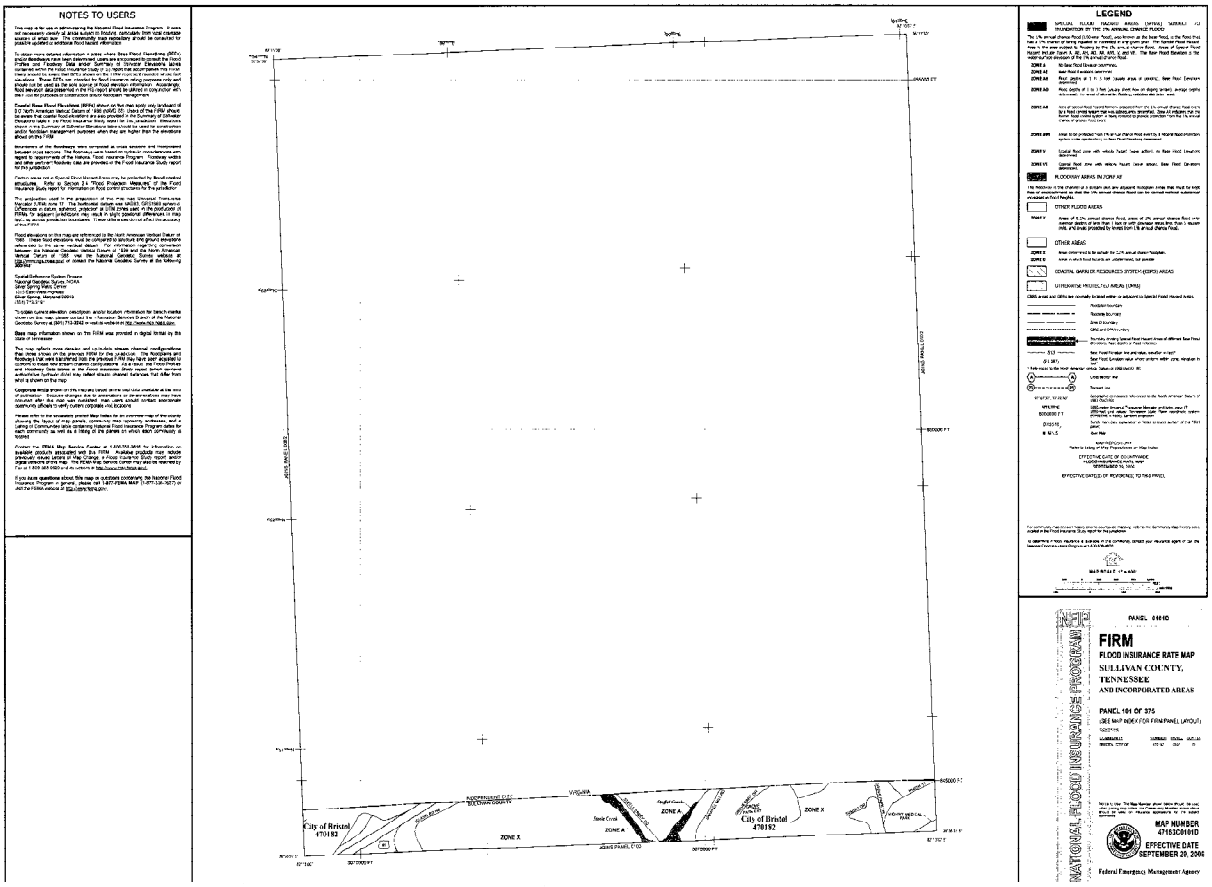
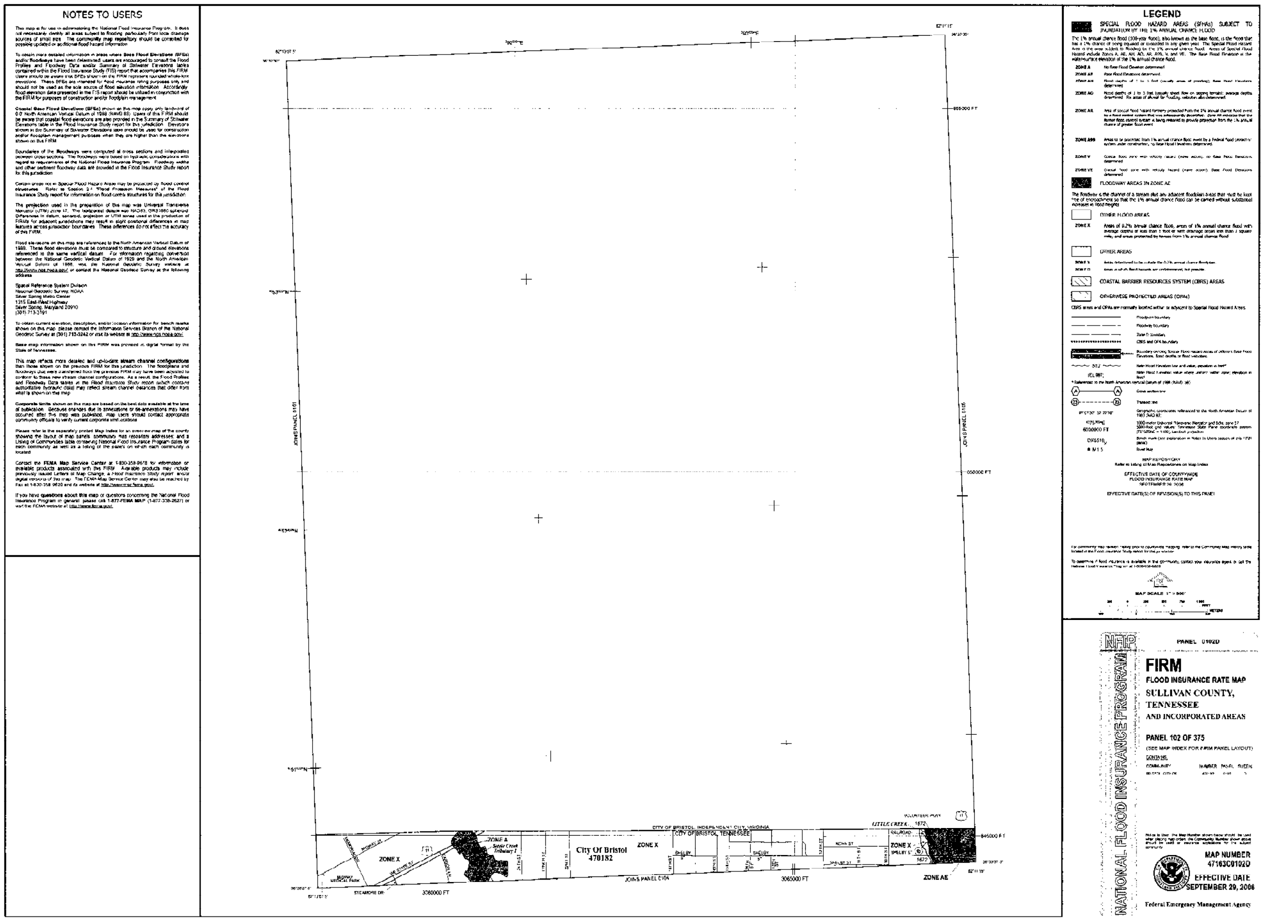
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
ZONE A
ZONE X
ZONE AE
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0093D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 93 OF 375
MAP NUMBER
47163C0093D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 94 OF 375
MAP NUMBER
47163C0094D
EFFECTIVE DATE
SEPTEMBER 29, 2010
Federal Emergency Management Agency
Sullivan County Unincorporated Areas 470181
City Of Bristol 470182


NOTES TO USERS
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 191 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
47163C0191D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
City of Bristol
470182
ZONE X
ZONE A
ZONE AE


NOTES TO USERS
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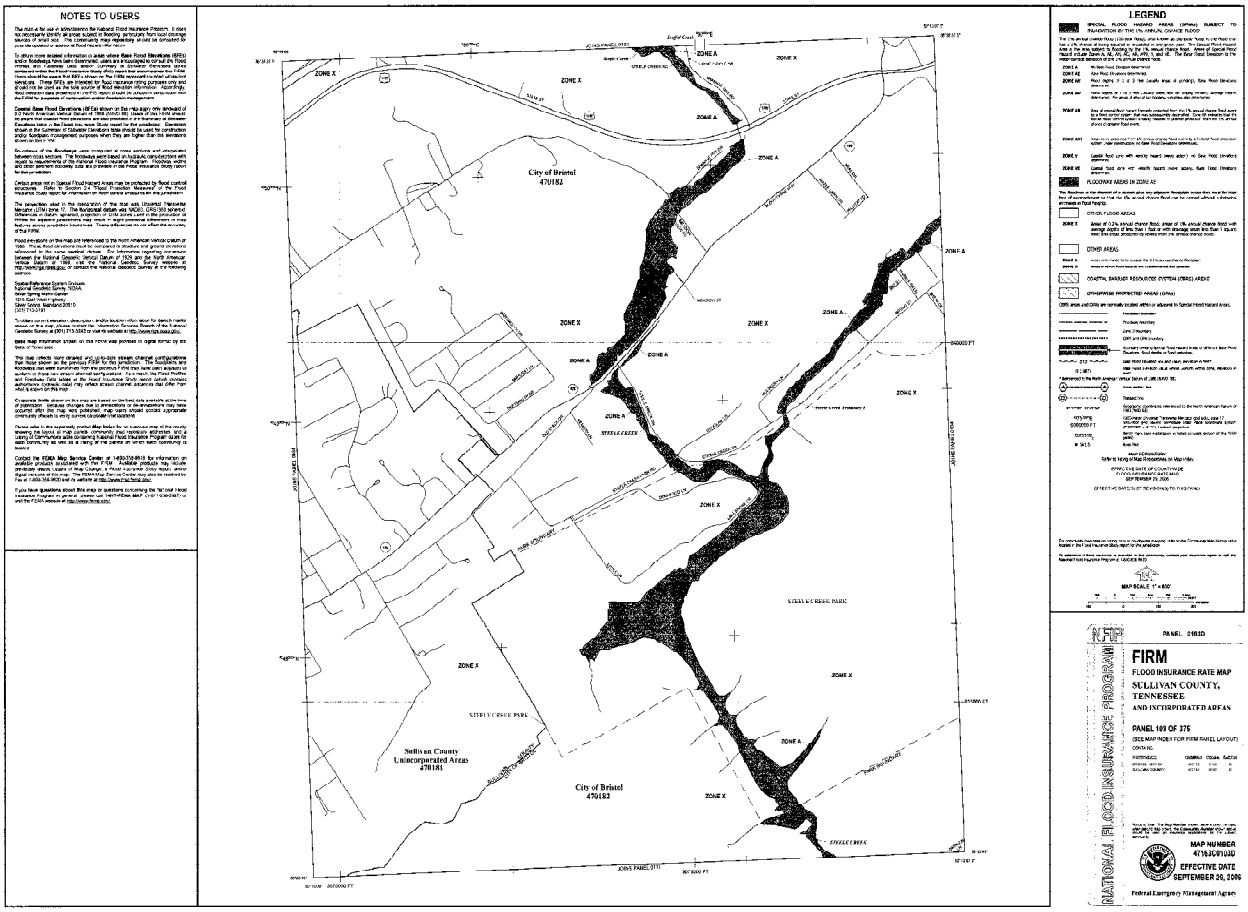
City Of Bristol
470182
ZONE X
ZONE AE
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0102D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 102 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
47163C0102D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
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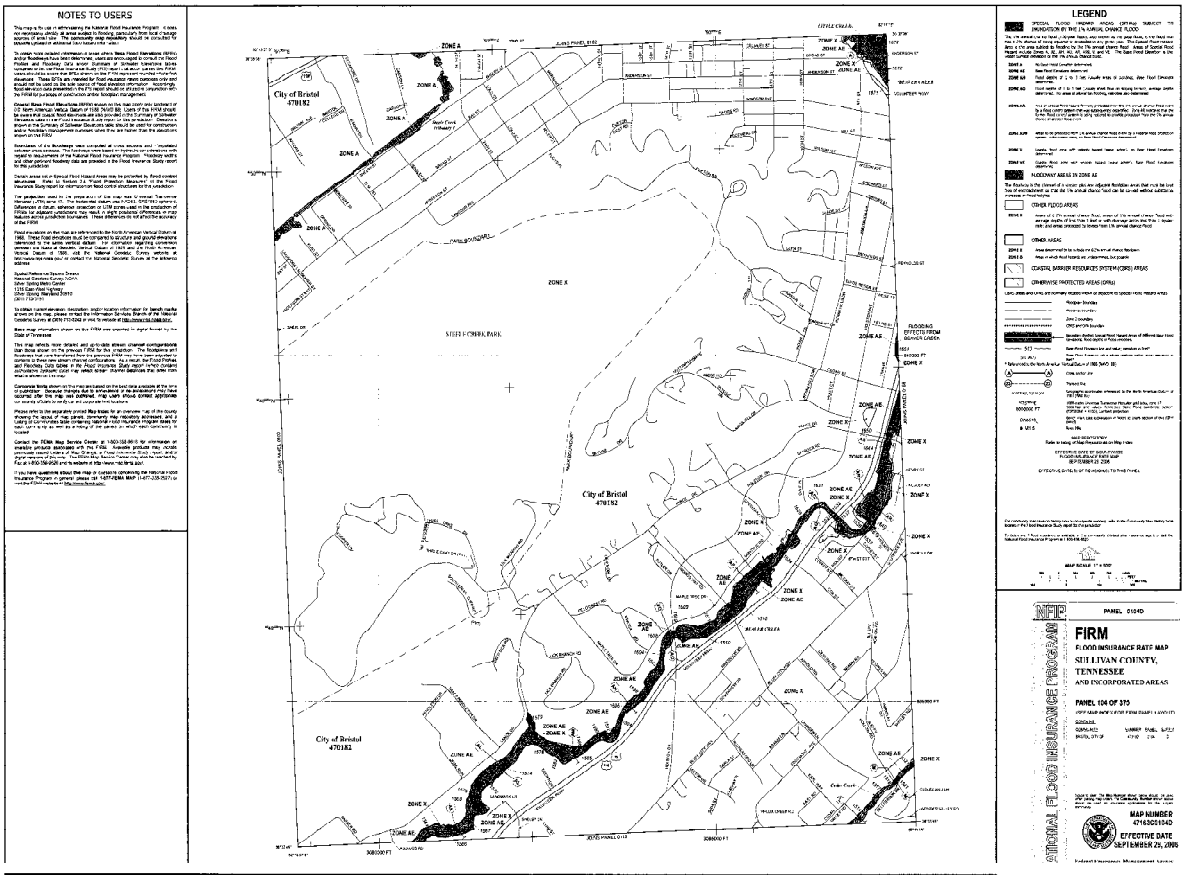
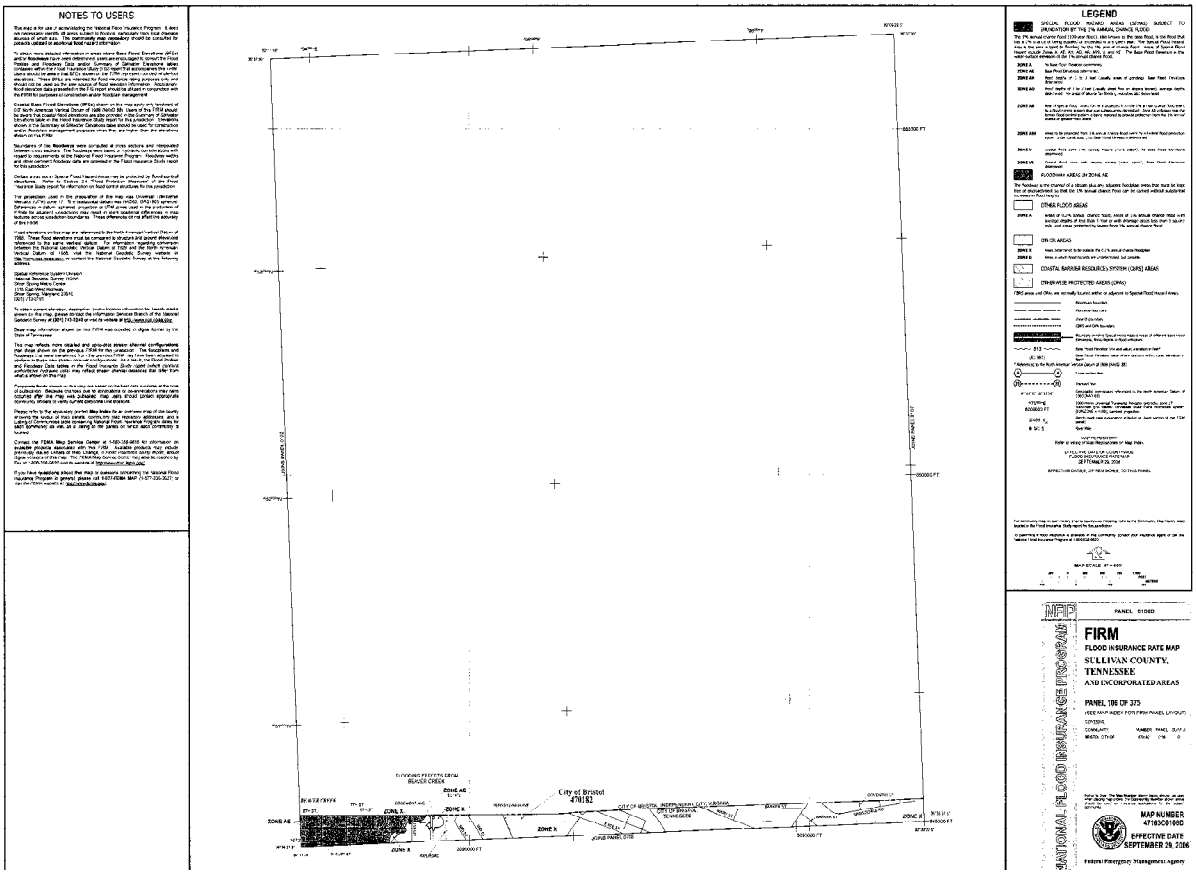
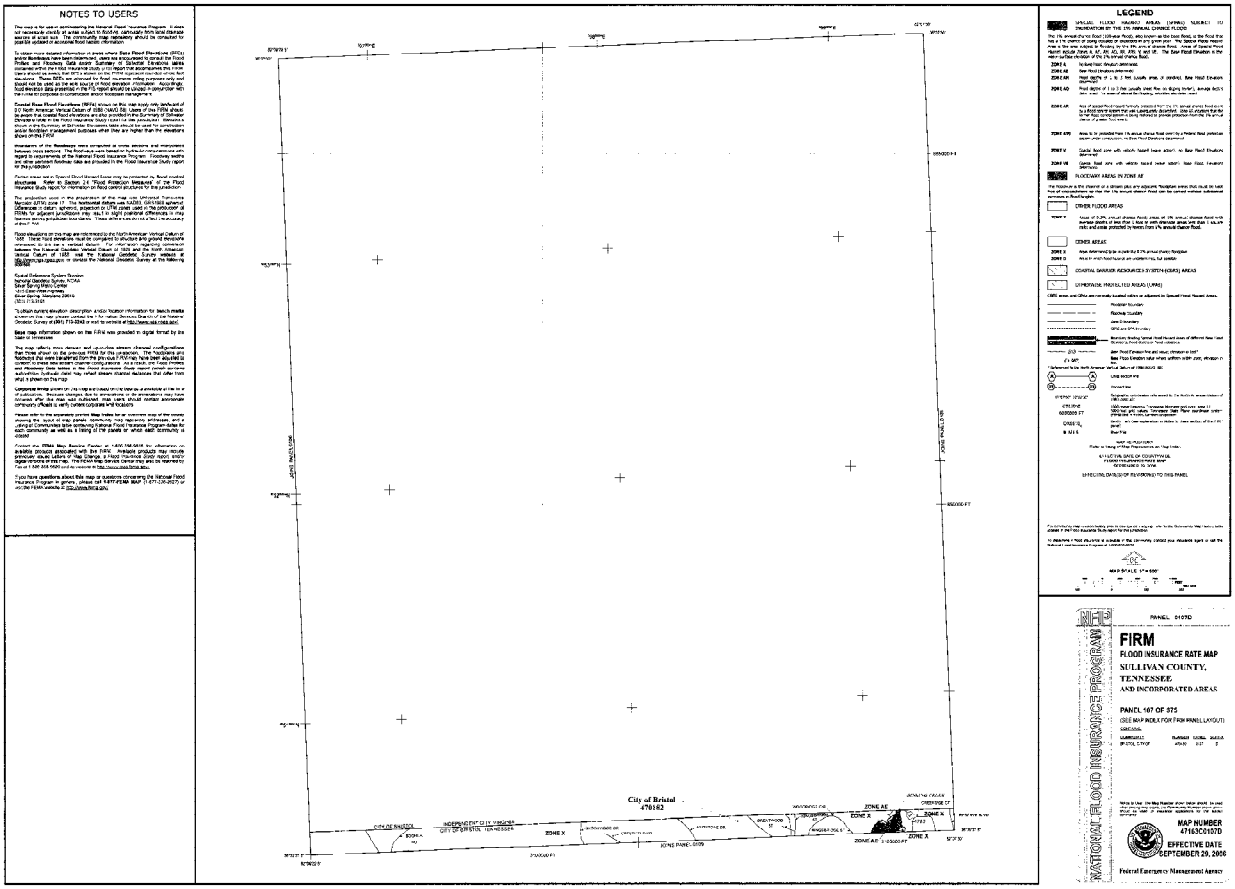
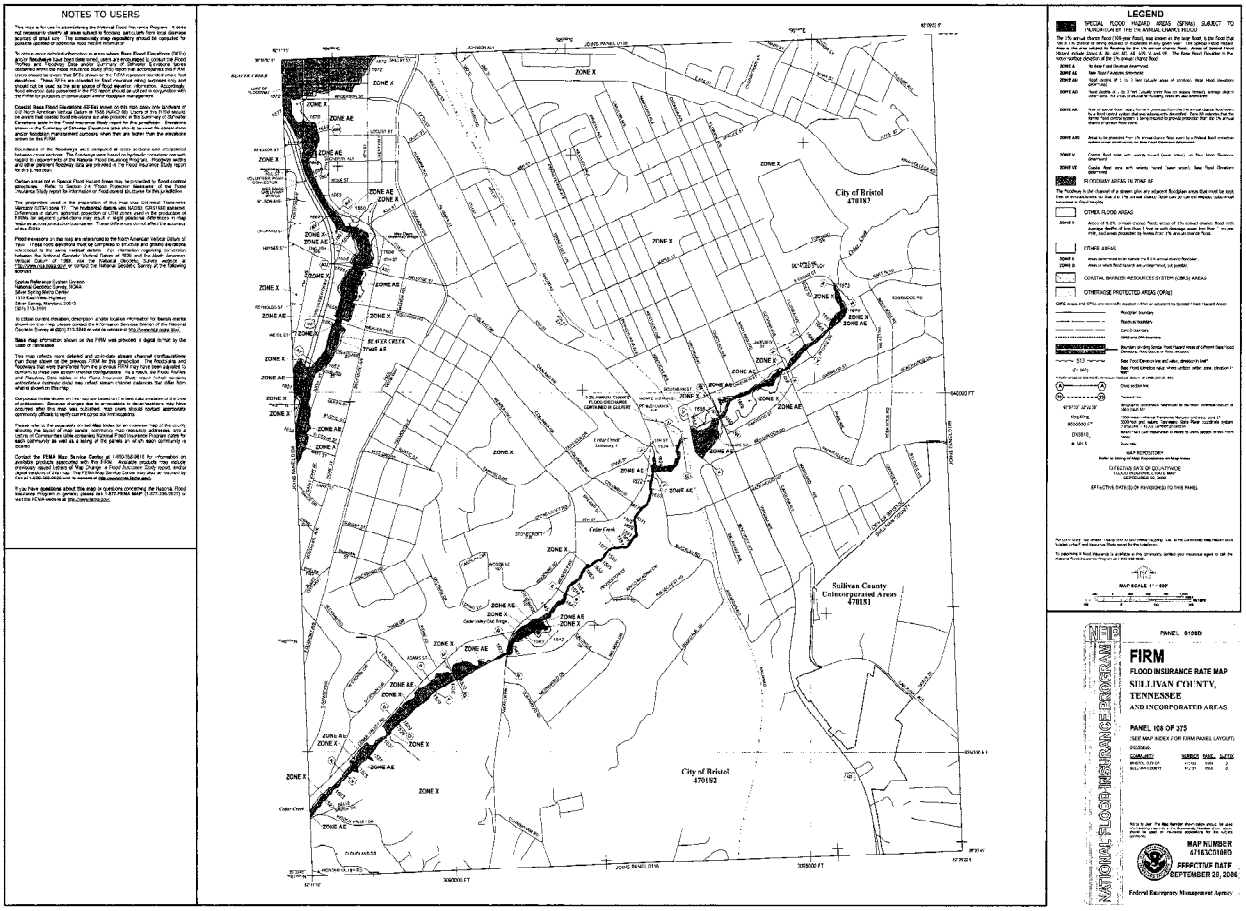
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE X
STEELE CREEK PARK
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 109 OF 376
MAP NUMBER
47163C0109D
EFFECTIVE DATE
SEPTEMBER 20, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
City of Bristol
470182
STEELE-CHEEK PARK
ZONE A
ZONE AE
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 104 OF 370
MAP NUMBER
47163C0104D
EFFECTIVE DATE
SEPTEMBER 29, 2006


NOTES TO USERS
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 106 OF 375
MAP NUMBER
47163C0106G
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
City of Bristol
470182
BEAVER CREEK
ZONE AE
ZONE X
ZONE A


NOTES TO USERS
LEGEND
City of Bristol
470162
ZONE AE
ZONE X
ZONE A
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 107 OF 975
MAP NUMBER
47163C0107D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
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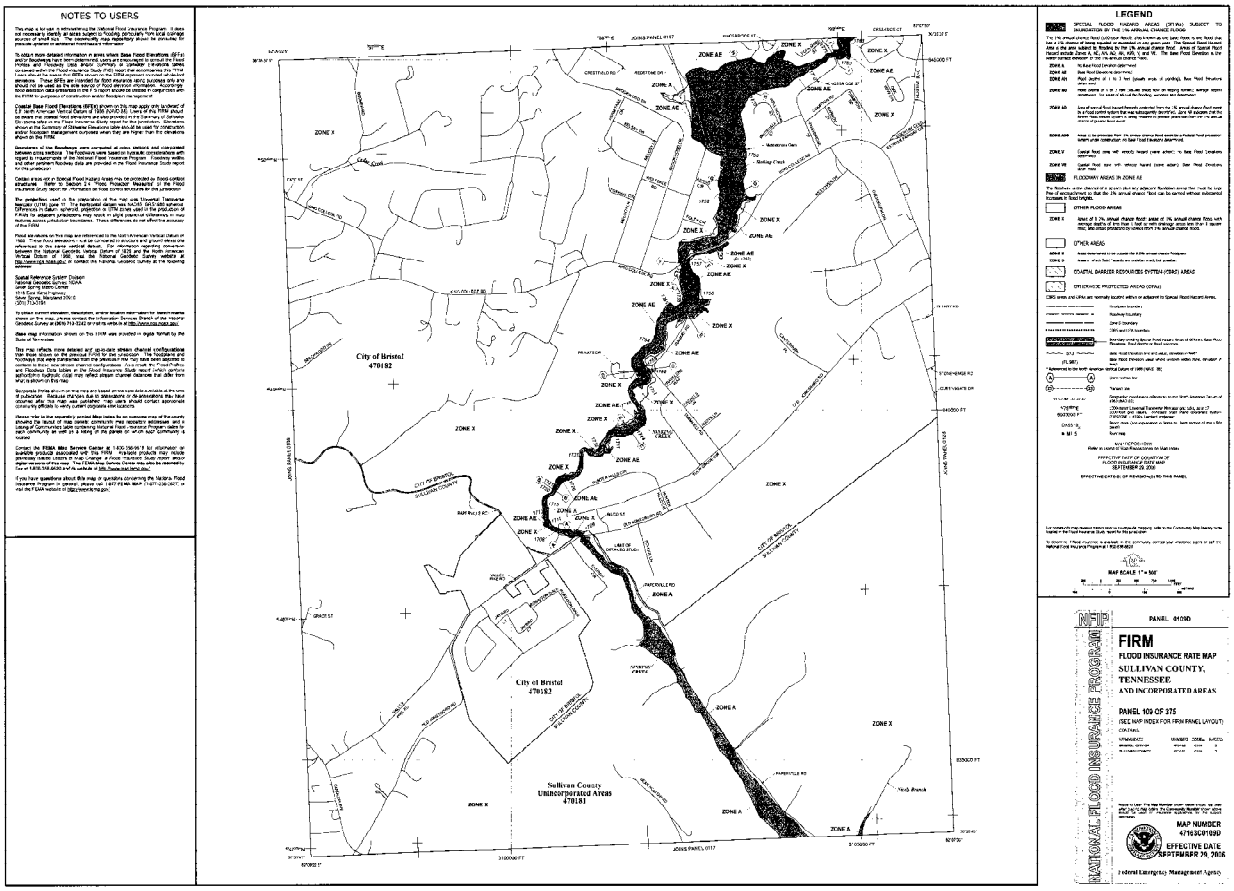
City of Bristol
470187
Sullivan County
Unincorporated Areas
470183
City of Bristol
470182
ZONE X
ZONE AE
ZONE A
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 109 OF 375
MAP NUMBER
47163C0109D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
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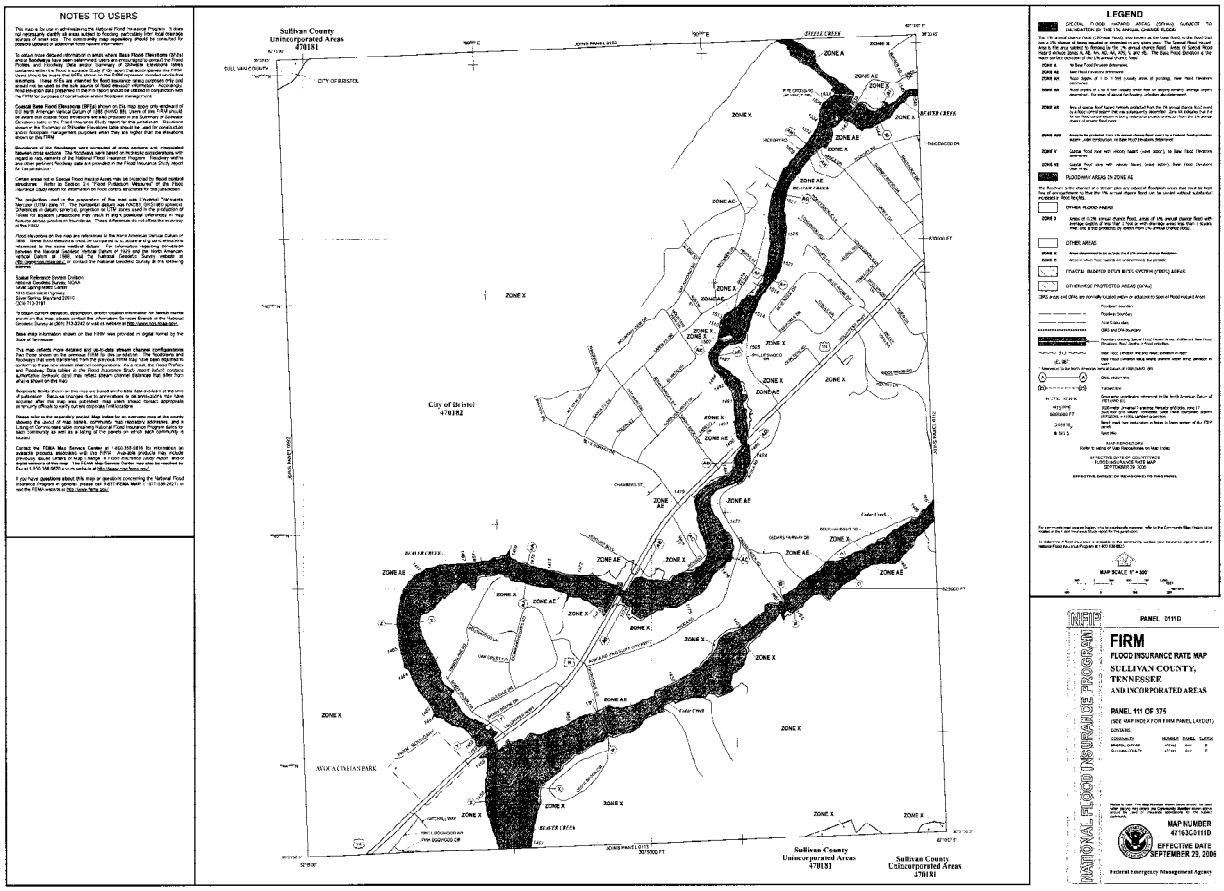
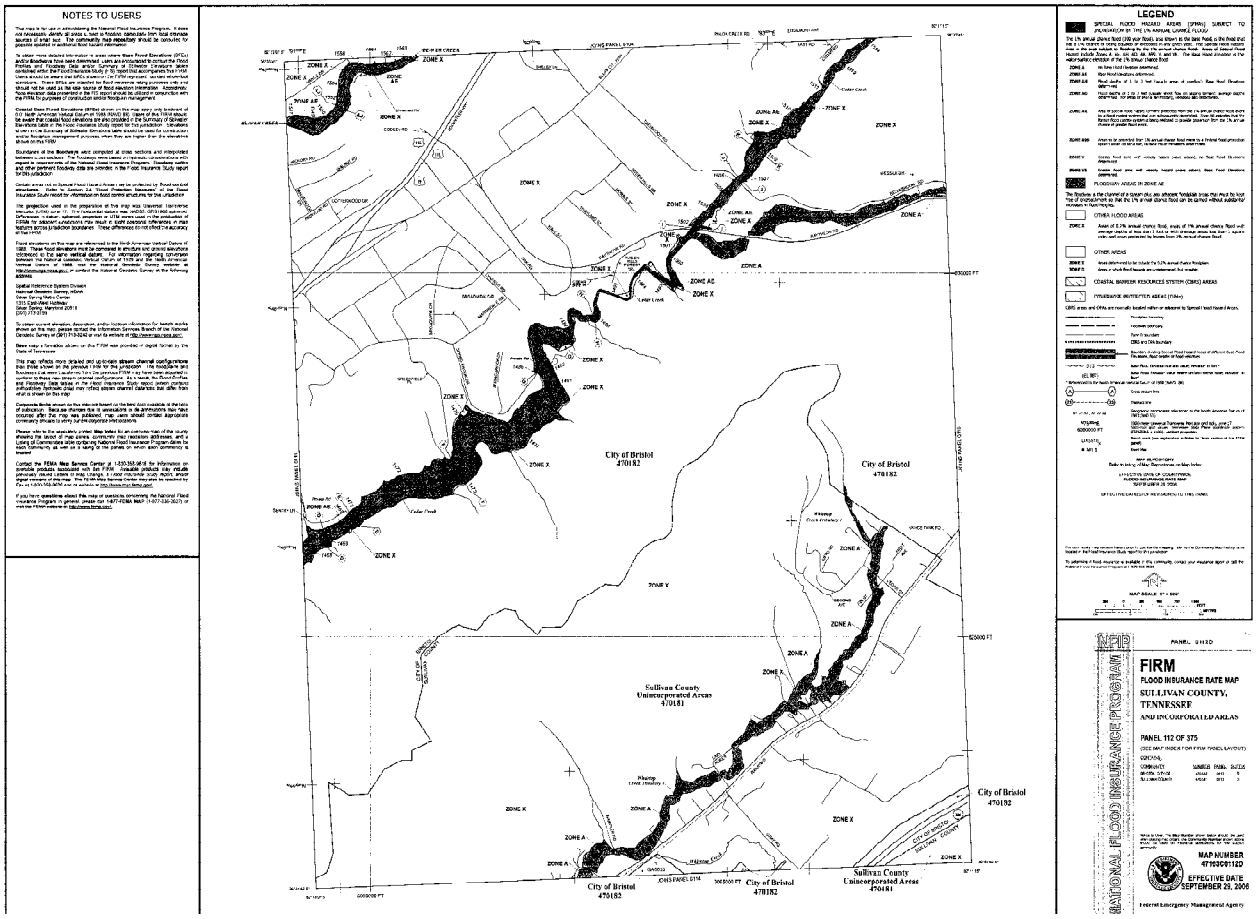
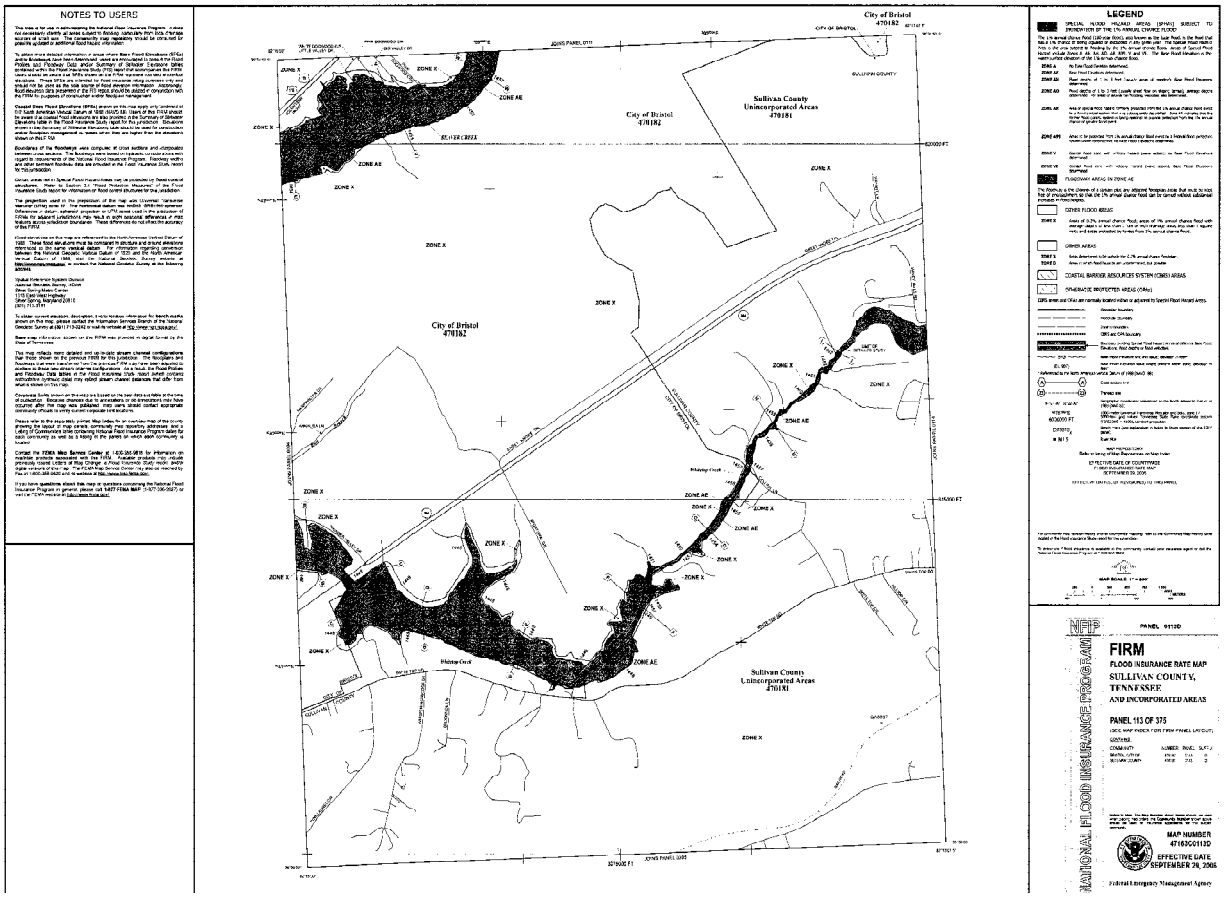
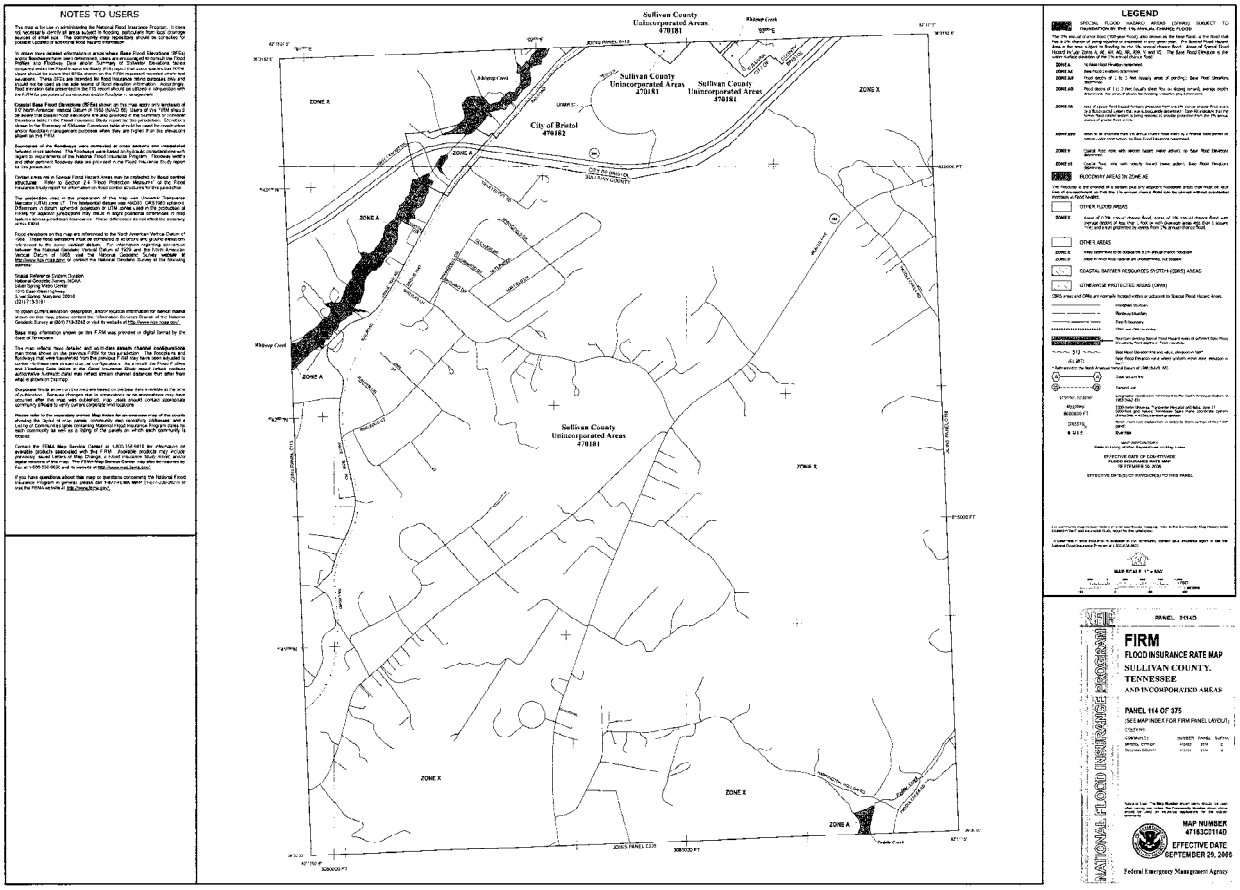
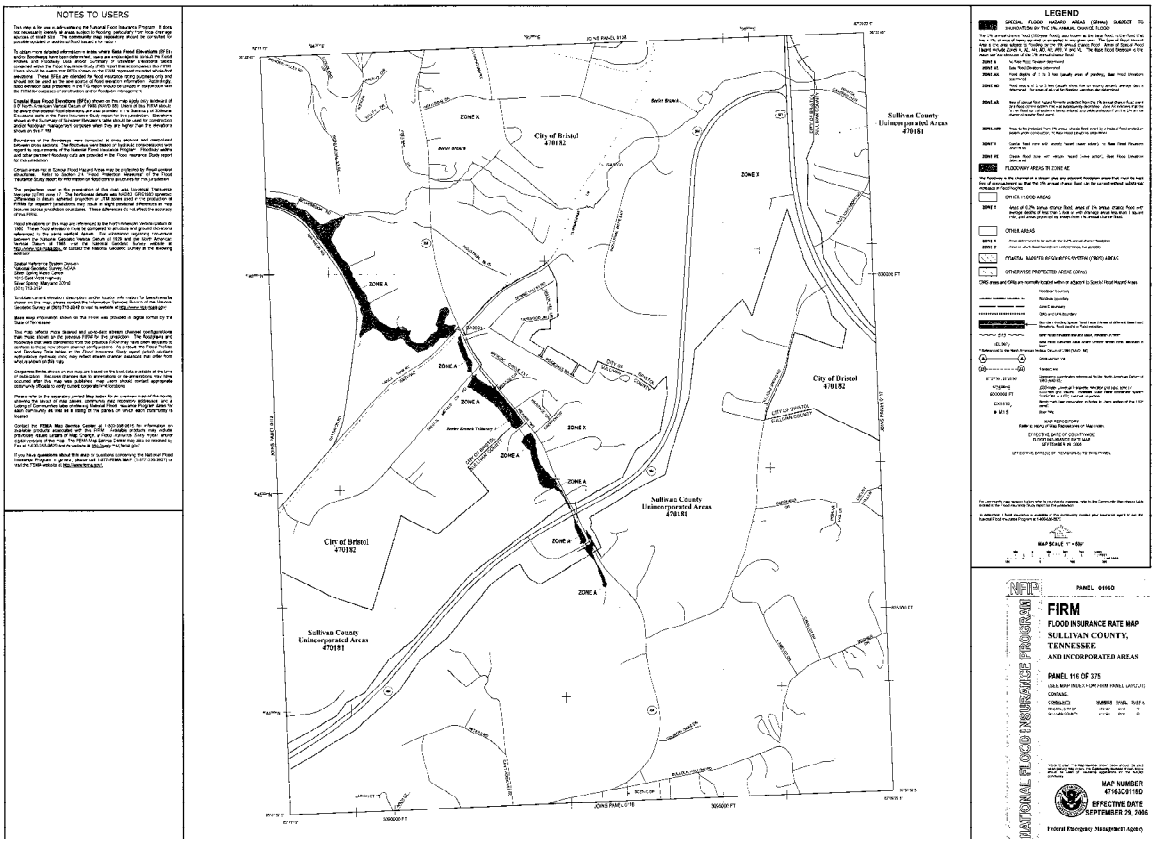
City of Bristol
470182
City of Bristol
470183
Sullivan County
Unincorporated Areas
470181
ZONE AE
ZONE A
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 109 OF 375
MAP NUMBER
47163C0109D
EFFECTIVE DATE
SEPTEMBER 29, 2006
NATIONAL FLOOD INSURANCE PROGRAM

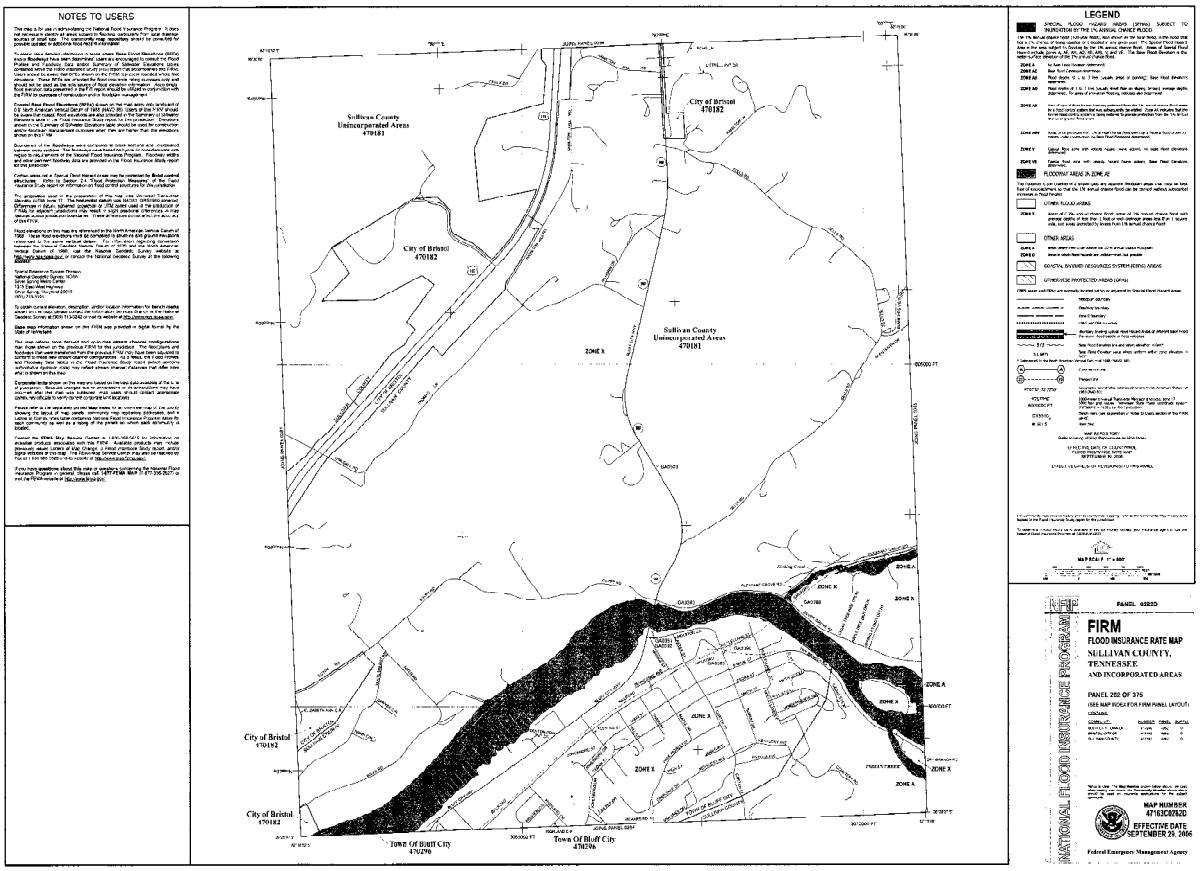

NOTES TO USERS
LEGEND
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
Sullivan County
Unincorporated Areas
470181
MAP SCALE 1" = 500'
PANEL 0111D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 111 OF 375
MAP NUMBER
47163C0111D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 112 OF 375
MAP NUMBER
47163C0112D
EFFECTIVE DATE
SEPTEMBER 29, 2006
NATIONAL FLOOD INSURANCE PROGRAM
Federal Emergency Management Agency
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE AE
ZONE X


NOTES TO USERS
LEGEND
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE X
ZONE AE
ZONE A
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 115 OF 375
MAP NUMBER
47163C0115D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


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


NOTES TO USERS
LEGEND
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 916 OF 375
MAP NUMBER
47163C0916D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
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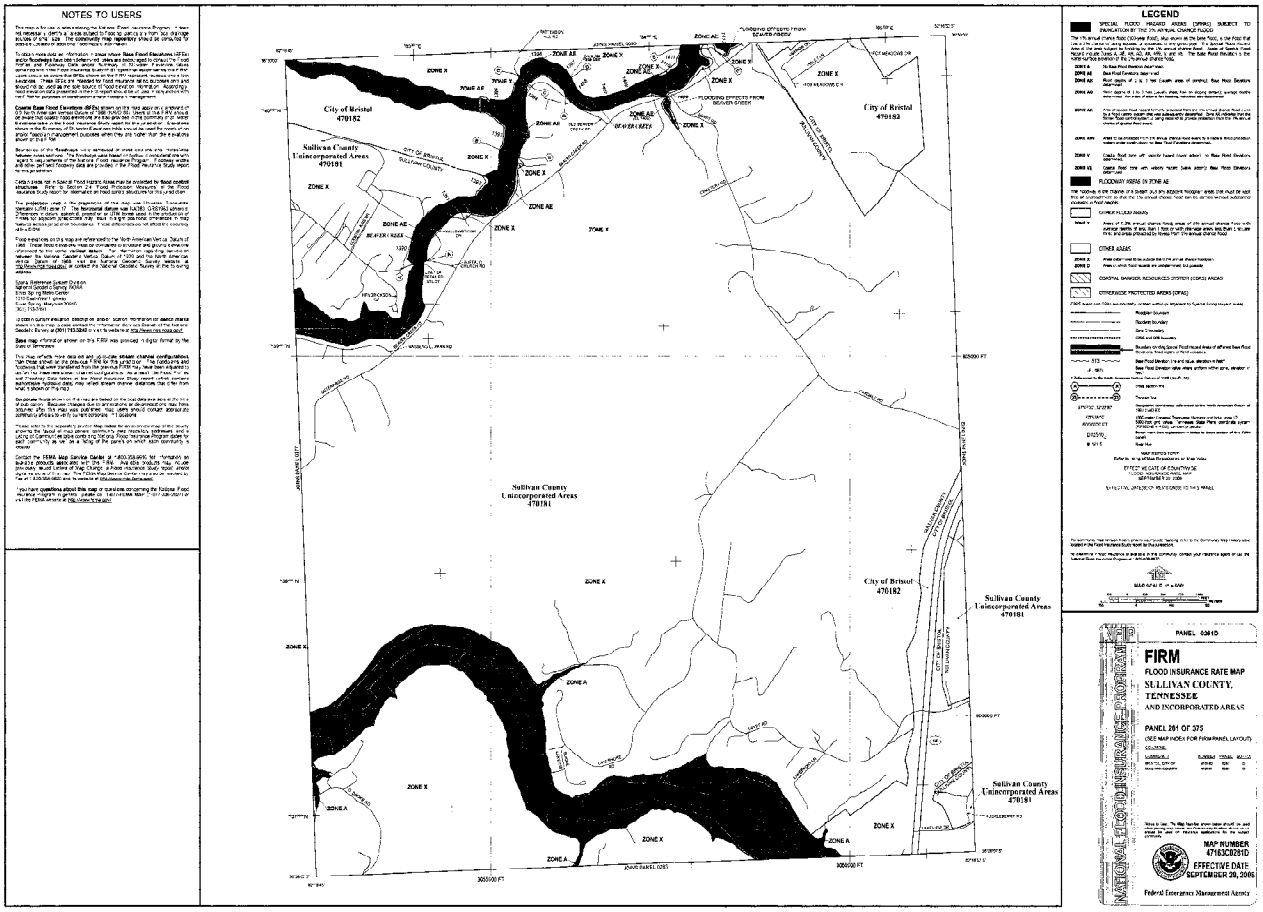
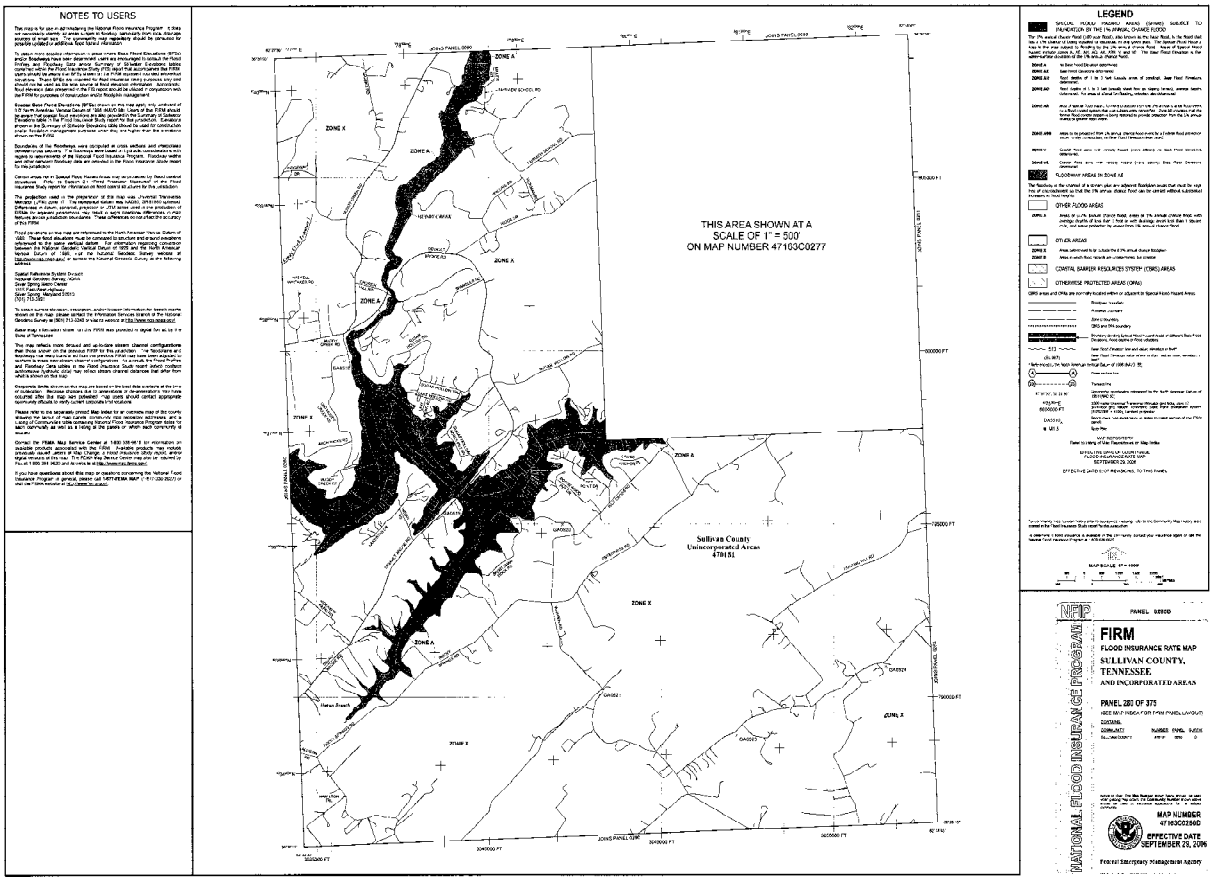
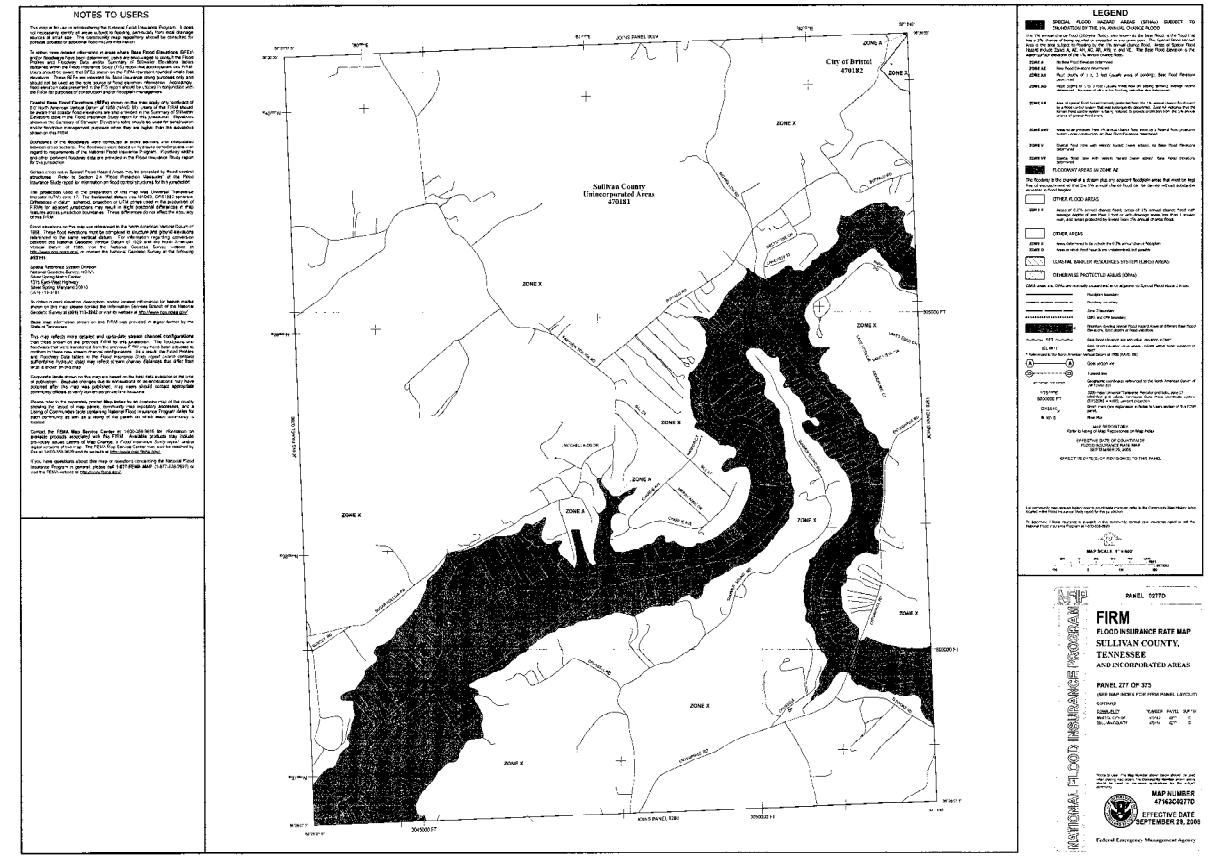
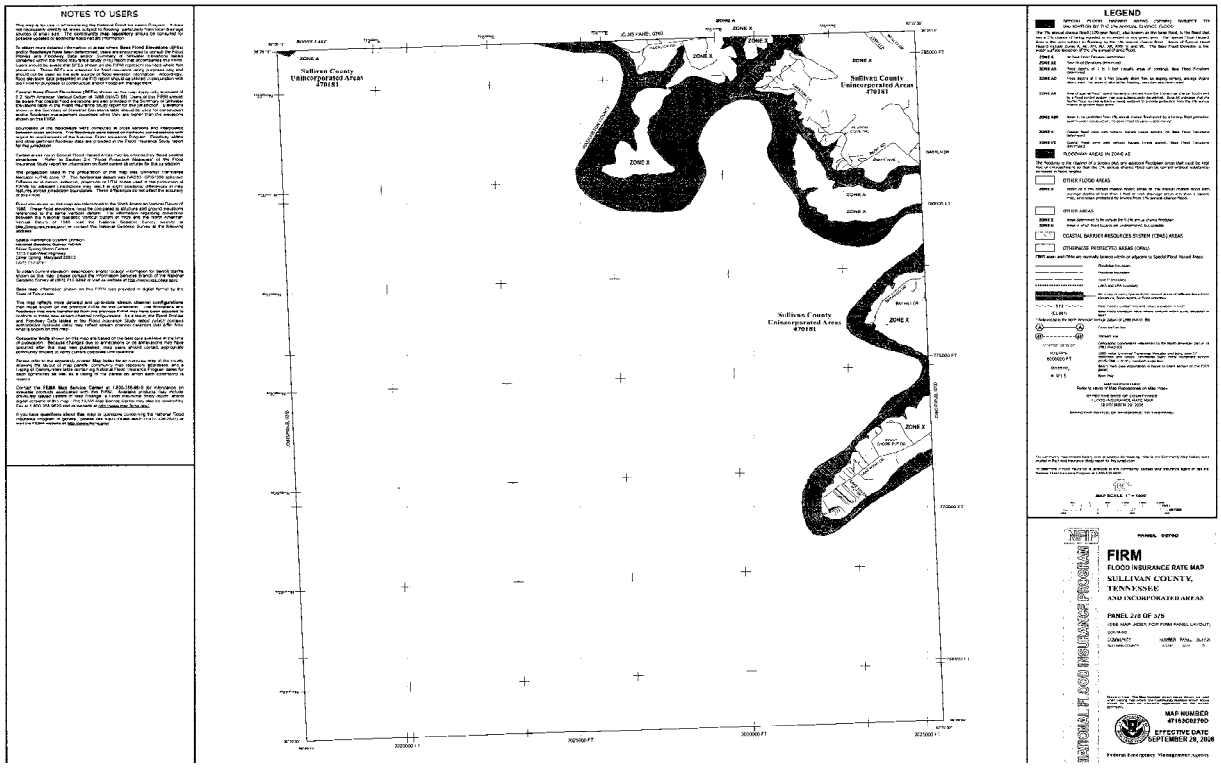
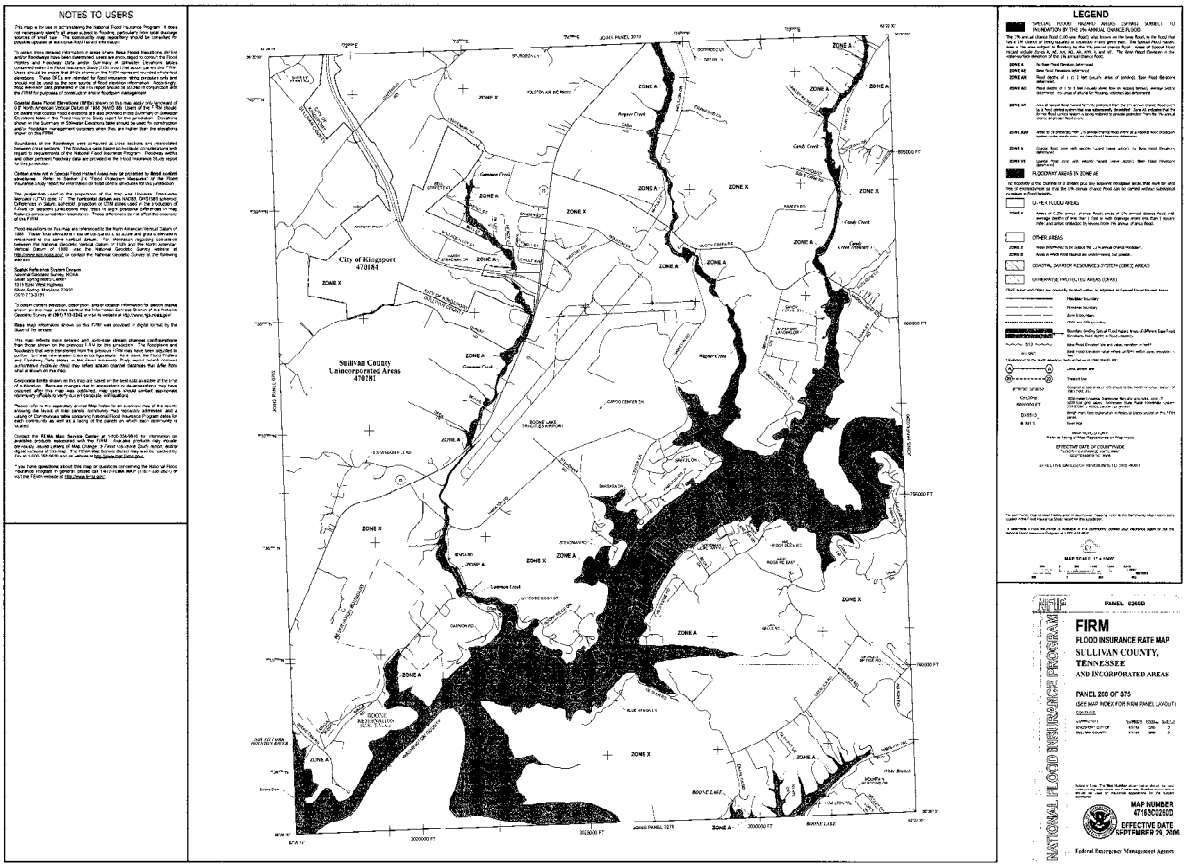
Sullivan County
Unincorporated Areas
470181
City of Bristol
470182
Town Of Bluff City
470276
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 282 OF 375
MAP NUMBER
47163C0282D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM

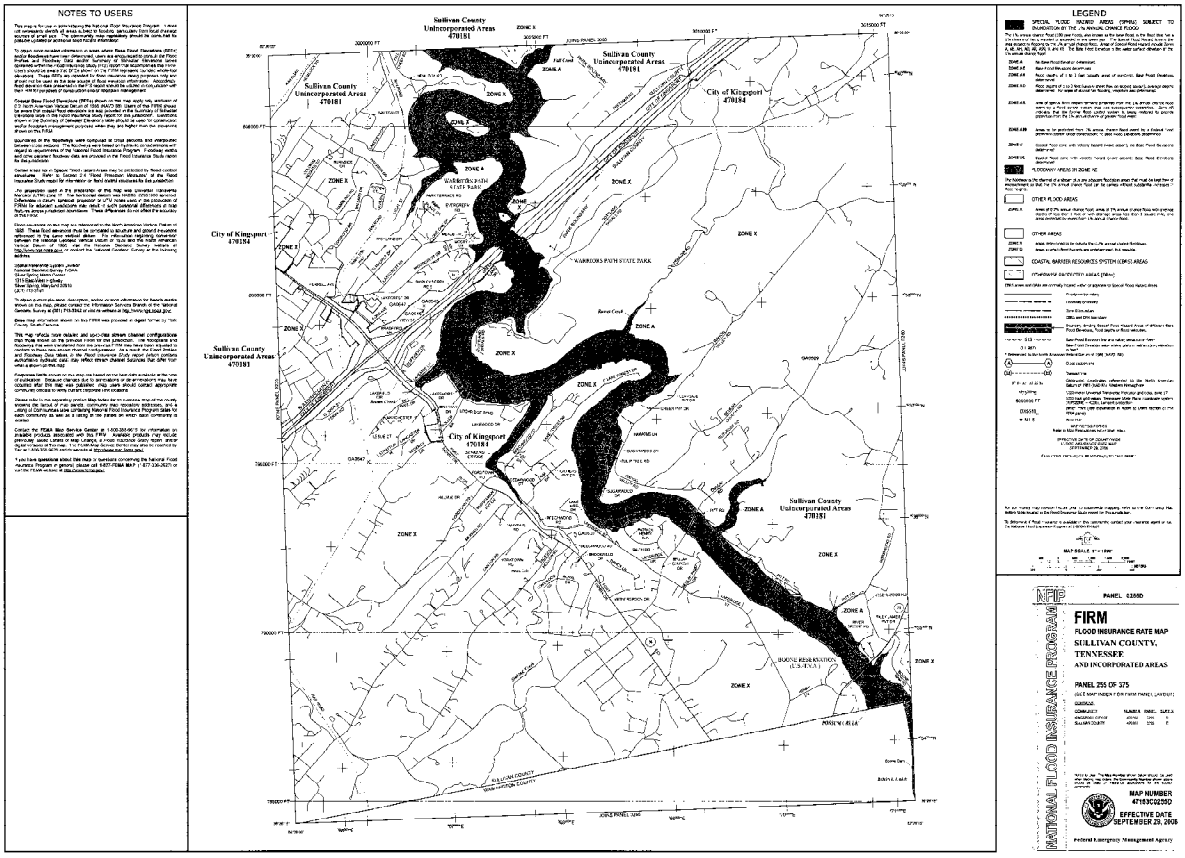

NOTES TO USERS
LEGEND
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE X
ZONE AE
ZONE A
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 261 OF 375
MAP NUMBER
47163C0261D
EFFECTIVE DATE:
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
THIS AREA SHOWN AT A
SCALE OF 1" = 500'
ON MAP NUMBER 47163C0277
Sullivan County
Unincorporated Areas
470151
ZONE A
ZONE X
NFIP
PANEL 0280D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE,
AND INCORPORATED AREAS
PANEL 280 OF 375
MAP NUMBER
47163C0280D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
City of Bristol
470182
Sullivan County
Unincorporated Areas
470181
ZONE X
ZONE A
LEGEND
OTHER FLOOD AREAS
OTHER AREAS
FLOODWAY AREAS IN ZONE AE
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0277D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 277 OF 373
MAP NUMBER
47163C0277D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
Sullivan County
Unincorporated Areas
470181
Sullivan County
Unincorporated Areas
470181
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE X
LEGEND
OTHER FLOOD AREAS
OTHER AREAS
FLOODWAY AREAS IN ZONE AE
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
OTHERWISE PROTECTED AREAS (OPAs)
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0278D
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 278 OF 373
MAP NUMBER
47163C0278D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
LEGEND
City of Kingsport
470184
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 200 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER
47163C0200
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
Sullivan County Unincorporated Areas 470181
City of Kingsport 470184
LEGEND
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
PANEL 255 OF 575
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER
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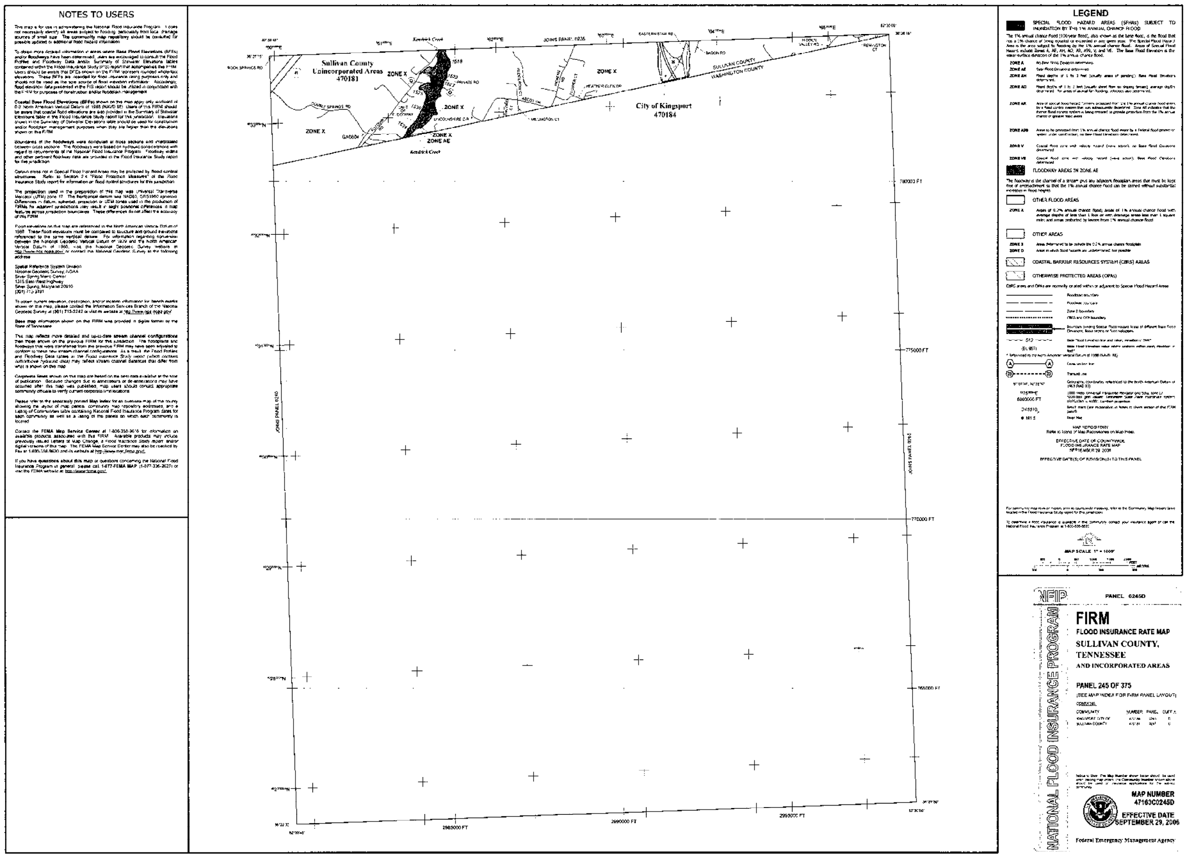
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


NOTES TO USERS
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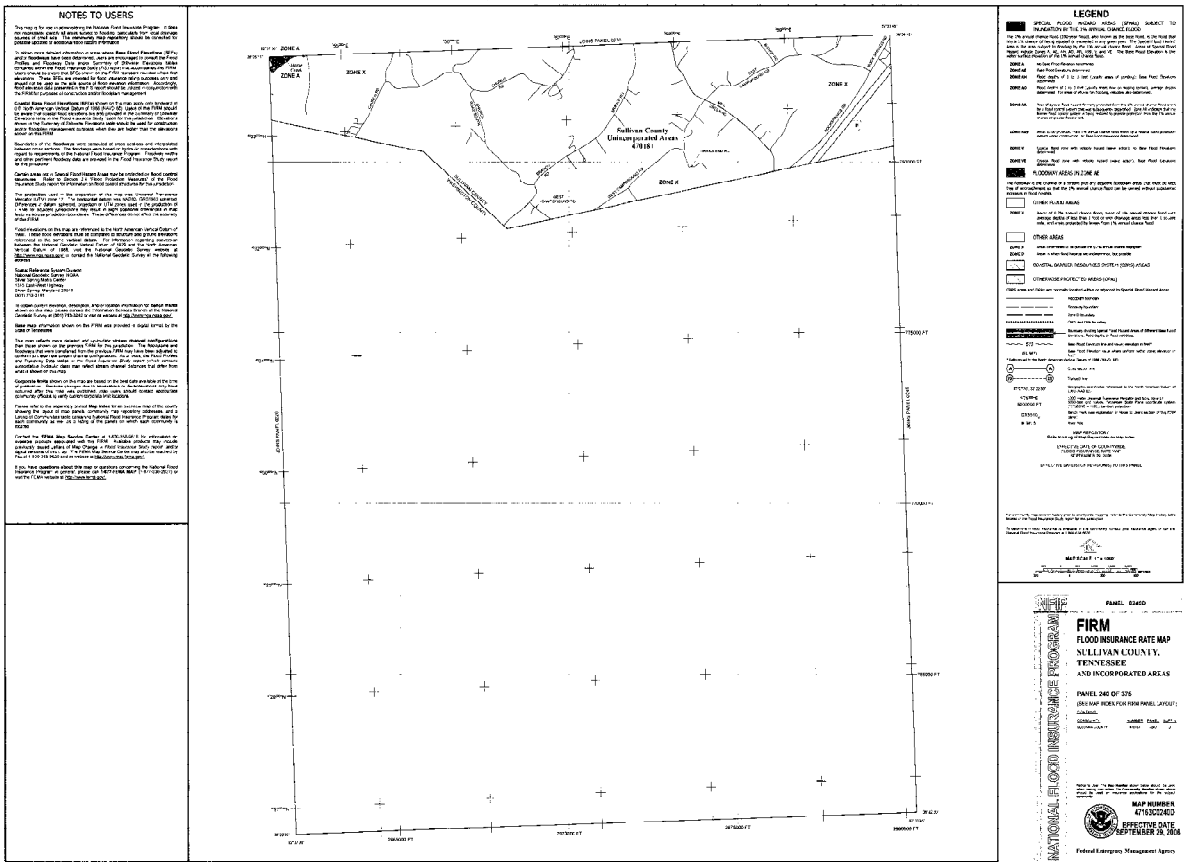
Sullivan County
Unincorporated Areas
470181
City of Kingsport
470184
ZONE X
ZONE AE
MAP SCALE 1" = 1000'
NFIP
PANEL 0245D
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 245 OF 375
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
47163C0245D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency


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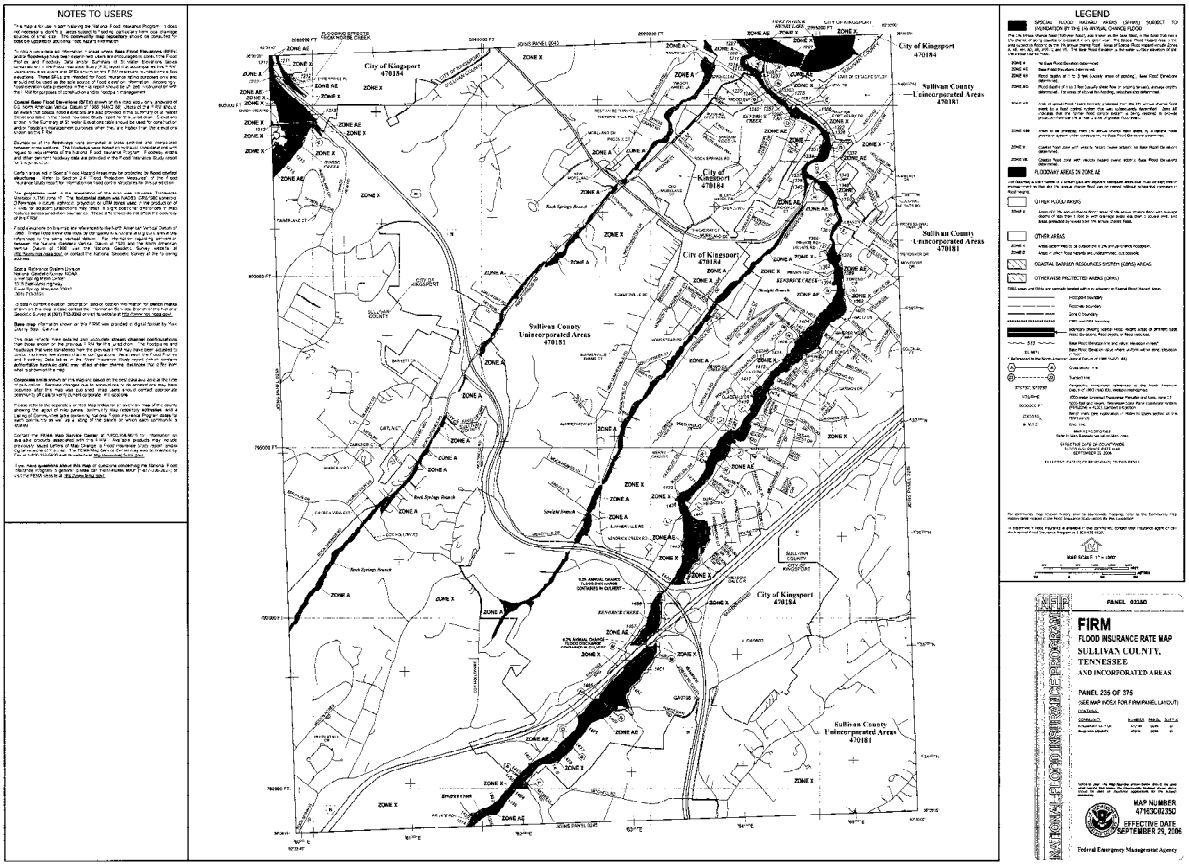
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE X
ZONE AE
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY,
TENNESSEE
AND INCORPORATED AREAS
PANEL 240 OF 375
MAP NUMBER
47163C0240D
EFFECTIVE DATE
SEPTEMBER 29, 2006
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM


NOTES TO USERS
LEGEND
City of Kingsport
470184
Sullivan County
Unincorporated Areas
470181
ZONE A
ZONE AE
ZONE X
FIRM
FLOOD INSURANCE RATE MAP
SULLIVAN COUNTY, TENNESSEE
AND INCORPORATED AREAS
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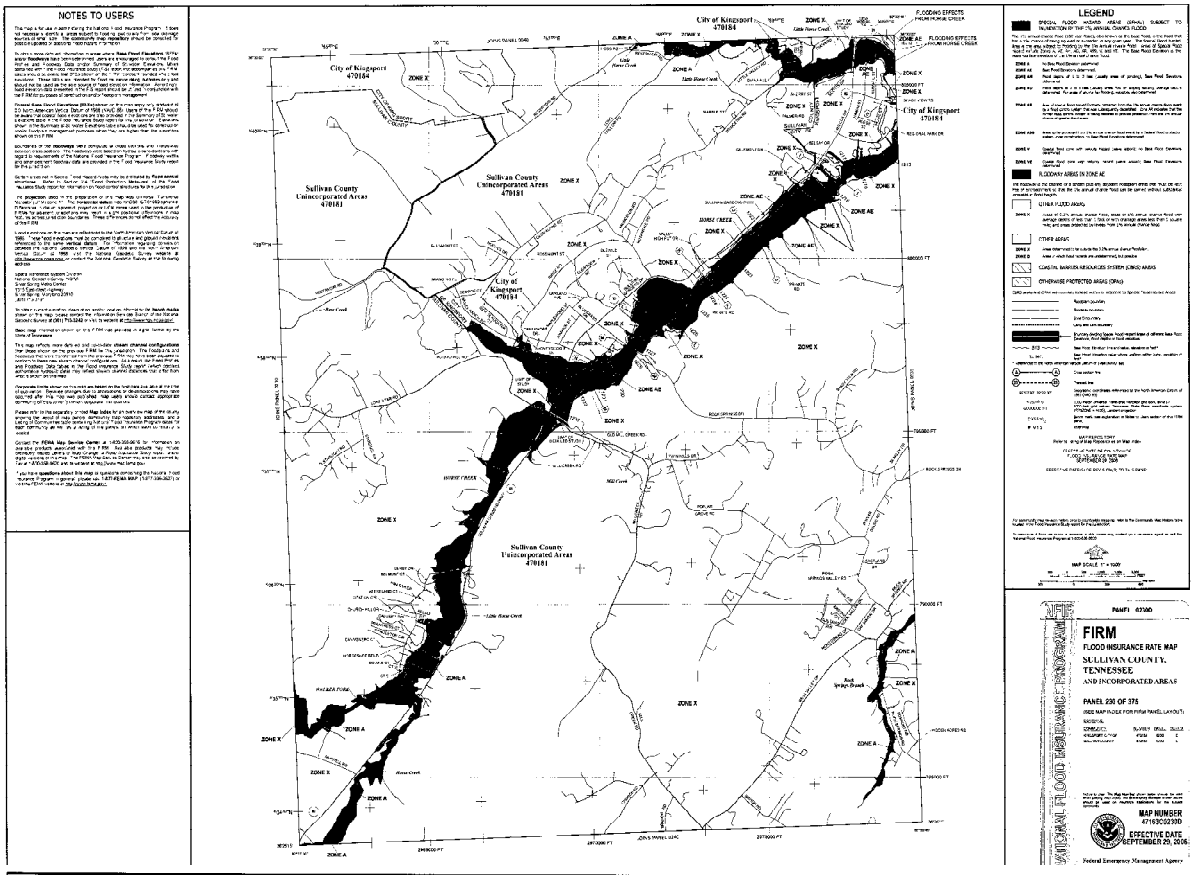
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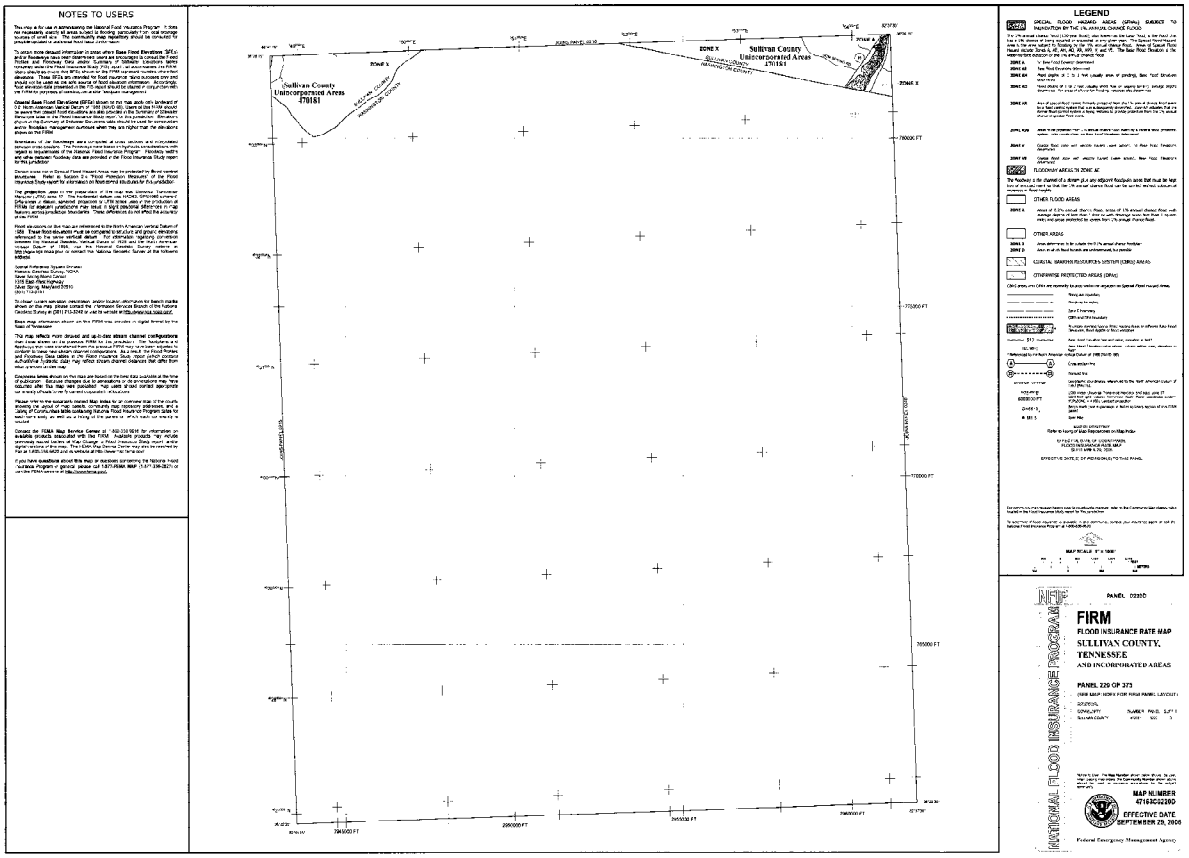
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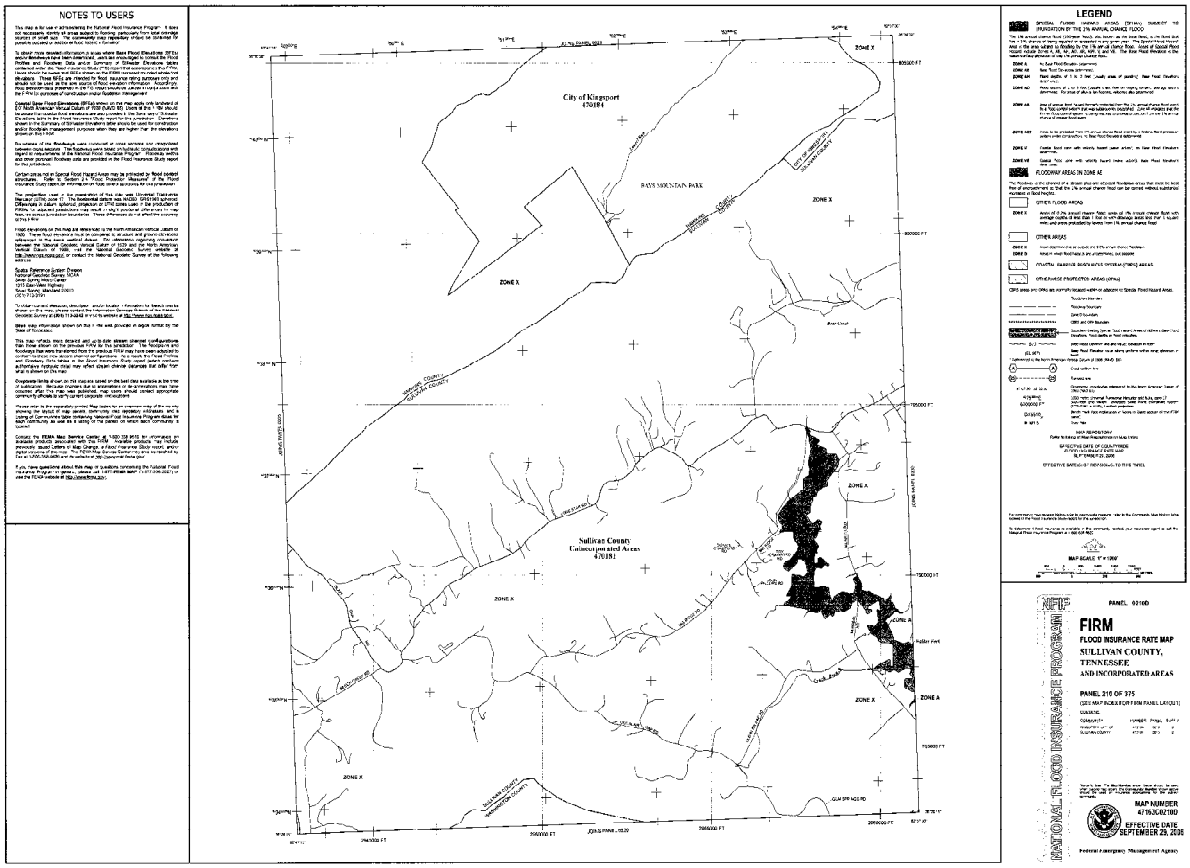
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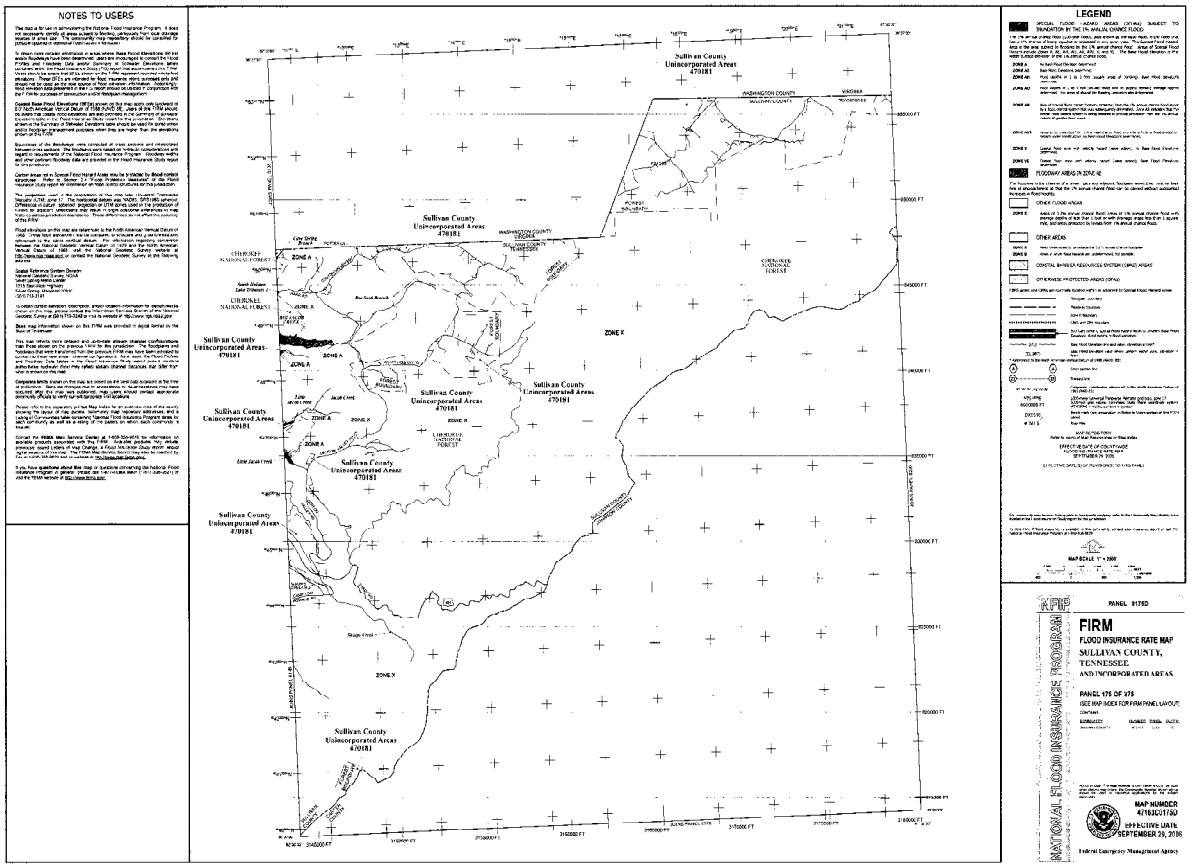
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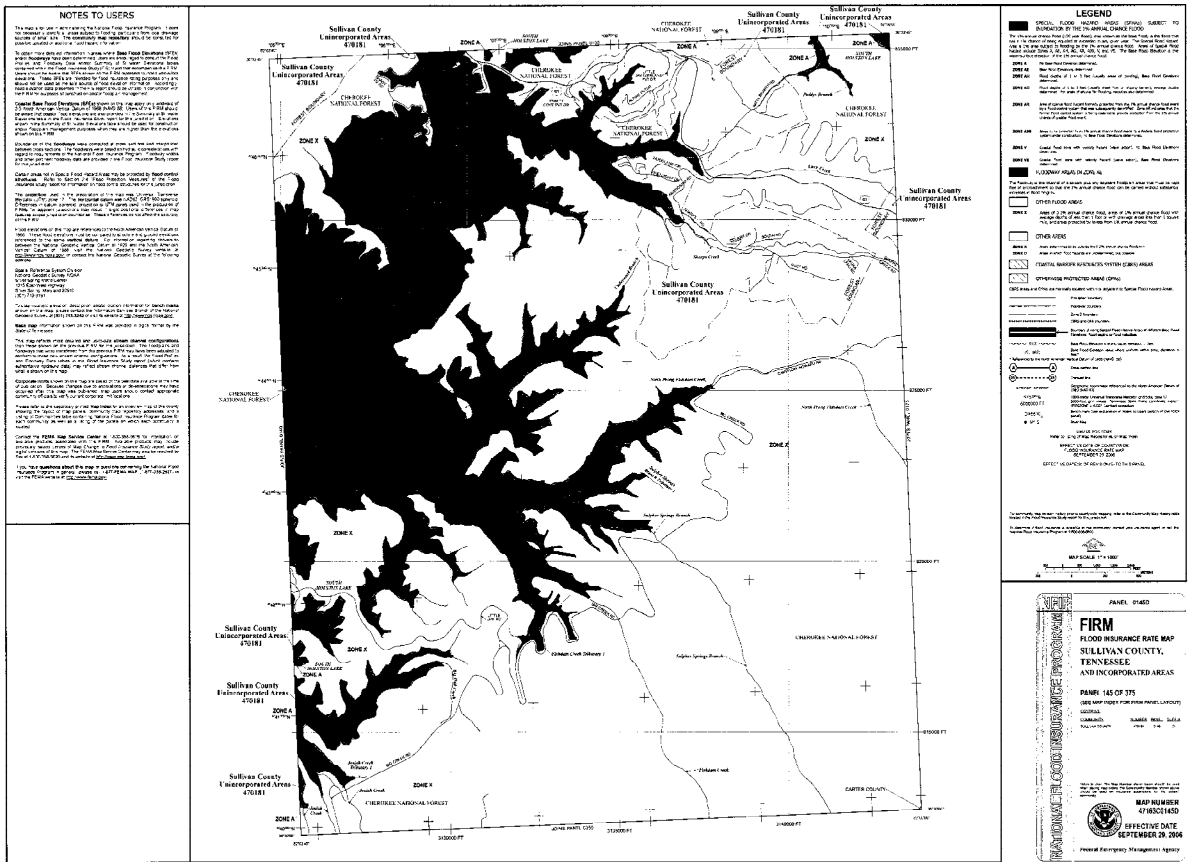
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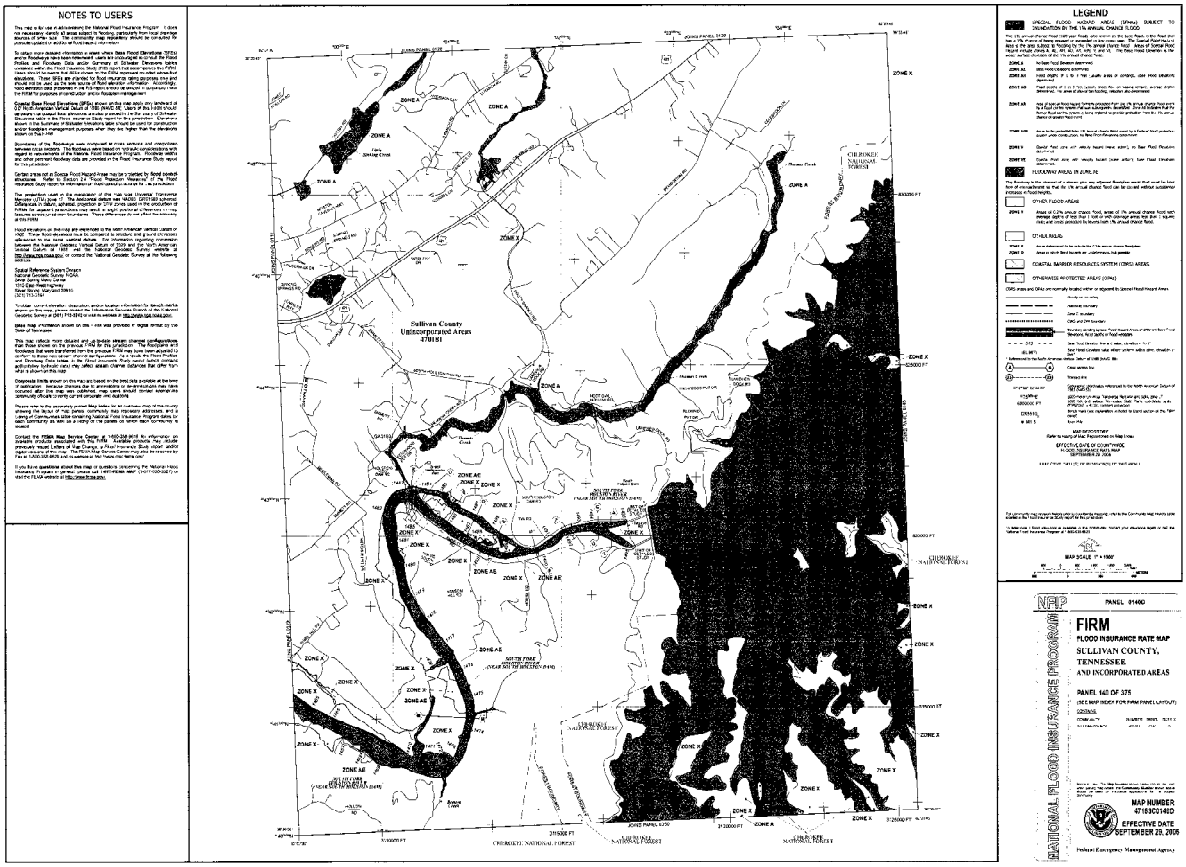
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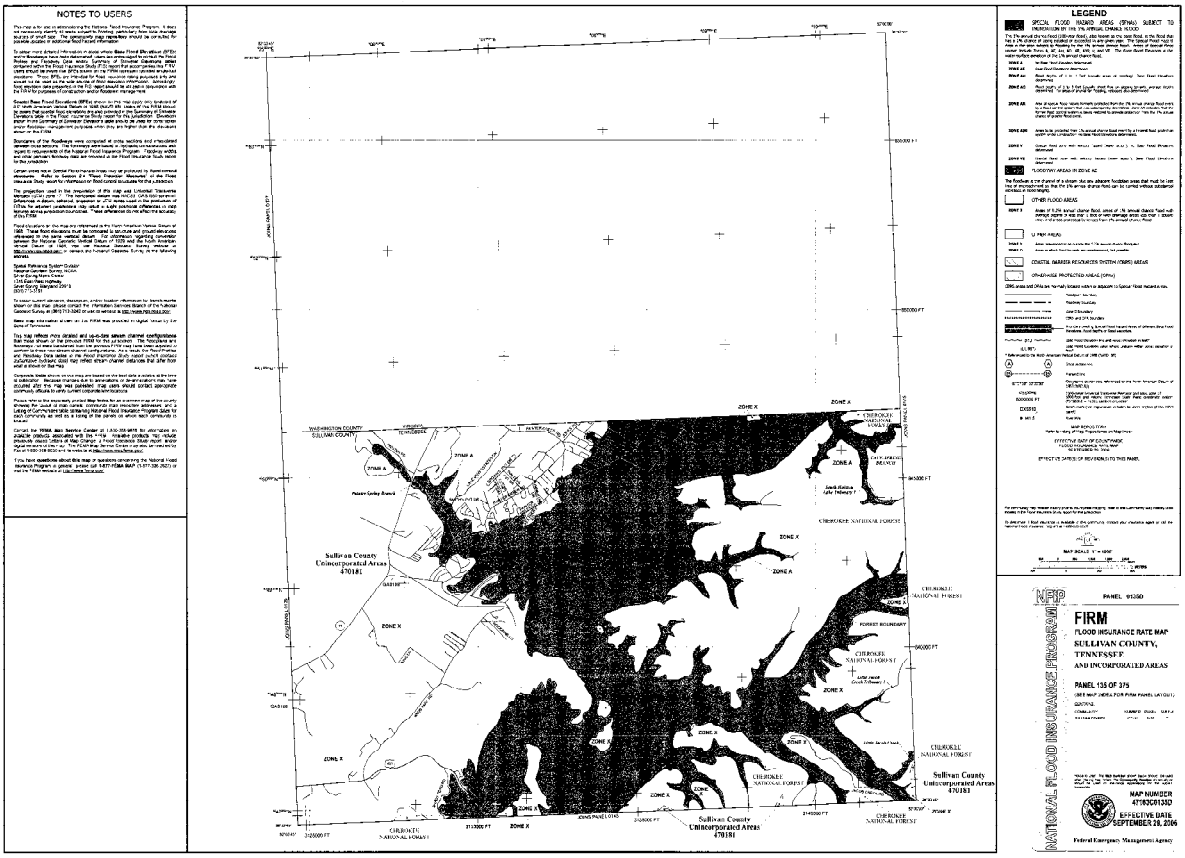
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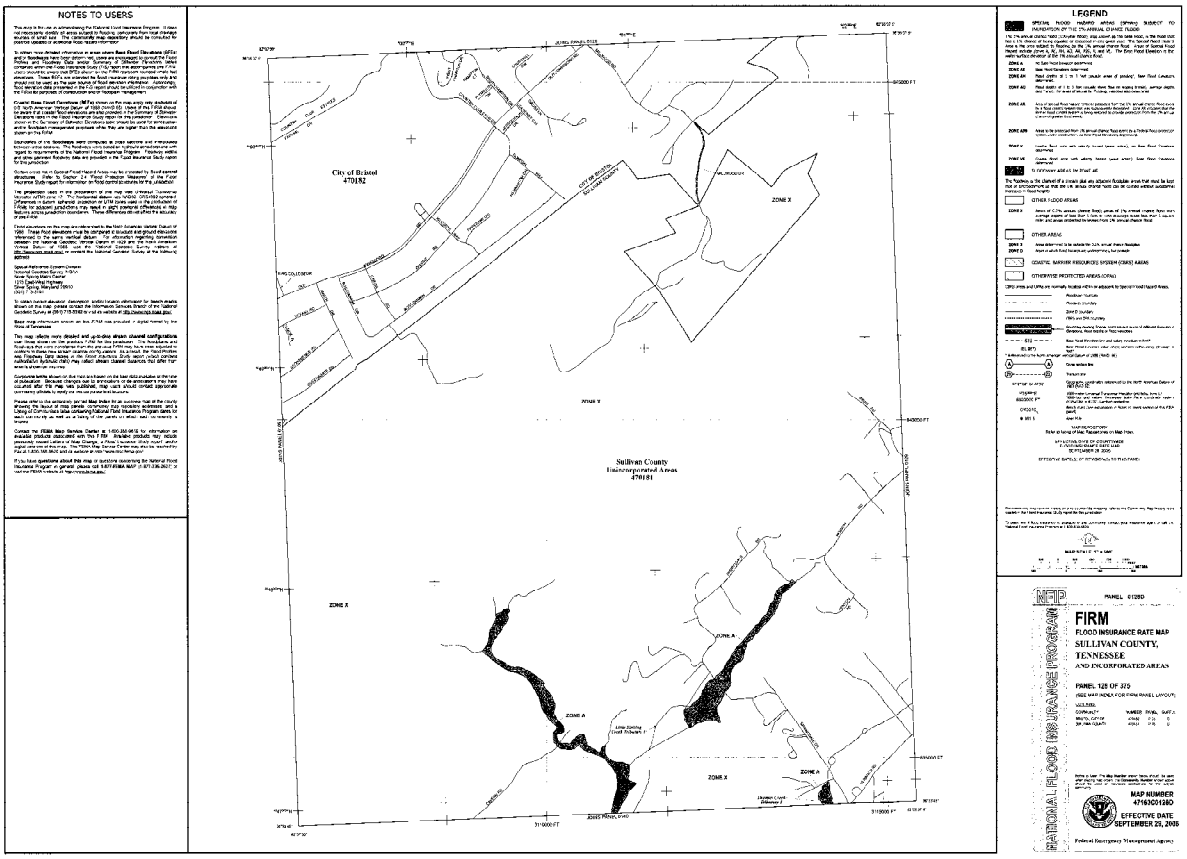
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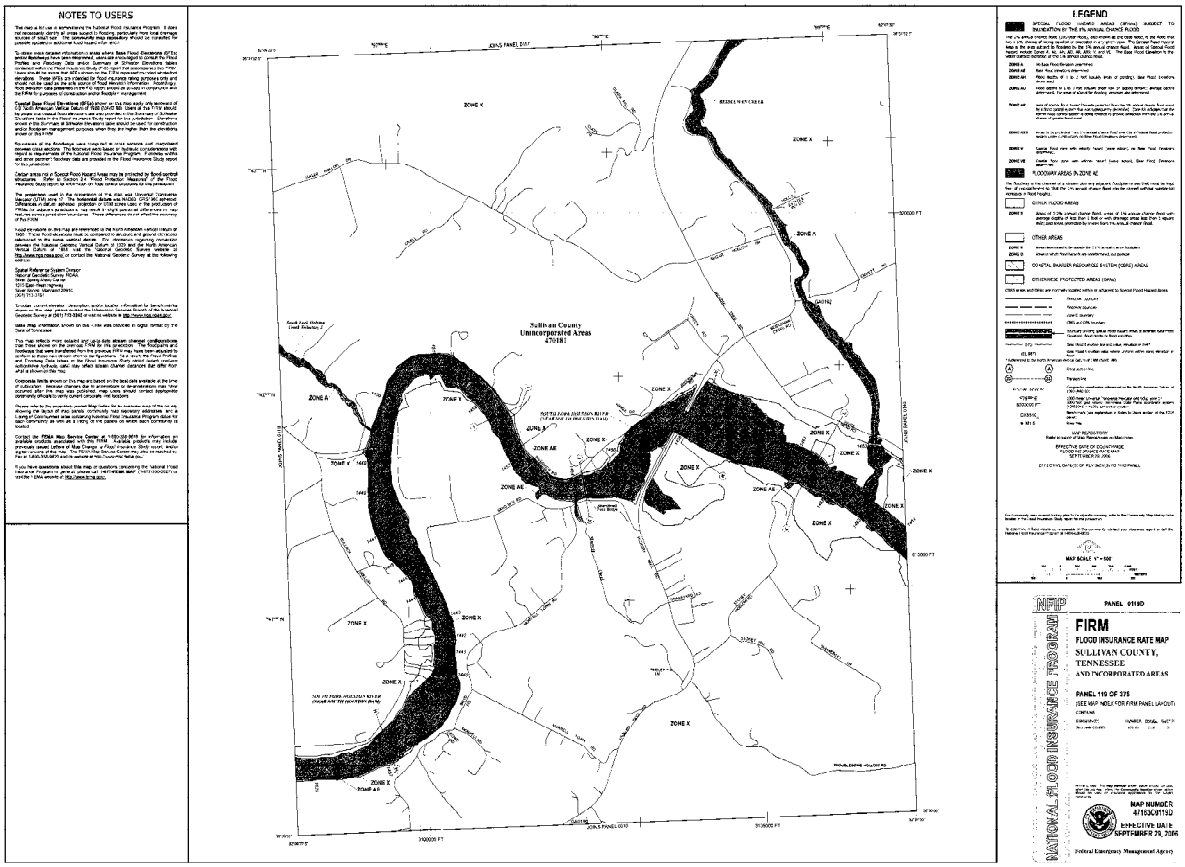
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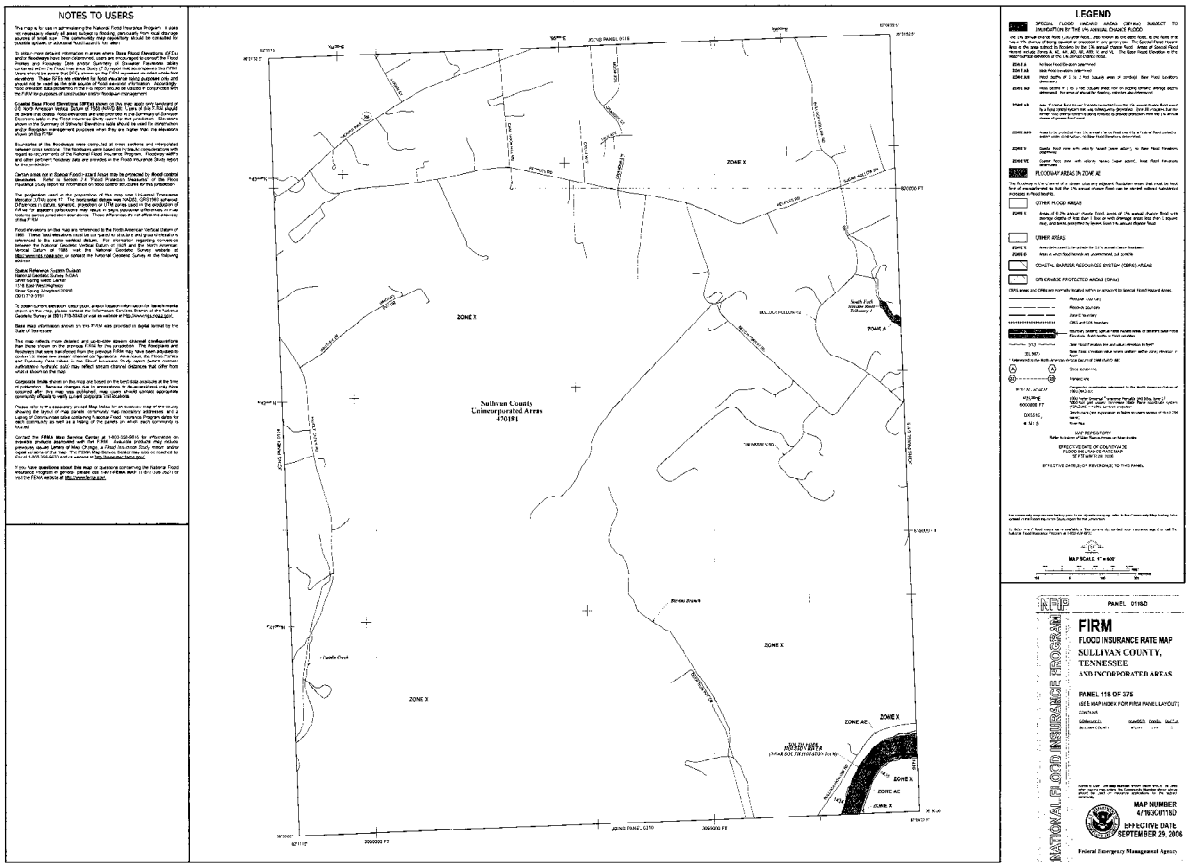
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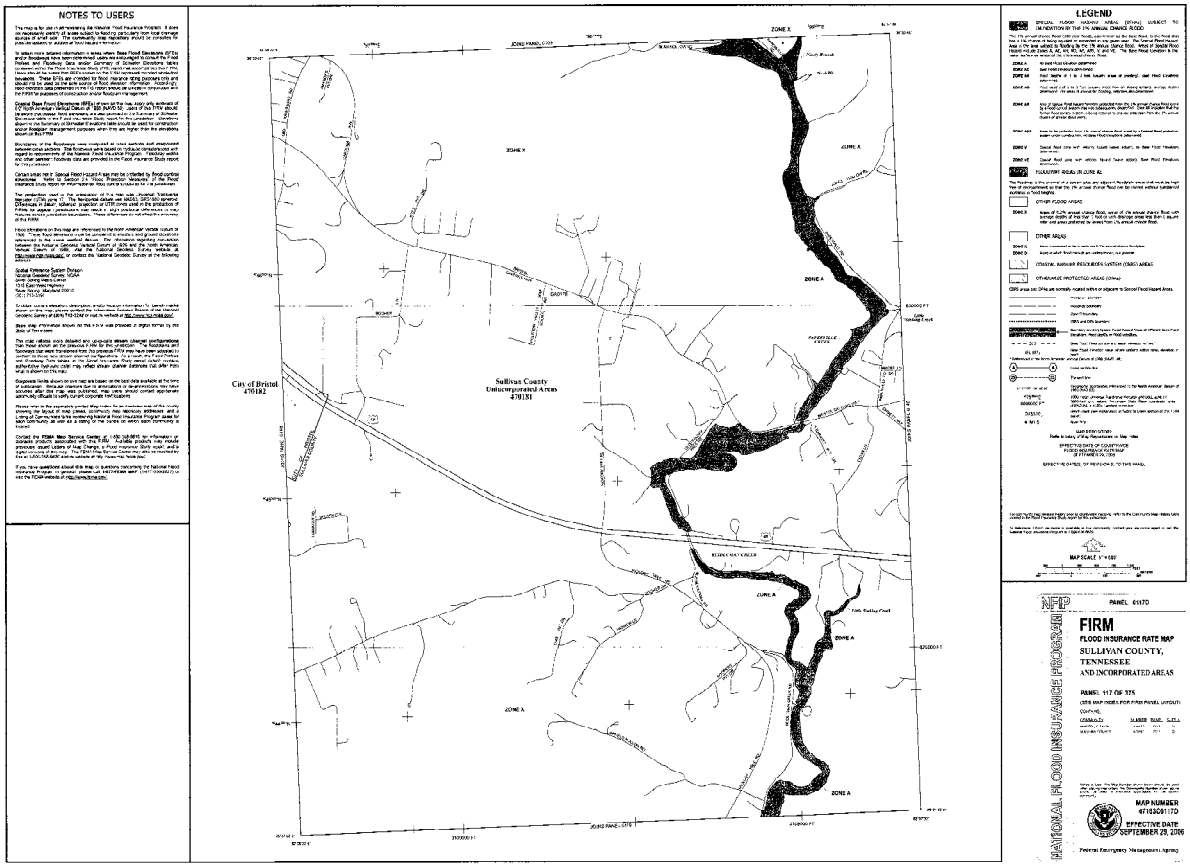
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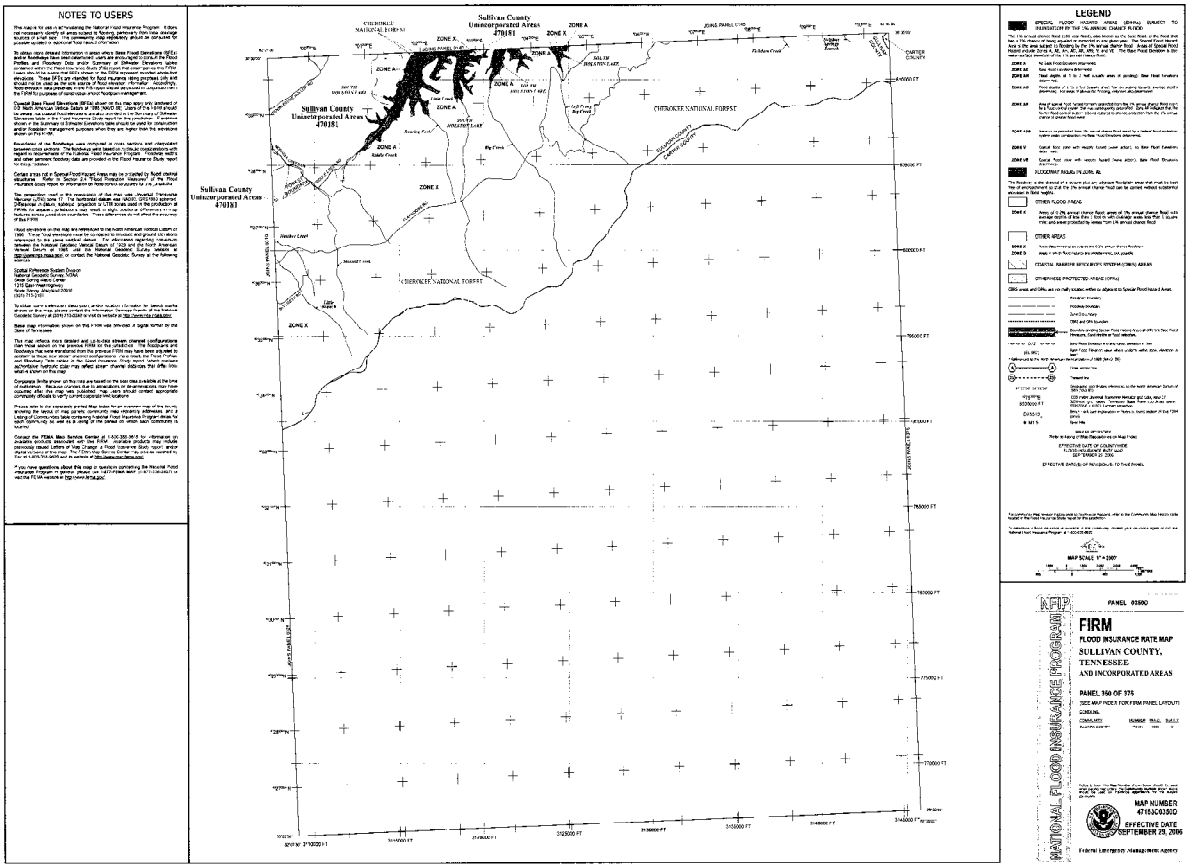
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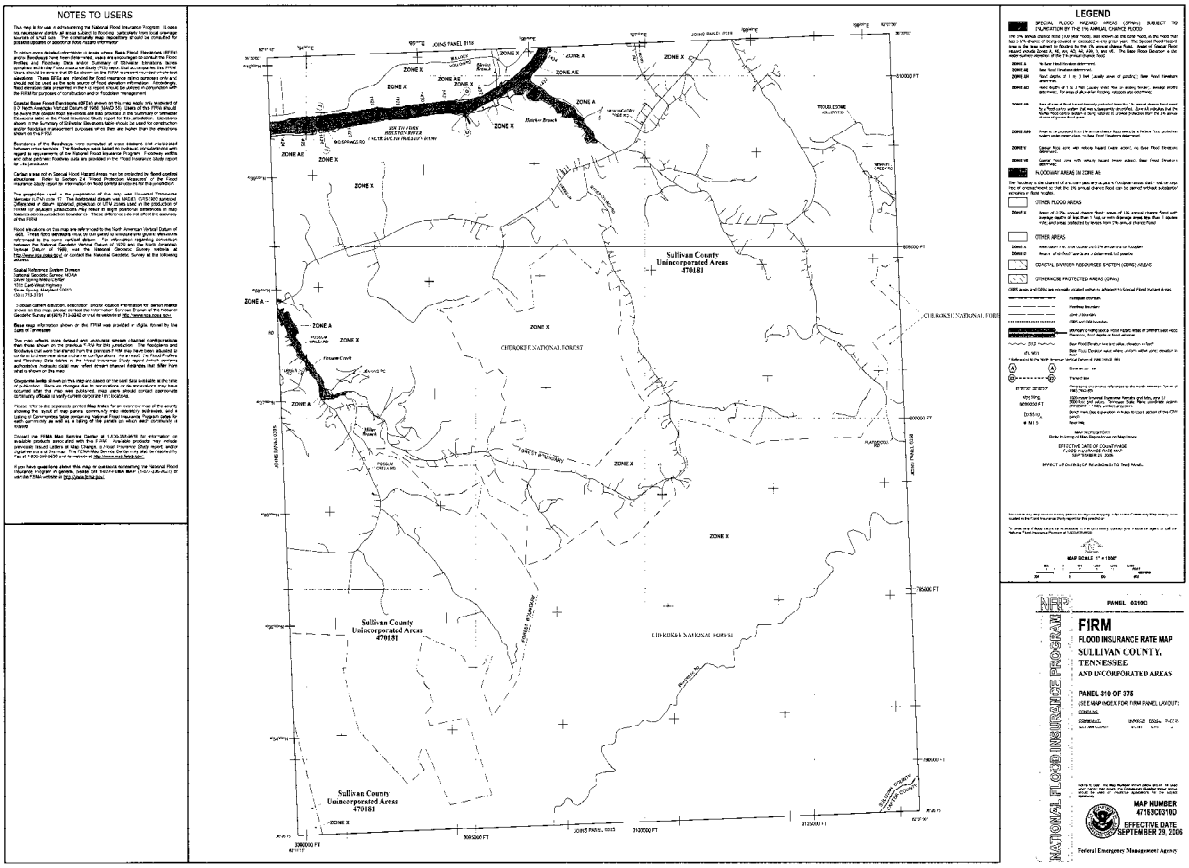
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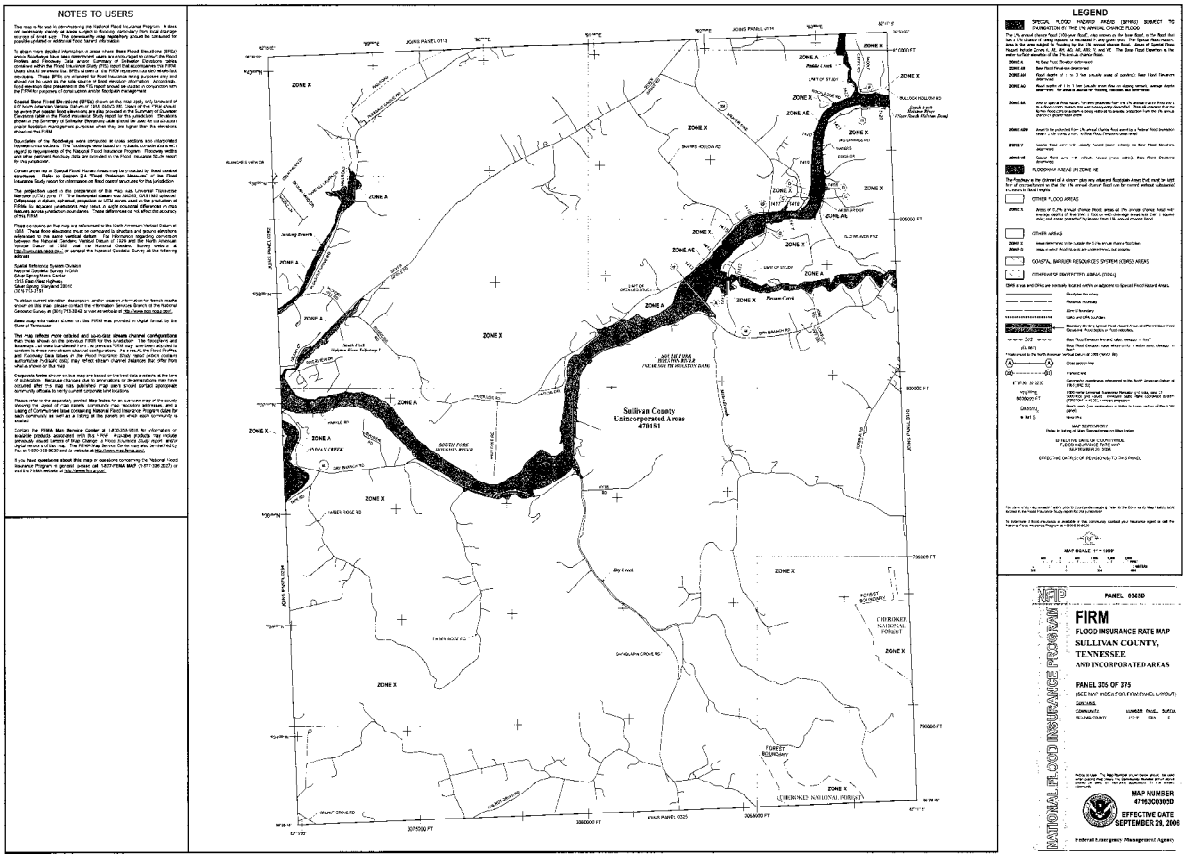
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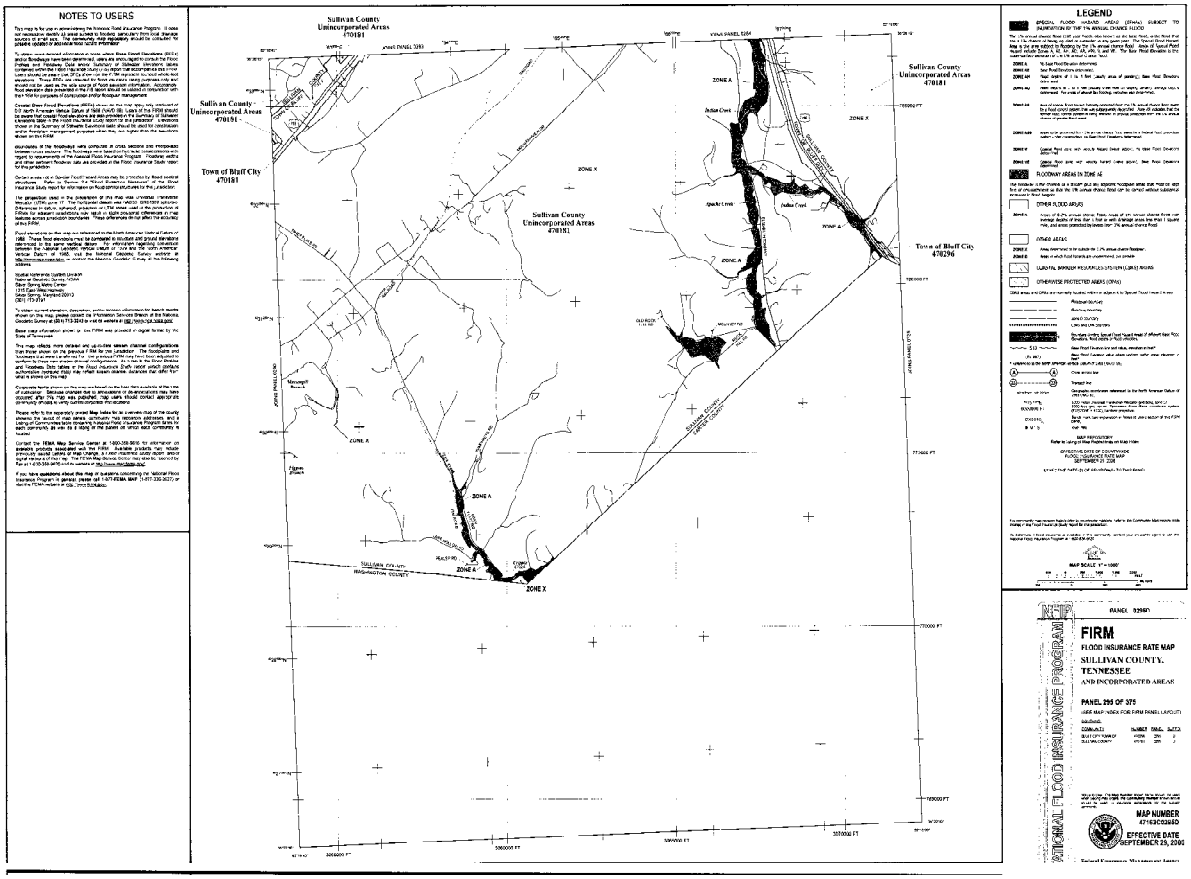
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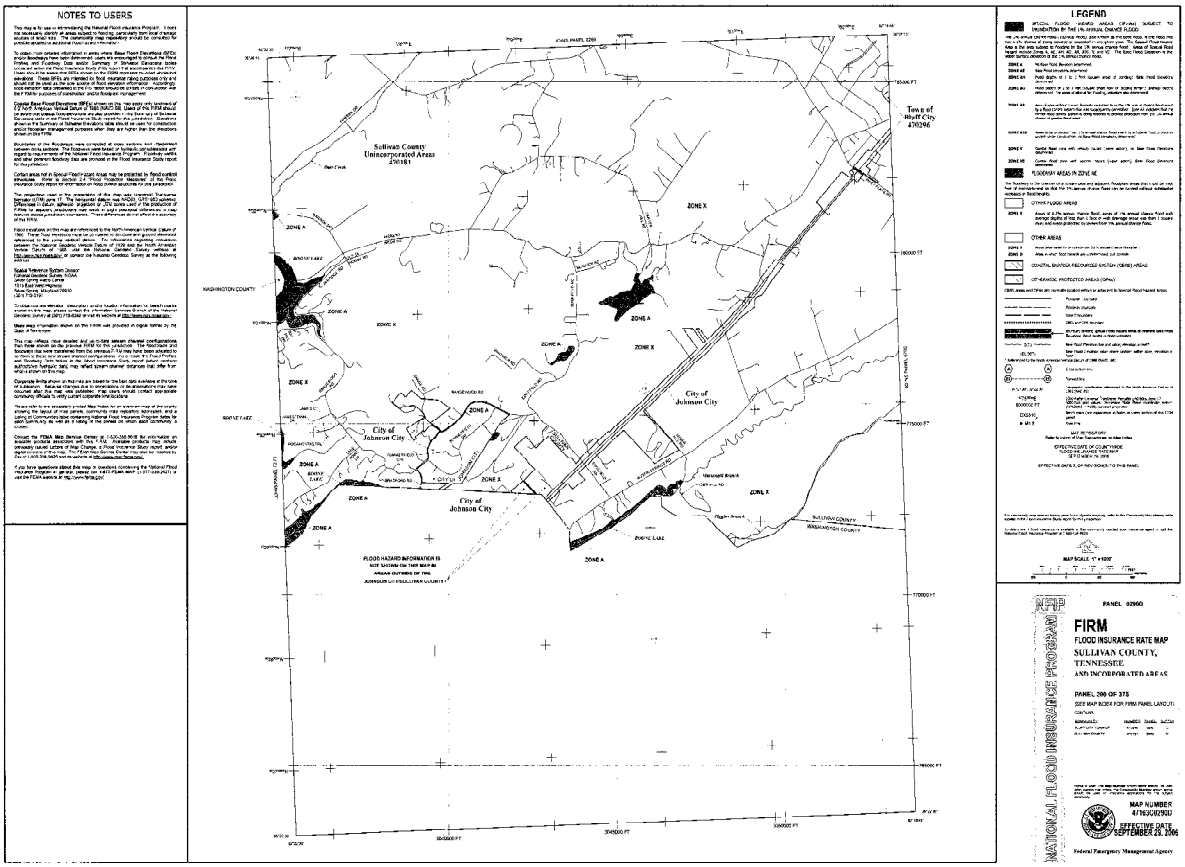
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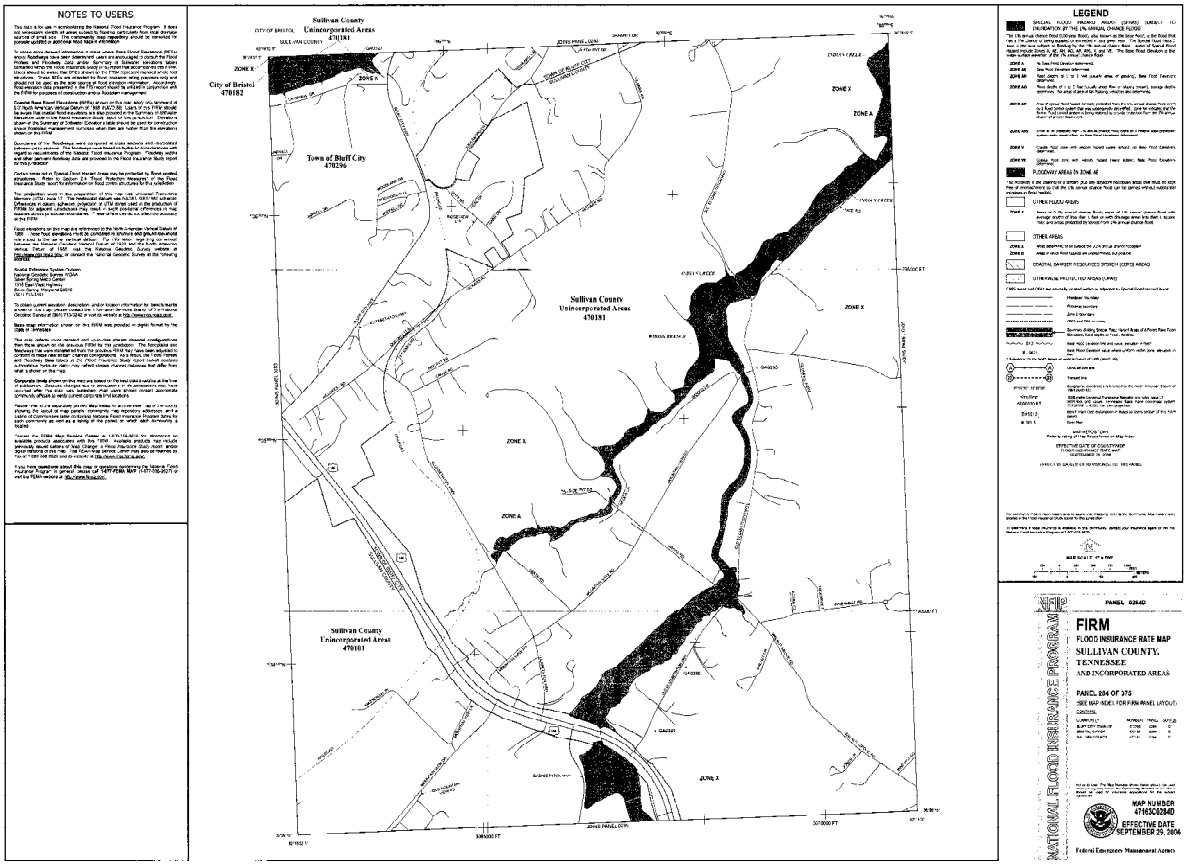
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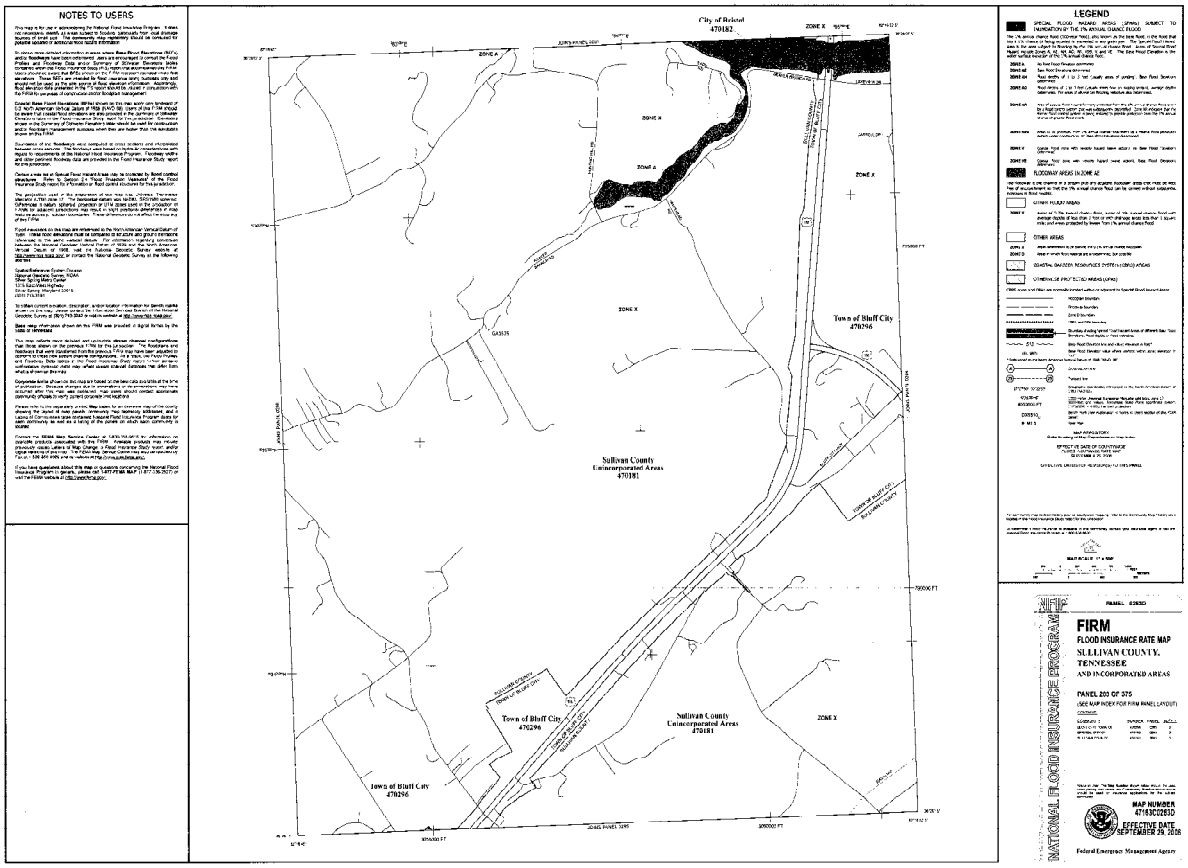
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Federal Emergency Management Agency

Hazus: Flood Global Risk Report

Region Name:	Sullivan_County
Flood Scenario:	Sullivan_County_500yr_Flood
Print Date:	Monday, February 10, 2020

Disclaimer:

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

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

FEMA

RiskMAP
Increasing Resilience Together

Table of Contents

General Description of the Region

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

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

- Tennessee

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

The geographical size of the region is approximately 430 square miles and contains 5,735 census blocks. The region contains over 66 thousand households and has a total population of 156,823 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 71,682 buildings in the region with a total building replacement value (excluding contents) of 14,988 million dollars. Approximately 92.35% of the buildings (and 72.87% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 71,682 buildings in the region which have an aggregate total replacement value of 14,988 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	10,921,132	72.9%
Commercial	2,394,056	16.0%
Industrial	940,109	6.3%
Agricultural	35,845	0.2%
Religion	455,830	3.0%
Government	73,138	0.5%
Education	167,997	1.1%
Total	**14,988,107**	**100%**

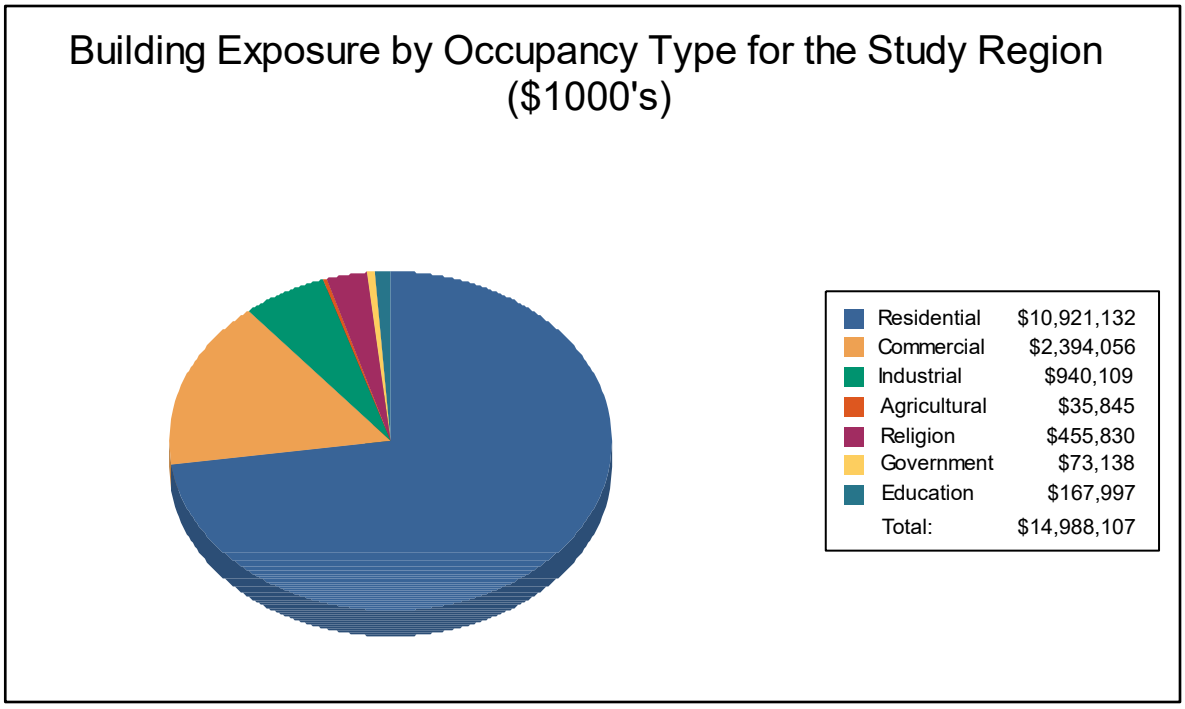
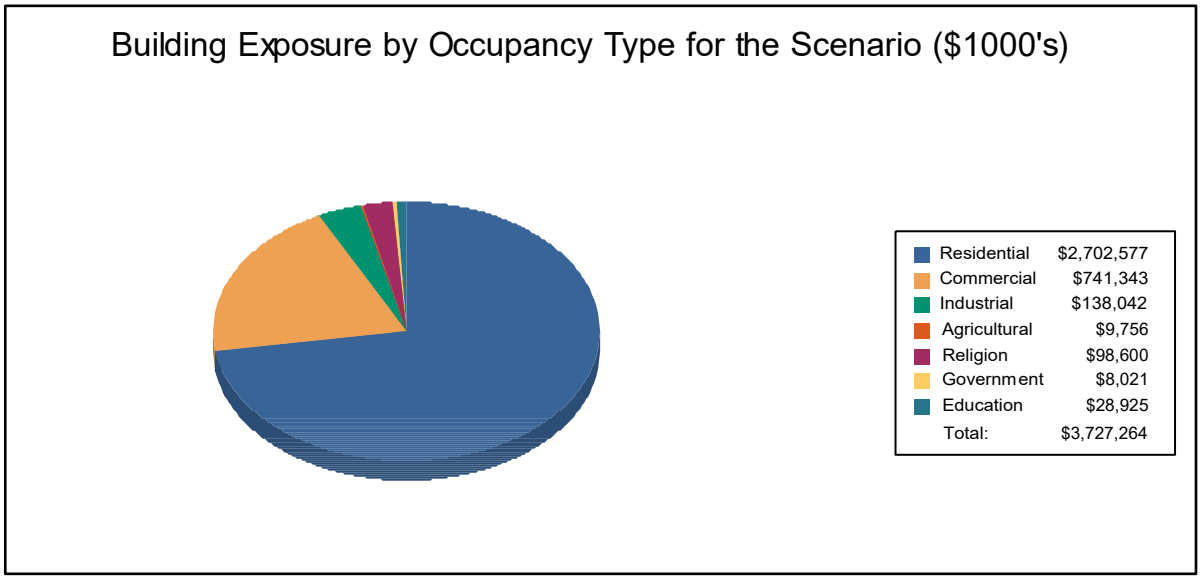


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	2,702,577	72.5%
Commercial	741,343	19.9%
Industrial	138,042	3.7%
Agricultural	9,756	0.3%
Religion	98,600	2.6%
Government	8,021	0.2%
Education	28,925	0.8%
Total	**3,727,264**	**100%**



Essential Facility Inventory

For essential facilities, there are 4 hospitals in the region with a total bed capacity of 1,076 beds.
There are 59 schools, 11 fire stations, 3 police stations and no emergency operation centers.

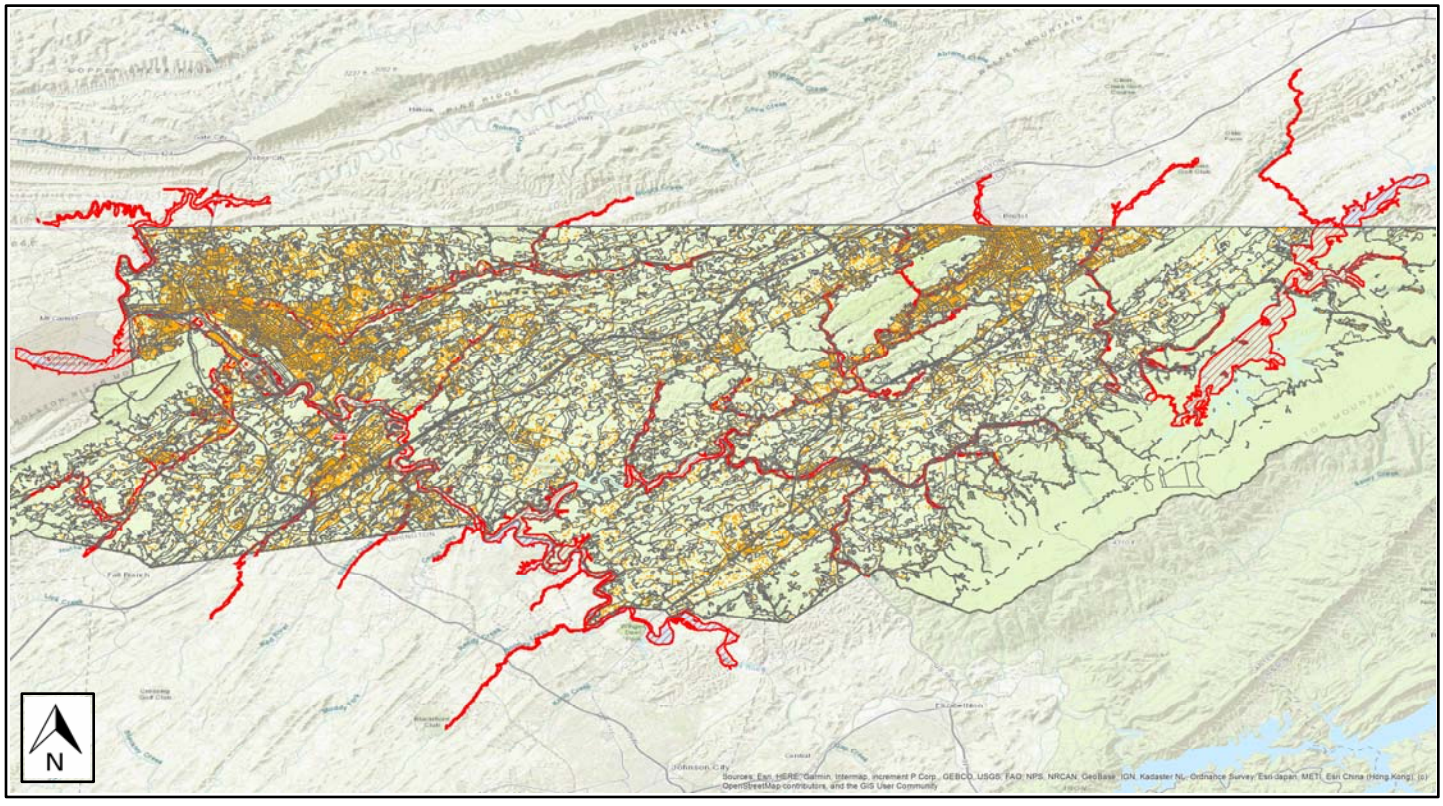
Flood Scenario Parameters

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

Study Region Name:	Sullivan_County
Scenario Name:	Sullivan_County_500yr_Flood
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

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



Building Damage

General Building Stock Damage

Hazus estimates that about 471 buildings will be at least moderately damaged. This is over 41% of the total number of buildings in the scenario. There are an estimated 166 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

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

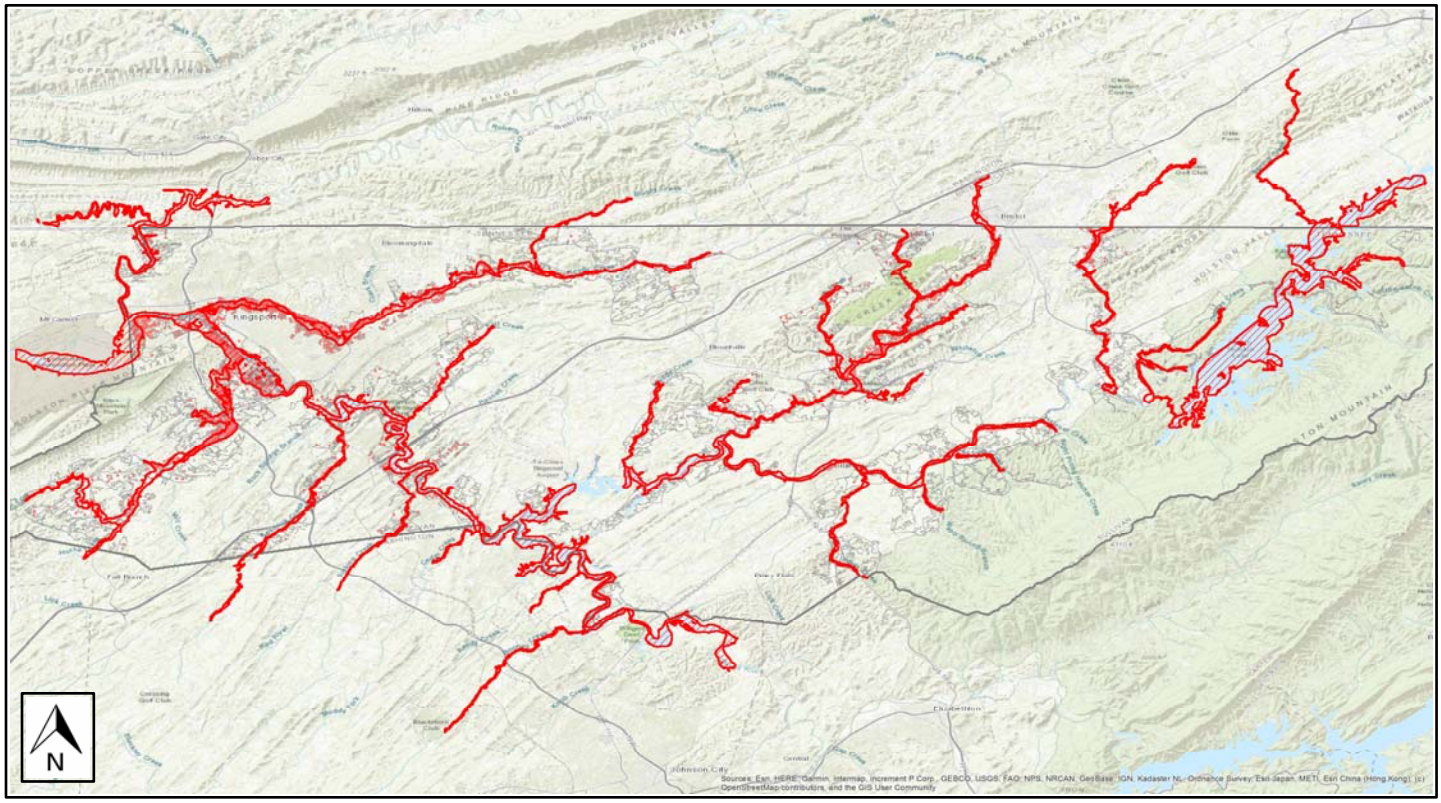


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	2	9	16	73	2	9	2	9	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	30	6	92	19	71	15	63	13	59	12	166	35
Total	**32**		**108**		**73**		**65**		**59**		**166**	

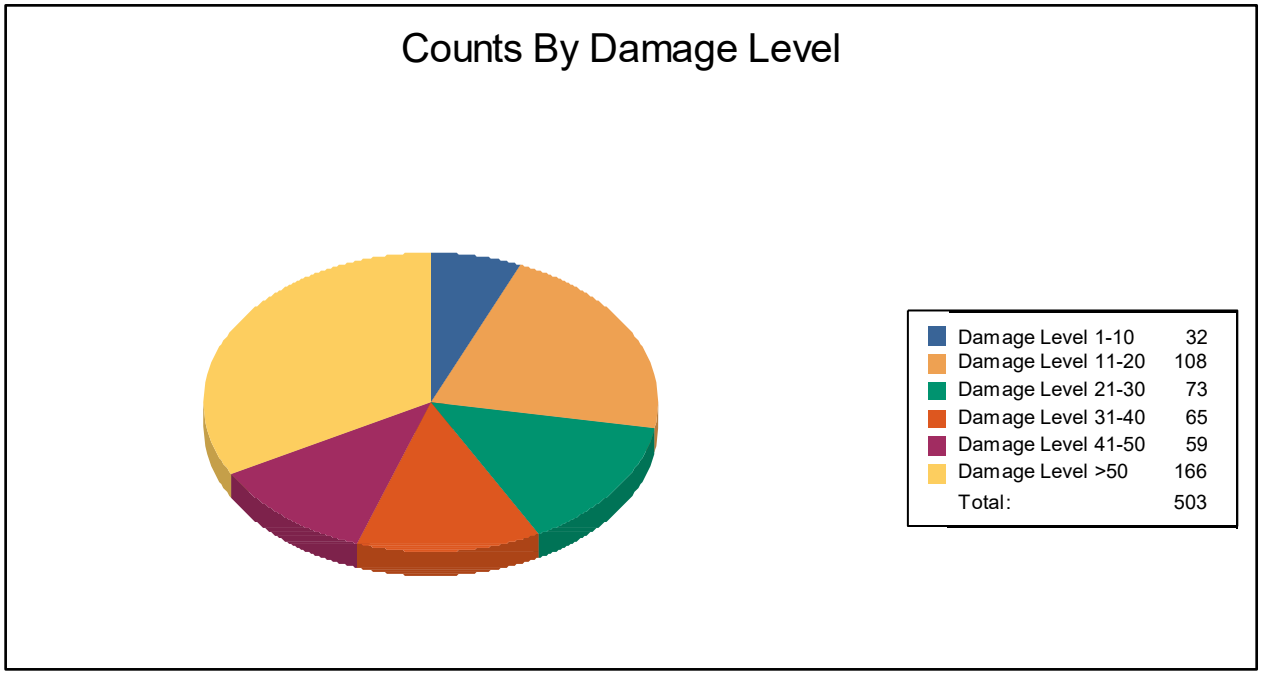


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	1	33	1	33	1	33	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	27	100
Masonry	1	6	7	39	4	22	2	11	2	11	2	11
Steel	0	0	3	60	1	20	1	20	0	0	0	0
Wood	30	7	92	21	70	16	62	14	57	13	137	31

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 1,076 hospital beds available for use. On the day of the scenario flood event, the model estimates that 1,076 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	0	0	0	0
Fire Stations	11	1	0	1
Hospitals	4	0	0	0
Police Stations	3	0	0	0
Schools	59	0	0	0

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

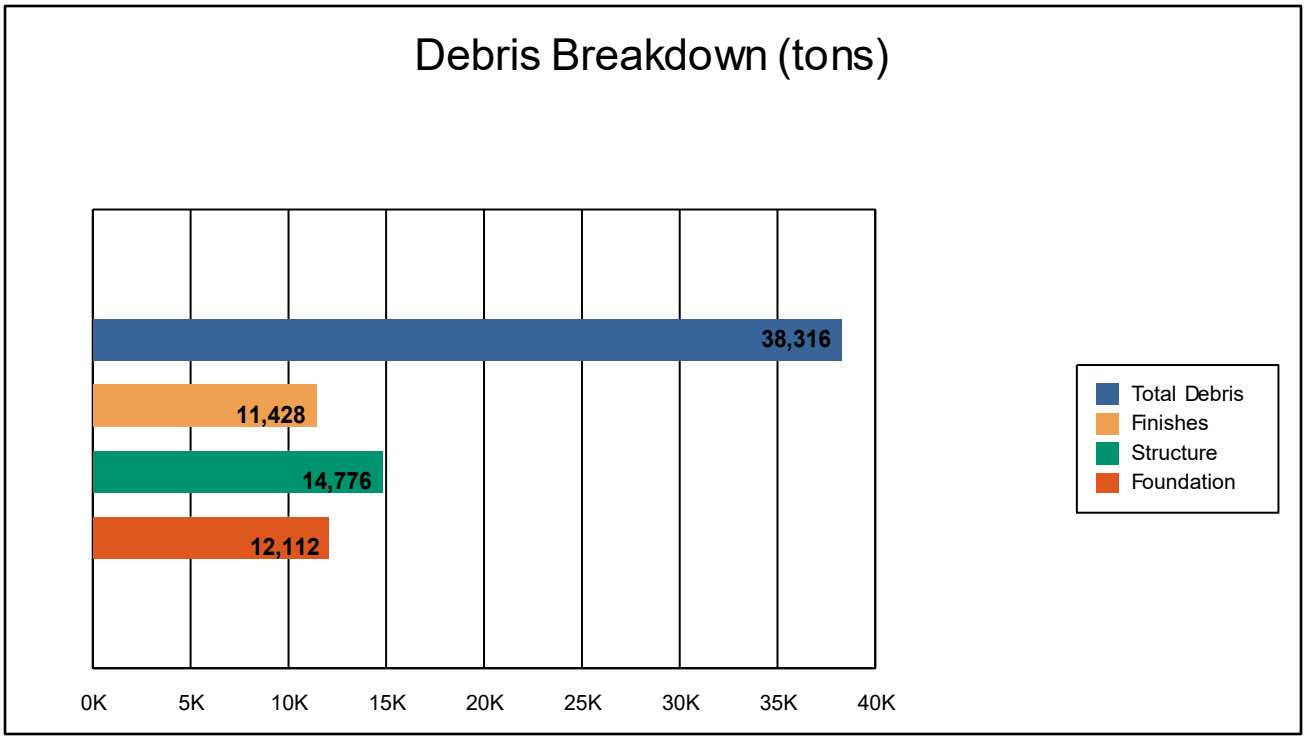
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

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

Induced Flood Damage

Debris Generation

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

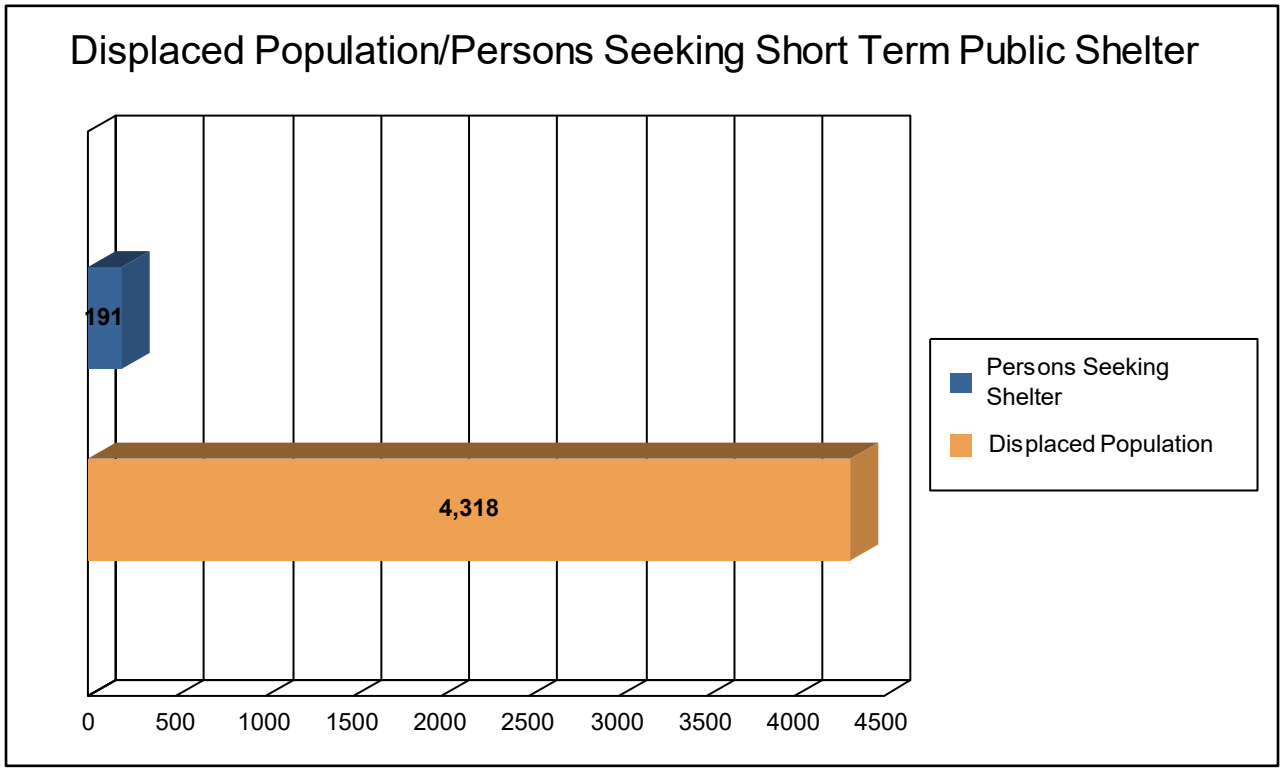


The model estimates that a total of 38,316 tons of debris will be generated. Of the total amount, Finishes comprises 30% of the total, Structure comprises 39% of the total, and Foundation comprises 32%. If the debris tonnage is converted into an estimated number of truckloads, it will require 1533 truckloads (@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 1,439 households (or 4,318 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 191 people (out of a total population of 156,823) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 824.49 million dollars, which represents 22.12 % of the total replacement value of the scenario buildings.

Building-Related Losses

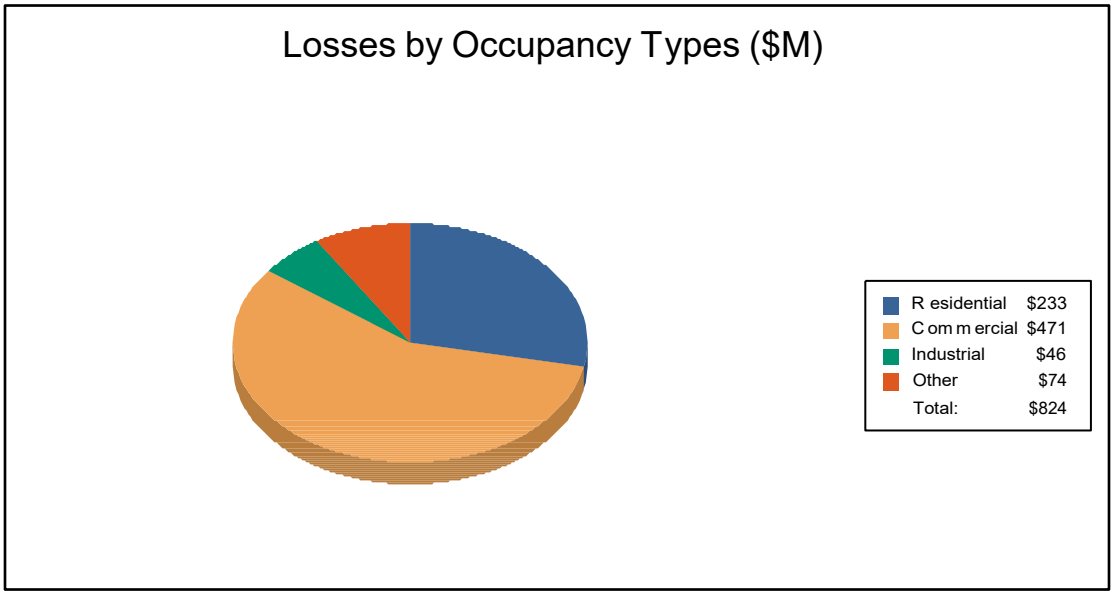
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability 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 474.58 million dollars. 42% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 28.29% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	113.93	59.70	12.78	7.31	193.72
	Content	61.74	156.71	25.72	25.24	269.41
	Inventory	0.00	6.30	4.98	0.17	11.45
	Subtotal	**175.67**	**222.71**	**43.48**	**32.71**	**474.58**
Business Interruption						
	Income	4.22	88.14	0.67	8.46	101.48
	Relocation	27.75	28.00	0.67	3.51	59.93
	Rental Income	15.72	18.75	0.13	0.45	35.05
	Wage	9.90	113.24	1.20	29.10	153.45
	Subtotal	**57.59**	**248.13**	**2.67**	**41.52**	**349.91**
ALL	**Total**	**233.27**	**470.84**	**46.15**	**74.23**	**824.49**



Appendix A: County Listing for the Region

Tennessee

- Sullivan

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Tennessee				
Sullivan	156,823	10,921,132	4,066,975	14,988,107
Total	**156,823**	**10,921,132**	**4,066,975**	**14,988,107**
Total Study Region	**156,823**	**10,921,132**	**4,066,975**	**14,988,107**