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

FEMA

December 29, 2011

Ms. Judy Huff
State Hazard Mitigation Officer
Tennessee Emergency Management Agency
3041 Sidco Drive
Nashville, Tennessee 37204

Reference: Anderson County Multi-jurisdictional Hazard Mitigation Plan Update

Dear Ms. Huff:

We are pleased to inform you that the Anderson County Multi-jurisdictional Hazard Mitigation Plan Update is in compliance with the federal hazard mitigation planning standards resulting from the Disaster Mitigation Act of 2000, as contained in 44 CFR 201.6. The plan is approved for a period of five (5) years, to December 29, 2016.

This plan approval extends to the following participating jurisdictions that provided copies of their resolutions adopting the plan:

- Anderson County
- City of Clinton
- City of Lake City
- City of Norris
- City of Oak Ridge
- Town of Oliver Springs

The approved participating jurisdictions are hereby eligible applicants through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Severe Repetitive Loss (SRL)
- Flood Mitigation Assistance (FMA)

A fifth program, Repetitive Flood Claims (RFC), does not have a requirement for a Local Hazard Mitigation Plan. National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Anderson County plan for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each Community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years.

We also encourage each Community to conduct a plan update process within one (1) year of being included within a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development.

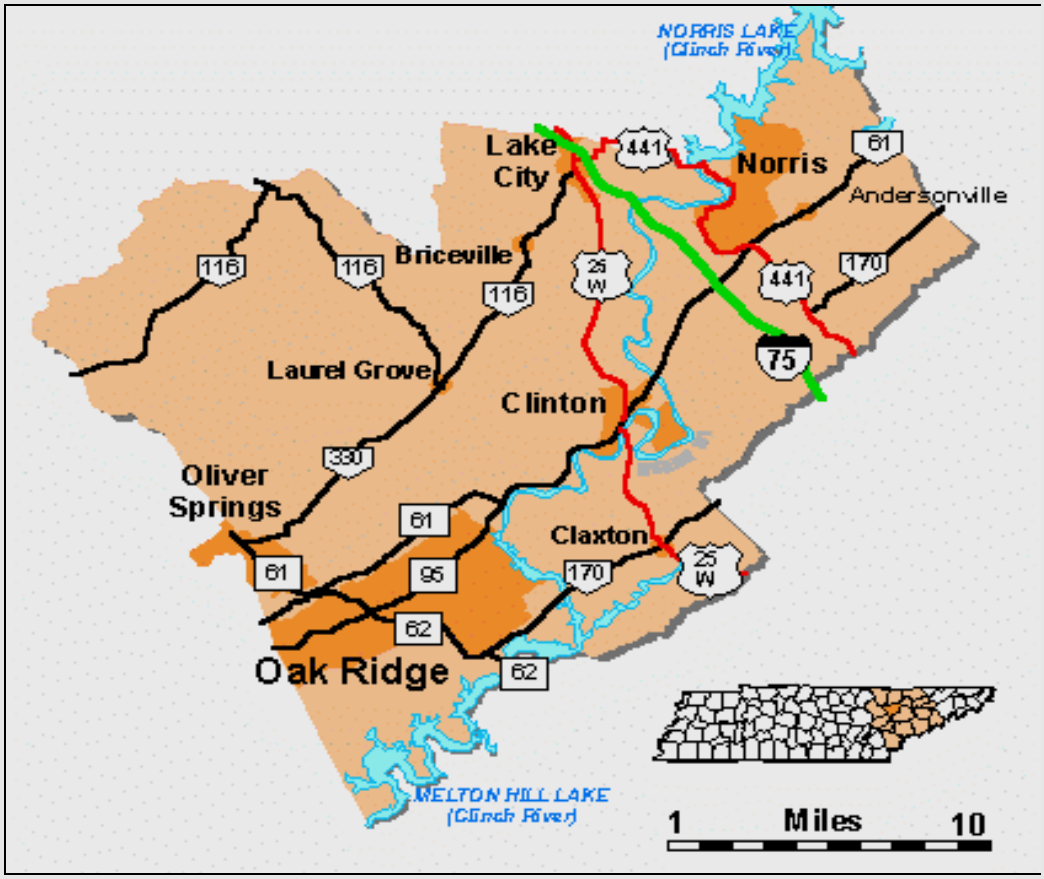
When the plan is amended or revised, it must be resubmitted through the State as a "plan update" and is subject to a formal review and approval process by our office. If the plan is not updated prior to the required five (5) year update, please ensure that the draft update is submitted at least six (6) months prior to expiration of this plan approval.

The State and Anderson County should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Anderson County have any questions or need any additional information, please do not hesitate to contact Cathy Strickland, of the Hazard Mitigation Assistance (HMA) Branch at (770) 220-5328, or Linda L. Byers of my staff at (770)-220-5498.

Sincerely,

Robert E. Lowe, Chief
Risk Analysis Branch
Mitigation Division

MULTI-JURISDICTIONAL ALL HAZARDS MITIGATION PLAN



ANDERSON COUNTY TENNESSEE 2011

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SECTION 1
PLAN INTRODUCTION

1.1 2011 Plan Updates

This Section 1 – Plan Introduction, replaces the 2005 Plan Introduction. This section has been updated and enhanced in the 2011 Plan to include more detailed information. The information added is related to mitigation planning legislative information (DMA2K, etc.), the Flood Management Assistance Program (FMA), the National Flood Insurance Program (NFIP), and related grant information. The grant information includes descriptions of Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) programs that address repetitive loss properties, now required by the Federal Emergency Management Agency (FEMA) to be documented in hazard mitigation plans.

1.2 EMERGENCY MANAGEMENT BACKGROUND

Over the past fifty years, the meaning and scope of emergency management has evolved in response to changes in political, military, and natural environments. Emergency management has grown from a narrow civil defense focus to its present position of providing a wide array of services in response to natural, technological, and human-caused hazards.

Emergency management began after World War II as a response to military attack. The federal government created a nationwide shelter program under the Civil Defense Act, and the first federal assistance to state and local governments was provided under civil defense programs. Response and recovery from natural, technological, and human-caused disasters were expected to be managed within the jurisdictions of state and local governments. These disasters were legally separate from "war-related" emergencies until the late 1970s.

In 1979, the Federal Emergency Management Agency (FEMA) was established to assist in responding to war-caused emergencies, nuclear incidents, and natural, technological, and human-caused disasters. In the 1980s, response and recovery efforts from other than war became eligible for federal funding. This was the first effort to view emergency management as a comprehensive set of services encompassing four phases - mitigation, preparedness, response, and recovery.

Emergency management also experienced a key policy shift. Focus shifted from one of nuclear war preparedness to a more balanced focus on natural, technological, and human-caused hazards and disasters. An "all-hazards" approach was emphasized. Federal assistance became available for preparedness, response, and recovery efforts. In the 1990s, increasing demand on federal funds for disaster recovery assistance prompted changes in federal policy to emphasize mitigation and provide technical assistance to build state and local government capabilities to deal more independently with emergencies and disasters that occur within their jurisdictions.

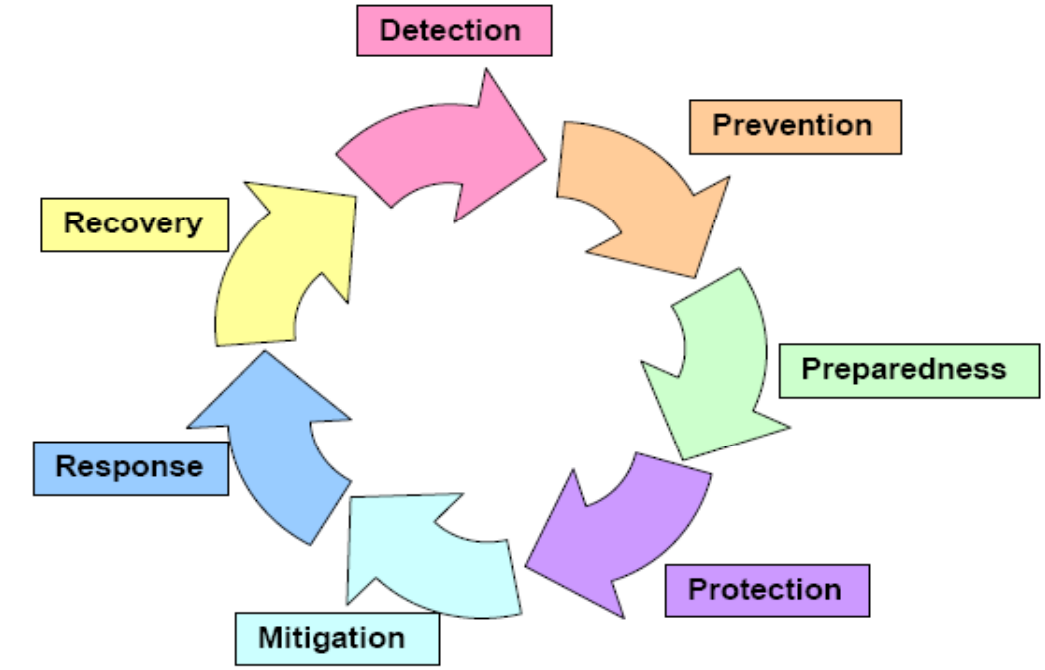
This evolution resulted in a shift from federal initiatives to fostering local and state developed and delivered programs. Within this framework, local emergency management organizations work to implement local, state, and federal emergency management and homeland security policy. By working collaboratively with governmental agencies, private industry, and citizens,

and by providing technical assistance and support, local emergency management organizations are expanding capabilities to contribute a broad spectrum of professional services.

In the 1990s, federal, state, and local governments recognized the increasing threat of terrorism based on domestic and foreign incidents, including the bombing of the New York World Trade Center in 1993, the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma, the bombing of the Khobar Towers in Saudi Arabia in 1996, and the bombing of the U.S.S. Cole in Yemen in 2000. These incidents demonstrated terrorists' willingness to use weapons of mass destruction, and as a result, federal agencies began to examine the causes and effects of these incidents to shape U.S. policy and fund domestic anti-terrorism preparedness activities.

The September 11, 2001 terrorist attacks on the New York World Trade Center and the Pentagon was a defining moment in terrorism and resulted in the restructuring of domestic and foreign policy and the development of nationwide initiatives to detect and prevent terrorist attacks and protect national critical infrastructure. At the federal level, anti-terrorism activities created the Department of Homeland Security and expanded the view of emergency management as a comprehensive set of services encompassing seven phases - detection, prevention, preparedness, protection, mitigation, response, and recovery.

Figure 1.1 Seven Phases of Homeland Security and Emergency Management



Seven Phases of Homeland Security and Emergency Management

Since this implementation of Homeland Security and Emergency Management, several attempts of terrorist attacks on the homeland have occurred. Three attempts on airliners (the shoe bomber, the underwear bomber, and the 2010 cargo package attack) were thwarted. Other serious attempts to bomb or attack military bases, subways, and Times Square were also shut down without loss of life or property. The Fort Hood shooting was the only successful terrorist attack, resulting in 11 seriously wounded or killed military personnel.

1.3 PLAN AUTHORITY

This 2011 Plan update was developed in accordance with federal, state and local rules and regulations governing local hazard mitigation plans. The Plan authority will be routinely monitored and revised to maintain compliance with the below provisions, rules, and legislation:

Table 1.1 Plan Authorities

Authority	Authority Description	Date
Federal	The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968	1968
Federal	Flood Mitigation Assistance Program (FMA) was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101)	1994
Federal	Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390)	10/30/2000
Federal	Pre-Disaster Mitigation (PDM) Program was authorized by section 203 of the 2000 Stafford Act, 42 USC (Public Law 106-390)	10/30/2000
Federal	FEMA's Interim Final Rule published in the Federal Register on February 26, 2002, at 44 CFR Part 201 and 206	02/26/2002
State	Tennessee Code Annotated, Title 58, Chapter 2	Ongoing
State	State of Tennessee Administrative Plan for Hazard Mitigation	2007
County	Anderson County Resolution	01/15/2005

1.4 PLAN SCOPE

This Hazard Mitigation Plan will be updated and maintained by Anderson County Emergency Management and the assigned mitigation committee to continually address hazards determined through detailed risk assessment to be of high and moderate risk. Other hazards that pose a low or negligible risk will continue to be evaluated for future updates to the Plan. The geographic scope for the Plan includes all incorporated and unincorporated areas of Anderson County.

Table 1.2 Participating Jurisdictions, Agencies, and Departments

Participating Jurisdictions	
Anderson County, Tennessee	City of Norris
City of Clinton	City of Oak Ridge
City of Lake City	City of Oliver Springs
Participating Agencies and Departments	
Anderson County Fire Commission	Anderson County Health Department
Clinton Fire Department	Methodist Medical Center
Lake City Fire Department	Anderson County Schools
Norris Fire Department	Clinton City Schools
Oak Ridge Fire Department	Oak Ridge Schools
Oliver Springs Fire Department	Roane State Community College
Anderson County Sheriff's Office	Agriculture Extension Service
Clinton Police Department	Department of Agriculture – Forestry Division
Lake City Police Department	Anderson County Law Director
Norris Police Department	Anderson County LEPC
Oak Ridge Police Department	American Red Cross – Appalachian Chapter
Oliver Springs Police Department	Anderson County Chamber of Commerce

Anderson County GIS	Lake City Chamber of Commerce
Anderson County Tax Assessor	Oak Ridge Chamber of Commerce
Anderson County Planning & Zoning	Anderson County Emergency Management Agency
Clinton Public Works	Campbell County Emergency Management Agency
Lake City Public Works	Knox County Emergency Management Agency
Norris Public Works	Morgan County Emergency Management Agency
Oak Ridge Public Works	Roane County Emergency Management Agency
Oliver Springs Public Works	Union County Emergency Management Agency
Clinton Utilities Board – Electric	Tennessee Emergency Management Agency
Oak Ridge Electric	Food Lion
Clinton Utilities Board – Water	Coal Creek Company
Anderson County Water Authority	Anderson County Economic Development Corp.
Oak Ridge Utility District	Oak Ridge Economic Partnership
Powell-Clinch Utility District	

1.5 PLAN DESCRIPTION

Natural, technological, and human-caused hazards pose a threat to every citizen and community within Anderson County on some level and frequency. Often, the reality of potential hazards to a community are not fully understood or realized until a major disaster occurs. It is then that a community experiences the extreme hardship of significant human and economic loss. The process of hazard mitigation planning is a critical part of any community's planning program. Because most hazards occur infrequently, mitigation programs for hazards are usually initiated as a reaction to recover from the most recent disaster. This form of hazard mitigation response is more costly, both in property and human loss, than is pre-disaster planning and mitigation.

Local Mitigation Plans must be updated and resubmitted to FEMA for approval every five (5) years in order to continue eligibility for FEMA hazard mitigation assistance programs. The mitigation planning regulation at 44 CFR §201.6(d)(3) states:

> *"A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five (5) years in order to continue to be eligible for mitigation project grant funding. Plan updates must demonstrate that progress has been made in the past 5 years for Local Mitigation Plans to fulfill commitments outlined in the previously approved plan. This involves a comprehensive review and update of each section of the Local Mitigation Plan and a discussion of the results of evaluation and monitoring activities detailed in the Plan Maintenance section of the previously approved plan. Plan updates may validate the information in the previously approved plan, or may involve a major plan rewrite."*

Anderson County and its jurisdictions prepared a countywide hazard mitigation plan in 2005 to provide a guide for actions to reduce risk, create a more resilient framework, and speed recovery from disasters. In 2010, Anderson County received a Pre-Disaster Mitigation Grant to update the Anderson County Hazard Mitigation 2005 Plan. This is the resulting 2011 Plan update to the 2005 plan.

The process of all-hazard mitigation planning is the first step toward protecting a community from losses associated with hazards and resulting disasters. With regard to hazard mitigation, the Federal Emergency Management Agency (FEMA) provides the following definitions:

- Hazard mitigation - Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.
- Planning - The act or process of making or carrying out plans, specifically, the establishment of goals, policies, and procedures for a social or economic unit.

This Plan update provides a framework on which to base comprehensive mitigation of hazards for all Anderson County jurisdictions.

1.6 PLAN PURPOSE

This Plan was developed not only to demonstrate a concerted effort toward countywide commitment to reducing or eliminating the impact of natural, technological, and human-caused hazards, but also to support efficient and effective response and recovery in times of critical need. The Plan addresses myriad risks and degrees of vulnerability, mitigation goals, objectives, and strategies.

Whereas federally approved state and local planning efforts (plans) are prerequisite to mitigation grants, the Anderson County Multi-Jurisdictional Hazard Mitigation Plan was developed in order to ensure the county's future eligibility for federal disaster mitigation funds through the Hazard Mitigation Grant Program as provided through the Robert T. Stafford Disaster Relief and Emergency Assistance Act, amended by the Disaster Mitigation Act of 2000. The Plan also ensures access to other federal programs, i.e., Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA). Although county and local communities would remain eligible for certain emergency assistance and Human Services programs, the county is well aware that without an approved hazard mitigation plan, it and all participating jurisdictions would be ineligible for other disaster recovery programs such as Fire Management and Public Assistance.

This Plan is structured through the planning requirements detailed in 44 Code of Federal Regulation (CFR) Part 201. The key purposes of this 2011 Plan update are:

- To involve members of the county, cities, other agencies, and the public to draft and adopt a mitigation action plan that serves as the blueprint for future development and preparedness activities across the county;
- To extend beyond the 2005 Plan identification of possible risks and hazards that may affect Anderson County by a systematic hazard identification and risk assessment process;
- To prioritize loss reduction and emergency preparedness activities for disasters;
- To determine areas within Anderson County that may be vulnerable to various hazards;
- To develop strategies and best practices to avoid and mitigate the impact of hazards.

1.7 HAZARD MITIGATION LEGISLATION

1.7.1 Disaster Mitigation Act of 2000

To support the expanded role of emergency management, Congress passed the Disaster Mitigation Act of 2000, (DMA2K), commonly known as the Stafford Act. Section 322, an amendment to the Act, deals with the development of local hazard mitigation plans. DMA2K, signed into law on October 30, 2000 (Public Law 106-390), amended the Stafford Act to establish a national program for pre-disaster mitigation, streamline the administration of disaster relief, and control federal disaster assistance costs. The Interim Final Rule for planning provisions (44 CFR Part 201) is published in the Federal Register. Local hazard mitigation planning requirements are described in 44 CFR Part 201.6.

Congress envisioned that implementation of these new requirements would result in the following benefits:

- Reduction of loss of life and property, human suffering, economic disruption, and disaster costs.
- Prioritization of hazard mitigation planning at the local level, with an increased emphasis on planning and public involvement, assessing risks, implementing loss reduction measures, and ensuring critical services/facilities survive a disaster.
- Establishment of economic incentives, awareness, and education to state, tribal, and local governments that result in forming community-based partnerships, implementing effective hazard mitigation measures, leveraging additional non-federal resources, and establishing commitments to long-term hazard mitigation efforts.

1.7.2 Regulation 44CFR Part 201

44 CFR Part 201 regulations reflect the need for state, tribal, and local governments to closely coordinate mitigation planning and implementation efforts. State, tribal, and local governments must have a state- and FEMA-approved Local Mitigation Plan in order to receive FEMA hazard mitigation assistance and to apply for and/or receive the following project grants:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims (RFC)
- Severe Repetitive Loss (SRL)
- Community Rating System (CRS)

Each hazard mitigation plan must, at minimum, address or include the following items:

- Plan adoption by all participating jurisdictions
- A description of the planning process including public involvement
- Hazard identification and risk assessment
- Mitigation strategy
- Plan implementation and maintenance procedures

- Any specific state requirements

The mitigation plan requirements in 44 CFR Part 201 emphasize greater interaction between state and local mitigation activities, and highlight the need for improved linkage between state and local mitigation plans. Under 44 CFR §201.4(c)(4), states are required to coordinate mitigation planning with tribal and local jurisdictions, and document the funding and technical assistance they will provide. States should refer to local mitigation plans to improve the level of detail and comprehensiveness of statewide risk assessments and coordinate mitigation goals and objectives with local goals and objectives. Similarly, local governments may refer to the state mitigation plan where information may be useful for local mitigation strategy development.

1.7.3 Hazard Mitigation Grant Program

In 1988, Congress established the Hazard Mitigation Grant Program (HMGP) in Section 404 of the Stafford Act. In 2002, regulations pertaining to the HMGP were changed by 44 CFR Part 206. An Interim Final Rule was issued wherein the final compliance date was set to November 1, 2004 for all governments to have a FEMA-approved mitigation plan. The HMGP assists states and local communities to implement long-term hazard mitigation measures by providing federal funding after a major disaster declaration. Eligible applicants include state and local agencies, tribal organizations, and certain non-profit organizations. Examples of HMGP projects include:

- Property acquisition and relocation projects
- Structural retrofitting to minimize damages from high winds, earthquake, flood, wildfire, or other hazards
- Elevation of flood-prone structures
- Vegetative management programs

1.7.4 Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation (PDM) Program is authorized by section 203 of the 2000 Stafford Act. Funding for the program is provided to assist state, tribal, and local governments in implementing cost-effective hazard mitigation activities that complement a comprehensive mitigation program. Two types of grants are offered under the PDM Program.

Planning Grants - Allocated funds to be used for hazard mitigation plan development.

Competitive Grants - Distributed funds using a competitive application process.

The minimum eligibility requirements for jurisdictions receiving PDM funds include:

- Participation in the National Flood Insurance Program (NFIP)
- Must not be suspended or on probation from the NFIP
- Must have a FEMA-approved hazard mitigation plan

1.7.5 National Flood Insurance Program (NFIP)

The U.S. Congress established the National Flood Insurance Program (NFIP) in 1968. The Act was amended in 1973. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the federal government. If a

community adopts and enforces a floodplain management ordinance to reduce future flood risk to construction in floodplains, the federal government will make flood insurance available as a financial protection against flood losses. This insurance is designed to provide an alternative to disaster assistance and to reduce the costs of repairing buildings and their contents caused by floods. The goal of the NFIP is to:

- Improve basic knowledge about flood hazards;
- Coordinate and plan new developments in the floodplain;
- Better indemnify individuals for flood losses through insurance;
- Reduce future flood damages through floodplain management regulations; and
- Reduce federal expenditures for disaster assistance and flood control.

In 1994, Congress amended the 1968 and the 1973 Act with the National Flood Insurance Reform Act (NFIRA). The 1994 Act included measures, among others, to:

- Increase compliance by mortgage lenders with the mandatory purchase requirement and improved coverage;
- Increase the amount of flood insurance coverage that can be purchased;
- Provide flood insurance coverage for the cost of complying with floodplain management regulations by individual property owners (Increased Cost of Compliance coverage);
- Establish a Flood Mitigation Assistance grant program to assist states and communities to develop mitigation plans and implement measures to reduce future flood damages,
- Codify the NFIP Community Rating System; and
- Require FEMA to assess its flood hazard map inventory at least once every five years.

1.7.5.1 The "100-year/500-year" Standard

In order to assess and manage the flood risk, the U.S. Department of Housing and Urban Development, which initially administered the NFIP before FEMA, established the 1-percent-annual-chance of flooding (also referred to as the 100-year or "Base Flood") to be used as the standard for the NFIP. The 1-percent-annual-chance flood (or 100-year flood) represents a magnitude and frequency that has a statistical probability of being equaled or exceeded in any given year, or, stated alternatively, the 100-year flood has a 26 percent (or 1 in 4) chance of occurring over the life of a 30-year mortgage. The 500-year standard (0.2-percent-annual-chance) was also established.

1.7.5.2 Flood Mitigation Assistance Program (FMA)

The Flood Mitigation Assistance Program (FMA) was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 with the goal of reducing or eliminating claims under the NFIP. FMA funding is provided by the NFIP and provides funding to assist states and communities in implementing measures to:

- Reduce the number of repetitively or substantially damaged structures and the associated claims on the National Flood Insurance Fund;
- Encourage long-term, comprehensive mitigation planning;
- Respond to the needs of communities participating in the NFIP to expand their mitigation activities beyond floodplain development review and permitting; and

- Complement other federal, state and local mitigation programs with similar, long-term mitigation goals.

There are three types of grants available under FMA:

- FMA Planning Grants are available to states and communities to prepare Flood Mitigation Plans.
- FMA Project Grants are available to states and NFIP participating communities to implement measures to reduce flood losses. NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project Grants.
- Technical Assistance Grants Up to 10% of the Project Grant funding is made available to the states for technical assistance. These funds may be used to help administer the program.

In order to be eligible for project funds under the Flood Mitigation Assistance (FMA) program, communities are required to be participating in the NFIP and have a mitigation plan that addresses flood hazards. Although communities are not required to have a multi-hazard mitigation plan for the FMA program, they are encouraged to consider all hazards that could impact the community. A multi-hazard risk assessment may reveal effects of or relationships between different hazards. For example, hurricanes have a combination of flood and wind impacts. Addressing all hazards will allow a community to be eligible for a wider range of federal mitigation assistance programs.

On October 31, 2007, FEMA published amendments to the 44 CFR Part 201 to incorporate mitigation planning requirements for the FMA program. The amendments impacted 44 CFR §201.6, Local Mitigation Plans, as follows:

- Combined the Local Mitigation Plan requirement for all hazard mitigation assistance programs under 44 CFR §201.6 to include the FMA as well as the HMGP, PDM and SRL programs, thus eliminating duplicative mitigation plan regulations;
- Incorporated the requirement for communities with National Flood Insurance Program (NFIP) insured properties that have been repetitively damaged from floods to address such properties in their risk assessment and mitigation strategy; and
- Incorporated the requirement for communities that participate in the NFIP to include a strategy for continued compliance with the NFIP.

1.7.5.3 NFIP Repetitive Flood Claims (RFC) Program

The Repetitive Flood Claims (RFC) grant program provides funding to reduce or eliminate the long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP) that have had one or more claim payments for flood damages. The long-term goal of RFC is to reduce or eliminate claims under the NFIP through mitigation activities that are in the best interest of the National Flood Insurance Fund (NFIF).

Applications will be accepted for any insured property that has one or more claim payments for flood damages and is located within a state or community that can not meet the requirements of the FMA program for either cost share or capacity to manage the activities stipulations. RFC awards will prioritize projects that create the greatest savings to the NFIF based on a Benefit-Cost Analysis (BCA).

1.7.5.4 NFIP Severe Repetitive Loss (SRL) Program

The SRL program was created pursuant to Section 1361A of the National Flood Insurance Act of 1968, as amended by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, with the goal of reducing flood damages to SRL properties. The definition of severe repetitive loss was established in section 1361A of the National Flood Insurance Act, as amended. An SRL property is a residential property that is covered under an NFIP flood insurance policy and:

a. Has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
b. Has at least two separate claims payments (building payments only), with the cumulative amount of the building portion of such claims exceeding the market value of the building.

The long-term goal of the SRL program is to reduce or eliminate NFIP claims. The SRL program will fund mitigation projects which, result in the greatest savings to the National Flood Insurance Fund in the shortest period of time, based on a Benefit-Cost Ratio (BCR) using a FEMA-approved methodology.

Participation in this program is voluntary. The SRL program differs from other FEMA mitigation grant programs in that those property owners who decline offers of mitigation assistance will be subject to increases in their insurance premium rates.

1.7.5.5 Community Rating System (CRS)

The CRS was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the Community Rating System. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

The Community Rating System (CRS) provides a flood insurance premium discount in participating communities that implement floodplain management activities above and beyond the minimum criteria of the NFIP. Policyholders receive 5% to 45% discounts on premiums.

The CRS recognizes 18 creditable activities, organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Communities can develop a CRS plan to improve their CRS rating. The CRS 10-step planning process is consistent with the multi-hazard planning regulations under 44 CFR Part 201. However, the CRS provides additional points for activities that communities take during the planning process that exceed the minimum. An approved multi-hazard mitigation plan under 44 CFR Part 201 that addresses floods could qualify for CRS credit. Communities are not required to participate in CRS in order to receive approval of a local mitigation plan; however, FEMA encourages jurisdictions to integrate the CRS planning steps into their hazard mitigation plan.

Table 1.3 CRS Ratings

Credit points earned, classification awarded, and premium reductions for communities in the NFIP CRS rating system

Credit Points	Class	SFHA	Non-SFHA
4500+	1	45%	5%
4,000 - 4,499	2	40%	5%
3,500 – 3,999	3	35%	5%
3,000 – 3,499	4	30%	5%
2,500 – 2,999	5	25%	5%
2,000 – 2,499	6	20%	5%
1,500 – 1,999	7	15%	5%
1,000 – 1,499	8	10%	5%
500 - 999	9	5%	5%
0 - 499	10	0%	0%

SFHA = Special Flood Hazard Area

Effective May 1, 2008, FEMA instituted a new CRS policy. Flood insurance policies for buildings having the lowest floor one foot or more below the base flood elevation will no longer be eligible for the community's CRS discount. Some clarifications:

- In most cases, the affected structures are non-compliant, i.e., in violation of the NFIP construction criteria. They may have received a variance from the community. If so, the variance applicant was advised that "the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance."
- This new policy only affects elevation-rated buildings. Typically, these are new construction or "post- FIRM" buildings, not older buildings that qualify for the pre-FIRM "subsidized" rates.
- Only buildings in the mapped Special Flood Hazard Area are affected. Buildings in B, C, or X Zones are not rated based on the elevation of their lowest floors.
- It does not affect those V Zone properties that have approved breakaway walls surrounding unfinished enclosures used only for building access, storage, and parking, but that were rated based on the enclosed area's designation as the lowest floor.

1.8 PLAN OUTLINE

Section 1: Introduction provides an introduction and overview of the Plan including the purpose, scope, authorities, and section summaries.

Section 2: Anderson County Profile describes the jurisdiction in terms of geography, history, population, economy, and significant characteristics. This section also provides descriptions of the general makeup of Anderson County and its local jurisdictions, including prevalent geographic, demographic, and economic characteristics.

Section 3: Planning Process describes the process used to develop the 2011 updated Anderson County Multi-Jurisdictional Hazard Mitigation Plan. The description provides a general overview of local hazard mitigation planning and the specific procedures used by Anderson County to prepare this Plan. It includes who was involved as members of the planning team, and documents the outcomes of meetings. It also demonstrates the opportunities for the public and other stakeholders to participate in the Plan development process. This section documents how each section of the 2005 Plan was reviewed, and identifies specifics on how each section of the 2011 Plan was updated.

Section 4: Hazard Risk Assessment - Hazard Identification identifies hazards that have impacted Anderson County and its participating jurisdictions. Specifically, Hazard Identification identifies the hazard threats that have historically occurred in and across the county, as well as hazards that may impact Anderson County communities in the future. Hazard Identification provides background information for these hazards. All hazards, including hazards identified in the state mitigation plan, were considered for relevance.

Section 5: Hazard Risk Assessment - Hazard Profiling focuses on hazards that are of significant concern to Anderson County and its communities. The profiles provide specific historical incident information and identify the potential for a hazard incident to occur in the future. This includes identifying location and spatial extent of the incident and best available data regarding the impact on the county and participating jurisdictions.

Section 6: Risk Assessment - Assessing Hazard Vulnerability consists of Hazard Risk and Vulnerability assessments that build on available historical data from past hazard occurrences and establish hazard loss profiles. A Loss Estimation Methodology is used to evaluate known hazard risks by their relative expected damage long-term cost. The vulnerability assessment also defines hazard risks that may uniquely or exclusively affect individual municipal jurisdictions. Communities must determine the most appropriate mitigation actions to pursue and implement, enabling communities to prioritize and focus their efforts on those hazards of greatest concern and/or those structures or areas facing the greatest risk. This section also includes a Land Use and Development Trend Analysis that identifies and describes future land use based on growth and jurisdiction planning.

Section 7: Mitigation Strategy consists of a capability assessment and a comprehensive mitigation strategy. The capability assessment provides a comprehensive examination of Anderson County's capacity to implement meaningful mitigation strategies and identifies existing opportunities to increase and enhance that capability. Capabilities addressed in this section include planning and regulatory capability, technical capability, and fiscal capability. Information was obtained through the use of detailed survey questionnaires and an inventory and analysis of existing plans, ordinances, and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses, or conflicts in programs or activities that may hinder mitigation efforts, and to identify activities that should be built upon in establishing a successful and sustainable hazard mitigation program.

The comprehensive mitigation strategy is a list of strategic goals, objectives, and mitigation actions. The goals consist of broad goal statements for each local jurisdiction participating in the planning process to strive to achieve. The objectives provide the foundation for identifying and prioritizing mitigation actions. Mitigation actions are specific to each local jurisdiction, and link proposed mitigation strategies to locally assigned implementation mechanisms and target implementation dates. This section makes the Plan both strategic, through the identification of long-term goals, and functional, by identifying short-term and immediate actions that will guide day-to-day decision-making and project implementation.

Section 8: Plan Monitoring, Maintenance, and Updating contains strategies that Anderson County and its participating jurisdictions will use to ensure the Plan's continuous long-term implementation. The maintenance procedures include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

Section 9: Appendices contains acknowledgements, mitigation meetings information and adoption resolutions

Annex 1: Supporting Information Annex includes detailed hazard historic information, and lists of critical, Tier II, and terrorist target facilities, which is considered sensitive information. Reference maps are also included in this section, along with documents supporting the planning and adoption process.

Individual Mitigation Action Plans contain mitigation plans for each municipality that consist of:

- Individual jurisdiction profiles, which describe each municipality's geography and history and provide information on its population, demographics, households, earnings, and employment.
- Individual jurisdiction capability assessments, which provide a comprehensive examination of each municipality's capacity to implement meaningful mitigation

strategies and identify existing opportunities to increase and enhance that capability. Capabilities addressed in this section include planning and regulatory capability, technical capability, and fiscal capability. Information was obtained through the use of detailed survey questionnaires for local officials and an inventory and analysis of existing plans, ordinances, and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses, or conflicts in programs or activities that may hinder mitigation efforts, and to identify those activities that should be built upon in establishing a successful and sustainable community hazard mitigation program.

- Individual jurisdiction comprehensive mitigation plans contain a mitigation strategy for each municipality. The mitigation strategy consists of specific goals, objectives, and action items for each jurisdiction participating in the planning process. The strategy provides the foundation for identifying and prioritizing mitigation actions. Mitigation actions are specific to each local jurisdiction. They link proposed mitigation actions to locally assigned implementation mechanisms, and target implementation dates. This section makes the Plan both strategic, through the identification of long-term goals, and functional, through the identification of short-term and immediate actions that will guide day-to-day decision-making and project implementation within the jurisdiction.

SECTION 2
JURISDICTION PROFILE

2.1 INTRODUCTION

2.2 2011 PLAN UPDATE

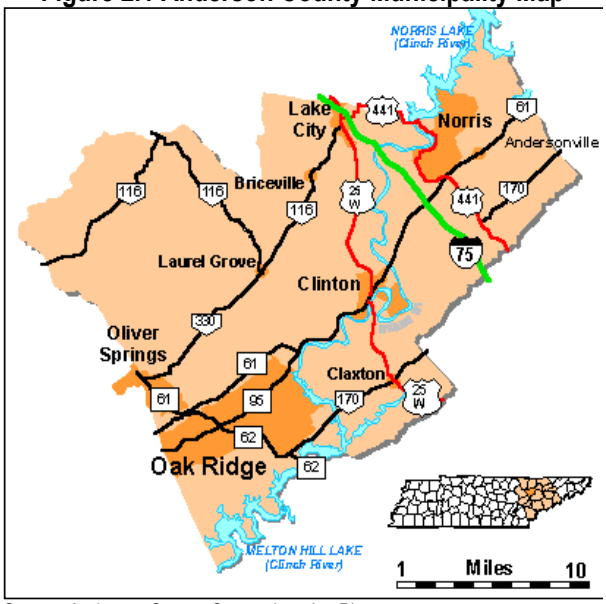
This Section 2 – Jurisdiction Profile, replaces the 2005 Section 2 – Planning Process, which has been moved to Section 3. This 2011 Plan update adds more detailed historic, population, demographic, economic, geologic, and infrastructure information. Individual municipal profiles are now included in the 2011 Individual Mitigation Action Plans, along with jurisdictional capabilities, mitigation strategies, and mitigation actions.

It should be noted that although the 2010 census has been completed, all demographic, housing, and employment data was not available at the time this plan was completed.

2.3 ANDERSON COUNTY PROFILE

In this section, the Anderson County jurisdiction is profiled. Anderson County is comprised of nine unincorporated communities and five municipalities.

Figure 2.1 Anderson County Municipality Map



Source: Anderson County Comprehensive Plan

2.3.1 Anderson County Description

Anderson County is situated in East Tennessee at 36° 01' N Latitude, 84° 14' W Longitude. Almost triangular in shape, it is about 23 miles long and, from tip to tip at the widest point, about 26 miles wide. Bounded on the north by Scott and Campbell Counties, on the east by Union County, on the south by Knox County, and on the west by Morgan and Roane Counties, Anderson County is part of the 16-county Knoxville MSA.

Geographically, Anderson County is divided into two sections. The northwestern or mountainous section constitutes approximately 35% of the county's total land area, presenting steep mountain terrain, three-fourths of which contains slopes greater than 25%. High mountain peaks and narrow, ravine-like valleys are covered with a dense growth of timber. The remainder of the county lies in the East Tennessee Valley and presents more moderate elevations and land suitable for agriculture. Through this valley, the Clinch River passes from the extreme northern to the extreme southern point of the county by a winding route through the center. Waters of the Clinch River within the county cover 32.5 square miles. The county's 345 square miles range in elevation from 557 feet at Rogers Group in Oak Ridge to 3,501 feet at Windrock Mountain.

2.3.2 Anderson County History

Indians first ventured into this land on the northwestern rim of the Great Valley as early as the 1400s. White explorers and long hunters like Daniel Boone first ranged across the wild and rugged Cumberland Mountains and down the untamed Clinch River in the 1760s.

The settlement of this region by white pioneers began in earnest after the signing of treaties with the Cherokee Indians in 1790, followed by Tennessee's admission into the Union as the 16th state in 1795. The settlers migrated from the Eastern seaboard in search of new land and opportunity; they were a diverse mix, the American-born sons of English, Scottish, Welsh, and German immigrants, along with the occasional black slave. They found fertile farmland along the rolling river bottoms, and rich ground for hunting and trapping in the wooded mountains.

Anderson County was originally a part of Knox County, which once extended all the way to the Kentucky border, but by 1801 there were enough people in the region above Copper Ridge and Poplar Creek to warrant the establishment of a new county. Named Anderson for Judge Joseph Anderson, Anderson County was established by an act of the General Assembly on November 6, 1801. A county seat was decreed and built that year, near a popular spring and ford on the north side of the Clinch River, and was named Burrville for Aaron Burr; but in 1809, in the wake of Burr's disgrace, it was renamed Clinton for Thomas Jefferson's vice-president, George Clinton.

The first jail was built of logs, and was completed in 1802. In December 1803, the courthouse, also a log structure, was completed and occupied. It stood a little to the east of the present site, and was occupied until 1821 or 1822 when a stone courthouse was built.

Enterprising merchants established services throughout the county. In the area around what is now Andersonville, John Whitson and Robert McKamey established a store, and Peter Clear operated a tannery. Some three miles northwest, John Gibbs engaged in running a mill and distillery. About six miles to the north of Clinton, James Ross had an extensive mercantile business. Thomas and Joseph Hart had a saw and gristmill on Hinds Creek. John McWhirter ran a ferry across Clinch River near the town of Clinton, and John Sutherland kept another ferry about six miles downstream. John Whitson and John Jarnigan were hotelkeepers. William Hogshead was the first, and for some time the only, lawyer in the county.

About 1840, the Baptists built a church. Previous to that time the courthouse had been used for holding services. About 1851, the Methodist Episcopal Church South erected a house of worship. About 1845, the Baptists, chief among whom was Major John Jarnagin, erected a brick building and established a seminary, which was maintained until the Civil War, when it was destroyed.

The County suffered great turmoil and desolation during the Civil War years. Although slave holding was not unheard of, it was a distinct minority position; when the slavery issue pulled the South and Tennessee into secession and war in 1860, the people of Anderson County found their loyalties bitterly divided.

Change came rapidly in the decades following the War. Agriculture resumed and prospered. More significantly, the mining of coal from the mountains developed into a major industry. Coal and land companies dominated this region, and communities, centered on the mining life, grew up at Coal Creek, Beech Grove, Fraterville, Briceville, and Rosedale. The life was hard, with long hours of toil and regular loss of life in cave-ins and other disasters.

The second largest town in the county was Coal Creek, situated about ten miles north of Clinton, on the Knoxville and Ohio Railroad. Its growth resulted from the mining operations in that vicinity, and grew after the opening of the railroad. The coal industry in Coal Creek and the

north of the county brought growth to Clinton, as well. The railroad from Knoxville to the coalfields reached Clinton in 1869, providing the town uncommonly easy ingress and egress for what had been, still, an isolated area. The legal affairs of the mining operations were conducted in the county seat, and there was general, steady commercial and industrial growth.

A colorful chapter was written in Clinton's history from 1895 to 1936, during the era of pearling on the Clinch River. Freshwater mussels harvested from the river nearby produced superior and much sought after pearl, bringing in wholesale buyers from around the country and giving the town something of a cosmopolitan air. This was also the heyday of the famous resort hotel and mineral springs at Oliver Springs, in the county's northwest corner.

The very face of Anderson County changed in 1934 when the Tennessee Valley Authority, one of the more ambitious New Deal agencies, chose a site near Coal Creek for construction of its first major dam. The dam was named for Nebraska Senator George Norris, a major TVA backer.

When the Norris Dam floodgates were closed in 1936, the region gained a source of cheap electricity for the vast rural areas, which had done without up to that time. But the most important result was the control gained over the mighty Clinch River, which had annually brought havoc-making floods to towns and farmlands downstream. Also in 1936, the town of Coal Creek gained the new name of Lake City, the beautiful town of Norris was established, and Norris Lake, a major fishing and recreation lake, was formed. Ironically, the change in water temperature below the dam resulted in the demise of mussels and the related pearling industry.

Drastic change again came to Anderson County in 1942 with the creation of what is now the city of Oak Ridge, originally built to support a secret wartime project and now the largest community in the county. At the height of World War II, thousands of construction workers, technicians, and top nuclear physicists were shipped to the huge complex, chosen for its isolation and seclusion. Only a few knew the true nature of the project, and all were sworn to secrecy.

Three large plants were built, along with administrative buildings, barracks, houses, churches, stores, and other facilities needed to accommodate the 75,000 people at work at the height of the Manhattan Project. It was not until the dropping of atomic bombs in 1945, which brought an end to the war with Japan, that the inhabitants learned what they had been working on.

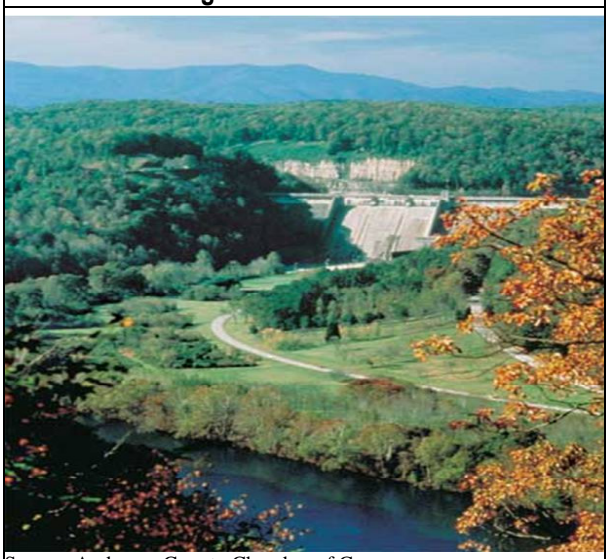
After the War, the Oak Ridge plants remained in operation as research and nuclear production centers. Many of the workers stayed on, started families, and continued the community life they had begun together. In 1955, the federal government sold the residential and commercial sections of the city to private concerns; in 1959 the town was incorporated. Oak Ridge has continued to grow as a research and technology center of international stature.

Anderson County likewise continues to grow and prosper on the firm foundation of Appalachian tradition and 21st century technological foresight. New industry, new business, and new residents find this area to their liking, with its beautiful surroundings and friendly, industrious people. The future of Anderson County looks as varied, interesting, and bright as its past.

2.3.3 Anderson County Significant Characteristics

Begun in 1934, Norris Dam was the first dam built by the Tennessee Valley Authority for flood control and to bring efficient electrical power to East Tennessee. Norris Dam is 265 feet high and stretches 1,860 feet across the Clinch River. Visitors may enjoy the views of the mountains and valleys at the overlooks and trails that surround the dam.

Figure 2.2 Norris Dam



Source: Anderson County Chamber of Commence

Surrounded by the mountains of East Tennessee, Norris Lake extends 56 miles up the Powell River and 72 miles up the Clinch River with 34,000 acres of water surface and 800 miles of shoreline. Visitor amenities include marinas, free launch facilities, restaurants, cabins, motels, houseboat rental, campgrounds, and hiking trails.

Norris Dam State Park occupies more than 4,000 acres on the shores of Norris Lake and surrounds Norris Dam. The park has deluxe and rustic cabins, two camping areas with a combined 75 campsites with tables, grills, modern bathhouses, electric and water hookups, and dump stations. In addition, the park has a full service marina, recreation area with a swimming pool, game room with pool tables, air hockey and other games, tennis courts, a volleyball area, playgrounds, laundry facilities, and primitive campsites which can be reserved for groups. Handicapped cabins and campsites are available. Caves, scenic valleys, sparkling streams, wildflower trails, and a virgin forest with hiking trails are among the natural features of the park. A park naturalist is on duty throughout the summer months to conduct a variety of planned programs and activities including guided tours, slide shows, and nature and history programs.

Located on Norris Lake at Pellissippi Point, Anderson County Park is a haven for families, boaters, fishermen, campers and hikers with its 196 acres of camp sites, swimming area, playgrounds, walking and hiking trails.

Within the county is the Museum of Appalachia, a 65-acre Appalachian history complex. This open-air museum is called "the most authentic and complete replica of pioneer Appalachian life in the world." The museum has been featured in several national publications and contains over 250,000 pioneer artifacts and 30 log structures, including a chapel, schoolhouse, cabins and barns. Each October the museum's three-day Fall Homecoming Festival draws thousands of visitors from all over the world.

The American Museum of Science and Energy provides formal and informal learning experiences for students of all ages. Classroom programs, live demonstrations, and activity stations foster curiosity, discovery, and learning about electricity, magnetism, states of matter, energy, and nuclear and environmental science. Permanent exhibits showcase the history of the Manhattan Project and the evolution of nuclear science.

Wheat Community African Burial Ground, an 1850s slave cemetery believed to be part of the Gallaher-Stone Plantation, has more than 90 unmarked graves. A beautiful monument stands in memory of those held in bondage.

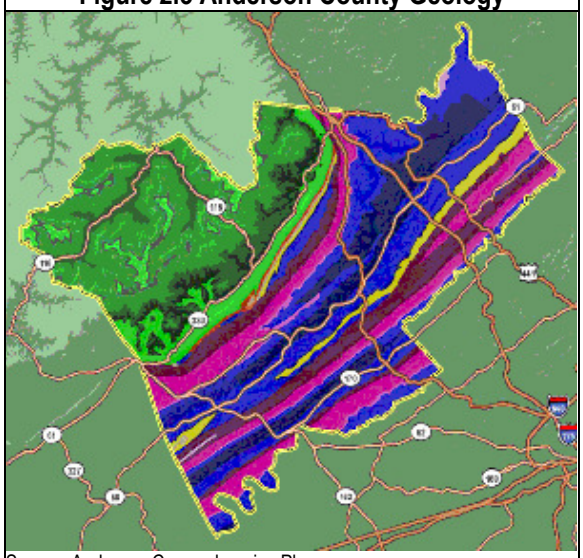
The Green McAdoo Cultural Center, opened in 2006, commemorates twelve black students, who in 1956 were the first to desegregate a state-supported high school in the South. The center's exhibits tell the story of the civil disorder and bombing of the school, highlights Clinton's place in the history of civil rights, and celebrates Clinton High School's honor of having graduated the first black student from a public high school in the South.

2.3.4 Geology

Anderson County's surface is very broken. Walden's Ridge runs through the entire length of the county, parallel with the tableland, which forms the watershed between the Cumberland and Tennessee Rivers. Several creeks flowing northwesterly unite and form the South Fork of the Cumberland River, while Coal Creek and Poplar Creek flow in an opposite direction and empty into the Clinch River, which traverses the central and southern portions of the county.

Partly in the valley of East Tennessee, and partly on the Cumberland Tableland, a major sub-region of the northern half of the Cumberland Plateau, nearly level beds of Pennsylvanian-age sandstone, shale, and minable coal seams make up the stratigraphic units in this area

Figure 2.3 Anderson County Geology



Source: Anderson Comprehensive Plan

The southeastern two-thirds of the county are in the Valley and Ridge Physiographic Province. Highly faulted and folded beds of dolomite, limestone, sandstone, and shale ranging from Cambrian to Mississippian in age underlie this part of the county. The general elevations on the crests of the ridges are 1,100 to 1,200 feet while valley floors average about 900 feet. In minerals, the county is one of the richest in the state. Coal and iron are abundant, and soft lead, zinc, limestone, and marble are found in considerable quantities.

2.3.5 Hydrology and Aquifers

Anderson County is located within the Lower Clinch River Watershed. The watershed originates in the tail waters of Norris Lake in East Tennessee. There are 802 stream miles and 8,167 lake acres, which drain approximately 631 square miles of land and empty into the Watts Bar Lake Watershed. The lower part of the Clinch River, Melton Hill Lake, and the cities of Clinton, Lake City, Norris, Oak Ridge, Oliver Springs, and Kingston (in Roane County) are located in the watershed.

Figure 2.4 Anderson County Clinch River Aquifer

Source: Anderson Comprehensive Plan

2.3.6 Climate

Anderson County enjoys a moderate climate. Average January temperatures range from a low of 27°F to a high of 45°F. Average June temperatures range from a low of 62°F to a high of 85°F. Prevailing southwest winds bring moisture-laden air from the Gulf to provide an annual precipitation of 60 inches, including an average five inches of snowfall.

2.3.7 Population and Demographics

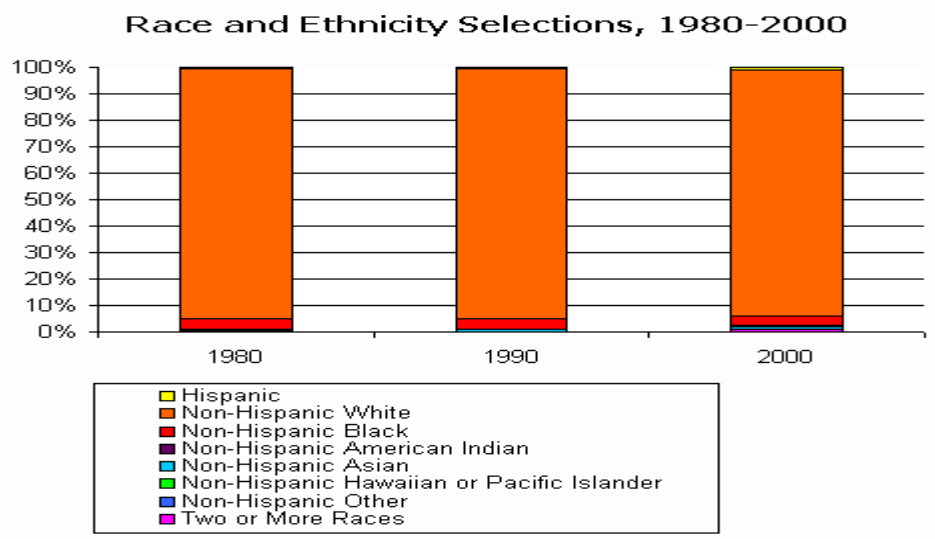
Sixty-eight percent of the county's 345 square miles are rural, unincorporated areas populated by 44% of the county's 75,129 residents; the remaining population resides in the five incorporated municipalities of Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs. A number of small, unincorporated communities also dot the county map. These include Andersonville, Briceville, Fraterville, Claxton, Dutch Valley, Frost Bottom, Marlow, and Medford. The most remote community in the county is New River, an isolated community reached only by a mountainous, winding highway.

Table 2.1 Anderson County Population Growth

	1980	1990	2000	2010.	2015 Est.
Population	67,346	68,250	71,330	75,129	78,885
Change		904	3,080	3,799	1,490
% Change		1.34%	4.51%	5.32%	5%

On the 2000 Census questionnaire, "race" and "Hispanic ethnicity" are listed as separate questions. A person of Hispanic ethnicity is anyone who identifies with that social group, and so can be of any race. Race data is also difficult to compare from Census to Census because categories have changed over time. For example, the 2000 Census was the first to offer the category "Native Hawaiian or Other Pacific Islander," and those people could have responded in a number of different ways in previous years. The 2000 Census also marked the first time that respondents were allowed to select more than one racial category.

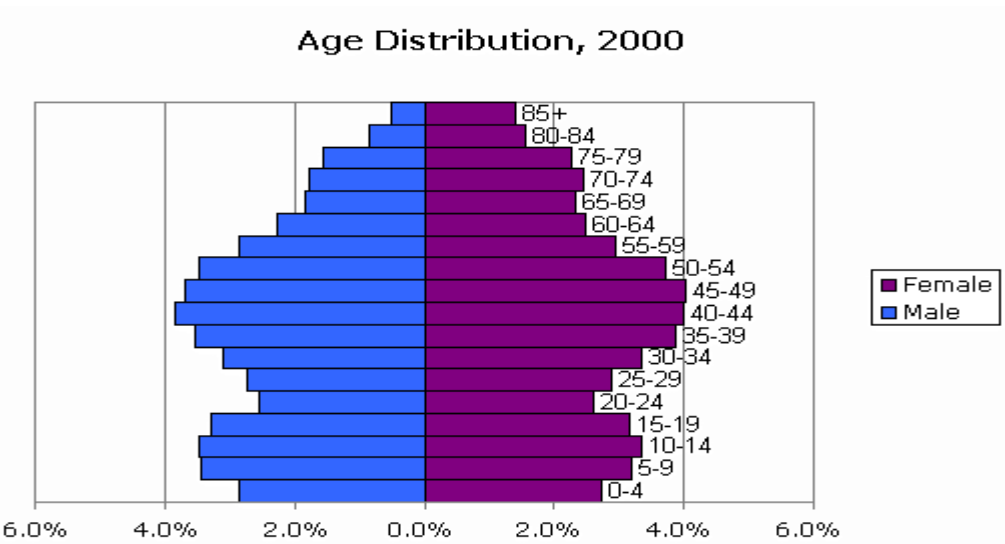
Figure 2.5 Anderson County Multiracial Population – 2000 Census



Source: Census scope

When drawn as a "population pyramid," age distribution can hint at patterns of growth. A top-heavy pyramid suggests negative population growth that might be due to any number of factors, including high death rates, low birth rates, and increased migration from the area. A bottom-heavy pyramid suggests high birthrates, falling or stable death rates, and the potential for rapid population growth. Most areas fall somewhere between these extremes and have a population pyramid that resembles a square, indicating slow and sustained growth with the birth rate exceeding the death rate, though not by a great margin.

Figure 2.6 Anderson County Population Age Distribution, 2000

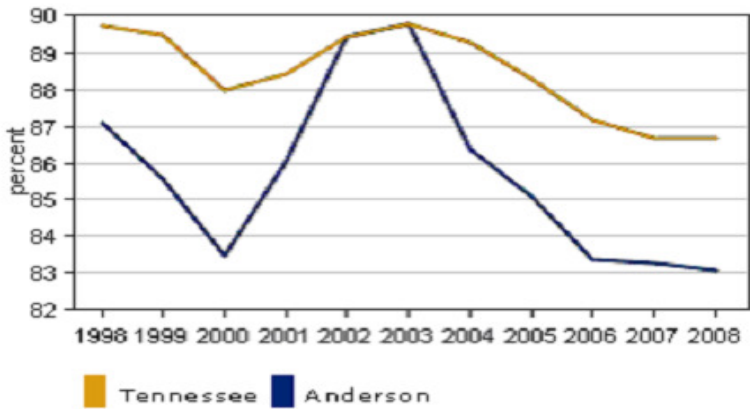


Source: Censes scope

2.3.8 Economy

In 2008, Anderson County had a per capita personal income (PCPI) of $33,367. This PCPI ranked 13th in the state and was 96% of the state average of $34,833, and 83% of the national average of $40,166. The 2008 PCPI reflected an increase of 1.7% from 2007. The 2007-2008 state change was 2.0% and the national change was 2.0%. In 1998, the PCPI of Anderson County was $23,729 and ranked 10th in the state. The 1998-2008 average annual growth rate of PCPI was 3.5%. The average annual growth rate for the state was 3.6% and for the nation was 4.0%. In 2008, Anderson County had a total personal income (TPI) of $2,475,263. This TPI ranked 16th in the state and accounted for 1.1% of the state total. In 1998, the TPI of Anderson County was $1,692,381 and ranked 15th in the state.

Figure 2.7 Anderson County Per Capita Income as a Percent of the U. S.



Source: US Census Bureau

Poverty status is determined by Poverty Thresholds, which take into account a number of factors including income and family size and structure. For example, the 2000 Poverty Threshold for a family of four in the continental United States with two related children was $17,463. However, Poverty Thresholds are misleading because they do not provide an accurate picture of what a "poor" family's life is like. According to the National Center for Children in poverty, most families of four would have to make twice their assigned Poverty Threshold in order to provide their children with basic necessities such as housing, food, and health care.

Table 2.2 Poverty by Age

	1990		2000	
	Number	Percent	Number	Percent
Total Population*	67,535	100.00%	70,426	100.00%
In Poverty	9,664	14.31%	9,255	13.14%
Not in Poverty	57,871	85.69%	61,171	86.86%
11 Years and Under	10,652	15.77%	10,503	14.91%
In Poverty	2,363	3.50%	2,158	3.06%
Not in Poverty	8,289	12.27%	8,345	11.85%
12 to 17 Years	5,454	8.08%	5,804	8.24%
In Poverty	871	1.29%	866	1.23%
Not in Poverty	4,583	6.79%	4,938	7.01%
18 to 64 Years	41,305	61.16%	42,874	60.88%
In Poverty	5,134	7.60%	5,243	7.44%
Not in Poverty	36,171	53.56%	37,631	53.43%
65 Years and Above	10,124	14.99%	11,245	15.97%
In Poverty	1,296	1.92%	988	1.40%
Not in Poverty	8,828	13.07%	10,257	14.56%

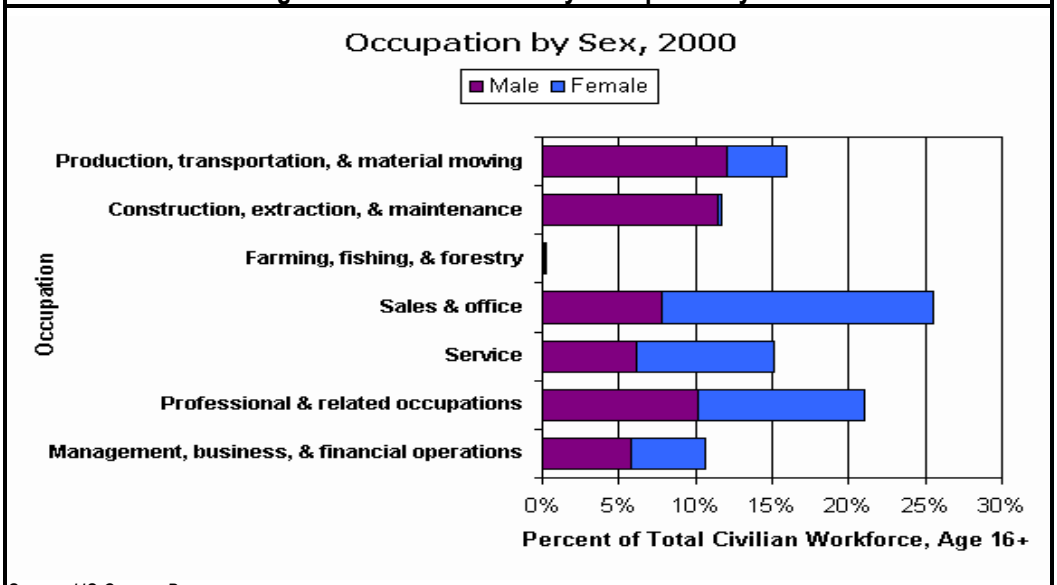
*The total population is the population for which poverty status is determined and does not match the total population

Table 2.3 Anderson County Total employment by NAICS industry 2008	
Employment by place of work	**Number Of Jobs**
Total employment by industry	54,212
Farm employment	505
Non-farm employment	53,707
Private employment	48,204
Forestry, fishing, and related activities	73
Mining	169
Utilities	(D)
Construction	4,138
Manufacturing	9,815
Wholesale trade	1,168
Retail trade	5,175
Transportation and warehousing	(D)
Information	288
Finance and insurance	1,833
Real estate and rental and leasing	1,888
Professional, scientific, and technical services	6,576
Management of companies and enterprises	58
Administrative and waste services	3,629
Educational services	371
Health care and social assistance	4,905
Arts, entertainment, and recreation	676
Accommodation and food services	3,425
Other services, except public administration	2,907
Government and government enterprises	5,503
Federal, civilian	1,027
Military	258
State and local	4,218
State government	602
Local government	3,616

Table 2.4 Anderson County Top Ten Employers	
Company	**Employees**
B&W Y-12	4,500
UT-Battelle/ORNL	4,200
Methodist Medical Center	1,350
Bechtel Jacobs Company	1,337
SAIC	1,100
Anderson County Schools	1,018
Wackenhut – Oak Ridge	902
Eagle Bend Manufacturing	624
Carlisle Tire & Wheel	600
Oak Ridge Associated Universities	600

The American workforce evolved over the past fifty years as more and more women have sought jobs outside the home, and work has changed as the service sector has grown and employment in manufacturing has declined.

Figure 2.8 Anderson County Occupation by Sex



Source: US Census Bureau

Anderson County is a prime location for retail and commercial business as it is focused on sustainable growth and development. Home to the Department of Energy's Oak Ridge Operations (along with its many spin-off operations) and just a short drive from Knoxville, one of the New South's premier cities, Anderson County provides a location with a diverse economy, excellent schools, a variety of recreational mountain and lake activities, and a mild climate with beautiful seasons. With a business friendly attitude, Anderson County offers:

- A low private and business tax burden
- Short-term tax incentives for new industry
- Excellent economic vitality
- A growing population
- Environmentally positive policies
- A dynamic tourist economy
- A commitment to developing and upgrading infrastructure
- Excellent county and city services
- Outstanding quality of life

Anderson County is within a day's drive of 70% of the U.S. marketplace. Nine state and two U.S. highways serve Anderson County. I-75 runs through the eastern portion of Anderson County, and I-81 is within 55 miles of industrial parks in this area. I-40 runs within 8 miles of the western portion of Anderson County. Pellissippi Parkway connects Anderson County with Interstates 40, and 75, and provides four-lane travel to Knoxville's McGhee-Tyson airport with 7 airlines and 120 flights daily. Both Norfolk Southern and CSX rail lines service Anderson County industrial parks.

The Clinch River and Melton Hill Lake flow through Anderson County. The Clinch River provides access to the Inland Waterway, linking Anderson County with 21 states, the Mississippi River, and the Great Lakes. Barge terminals are located within minutes of the county. Over 100 motor carriers serve Anderson County and the Knoxville region.

The Anderson County Economic Development Corporation (ACEDC), a private, non-profit corporation chartered in 1997 as a 501(c)3, serves Anderson County. Anderson County created ACEDC to enhance job creation and capital investment growth. ACEDC works closely with the Melton Hill Regional Industrial Development Association to create opportunities for new and existing companies in Anderson County. ACEDC is responsible to identify potential sites and acquire the land that will be transformed into county industrial parks. ACEDC works in partnership with other agencies to provide the necessary infrastructure for its properties, determines the actual negotiated sales price, and represents Anderson County in the sales transactions of the property.

An emerging economic aspect, the discovery of natural gas and oil in Anderson County, is driving a well-drilling boom on the northern Cumberland Plateau and in Anderson County's mountains. Most of these wells are for natural gas, and drilling is spiking in Anderson, Morgan and Scott counties. Pockets of natural gas and oil are trapped in fractured layers of Mississippian limestone that are about 2,000 to 2,500 feet deep on the plateau. Some 300 wells are now located in the Anderson County portion of Windrock Mountain on land leased from the Coal Creek Company. Natural gas annual production is in excess of 2.5 billion cubic feet; annual oil production will exceed 75,000 barrels.

Based on the current statewide permitting rate, drilling companies will be investing between $100 million and $180 million this year in their search for natural gas and, to a lesser extent, oil. The economic ripple effects include local contractors who work for the drillers, well service firms that run steel casings down the wells, and timber crews that cut trees for roads and pipelines. Landowners who lease out their property receive a 12.5 percent royalty on any oil or natural gas extracted from their land. Ariana Energy is now producing about two million cubic feet of natural gas a day. The company has 50 wells in Anderson County.

Coal Creek Company also leases Windrock Mountain holdings to two timber contractors with an annual output of six million board feet. Two strip mines and one underground mine on Windrock have an annual production in excess of 200,000 tons of coal.

Coal Creek Company also operates the Coal Creek Recreation Area, a 72,000-acre off-road vehicle area with 250 miles of trails, attracting some 170,000 visitors each year. In addition to the land-use permit fee for each person, riders contribute to the income of local campgrounds, hotels, gas stations, groceries, and restaurants.

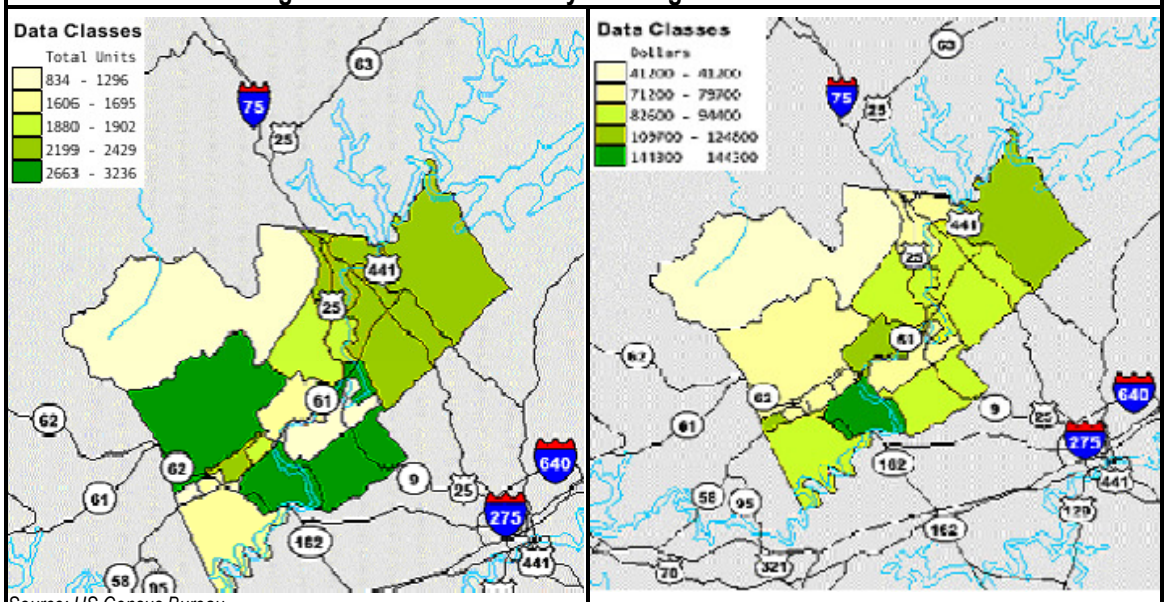
2.3.9 Housing

Housing Characteristics: In 2009, Anderson County had a total of 34,000 housing units, 10 percent of which were vacant. Of the total housing units, 73 percent was in single-unit structures, 15 percent was in multi-unit structures, and 12 percent was mobile homes. Twenty-one percent of the housing units were built since 1990.

Occupied Housing Unit Characteristics: In 2005-2009, Anderson County had 31,000 occupied housing units with 22,000 (72 percent) owner-occupied and 8,800 (28 percent) renter-occupied.

Housing Costs: the median monthly housing cost was $1,043 for mortgaged owners, $321 for non-mortgaged owners, and $593 for renters. Twenty-seven percent of owners with mortgages, 13 percent of owners without mortgages, and 43 percent of renters in Anderson County spent 30 percent or more of household income on housing.

Figure 2.9 Anderson County Housing Units/Median Value



Source: US Census Bureau

2.3.10 Infrastructure

Anderson County is governed by a Mayor and Board of Commissioners comprised of 16 Commissioners chosen by non-partisan election, with two commissioners representing each of the county's eight voting districts. Each municipality is governed by a city council. Mayors are elected by popular vote in Clinton, Lake City, and Oliver Springs. Norris and Oak Ridge Mayors, elected by popular vote to serve on City Council, are elected within that body to serve as Mayor. Clinton, Norris, Oak Ridge, and Oliver Springs employ City Managers.

Each jurisdiction provides law enforcement and a public works department. Three separate E-911 Dispatch centers are operated by law enforcement in Anderson County, Clinton, and Oak Ridge. Lake City, Norris, and Oliver Springs Police Departments dispatch jurisdictional fire and police, but do not receive 911 calls.

Fire departments in Clinton (2 stations) and Oak Ridge (4 stations) are staffed by full time paid personnel. Lake City and Oliver Springs (2 stations) provide combination fire departments with a paid chief and volunteers paid-on-call. Norris employs a public safety fire department with a paid chief, all law enforcement personnel cross-trained as firefighters, and volunteers. Fire protection for the unincorporated areas of the county is provided by five all-volunteer departments – Andersonville (2 stations), Briceville, Claxton (2 stations), Marlow (2 stations), and Medford. In 2011, a new fire station is planned for Clinton to serve the recently annexed I-75 Exit 122 area. An all-volunteer rescue squad stationed in Clinton serves the rural areas and provides mutual aid to municipalities, as requested.

Operating from six stations strategically located throughout the county, Anderson County EMS provides ambulance service to the entire county. University of Tennessee's LifeStar air ambulance service maintains a base near the I-75 Exit 122 EMS facility.

Except for Lake City, each jurisdiction has a water treatment facility. Wastewater systems exist within the municipalities. In 2009, North Anderson County and Anderson County Utility Districts merged to form the Anderson County Water Authority, which serves the northeast and central portions of the county. Northwestern residents receive water from the Oliver Springs Water Board, and a small portion of the eastern area receives water from Hallsdale-Powell Utility District.

Oak Ridge Electric provides service to residents of that jurisdiction. The remainder of the county receives electricity from Clinton Utilities Board.

Oak Ridge Utility District provides natural gas to the residents of that city. The remainder of the county is served by Powell-Clinch Utility District.

The federal government has a significant presence in the county. In addition to operation of Norris Dam, which generates affordable electricity and is capable of 1,113,000 acre-feet of water storage, TVA provides regulatory control of land use and construction along shorelines of the Clinch River and its tributaries, and has undertaken stream-flooding mitigation. In 1967, TVA began operation of Bull Run Fossil Plant, generating electricity from coal-fired steam.

The 55 square mile Department of Energy (DOE) Oak Ridge Reservation contains the B&W Y-12 National Nuclear Security Administration (NNSA) Complex, Oak Ridge National Laboratory (X-10), and East Tennessee Technology Park (K-25) facilities. Managed by civilian contractors, each of these DOE facilities processes, stores, or transports nuclear materials in some form. Construction of the $1.4 billion Spallation Neutron Source was completed in April 2006. Oak Ridge National Laboratory completed a yearlong $300 million revitalization of the High Flux Isotope Reactor in 2007. Private contractors continue cleanup activities at DOE facilities.

Anderson County supports three state-funded public school systems. Anderson County Schools has 6,682 students in nine elementary, four middle, and two high schools. Clinton City Schools with 892 students provides three elementary schools. Oak Ridge Schools has 4,732 students in five elementary, two middle, and one high school. Four private schools have a combined total of 354 students enrolled. Roane State Community College offers a two-year associate degree program and is attended by 6,265 students.

Table 2.5 Infrastructure Summary

PK – 5		K - 8		Middle		High	
Number	Enrollment	Number	Enrollment	Number	Enrollment	Number	Enrollment
17	5596	0	0	6	3002	3	3708
Private Schools		**College/University**		**Technical**		**Child Care**	
Number	Enrollment	Number	Enrollment	Number	Enrollment	Number	Enrollment
4	354	1	6265	0	0	25	1550
Hospitals		**Clinics**		**Nursing and Assisted Living Facilities**		**Medical Practitioners**	
Number	Beds	Number				Doctors	Dentists
1	301	20+		9		362	46

ANDERSON COUNTY TRANSPORTATION					
General Aviation		Commercial Aviation		Highways	
Location	Oliver Springs	Location	Knoxville	Interstate	I-75

Runway Length	2800'	**Distance**	32 miles	**U.S.**	25W, 441
Runway surface	Grass	**Daily flights**	120	**State**	9, 58, 61, 62, 71, 95, 116, 170, 330
Communications	None	**Airlines**	7	**Local**	
Lighting	None	**Repairs**	Major		
Fuel	None	**Railroad**		**Common Carriers**	
Bus Service		CSX		100+	
None		Norfolk Southern			

ANDERSON COUNTY COMMUNICATIONS AND UTILITIES			
Telephone	**Newspaper**	**Radio**	**TV/Cable/Satellite**
AT&T	Clinton Courier News	WYSH 1380 AM	WATE CH 6 ABC
Sprint	The Oak Ridger	WATO 1290 AM	WVLT CH 8 CBS
		WDVX 89.9 FM	WBIR CH 10 NBC
		WOKI 100.3 FM	BBB TV CH 12
		WIVK 107.7 FM	Comcast Cable
Electricity	**Natural Gas**	**Water**	**Sewage/Landfill**
Clinton Utility	Powell-Clinch Utility	Anderson County Water Authority	Chestnut Ridge Landfill
Oak Ridge Electric	Oak Ridge Utility	Clinton Utility	Clinton Utility
TVA		Norris Utility	Lake City Utility
		Oak Ridge Utility	Norris Utility
		Oliver Springs Utility	Oak Ridge Utility
		Hallsdale-Powell Utility	Oliver Springs Utility

SECTION 3
THE MITIGATION PLANNING PROCESS

3.1 INTRODUCTION

This section of the Plan describes the mitigation planning process undertaken by Anderson County to prepare this 2011 Mitigation Plan update.

3.2 2011 PLAN UPDATE

This Section 3, The Mitigation Planning Process, replaces the 2005 mitigation Plan Section 3, Jurisdiction Profiles. The Planning Process has been significantly enhanced in this 2011 Plan update to meet the 2008 FEMA guidance and crosswalk requirements. Enhancements include additional information in multi-jurisdictional participation, the planning process overview, updates to the mitigation planning team, and adoption actions. The number of meetings was increased, improving committee, stakeholder, and public participation. The number of plans reviewed and incorporated was also increased. Added in this section is significant detail regarding natural, technological, and human-caused hazard identification and planning. The final sub-section is a synopsis of the Planning Committee's review of the 2005 plan and the revisions included in this 2011 update.

Requirement §201.6(c)(5): The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commission, Tribal Council).
A. Has the local governing body adopted new or updated plan?
B. Is supporting documentation, such as a resolution, included?
Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.
A. Does the new or updated plan indicate the specific jurisdictions represented in the plan?
B. For each jurisdiction, has the local governing body adopted the new or updated plan?
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?

CRS Step 9: Adopt the Plan: Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. The adoption must be either a resolution or ordinance. When a multi-jurisdictional plan is prepared, it must be adopted by the governing body of each community seeking CRS credit.

3.3 PLANNING PROCESS OVERVIEW

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. Mitigation planning offers many benefits, including:

- Saving lives and property;
- Saving money;
- Facilitating recovery following disasters;
- Reducing future vulnerability through wise development and post-disaster recovery;
- Expediting the receipt of pre- and post-disaster grant funding; and
- Demonstrating a commitment to improve community health and safety.

Mitigation planning has the potential to produce long-term and recurring benefits by breaking the repetitive cycle of a disaster loss. A core assumption is that pre-disaster investments will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, recovery, repair, and reconstruction. Mitigation practices will enable residents, businesses, and industries to more quickly recover in the wake of a disaster to ensure the community economy is re-established efficiently and with less interruption.

The benefits of mitigation planning go beyond reducing hazard vulnerability. Measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals such as preserving open space, maintaining environmental health, and enhancing recreational opportunities. It is vitally important that the local mitigation planning process be integrated with other local planning efforts, and any proposed mitigation strategies be congruent with other existing community goals or initiatives.

3.4 PLAN ADOPTION BY LOCAL GOVERNING BODIES

Plan adoption legitimizes the Plan and authorizes responsible agencies to execute their responsibilities. In order for the multi-jurisdictional plan to be approved, each jurisdiction included in the Plan must have its governing body adopt the Plan. Adoption of the plan:

- Lends authority to the Plan to serve as a guiding document for all local and state government officials.
- Gives legal status to the Plan in the event it is challenged in court.
- Certifies that the Plan has been properly approved by the governing authority and considered by the jurisdiction's citizens.
- Helps to ensure the continuity of mitigation programs and policies over time as elected officials, staff, and other decision makers can refer to the Plan when making decisions about the community's future.

Each participating jurisdiction will proceed with formal adoption proceedings after TEMA and FEMA provide conditional approval of this Plan. Each participating jurisdiction will submit a copy of the adoption resolution to TEMA and FEMA and understands that FEMA will transmit acknowledgement of verification of formal Plan adoption and the official approval of the Plan to the mitigation plan coordinator. The table below documents that this 2011 Hazard Mitigation Plan has been adopted by the jurisdictions in accordance with the authority and powers granted to county, cities, and towns as defined by the State of Tennessee. The original resolutions supporting the adoption of the Plan are included in the Appendices as scanned documents.

Table 3.1 Mitigation Plan Adoption Summary

Jurisdiction	Resolution Number	Adoption Date
Anderson County	11-412	8/15/11
City of Clinton	686	8/29/11
City of Lake City	483	8/18/11
City of Norris	8-2011	8/22/11
City of Oak Ridge	10-92-11	10/10/11
City of Oliver Springs	11-09-01A	9/1/11

3.5 MULTI-JURISDICTIONAL PLANNING PARTICIPATION

Each of the jurisdictions, agencies, and departments was required to perform the following tasks to satisfy multi-jurisdictional participation requirements:

- Designate appropriate officials to serve on the Mitigation Planning Committee;
- Participate in all mitigation planning meetings and workshops;
- Provide best available data for the risk assessment portion of the Plan;
- Complete the Capability Assessment Survey and provide copies of any mitigation or hazard-related documents for review and incorporation into the Plan;
- Support the development of a countywide mitigation strategy, including the design and adoption of general goal statements for all jurisdictions to pursue, and develop a Mitigation Action Plan with specific mitigation actions for its jurisdiction;
- Review and provide timely comments on all draft components of the Plan;
- Adopt the Anderson County Multi-Jurisdictional Hazard Mitigation Plan 2011 Update.

Multi-hazard Requirement §201.6(a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process. Statewide plans will not be accepted as multi-jurisdictional plans.
A. Does the new or updated plan describe how each jurisdiction participated in the plan's development?
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?

CRS Step 1: Organize to Prepare the Plan: Multi-jurisdictional plans are encouraged in CRS. Credit is based on each jurisdiction's full participation in the planning process.

Through the completion of these tasks Plan participants will have fully participated in the development of this Plan. All jurisdictions that participated in the 2005 Plan development participated in the 2011 Plan update.

Table 3.2 Participating Jurisdictions, Agencies, and Departments

Participating Jurisdictions Agencies/Departments	
Anderson County, Tennessee	City of Norris
City of Clinton	City of Oak Ridge
City of Lake City	City of Oliver Springs
Anderson County Fire Commission	Oak Ridge Utility District
Clinton Fire Department	Powell-Clinch Utility District
Lake City Fire Department	Anderson County Health Department
Norris Fire Department	Methodist Medical Center
Oak Ridge Fire Department	Anderson County Schools
Oliver Springs Fire Department	Clinton City Schools
Anderson County Rescue Squad	Oak Ridge Schools
Anderson County Sheriff's Office	Roane State Community College
Clinton Police Department	Agriculture Extension Service
Lake City Police Department	Department of Agriculture – Forestry Division
Norris Police Department	Anderson County Law Director
Oak Ridge Police Department	Anderson County LEPC
Oliver Springs Police Department	American Red Cross – Appalachian Chapter
Anderson County GIS	Anderson County Chamber of Commerce
Anderson County Property Assessor	Lake City Chamber of Commerce

Table 3.2 Participating Jurisdictions, Agencies, and Departments	
Participating Jurisdictions Agencies/Departments	
Anderson County Building Commissioner	Oak Ridge Chamber of Commerce
Anderson County Planning & Zoning	Anderson County Emergency Management Agency
Anderson County Highway Department	Campbell County Emergency Management Agency
Clinton Public Works	Knox County Emergency Management Agency
Lake City Public Works	Morgan County Emergency Management Agency
Norris Public Works	Roane County Emergency Management Agency
Oak Ridge Public Works	Union County Emergency Management Agency
Oliver Springs Public Works	Tennessee Emergency Management Agency
Clinton Utilities Board – Electric	Food Lion
Oak Ridge Electric	Coal Creek Company
Clinton Utilities Board – Water	Anderson County Economic Development Corp.
Anderson County Water Authority	Oak Ridge Economic Partnership

3.6 MITIGATION PLANNING PROCESS

In preparing this 2011 update to the 2005 Plan, Anderson County utilized a multi-jurisdictional planning process consistent with FEMA's Publication Series 386. These standards are based upon FEMA's Interim Final Rule as published in the Federal Register on February 26, 2002, in Part 201 of the Code of Federal Regulations. An associated Local Mitigation Plan Crosswalk provides a summary of FEMA's current minimum standards of acceptability for compliance with the Disaster Mitigation Act and notes the location where each requirement is met within this 2011 update.

Guidance was also used from the National Flood Insurance Program. Participation in the NFIP is based on an agreement between communities and the federal government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to facilities in floodplains, the federal government will make flood insurance available as a financial protection against flood losses.

Multi-hazard Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
Multi-hazard Requirement §201.6(c)(1): The plan shall document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved?
A. Does the plan provide a narrative description of the process followed to prepare the new or updated plan?

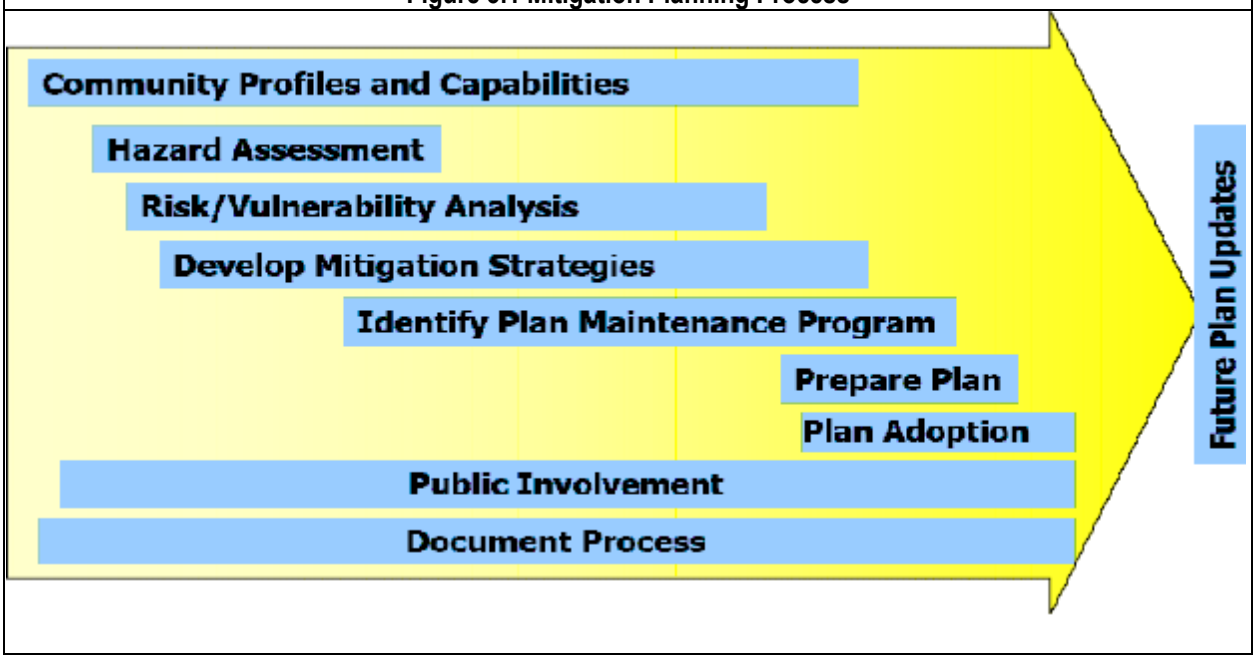
Step 1: Organize to Prepare the Plan, Step 2: Involve the Public and Step 3: Coordinate with other Agencies: Credit is based on how the community organizes to prepare its floodplain management plan. Describe who is involved in the planning process and what their role is in the development of the plan. The planning process must include an opportunity for the public, neighboring communities and local and regional agencies to comment on the plan during the drafting stage and before plan approval. The term public means residents, businesses, property owners, and tenants in the floodplain and other known hazards areas as well as other stakeholders in the community, such as business leaders, civic groups, academia, non-profit organizations and major employers. The plan must also incorporate and document a review of existing studies, reports, and technical information into the community's needs, goals and plans for the area.

The Mitigation Planning Committee also used guidance from the Flood Mitigation Assistance Program (FMA), created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101), with the goal of reducing or eliminating claims under the NFIP.

Anderson County also applied the Community Rating System (CRS) 10-step planning process to hazard mitigation plan development. CRS is consistent with the multi-hazard planning regulations; therefore FEMA encourages jurisdictions to integrate the CRS planning steps into their multi-hazard mitigation plans. This means that an approved multi-hazard mitigation plan that addresses floods will automatically qualify for the minimum CRS credit. Using the multi-hazard mitigation planning regulations, Anderson County performed the additional steps as outlined in the CRS criteria within each phase of work on Planning Process, Risk Assessment, Mitigation Strategy, and Plan Maintenance. This qualifies Anderson County and its participating jurisdictions to qualify for more CRS points, thus possibly lowering insurance rates.

The planning process for this 2011 update to the 2005 Plan includes major steps that were completed during the development of the Plan. These steps are illustrated in Figure 3.1 below.

Figure 3.1 Mitigation Planning Process



3.7 THE MITIGATION COMMITTEE

A community-based mitigation committee developed this Plan update in cooperation with the Tennessee Emergency Management Agency (TEMA) and consulting company EM-Associates.

The Mitigation Planning Committee, consisting of representatives from Anderson County, its participating jurisdictions, and supporting agencies and departments, assembled to oversee the development of the Plan. The committee engaged government officials and other stakeholders in

Multi-hazard Requirement §201.6(b): Multi-hazard Requirement §201.6(c)(1):
B. Does the new or updated plan indicate who was involved in the current planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)

CRS Step 1: Organize to Prepare the Plan:
Describe who is involved in the planning process and what their roll is in the development of the plan.

local meetings and planning workshops to discuss and complete tasks. In addition to regular meetings, this working group coordinated all aspects of the Plan development process. Members routinely communicated and were kept informed through a dedicated e-mail distribution group. Additional participation and input from county residents and other identified stakeholders were solicited through the distribution of public surveys, news releases, public notices, and the facilitation of public meetings. The Planning Committee was charged with the following:

- Establish new goals for this 2011 Plan update that are relevant and correspond to state mitigation goals;
- Establish a timeline for completion of the updated Plan;
- Ensure that the updated Plan meets the requirements of DMA2K, FEMA, and TEMA;
- Solicit and encourage the participation of regional agencies, a range of stakeholders, and citizens in the Plan development process;
- Assist in gathering information for inclusion in the updated Plan, including the use of previously developed reports and data;
- Organize and oversee the public involvement process; and
- Develop, revise, adopt, and maintain the updated Plan.

The designated primary and alternate points of contact for Anderson County were the Anderson County Emergency Management Director and the Emergency Management Administrative Assistant. These points of contact provided the interface for EM-Associates and the Anderson County Hazard Mitigation Planning Committee. These Anderson County points of contacts were the same for this updated Plan and the 2005 Plan.

Table 3.3 Anderson County Points of Contact

	Primary	Alternate
Name	Lin Chilcoat	Steve Payne
Title	Plan Coordinator	Director
Department	Anderson County Emergency Management	Anderson County Emergency Management
Phone	865-457-7846	865-457-6765
Fax	865-457-6557	865-457-6557
Email	themarlowmama@hotmail.com	paynkey@hotmail.com
Street Address	111 South Charles G. Seivers Boulevard	111 South Charles G. Seivers Boulevard
County, State, Zip	Clinton, TN 37716	Clinton, TN 37716

Table 3.4 Consultant Points of Contact

	Primary	Alternate
Name	Les Junge	Jim Kincaid
Title	Program Manager	Project Manager
Department	Emergency Management	Emergency Management
Phone	256.892.0608	
Mobile	256.453.5112	205.919.8129
Fax	256.892.4520	
Email	ljunge@em-associates.org	contact@jimkincaid.biz
Street Address	4720 Grant Drive	5513 Overton Rd
County, State, Zip	Southside, AL 35907	Irondale Al. 35210

The mitigation committee was made up of representatives of all of Anderson County's participating jurisdictions, relevant county and state agencies and departments, and other stakeholders identified in the table below.

Table 3.5 Anderson County Hazard Mitigation Planning Committee

Member Name	Agency/Department	Contact Number	E-mail	Role/Focus Planning Hazards Risk Mitigation
Myron Iwanski	Anderson County Mayor	865-457-6200	miwanski@andersontn.org	Chairman
Scott Burton	Clinton Mayor	865-457-0424	sburton@clintontn.net	Steering Committee
Tim Sharp	Lake City Mayor	865-426-2838	cityoflakecity@bellsouth.net	Steering Committee
Tim Hester	Norris City Manager	865-494-7645	timdhester@comcast.net	Steering Committee
Mark Watson	Oak Ridge City Manager	865-425-3432	mwatson@cortn.org	Steering Committee
David Bolling	Oliver Springs City Manager	865-435-7722	oscitymanager@comcast.net	Steering Committee
Steve Payne	Anderson County Emergency Management Agency	865-457-6765	paynkey@hotmail.com	Steering Committee
Lin Chilcoat	Anderson County Emergency Management Agency	865-457-7846	themarlowmama@hotmail.com	Plan Coordinator
Tony Hart	Anderson County LEPC	865-574-8171	harttony@msn.com	Hazards, Vulnerability
James Kolopus	Anderson County Fire Commission	865-463-8955	claxtonfire@att.net	Hazards, Vulnerability
Archie Brummitt	Clinton Fire Department	865-457-2131	abrummitt@clintontn.net	Hazards, Vulenrability
Sam Bailey	Lake City Fire Department	865-426-8612	chieflcfd@comcast.net	Hazards, Vulnerability
Danny Humphrey	Norris Public Safety	865-494-0880	norrisps@comcast.net	Hazards, Vulnerability
Mack Bailey	Oak Ridge Fire Department	865-425-3522	mbailey@cortn.org	Hazards, Vulnerability
Justin Bailey	Oliver Springs Fire Department	865-257-2560	osfd399@aol.com	Hazards, Vulnerability
Dale Lesniak	Anderson County Rescue Squad	865-206-1194	mvfd7500@comcast.net	Hazards, Vulnerability
Bruce Miller	TN Department of Forestry	865-494-9434	bmrmiller@comcast.net	Hazards, Vulnerability
Joe Hall	University of TN Agriculture Extension	865-457-6246	jhall@utk.edu	Agriculture Hazards, Vulnerability
Paul White	Anderson County Sheriff's Office	865-463-6834	sheriff@tnacso.net	Hazards, Vulnerability
Jim Shetterly	Lake City Police Department	865-426-7402	cityoflakecity@bellsouth.net	Hazards, Vulnerability
Greg Darnell	Anderson County Building Commissioner	865-463-6871	gdarnell@andersontn.org	Hazards, Vulnerability & Mitigation
Brian Jenks	Anderson County Engineering & Public Works	865-463-6870	bjenks@andersontn.org	Hazards, Vulnerability & Mitigation
Sarah Booher	Staff Planner	865-463-6840	sbooher@andersontn.org	Hazards, Vulnerability & Mitigation

Table 3.5 Anderson County Hazard Mitigation Planning Committee				
Member Name	**Agency/Department**	**Contact Number**	**E-mail**	**Role/Focus Planning Hazards Risk Mitigation**
Larry Clowers	Anderson County Water Authority	865-457-3033	ldclowers@aol.com	Hazards, Vulnerability & Mitigation
Dan Hawkins	Clinton Utilities Board	865-220-6240	dhawkins@clintonub.com	Hazards, Vulnerability & Mitigation
Gary Long	Anderson County Highway Department	865-457-2735	garylongachd@comcast.net	Hazards, Vulnerability & Mitigation
Vernon Long	Anderson County Property Assessor	865-467-6225	vlong@andersontn.org	Research
Matthew Lambert	Anderson County GIS	865-463-6843	mlambert@andersontn.org	Mapping Consultant
Betty Dick	Anderson County Health Department	865-425-8801	Elizabeth.Dick@tn.gov	Pandemic Mitigation
Gail Baird	Anderson County Health Department	865-425-8775	Gail.Baird@tn.gov	Pandemic Mitigation
Trish Polfus	Methodist Medical Center	865-835-3267	tpolfus@covhlth.com	Pandemic Mitigation
Tony Farris	American Red Cross	865-483-5641	farrist@comcast.net	Shelter Vulnerability
Tom Bailey	Oak Ridge Schools	865-425-9001	tbailey@ortn.edu	Hazards, Vulnerability & Mitigation
Joe Forgety	Anderson County Schools	865-740-0777	jforgety@acs.ac	Hazards, Vulnerability & Mitigation
Matt Foster	Roane State Community College	865-882-4512	fostermr@roanestate.edu	Hazards, Vulnerability & Mitigation
Jackie Nichols	Anderson County Chamber of Commerce	865-457-2559	jackie@andersoncountychamber.org	Community Profile
Brent Galloway	The Coal Creek Company	865-556-5430	bgalloway@coalcreekcompany.com	Research, Consultant
Audry Goins	Food Lion	865-457-0094	agoins@retail.foodlion.com	Observer
Kathy Cramer	Citizen	865-567-8250	khcramer@comcast.net	Hazards Research, Mitigation
Richard Pumphrey	Citizen	865-435-1999	Wn9ddv@yahoo.com	Hazards Research, Mitigation
Charles Stearle	Citizen	865-494-8529	cstearle@comcast.net	Hazards Research, Mitigation
Tony Hart	Bechtel Jacobs	865-574-8171	harttony@msn.com	Observer
Jay Muncy	Campbell County Emergency Management	423-562-6201	jmun645@comcast.net	Observer, Consultant
Jody Zorch	Morgan County Emergency Management	423-346-1003	emermgmt@highland.net	Observer, Consultant
Scott Stout	Roane County Emergency Management	865-717-4115	scottstout@roanegov.org	Observer, Consultant
Ken Fritts	Tennessee Emergency Management Agency	865-414-5244	kfritts@tnema.org	Observer, Consultant
Tom Cloud	Tennessee Emergency Management Agency	865-599-0035	tcloud@tnema.org	Observer, Consultant

3.8 PLANNING MEETINGS AND WORKSHOPS

The preparation of this 2011 update to the 2005 Plan required a series of meetings with the Mitigation Planning Committee and local community officials for facilitating discussion and data collection efforts. The meetings and workshops prompted continuous input and feedback throughout the drafting stages of the Plan. Below is a summary of the key meetings. Additional meetings were held by the participating jurisdictions to accomplish planning tasks specific to their community, such as specific mitigation actions for inclusion in their Mitigation Action Plan. Public notices and/or minutes of mandatory meetings are scanned into this Plan and can be found in the Appendices.

Table 3.6 Mitigation Planning Committee And Mandatory Public Meetings		
Meeting	**Date**	**Attendees**
Initial Mitigation Plan Planning Meeting	**01/20/2010**	**3**
The initial mitigation plan project meeting was held via conference call on January 20, 2010. Participating were Les Junge, EM-Associates planning consultant hired by Anderson County to facilitate preparation of the mitigation plan; Steve Payne, Emergency Management Director; and Lin Chilcoat, Emergency Management Plan Coordinator. Discussion focused on the overall project approach, in which emphasis was placed on the steps necessary to meet the requirements of the DMA2K and 44 CFR Part 201, building on work already completed at the state and local levels. Discussion also focused on the specific roles and responsibilities of all parties involved in the planning process. In addition to representatives from each of the participating jurisdictions, it was determined that representatives from fire, law enforcement, private business, education, voluntary agencies, and the public will be invited to participate in the planning process. News releases and letters to the editor will inform the public of the opportunity to participate. A legal announcement will publicize a meeting at Anderson County Courthouse for public comment. A Public Hazard Mitigation Survey form will be placed in the six libraries in the county and in public municipal buildings. It was decided that the final mitigation plan project meeting would be held at 10:00 a.m. March 9, 2010, followed by the Project Kickoff meeting at 1:00 p.m., and the mandatory public meeting at 6:00 p.m.		
Meeting	**Date**	**Attendees**
Final Mitigation Project Meeting	**03/09/2010**	**3**
The final mitigation plan project meeting was held on March 9, 2010. Attending were Les Junge and Jim Kincaid of EM-Associates, and Lin Chilcoat Emergency Management Plan Coordinator. Consultants reviewed the Public Participation Survey and documents published in local newspapers inviting public participation in the planning process. Critical "next steps" were discussed, including the need to evaluate progress of each goal and activity under the present plan, and to ensure incorporation of information regarding mitigation projects and changes in policies, programs, studies, and land-use during the past five years. Specific data collection tools were discussed. These will be distributed to planning committee members for submittal on April 15 via on-line forms. Agendas for future meetings were established.		
Meeting	**Date**	**Attendees**
Mitigation Planning Committee Kickoff Meeting	**03/09/2010**	**23**
The Mitigation Planning Committee Kickoff Meeting was held at 1:00 p.m. on March 9, 2010 to present the project, its benefits, and requirements to all participating jurisdictions and invited stakeholders. The purpose of the meeting was to give an overview of the mitigation planning process, explain DMA2K multi-jurisdictional planning requirements, and emphasize the importance to all jurisdictions of having an approved plan. Data collection job aids, including the capability assessment and hazards and mitigation surveys, were distributed to each jurisdiction and pertinent agencies, and the on-line submittal forms were demonstrated. Project tasks and timelines were discussed to ensure timely completion of the plan. Specific issues, including the need to gather, analyze, and incorporate information regarding mitigation projects and changes in policies, programs, studies, reports, technical documentation, and land-use during the past five years were discussed. Data collection tools were distributed for submission on April 15 via on-line forms. Committee members were asked to bring to the Planning Committee specific types of mitigation actions that should be considered for their jurisdictions. Following the presentation, Anderson County Emergency Management and EM-Associates addressed questions raised by the attendees. These questions primarily related to data collection methodologies and requirements for completing risk and capability assessments. EM-Associates and the Plan Coordinator will schedule meetings with each jurisdiction during the week of July 12 – 16 to finalize data collection. The next full Planning Committee meeting will be established based on completion of a draft plan.		

Meeting	Date	Attendees
Mitigation Plan Public Meeting	**03/09/2010**	**4**

The mandatory Hazard Mitigation Plan Public Meeting was held in Room 118A of the Anderson County Courthouse at 6:00 p.m. on March 9, 2010. Notice of the meeting, inviting public comment on and participation in the development of a countywide multi-jurisdictional hazard mitigation plan was publicized in local newspapers and posted in public municipal buildings. The purpose of the meeting was to educate the public on the mitigation planning process and explain DMA2K requirements. The concept of hazard mitigation and the mitigation planning process was presented. The Public Hazard Mitigation Survey was distributed and completed by attending citizens. Following the presentation, EM-Associates and Anderson County Emergency Management addressed questions raised by the attendees.

Meeting	Date	Attendees
Mitigation Plan Data Collection Jurisdictional Meetings	**07/13-15, 2010**	**24**

Planning consultant Les Junge and plan coordinator Lin Chilcoat met with representatives from each of the Anderson County Jurisdictions. To begin each meeting, the consultant reviewed the purpose and importance to the community of hazard mitigation planning. Les explained the five types of mitigation grants available and suggested ways in which the jurisdiction can meet the required match for pre-disaster mitigation grants. Each jurisdiction stated that matching funds have been a hindrance in applying for grant funds. Lin will send all jurisdictions the website for FEMA's Hazard Mitigation Assistance Unified Guidance which details the five hazard mitigation assistance programs.

Participants were provided a copy of their jurisdiction's table of critical facilities, and tables for legal and regulatory, fiscal, and administrative and technical capabilities. These were reviewed for accuracy. Additions were made to the table of critical facilities to include childcare facilities and income-producing commercial establishments critical to sales tax revenue for the jurisdiction. Missing information on the capabilities tables was provided.

During the second half of the meeting, mitigation goals, objectives, and action items were discussed. While the plan will contain countywide goals, objectives, and actions common to all jurisdictions, each jurisdiction was asked to identify action items specific to the unique needs of its community. The consultant explained the jurisdiction's need to establish goals, objectives, and actions. These will be used to create the jurisdiction's individual Mitigation Action Plan.

To assist the process, a table was distributed with sample action items and each jurisdiction was asked to tailor pertinent items to the jurisdiction's needs or to create other actions important to the community. Each jurisdiction was asked to submit a list of action items, complete with information reflecting responsibility, funding source, cost benefit, completion date, and priority by August 31. Following questions and a general discussion of community concerns, the meetings were adjourned. Meeting times, participants, and special concerns were:

Norris, July 13, 9:00 a.m. to 11:00 a.m. – Norris Community Center
Tim Hester, City Manager; Danny Humphrey, Chief Norris Public Safety
Norris has a concern about a hazardous materials transportation accident on Interstate 75.

Clinton, July 13, 3:00 p.m. to 5:00 p.m. – Clinton City Hall
Anthony Braden, Clinton Fire Department; Vickie Fagan, Clerk; Larry Miller, Clinton Police Department; Lynn Murphy, Public Works Director; Curtis Perez, Zoning
Clinton has concerns regarding its water supply capabilities in a flood incident.

Lake City, July 14, 9:00 a.m. to 11:00 a.m. – Lake City City Hall
Sam Bailey, Lake City Fire Chief; Jim Shetterly, Lake City Police Chief; James Wills, Public Works Director
Lake City has concerns regarding a hazardous materials rail accident.

Oak Ridge, July 14, 12:30 p.m. to 2:30 p.m. – Oak Ridge Municipal Building
Mack Bailey, Oak Ridge Fire Chief; Steve Byrd, Public Works; Ken Kruchenski, City Attorney
Oak Ridge contains four DOE facilities with radiological and many other hazardous materials.

Anderson County, July 14, 3:00 p.m. to 5:00 p.m. – Anderson County Zoning & Codes Office
Sarah Booher, Community Planning; Greg Darnell, Codes and Building Commissioner; Brian Jenks, Storm Water Coordinator; Matthew Lambert, GIS

Oliver Springs, July 15, 1:00 p.m. to 3:00 p.m. – Oliver Springs City Hall
David Bolling, City Manager; Justin Bailey, Oliver Springs Fire Department; Ken Morgan, Oliver Springs Police Chief
Oliver Springs has serious concerns regarding flooding in the downtown area, at the bridge on Airport Road, and at Arrowhead Park below Oliver Springs High School.

Anderson County GIS/Assessor, July 15, 9:00 a.m. to 11:00 a.m.
Matthew Lambert, GIS; Vernon Long, Assessor (by phone)
In the meeting with the County's GIS technician (and by phone, the County Assessor, who was on vacation), Les discussed the process for mapping hazard scenarios to estimate damage to types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas. Les and Lin will consult with the Emergency Management Director to establish these areas. Matthew, the GIS technician, will map critical facilities and update maps to comply with the mitigation planning requirements of section 201.

Meeting	Date	Attendees
Mitigation Planning Committee Meeting	**6/16/11**	**8**

A meeting of the Anderson County Multi-Jurisdictional Hazard Mitigation Planning Committee was held at 3:00 p.m. on June 16, 2011, at the Anderson County Health Department with eight attending. Conducting the meeting were EM Associates Consultants Les Junge and Jim Kincaid. Les Junge emphasized the importance of the mitigation plan to Anderson County and its jurisdictions, and reviewed the four types of grants for mitigation projects available to jurisdictions with a FEMA-approved plan.
A PowerPoint presentation summarized the contents of each section of the plan, including "next steps" for preparing the plan for submission to TEMA and FEMA. Les discussed the adoption process for each jurisdiction, and outlined plan implementation and maintenance. Questions and comments by the committee were solicited. Committee members were asked to complete review of the plan online at em-associates.org/anderson-county.htm and send questions or suggestions for revisions to Les of Lin before June 24. The plan will be submitted to TEMA by June 30.
Planning Committee members were invited to attend the public meeting at Anderson County Courthouse, Room 118A.
Attendees: Matthew Lambert/Anderson County GIS, Sarah Booher/Anderson County Planning, Trish Polfus/Methodist Medical Center, Gail Baird/Anderson County Health Department, Justin Bailey/Oliver Springs Fire Department, Lin Chilcoat/Anderson County Emergency Management.
There being no further business, the meeting was adjourned at 4:45 p.m.

Meeting	Date	Attendees
Mitigation Plan Public Draft Plan Review Meeting	**6/16/11**	**4**

A public meeting of the Anderson County Hazard Mitigation Planning Committee was held at 6:00 p.m. on June 16, 2011, at the Anderson County Courthouse, Room 118A, for the purpose of gathering citizen comment on the draft 2011 update of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan. Attending were Les Junge, Jim Kincaid, Joe Forgety/Anderson County Schools, and Lin Chilcoat/Anderson County Emergency Management Agency.
Les Junge emphasized the importance of the mitigation plan to Anderson County and its jurisdictions, and reviewed the four types of grants available to jurisdictions with a FEMA-approved plan.
A PowerPoint presentation summarized the contents of each section of the plan, including adoption by each jurisdiction. Questions and comments were solicited. Joe Forgety shared concerns for preparing staff for terrorism incidents in schools. There being no further business, the meeting was adjourned at 7:45 p.m.

Meeting	Date	Attendees
Mitigation Plan Public Hearing	**8/15/11**	**22**

Following FEMA conditional approval of the updated hazard mitigation plan, a public hearing was held on August 15, 2011, in Room 230 of the Anderson County Courthouse, with 22 attending.

Meeting	Date	Attendees
Mitigation Plan Jurisdictions Public Adoption Meetings	**8/15 to 10/10/11**	**Varies**

Following conditional approval of the updated mitigation Plan by TEMA and FEMA, Anderson County and the five participating municipalities adopted the 2011Anderson County Multi-Jurisdictional Hazard Mitigation Plan at formally scheduled and conducted county commission and city council meetings. The final plan was published on the county website and copies provided to each municipality. Public comments were noted and the resolutions were captured for inclusion in the final plan before submission to TEMA and FEMA for final approval.

3.9 INVOLVING THE PUBLIC IN MITIGATION PLANNING

Multi-hazard Requirement §201.6(b): Multi-hazard Requirement §201.6(c)(1):
C. Does the new or updated plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)

CRS Step 2: Involve The Public: The planning process must include an opportunity for the public, neighboring communities and local and regional agencies to comment on the plan during the drafting stage and before plan approval.

Public awareness is a key component of an overall mitigation strategy aimed at making a home, neighborhood, school, business, or county safer from the potential effects of natural or man-made hazards. A fundamental component of Anderson County's community-based mitigation planning process involved public participation. Citizen involvement provided the Mitigation Committee with a greater understanding of local concerns and ensured a higher degree of mitigation success by developing community "buy-in" from those directly affected by the planning decisions of public officials. As citizens become more involved in decisions that affect their lives and safety, they are more likely to gain a greater appreciation of the hazards present in their community and take personal steps to reduce the potential impact.

3.9.1 Public Participation During Plan Update Construction

Public input was sought using four methods: (1) surveys; (2) news releases; (3) open public meetings; and (4) publicizing the availability of the draft hazard mitigation plan at government offices and an Internet site.

A Public Participation Survey, included in the Supporting Information Annex, was designed to capture information from Anderson County citizens. Surveys were available at all six public libraries in the county, provided at public meetings, and distributed to fire departments. County and municipal officials distributed additional copies of the survey.

A countywide public "kickoff" meeting was held to garner public input as to unique hazard concerns and mitigation actions that could be included in the hazard mitigation plan update. Attendees were provided a presentation and informational handouts on mitigation planning. Current mitigation process and progress were discussed and the Public Participation Survey was distributed and explained. It was requested that citizens complete and return the surveys for committee review.

A second public meeting was held to review the draft mitigation Plan. Preceding the meeting, the draft plan was advertised as available on the consultant's website, and copies were distributed via e-mail to the jurisdictional points of contact. A copy of the Plan was also provided at the county Mayor's office. The public was advised of the meeting through news releases in local newspapers, a public meeting notice, and notices posted at jurisdictional government offices. All comments from the public were collected and discussed. The mitigation committee reviewed the comments and updated the Plan accordingly.

3.9.2 Public Participation During Plan Update Final Approval

Following conditional Plan approval by FEMA, a public hearing was held to allow final citizen comment before adoption of the 2011 Plan update. The public was notified of the hearing through news releases in local newspapers, publication of a public hearing notice, and notices at

jurisdictional government offices. The completed Plan was available for public review and comment, both prior to and during the meeting.

During the formal adoption meeting in each jurisdiction, an overview of the Plan, including purpose and content, was presented to those attending the County Commission/City Council meeting, followed by a question and answer session. All comments were documented in the meeting minutes and provided to the Mitigation Planning Committee.

3.10 INVOLVING STAKEHOLDERS IN MITIGATION PLANNING

Multi-hazard Requirement §201.6(b): Multi-hazard Requirement §201.6(c)(1):
D. Does the new or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?

CRS Step 3: Coordinate with other Agencies: The planning process must include an opportunity for the public, neighboring communities and local and regional agencies to comment on the plan during the drafting stage and before plan approval.

A range of stakeholders was invited and encouraged to participate in the development of the Hazard Mitigation Plan. Stakeholder involvement was encouraged through notifications and invitations to agencies and individuals to participate. These included representatives from Anderson County and each participating jurisdiction, LEPC, private sector businesses, voluntary agencies, citizens, and surrounding counties. In addition to the Mitigation Planning Committee meetings, Anderson County encouraged open and widespread participation in the mitigation planning process through the publication of newspaper notices promoting open public meetings. These media advertisements provided local officials, residents, businesses, academia, and other private interests in Anderson County the opportunity to be involved and offer input throughout the local mitigation planning process. Anderson County encouraged continued stakeholder involvement by reminding all participating jurisdictions to make announcements and notifications consistent with their existing local Plan adoption procedures. Many departments, agencies, and individuals became mini-stakeholders when contacted to provide information and data for profiles, capability, and vulnerability assessments. These "external participants" played a vital role in Plan completion.

3.11 REVIEW AND INCORPORATION OF EXISTING PLANS

Multi-hazard Requirement §201.6(b): Multi-hazard Requirement §201.6(c)(1):
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?

CRS Step 3: Coordinate with other Agencies: The plan must also incorporate and document a review of existing studies, reports, and technical information into the community's needs, goals and plans for the area.

An important aspect of the planning process involved the review of existing federal, state, and local plans, studies, reports, and technical information, as well as the ordinances, regulations, and resolutions of each participating jurisdiction for incorporation into the Hazard Mitigation Plan 2011 update.

In some cases, these documents identified areas for needed mitigation actions; for example, review of the Anderson County Basic Emergency Operations Plan made clear the need to include hazard-specific annexes, and objectives/actions were written to mitigate this weakness. After review of the ordinances, regulations, and resolutions of each jurisdiction, the Legal and Regulatory Capabilities Summary Table was prepared. This summary

identified that some jurisdictions lacked ordinances and regulations to control hazards and reduce risk. By incorporating data from existing programs into this mitigation Plan, the Planning Committee was able to identify the relevance of mitigation planning to these existing programs.

3.11.1 Local Data

The Planning Committee reviewed and incorporated existing data and plans to support the mitigation plan. A number of electronic and hard copy documents were made available to support the planning process. The Anderson County Basic Emergency Operations Plan provided insight into the jurisdictional response to disasters and was used to develop and validate mitigation goals, objectives, and actions. These documents are listed below:

Table 3.7 Local Plans and Documents Incorporated
Jurisdictional ordinances, regulations, and resolutions
Anderson County Urban Growth Plan
Anderson County Multi-Jurisdictional Hazard Mitigation Plan (2005)
Anderson County Basic Emergency Operations Plan (2010)
Anderson County Emergency Evacuation Plan
Anderson County Department of Health Infectious Disease Response Plan
Anderson County Economic Development Corporation Website
East Tennessee Development District Comprehensive Economic Development Strategy 09-10
City of Norris 2008 – 2013 Strategic Plan
Oak Ridge City Council Strategic Plan Fiscal Years 2006 – 2009
Clinton Mayor's Commission Report
Anderson County Schools Emergency Response/Crisis Management Plan
Clinton Schools Emergency Response Plan
Oak Ridge Schools Emergency Response Plan
Anderson County Water Authority Emergency Response Plan
Clinton Utilities Board Electric Risk Management Plan
Clinton Utilities Board Water and Reclamation Risk Management Plan
SARA Tier II facilities reporting documents and site emergency plans
US Department of Energy Oak Ridge Reservation Emergency Response Plan, Volumes 1, 2, 3
Tennessee Multi-Jurisdictional Emergency Response Plan for the Oak Ridge Reservation
Long range transportation plans/growth projections from the Regional Planning Commission
TVA Dam Safety Emergency Action Plan – Norris/Doakes Creek
Norfolk Southern Local Community Emergency Action, Plan for Hazardous Materials Incidents
Anderson County Basic Emergency Operations Plan – ESF 10 Environmental Response–Hazardous Materials

3.11.2 Federal and State Data

State and federal response and homeland security documents were referenced to ensure Anderson County's goals supported these plans and promoted compliance with requirements. The State of Tennessee Hazard Mitigation Plan formed the basis for identifying and analyzing the natural hazards and man-made hazards that could affect Anderson County and participating jurisdictions. Federal and state data was collected and used throughout the mitigation process.

Table 3.8 State and Federal Plans Referenced
State of Tennessee Hazard Mitigation Plan (2007)
Governor's Office of Homeland Security "A Strategy for Tennessee"
A Nation Prepared: FEMA Strategic Plan Fiscal Years 2003-2008

U.S. Department of Homeland Security National Incident Management System
U.S. Department of Homeland Security National Response Framework
FEMA National Flood Insurance Program – Program Description
FEMA Community Rating System
National Weather Service: Operations Present and Future
US Census Bureau data
FEMA and local disasters reports
Flood Insurance Studies and Flood Insurance Rate Maps
Dam Inundation Studies
Data from the National Weather Service (NWS)
Data from the National Oceanic and Atmospheric Administration (NOAA)
FEMA State and Local Mitigation Planning How-to Guides 386-1 to 386-4, and 386-7): Getting Started, Understanding Your Risks, Developing the Mitigation Plan, and Bringing the Plan to Life
Integrating Technological and Human-Caused Hazards into Mitigation Planning
Tennessee One Call System Emergency Responder Handbook for Pipeline Emergencies
The Pipeline Group Emergency Response Manual
Tennessee Department of Health Infectious Disease Response Plan
Tennessee Department of Environment & Conservation (Natural Resources)
Tennessee Data Center demographic and economic reports
Public laws and other programs such as the NFIP were examined to complete this Plan.

These documents, on file at Anderson County Emergency Management Agency in electronic or hard copy format, provided valuable guidance in the planning process.

3.12 NATURAL HAZARDS PLANNING

3.12.1 State of Tennessee Mitigation Plan

During the 2007 State of Tennessee Mitigation Plan update, the initial step in the risk assessment was the identification of hazards that could probably/possibly occur in the State of Tennessee (See Tennessee Emergency Management Plan, Appendix 2). Utilizing degrees of probability and possibility, the natural hazards identified in the Tennessee Emergency Management Plan were reviewed and evaluated by the Hazard Mitigation Planning Committee/Hazard Mitigation Council for the State's Hazards of Prime Concern. It was determined that that the natural hazards in the following table would be identified and profiled in the state Plan.

Table 3.9 State of Tennessee Consolidated/Committee Hazards

Natural Hazard	Probable	Possible
Flood (Riverine/Flash)	X	
Severe Storm (Hail/Lightning/Wind/Etc.)	X	
Severe Winter Storm (Snow/Ice/Etc.)	X	
Tornado	X	
Earthquake		X
Extreme Temperatures		X
Drought		X
Fire (Wildland/Urban.)	X	
Geologic (Landslides/Expansive Soils/Subsidence)	X	

3.12.2 Anderson County Mitigation Plan

The Anderson County Mitigation Planning Committee decided to follow the State of Tennessee Plan in the identification and profiling of natural hazards with the following exceptions:

- Identifying and profiling Thunderstorm and Tropical Storm Flooding under Floods.
- Identifying and profiling a separate High Wind Category, which includes Thunderstorm High Winds, Tropical Storm High Winds, and Tornadoes.
- Identifying Severe Winter Storm as Ice/Snow Storms

3.13 TECHNOLOGICAL/HUMAN-CAUSED HAZARDS PLANNING

The Tennessee Emergency Management Agency, Planning Branch and Mitigation Section, performed a technical review and evaluation of the technological/human-caused hazards documented in the Federal Emergency Management Agency State and Local Mitigation Planning How-To Guide entitled "Integrating Manmade Hazards into Mitigation Planning."

Just as with natural hazards, the methodology described in the FEMA publication 386-2, "Understanding Your Risks – Identifying Hazards and Estimating Losses," provided direction for the technological and human-caused hazard risk assessment. Incorporation of those analyses into the overall planning effort necessitated the utilization of other publications including, but not limited to, FEMA publication 386-7 "Integrating Manmade Hazards into Mitigation Planning," and the Emergency Management Accreditation Program (EMAP) Standard.

Additionally, further review/evaluation of possible other technological/human-caused hazards in all 95 counties of the state were accomplished through in-depth surveys (Office of Domestic Preparedness (ODP) Jurisdiction Assessment Report). Coupled with information derived from local planning efforts, as well as numerous other state and federal documents/data sources, the surveys provided a point of embarkation toward the state's final hazard identification decision, made in similar fashion as that for the natural side of the hazard triad.

After review of the State's Hazard Mitigation Plan, which included technological and human-caused hazards, and in consideration of Anderson County's vulnerability to these hazards, the Hazard Mitigation Planning Committee decided to include technological and human-caused hazards in this 2011 Plan update.

The Pre-Disaster Mitigation Program (PDM) is subject to the availability of appropriation funding, well as any directive or restriction made with respect to such funds. The PDM program, authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), is designed to assist states and communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures, while also reducing reliance on federal funding from actual disaster declarations. Although hazard mitigation projects and plans may also address hazards caused by technological and human-caused incidents, PDM funds must be used primarily to support mitigation activities that address natural hazards. PDM guidance identifies as ineligible projects for PDM funding for projects that "solely address a technological or human-caused hazard." Further, it has been interpreted that PDM funds cannot be used to include technological and human-caused hazards in a mitigation plan because that may be a violation of the HMA Program Guidance Section 2.1.3.4.2 "Duplication of Funds."

In order avoid conflict with the aforementioned constraints, Anderson County has employed the following methodology to include pandemic, technological, and human-caused hazards in this Multi-Jurisdictional Hazard Mitigation Plan 2011 update:

- Human-caused hazard information has been gathered by the plan participants separate and apart from the natural hazard information.
- The associated time, materials, and equipment needed to gather technological and human-caused hazard information by the participants is not included in the "in kind contribution" time associated with natural hazard mitigation efforts.
- Technological and human-caused hazard information was complied by the Anderson County Emergency Management staff for inclusion in the Plan and the associated time, materials and equipment needed was not included in the "in kind contribution" time allocated to the natural hazard mitigation effort.
- The plan coordinator compiled technological and human-caused hazard information as a part of emergency management duties, and the associated time was not included as wages paid to the plan coordinator by the PDM grant for this Plan update.
- The contracted consultant agreed to include technological and human-caused hazards into this plan at no additional charge to the county, the state, or FEMA.

3.14 PREVIOUS PLAN REVIEW (2005)

The Anderson County Hazard Mitigation Planning Committee extensively reviewed each section of the 2005 Anderson County Hazard Mitigation Plan. In an effort to clarify the steps undertaken during the planning process, the Planning Committee increased the number of Plan sections and enhanced the information provided in each. Following is a synopsis of each section review and the revisions incorporated in this 2011 Plan update.

Multi-hazard Requirement §201.6(b): Multi-hazard Requirement §201.6(c)(1):
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?

CRS Step 3: Coordinate with other Agencies: The plan must also incorporate and document a review of existing studies, reports, and technical information into the community's needs, goals and plans for the area.

3.14.1 Section 1 Review: Plan Introduction

The 2011 Plan Introduction section has been updated and enhanced to include more detailed information. The information added is related to mitigation planning legislative information (DMA2K, etc.), the Flood Management Assistance Program (FMA), the National Flood Insurance Program (NFIP), and related grant information. The grant information includes descriptions of Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) programs that address repetitive loss properties. This information is now required by the Federal Emergency Management Agency (FEMA) to be documented in hazard mitigation plans. The 2011 section now includes 2011 Plan Updates, Plan Description, Emergency Management Background, Hazard Mitigation Legislative Background, Plan Purpose, Plan Scope, Plan Authority, and Plan Outline.

3.14.2 Section 2 Review: Planning Process

This 2011 Plan update has been restructured by including the Jurisdiction Profile as Section 2 and moving the 2005 Planning Process section to Section 3. The Jurisdiction Profile has been enhanced by adding more detailed historic, population, demographic, economic, geologic, and infrastructure information. The information is updated to reflect 2008-2009 estimated information and the 2010 census, where available. In addition, municipal profiles have been developed for each participating jurisdiction and are included in the 2011 Individual Mitigation Action Plan Annex, along with their capabilities and mitigation strategies and actions.

3.14.3 Section 3 Review: Jurisdiction Profiles

Section 3 in this 2011 Plan is now The Planning Process. This section has been significantly updated to meet the 2008 FEMA guidance and crosswalk requirements. The enhancements include additional information in the discussion of the planning process overview and multi-jurisdiction participation. The number of meetings was increased, which enhanced both public and stakeholder participation. The number of plans reviewed and incorporated was also increased. Also added in this section is this review of the 2005 Plan, jurisdictional adoption information, natural hazards planning, technological and human-caused hazards planning, and a sub-section which identifies differences and enhancement over the 2005 Plan.

3.14.4 Section 4 Review: Risk Assessment

In the 2005 Plan, Section 4 combined hazard identification, hazard analysis, and hazard vulnerability. In this 2011 Plan update, Section 4 is now Hazard Identification, Section 5 is Hazard Profiles, and Section 6 is Hazard Vulnerabilities.

The new Section 4, Risk Assessment-Hazard Identification, identifies hazards that have or may impact Anderson County and its jurisdictions. This section has been significantly enhanced and reformatted in this 2011 Plan to meet the 2008 FEMA guidance and crosswalk requirements. This 2011 Plan is based on all natural hazards identified in the State of Tennessee 2007 Plan. As in the 2005 plan, this 2011 Plan update includes technological and human-caused hazards: hazardous materials, illegal methamphetamine laboratories, terrorism, urban fire, and pandemic.

In this 2011 Plan update, Section 5, Risk Assessment-Hazard Profiles is an additional section that replaces the profiling of hazards in the 2005 plan Section 4 – Risk Assessment. All hazards identified in the 2007 Tennessee Mitigation Plan are profiled. This significant enhancement over the 2005 Plan documents, in detail, possible event location, extent, future probability, historic occurrences, and historic occurrence discussions.

Section 6, Risk Assessment-Assessing Vulnerability, is an additional section in this 2011 Plan update that replaces the profiling of hazards in Section 4-Risk Assessment of the 2005 Plan. This significant enhancement documents critical facilities by jurisdiction, identifies an inventory of current and future "in-hazard facilities and populations" by jurisdiction, contains detailed vulnerability and loss estimates for primary hazards of flooding, high winds, and hazardous materials by jurisdiction. Also included in this section are impact/damage assessments for secondary hazards that may have a countywide impact. The last item in this section is a discussion of future land use in Anderson County. In addition to the data in this section, detailed critical facilities information, including jurisdictional maps, is included in the Supporting Annex.

3.14.5 Section 5 Review: Capabilities, Mitigation and Maintenance

Section 5 in the 2005 Plan has been divided for this 2011 Plan update into Section 7, Capabilities and Hazard Mitigation Strategy, and Section 8, Mitigation Plan Maintenance.

Section 7 now contains a comprehensive capabilities assessment of Anderson County. The mitigation strategy for the 2011 Plan update has been significantly enhanced. Countywide mitigation goals, objectives, and action items were adopted by each participating jurisdiction. The 2011 Plan update also contains added components which include identifying NFIP status, repetitive loss properties, and prioritizing of mitigation actions using the "STAPLEE" methodology. There are new actions addressing NFIP and protection of existing and new structures. Each jurisdiction has developed an individual Mitigation Action Plan which includes capabilities, critical facilities, and jurisdiction-specific goals and actions. These may be found in the 2011 Plan Individual Mitigation Plan Annex.

The mitigation actions identified in the 2005 Plan have been extensively reviewed and evaluated. The effectiveness of the actions identified in the 2005 Plan is documented in this section. The actions not implemented are either carried forward to the updated Plan or have been eliminated as not feasible or no longer an effective action. Those carried forward are cross-referenced to indicate their place in the actions for the 2011 Plan.

Section 8, Mitigation Plan Maintenance, has been enhanced in the 2011 Plan update to expand documenting and describing of monitoring, maintenance, and updating. This includes aggressive methodologies to include public participation in Plan maintenance and update. The Mitigation Planning Committee extensively reviewed the 2005 plan maintenance and updating methodologies and processes. Documented in this section is the status of the 2005 methodologies and their effectiveness.

The Table below shows section content in the 2005 and 2011 Plans.

Table 3.10 Section Content 2005 and 2011 Plans

Section	2005 Plan	2011 Plan
1	Plan Introduction	Plan Introduction
2	Planning Process	Jurisdiction Profile
3	Jurisdiction Profiles	Planning Process
4	Risk Assessment Hazard Identification Hazard Analysis Hazard Vulnerability	Risk Assessment – Hazard Identification
5	Capabilities, Mitigation, and Maintenance	Risk Assessment – Hazard Profiles
6		Risk Assessment – Hazard Vulnerability
7		Capabilities and Hazard Mitigation Strategy
8		Mitigation Plan Maintenance
9		References

3.14.6 Appendices Review

Appendices in the 2011 Plan is comparable to the appendices in the 2005 Plan and contains Plan references, Plan certification, scanned meeting notices and minutes, and the scanned formal jurisdictional adoption documents.

SECTION 4
RISK ASSESSMENT – HAZARD IDENTIFICATION

4.1 INTRODUCTION

Multi-hazard Requirement §201.6(c)(2)(i): The risk assessment shall include a description of the type of all natural hazards that can affect the jurisdiction.
A. Does the new or updated plan include a description of the types of all natural hazards that affect the jurisdiction?

CRS Step 4: Assess the Hazard: CRS requires at the minimum that the flood hazard be identified including addressing the repetitive loss areas. However, additional credit can be earned for including discussion of all other natural hazards.

According to the Federal Emergency Management Agency (FEMA) Guidance 386-2, "risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural, technological, and human-caused hazards." The risk assessment process used for this 2011 Plan update is consistent with the process and steps presented in the Federal Emergency Management Agency 386-2, State and Local Mitigation Planning How-to-Guide, Understanding Your Risks – Identifying Hazards and Estimating Losses (FEMA, 2001).

The first step of the risk assessment process is to identify the hazards of concern. This section identifies natural, technological, and human-caused hazards that may impact Anderson County and its communities.

4.2 2011 PLAN UPDATE

Section 4 Risk Assessment – Hazard Identification, contains a comprehensive description of the hazards with pictures or figures that assist in identifying many hazards. This section has been significantly enhanced to include all natural hazards identified in the State of Tennessee 2007 Hazard Mitigation Plan. Also identified are technological and human-caused hazards including hazardous materials incidents, illegal methamphetamine laboratories, pandemic, terrorism and urban fires.

4.3 NATURAL HAZARD IDENTIFICATION METHODOLOGY

FEMA's current regulations require only identification, profiling, and evaluation of natural hazards that threaten lives, property, and other assets. However, FEMA strongly suggests including technological and human-caused hazards in jurisdictional hazard mitigation plans.

In addition, as new developments occur and the environment changes, new hazards may become evident and must be considered for inclusion in mitigation plan. Examples include a new industry that introduces a hazardous material, a political climate (i.e., 9/11, which introduced terrorism), and human, animal, and plant disease/infestation incidents.

Anderson County is vulnerable to a wide array of hazards that threaten life and property. This Risk Assessment – Hazard Identification section provides background information for these hazards. It is important that all natural hazards be initially considered for relevance in advancing through the hazard mitigation planning process. Subsequent sections of the updated Plan –

Section 5 Hazard Profiles and Section 6 Assessing Vulnerability – address the hazards of specific concern to the county. The Anderson County Hazard Mitigation Planning Committee considered and evaluated all natural hazards in terms of their potential risk to Anderson County and its citizens. The end result was identifying the same natural hazards identified in the State of Tennessee 2007 Hazard Mitigation Plan. The Table below documents the hazards included in the Anderson County 2005 Plan and their disposition in Sections 4, 5, and 6 of the 2011 Plan update.

Table 4.1: 2005 Mitigation Plan Hazards/2011 Updated Plan Hazard Status

2011 Hazard	Exp	Risk/Threat	2005 Plan Status	2011 Updated Plan Status
Drought	Poss	Moderate/ Slight	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Earthquake	Poss	Low/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Extreme Temperature	Poss	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Flooding	Prob	Moderate/ High	Identified as flooding by Thunderstorms, Hurricanes, some vulnerability assessment	Identified as Tropical Storms/Hurricanes, Thunderstorms, Dam/Levee Failure, profiled and detailed vulnerability assessment
Hail	Prob	Moderate/ Minimal	Identified under Thunderstorms	Identified/profiled, detailed vulnerability assessment
High Winds	Prob	High/ High	Identified/profiled as Tornadoes, Thunderstorms, Hurricanes, some vulnerability assessment	Identified as Tropical Storms/Hurricanes, Thunderstorms, Tornadoes, profiled and detailed vulnerability assessment
Ice/Snow Storms	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Land Subsidence	Prob	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Landslides/ Mudslides	Prob	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Lightning	Prob	Moderate/ Low	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Wildfires	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Hazardous Materials	Prob	Moderate/ High	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Illegal Meth Labs	Prob	Moderate/ Slight	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Terrorism	Poss	Slight/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Urban Fires	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Pandemic	Poss	Low/ High	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment

Exp = Possible/Probable, Risk = Probability of Occurrence, Threat = Impact on loss of life and property damage

4.4 STATE OF TENNESSEE HAZARD IDENTIFICATION (2007 Plan)

The initial step in the State of Tennessee risk assessment was the identification of hazards that could probably/possibly occur in the State of Tennessee. Utilizing degrees of probability and

possibility, the natural hazards identified in the Tennessee Emergency Management Plan were reviewed by the State Hazard Mitigation Planning Committee/Hazard Mitigation Council for the State's Hazards of Prime Concern. (See Tables below.)

Table 4.2: State of Tennessee 2007 Plan Hazard Identification				
HAZARD	Probable	Possible	Unlikely	No Threat
Avalanche[1]			X	
Drought		X		
Extreme Temperatures	X			
Earthquake		X		
Erosion[2]				X
Famine[1]			X	
Fire	X			
Flood	X			
Geologic	X			
Glacier/Iceberg[2]			X	X
Hurricane[1]			X	
Range Fire[1]			X	
Severe Storm	X			
Severe Winter Storm	X			
Sleet (Included in SWS)	X			
Tornado	X			
Tropical Cyclone[2]			X	X
Tsunami[2]			X	X
Volcano[2]			X	X
1 Due to the unlikelihood of occurrence, Avalanche, Famine, Hurricane, and Range Fire were excluded from the in-depth review/evaluation process.				
2 Some incidents were conceivable but highly improbable. Consequently, Erosion, Glacier/Iceberg, Tropical Cyclone, Tsunami, and Volcano were considered NO THREAT to the state.				

Table 4.3: State of Tennessee 2007 Identified Hazards		
HAZARD	Probable	Possible
Flood (Riverine/Flash)	X	
Severe Storm (Hail/Lightning/Wind/Etc.)	X	
Severe Winter Storm (Snow/Ice/Sleet)	X	
Tornado	X	
Earthquake		X
Extreme Temperatures	X	
Drought		X
Fire (Wildland/Urban.)	X	
Geologic (Landslides/Expansive Soils/Subsidence)	X	

4.5 NATURAL HAZARDS IDENTIFICATION

4.5.1 Avalanche Identification

An avalanche is a sudden rapid flow of snow down a slope, occurring when either natural triggers or human activity causes a critical escalating transition from the slow equilibrium evolution of the snow pack. Typically occurring in mountainous terrain, an avalanche can mix air and water with the descending snow. Powerful avalanches have the capability to entrain ice, rocks, trees, and other material on the slope. Avalanches are primarily composed of flowing snow, and are distinct from mudslides, rockslides, and serac collapses on an icefall. In contrast to other natural incidents that cause disasters, avalanches are not rare or random incidents and are endemic to any mountain range that accumulates a snow pack. In mountainous terrain, avalanches are among the most serious hazards to life and property with their destructive capability resulting from their potential to carry an enormous mass of snow rapidly over large distances.

Avalanches are classified by their morphological characteristics, and are rated by either their destructive potential, or the mass of the downward flowing snow. Some of the morphological characteristics used to classify avalanches include the type of snow involved, the nature of the failure, the sliding surface, the propagation mechanism of the failure, the trigger of the avalanche, the slope angle, direction, and elevation. Avalanche size, mass, and destructive potential are rated on a logarithmic scale, typically of 5 categories, with the precise definition of the categories depending on the observation system or forecast region.

Figure 4.1: Depiction of an Avalanche

Source: NWS

Avalanches only occur when the stress on the snow exceeds the shear, ductile, and tensile strength either within the snow pack or at the contact of the base of the snow pack with the ground or rock surface. A number of the forces acting on a snow pack can be readily determined. For example, the weight of the snow is straightforward to calculate, but it is very difficult to estimate the shear, ductile, and tensile strengths within the snow pack or relative to the ground below. These strengths vary with the type of snow crystal and the bonding between them. The thermo-mechanical properties of the snow crystals in turn depend on the local conditions they have experienced, such as temperature and humidity. One of the aims of avalanche research is to develop and validate computer models that can describe the time evolution of snow packs and predict the shear yield stress. A complicating factor is the large spatial variability that is typical.

All avalanches share common elements: a trigger which causes the avalanche, a start zone from which the avalanche originates, a slide path along which the avalanche flows, a run out where the avalanche comes to rest, and a debris deposit which is the accumulated mass of the avalanched snow once it has come to rest. Avalanches also have a failure layer that propagates the failure and the bed surface along which the snow initially slides. In most avalanches the failure layer and the bed surface are the same. Slab avalanches have a crown fracture at the top of the start

zone, flank fractures on the sides of the start zones, and a shallow staunch fracture at the bottom of the start zone. The crown and flank fractures are vertical walls in the snow delineating the snow that was entrained in the avalanche from the snow that remained on the slope. The nature of the failure of the snow pack is used to morphologically classify the avalanche.

Slab avalanches are generated when an additional load causes a brittle failure of a slab that is bridging a weak snow layer; this failure is propagated through fracture formation in the bridging slab. Loose snow, point release, and isothermal avalanches are generated when a stress causes a shear failure in a weak interface, either within the snow pack, or at the base. When the failure occurs at the base they are known as full depth avalanches. Spindrift avalanches occur when wind-lifted snow is funneled into a steep drainage from above the drainage. Slab avalanches account for around 90% of avalanche-related fatalities, and occur when there is a strong, cohesive layer of snow known as a slab. These are usually formed when falling snow is deposited by the wind on a lee slope, or when loose ground snow is transported elsewhere. When there is a failure in a weak layer, a fracture very rapidly propagates so that a large area, that may be hundreds of meters in extent and several meters thick, starts moving almost instantaneously.

Loose snow avalanches occur in freshly fallen snow that has a lower density and are most common on steeper terrain. In fresh, loose snow the release is usually at a point and the avalanche then gradually widens down the slope as more snow is entrained, usually forming a teardrop appearance. This is in contrast to a slab avalanche.

A wet snow avalanche or isothermal avalanche occurs when the snow pack becomes saturated by water. These tend to also start and spread out from a point. When the percentage of water is very high they are known as slush flows and they can move even on very shallow slopes.

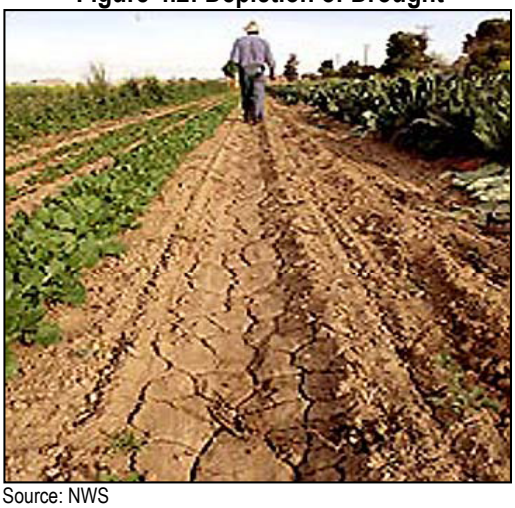
Powder snow avalanches are one of the largest and most powerful of avalanches and can exceed speeds of 300 km/h, and masses of 10,000,000 tons. Their flows can travel long distances along flat valley bottoms and even up hill for short distances. A powder snow avalanche is a powder cloud that forms when an avalanche accelerates over an abrupt change in slope, such as a cliff band, causing the snow to mix with air.

4.5.2 Drought Identification

The National Weather Service (NWS) Climate Prediction Center (CPC) defines drought as a deficiency of moisture that results in adverse impact on people, animals, or vegetation over a sizeable area. Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In general, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector.

Other climatic factors, such as high temperatures, prolonged high winds, and low relative humidity, can aggravate the severity of a drought. These conditions are caused by anomalous weather patterns when shifts

Figure 4.2: Depiction of Drought



Source: NWS

in the jet stream block storm systems from reaching an area. As a result, large high-pressure cells may dominate a region for a prolonged period, thus reducing precipitation.

This natural hazard differs from others in several ways. First, there is no universally accepted definition of drought. Second, drought onset and recovery are usually slow. Third, droughts can cover a much larger area and last many times longer than most other natural hazards. Fourth, they are part of the natural climate variability. According to the Federal Emergency Management Agency (FEMA), the National Drought Mitigation Center (NDMC), and the NWS, there are four ways that drought can be defined:

Meteorological drought is a measure of departure of precipitation from normal. It is defined solely on the degree of dryness. Due to climatic differences, what might be considered as a drought in one location of the country may not be considered as a drought in another location.

Agricultural drought links various characteristics of meteorological drought to agricultural impacts, focusing on precipitation shortages, differences between actual and potential evapotranspiration, soil water deficits, reduced ground water or reservoir levels, etc. It occurs when there is not enough water available for a particular crop to grow at a particular time. Agricultural drought is defined in terms of soil moisture deficiencies relative to water demands of plant life, primarily crops.

Hydrological drought is associated with the effects of periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply and occurs when these water supplies are below normal. It is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.

Socioeconomic drought is associated with the supply and demand of some economic good with elements of meteorological, hydrological, and agricultural drought. This differs from the aforementioned types of drought because its occurrence depends on the time and space processes of supply and demand to identify or classify droughts. The supply of many economic goods depends on weather (e.g., water, forage, food grains, fish, and hydroelectric power). Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply.

4.5.3 Earthquake Identification

An earthquake is "sudden motion or trembling caused by an abrupt release of accumulated strain in the tectonic plates that comprise the earth's crust." These rigid plates, known as tectonic plates, are some 50 to 60 miles in thickness and move slowly and continuously over the earth's interior. The plates meet along their edges, where they move away, past, or under each other at rates varying from less than a fraction of an inch up to five inches per year. While this sounds small, at a rate of two inches per year, a distance of 30 miles would be covered in approximately one million years (FEMA, 1997). The tectonic plates continually bump, slide, catch, and hold as they move past each other, which causes stress to accumulate along faults. When this

Figure 4.3: Earthquake Example

Source: University of Colorado

stress exceeds the elastic limit of the rock, an earthquake occurs, immediately causing sudden ground motion and seismic activity.

The vibration or shaking of the ground during an earthquake is described by ground motion. The severity of ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. Ground motion causes waves in the earth's interior, known as seismic waves, and along the earth's surface, known as surface waves. The following are the two kinds of seismic waves:

P (primary) waves are longitudinal or compressional waves similar in character to sound waves that cause back-and-forth oscillation along the direction of travel (vertical motion), with particle motion in the same direction as wave travel. They move through the earth at approximately 15,000 mph.

S (secondary) waves, also known as shear waves, are slower than P waves and cause structures to vibrate from side-to-side (horizontal motion) due to motion at right angles to the direction of wave travel. Unreinforced buildings are more easily damaged by S waves.

There are also two kinds of surface waves, Raleigh waves and Love waves. These waves travel more slowly and typically are significantly less damaging than seismic waves.

The location of an earthquake is commonly described by its focal depth and the geographic position of its epicenter. The focal depth of an earthquake is the depth from the earth's surface to the region where an earthquake's energy originates (the focus or hypocenter). The epicenter of an earthquake is the point on the earth's surface directly above the hypocenter (Shedlock and Pakiser, 1997). Earthquakes usually occur without warning and their effects can impact areas a great distance from the epicenter (FEMA, 2001).

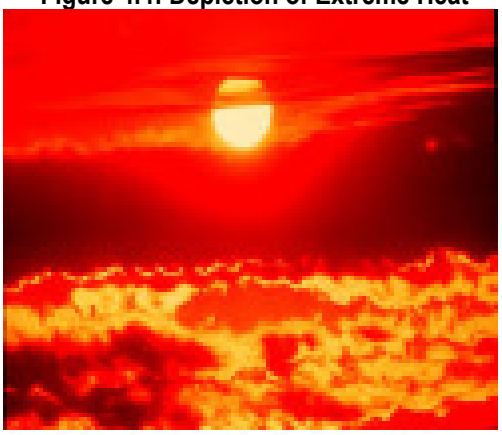
4.5.4 Extreme Temperatures Identification

Extreme temperatures include both heat and cold incidents, which can have a significant impact to human health, commercial/agricultural businesses, and primary and secondary effects on infrastructure (e.g., burst pipes and power failure). Based on what the population is accustomed to, what constitutes "extreme heat" or "extreme cold" varies across different areas of the country.

4.5.4.1 Extreme Heat

The CDC defines temperatures that hover 10 degrees or more above the average high temperature for a region and last for several weeks as extreme heat. A heat wave is a prolonged period of excessively hot weather, which may be accompanied by high humidity. There is no universal definition of a heat wave because the term is relative to the usual weather in the area. Temperatures that people from a hotter climate consider normal can be termed a heat wave in a cooler area if they are outside the normal climate pattern for that area. Also, the term is applied both to routine weather variations and to extraordinary spells of heat, which may occur only once a century.

Figure 4.4: Depiction of Extreme Heat



Source: State of Tennessee Mitigation Plan

4.5.4.2 Extreme Cold

What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered extreme cold. Extreme cold incidents occur when temperatures drop well below normal in an area. Extremely cold temperatures often accompany a winter storm, so individuals may have to cope with power failures and icy roads. Although staying indoors as much as possible can help reduce the risk of car crashes and falls on the ice, individuals may also face indoor hazards. Many homes will be too cold – either due to a power failure or because the heating system is not adequate for the weather. As people use space heaters and fireplaces to stay warm, the risk of household fires and carbon monoxide poisoning increases. Exposure to cold temperatures can lead to serious or life-threatening health problems such as hypothermia, cold stress, frostbite, or freezing of the exposed extremities such as fingers, toes, nose, and ear lobes.

4.5.5 Flooding Identification

Flooding is an overflowing of water onto normally dry land and is one of the most significant and costly of natural disasters. The principle types of floods are dam or levee failure, flash floods, riverine floods, and storm surge flooding.

Figure 4.5: Depiction of a Flood

Source: NOAA

Dam/Levee Failure floods usually result from intense rainfall or snow melt that produces water quantities that breach dams or levees because of faulty design, construction, or operational inadequacies. Levee failures may also result from storm surge in coastal areas.

Flash floods result from quickly rising streams after heavy rain or rapid snowmelt, ice jams (ice that accumulates at a natural or human-made obstruction and slows the flow of water) or the absence or overflow of storm sewers in a relatively small drainage area and produce localized floods of great volume and short duration. Flash floods usually result from tropical storm/hurricane or thunderstorm weather incidents.

Riverine floods result from precipitation or snowmelt over large areas and occur in river systems and tributaries that may drain large geographic areas. The precipitation usually results from tropical storm/hurricane or thunderstorm weather incidents.

Storm Surge floods result from tropical storm/hurricane weather incidents.

Tsunami floods are the result of an extreme ocean wave breaking on shore, usually generated by extremely high winds or a seismic incident occurring in adjacent oceans.

Other flood-related definitions:

Floodplain - Any land area susceptible to inundation by floodwaters from any source.

100/500-Year Floodplain is defined as the area adjoining a river, stream, or watercourse covered by water in the event of a 100/500-year flood.

The term "100-year flood" is misleading. It is not a flood that will occur once every 100 years. Rather, it is the flood elevation that has a 1 percent chance of being equaled or exceeded each

year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. A structure located within a special flood hazard area shown on a map has a 26 percent chance of suffering flood damage during the term of a 30-year mortgage. One hundred year floodplains have been identified, mapped and used for further analysis using the county's Geographic Information System (GIS).

The 500-year standard (0.2-percent-annual-chance) follows the same logic as the 100-year flood definition.

Floodway: The channel of a river or watercourse and the adjacent areas that must be reserved in order to discharge the 100-year flood without cumulatively increasing the water surface elevation more than one foot.

Flood Fringe: That portion of the floodplain outside the floodway that is inundated by floodwaters in which encroachment is permissible**.**

Encroachment: Any man-made obstruction in the floodplain that displaces the natural passage of floodwaters**.**

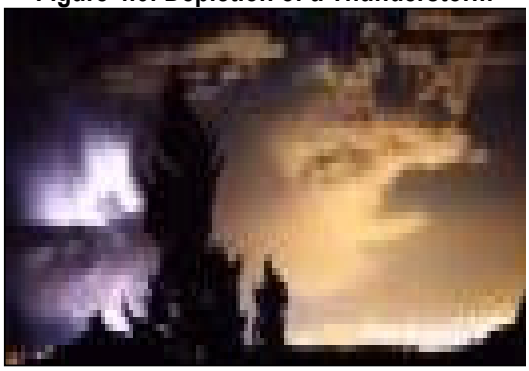
Surcharge: An increase in flood elevation due to destruction of the floodplain that reduces conveyance capacity**.**

Described below are the major causes of natural hazard flooding: Thunderstorms, Tropical Storms/Hurricanes, and Storm Surge.

4.5.5.1 Flooding Thunderstorm Identification

Thunderstorms are associated with heavy rains that can lead to riverine, dam/levee failure, and flash flooding. Thunderstorms are formed from a combination of moisture, rapidly rising warm air, and a force capable of lifting air (such as a sea breeze, a warm and cold front, or a mountain). Thunderstorms may occur singly, in clusters, or in lines. The most severe weather occurs when a single thunderstorm affects one location for an extended time.

Figure 4.6: Depiction of a Thunderstorm



Source NOAA

Thunderstorms affect relatively small, localized areas. Thunderstorms can strike in all regions of the U.S., but, are most common in the central and southern states. The atmospheric conditions in these regions of the country are ideal for generating these powerful storms (NVRC, 2006). More than 100,000 thunderstorms occur each year in the U.S.; however, only about 10% are classified as severe.

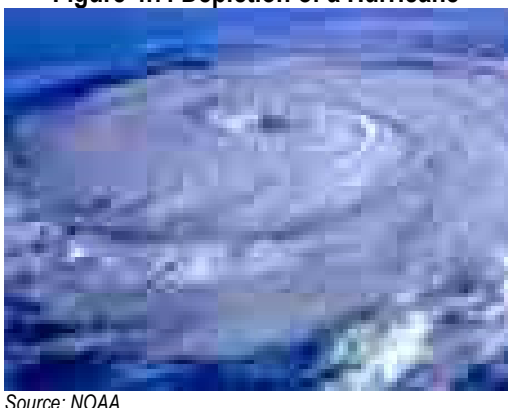
4.5.5.2 Flooding Tropical Storm/Hurricane Identification

As a tropical storm/hurricane nears land, it usually brings torrential rains that can last for days. These torrential rains cause dam/levee failure, riverine, and flash flooding**.**

A Tropical Storm is an organized system of strong thunderstorms with maximum sustained winds between 34 to 63 knots (39 to 73 mph) (FEMA, 2007). In time, the storm becomes more organized and begins to become more circular in shape, resembling a hurricane.

A Hurricane is an intense tropical cyclone with wind speeds reaching a minimum constant speed of 74 mph (FEMA, 2004). It is a category of tropical cyclone characterized by thunderstorms and defined surface wind circulation. Hurricanes are caused by the atmospheric instability created by the collision of warm air with cooler air. They form in the warm waters of tropical and sub-tropical oceans, seas, or Gulf of Mexico (NWS, 2000). Hurricanes begin when areas of low atmospheric pressure move off the western coast of Africa and into the Atlantic, where they grow and intensify in the moisture-laden air above the warm tropical ocean. Air moves toward these atmospheric lows from all directions and circulates clockwise under the influence of the Coriolis effect, thereby initiating rotation in the converging wind fields. When these hot, moist air masses meet, they rise up into the atmosphere above the low-pressure area, potentially establishing a self-reinforcing feedback system.

Figure 4.7: Depiction of a Hurricane



Source: NOAA

4.5.5.3 Flooding Dam/Levee Failure Identification

A dam is a barrier constructed across a watercourse for the purpose of storage, control, or diversion of water. A levee is a barrier constructed along the side of a watercourse or along a coastal or bay shoreline for the purpose of preventing water-flow to extend beyond the watercourse, ocean, or bay. Dams and levees generally fall into the following categories**:**

Earth Dams/Levees make up the vast majority of dams and levees and are safe if properly constructed and maintained.

Concrete Gravity Dams/Levees are designed to resist sliding and overturning.

Buttress Concrete Dams/Levees have a strong foundation and are resistant to sliding, overturning, and overflowing.

Arch Concrete Dams are used to narrow sites and have strong abutments.

Gravity Arch Concrete Dams are a conservative design of the Arch.

Stone Masonry Dams are constructed of stone or block with masonry joints.

Figure 4.8: Depiction of a Dam Break

Source: NEMA

The degree and extent of damage from a dam failure depends on the size of the dam or levee. The greatest threat to people and property is in the area immediately below a dam since the volume of water decreases as the flood wave moves downstream.

The degree and extent of damage from a levee failure depends on the height and length of the levee preventing water from inundating the area protected by the levee and the elevation of the land or structures at risk. The greatest threat to people and property is in the area immediately adjacent to the waterway, ocean, or bay. A levee failure resulting from storm surge would have

an effect similar to a dam break, whereas a levee failure along a watercourse generally affects an area with a lower volume of water over a longer time.

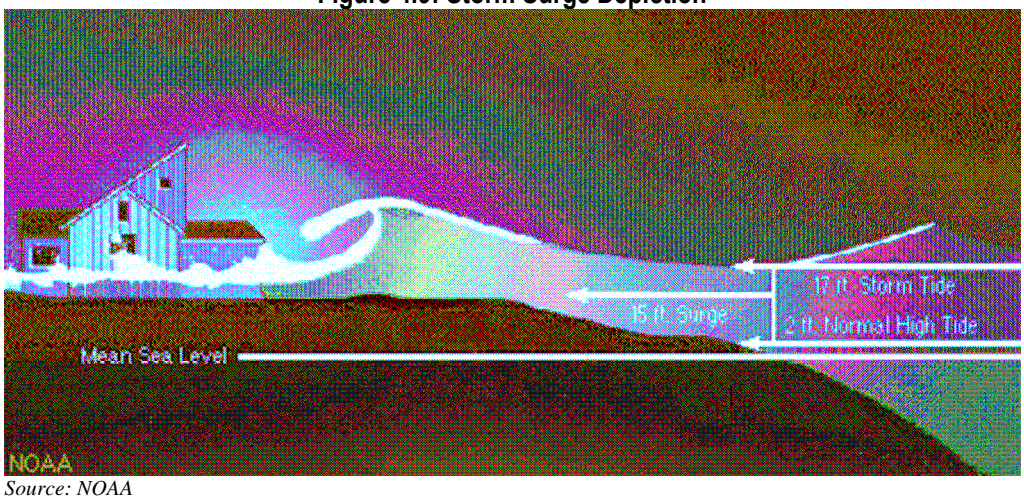
4.5.5.4 Flooding Storm Surge Identification

Storm surge is water that is pushed toward the shore by the force of the winds swirling around a tropical storm or hurricane. This advancing surge combines with the normal tides to raise the water level. Wind driven waves are superimposed on the storm surge. A rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides. The storm surge creates a large dome of water, often 50 to 100 miles wide that sweeps across the coastline near where the hurricane makes landfall.

The stronger the hurricane and the shallower the offshore water, the higher the storm surge will be (NWS, 2000). Storm surges are particularly damaging when they occur during a high tide, combining the effects of the surge and the tide. As the water slams into shoreline structures, even well built structures can quickly be demolished. As the water moves inland, carrying debris, it can cause further damage.

Because storm surge is produced by the high winds circulating a tropical/storm or hurricane, the resulting storm surge can occur from any direction when the hurricane is over the ocean or large bodies of waters such as bays.

Figure 4.9: Storm Surge Depiction



Source: NOAA

4.5.5.5 Tsunami Identification

A tsunami is the generation of an extreme ocean wave breaking on-shore, generally as a result of extremely high winds or a seismic incident occurring in adjacent oceans.

Characteristics of Tsunamis

Debris: As the tsunami wave comes ashore, it brings with it debris from the ocean, including man-made debris like boats, and as it strikes the shore, creates more on-shore debris. Debris can damage or destroy structures on land.

Distance from shore: Tsunamis can be both local and distant. Local tsunamis give residents only a few minutes to seek safety and cause more devastation. Distant tsunamis originating in places like Chile, Japan, Russia, or Alaska can also cause local damage.

High tide: If a tsunami occurs during high tide, the water height will be greater and cause greater inland inundation, especially along flood control and other channels.

Outflow: Outflow following inundation creates strong currents, which rip at structures and pound them with debris, and erode beaches and coastal structures.

Water displacement: When a large mass of earth on the ocean bottom sinks or uplifts, the column of water directly above it is displaced, forming the tsunami wave. The rate of displacement, the motion of the ocean floor at the earthquake epicenter, the amount of displacement of the rupture zone, and the depth of water above the rupture zone all contribute to tsunami intensity.

Wave run-up: is the height that the wave extends upon steep shorelines, measured above a reference level (the normal height of the sea, corrected to the tide at the time of wave arrival).

Wave strength: Even small wave heights can cause strong, deadly surges. Waist-high surges can cause strong currents that float cars, structures, and other debris.

The following factors will affect the severity of a tsunami:

Coastline configuration: Tsunamis impact long, low-lying stretches of linear coastlines, usually extending inland for relatively short distances. Concave shorelines, bays, sounds, inlets, rivers, streams, offshore canyons, and flood control channels may create effects that result in greater damage. Offshore canyons can focus tsunami wave energy, and islands can filter the energy. The orientation of the coastline determines whether the waves strike head-on or are refracted.

Coral reefs: Reefs surrounding islands in the western North Pacific and the South Pacific generally cause waves to break, providing some protection to the islands.

Earthquake characteristics: Several characteristics of the earthquake that generates the tsunami contribute to the intensity of the tsunami, including the area and shape of the rupture zone.

Fault movement: Vertical movements along a fault on the seafloor displace water and create a tsunami hazard. Earthquakes with greater magnitude cause more intense tsunamis. Shallow-focus earthquakes also have greater capacity to cause tsunamis.

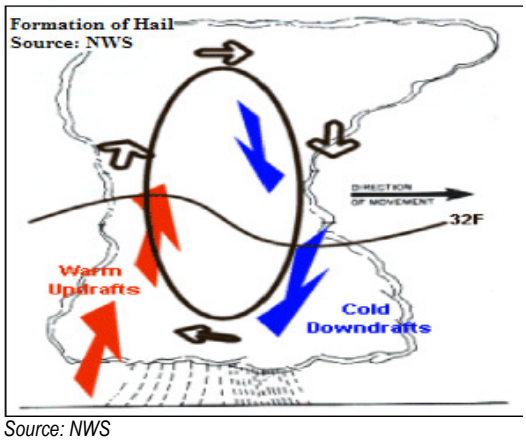
Human activity: With increased development, property damage increases, multiplying the amount of debris available to damage or destroy other structures.

4.5.6 Hail Identification

Hailstones are products of thunderstorms and are developed by downdrafts and updrafts that develop inside cumulonimbus clouds of a thunderstorm, where super cooled water droplets exist. The transformation of droplets to ice requires a temperature below 32°F and a catalyst in the form of tiny particles of solid matter, or freezing nuclei. Continued deposits of super cooled water cause the ice crystals to grow into hailstones.

The size of hailstones varies and is related to the severity and size of the thunderstorm that produced them. The higher the temperatures at the earth's

Figure 4.10: Formation of Hail



Source: NWS

surface, the greater the strength of the updrafts, and the greater the amount of time the hailstones are suspended, giving the hailstones more time to increase in size. Hailstones vary widely in size. Penny size or larger hail is considered severe**.**

Hailstorms occur most frequently during the late spring and early summer, when the jet stream moves northward across the Great Plains. During this period, extreme temperature changes occur from the surface up to the jet stream, resulting in the strong updrafts required for hail formation**.**

4.5.7 High Winds Identification

Wind is defined as the motion of air relative to the earth's surface. In the mainland United States, the mean annual wind speed is reported to be eight to 12 mph, with frequent speeds of 50 mph and occasional wind speeds greater than 70 mph. High winds are generally the result of thunderstorms, tornadoes, and tropical storms/hurricanes.

4.5.7.1 High Winds Tropical Storm/Hurricane Identification

Tropical Storm/Hurricane winds can quickly decimate the tree population, down power lines and utility poles, knock over signs, and damage/destroy homes and buildings. Flying debris can also cause damage to both structures and the general population. When hurricanes first make landfall, it is common for tornadoes to form.

A Tropical Storm is an organized system of strong thunderstorms with maximum sustained winds between 34 to 63 knots (39 to 73 mph) (FEMA, 2007). In time, the storm becomes more organized and begins to become more circular in shape, resembling a hurricane.

A Hurricane is an intense tropical cyclone with wind speeds reaching a minimum constant speed of 74 mph (FEMA, 2004). It is a category of tropical cyclone characterized by thunderstorms and defined surface wind circulation. Hurricanes are caused by the atmospheric instability created by the collision of warm air with cooler air. They form in the warm waters of tropical and sub-tropical oceans, seas, or Gulf of Mexico (NWS, 2000). Hurricanes begin when areas of low atmospheric pressure move off the western coast of Africa and into the Atlantic, where they grow and intensify in the moisture-laden air above the warm tropical ocean. Air moves toward these atmospheric lows from all directions and circulates clockwise under the influence of the Coriolis effect, thereby initiating rotation in the converging wind fields. When these hot, moist air masses meet, they rise up into the atmosphere above the low-pressure area, potentially establishing a self-reinforcing feedback system.

4.5.7.2 High Winds Thunderstorm Identification

High winds can result from thunderstorm inflow and outflow or from downburst winds when the storm cloud collapses, and can result from strong frontal systems, or gradient winds from high or low-pressure systems. Thunderstorms produce downdraft winds, which are defined as a small-scale column of air that rapidly sinks toward the ground, usually accompanied by precipitation as in a shower or thunderstorm. A downburst is the result of a strong downdraft. The downburst can cause damage equivalent to a tornado. The outflow of cool or colder air can also create damaging winds at or near the surface. As these downburst winds spread out they are often referred to as straight-line winds, which exceed 130 miles per hour.

Thunderstorms are formed from a combination of moisture, rapidly rising warm air, and a force capable of lifting air (such as a sea breeze, a warm and cold front, or a mountain). Thunderstorms usually occur singly and affect relatively small, localized areas; however, they may occur in clusters, or in lines. The most severe weather occurs when a single thunderstorm affects one location for an extended time.

4.5.7.3 High Winds Tornado Identification

Figure 4.11 Depiction of a Tornado

Source NOAA

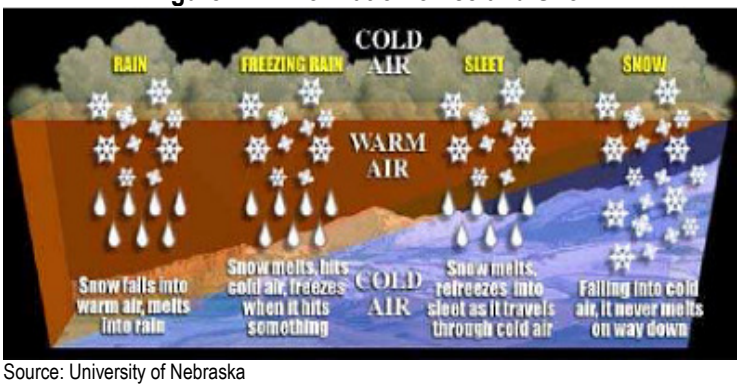
Tornadoes are violent windstorms characterized by a twisting, funnel-shaped cloud. A tornado is spawned by a thunderstorm or hurricane and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. A funnel does not need to reach to the ground for a tornado to be present. Tornados occur at any time of the year; however, the season is generally March through August.

The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of 1 mile wide and 50 miles long. Even with advances in meteorology, adequate warning time for tornadoes is short or sometimes not possible. A debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado. The damage from a tornado is a result of the high wind velocity and wind-blown debris.

4.5.8 Ice/Snow Storm Identification

Winter storms produce an array of hazardous weather conditions including heavy snow, blizzards, freezing rain, ice pellets, and extreme cold. Severe Ice/Snow storms are extra-tropical cyclones (storms that form outside of the warm tropics) fueled by strong temperature gradients and an active upper-level jet stream. The definitions of winter storms include:

Figure 4.12: Formation of Ice and Snow



Source: University of Nebraska

Blizzards: The occurrence of the following conditions lasting for three hours or longer: wind speeds of 35 miles per hour (mph) or more; considerable falling and/or blowing snow (reducing visibility frequently to less than ¼ mile); and generally temperatures of 20° F or lower.

A severe blizzard has wind speeds of 45 mph or more; a great density of falling and/or blowing snow (reducing visibility to near zero); and temperatures of 10° F or lower.

Ice and Sleet Storms are defined as storms that generate a sufficient quantity of ice or sleet to result in hazardous conditions and/or property damage. An ice storm (freezing rain) is probably

the most serious of the winter storms. It occurs during a precipitation incident when warm air aloft exceeds 32°F while the surface remains below the freezing point. When precipitation originating as rain or drizzle contacts physical structures on the surface, ice forms on all surfaces, creating traffic issues and downed utility lines and tree limbs.

Sleet forms when precipitation originating as rain falls through a large layer of the atmosphere that has below freezing temperatures allowing raindrops to freeze before reaching the ground. Sleet is also referred to as ice pellets. Sleet storms are usually of shorter duration than freezing rain and generally create fewer problems.

4.5.9 Landslides/Mudslides Identification

Landslides (rockslides, mudslides, etc.) are among the most common natural hazards. Unlike most natural hazards, however, most damage is not caused by extreme incidents, but by uncounted (and often unreported) minor slides. The hazards associated with landslides are as diverse as the types of failure.

Falls may damage roads or buildings at the base of a steep slope, injure climbers, or remain on a road as a hazard to transportation.

Slumps usually damage utilities within or below the slide mass, but seldom cause a threat to life.

Flows surround well-built structures causing damage from water and mud.

Figure 4.13 Landslide Depiction

Source: NOAA

Translational slides can be the most catastrophic. In addition to presenting a hazard to structures and utilities, they can cause damage and death both far from and slightly below the source.

In addition to the direct hazards of a landslide moving out from under or onto structures or utilities, there is a major indirect hazard. Large slides generally do not stop moving until they reach the bottom of a valley where they block streams, usually resulting in flooding and damage to the system ecology.

4.5.10 Land Subsidence Identification

Subsidence is a phenomenon that combines soil compaction and geological/tectonic forces. Subsidence is the formation of depressions, cracks, and sinkholes in the earth's surface, which normally occurs over many days to a few years, usually a result of karst topography. Karst topography develops when beds of relatively soft limestone and dolomite are present. The diluted organic acids present in water percolate downward and dissolve these formations. In such places, rock is honeycombed with cracks, fissures, and potentially large caverns that can collapse.

Figure 4.14: Depiction of Land Subsidence

Source: FEMA

Subsidence results from a number of factors including:

compaction/consolidation of shallow strata caused by the weight of river delta deposits, soil oxidation, and aquifer draw-down (shallow component); consolidation of deeper strata (intermediate components); and tectonic effects (deep component). This last element was only recently quantified, and research indicates that it accounts for 50% or more of subsidence.

In some areas natural drainage occurs below ground rather than via surface streams. These underground passages are commonly connected to the surface by funnel-shaped depressions called sinkholes. The formation of these sinkholes often leads to ground subsidence or collapse. This results from the settlement or collapse of overlying materials into openings beneath the surface, such as caves or enlarged joints. Sinkhole development is usually a slow process; however, they may occur suddenly. In addition to sinkholes, land subsidence also occurs when abandoned mines, mine shafts, and tunnels give way.

4.5.11 Lightning Identification

Lightning is generally associated with thunderstorms and is an electrical discharge that results from the buildup of positive and negative charges. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees in a split second.

Figure 4.15: Depiction of Lightning

Source: NWS

Lightning casualties can happen at the beginning of an approaching storm; however, more than half of lightning deaths occur after a thunderstorm has passed. The lightning threat diminishes after the last sound of thunder, but may persist for more than 30 minutes. When thunderstorms are in the area, but not overhead, the lightning threat can exist when skies are clear. Lightning has been known to strike more than 10 miles from the storm in an area with clear sky above.

According to the National Oceanic and Atmospheric Administration (NOAA), an average of 20 million cloud-to-ground flashes are detected every year in the continental United States. About half of all flashes have more than one ground strike point, so at least 30 million points on the ground are struck on the average each year. In addition, there are roughly 5 to 10 times as many cloud-to-cloud flashes as there are to cloud-to-ground flashes (NOAA, July 7, 2003).

4.5.12 Wildfire Identification

A wildfire is any instance of uncontrolled burning in grasslands, brush, or woodland. A wildfire is further defined as an uncontrolled fire spreading through vegetative fuels, possibly consuming structures (FEMA, 2001). Wildfires often begin unnoticed and spread quickly. The Federal Emergency Management Agency (FEMA) Fire Management Assistance Grant Program (FMAGP) indicates that a wildfire, also known as a forest fire, vegetation fire, grass fire, or brush fire, is an uncontrolled fire requiring suppression action.

Common causes of wildfires include lightning, negligent human behavior, and arson. Many sources indicate that arson, defined as an intentional and willful "crime of setting a fire for an unlawful or improper purpose," is the leading cause of wild land fires in most states.

FEMA indicates that there are four categories of wildfires that are experienced throughout the U.S. These categories are defined as follows:

Interface or intermix fires – Urban wild land interface fires are wildfires in a geographical area where structures and other human development meet or intermingle with wild land or vegetative fuels. Vegetation and the built-environment provide fuel to urban/wild land fires.

Figure 4.16: Depiction of a Wildfire

Source: FEMA

Firestorms – Fires of such extreme intensity that effective suppression is virtually impossible. Firestorms occur during extreme weather and generally burn until conditions change or the available fuel is exhausted.

Prescribed fires and prescribed natural burns – fires that are intentionally set or selected natural fires that are allowed to burn for beneficial purposes (FEMA, 1997).

Wild land fires are wildfires in an area where development is essentially nonexistent except for roads, railroads, power lines, and similar facilities. Wild land fires are fueled almost exclusively by natural vegetation. Wild land fires can be classified as surface fires, ground fires, and/or crown fires. Surface fires are the most common type and burn along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires are spread rapidly by wind and move quickly by jumping along the tops of trees.

The potential for wildfire depends upon fuel characteristics, climate conditions, meteorological conditions, and fire behavior. Hot, dry summers and dry vegetation increase susceptibility to fire. The potential for wildfire, and its subsequent development and severity, is determined by the area's topography, the presence of fuel, and weather.

Topography can have a powerful influence on wildfire behavior. The movement of air over the terrain tends to direct a fire's course. Gulches and canyons can funnel air and act as a chimney, intensifying fire behavior and inducing faster spread rates. Saddles on ridge tops tend to offer lower resistance to the passage of air and will draw fires. Solar heating of drier, south-facing slopes produces upslope thermal winds that can complicate behavior.

Slope is an important factor. If the uphill slope doubles, the rate at which the wildfire spreads will most likely double. On steep slopes, fuels on the uphill side of the fire are closer physically to the source of heat. Radiation preheats and dries the fuel, thus intensifying fire behavior. Terrain can inhibit wildfires: fire travels down slope much more slowly than it does upslope, and ridge tops often mark the end of wildfire's rapid spread (FEMA, 1997).

Fuels are classified by weight or volume (fuel loading) and by type. Fuel loading can be used to describe the amount of vegetative material available. If this doubles, the energy released can also double. Each fuel type has a burn index, which is an estimate of the amount of potential energy that may be released. Different fuels have different burn qualities. Grass releases relatively little

energy but can sustain very high rates of spread (FEMA, 1997). According to the U.S. Forest Service, a forest stand may consist of several layers of live and dead vegetation in the understory (surface fuels), midstory (ladder fuels), and overstory (crown fuels). Fire behavior is strongly influenced by these fuels.

Surface fuels consist of grasses, shrubs, litter, and woody material lying on the ground. Surface fires burn low vegetation, woody debris, and litter. Under the right conditions, surface fires reduce the likelihood that future wildfires will grow into crown fires.

Ladder fuels consists of live and dead small trees and shrubs, live and dead lower branches from larger trees, needles, vines, lichens, mosses, and any other combustible biomass located between the top of the surface fuels and the bottom of the overstory tree crowns.

Crown fuels are suspended above the ground in treetops or other vegetation and consist mostly of live and dead fire material. When historically low-density forests become overcrowded, tree crowns may merge and form a closed canopy. Tree canopies are the primary fuel layer in a forest crown fire (U.S. Forest Service, 2003).

4.5.13 Volcano Identification

A volcano is an opening or rupture, in a planet's surface or crust, which allows hot magma, volcanic ash, and gases to escape from below the surface.

Figure 4.17: Mt St. Helens Volcano - Skamania County, Washington

Source: Wikipedia

Volcanoes are generally found where tectonic plates are diverging or converging. A mid-oceanic ridge, for example the Mid-Atlantic Ridge, has examples of volcanoes caused by divergent tectonic plates pulling apart; the Pacific Ring of Fire has examples of volcanoes caused by convergent tectonic plates coming together. By contrast, volcanoes are usually not created where two tectonic plates slide past one another. Volcanoes can also form where there is stretching and thinning of the earth's crust (called "non-hotspot intraplate volcanism"), such as in the East African Rift, the Wells Gray-Clearwater Volcanic Field, and the Rio Grande Rift in North America. Volcanoes can be caused by mantle plumes. These so-called hotspots, for example at Hawaii, can occur far from plate boundaries. Hotspot volcanoes are also found elsewhere in the solar system, especially on rocky planets and moons.

The most common perception of a volcano is of a conical mountain, spewing lava and poisonous gases from a crater at its summit. This describes just one of many types of volcano, and the features of volcanoes are much more complicated. The structure and behavior of volcanoes depends on a number of factors. Some volcanoes have rugged peaks formed by lava domes rather than a summit crater, whereas others present landscape features such as massive plateaus.

Vents that issue volcanic material (lava, which is what magma is called once it has escaped to the surface, and ash) and gases (mainly steam and magmatic gases) can be located anywhere on the landform. Active mud volcanoes tend to involve temperatures much lower than those of igneous volcanoes, except when a mud volcano is actually a vent of an igneous volcano.

4.6 TECHNOLOGICAL/HUMAN-CAUSED HAZARDS IDENTIFICATION

The Tennessee Emergency Management Agency, Planning Branch and Mitigation Section, performed a technical review and evaluation of the technological/human-caused hazards documented in the Federal Emergency Management Agency State and Local Mitigation Planning How-To Guide" entitled "Integrating Manmade Hazards Into Mitigation Planning." Additionally, further review/evaluation of possible other technological/human-caused hazards in all 95 counties of the State were accomplished through in-depth surveys (Office of Domestic Preparedness (ODP) Jurisdiction Assessment Report). Coupled with information derived from local planning efforts, as well as numerous other state and federal documents/data sources, the surveys provided a point of embarkation toward the State's final hazard identification decision, made in similar fashion as that for the natural side of the hazard triad.

Table 4.4: State of Tennessee Technological and Human-Caused Hazards

HAZARD	PROBABILITY OF OCCURRENCE	HISTORICAL OCCURRENCE	SOURCES
Hazardous Materials			
Chemical	M	Y	TEMA, FEMA, DOE, NRC, TDEC
Radiological	L	Y	TEMA, FEMA, TDEC, TDOT,TDOS
Transportation			
Air	L	Y	TDOT, NTSB, FAA
Highway	H	Y	TDOT, TDOS, NTSB, TEMA
Rail	M	Y	TDOT, NTSB, TEMA
Water	L		TDOT, USCG, NTSB
Communications Failure	L	Y	TEMA, TDF&A
Energy Failure	L	Y	TDE&CD, TVA, TRA, TEMA
Dam Failure	L	Y	TVA, USCOE, TDEC, TDOS
Biologic- Human/Animal Disease Epidemic	L	Y	TDH, TDA, TWRA, CDC
Enemy Attack*	L	Y	History
Civil Disturbance	L	Y	TDOS, TEMA, TBI,
Terrorism – Chemical, Biological, Radiological, Conventional, Cyber	M	Y	TDOS, HS, TEMA, FBI, TBI, TDH

4.6.1 Attack Identification

Attack is defined as any hostile attack against the United States, using nuclear weapons, which results in destruction of military and/or civilian targets. All areas of the United States are conceivably subject to the threat of nuclear attack. However, the strategic importance of military bases, population centers, and certain types of industries place these areas at greater risk than others. The nature of the nuclear attack threat against the U.S. has changed dramatically with the end of the "Cold War" and the conversion of previous adversaries to more democratic forms of

government. Even so, the threat still exists for a nuclear attack against this country. Despite the dismantling of thousands of nuclear warheads aimed at U.S. targets, there remain in the world a large number of nuclear weapons capable of destroying multiple locations simultaneously. In addition, controls on nuclear weapons and weapons components are sporadic at best in the former Soviet Union, and the number of countries capable of developing nuclear weapons continues to grow despite the ratification of an international nuclear nonproliferation treaty. The possibility of nuclear materials being used in a terrorist attack is also becoming uncomfortably plausible. It appears that the threat of nuclear attack will continue to be a hazard in this country for some time in the future.

Currently, attack planning guidance prepared by the federal government in the late 1980s still provides the best basis for a population protection strategy. That guidance has identified potential target areas in communities, classified as follows: 1) commercial power plants; 2) chemical facilities; 3) counterforce military installations; 4) other military bases; 5) military support industries; 6) refineries; and 7) political targets. For each of these target areas, detailed plans have been developed for evacuating and sheltering the impacted population, protecting critical resources, and resuming vital governmental functions in the post-attack environment. While it is possible for a device to be detonated accidentally in unintended or seemingly random locations due to error, technological device limitations, or mission failure, it is still a good assumption that the locations that are at the greatest risk of attack are those that are most vital to our country's operation. In addition to specific ground target areas, some high-altitude detonation sites may be selected with the intention of maximizing the disruptive effects of a nuclear weapon's electromagnetic pulse on our country's electronic infrastructure.

4.6.2 Civil Disorder Identification

Civil disorder is most commonly thought of as racial tension, racial unrest, or other connotations and implications regarding race. Civil disorder is defined however, as “unlawful actions by a civilian population with the intent to demonstrate unlawfully against the peace and welfare of the government.” Also known as rioting, it is further defined by law as "...a public disturbance involving an assemblage of three or more persons; which by disorderly and violent conduct, or the imminent threat of disorderly or violent conduct, results in injury or damage to persons or property, or creates a clear and present danger of injury or damage to persons or property."

Civil disorders can take the form of small gatherings or large groups blocking or impeding access to a building, or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full-scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals.

Generally, there are two types of large gatherings typically associated with disorders: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories:

Casual Crowd – A casual crowd is a group of people who happen to be in the same place at the same time. The likelihood of violent conduct is non-existent.

Cohesive Crowd – A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshiping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.

Expressive Crowd – An expressive crowd is one held together by a common commitment or purpose. Although members may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group protesting something.

Aggressive Crowd – An aggressive crowd is comprised of individuals who have assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They tend to be impulsive and highly emotional, and require only minimal stimulation to arouse them to violence. Examples of this type of crowd include demonstrators and strikers.

A mob can be defined as a large disorderly crowd. Mobs are usually emotional, loud, tumultuous, violent, and lawless. Similar to crowds, mobs have different levels of commitment and can be classified into four categories:

Aggressive Mob – An aggressive mob is one that attacks, riots, and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.

Escape Mob – An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs have lost their capacity to reason and are generally impossible to control. They are characterized by unreasonable terror.

Acquisitive Mob – An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property. Examples of acquisitive mobs would include the looting in south central Los Angeles in 1992.

Expressive Mob – An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations. Examples of this type of mob include the June 1994 riots in Canada following the Stanley Cup professional hockey championship, European soccer riots, and those occurring after other sporting events in many countries, including the United States.

Although members of mobs have differing levels of commitment, as a group they are far more committed than members of a crowd. As such, a “mob mentality” sets in, which creates a cohesiveness and sense of purpose that is lacking in crowds.

4.6.3 Communications Failure Identification

Communication failure is defined as the severe interruption or loss of private and/or public communications systems, including but not limited to transmission lines, broadcast, relay, switching and repeater stations, as well as communications satellites, electrical generation capabilities, and associated hardware and software applications necessary to operate communications equipment.

Communication systems, like other utilities may suffer disruption from natural or manmade disasters. Seismic bracing should be reviewed on a regular basis to ensure system stability. Transmission stations, land lines, satellites, cellular, and other facilities cannot be made completely secure and are therefore vulnerable to disruption.

Satellites are vital in the respect that they provide communication capabilities with the world outside of our local area. We depend on them daily for news, weather forecasts and national defense. They are subject to the effects of natural disasters such as cosmic debris and mass coronal ejections (MCE). They are also subject to mechanical and electrical system failure like any other communication device. These disruptions may result from equipment failure, human acts (deliberate or accidental), or the results of natural or human-caused disasters. A communications failure would affect essential facilities and the day-to-day operations of local government, as well as the business community. Sites of concern would range from dispatch agencies, SCADA systems, satellite uplink and downlink sites, internet service provider sites, and the telecommunication industry switching sites.

Figure 4.18 Communications Tower

Source: FEMA

4.6.4 Hazardous Materials Identification

Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States – from major industrial plants to local dry cleaning establishments and gardening supply stores. Hazardous materials are transported by highway, railway, waterway, and pipeline daily, so any area is vulnerable to a hazardous materials incident.

Hazardous materials incidents typically take three forms: transportation incidents, pipeline incidents, and fixed facility chemical and radiological incidents. It is reasonably possible to identify and prepare for a fixed site incident, as laws require those facilities to notify state and local authorities as to what is being used or produced. Transportation and pipeline incidents are much harder to prepare for as the incident location, and often the material involved are not known until the accident actually occurs.

Figure 4.19: Hazmat Train Accident

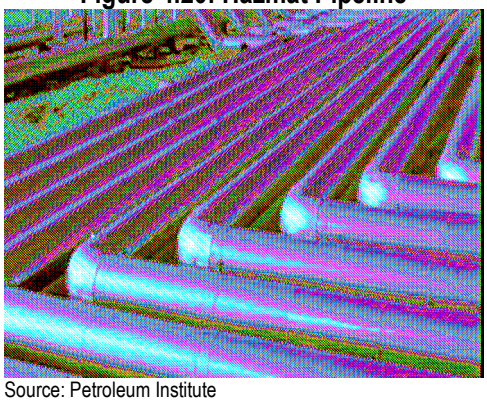
Source: TVA

Fixed Facility Incident is any occurrence of uncontrolled release of materials from a fixed site that poses a risk to health, safety, and property as determined in the EPA's Resource Conservation and Recovery Act. These materials are classed identically to those specified in the section on transportation accidents

Transportation Incident is any hazardous material release during transport that poses a risk to health, safety, and property, as defined by Department of Transportation materials transport regulations. Hazardous materials transportation incidents can occur at any time and place, although the majority occurs on interstate highways, major federal or state highways, or on the major rail lines

Pipeline Incident is a release of hazardous materials that are transported by a pipeline. In the U.S., pipelines are the principle mode for transportation of oil and petroleum products such as gasoline, and virtually all natural gas is moved by pipeline. The potential risk of pipeline accidents is a significant national concern. Much of the oil pipeline infrastructure is old, requiring regular safety and environmental reviews to ensure its safety and reliability. Energy pipelines are also extremely vulnerable to sabotage and disruption, and the resulting spills can generate large-scale environmental damage and require extensive clean-up and remediation. Recently, the U.S. Department of Homeland Security identified the energy sector as one of the 14 primary Critical Infrastructures, and pipelines in particular must be evaluated to determine the impact of loss or damage. In 2004, the Hazardous Materials Pipeline Act required all pipeline owners to conduct an analysis of pipeline exposures.

Figure 4.20: Hazmat Pipeline



Source: Petroleum Institute

Radiological Incident is defined as the unintentional exposure to materials that emit ionizing radiation. Nuclear power plants are a significant potential source of ionizing radiation. The health and environment impacts from the Three-Mile Island and Chernobyl, Russia disasters illustrate the potential hazards from nuclear power plants. Other sources of ionizing radiation include medical and diagnostic X-ray machines, certain surveying instruments, some imaging systems used to check pipelines, radioactive sources used to calibrate radiation detection instruments, and even some household fire detectors.

Figure 4.21: Nuclear Facility

Source: TVA

4.6.5 Illegal Methamphetamine Labs Identification

Typically methamphetamine ("meth") is a white powder that easily dissolves in water. Another form of meth is clear, chunky crystals called crystal meth, or ice. Meth can also be in the form of small, brightly colored tablets. The pills are often called by their Thai name, yabba. Street terms for methamphetamine are meth, poor man's cocaine, crystal meth, ice, glass, and speed.

Amphetamine, dextroamphetamine, methamphetamine, and their various salts are collectively referred to as amphetamines. In fact, their chemical properties and actions are so similar that even experienced users have difficulty knowing which drug they have taken. Methamphetamine is the most commonly abused.

Figure 4.22 Methamphetamine

Source: DEA

Illegal domestic labs that produce meth are dependent on supplies of the precursor ephedrine or pseudoephadrine. Sometimes it is smuggled in quantity from Canada and Mexico, but may be readily purchased over-the-counter in some states in the form of the decongestant Sudafed and other pseudoephadrine-containing cold tablets. Depending on the method used, meth is "cooked" using the cold medicine and other easily obtained items such as coffee filters, lye, battery acid, matchbook striker plates, iodine, lithium batteries, and Coleman fuel.

The process of cooking meth leaves behind a hazardous coating on walls, floors, and in ventilation systems. State law requires meth-contaminated property be quarantined until clean up operations have been completed and the property tested by a certified contractor as safe for habitation. Cost for cleaning and certifying a 1,200 square foot house is about $9,000. In hotels, rooms adjacent, above, and below must also be certified as safe.

In recent years, reports of a simplified "Shake 'n Bake" synthesis have surfaced. The method is suitable for such small batches that pseudoephedrine restrictions are less effective, it uses chemicals that are easier to obtain (though no less dangerous than traditional methods), and it is so easy to carry out that some addicts have made the drug while driving.

Drug Enforcement Agency officials estimate that for each pound of meth produced, a lab operator winds up with 6 pounds of toxic waste, including leftover chemicals such as anhydrous ammonia, lye, and solid meth residue.

4.6.6 Terrorism Identification

The Federal Bureau of Investigation (FBI) defines terrorism as "the unlawful use of force against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in the furtherance of political or social objectives." Incidents typically would be expected in urban areas near public gatherings, government facilities, or highly visible areas. Terrorism is generally categorized as one of two types.

Domestic terrorism involves groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction.

International terrorism involves groups or individuals whose terrorist activities are foreign-based and/or directed by countries or groups outside the U.S., or whose activities transcend national boundaries.

Figure 4.23 9/11 Terrorist Attack

Source: Dept. of Agriculture

A terrorist attack can take several forms including involving the use of Weapons of Mass Destruction (WMD). The term "Weapons of Mass Destruction" has various definitions. Common to all of them is the assumption that WMDs comprise incendiary, chemical, biological, radiological, nuclear and/or explosive agents. 50 U.S.C., § 2302 defines WMD as "any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of a toxic or poisonous chemicals or their precursors, a disease organism, or radiation or radioactivity."

4.6.6.1 Bombings

Bombings are the most frequently used method terrorist incident in the U.S. This includes the 1993 bombing of the World Trade Center in New York, the U.S. Capitol, Mobil Oil's corporate headquarters in New York City, and the bombing of the Alfred P. Murrah federal building in Oklahoma City. The World Trade Center Buildings and the Pentagon were the targets of a well-planned terrorist attack involving the use of commercial aircraft as flying bombs.

4.6.6.2 Chemical/Biological Agents

Chemical/Biological agents have been developed by several nations for use in warfare. Such agents are selected or adapted from bacteria, fungi, viruses, or toxins that cause various diseases in humans, animals, or food crops. Currently, the development of biological agents as weapons has kept pace with our ever-evolving day-to-day technology. Despite the widespread ban, international diplomatic efforts have not been entirely effective in preventing the enhancement and proliferation of offensive biological warfare programs. There are four major categories under which the chemical agents may be classified:

Blister agents are intended to incapacitate, rather than kill. These agents were used extensively during World War I. Their use by a terrorist group largely depends on the group's objectives and moral views. If the intent of an attack were to injure numerous people and overload the area's medical facilities without causing many deaths, a blister agent would be the best choice.

Choking agents were the agents most used during WW I. With the advent of nerve agents, they have lost much of their usefulness. These substances are intended to cause death and are convenient and readily available to terrorists.

Blood agents are cyanide-based compounds. Unsuited for use on multitudes of people, the primary use would be the assassination of targeted individuals.

Nerve agents are the most recently developed chemical weapons. Originally developed by German scientists 1930s as insecticides, nerve agents were used as chemical weapons by the Nazi military. Hundreds of times more lethal than blister, choking, or blood agents, nerve agents have been stockpiled as the primary chemical weapon. These chemicals are the most useful to terrorists due to the small quantity needed to inflict a substantial amount of damage.

4.6.6.3 Radiation Devices

Radiation devices, including a nuclear bomb, produce five primary potential effects:

- Overpressure: When a nuclear weapon explodes in the atmosphere, a blast or shock wave is created that initially moves at speeds higher than the speed of sound.
- INR/EMP: Initial nuclear radiation (INR) is radiation in the first minute after detonation and is hazardous to unprotected people within about 1.5 miles. Electromagnetic radiation pulse (EMP) is the conversion of nuclear energy into electromagnetic frequency and occurs when a nuclear weapon is detonated outside of earth's atmosphere. EMP disrupts electrical and electronic equipment across entire continents. The equipment is unusable until repaired.
- Fire Risk: The combined effects of blast overpressure damage and the thermal pulse or fireball can ignite combustible materials, causing sustained fires. Primary fires are those ignited directly by the thermal pulse. Secondary fires are generated by damage and

destruction from blast overpressures and result from the disruption of furnaces and gas and electric lines.

- Fallout Risk: A nuclear explosion near the ground makes a big crater. Earth from the crater is changed from solids into hot gas and fine dust. This hot gas and dust, together with vaporized materials, form a giant fireball that rises rapidly and becomes the top part of the nuclear mushroom cloud. The heavier particles of earth become the stem of the mushroom cloud. The earth in the stem and in the mushroom cloud becomes radioactive. The top of the mushroom is a cloud of fine particles. While the larger, heavier particles settle close to the point of explosion, the small particles float several hundred miles in the wind. The first 24 hours are the most dangerous as the initial fallout is highly radioactive. The delayed fallout particles lose much of their radioactivity and reach the earth in rain or snow over periods ranging from days to years.
- The three kinds of dangerous radiation in fallout are alpha, beta and gamma. Alpha radiation is stopped by the outer skin layers and does not usually present an external hazard. However, if contaminated air, food, or water enter the body in sufficient quantity, considerable internal damage can occur. Beta radiation is more penetrating and may cause burns on the skin. Gamma radiation penetrates the body, causing damage to organs, blood and bones. Large doses of gamma radiation can cause sickness or death. Small doses incurred over a long period of time may not have an immediate effect, but may cause various forms of illness later in life. Genetic damage in subsequent generations may also result.

The effects of a nuclear/radiation attack have varying effects on populations. Those people located near the explosion would be killed or seriously injured by the blast, heat, or initial nuclear radiation. People a few miles away would be subject to blast, heat, and fires. A high percentage of the population residing in the lighter damaged areas would probably survive, but might subsequently be endangered by radioactive fallout.

4.6.6.4 Cyber-Terrorism:

Figure 4.24 Cyber Attack

Source: DHS

Cyberterrorism is a phrase used to describe the use of Internet based attacks in terrorist activities, including acts of deliberate, large-scale disruption of computer networks, especially of personal computers attached to the Internet, by the means of tools such as computer viruses.

Cyberterrorism can also be defined as any computer crime targeting computer networks without necessarily affecting real world infrastructure, property, or lives. There is much concern from government and media sources about potential damages that could be caused by cyber terrorism, and this has prompted official responses from government agencies.

The U.S. interest in promoting cyber-security extends well beyond its borders. Critical domestic information infrastructures are directly linked with Canada, Mexico, Europe, Asia, and South America. The nation's economy and security depend on far-flung U.S. corporations, military forces, and foreign trading partners that require secure and reliable global information networks

to function. The vast majority of cyber attacks originates or passes through systems abroad, crosses several borders, and requires international cooperation to stop.

4.6.7 Transportation Accident Identification

A transportation accident is an incident related to a mode of transportation (highway, air, rail, waterway, port, harbor) where an emergency response is necessary to protect life and property. Transportation accidents are generally of four types:

An air transportation incident may involve a military, commercial, or private aircraft. Air transportation is playing a more prominent role in transportation as a whole; airplanes, helicopters, and other modes of air transportation are used to transport passengers for business and recreation as well as to move thousands of tons of cargo. A variety of circumstances can result in an air transportation incident; mechanical failure, pilot error, enemy attack, terrorism, weather conditions, and on-board fire can all lead to an incident at or near the airport. Air transportation incidents can occur in remote unpopulated areas, residential areas, or downtown business districts. Incidents involving military, commercial, or private aircraft can also occur while the aircraft is on the ground.

A railway transportation incident is a train accident that directly threatens life and/or property, or adversely impacts a community's capabilities to provide emergency services. Railway incidents may include derailments, collisions, and highway/rail crossing incidents. Train incidents can result from a variety of causes. Human error, mechanical failure, faulty signals, and problems with the track can all lead to railway incidents. Results of an incident can be range from minor "track hops" to catastrophic hazardous materials incidents, and even passenger casualties. With the many miles of track in the U.S., there are numerous at-grade crossings at which vehicles must cross the railroad tracks.

A highway transportation incident can be single or multi-vehicle accidents requiring responses exceeding normal day-to-day capabilities. Hundreds of thousands of trips a day are made on the streets, roads, highways, and interstates in the state; if the designed capacity of the roadway is exceeded, the potential for a major highway incident increases. Weather conditions play a major factor in the ability of traffic to flow safely in and through the state, as does the time of day (rush hour) and day of week.

Figure 4.25 Transportation Accident

Source: FEMA

A Waterway Transportation incident can involve ships, barges, ferries, and large and small pleasure craft. There have been hundreds of significant accidents involving ships and barges colliding with bridges and each other, resulting in significant property loss and loss of life. Ferry accidents have claimed thousands of lives.

4.6.8 Urban Fire Identification

Figure 4.26: Structure Fire

Source: NFPA

Fire is a rapid, persistent chemical reaction that releases heat and light, especially the exothermic combination of a combustible substance with oxygen. A fire is categorized as both a natural hazard and a manmade hazard. The types of fires include:

Residential: single family dwellings, apartments, mobile homes, hotels, and motels.

Public and Mercantile: stores, restaurants, grocery stores, institutions, churches, public facilities, education.

Industrial, Manufacturing: basic industry, manufacturing, storage, residential garages, and vacant buildings.

Vehicle Fires: aircraft, automobiles, trucks, trains, buses, boats.

There are many causes of fire as a technological hazard including careless smoking, cooking, arson, improper building wiring, industrial mishaps, and incidents such as train derailments or transportation collisions.

4.6.9 Utility Power Failure Identification

A major electrical power failure is defined as a failure of the electrical distribution system that will exceed twenty-four hours in duration and effect greater than 33% of a given geographical area. Electrical distribution systems can be interrupted for a number of reasons, but those that have historically been the main cause are high winds, severe thunderstorms, lightning, and winter storms.

The electric system in the U.S. is an interconnected, multi-modal distribution system that consists of three major parts: generation, transmission and distribution, along with control and communications. Generation assets include fossil fuel plants, hydroelectric dams, and nuclear power plants. Transmission systems link areas of the grid. Distribution systems manage and control the distribution of electricity into homes and businesses. Control and communications systems operate and monitor critical infrastructure components.

The nation's power and utility infrastructure has grown increasingly complex and interdependent; consequently, any disruption could have far-reaching effects. Large-scale power and utility failures may result from a variety of natural causes such as geomagnetic storms, severe weather, and earthquakes. They may also result from a variety of manmade causes such as technological accidents, equipment failures, or deliberate interference.

Almost every form of productive activity – whether in businesses, manufacturing plants, schools, hospitals, or homes – requires electricity. Utility power systems are critical components to the overall health and safety of citizens. A prolonged major electrical system failure during extreme temperatures can have dramatic effects on a population.

4.6.10 Water Contamination Identification

The water sector consists of two basic and vital components: fresh water supply and wastewater collection and treatment. Water sector infrastructures are diverse, complex, and range from rural to urban distribution systems. The primary focus of critical infrastructure protection efforts are the public water systems that depend on reservoirs, dams, wells and aquifers, as well as treatment facilities, pumping stations, aqueducts, and transmission pipelines.

Drinking water comes from surface water and from ground water. Large-scale water supply systems tend to rely on surface water resources such as rivers, lakes, and reservoirs. Smaller water systems tend to use ground water pumped from wells that are drilled into aquifers, geologic formations that contain water.

Wastewater tertiary treatment is sometimes defined as anything more than primary and secondary treatment in order to allow rejection into a highly sensitive or fragile ecosystem (estuaries, low-flow rivers, coral reefs,...). Treated water is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior to discharge into a stream, river, bay, lagoon or wetland, or it can be used for the irrigation of a golf course, green way or park. If it is sufficiently clean, it can also be used for groundwater recharge or agricultural purposes

The primary concerns with regard to water infrastructure are (1) adequate water supply and (2) the damage or disruption of service that could be caused by natural, technological, or human-caused hazards. Potential hazards includes:

- The introduction of pollutants into public groundwater and/or surface water supplies**;**
- Chemicals from leaking underground storage tanks, feedlots and waste disposal sites;
- Human wastes and pesticides that may be carried to lakes and streams;
- Physical damage to or destruction of water assets, including intentional releases of toxic chemicals;
- Actual or threatened contamination of the water supply;
- Cyber attack on water management systems or other electronic systems;
- Interruption of services from other infrastructure.

The Safe Drinking Water Act of 1974 sets uniform nationwide minimum standards for drinking water. State public health and environmental agencies have the primary responsibility for ensuring that federal and state drinking water standards are met by each public water supplier. The EPA requires an ongoing water quality monitoring program to ensure water systems are working properly, and require suppliers to inform the public if a supply becomes contaminated.

4.6.11 Pandemics/Epidemics/Vectors Identification

Pandemics occur when disease affects large numbers of the population worldwide. Epidemics occur when large numbers are affected in a more localized area such as a city, region, state, or nation. Vector-based threats – bacteria, insects, and animals – are threats that pose a direct or indirect hazard to humans, their food supply, or the economy**.**

Human Pandemic/Epidemic Hazards

Influenza occurs every year and nations attempt to prepare for the "flu season" which brings one to two weeks of symptoms, even pneumonia, and death. The cost in the U.S. is $71 to $167 billion annually. Some 36,000 in the U.S. and 250,000 to 500,000 worldwide die annually.

Three types of influenza viruses exist: A, B, and C. Type A viruses are of most concern for humans, pigs, marine mammals, and birds. Type B virus has been identified in the seal population and is fatal. Influenza C virus is associated with ticks.

Influenza viruses are constantly evolving. The viruses undergo minor and major modifications through antigentic drift and antigentic shift. Antigentic drift is the mechanism responsible for creating small changes in the genetic composition of the virus. Antigentic drift occurs in Type A and B influenza. Antigentic shift describes significant changes in the genetic structure of the virus. It occurs only in type A when two different virus strains are simultaneously present in a host, or after transmission of viruses from different hosts. The two viruses swap genetic material creating a "new" virus. The ability to jump species, the constant changes in the generic makeup of the influenza virus, the potential for vaccine loss, and the rapid spread of flu viruses are some of the reasons influenza is always a threat to the world's population.

Avian flu was first discovered in Canada. It is estimated that 50% of wild ducks in Canada carry forms of the flu. Highly infectious forms are destructive to domestic poultry. Three strains of avian influenza viruses are known to jump the species barrier from birds to non-human animals to humans: A(H9n2), A(H7N7) and A(H5N1). The most lethal, A(H5N1) causes death in 68% of humans infected. Coughing or sneezing, victims spew infectious droplets at a rate of 150 feet per second. Shaking hands or contact with contaminated public washrooms and doorknobs can spread the disease very quickly.

Scientists expect that an Avian H5 Flu virus, which has swept through chickens and other poultry in Asia, will transform into a flu that can be transmitted to humans. It has emerged as a highly pathogenic strain of influenza virus that is affecting the entire western component of Asia. The CDC is preparing for a possible pandemic. Humans have no immunity to this new avian flu.

Confirmed cases of human infection from several subtypes of avian influenza infection have been reported since 1997. Most cases of avian influenza infection in humans have resulted from contact with infected poultry (e.g., domesticated chicken, ducks, and turkeys) or surfaces contaminated with secretion/excretions from infected birds. The spread of avian influenza viruses from one ill person to another has been reported very rarely.

Small Pox (variola major) was last seen in the U.S. in 1949. The last naturally occurring case was in Somalia in 1977. Smallpox vaccination in the U.S. ended in 1972 except for military personnel.

When smallpox was considered eradicated worldwide, only two laboratories were designated to keep the virus. One lab was the CDC in Atlanta, Georgia, and the other lab was in Russia. When the USSR break-up occurred, the location of Russia's smallpox virus became unknown. It was widely thought that at least four other countries received part of the virus.

Variola is classified as a biological weapon, included on the "A" list by the CDC. The virus can be transmitted from person to person, may result in high mortality rate (30%), and cause panic and social disruption. Variola has a moderate to high potential for large-scale dissemination and requires special action for public health preparedness and response.

Hepatitis A Virus results from eating food or drinking water contaminated with human excrement. Outbreaks are associated with consumption of produce. Hepatitis A virus attacks the liver, is highly infectious, and can lead to varying degrees of illness, hospitalization, and death.

Emerging Pathogens: Severe Acute Respiratory Syndrome (SARS) started in China in late 2002. The World Health Organization reported 29 countries were affected by the end of July 2003.

There were 8,500 cumulative cases and 774 deaths. In the United States, 29 cases were confirmed. SARS is closely associated with influenza.

Emerging Pathogens: Monkey Pox Virus is an orthopoxvirus, which also includes cowpox and smallpox. It is a viral disease occurring in the rain forests of central and West Africa. Monkey pox is milder than smallpox. It was seen in the U.S. June 14, 2003. It was introduced to this country by prairie dogs infected by Gambian rats imported by a distributor of exotic pets. By June 18, 2003, 87 persons in six states were confirmed with the virus.

Animal and Vector-Based Agriculture Hazards

An "emerging" series of threats to communities is vector-based threats – bacteria, insects, and animals – that pose a direct or indirect hazard to humans, their food supply, or the economy.

Foot and Mouth Disease (FMD) is a highly infectious and difficult-to-control disease of cloven-hoofed mammals including cattle, swine, wild sheep, goats, deer, and pigs. Although many people don't consider Foot and Mouth Disease to be a "threat," an outbreak of the disease in Europe caused widespread concern over the safety of the meat supply, as well as the possibility of resulting infection of humans. Federal, state and local officials, including the emergency services community, have plans and procedures for handling incidents involving these threats. Should an outbreak occur anywhere in the United States, routine livestock movements could rapidly spread the disease making early detection, combined with immediate eradication of affected animals, crucial for controlling the disease. Left unchecked, the economic impact of FMD could reach billions of dollars in the first year. Deer and other wildlife would likely become infected and be a source for re-infection of livestock. FMD is not known to cause illness in humans.

Figure 4.27 Foot and Mouth Disease Animals

Source: Dept. of Agriculture

Mad Cow Disease (Bovine spongiform encephalopathy [BSE]), is a fatal neurodegenerative disease in cattle that causes a spongy degeneration in the brain and spinal cord. BSE has a long incubation period, about 30 months to 8 years, usually affecting adult cattle at a peak age onset of four to five years, all breeds being equally susceptible

The first animal to fall ill with the disease occurred in 1984 in Britain. Lab tests the following year indicated the presence of BSE; it was only in November 1986 that the British Ministry of Agriculture accepted it had a new disease on its hands. A British inquiry into BSE concluded that the epizootic was caused by cattle, which are normally herbivores, being fed the remains of other cattle in the form of meat and bone meal, which caused the infectious agent to spread. The origin of the disease itself remains unknown. The infectious agent is distinctive for the high temperatures at which it remains viable; this contributed to the spread of the disease in Britain, which had reduced the temperatures used during its rendering process. Another contributory factor was the feeding of infected protein supplements to very young calves.

In 2006, Hematech, Inc, a biotechnology company based in Sioux Falls, South Dakota, announced that it had used genetic engineering and cloning technology to produce cattle that lacked a necessary gene for prion production – thus theoretically making them immune to BSE.

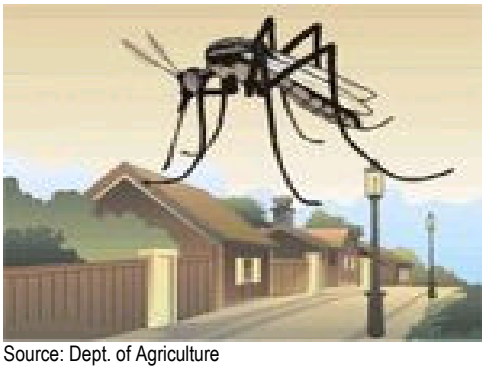
The disease may be most easily transmitted to human beings by eating food contaminated with the brain or spinal cord of infected carcasses. However, it should also be noted that the infectious agent, although most highly concentrated in nervous tissue, can be found in virtually all tissues throughout the body, including blood. In humans, it is known as new variant Creutzfeldt–Jakob disease (vCJD or nvCJD).

Avian influenza in birds (AI) is a viral disease characterized by respiratory signs, depression, and reduced feed and water intake. In egg-laying birds, there is a decline in egg production and quality. There are two pathotypes of AI virus: the most common is low pathogenic AI (LPAI) and the other is highly pathogenic AI (HPAI). The most virulent form (HPAI) was once called fowl plague. At the 1981 International Symposium on Avian Influenza, the term fowl plague was replaced with the term "highly virulent" influenza virus infection. The AI epidemic of 1983-1984 required yet new terms to describe relative pathogenicity of different isolates of the same stereotypes (nonpathogenic, low-pathogenic, highly pathogenic).

Infected birds shed influenza virus in their saliva, nasal secretions, and feces. Susceptible birds become infected when they have contact with contaminated secretions or excretions or with surfaces that are contaminated with secretions or excretions from infected birds. Domesticated birds may become infected with avian influenza virus through direct contact with infected waterfowl or other infected poultry, or through contact with surfaces (such as dirt or cages) or materials (such as water or feed) that have been contaminated with the virus. Lyme disease is an emerging infectious disease caused by at least three species of bacteria belonging to the genus Borrelia. Lyme disease is the most common tick-borne disease in the Northern Hemisphere. Borrelia is transmitted to humans by the bite of infected ticks belonging to a few species of the genus Ixodes ("hard ticks"). The disease is named after the town of Lyme, Connecticut, where a number of cases were identified in 1975. Although Allen Steere realized in 1978 that Lyme disease was a tick-borne disease, the cause of the disease remained a mystery until 1981, when B. burgdorferi was identified by Willy Burgdorfer.

West Nile Virus (WNV) is one of several mosquito-borne viruses in the United States. The virus was first detected in the New York City area in 1999. The virus has since been identified in all 48 continental states and the District of Columbia. WNV may cause a wide range of clinical illness ranging from mild “flu-like” symptoms to encephalitis (inflammation of the brain) that may be fatal to both humans and horses. Some horses infected with WNV do not develop clinical illness and recover uneventfully. Currently, there is no specific treatment for WNV. Mosquitoes acquire WNV from feeding on infected birds then pass the virus on to other birds, animals, and humans. Migratory birds are an important reservoir for WNV and have served as the major vector for the spread of the virus to new areas. Mosquitoes have not demonstrated the ability to feed on an infected horse and ingest enough virus to transmit it to other animals. Less than one percent of humans infected may develop meningitis or encephalitis.

Figure 4.28 Mosquito-borne Virus



Source: Dept. of Agriculture

Fire Ants are a variety of stinging ants with over 280 species worldwide. A typical fire ant colony produces large mounds in open areas, and feeds mostly on young plants, seeds, and sometimes crickets. Fire ants nest in the soil, often near moist areas, such as riverbanks, pond

edges, watered lawns and highway edges. Usually the nest will not be visible, as it will be built under objects such as timber, logs, rocks, pavers, bricks, etc. If there is no cover for nesting, dome-shaped mounds will be constructed, but this is usually only found in open space, such as fields, parks, and lawns. These mounds can reach heights of 40 cm (15.7 in). The mounds that the fire ants live in can also be as deep as five feet. Fire ant colonies can quickly become a human health hazard.

Pests and diseases threaten agricultural food crops. The damage they cause can be economic (through lost output, income, and investment) as well as psychological (manifested in shock and panic). Plant pests and animal diseases pose the greatest immediate threat when they move as plagues or when they are introduced for the first time into ecologically favorable conditions where there are few natural factors to limit their spread and people do not have experience in managing them. Such occurrences often have the most evident economic impact and, in many cases, affect marginalized people most severely.

SECTION 5
RISK ASSESSMENT – HAZARD PROFILES

5.1 INTRODUCTION

The second step of risk assessment is to profile for each hazard that is of particular concern and relevance to Anderson County. The Hazard profile selection for mitigation planning is primarily based on the historic occurrence of a disaster in a jurisdiction

5.1.1 2011 Plan Update

Section 5, Risk Assessment-Hazard Profiles, is an additional section that replaces the profiling of hazards in Section 4, Risk Assessment, of the 2005 Plan. This significant enhancement over the 2005 Plan, documents, in detail, possible incident location, extent, future probability, and historic occurrences, and provides historic occurrence discussions. This 2011 Plan update more closely follows the 2007 State of Tennessee Hazard Mitigation Plan. The Table below identifies the natural and technological/human-caused hazards of concern in the 2007 State Mitigation Plan.

Table 5.1 State of Tennessee Profiled Natural Hazards		
HAZARD	**Probable**	**Possible**
Flood (Riverine/Flash)	X	
Severe Storm (Hail/Lightning/Wind/Etc.)	X	
Severe Winter Storm (Snow/Ice/Etc.)	X	
Tornado	X	
Earthquake		X
Extreme Temperatures	X	
Drought		X
Fire (Wildland/Urban.)	X	
Geologic (Landslides/Expansive Soils/Subsidence)	X	
State of Tennessee Technological and Human-Caused Hazards of Concern		
HAZARD	**PROBABILITY OF OCCURRENCE**	**HISTORICAL OCCURRENCE**
Hazardous Materials		
Chemical	M	Y
Radiological	L	Y
Transportation		
Air	L	Y
Highway	H	Y
Rail	M	Y
Water	L	
Communications Failure	L	Y
Energy Failure	L	Y
Dam Failure	L	Y
Biologic - Human/Animal Disease Epidemic	L	Y
Enemy Attack	L	Y
Civil Disturbance	L	Y
Terrorism – Chemical Biological, Radiological, Conventional, Cyber	M	Y

The Anderson County Hazard Mitigation Plan profiles the same natural hazards as are profiled in the State Plan with the exception of Urban Fires, which has been moved in this 2011 Plan update from natural hazards to the technological and human-caused hazards profiles.

After thorough review of the state mitigation plan hazards of concern, the Anderson County Mitigation Planning Committee decided to profile urban fires, hazardous materials, biologic (pandemic/epidemic), and terrorism under technological and human-caused incidents, and added illegal methamphetamine labs to this hazard category. Dam failure was moved to the flooding hazard under natural disasters. Under the terrorism hazard the state identified "Conventional." In this 2011 Plan update, conventional is identified as "Nuclear," and "Explosive" is added (CBRNE). The table below shows the category status of each hazard as profiled by the state and Anderson County.

Table 5.2 Comparison of State and Anderson County Hazard Categories

State of Tennessee Hazards of Concern	State Plan Natural Hazard	State Plan Technological/ Human-Caused Hazard	Anderson County Natural Hazard	Anderson County Technological/ Human-Caused Hazard	Not Profiled
Flood (Riverine/Flash)	X		X		
Severe Storm (Hail/Lightning/Wind/Etc)	X		X		
Severe Winter Storm (Snow/Ice/Etc)	X		X		
Tornado	X		X		
Earthquake	X		X		
Extreme Temperatures	X		X		
Drought	X		X		
Fire (Woodland/Urban)	X		Woodland	Urban	
Geologic (Landslides/Expansive Soils/Subsidence)	X		X		
Hazardous Materials					
Chemical		X		X	
Radiological		X		X	
Transportation					
Air		X			X
Highway		X			X
Rail		X			X
Water		X			X
Communications Failure		X			X
Energy Failure		X			X
Dam Failure		X	Flood		
Biologic (Human/Animal Disease Epidemic)		X		X	
Enemy Attack		X			X
Civil Disturbance		X			X
Terrorism (Chemical, Biological, Radiological, Conventional, Cyber		X		CBRNE Cyber	
				Illegal Labs	

The following technological and human-caused incidents are not profiled in the Anderson County 2011 Plan update:

Attack is not profiled at this time, as in the opinion of the Planning Committee, a full-scale attack on the United States is a very remote possibility; although prime targets could be the DOE and TVA facilities in the county, the committee believes the terrorism profile addresses the possibility of an attack.

Civil Disturbance is not profiled at this time, as there has only been 1 incident (1958) of violent civil disturbance and in the opinion the Planning committee, the population and communities in Anderson County have a high degree of self-sufficiency.

Communications Failure is not profiled at this time, as the Planning Committee believes that sufficient backup systems exist with in the jurisdiction (i.e., landlines, cellular phones, pagers, radios) to enable the county to maintain communications in an emergency.

Energy Failure, although of concern, is not profiled at this time, as the TVA power systems have excess power available and are local to the jurisdictions. Also, the county and much of the utility infrastructure have emergency generators installed or available for emergencies.

Transportation is not profiled at this time as the county does not have and is not in the direct path of a major commercial airport, and there are no waterways within the county that sustain commercial traffic. Railway transportation within the county does not support passenger service. While railway transportation does introduce a quantity of hazardous materials, there has not been a major transportation incident. Such incidents are covered by the hazardous materials profile.

The table below documents the hazards included in the 2005 Plan and their disposition in Section 5 of the 2011 Plan update.

Table 5.3 2005 Mitigation Plan Hazards/2011 Updated Plan Hazard Status

2011 Hazard	Exp	Risk/Threat	2005 Plan Status	2011 Updated Plan Status
Drought	Poss	Moderate/ Slight	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Earthquake	Poss	Low/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Extreme Temperature	Poss	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Flooding	Prob	Moderate/ High	Identified as Flooding by Thunderstorms, Hurricanes. Some vulnerability assessment	Identified as Tropical Storms/Hurricanes, Thunderstorms, Dam/Levee Failure. Profiled and detailed vulnerability assessment
Hail	Prob	Moderate/ Minimal	Identified under Thunderstorms	Identified/profiled, detailed vulnerability assessment
High Winds	Prob	High/ High	Identified/profiled as Tornadoes Thunderstorms, Hurricanes. Some vulnerability assessment	Identified as Tropical Storms/Hurricanes, Thunderstorms, Tornadoes. Profiled and detailed vulnerability assessment
Ice/Snow Storms	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Land Subsidence	Prob	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Landslides Mudslides	Prob	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Lightning	Prob	Moderate/ Low	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Wildfires	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment

Table 5.3 2005 Mitigation Plan Hazards/2011 Updated Plan Hazard Status				
2011 Hazard	**Exp**	**Risk/Threat**	**2005 Plan Status**	**2011 Updated Plan Status**
Hazardous Materials	Prob	Moderate/ High	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Illegal Meth Labs	Not Rated	Moderate/ Slight	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Terrorism	Poss	Slight/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Urban Fires	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Pandemic	Poss	Low/ High	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Exp = Possible/Probable, Risk = Probability of Occurrence, Threat = Impact on loss of life and property damage				

5.2 HAZARD PROFILES METHODOLOGY

The hazard profile identifies the areas of the jurisdiction that are most severely affected by each hazard and describes the analysis or sources used to determine the probability, likelihood, or frequency of occurrence, as well as the magnitude of future hazard incidents. All data limitations are identified.

Each type of hazard has unique characteristics that vary from incident to incident. The impact of a specific hazard can vary depending on the magnitude and location of each incident (a hazard incident is a specific, uninterrupted occurrence of a particular type of hazard).

The probability of occurrence of a hazard in a given location impacts the priority assigned to that hazard and each hazard will impact different communities in different ways, based on geography, local development, population distribution, age of buildings, and mitigation measures already implemented. The Individual Hazard Profile tables in this section and the Supporting Annex contain descriptions of those hazards and include the following information and discussions:

Multi-hazard Requirement §201.6(c)(2)(i): The risk assessment shall include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
A. Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the plan?
B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the plan?
C. Does the plan provide information on previous occurrences of each hazard addressed in the plan?
D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the plan?

CRS Step 4: Assess the Hazard: Credit is based on what the community includes in its assessment of the hazard. The minimum requirement is for the flood hazard only. However, additional credit can be earned by identifying and including a description of all other natural hazards

- Sources of information used or consulted for assembling a history of past occurrences;
- Date and duration of occurrence;
- Location of incident;
- Description and severity (i.e., flood depth, wind speeds, earthquake intensity, etc.);
- Damages that occurred (e.g., costs of recovery, property damage, and lives lost).

The location defines geographical areas in the community that would be affected by the incident.

The extent (magnitude/severity) of a potential hazard is identified using technical measures specific to a hazard. Through the use of scientific scales, such as the Fujita Scale, Richter Scale, Beaufort Wind Scale, Saffir-Simpson Scale, and the Palmer Index, or by using quantitative measurements such as miles per hour, flood depth, inches of rain, fire danger rating, or acres burned, a magnitude or severity that could be experienced is identified for specific hazards.

The probability or likelihood that the hazard incident would occur in an area is determined through the use of a scale that is identified and discussed for specific hazards. In some cases the extent and/or probability of hazard incidents are classified using the terms high, medium, or low or a 1-3 or 1-5 measure, where 1 is low.

A discussion of past occurrences of hazard incidents in or near the community is included.

The profile section also provides a discussion of conditions, such as topography, soil characteristics, meteorological conditions, etc., in the area that may exacerbate or mitigate the potential effects of hazards. Where possible, the hazard profile also identifies on a map the areas affected by each identified hazard. A variety of sources were used including national, regional, and local sources, Web sites, published documents, newspapers, databases, maps, the citizen survey, and a discussion with the Planning Committee. The selected hazards are profiled below.

5.3 NATURAL HAZARDS PROFILED

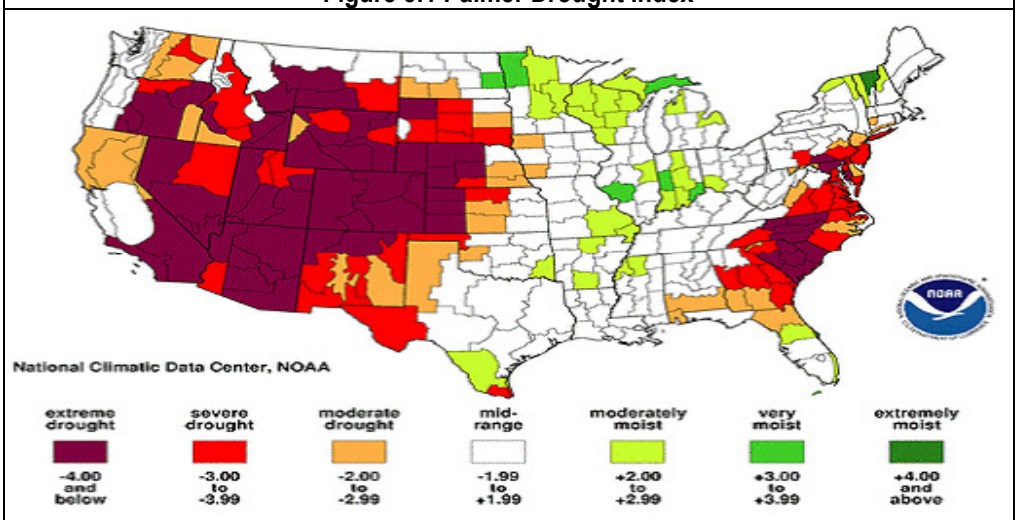
5.3.1 Drought Profile

A drought is an extended dry climate condition when there is not enough water to support urban, agricultural, human, or environmental water needs. It usually refers to a period of below-normal rainfall, but can also be caused by drying bores or lakes, or anything that reduces the amount of water available. Droughts are a cumulative result of numerous meteorological factors. Most droughts in Tennessee begin with decreased precipitation during the winter and spring, when soil moisture is being recharged. If a subtropical high-pressure cell, called the Bermuda High and a weak jet stream persist over the State, then the stable, subsiding air inhibits the normal development of thunderstorms. Wave troughs positioned west of the Bermuda High divert storm tracks either north or south of the region. The combination of decreased precipitation and cloudiness, increased solar radiation, and extreme heat dries and hardens the soil.

Location

Drought is possible throughout the planning area. The Palmer Hydrological Drought Index indicates that Anderson County is in a “mid-range” area of incurring drought conditions.

Figure 5.1 Palmer Drought Index



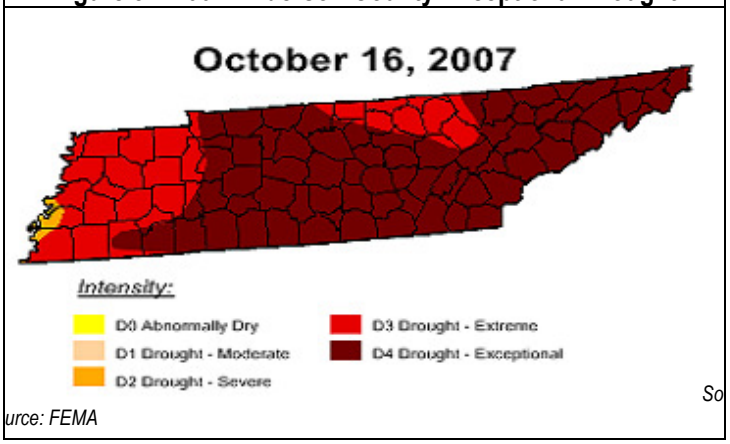
Source: NOAA

Extent

A drought's severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water demands by humans and vegetation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity (FEMA, 1997). Due to its multi-dimensional nature, drought is difficult to define in exact terms and also poses difficulties in terms of comprehensive risk assessments.

Drought can cause extensive damage to the foundations, framing, and walls of commercial and residential structures, and to agricultural crops, roads, bridges, pipelines, utilities, and railroads. Anderson County has experienced 12 incidents of drought in the last 98 years. Losses are calculated from the agriculture census of crop value times the reported estimated crop loss percentage. The total drought years experienced was 28 years causing zero fatalities/injuries and $2,986,466 in property damage.

Figure 5.2 2007 Anderson County Exceptional Drought

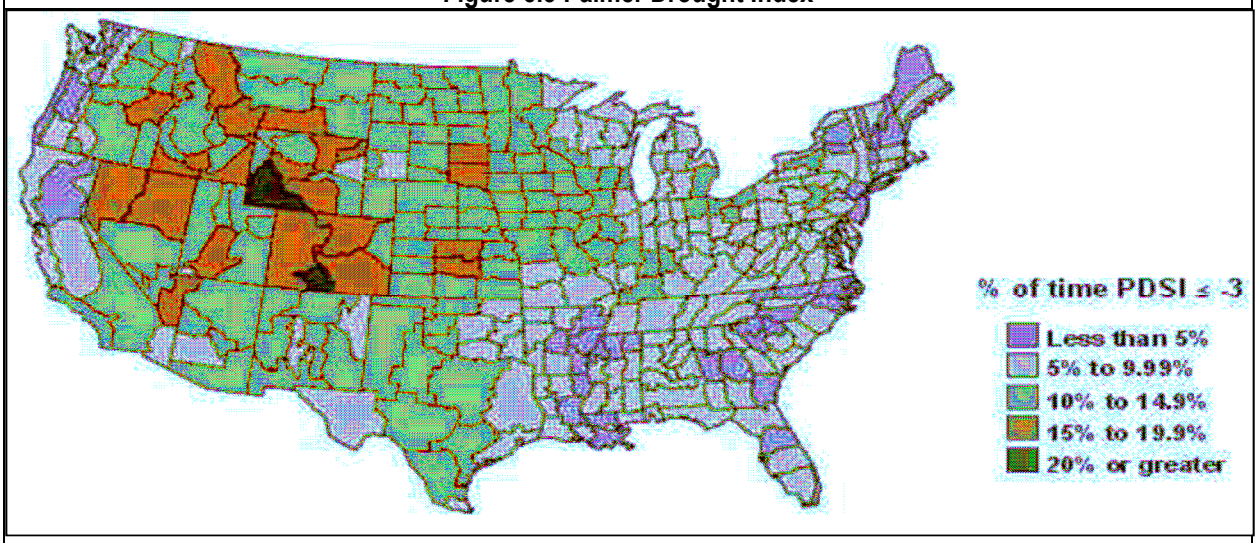


Source: FEMA

Future Probability

Anderson County has a 5% to 9.99% probability of incurring a drought condition in any one year. While all areas of Anderson County are equally at risk of a drought, an agricultural drought incident would have greater impact on the county's unincorporated areas where farming and livestock are present. With TVA's water release program, urban drought is likely only in the event of a severe drought across a major portion of eastern Tennessee. Urban drought would have greater impact on the small municipalities because of the limited amount of water resources.

Figure 5.3 Palmer Drought Index



Source: NOAA

Historic Occurrences

Only one drought occurrence (1988) is identified in the NOAA weather database. The remainder of the entries in the Table below was extracted from the 2007 State of Tennessee Hazard Mitigation Plan and Internet sources.

Table 5.4 Anderson County Historic Drought Incidents

Event Date	Location or Map Reference	Extent Description: Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc.	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost: Loss Amount	Other Loss or Cost: Type
2010-11	Countywide	Drought resulted in Federal Disaster Declaration (S3055) for Anderson County crop losses ranging from 30 to 50%	0	0	0	0	381,150	A
2006-08	Countywide	20% loss of agriculture crops	0	0	0	0	693,000	A
1998	Countywide	An extremely dry year. Rainfall totals from Knoxville 1.76" below normal;	0	0	0	0	0	
1983-88	Countywide	Most severe drought in TN history. Rainfall was 35-70% below normal.	0	0	0	0	1,386,000	A
1980-81	Countywide	Minor drought	0	0	0	0	0	
1969-71	Countywide	Minor drought	0	0	0	0	526,316	A
1966-67	Countywide	Minor drought	0	0	0	0	0	
1953-54	Countywide	3rd most severe drought in TN history	0	0	0	0	0	
1940-42	Countywide	2nd most severe drought in TN history	0	0	0	0	0	
1930-31	Countywide	4th most severe drought in TN history	0	0	0	0	0	
19-25-26	Countywide	35-50% of normal rainfall	0	0	0	0	0	
1913-14	Countywide	Worst drought in 30 years. 20% loss of crops	0	0	0	0	0	
12		Totals	0	0	0	0	2,986,466	
Data Sources		**FEMA, USDA, TN Dept of Agriculture, Sheldus, NOAA**						

Table 5.4 Anderson County Historic Drought Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc.	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Loss Amount	Type
Loss Type		A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup						

Major Historic Occurrences Discussion

2009-2010: Drought resulted in a rainfall deficit, low water levels, and crop losses of 35% to 70%. Small, non-farm agriculture-dependent businesses in Anderson, Roane, Morgan and Campbell counties are eligible for up to $1.5 million in loans because of the extreme drought

2006-2008: Rainfall in East Tennessee was down about 50 percent, almost 12 inches below normal. The five-month period from January to May 2007 was the driest in 118 years. Water levels on parts of the Tennessee River system were significantly down because of the drought conditions, and tributary reservoir levels were 10 feet below normal on average. Several weeks of unrelenting heat killed more than a dozen people across Tennessee. The drought that devastated agriculture also caused some cities to run out of water.

1980-1988: The decade of the 1980s will undoubtedly go down as the worst drought period in the state's history. The costs were high, especially to farmers, nurseries, barge transportation companies, and the forest products industry. The drought began in June of 1984, just after the May floods. It lasted through the fall of 1988. Eventually it led to a 50-inch overall precipitation deficit for the four-year period. The lowest water level ever recorded for the Mississippi River at Memphis (11 feet below base level) halted commercial barge traffic. There was also a failure of many municipal water systems as streams, lakes, springs, and wells ceased flowing or dropped below intake levels. Water quality and quantity problems occurred on TVA and U.S. Army Corps of Engineers lakes in Tennessee.

1953-1954 was the third worst drought in the state's history. One source described it as the "longest dry spell and hottest weather in recorded history." In August 1953, Tennessee and Indiana had the least percentage of normal rainfall of any states in the nation.

1940-42 was the second worst drought in Tennessee's history. In 1941 only 37.86 inches of rain fell. TVA's reserves were so depleted that it had only a nine-week supply of water left.

1930-31: This drought is considered the fourth worst in Tennessee history. Beginning in the spring of 1930, the severe drought crept across 23 states. Tennessee experienced 54% percent of normal annual rainfall. Springs and wells failed in 13 cities and towns.

1925 A drought occurred when there was a 20-inch rainfall deficiency. It ranged from 35% to 50% below normal for a 12-month period. Every month except December showed a deficit in the Tennessee River Basin. Forest fires raged in mountainous areas with losses in the millions of dollars. Low flow records were established for almost every stream in August and September. Crops, except those in bottomlands, were virtually total failures.

5.3.2 Earthquake Profile

An earthquake is a sudden release of energy from the earth's crust that creates seismic waves. Tectonic plates become stuck, putting a strain on the ground. When the strain becomes so great that rocks give way, fault lines occur. At the earth's surface, earthquakes may manifest themselves by a shaking or displacement of the ground.

Location

The focal depth and the geographic position of its epicenter describe an earthquake's location. The focal depth of an earthquake is the depth from the earth's surface to where an earthquake's energy originates. The epicenter of an earthquake is the point on the earth's surface directly above the hypocenter. Earthquakes usually occur without warning and can impact areas a great distance from the epicenter. Earthquakes epicenters in Tennessee have been recorded throughout most of the state. Recent seismograph records indicate that earthquakes are more frequent than past records indicate, but are often not strong enough to be felt by people.

In 1993, the Eastern Tennessee Seismic Zone (ETSZ) was identified as running roughly parallel to Interstate 75 from Chattanooga, northward to Oak Ridge in Anderson County, then eastward toward the Knoxville area. This is part of a crescent of moderate seismic activity risk extending from Charleston, South Carolina, northwestward into eastern Tennessee, then curving northeastward into central Virginia. The zone in eastern Tennessee is 300 km long by 50 km wide. It has not produced a damaging earthquake in historical time; the largest recorded magnitude was 4.6 in 1973. The Southern Appalachian Regional Seismic Network (SARSN) has monitored the ETSZ since 1981, and stations in the network have recorded numerous measurements. While researchers have noted a ten-fold increase in registered seismic activity in the area in the period from 1980 to 1990, the activity tends to be on the low side of the Modified Mercalli Scale and generally does not raise much public interest.

Extent

The depth of the quake, the geology in the area, and the soils influence the severity of earthquakes. Damaging effects include:

Surface faulting: Displacement that reaches the earth's surface during a slip along a fault. This commonly occurs with shallow earthquakes and an epicenter less than 20 km.

Ground shaking: The movement of the earth's surface from earthquakes is produced by waves that are generated by sudden slip on a fault or sudden pressure at the explosive source and travel through the earth and along its surface.

Landslide: A movement of material down a slope.

Liquefaction: A process by which water-saturated sediment temporarily loses strength and acts as a fluid.

Tectonic Deformation: A change in the shape of a material due to stress and strain.

Tsunami: A sea wave of local or distant origin resulting from large-scale seafloor displacements associated with earthquakes, major submarine slides, or volcanic action.

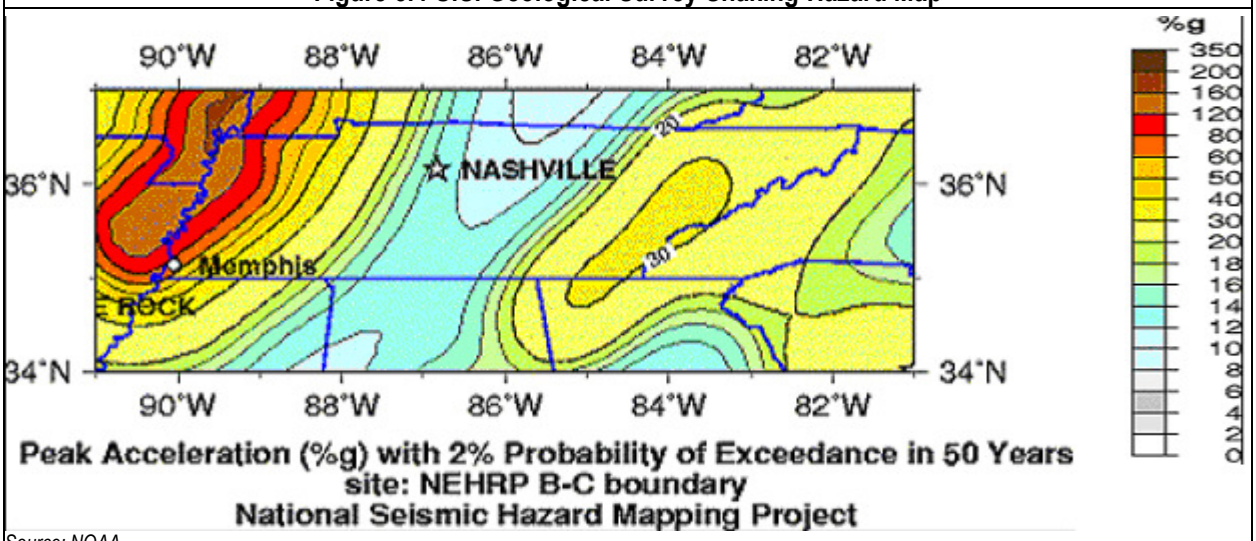
Seiche: The waves in a lake or reservoir that are induced due to ground shaking.

The Mercalli scale is the method most commonly used in the United States for measuring earthquake intensity. This twelve tier scale ranks observed effects from I, felt only under especially favorable circumstances, to XII, total destruction. The magnitude of an earthquake is measured through the use of the Richter scale. Earthquake magnitudes describe the subject on an absolute scale. An earthquake of magnitude 8, for example, is ten times stronger than a magnitude 7 earthquake, and 100 times stronger than a magnitude 6 earthquake, etc.

Table 5.5 Mercalli Scale of Earthquake Intensity and the Corresponding Richter Scale				
Scale	Mercalli (Intensity)	Description of Effects	Maximum Acceleration	Richter Scale (Magnitude)
I	Instrumental	Detected only on seismographs	<10	
II	Feeble	Some people feel it	<25	<4.2
III	Slight	Felt by people resting	<50	
IV	Moderate	Felt by people walking	<100	
V	Slightly Strong	Sleepers awake; church bells ring	<250	<4.8
VI	Strong	Trees sway/objects fall off shelves	<500	<5.4
VII	Very Strong	Walls crack; plaster falls	<1000	<6.1
VIII	Destructive	Cars uncontrollable; poorly constructed buildings damaged	<2500	
IX	Ruinous	Houses damaged/ground cracks/pipes break	<5000	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides	<7500	<7.3
XI	Very Disastrous	Most buildings collapse; pipes/roads, bridges, railways destroyed; triggers other hazards	<9800	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>9800	>8.1

The U.S. Geological Survey shaking-hazard map for the United States is a based rate at which earthquakes occur in different areas and on how far shaking extends from earthquake sources. Colors on this map show the levels of horizontal shaking that have a 1-in-50 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of g (g is the acceleration of a falling object due to gravity). The regional map provided by USGS shows the PGA values for areas with a 10% chance of being exceeded over 50 years. Anderson County is in the 20-30%g range, which is considered to be a high earthquake hazard risk. The map below shows three things about earthquake risk: the geographic area affected (all colored areas on the map), the probability of an earthquake (10% chance in 50 years), and the level of severity.

Figure 5.4 U.S. Geological Survey Shaking-Hazard Map



Source: NOAA

Most property damage and earthquake-related deaths are caused by the collapse of structures. The level of damage depends upon the amplitude and duration of the ground shaking, which is directly related to the earthquake size, distance from the fault, site, and regional geology. Earthquakes can affect hundreds of thousands of square miles, cause damage to property

measured in the tens of billions of dollars, loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area.

Earthquakes of smaller magnitude have the potential to damage infrastructure. Throughout Anderson County, many existing roadways are cut through mountainous areas, presenting steep banks on one or both sides of the road. Even moderate earthquake vibrations could dislodge sections of road banks throughout the county, closing roads, damaging bridges, and affecting structures built above and below the banks, especially when periods of heavy rainfall may set the stage for landslide and soil liquefaction to occur.

Figure 5.5 Earthquake Damage

S
ource: Colorado University Earthquake Center

Each year more than 400 seismic incidents occur, largely unfelt by the populace. A total of 27 earthquake incidents have impacted Anderson County in the past 100 years resulting in an average of one every four years. They have caused $46,000 in property damage and zero fatalities and injuries.

Future Probability

East Tennessee is seldom thought of as "earthquake country." However, the National Earthquake Hazard Reduction Program recently categorized portions of Tennessee as "high risk" in recognition of the state's vulnerability to earthquakes that occur both within and outside its borders. Anderson County is located in an active but deep seismic zone, and seismologists postulate that a Richter Scale 5.0 magnitude quake is possible within a ten-year period.

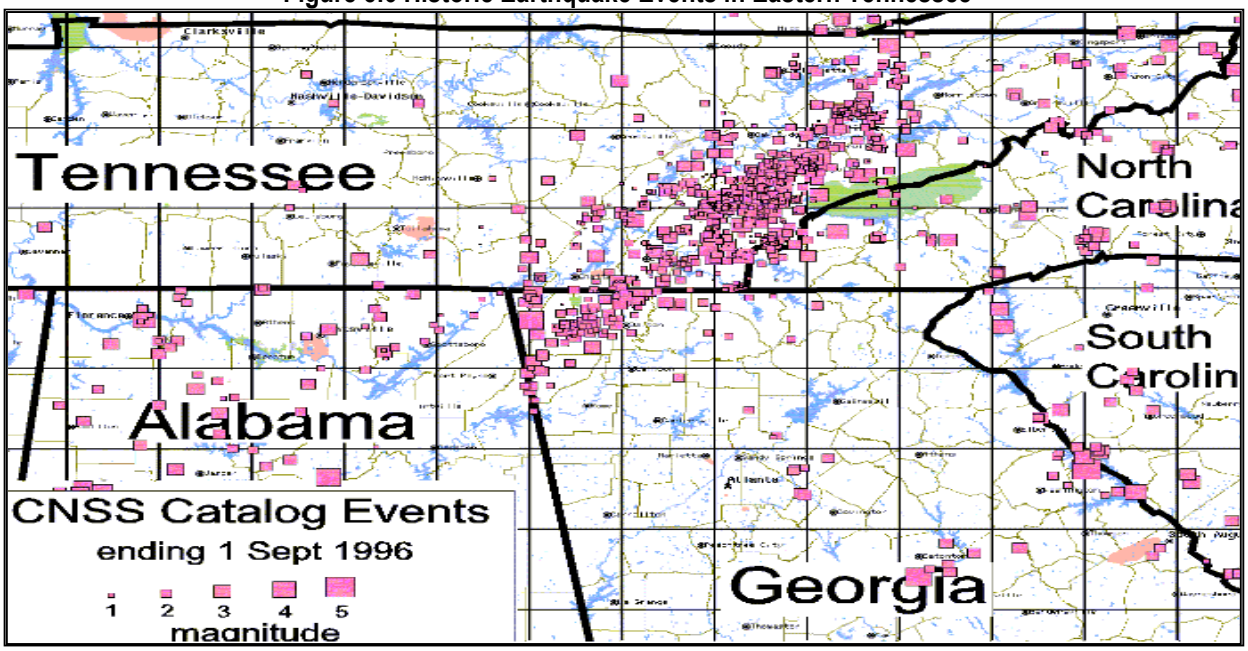
A significant earthquake incident in Anderson County could be expected to affect 50% of the population, primarily through disruption of commerce, malfunction of utility services, building collapse, landslides, hazardous materials release, and dam failure. While the county and its municipalities are at equal risk of earthquake, certain areas may be more impacted by a large magnitude event.

- Due to population and housing densities, impact would be greatest in Clinton and Oak Ridge.
- Lying within the five-mile radius of Y-12, Oak Ridge would be most affected by an earthquake of significant magnitude to cause a hazardous materials release from this facility. Depending on wind direction and velocity, Oliver Springs and the unincorporated areas joining these cities could also be at increased risk.
- Clinton and Oak Ridge would be at greater risk of release of other industrial and manufacturing hazardous materials due to the concentration of these facilities within their boundaries.
- Failure of Norris Dam would impact Lake City, Clinton, Oak Ridge, Oliver Springs, and all unincorporated areas downstream due to flood waters backing up in the tributaries of the Clinch River throughout the low-lying center portion of the county.

Historic Occurrences

The map below depicts the historic earthquake incidents and their severity that have occurred in and around Anderson County.

Figure 5.6 Historic Earthquake Events in Eastern Tennessee



Source: NOAA

The table below identifies historic earthquakes that have impacted Anderson County.

Table 5.6 Anderson County Historic Earthquake Incidents

Event Date	Location or Map Reference	Extent Description: Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc.	Fatalities	Injuries	# of Assets Damaged	Structure Loss	Other Loss or Cost: Loss Amount	Other Loss or Cost: Type
12/16/1811	NE Arkansas	8.5 XII No Damage	0	0	0	0	0	
01/23/1812	New Madrid MO	8.0 XII No Damage	0	0	0	0	0	
02/07/1812	New Madrid MO	8.5 XII No damage	0	0	0	0	0	
11/28/1844	Knox County	VI Some damage	0	0	0	4,000	1,000	
08/31/1886	Charleston SC	X Minor damage	0	0	0	1,000	1,000	C
03/28/1913	Knox County	VII Minor damage	0	0	0	1,000	1,000	C
04/17/1913	Polk County	VI Minor Damage	0	0	0	1,000	1,000	C
10/29/1915	Asheville NC	V No damage	0	0	0	0	0	
07/08/1926	Mitchell NC	VI No damage	0	0	0	0	0	
02/10/1948	Campbell County	VI No Damage	0	0	0	0	0	
09/07/1957	Blount County	VI Minor Damage	0	0	0	1,000	0	C
11/24/1957	Cocke County	VI Minor Damage	0	0	0	0	0	
10/30/1973	Knoxville TN	4.6 VI Moderate damage	0	0	0	25,000	0	
11/30/1973	Blount County	VI Minor Damage	0	0	0	0	1,000	C
11/30/1976	Polk County	VI Minor Damage	0	0	0	0	1,000	C
04/16/1994	Blount County	V No Damage	0	0	0	0	0	

Table 5.6 Anderson County Historic Earthquake Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc.	Fatalities	Injuries	# of Assets Damaged	Structure Loss	Other Loss or Cost	
							Loss Amount	Type
06/17/1998	Oak Ridge	3.6 Minor Damage	0	0	0	3,000	1,000	C
01/03/2001	Blount County	2.2 No Damage	0	0	0	0	0	
07/26/2001	Knox County	2.1 No Damage	0	0	0	0	0	
04/29/2003	Mentone AL	2.3 V No Damage	0	0	0	0	0	
03/18/2005	Blount County	2.5 No Damage	0	0	0	0	0	
12/18/2008	Jefferson County	2.9 No Damage	0	0	0	0	0	
04/20/2010	Blount County	3.3 Minor Damage	0	0	0	2,000	1,000	C
12/08/2010	Niota TN	2.3 No Damage	0	0	0	0	0	
12/06/2010	Louisville TN	1.3 No Damage	0	0	0	0	0	
11/16/2010	Sweetwater TN	2.0 No Damage	0	0	0	0	0	
01/10/2011	Sweetwater TN	2.2 No Damage	0	0	0	0	0	
27			0	0	0	38,000	8,000	
Data Sources		USGA, TN Dept of Geology, Sheldus						
Loss Type		A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup						

Major Historic Occurrences Discussion

October 30, 1972: An earthquake (VI) sequence consisting of one foreshock, a magnitude 4.6 main shock, and more than 30 aftershocks occurred south of Knoxville. The 3.4 magnitude foreshock was felt over an area of 2,100 square kilometers. The main shock caused minor damage in several towns in eastern Tennessee, Georgia, Kentucky, and North Carolina. Minor cracks in walls at the University of Tennessee Hospital at Knoxville were reported. Minor damage to walls, windows, and chimneys occurred in the Maryville-Alcoa area. The shock disrupted relay contacts at the Alcoa switching station, causing a temporary loss of power. The total felt area covered about 65,000 square kilometers.

September 7, 1956: Two tremors (VI) about 13 minutes apart were felt over a broad area of eastern Tennessee and adjoining parts of Kentucky, North Carolina, and Virginia. At Knoxville, both shocks were felt by nearly all, many of whom were alarmed. Windowpanes shattered, dishes broke, objects were shaken from shelves, pictures fell, and some plaster was knocked from walls. The total felt area covered approximately 21,500 square kilometers.

March 28, 1913: A strong shock (VII) centered at Knoxville was felt over an area of 7,000 square kilometers in eastern Tennessee. Two shocks were felt in many places. Movable objects were overthrown, and bricks fell from chimneys. A number of false alarms were set off at fire stations. Buildings throughout the city shook violently. The Knox County Courthouse, a massive brick structure, trembled noticeably. People outdoors experienced a distinct rise and fall in the ground; there were some cases of nausea.

5.3.3 Extreme Temperatures Profile

Temperatures that hover ten degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions occur when a dome of high atmospheric pressure traps hazy, damp air near the ground. What constitutes

extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Extreme cold incidents are when temperatures drop well below normal in an area.

Location

Prolonged periods of extreme heat and cold have occurred in Anderson County in the past and will occur in the future, affecting both rural and incorporated areas.

Extent

The combination of high temperatures and humid conditions increase the level of discomfort and the potential for danger to humans. The human risks associated with extreme heat include heatstroke, heat exhaustion, heat syncope, and heat cramps.

Heatstroke is considered a medical emergency and is often fatal. It exists when rectal temperature rises above 105°F as a result of environmental temperatures. Patients may be delirious, stuporous, or comatose. The death-to-care ratio in reported cases averages about 15%.

Heat Exhaustion is less severe than heatstroke. The body temperature may be normal or slightly elevated. A person suffering from heat exhaustion may complain of dizziness, weakness, or fatigue.

Heat Syncope is typically associated with exercise by people who are not acclimated to exercise. The symptom is a sudden loss of consciousness. Consciousness returns promptly when the person lies down. The cause is primarily associated with circulatory instability as a result of heat. The condition typically causes little or no harm to the individual.

Heat Cramps are typically a problem for individuals who exercise outdoors but are unaccustomed to heat. Similar to heat exhaustion, it is thought to be the result of a mild imbalance of fluids and electrolytes.

Figure 5.7 Heat Index Chart

Relative Humidity (%)	Temperature (°F) 80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

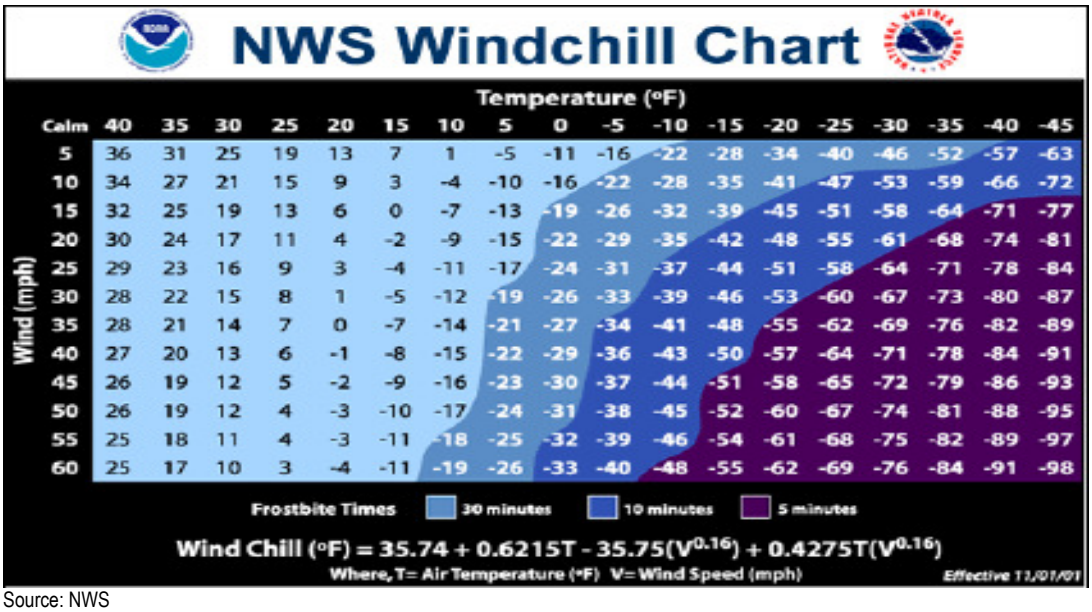
Heat Index	Notes
80-90	Caution - fatigue is possible with prolonged exposure and activity
90-105	Extreme caution - sunstroke, heat cramps, and heat exhaustion are possible
105-130	Danger - sunstroke, heat cramps, and heat exhaustion are likely; heat stroke is possible
over 130	Extreme danger - heat stroke or sunstroke are likely with continued exposure

Source NWS

A severe heat wave struck Tennessee in 1980 and resulted in 156 heat-related deaths. Ten were recorded in Nashville, 16 in Chattanooga, 88 in Memphis, and 42 elsewhere. During the worst part of the heat wave, Memphis exceeded 100°F on 33 days. Thirteen of these days were consecutive, and on July 13, the temperature reached 108°. In Anderson County, the heat index has occasionally exceeded 100° for periods of short duration.

Extremely cold temperatures often accompany a winter storm, so individuals may have to cope with power failures and icy roads. Individuals may also face indoor hazards. Many homes will be too cold, either due to a power failure or because the heating system is not adequate. As people use space heaters and fireplaces to stay warm, the risk of household fires and carbon monoxide poisoning increases. Wind chills can present significant risk, particularly if people are not properly clothed or protected. A -15°F air temperature with wind speeds of 10 miles per hour creates a wind chill of 35°F below zero.

Figure 5.8 National Weather Service Wind-chill Chart



Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Source: NWS

Exposure to cold temperatures can lead to serious or life-threatening health problems such as hypothermia, cold stress, frostbite, or freezing of exposed extremities.

Hypothermia occurs when the core body temperature is below 95ºF (35ºC). If persons exposed to excessive cold are unable to generate enough heat (e.g., through shivering) to maintain a normal core body temperature of 98.6ºF (37ºC), their organs (e.g., brain, heart, or kidneys) can malfunction. When brain function deteriorates, persons with hypothermia are less likely to perceive the need to seek shelter. Signs and symptoms of hypothermia (e.g., lethargy, weakness, loss of coordination, confusion, or uncontrollable shivering) can increase in severity as the body's core temperature drops. Infants and the elderly are most susceptible to such conditions.

Extreme cold also can cause emergencies in susceptible populations, such as those without shelter or who are stranded, or those who live in a home that is poorly insulated or without heat. Infants and the elderly are particularly at risk.

Twelve extreme temperature incidents in 94 years have occurred in Anderson County. These incidents have resulted in $1,079,631 in property damage and one fatality.

Future Probability

The heat index has occasionally exceeded 100° for periods of short duration. The probability of future extreme heat incidents exists.

Extreme cold temperature incidents have approached zero and below for short periods of time and will continue to occur, although global warming may significantly reduce this exposure

An extreme temperature incident has occurred approximately once every eight years. The probability of future extreme temperature incidents is moderate across the entire county. While areas of higher elevation are at lesser risk for heat and greater risk for cold, all other unincorporated and municipal areas of the county are at equal risk and impact from extreme temperature incidents.

Historic Occurrences

According to the NCDC/Sheldus hazard databases, there have been three extreme temperature incidents in Anderson County since 1980. However the State of Tennessee 2007 Mitigation Plan and newspaper sources identify 12 extreme temperature incidents since 1917 (7 extreme cold and 5 excessive heat).

Table 5.7 Anderson County Historic Extreme Temperature (Hot/Cold) Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets Damaged, Evacuation, Etc	Fatalities	Injuries	# of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
1917-18	Countywide	Extreme Cold - Temperatures just above zero for many days	0	0	0	0	0	
Jan 1940	Countywide	Extreme Cold -26 degrees	0	0	0	0	0	
1952	Countywide	Excessive Heat - 38 fatalities across TN	0	0	0	0	0	
01/24/63	Countywide	Extreme Cold -30 in adjacent counties	0	0	0	0	0	
02/14/67	Countywide	Excessive Heat	0	0	0	0	0	
07/01/80	Countywide	Excessive Heat - crop damage, 150 fatalities in West Tennessee	0	0	0	0	526316	C
07/01/83	Countywide	Excessive Heat - crop damage	0	0	0	0	526315	C
03/13/98	Countywide	Extreme Cold - four days of frigid temperatures and record lows.	0	0	0	0	0	
12/27/01	Countywide	Extreme Cold - low temperatures(-4) caused a record high power usage	0	0	0	0	0	
11/21/05	Countywide	Extreme Cold - knocked out power to more than 100 Oak Ridge residents	0	0	0	15000	0	
08/22/07	Countywide	Extreme Heat - temperatures were near 100 degrees	0	0	0	0	0	
01/15/10	Countywide	Extreme Cold - weather contributed to 18 water line breaks in Oak Ridge	0	0	0	12000	0	
12			0	0	0	27000	1052631	
Data Sources		**NOAA/NWS, Sheldus, Local Sources**						
Loss Type		**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**						

Major Historic Occurrences Discussion

The landmark winters of the nineteenth century were in 1835 and 1898. February 5, 1835, was called "Cold Friday" because so many cattle and hogs froze to death that day.

December 1917 to mid-March 1918: In East and Middle Tennessee, snow was ever-present on the ground. Much of that time, the thermometer hovered slightly above or slightly below zero during the night hours. Ponds and streams remained frozen for weeks.

January 26, 1940: Temperatures dropped dramatically. Minus 20°F in Marshall County, minus 28° in Scott County, minus 26° in Anderson County, and a frozen Cumberland River near Nashville serve as only a few examples of the many frigid locations.

July 1980: A severe heat wave engulfed Tennessee in 1980 and resulted in 156 heat-related deaths; 10 in Nashville, 16 in Chattanooga, 88 in Memphis, with 42 others interspersed across the state. During the worst part of the heat wave, Anderson County exceeded 100°F.

September 15, 1998: Anderson County experienced the fourth day of record-setting temperatures with 94° to 98° readings. The National Weather Service issued a hazardous weather forecast for East Tennessee. Temperatures in Nashville were expected to break 100°.

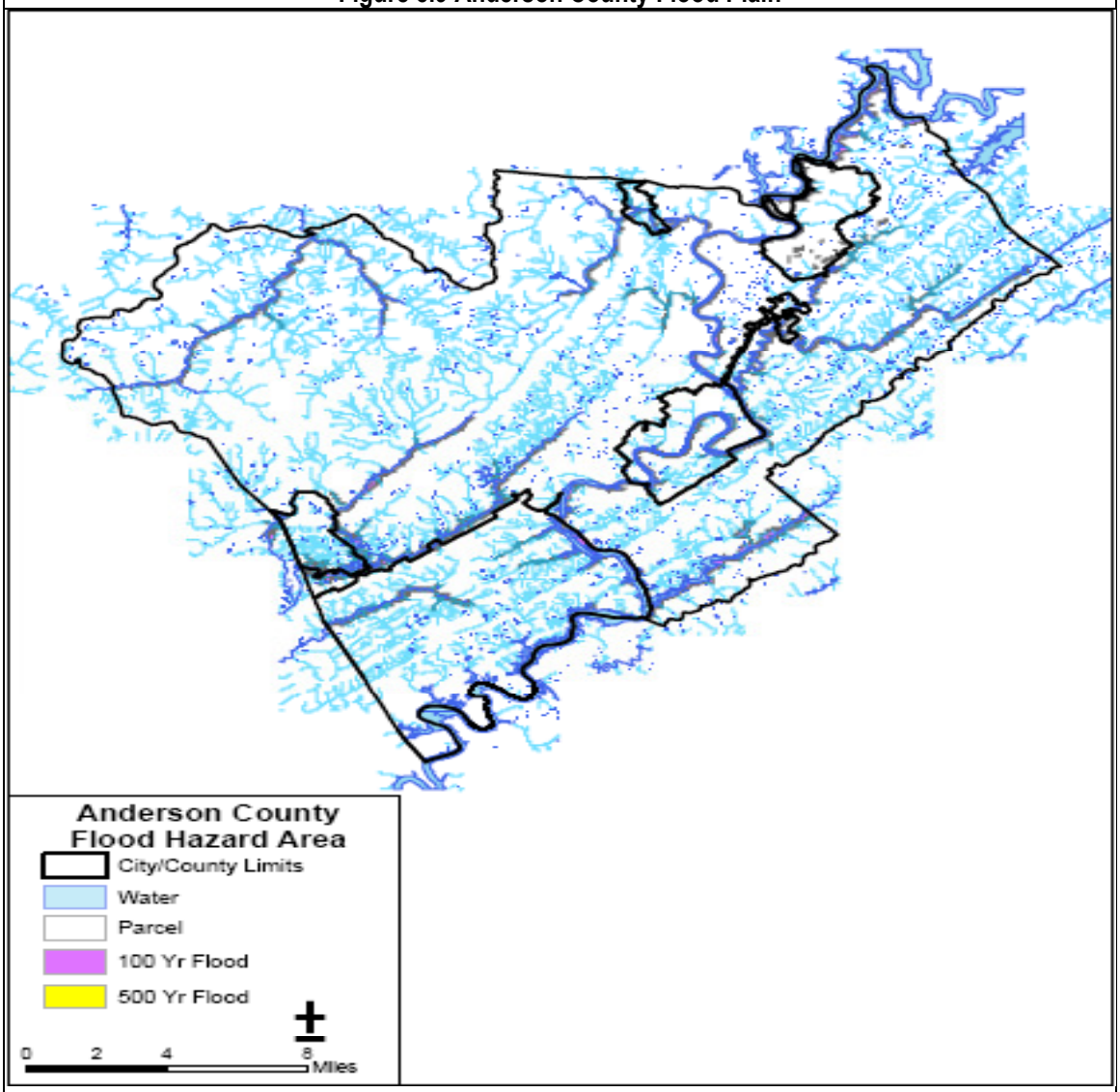
December 27, 2001: The low temperature was 4° in Oak Ridge. The extremely cold temperatures in Oak Ridge, Clinton, and Lake City caused a record high power usage in East Tennessee.

August 22, 2007: Temperatures were predicted near 100° for the eastern two-thirds of the state. Chattanooga was expected to see temperatures hit the upper 90s; in Knoxville, highs were predicted for the mid 90s.

5.3.4 Flooding Profile

Flooding occurs when abnormally high stream flow overtops the banks of a watercourse. The three principal types of floods that may affect Anderson County are: dam failure floods, flash floods, and riverine floods. The figure below identifies the Anderson County flood plain.

Figure 5.9 Anderson County Flood Plain



Source: Anderson County GIS

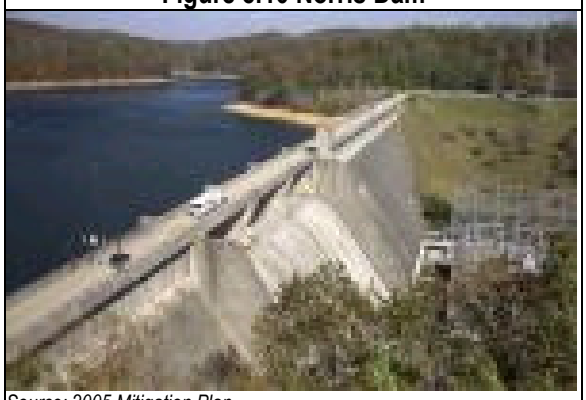
5.3.4.1 Flooding Dam/Levee Failure

Dam/levee failure floods are usually associated with intense rainfall or flood conditions. Dam/levee failure may be caused by faulty design, construction, operational inadequacies, or the occurrence of a flood incident exceeding the dam/levee design.

Location

TVA's Norris Dam, (pictured at right) is located on the Anderson-Campbell County line. Completed in 1936, the 285-foot dam has a storage capacity of 1,113,000 acre-feet. As a part of its dam safety plan, TVA conducts rigorous, routine inspections.

Figure 5.10 Norris Dam



Source: 2005 Mitigation Plan

In addition to Norris Dam, several dams and impoundments associated with post-1977 mining operations exist. The Mine Safety and Health Administration, TDEC, and/or the Office of Surface Mining regulate those structures. There are at least two dams and impoundments on abandoned mine land that are not regulated by a government agency. One is on Bear Hollow Fork of Slatestone Creek upstream of Briceville, and the other is on an unnamed tributary of Coal Creek upstream of Fraterville.

Table 5.8 Dams in Anderson County

Dam Name	River	City Impacted	NID Height	NID Storage	Year Built	Drain Area	Hazard Rating	Owner Name
Gum Branch	Gum Branch	Devonia	210	2025	1982	0.37	H	Tennessee Mining
Norris/Loyston Back Water Dike	Clinch River	Norris	35	0	1935	0	H	TVA
Norris	Clinch River	Clinton	265	1113000	1936	2912	H	TVA
Refuse Area #3 Dam		Lake City	20	100	Unk	0.13	H	Beech Grove Co.
Gum Branch Slurry Dam	Gum Branch	Devonia	150	250	Unk	0.38	H	Tennessee Mining
Butcher	Trib-Melton Hill	Oak Ridge	22	63	1970	0.11	L	Whirwind H.O.A
Commerce Park	Scarboro Branch	Oak Ridge	40	72.8	1987	0.13	S	City of Oak Ridge
Abandoned Dam	Slatestone Creek	Briceville	Unk	Unk	Unk	Unk	L	Unknown
Abandoned Dam	Trib- Coal Creek	Fraterville	Unk	Unk	Unk	Unk	L	Unknown

Extent

The areas impacted by a dam failure are analyzed on the basis of "sunny day" failures and failures under flood condition. Typically, the dam-break floodplain is more extensive than the floodplain used for land use development purposes, and few communities consider upstream dams when permitting development. The potential severity of a full or partial dam failure is influenced by two factors: the amount of water impounded, and the density, type, and value of development and infrastructure downstream.

The greatest threat to people and property is in the area immediately below the dam since flood discharges decrease as the flood wave moves downstream. A small dam retaining water in a stock pond may result in little damage, but could result in the loss of irrigation water, causing financial hardship to farmers. Failure of a larger dam might bring about considerable loss of property, destruction of cropland, roads, and utilities, and loss of life. Far-reaching consequences can include loss of income, disruption of services, and environmental devastation.

Earthquakes present a significant threat to dams; even a moderate quake could result in dam failure. Norris Dam could fail as a result of an earthquake, rainfall flooding that would exceed the capacity of the dam, or an act of terrorism.

Future Probability

The probability of future occurrences of dam/levee failure is difficult to characterize because of the lack of available information. The probability of a dam failure in Anderson County is rated low and the vulnerability is rated high. According to the TVA Emergency Action Plan for Norris Dam, a failure of Norris Dam is a high-risk potential hazard due to the downstream impact to Lake City, Clinton, Oak Ridge, Oliver Springs, and a significant part of eastern and central Anderson County. Most of the downtown area Lake City and Oliver Springs would flood as a result of tributary backup. The waters would arrive at the northeastern area of Clinton in 15 minutes and reach peak flood elevation of approximately 880-929 feet in 7-10 hours. This would flood all of downtown Clinton. The waters would reach Oak Ridge in about 90 minutes and reach a peak flood elevation of 839 -878 feet, flooding ingress and egress routes, effectively making Oak Ridge an island.

Historic Occurrences

Anderson County and its municipalities have not been affected by dam failure.

Major Historic Occurrences Discussion

Over the past century, 55 known dam failures with release of water have occurred in Tennessee. An additional 21 dams have had partial failures which could have resulted in release of floodwaters had remedial action not been taken. Since 1973, 37 dams in the state have failed, 33 of which were unregulated.

The worst dam failure incident was in Claiborne County, south of New Tazewell, on August 3, 1916. A milldam failed on Big Barren Creek, sending a wall of water downstream and breaching several other dams in the process. Twenty-four people died amidst the immense property damage caused by the roaring water.

5.3.4.2 Flash and Riverine Flooding

Flash and riverine flooding occurs when abnormally high stream flow overtops the natural or artificial banks of a watercourse. Flash flooding is a result of too much rain falling in a short period of time, often a result of thunderstorms or tropical storms, while riverine floods result from precipitation over large areas with tributaries draining a large geographic area.

The principal sources for the state's moisture are the Gulf of Mexico and the subtropical Atlantic Ocean. Severe weather and large quantities of precipitation can be produced when warm, moist air from the Gulf converges with cold, arctic air from the north.

Location of Riverine/Flash Flooding

Flash Flooding occurs in Anderson County in residential and business/industrial areas. Riverine flooding occurs in Anderson County along rivers and various small streams. The major causes of these floods in Anderson County are (1) intense precipitation associated with tropical storms, (2) thunderstorms; and (3) slow-moving or stationary frontal systems.

Areas of repetitive, localized general flooding are scattered throughout the unincorporated portions of the county. Flooding in these areas may be attributed to poorly designed or maintained drainage ditches, streams out-of-bank, or low-lying areas.

Beginning high in the mountains, Poplar Creek and Coal Creek flow to the southeast to unite with the Clinch River. Both are fairly swift streams throughout their entire course. Poplar Creek, the largest and longest of the major Anderson County streams, traverses more than half the length of the county, north to south, on the west side of Walden's Ridge. Coal Creek runs along the length of Highway 116 to Lake City. Hinds Creek and Clear Creek are swift-flowing streams on the east side of the Clinch River. Bull Run Creek, in the extreme southeast of the county, is one of the Clinch River's largest tributaries. A slow-moving stream with low banks, it is subject to numerous overflows. The Table below shows the area, location, and primary cause of flooding.

Table 5.9 Anderson County Repetitive Flooding Areas

Area	Location	Primary Cause
Northeast	Andy's Ridge Road	Maintenance
	Lower End Road	Low-lying
	Highway 116 (many areas)	Out-of-bank
	Briceville Convenience Center	Maintenance
	Slate Stone Road	Maintenance
	David's Apartments	Out-of-bank
	Coal Creek (entire length)	Out-of-bank
	Railroad Street	Storm Drain
	Chestnut Street	Out-of-bank
	Mountain Road at Hinds Creek Bridge	Out-of-bank
	Buffalo Road at Hinds Creek Bridge	Out-of-bank
	Irwin Mill Road at Buffalo Creek Bridge	Out-of-bank
	Dairy Pond Road	Low-lying
	Norris Circle	Low-lying
	Little Senator Drive	Out-of-bank
	Lower Clear Creek Road	Low-lying
	Granite Road	Low-lying
	Pumpkin Hollow Road at Brooks Gap	Out-of-bank
	Brooks Gap Road	Out-of-bank
	Brushy Valley Road	Out-of-bank
	Sinking Springs Road at Overton Walker Road	Low-lying
	Hinds Creek Road at Old Jacksboro Pike	Out-of-bank
	Longfield Road (Cane Creek at Hwy 25W)	Out-of-bank
	Old Dutch Valley Road (several places)	Low-lying
	Beets Valley Road	Out-of-bank
	Lovely Bluff at Coal Creek	Out-of-bank
	Offitt Road at Highway 61	Out-of-bank
	Mountainside Lane	Low-lying
	Lake City Highway at Carroll Hollow	Out-of-bank
	Old Cane Creek Cemetery Road	Low-lying
	Highway 441 at Fairview Elementary School	Out-of-bank
Southwest	Airport Road	Out-of-bank
	Main Street	Low-lying
	Midway Drive	Out-of-bank
	Arrowhead Park	Out-of-bank
	Jefferson Avenue	Low-lying

	Illinois Avenue	Out-of-bank
	Midway Road at Midland Road	Storm Drain
Central	Key Springs Road at Bacon Springs Road	Out-of-bank
	Bacon Springs Road	Out-of-bank
	Pine Ridge Road at Highway 61	Low-lying
	Old Batley Road at CSX Crossing	Low-lying
	Smith Road	Low-lying
	Dutch Valley Road (several places)	Low-lying
	Hoskins Gap Road	Low-lying
	A.J. Robbins Lane	Low-lying
	Longmire Road	Low-lying
	Frost Bottom Road at Kennedy Lane	Low-lying
	Frost Bottom Road at Convenience Center	Low-lying
	Half Moon Road	Culvert
	Sulphur Springs Road at CSX Trestle	Low-lying
	Marlow Road at CSX Crossing	Low-lying
	Windrock Road (several places)	Low-lying
	Pasture and Woods along Highway 61	Out-of-bank
	Forest Avenue at Rogers Street	Low-lying
	Hillcrest Street	Low-lying
	Sulphur Springs at Clinch Avenue	Low-lying
Southeast	Ridgeview Drive at Iroquois Way	Low-lying
	Mehaffey Road at Clinton Highway	Out-of-bank
	Bull Run Creek at Clinton Highway	Out-of-bank
	Oak Road	Low-lying
	Blockhouse Valley Road at Lanes Bluff Road	Out-of-bank
	Terisu Circle	Low-lying
	West Wolf Valley Road at Clinton Highway	Low-lying
	Old Clinton Highway	Low-lying
	Nature Lane	Out-of-bank
	Mehaffey Road at Creek Road	Low-lying
	Ivanhoe Road	Low-lying

Much of the mountainous area in the northwestern section is sparsely populated with homes accessible only by unimproved roads. When flooding occurs, evacuation and emergency response efforts are difficult. Flooding in rural areas forces early dismissal or closure of Anderson County schools at least once a year.

During periods of heavy rainfall, Clinton is affected by flooding of Forest Avenue at Rogers Street, Hillcrest Street, and Sulphur Springs Road at Clinch Avenue.

Lake City experiences out-of-bank flooding from Coal Creek along its entire length through the city, closing Leach and Main Streets, Phillips Lane, Jacksboro Pike, and Chestnut Street at Highway 441 to vehicular traffic. Inadequate storm drains prompt flooding of Railroad Street.

Norris flood incidents occur repetitively at low-lying areas on Lower Clear Creek Road, Dairy Pond Road, Little Senator Circle, and East Norris Road, closing these roads to vehicular traffic during periods of heavy rainfall.

In Oak Ridge, overflow from East Fork Poplar Creek occasionally floods Illinois Avenue. Low-lying Jefferson Circle and the Midway/Midland Roads area flood during periods of intense rainfall.

In Oliver Springs, Poplar Creek repetitively overflows its banks, flooding Arrowhead Park and the roadway at bridges on Tri-County Boulevard, Airport Road, and Midway Road. Intense rainfall in February 2003 resulted in flooding of the low-lying downtown streets and businesses.

Extent of Riverine/Flash Flooding

General flooding occurs annually in Tennessee and is the most common and costly disaster in the state. From 1963 through 2010, flooding has resulted in 22 Presidential declared disasters across the state, with expenditures in excess of $100 million. Flooding presents significant problems for between 20 and 30 percent of the state's population annually. Slow-rise and flash floods have been the most common recurrent disasters.

In Tennessee, the worst slow-rise floods occurred in 1926-27, 1936-37, and 1973. The great Tennessee and Cumberland River floods of 1927 gave way to even greater floods in 1937. Moderate to heavy rainfall, ice, and snow in December 1936 continued through of January 1937. Soils became saturated, and the Mississippi, Cumberland, and Tennessee Rivers and their tributaries overflowed into some of the most industrialized and populated sections of Tennessee. It was a record flood year for these river systems. Socially and economically, this was the worst single disaster in American history to that date, rivaling the combined effects of the floods of 1926-27 and the "Dust Bowl" of 1930-31. The National Weather Service reported that 21.24 inches of rain fell in January alone. January 24 was dubbed "Black Sunday" as rivers overflowed in Tennessee and eleven other states, inundating 12,700 square miles and affecting 75,000 homes. Almost 900 people were seriously injured and 250 died of flood-related causes.

Anderson County has been significantly affected by flooding caused by tropical storms, thunderstorms, and frontal systems. Anderson County's vulnerability to flooding is a result of topography, rainfall amounts, and vegetative patterns. Located at the foot of the Cumberland Mountains, approximately 35% of Anderson County's 345 square mile area is steep mountain terrain. In the northwestern section, three-fourths of the area is greater than 25% slope, and ninety percent is greater than 15% slope. With an average rainfall amount of 55 inches, any intense rainfall in this area, even for short periods, presents the potential for flash flooding of stream valleys.

Figure 5.11 Historic Flooding in Anderson County

Source: TVA

Flooding potential is compounded by long-term coal mining and logging operations, which have removed vegetation and altered the natural land contours in these areas. Wildfires and the southern pine beetle infestation have contributed to deforestation.

During periods of heavy rainfall, the Clinch River water level is controlled by TVA's water release program and does not itself present a significant flood hazard. However, when the water

level is higher than normal, tributary streams are prone to back up and overflow their banks. Given a heavy clay overburden, many low-lying areas throughout the county are subject to flooding during periods of extended or heavy rainfall. Water flow is often restricted due to debris obstructions and accumulation of silt in poorly maintained streambeds and drainage ditches.

The worst flood of the century struck Anderson County in March 1929 when the bridges between Coal Creek (Lake City) and Briceville were washed away. Business buildings in Clinton were heavily damaged. The Clinch River "bulged the banks at a crest of 35.5 feet and overflowed adjacent territory." The greatest flood stage recorded on the Clinch River was in March 1885 when a crest of 46 feet was registered. Completion of TVA's Norris Dam in 1936 provided flood control of the Clinch River.

There have been 55 flooding incidents identified impacting Anderson County since 1961, a period of 50 years. This results in a flooding incident occurring approximately every one year. These incidents resulted in 14 fatalities/injuries and $2,681,593 in reported property damage.

Future Probability of Riverine/Flash Flooding

The probability for and risk from future flooding incidents is high for Lake City, Norris, Oliver Springs, and the unincorporated areas of the county. With adequate storm water systems in place, Clinton and Oak Ridge share a moderate risk. A major flood incident would equally impact the entire county except for the mountainous northwestern area.

Historic Occurrences of Riverine/Flash Flooding

The NCDC/Sheldus database documents 25 flooding incidents resulting from thunderstorms or strong weather fronts. Another 30 were identified from other sources. There was 1 incident from a tropical storm, Hurricane Eloise, in 1975.

Table 5.10 Historic Riverine/Flash Flooding Thunderstorm/Frontal System Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
12/18/61	Countywide	Flooding Thunderstorm	0	0	0	1,020	0	
12/18/61	Countywide	Flooding Thunderstorm	0	0	0	1,020	0	
03/19/63	Countywide	Flooding Front	0	0	0	0	0	
03/24/65	Countywide	Flooding Thunderstorm	0	0	0	98,039	0	
07/24/65	Briceville	Flooding Thunderstorm Coal Creek	1	0	0	19,231	0	
07/11/67	Countywide	Flooding Thunderstorm	0	2	0	250,000	0	
08/04/68	Countywide	Flooding Thunderstorm	0	0	0	1,852	0	
06/23/69	Briceville	Flooding Thunderstorm	1	1	0	5,263	0	
04/27/70	Countywide	Flooding Thunderstorm	0	0	0	2,083	0	
06/20/71	Countywide	Flooding Thunderstorm	0	0	0	526	0	
08/21/71	Countywide	Flooding Thunderstorm	0	0	0	2,500	0	
04/12/72	Countywide	Flooding Tstm	0	0	0	25,000	2,500	C
12/09/72	Countywide	Flooding Tstm	0	0	0	1,136	0	
01/22/73	Countywide	Flooding Tstm	1	0	0	52,632	0	
03/14/73	Countywide	Flooding Tstm	1	0	0	74,529	0	
03/12/75	Countywide	Flooding Tstm	1	0	0	64,935	0	

Table 5.10 Historic Riverine/Flash Flooding Thunderstorm/Frontal System Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
09/23/75	Countywide	Flooding Tropical storm from Hurricane Eloise	0	0	0	7,000	7,350	C
03/30/77	Countywide	Flooding Tstm	2	0	0	555,556	555,556	C
04/02/77	Countywide	Flooding Tstm	0	1	0	11,364	0	
07/20/79	Countywide	Flooding Tstm	1	0	0	6,410	0	
02/10/81	Clinton	Flooding Tstm	0	0	0	50,000	0	
08/31/82	Clinton	Flooding Tstm Clinch River	0	0	0	50,000	0	
12/03/87	Countywide	Flooding Tstm	0	0	0	8,333	0	
03/05/89	Countywide	Flooding Tstm	0	0	0	526	0	
02/03/90	Countywide	Flooding Tstm	0	0	0	50,000	0	
02/03/90	Countywide	Flooding Tstm	0	0	0	50,000	0	
02/21/93	Countywide	Flooding Tstm	1	0	0	52,632	0	
03/23/93	Countywide	Flooding Tstm	0	0	0	5,000	0	
05/09/95	Clinton	Flood-Flash Tstm Heavy rainfall flooded streets	0	0	0	2,000	0	
06/13/96	Oak Ridge	Flood-Flash Tstm 2" of rain fell in 35 minutes causing roads to close	0	0	0	14,000	0	
07/13/96	Clinton	Flood Flash Tstm Heavy rain resulted in mud slides and flash flooding along highway 25W	0	0	0	0	0	
03/03/97	Countywide	Flood Tstm 3.14" roads closed (116, 441, 330, I-75), schools closed, school roof leaks	0	0	1	10,000	0	
06/19/97	Claxton Clinton	Flooding Tstm, Heavy rain caused widespread flooding. Streets/Roads closed (441 and I-75)	0	0	0	2,000	8,000	C
07/01/97	Countywide	Flood Tstm Oliver Springs flooding	0	0	0	0	0	C
04/17/98	Lake City	Flood-Flash Tstm Hinds creek Car Fatality	1	0	0	190,000	28,000	C
04/17/98	Norris	Flooding Tstm Storm Water	0	0	3	142,000	0	
04/18/98	Clinton	Flooding Tstm Storm Water over roads	0	0	0	0	0	
04/19/98	Clinton	Flooding Tstm roads closed	0	0	0	0	0	
06/01/98	Countywide Clinton	Flooding Cinch river 5" Rain TSTM Rockslide flooded, Highway 61 and Buffalo Road	0	0	0	202,500	0	
06/02/98	Lake City	Flood Tstm Highway 25 flooded. Car washed off road	0	0	0	1,000	0	
07/11/99	Countywide	Flooding Tstm Widespread rain caused flooding problems throughout the county	0	0	0	0	0	
07/24/99	Oliver Springs	Flooding Tstm 2 feet of water washed large tree limbs and other debris	0	0	0	0	0	
04/04/00	Countywide	Flooding Tstm roads washed out and closed	0	0	0	0	0	
01/23/02	Countywide	Flooding Front heavy rain closed roads	0	0	0	0	0	
03/17/02	Countywide	Flooding 5-8" rain reported in 36 hours	0	0	0	5,000	0	
05/26/02	Briceville	Flooding Tstm Residents were stranded in homes by flooding on lower Briceville road	0	0	0	6,000	0	
02/14/03	Countywide Clinton	Flooding Tstm/snow melt 4 day rain totals 2-8" combined with a melting snow pack	0	0	0	59,100	0	

Table 5.10 Historic Riverine/Flash Flooding Thunderstorm/Frontal System Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
02/15/03	Countywide	Flood Tstm roads closed, mud slides. 1 home evacuated and 1 business was damaged	0	0	2	0	0	
02/21/03	Countywide	Flood Front 3 day rain 1-3" created some flooding and several mudslides	0	0	0	0	0	
04/11/03	Countywide	Flood Front 7 day rain 3-5" Several roads across the area were flooded	0	0	0	0	0	
06/23/04	Oak Ridge	Flood Tstm roads were closed	0	0	0	0	0	
09/18/09	Clinton	Flood Tstm a	0	0	0	0	0	
09/26/09	Oak Ridge	Flood Front	0	0	0	0	0	
55			10	4	6	2,080,187	601,406	
Data Sources		NOAA/NWS, Sheldus, Local Sources, Internet						
Loss Type		A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup						

Major Historic Occurrences Discussion of Riverine/Flash Flooding

March 4-19, 1963: Three storms struck the western slopes of the Appalachians from Alabama to West Virginia, including Anderson County, resulting in widespread flooding. According to the Tennessee Division of Water Resources, 3,000 homes were damaged or destroyed; 1,500 livestock were lost; 100,000 acres of winter crops were damaged; one-half million acres of cropland were damaged; and 1,000 bridges were damaged or destroyed.

March 3, 1997: Heavy rainfall, 3.14" in Oliver Springs. Highway 116 in Briceville closed. Anderson County schools were delayed an hour because of flooding. Briceville Elementary School was closed for the day. Roof leaks occurred at Claxton Elementary.

July 1, 1997: Flooding and major problems occurred in Oliver Springs. In the Andersonville/Big Ridge Park area, 750 customers were without power when a downed tree broke a main electrical line. Flooding was reported in the Norris/Andersonville/Fairview areas. Trees were reported down in the areas of Ivanhoe and Mountain View Roads.

July 23, 1997: Oak Ridge was impacted by 3.57 inches of rain. Most damage occurred at the Oak Ridge Y-12 Plant where 6" of rain fell in about two hours. Water damage in the buildings ranged from puddles to several inches. South Illinois Avenue between Lafayette Drive and Oak Ridge Turnpike was closed. There were reports of damage from flooding in businesses along South Illinois including Kroger, the Oak Ridge Bowling Center. Poston & Co, and Greer's. Several other areas of the city were flooded including Jefferson Avenue, Melton Lake Drive, and the Turnpike near Food City and west of Wisconsin Avenue.

April 17, 1998: Severe thunderstorms caused major flooding, trapped some people inside their vehicles and forced some evacuations throughout Anderson County. Rescuers found the body of the 34-year-old woman inside her flooded vehicle. In Oliver Springs, an elderly patient in a flooded car was helped by her grandson to a tree. She held on until rescued. Another patient in the car was stuck because of high water. An ambulance rescued both patients. Emergency services personnel also rescued people from their homes in Willow Run apartments in Clinton, Middlebrook apartments in Lake City, and Royce Circle apartments in Oak Ridge. Firefighters rescued two people from cars on Jefferson Avenue and on Raccoon Road. Firefighters were

called to one house fire caused by lightning, resulting in $2,500 in damage. Oak Ridge received about 10 calls about sewer backups. .

Minor power outages affected approximately 25 customers. Oak Ridge schools were delayed one hour, while Anderson County schools were closed for the day. Damage in the city schools included leaks. Red Cross assisted the city with sheltering approximately 60 people.

Several roads in Oliver Springs were flooded. Roads in the Brushy Valley Road-Hinds Creek area and in the Norris-Andersonville area were hardest hit, followed by roads in the Briceville area. East Fork Poplar Creek overflowed, flooding Jefferson Avenue and Highway 95 between Oak Ridge and East Tennessee Technology Park. Damages to county roads totaled $600,000

April 4, 2000: Heavy rains falling for three days created widespread problems across Anderson County. County schools closed. A total of 3.61 inches of rain fell in Oak Ridge. The rain caused sewer line and storm drain backups, several mudslides, and road closings. A mudslide in the Park Meade subdivision adjoining Centennial Golf Course blocked Park Meade Drive. Brooks Gap and Nig Longmire roads in the Andersonville area were flooded, as was Airport Road in Oliver Springs. Half Moon Road in the Marlow area was impassible due to a stopped-up culvert. A mudslide caused problems on Walden's Ridge. In Lake City, Railroad Street was flooded. Water seeped into Norris Elementary. A leaky roof also led to some minor carpet damage at Anderson County Career and Technical Center.

March 17, 2002: Widespread flooding occurred across most of East Tennessee including Anderson, Bledsoe, Meigs, Roane, Rhea, Loudon, Blount, Knox, and Sevier Counties. Rainfall totals between 5” to 8” were reported in 36 hours. Major rivers flooded including the Powell, Sequatchie, and Pigeon Rivers. Damage estimates were over $5 million.

5.3.5 Hail Profile

The size of hailstones varies and is related to the severity and size of the thunderstorm that produced them. The higher the temperatures at the earth’s surface, the greater the strength of the updrafts, and the greater the amount of time the hailstones are suspended, giving hailstones more time to increase in size.

Location

Hailstorms occur throughout Anderson County, most frequently during the late spring and early summer, when the jet stream moves northward across the Great Plains. During this period, extreme temperature changes occur from the surface up to the jet stream, resulting in the strong updrafts required for hail formation.

Extent

Since 1988, there have been on average nearly 3,000 individual hail incidents reported each year. Although they occur in every state on the mainland United States, hailstorms occur most frequently in the Southern and Midwestern states. Hailstorms can occur throughout the year; however, most hailstorms occur during the months of April through October. July is the prime month of crop loss produced by hail. Hailstones vary widely in size, as shown in the Table below. Note that hail penny size (0.75 inch in diameter) or larger is considered severe.

Table 5.11 Estimating Hail Size

Size	Diameter Inches	Size	Diameter Inches
Pea	1/4 inch	Golf Ball	1 3/4 inches
Marble/mothball	1/2 inch	Tennis Ball	2 1/2 inches

Dime/Penny	3/4 inch	Baseball	2 3/4 inches
Nickel	7/8 inch	Tea cup	3 inches
Quarter	1 inch	Grapefruit	4 inches
Ping-Pong Ball	1 1/2 inch	Softball	4 1/2 inches

Hail causes $1 billion in damage to crops and property each year. The costliest hailstorm in the United States was in Denver in July 1990, with reported damage of $625 million. The largest hailstone ever recorded fell in Coffeyville, Kansas on September 3, 1970; it measured over 5.6 inches in diameter and weighed almost 2 pounds (NWS, January 10, 2003). Since 1959, 62 hail incidents have occurred in Anderson County. This is approximately 1.1 incidents per year. The hail incidents resulted in nine injuries and $565,000 in structure damage and crop loss.

Future Probability

The annual probability of hail occurring somewhere in the Anderson County is clearly quite high (1-5 incidents/yr). However, the site-specific incidence of hail is considered low because of the localized nature of the hazard. The probability rating for hail incidents in Anderson County is high. All areas of the county are at equal risk..

Historic Occurrences

The NCDC/Sheldus databases and local sources have recorded 62 historic hail incidents in Anderson County in 52 years.

Table 5.12 Anderson County Historic Hail Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
04/28/59	County	Hail 3”	0	0	0	0	0	
07/10/59	County	Hail 1.75”	0	0	0	0	0	
06/10/63	County	Hail 2”	0	0	0	0	0	
05/11/67	County	Hail 1”	0	0	0	0	0	
04/23/68	County	Hail 1”	0	0	0	0	0	
04/13/70	County	Hail .75”	0	0	0	0	0	
05/30/81	County	Hail .75”	0	0	0	0	0	
06/04/85	County	Hail 1.75”	0	0	0	0	0	
05/27/87	County	Hail 1”	0	0	0	0	0	
07/01/90	County	Hail 1”	0	0	0	0	0	
02/21/93	Oak Ridge	Hail ranged from 2.50”-3.50” in diameter	0	0	1	500	0	
05/18/93	Lake City	Hail .75”	0	0	0	0	0	
05/09/95	Oak Ridge	Hail tangerine-size hail caused power outages.	0	0	1	2000	0	
05/09/95	Oak Ridge	Hail 1”	0	0	1	1000	0	
05/10/95	Norris	Hail 1”	0	0	1	1000	0	
05/18/95	Clinton	Hail 2.75” 9 persons were treated for bruises a skylight broke, over 400 cars damaged.	0	9	451	500000	0	
04/13/96	Oak Ridge	Hail .75’	0	0	0	0	0	

Table 5.12 Anderson County Historic Hail Incidents								
03/28/97	County-North	Hail A severe thunderstorm produced .75" hail	0	0	2	20000	15000	A
04/12/97	Norris	Hail .75"	0	0	0	0	0	
04/21/97	Clinton	Hail .75"	0	0	0	0	0	
02/17/98	Oak Ridge	Hail .75"	0	0	0	0	0	
04/03/98	Oliver Springs	Hail 1.75"	0	0	0	0	0	
04/16/98	Countywide	Hail 1"	0	0	0	0	0	
04/16/98	Countywide	Hail 0	0	0	1	0	15000	A
06/02/98	Oak Ridge	Hail .75"	0	0	0	0	0	
05/13/99	Andersonville	Hail .75"	0	0	0	0	0	
06/02/99	Clinton	Hail 1"	0	0	0	0	0	
03/10/00	Oliver Springs	Hail 1"	0	0	0	0	0	
05/23/00	Clinton	Hail 1"	0	0	0	0	0	
05/23/00	Oak Ridge	Hail pelting and damaging side of the house	0	0	1	4000	0	
07/05/01	Oak Ridge	Hail 1"	0	0	0	0	0	
07/05/01	Norris	Hail .75"	0	0	0	0	0	
07/05/01	Norris	Hail .88"	0	0	0	0	0	
07/05/01	Oak Ridge	Hail 1"	0	0	0	0	0	
05/05/02	Oak Ridge	Hail .75"	0	0	0	0	0	
12/12/02	Oak Ridge	Hail .75 " no reported damage	0	0	0	0	0	
03/19/03	Oak Ridge	Hail .75"	0	0	0	0	0	
04/25/03	Oak Ridge	Hail .75"	0	0	0	0	0	
05/15/03	Oak Ridge	Hail 1"	0	0	0	0	0	
05/15/03	Clinton	Hail 1"	0	0	0	0	0	
07/16/03	Clinton	Hail .75'	0	0	0	0	0	
08/04/03	Clinton	Hail 1"	0	0	0	0	0	
08/31/03	Oak Ridge	Hail .75"	0	0	0	0	0	
06/02/04	Oak Ridge	Hail .88"	0	0	0	0	0	
06/02/04	Oliver Springs	Hail .88"	0	0	0	0	0	
06/02/04	Oak Ridge	Hail .75"	0	0	0	0	0	
06/20/05	Oak Ridge	Hail 1"	0	0	0	0	0	
10/21/05	Oak Ridge	Hail 1"	0	0	0	0	0	
04/02/06	Lake City	Hail .75"	0	0	0	0	0	
04/02/06	Clinton	Hail 1"	0	0	0	0	0	
04/03/06	Clinton	Hail .88"	0	0	0	0	0	
04/07/06	Clinton	Hail .75"	0	0	0	0	0	
04/21/06	Oliver Springs	Hail 1.75" Golf ball-size hail	0	0	0	0	0	
04/21/06	Clinton	Hail .75"	0	0	0	0	0	
08/10/06	Briceville	Hail 1"	0	0	0	0	0	
10/05/06	Braytown	Hail .75"	0	0	0	0	0	
05/04/07	Oak Ridge	Hail .75"	0	0	0	0	0	

Table 5.12 Anderson County Historic Hail Incidents								
08/21/07	Clinton	Hail .75”	0	0	0	0	0	
08/03/07	Rosedale	Hail .88”	0	0	0	0	0	
10/06/08	Clinton	Hail .75” damaged siding and trim	0	0	1	6000	0	
62			0	9	460	534500	30000	
Data Sources		**NOAA/NWS, Sheldus, Local Sources**						
Loss Type		**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**						

Major Historic Occurrences Discussion

October 6, 2008: Hail as large as hen eggs were reported. The hail broke siding off a home and damaged trim around windows

May 18, 1995: Nine persons were treated for bruises after being hit in the head by hail. A local newspaper had a skylight broken. Auto dealerships and others had over 400 cars damaged.

5.3.6 High Winds Profile

Wind is defined as the motion of air relative to the earth’s surface. In the United States the mean annual wind speed is reported to be eight to 12 mph, with frequent speeds of 50 mph and occasional wind speeds greater than 70 mph. High winds are generally the result of thunderstorms, fronts, tornadoes, and tropical storms/hurricanes. Winds in excess of 58 miles per hour are windstorms. Windstorms are among the nation's most severe natural hazards in terms of both lives lost and property damaged.

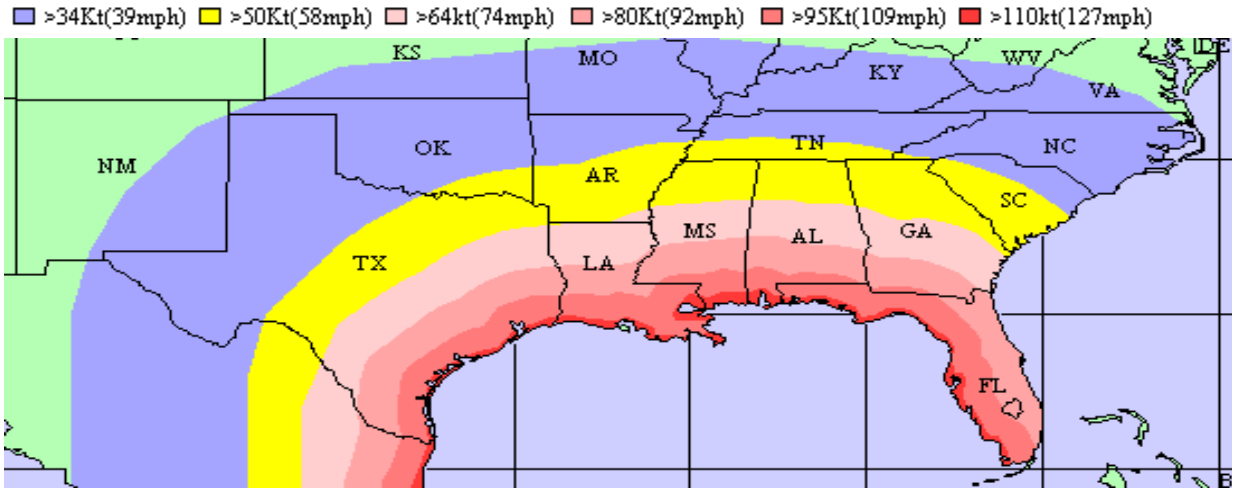
5.3.6.1 High Winds Tropical Storm/Hurricane

Tropical depressions/tropical storms and hurricanes are large-scale systems of severe thunderstorms that develop over tropical or subtropical waters and have a defined, organized circulation. Tropical storms have wind speeds of 39 mph to 74 mph.

Location

Anderson County occasionally experiences high winds from tropical depressions/tropical storms that are remnants of hurricanes that flow into Anderson County from Alabama, Mississippi and Louisiana. The inland extent of tropical depression/tropical storm/hurricane winds, as well as wind strength, increases with the strength of the hurricane at landfall and the actual forward motion of the storm. Anderson County is capable of receiving winds in excess of 39 mph for a tropical storm/hurricane category 4 storm as demonstrated in the figure below.

Figure 5.12 Extent of Inland Winds for a Category 4 Hurricane Moving Forward at 25 mph



Source: National Hurricane Center

Extent

The typical damage to structures from the different storm categories is shown in the Table below. The Beaufort scale applies to high winds. The Saffir-Simpson Scale is for hurricane winds.

Table 5.13 Beaufort and Saffir-Simpson Scales of Wind Damage

Type	Wind speed	Expected Property Damage
Strong gale	47-54 mph	Chimneys blown down, slate tiles torn from roofs
Whole gale	55-63 mph	Trees broken or uprooted
Tropical Storm	64-75 mph	Trees uprooted, cars overturned
Category 1 Hurricane	74-95 mph	Minimal: Damage is done primarily to shrubbery and trees, unanchored mobile homes are damaged, some signs are damaged, little structure damage
Category 2 Hurricane	96-110 mph	Moderate: Some trees are toppled, some roof coverings are damaged, and mobile homes suffer major damage
Category 3 Hurricane	111-130 mph	Extensive: Large trees are toppled, roof structural damage, mobile homes are destroyed, some structural damage to small homes/utility buildings.
Category 4 Hurricane	131-155 mph	Extreme: Extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail; some curtain walls fail.
Category 5 Hurricane	>155 mph	Catastrophic: Roof damage is considerable and widespread, window and door damage is severe, extensive glass failures, and entire buildings could fail.

High winds impact facilities, utilities, and transportation, and can result in loss of life. Tropical storm high winds can impose large lateral (horizontal) and uplift (vertical) forces on buildings. Residential buildings can suffer extensive wind damage when they are improperly designed and constructed. High winds can cause damage to rooftops and exterior windows and doors, allowing wind-driven rain to penetrate into the interior of both residential and commercial structures. Three occurrences of tropical storms in Anderson County resulted in no fatalities/injuries and $256,000 in property damage.

Future Probability

There have been three occurrences of significant high wind incidents caused by tropical storms/hurricanes recorded in the NCDC/Sheldus for Anderson County The probability of future

incidents is low and vulnerability is medium. All jurisdictions are at equal risk of these high wind incidents.

Historic Occurrences

There are three occurrences of high winds resulting from a tropical storm in Anderson County.

Table 5.14 Anderson County Historic High Wind Tropical Storm/Hurricane Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
10/05/95	Countywide	Tropical Storm resulting from Hurricane Opal caused damage to houses and downed trees	0	0	12	20,000	15,000	
07/01/03	Countywide	Tropical Depression Hurricane Bill	0	0	1	206,000	0	
09/16/04	Countywide	Tropical Storm resulting from Hurricane Ivan. Numerous trees and power lines were reported down across the county	0	0	1	15,000	0	
3			0	0	13	241,000	15,000	
Data Sources		**NOAA/NWS, Sheldus, Local Sources**						
Loss Type		**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**						

Major Historic Occurrences Discussion

September 16, 2004: A tropical storm resulting from Hurricane Ivan downed numerous trees and power lines across the county.

October 5, 1995: A large part of East Tennessee, including Anderson County, experienced high winds from the remnants of Hurricane Opal. Wind speeds at the higher elevations of the Appalachians were measured at 70 mph while 40-50 mph gusts were common at the lower elevations. Trees and power lines were down over much of the region. The greatest damage occurred in Hamilton County where damage was estimated in excess of $1 million. Over 20,000 homes were without power as a result of the storm. Over 70 miles of the Appalachian Trail were closed.

5.3.6.2 High Wind Thunderstorm

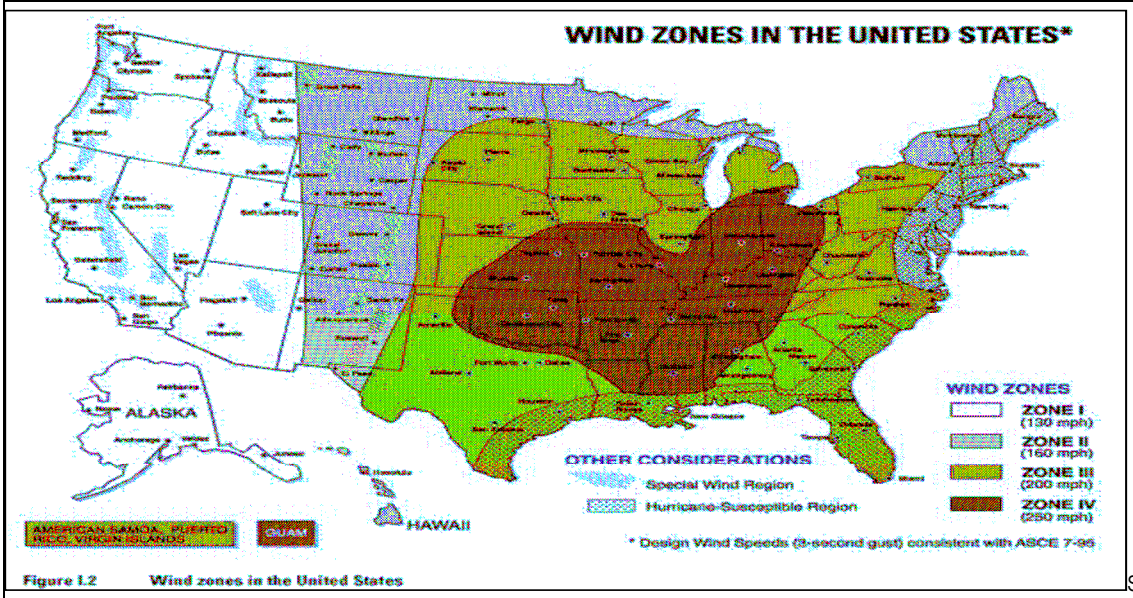
The NWS classifies a thunderstorm as severe if its winds reach or exceed 58 mph, it produces a tornado, or it drops surface hail at least 0.75 inches in diameter. High winds can result from thunderstorm inflow and outflow, downburst winds when the storm cloud collapses, and from strong frontal systems, or gradient winds from high or low-pressure systems. Thunderstorms produce downdraft winds, which are defined as a small-scale column of air that rapidly sinks toward the ground. A downburst is the result of a strong downdraft. The downburst can cause damage equivalent to a tornado. The outflow of cool or colder air can also create damaging winds at or near the surface. As these downburst winds spread out, they are often referred to as straight-line winds, which exceed 130 miles per hour.

Location

The atmospheric conditions in the southern region of the country are ideal for generating powerful storms. More than 100,000 thunderstorms occur each year in the U.S.; only about 10% are classified as “severe.” The most favorable conditions for thunderstorm development occur between June and August. All jurisdictions in Anderson County have experienced severe

thunderstorms accompanied by high winds. As depicted in the Wind Zone image below, Anderson County resides in Zone III, which can experience wind speeds up to 200 mph.

Figure 5.13 Wind Zones in The United States



Source: NWS

Extent

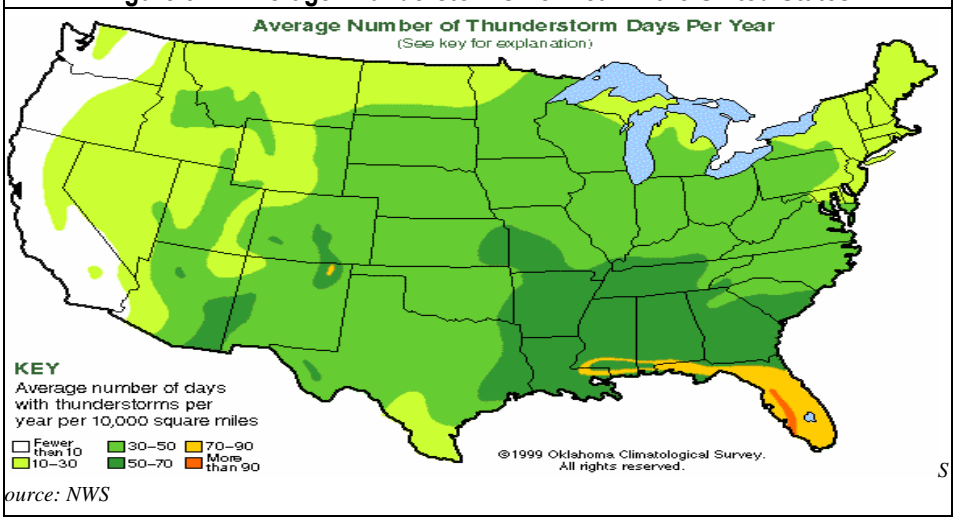
Severe thunderstorm winds are most likely to occur during the spring and summer months. During the spring, squall lines often move across the area, producing widespread wind damage. Summertime pulse thunderstorms will often produce wet microburst, which can cause localized damage paths. A typical thunderstorm is 15 miles in diameter and usually lasts 30 minutes. Thunderstorms affect relatively small, localized areas. The NWS Table below notes the following effects of various wind speeds.

Table 5.15 Effects of Wind Speed

Wind Speed	Effects
25-31 mph	Large branches in motion, whistling in telephone wires
32-38 mph	Whole trees in motion
39-54 mph	Twigs break off of trees, wind impedes walking
55-72 mph	Damage to chimneys and TV antennas, pushes over shallow rooted trees
73-112 mph	Peels surface off roofs, windows broken, trailer houses overturned
113+ mph	Roofs torn off houses, weak buildings and trailer houses destroyed, large trees uprooted

The following map indicates that Anderson County averages about 30-50 days with thunderstorms per year, per 10,000 square miles.

Figure 5.14 Average Thunderstorms Per Year in the United States



ource: NWS

Major hazards from thunderstorms are from flying debris or being in a collapsed building or mobile home. Major structural damage is most likely in mobile homes, homes with crawlspaces, and buildings with large spans, such as airplane hangers, gymnasiums, and factories. High winds accompanying thunderstorms can create hazardous driving conditions, lead to bodily injury or death, as well as cause substantial property and crop damages.

In 55 years, Anderson County has experienced 183 incidents of high wind from thunderstorms and weather fronts, approximately 3.3 per year, resulting in one fatality/injury and $2,147,184 in property damage

Future Probability

Long-term changes in weather patterns may influence the number of windstorms that occur. This frequency of future occurrences of thunderstorms/fronts is expected to continue. The future probability is high, as is vulnerability. All areas of Anderson County are at equal risk of high wind thunderstorm incidents.

Historic Occurrences

Table 5.16 Anderson County Historic High Wind Thunderstorm Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
07/16/56	Countywide	Tstm 0 kts	0	0	0	0	0	
06/17/57	Countywide	Tstm 0 kts	0	0	0	0	0	
01/21/59	Countywide	Tstm 0 kts	0	0	0	0	0	
08/06/62	Countywide	Tstm 0 kts	0	1	1	12,500	1250	A
06/10/63	Countywide	Tstm 0 kts	0	0	1	2381	2380	A
07/20/63	Countywide	Tstm 0 kts	0	0	1	526	1000	A
08/07/63	Countywide	Tstm 0 kts	0	0	1	1786	18000	A
03/04/64	Countywide	Tstm 0 kts	0	0	1	526	5000	A
03/09/64	Countywide	Tstm 0 kts	0	0	1	526	5000	A
03/14/64	Countywide	Tstm 0 kts	0	0	1	526	5000	A

Table 5.16 Anderson County Historic High Wind Thunderstorm Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
11/26/65	Countywide	Tstm 0 kts	0	0	1	526	5000	A
07/15/66	Countywide	Tstm 63 kts	0	0	0	0	0	
06/22/67	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
04/13/70	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
07/13/71	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
05/23/73	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
04/19/75	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
02/18/76	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
03/30/77	Countywide	Tstm Wind 61 kts	0	0	0	0	0	
8/22/79	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
5/7/84	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
5/7/84	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
6/15/84	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
4/5/85	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
4/5/85	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
5/22/86	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
7/13/86	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
7/5/87	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
7/16/88	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
4/28/90	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
6/9/90	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
3/27/91	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
4/9/91	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
6/16/91	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
6/16/91	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
6/15/92	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
6/15/92	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
7/3/92	Countywide	Tstm Wind 0 kts	0	0	0	0	0	
1/24/93	Oak Ridge	Tstm Wind 0 kts Trees fell on a power lines	0	0	1	500	0	
6/9/94	Oak Ridge	Tstm Wind 0 kts Trees/power lines down	0	0	1	500	0	
6/16/94	Claxton	Tstm Wind 0 kts Trees, power lines and power poles were down. Trees hit homes.	0	0	12	50,000	0	
05/13/95	Norris	Tstm Wind 0 kts Trees down. 1 damaged the deck of a house and a van	0	0	2	5,000	0	
05/14/95	Oak Ridge	Tstm Wind 0 kts Trees/power lines down	0	0	2	55,000	0	

Table 5.16 Anderson County Historic High Wind Thunderstorm Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
05/18/95	Clinton	Tstm Wind 0 kts The county courthouse was damaged. Trees/power lines down. One tree fell on a house.	0	0	3	25,000	0	
06/10/95	County North	Tstm Wind 0 kts Trees down	0	0	1	2000	0	
06/11/95	Oak Ridge	Tstm Wind 0 kts Outbuilding down. Garage roof off. Trees were down on cars	0	0	3	25,000	5,000	A
07/14/95	Clinton	Tstm Wind 0 kts Metal roofs were blown off. Several trees and power lines were down	0	0	5	16,000	5,000	A
11/11/95	Countywide	Frontal winds - Felled power lines, downed trees fell on homes/cars. A mobile home lost its roof	0	0	6	45,000	5,000	A
5/24/96	Countywide	Tstm Wind 0 kts Trees down	0	0	1	10,000	0	
5/27/96	Countywide	Tstm Wind 0 kts	0	0	1	0	10,0000	A
6/13/96	Oak Ridge	Tstm Wind 0 kts Trees fell on power lines.	0	0	1	2,000	8,000	A
03/28/97	Countywide	Tstm Wind 0 kts	0	0	2	111,111	15,000	A
06/14/97	Countywide	Tstm Wind 0 kts	0	0	1	0	2,000	A
06/19/97	Clinton	Tstm Wind 0 kts Trees fell on power lines	0	0	1	10,000	5,000	A
8/24/96	Andersonville	Tstm Wind 0 kts Trees/power lines down, Andersonville Elementary School was damaged	0	0	1	25,000	5,000	A
8/27/96	County North	Tstm Wind 0 kts Power lines were downed	0	0	1	0	5,000	A
1/5/97	Marlow	Tstm Wind 0 kts A mobile home was overturned	0	0	1	25,000		
2/21/97	Norris	Tstm Wind 0 kts Trees down	0	0	1		5,000	A
6/13/97	Andersonville	Tstm Wind 52 kts Trees/flag pole down in Andersonville. Trees down in Lake City	0	0	3	1,000	5,000	A
6/14/97	Clinton	Tstm Wind 0 kts Trees down	0	0	1	0	2,000	
6/19/97	Clinton	Tstm Wind 0 kts Phone pole/trees down	0	0	2	10,000	5,000	A
6/21/97	Claxton	Tstm Wind 0 kts Downed trees	0	0	1	0	8,000	A
7/23/97	Andersonville	Tstm Wind 0 kts Downed power lines	0	0	1	14,000		
7/28/97	Oak Ridge	Tstm Wind 0 kts Trees down	0	0	1	25,000	5,000	A
3/20/98	Oak Ridge	Tstm Wind 0 kts Trees down	0	0	1	0	10,000	A
4/16/98	Countywide	Tstm Wind 0 kts Trees down	0	0	1	0	15,000	A
5/25/98	Lake City	Tstm Wind 0 kts Trees down	0	0	1	0	2,000	A
6/30/98	Clinton	Tstm Wind 0 kts Trees down	0	0	1	0	7,000	A
11/25/98	Clinton	Tstm Wind 0 kts Trees down	0	0	1	0	5,000	A
5/6/99	Oak Ridge	Tstm Wind 0 kts Trees down	0	0	1	0	9,000	A
5/7/99	Claxton	Tstm Wind 100 kts	0	0	0	0	0	
5/7/99	Clinton	Tstm Wind 0 kts Trees down	0	0	1	0	5,000	A
6/2/99	Countywide	Tstm Wind 0 kts Trees and power lines down. 2000 customers lost power	0	0	12	20,000	0	

Table 5.16 Anderson County Historic High Wind Thunderstorm Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
7/24/99	Marlow	Tstm Wind 0 kts Trees down	0	0	1	0	3,000	A
7/27/99	Clinton	Tstm Wind 0 kts Power lines down	0	0	1	5,000	0	
7/27/99	Clinton	Tstm Wind 0 kts Trees and power lines down	0	0	1	10,000	0	
05/23/00	Oak Ridge	Tstm Wind 0 kts Trees down	0	0	1	0	9,000	A
5/25/00	Countywide	Tstm Wind 0 kts Trees down	0	0	1	0	10,000	A
5/27/00	Lake City	Tstm Wind 0 kts Trees down	0	0	1	0	10,000	A
5/27/00	Countywide	Tstm Wind 0 kts Trees down	0	0	1	0	14,000	A
7/28/00	Claxton	Tstm Wind 0 kts Trees down	0	0	1	0	8,000	A
7/29/00	Countywide	Tstm Wind 0 kts Trees down	0	0	1	0	15,000	A
7/30/00	Denovia	Tstm Wind 0 kts Trees down	0	0	1	0	12,000	A
8/10/00	Countywide	Tstm Wind 0 kts Trees down	0	0	1	0	26,000	A
11/9/00	Claxton	Tstm Wind 0 kts Trees down	0	0	1	0	18,000	A
12/16/00	Lake City	Tstm Wind 0 kts Trees down	0	0	1	0	9,000	A
6/29/01	Oak Ridge	Tstm Wind 0 kts Trees down	0	0	1	0	16,000	A
6/29/01	Lake City	Tstm Wind 0 kts Trees down	0	0	1	0	9,000	A
7/4/01	Oliver Springs	Tstm Wind 0 kts Trees down	0	0	1	0	10,000	A
7/4/01	Marlow	Tstm Wind 0 kts Trees down	0	0	1	0	15,000	A
7/5/01	Lake City	Tstm Wind 0 kts Trees down	0	0	1	0	7,000	A
10/24/01	Countywide	Tstm Wind 0 kts Trees/power lines down	0	0	2	10,000	2,000	A
1/24/02	Countywide	Tstm Wind 0 kts Trees down	0	0	1	0	5,000	A
4/28/02	Norris	Tstm Wind 0 kts Trees down	0	0	1	5,000	5,000	A
5/13/02	Clinton	Tstm Wind 0 kts Trees down	0	0	2	0	25,000	
7/2/02	Oliver Springs	Tstm Wind 0 kts Trees down on the Oliver Springs Public Library	0	0	2	20,000	0	
7/3/02	Oak Ridge	Tstm Wind 0 kts Trees down weighing 70 tons fell on a three bedroom home	0	0	2	48,000	2,000	A
7/21/02	Clinton	Tstm Wind 0 kts Trees down	0	0	1	0	5,000	
7/30/02	Norris	Tstm Wind 0 kts Trees down	0	0	1	0	10,000	A
8/2/02	Mills Creek	Tstm Wind 60 kts Boat dock was destroyed	0	0	1	10,000	0	
8/2/02	Mills Creek	Tstm Wind 0 kts Trees down	0	0	1	0	15,000	A
8/2/02	Countywide	Tstm Wind 0 kts Trees/power lines down	0	0	2	10,000	5,000	A
11/10/02	Countywide	Tstm Wind 0 kts Trees/power lines down	0	0	2	20,000	5,000	A
11/10/02	Countywide	Tstm Wind 0 kts Trees/power lines down	0	0	2	15,000	5,000	A
11/11/02	Countywide	Tstm Wind 0 kts Trees/power lines down	0	0	2	3,000	2,000	A
2/22/03	Countywide	Tstm Wind 60 kts Trees down	0	0	0	0	1,000	A
4/25/03	Countywide	Tstm Wind 60 kts Trees down on roads	0	0	1	0	10,000	A
5/1/03	Norris	Tstm Wind 60 kts Trees down	0	0	1	0	10,000	A
5/11/03	Clinton	Tstm Wind 55 kts Trees down	0	0	1	0	15,000	A
5/15/03	Oak Ridge	Tstm Wind 61 kts Trees down	0	0	1	0	5,000	A
5/15/03	Claxton	Tstm Wind 55 kts Trees down	0	0	1	0	10,000	

Table 5.16 Anderson County Historic High Wind Thunderstorm Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
5/17/03	Countywide	Tstm Wind 55 kts Trees down	0	0	1	0	20,000	A
6/11/03	Countywide	Tstm Wind 55 kts Trees down	0	0	1	0	15,000	A
7/9/03	Oak Ridge	Tstm Wind 60 kts Trees down	0	0	1	0	5,000	A
7/9/03	Oliver Springs	Tstm Wind 60 kts Trees/power lines down	0	0	1	0	5,000	A
7/12/03	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	5,000	A
8/4/03	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	5,000	A
8/17/03	Countywide	Tstm Wind 60 kts Trees down	0	0	1	0	5,000	A
8/31/03	Oak Ridge	Tstm Wind 60 kts Trees down	0	0	1	0	5,000	A
5/26/04	Oak Ridge	Tstm Wind 70 kts 30 Trees down	0	0	1	0	40,000	A
6/17/04	Clinton	Tstm Wind 65 kts Trees down	0	0	1	0	10,000	A
7/5/04	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	10,000	A
7/5/04	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	10,000	
7/6/04	Oak Ridge	Tstm Wind 60 kts Trees down	0	0	1	0	5,000	A
7/6/04	Lake City	Tstm Wind 60 kts Trees down	0	0	1	0	6,000	A
7/12/04	Countywide	Tstm Wind 60 kts Trees down	0	0	1	0	12,000	A
7/13/04	Oak Ridge	Tstm Wind 65 kts Trees down	0	0	1	0	20,000	A
7/13/04	Oak Ridge	Tstm Wind 65 kts Trees down	0	0	1	0	20,000	A
7/17/04	Oak Ridge	Tstm Wind 60 kts Trees down	0	0	1	0	12,000	A
4/22/05	Oak Ridge	Tstm Wind 60 kts	0	0	0	0	0	
6/14/05	Clinton	Tstm Wind 65 kts Trees down	0	0	1	0	15,000	A
6/20/05	Oak Ridge	Tstm Wind 52 kts	0	0	0	0	0	
6/27/05	Countywide	Tstm Wind 65 kts Trees/power lines down	0	0	2	10,000	5,000	A
7/27/05	Briceville	Tstm Wind 55 kts Trees down	0	0	1	0	15,000	A
8/4/05	Countywide	Tstm Wind 60 kts Trees down	0	0	1	0	10,000	A
8/6/05	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	18,000	A
8/6/05	Norris	Tstm Wind 65 kts Trees down	0	0	1	0	18,000	A
8/15/05	Norris	Tstm Wind 65 kts Trees/power lines down	0	0	2	15,000	5,000	A
8/17/05	Clinton	Tstm Wind 60 kts Trees/power lines down	0	0	2	15,000	5,000	A
8/19/05	Lake City	Tstm Wind 60 kts Trees/power lines down	0	0	2	10,000	5,000	A
10/21/05	Oak Ridge	Tstm Wind 55 kts Trees down	0	0	0	0	0	
1/2/06	Andersonville	Tstm Wind 60 kts Trees down	0	0	1	0	3,000	A
1/2/06	Marlow	Tstm Wind 60 kts Trees down on RR track	0	0	1	0	3,000	A
4/2/06	Countywide	Tstm Wind 70 kts Trees/power lines down School was damaged. 3000 lost power.	0	0	2	20,000	10,000	A
4/7/06	Lake City	Tstm Wind 60 kts Trees down	0	0	1	0	7,000	A
4/7/06	Norris	Tstm Wind 60 kts Trees down	0	0	1	0	8,000	A
4/7/06	Countywide	Tstm Wind 60 kts Trees down	0	0	1	0	12,000	A
5/20/06	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	8,000	A
6/23/06	Lake City	Tstm Wind 60 kts Trees down	0	0	1	0	6,000	A

Table 5.16 Anderson County Historic High Wind Thunderstorm Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
6/30/06	Oak Ridge	Tstm Wind 60 kts Trees/power lines down	0	0	0	2,000	1,000	A
6/30/06	Clinton	Tstm Wind 60 kts Trees limb/power line down	0	0	1	4,000	0	
7/21/06	Oak Ridge	Tstm Wind 60 kts Trees down	0	0	1	0	12,000	A
7/21/06	Oak Ridge	Tstm Wind 60 kts Trees down	0	0	1	0	12,000	A
7/28/06	Clinton	Tstm Wind 60 kts Trees/power lines down	0	0	2	20,000	5,000	A
7/28/06	Oak Ridge	Tstm Wind 60 kts Trees down	0	0	1	0	3,000	A
7/28/06	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	3,000	A
8/4/06	Clinton	Tstm Wind 60 kts Trees/power lines down	0	0	2	5,000	5,000	A
8/10/06	Claxton	Tstm Wind 60 kts Trees down	0	0	1	0	8,000	A
8/10/06	Lake City	Tstm Wind 60 kts Trees down	0	0	1	0	8,000	A
9/28/06	Claxton	Tstm Wind 60 kts Trees/power lines down	0	0	2	4,000	4,000	A
10/5/06	Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	3,000	A
10/11/06	Lake City	Front Wind 60 kts Trees/power lines down	0	0	2	5,000	5,000	A
12/01/06	Countywide	Frontal 60 kts winds Downed power lines and trees, carports/awnings/signs were damaged	0	0	12	30,000	0	A
4/3/2007	Lake City	Tstm Wind 55 kts Trees down damage to the docks and boats.	0	0	8	50,000	10,000	A
4/26/07	Lake City	Tstm Wind 55 kts straight-line winds Trees down	0	0	1	0	20,000	A
5/4/07	Oak Ridge	Tstm Wind 55 kts Trees down	0	0	1	0	20,000	A
6/8/07	Oak Ridge	Tstm Wind 60 kts Trees/power lines down	0	0	1	0	20,000	A
7/16/07	Lake City	Tstm Wind 60 kts Trees down	0	0	1	0	3,000	A
8/1/07	Clinton	Tstm Wind 40 kts Trees down	0	0	1	0	3,000	A
8/2/07	Lake City	Tstm Wind 40 kts Trees down	0	0	1	0	1,000	a
8/3/07	Rosedale	Tstm Wind 52 kts Trees down	0	0	1	0	2,000	A
1/29/08	Oak Ridge	Tstm Wind 50 kts Trees down	0	0	1	0	5,000	A
4/11/08	Lake City	Tstm Wind 60 kts Trees down	0	0	1	0	10,000	A
6/11/08	South Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	12,000	A
6/28/08	South Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	15,000	A
7/21/08	Mills Creek	Tstm Wind 60 kts Trees down	0	0	1	0	5,000	A
2/11/09	South Clinton	Tstm Wind 62 kts Trees down 3 homes were damaged	0	0	4	30,000	5,000	A
5/8/09	Mills Creek	Tstm Wind 55 kts Trees down	0	0	1	0	3,000	A
5/8/09	Buffalo	Tstm Wind 55 kts Trees down	0	0	1	0	3,000	
5/15/09	Elza	Tstm Wind 50 kts Trees down	0	0	1	0	3,000	A
5/25/09	Bethel	Tstm Wind 50 kts Trees down	0	0	1	0	3,000	
6/11/09	Oak Ridge	Tstm Wind 58 kts Trees/power lines down	0	0	2	10,000	2,000	A
6/16/09	South Clinton	Tstm Wind 60 kts Trees down	0	0	1	0	3,000	A
6/16/09	Knapp	Tstm Wind 58 kts Trees down, home damaged	0	0	1	8,000	2,000	A

Table 5.16 Anderson County Historic High Wind Thunderstorm Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
6/16/09	Seeber Flats	Tstm Wind 55 kts Trees down	0	0	0	0	0	
6/16/09	South Clinton	Tstm Wind 60 kts Trees/power lines down	0	0	2	15,000	5,000	A
6/18/09	Andersonville	Tstm Wind 52 kts Trees down	0	0	1	0	2,000	A
6/18/09	Clinton	Tstm Wind 55 kts Trees down	0	0	1	0	8,000	A
6/22/09	South Clinton	Tstm Wind 58 kts Trees/power lines down home damaged	0	0	2	10,000	5,000	A
6/28/09	South Clinton	Tstm Wind 55 kts Trees down	0	0	1	0	5,000	A
7/5/09	South Clinton	Tstm Wind 45 kts Trees down, home damaged	0	0	2	90,000	10,000	A
8/4/09	Clinton	Tstm Wind 50 kts Trees down	0	0	1	0	1,000	A
10/9/09	Clinton	Tstm Wind 55 kts Trees down	0	0	1	0	10,000	A
183		Totals	0	1	240	579,184	1,568,000	
Data Sources		NOAA/NWS, Sheldus, Local Sources						
Loss Type		A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup						

Major Historic Occurrences Discussion

June 11, 1995: One outbuilding was blown down. One home had its garage roof ripped off. A large number of trees were blown down as well. Some of the fallen trees damaged nearby vehicles.

May 24, 2000: Thunderstorms sweeping through Oak Ridge downed trees and power lines, resulting power outages to nearly 3,800 customers. Fallen trees damaged multiple homes, and 25 trees fell on power lines Firefighters responded to 44 calls in a 24-hour period. Firefighters checked homes and disconnected power to 35-40 homes. Two were injured in a car crash.

April 3, 2007: A squall line moved through Anderson County. Damage was predominantly created by straight-line winds. However, an EF1 tornado occurred on the Cumberland Plateau. Numerous trees were reported down across the county. The greatest concentration of tree damage was in Lake City. Lighthouse Marina sustained damage to the docks and boats.

February 11, 2009: A strong cold front tracked across Anderson County. A squall line formed ahead of it, producing widespread wind damage. Numerous trees and power lines were downed by thunderstorm winds countywide. Three homes were damaged by the winds.

5.3.6.3 High Winds Tornado

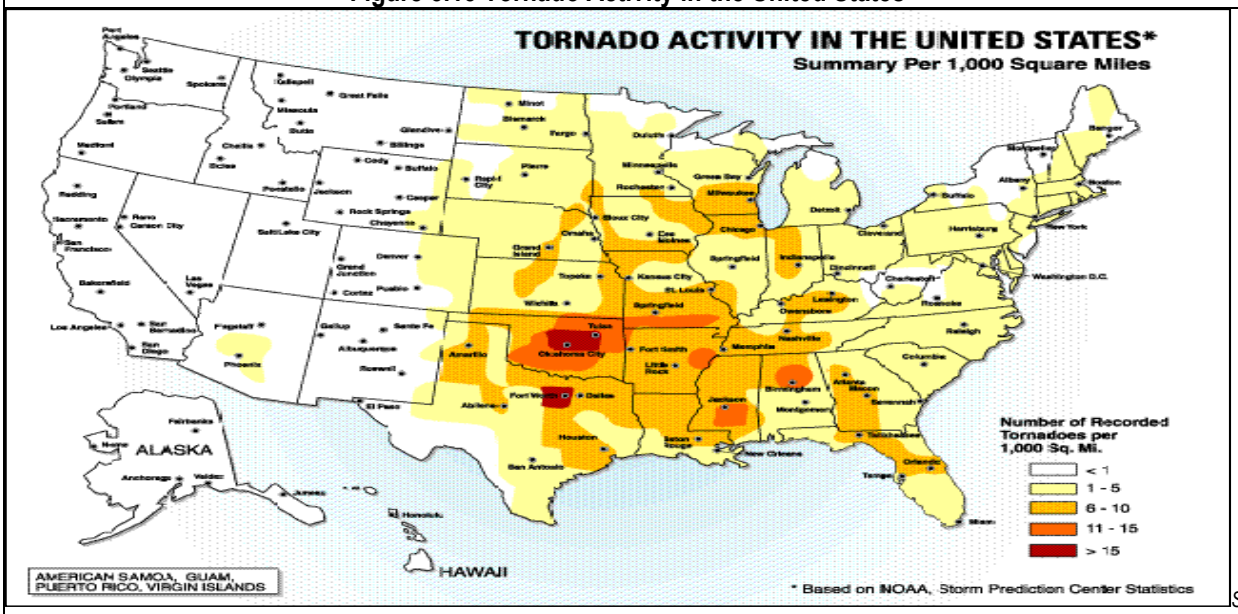
A tornado is a rapidly rotating vortex, or funnel, of air extending to the ground from a cumulonimbus cloud. In the United States, approximately 1,000 tornadoes each year are spawned by severe thunderstorms. Although most tornadoes remain aloft, those that touch ground are forces of destruction. Tornadoes are viewed as the most damaging summer storm.

Location

Unlike floods, tornadoes are not confined to any particular local geographic. Among the most unpredictable of weather phenomena, tornadoes can occur at any time of day, in any season, in any state. No community is without risk; any place in the Anderson County is considered to have

an equal chance of experiencing a tornado. The figure below shows tornado activity in the United States. The map below indicates that NOAA has recorded 1-5 tornadoes per 1000 square miles in Anderson County.

Figure 5.15 Tornado Activity in the United States



ource: http://www.fema.gov/hazards/tornadoes

Extent

The path length of a tornado can range from a few hundred yards to miles. A tornado typically moves at speeds between 30 and 125 mph and can generate internal winds exceeding 300 mph. The life span of a tornado rarely is longer than 30 minutes. Tornado damage severity is measured by the Fujita Tornado Scale. The Fujita Scale assigns numerical values based on wind speeds and categorizes tornadoes from zero to five. Tornadoes classified as F0-F1 are considered weak, those classified as F2-F3 are strong, while those classified as F4-F5 are considered violent.

Table 5.17 Fujita–Pearson Tornado Scale Description Table

F-Scale	Damage	Winds (mph)	Description
F-0	Light	40-72	Chimney damage, tree branches broken
F-1	Moderate	73-112	Mobile homes overturned
F-2	Considerable	113-157	Considerable damage, trees downed, mobile homes demolished
F-3	Severe	158-206	Roofs/walls torn down, trains and cars overturned
F-4	Devastating	207-260	Well-constructed walls leveled
F-5	Incredible	261-318	Homes lifted off foundation and carried considerable distances

Tornadoes have been known to lift and move objects weighing more than 300 tons a distance of 30 feet, toss homes more than 300 feet from their foundations, and siphon millions of tons of water from water bodies. Tornadoes generate a large amount of debris that becomes airborne shrapnel, causing additional damage and injuries. Tornado season is generally March through August, although tornadoes can occur at any time of the year. The most likely time for tornados in Anderson County is during the months of March through May, and in November.

A tornado watch is issued for a specific location when thunderstorms capable of producing tornadoes are recognized and arrival is expected in hours. A tornado warning is issued when

tornadoes are spotted or when Doppler radar identifies a distinctive "hook-shaped" area in a thunderstorm that is likely to form a tornado.

Damage due to tornadoes can range from minor to major depending on the strength of the tornado and where it strikes. A tornado that occurs in a rural area could cause crop damage and might damage some farm buildings and injure livestock, but the damage would typically be less than in populated areas. Tennessee leads the nation in the percentage of total tornadoes which have fatalities.

Tornadoes in Anderson County have caused 43 fatalities/injuries and $4,051,000 in property damage. From 1991 to 2010, Anderson County has received $501,458 in FEMA disaster relief assistance for tornado events

Future Probability

Anderson County historical tornado activity is slightly below Tennessee state average. It is 13% greater than the overall U.S. average. Tornadoes have affected Anderson County infrequently in the past, however, the probability of damage from this hazard in the future is medium. The entire county is at equal risk of future occurrences. The potential for property damage and loss of lives is equally high for incorporated and unincorporated areas of the county due to the large number of mobile homes throughout the rural areas.

Historic Occurrences

The NCDC and Sheldus databases have 4 tornadoes reported since 1953. Local sources have identified four other incidents, one of which was a funnel cloud.

Table 5.18 Anderson County Historic High Wind-Tornado Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
05/02/53	Oak Ridge Claxton	Tornado F2 100ydsX10Mile destroyed a small number of buildings	0	2	1	3,000	0	
07/03/70	Countywide	Tornado F0	0	0	0	0	0	
04/04/74	Norris	Tornado F0 200ydsX8.7miles moderate damage to trees and buildings	0	0	1	3,000	0	
12/23/90	County	Tornado F2	0	3	1	500,000	0	
02/21/93	Oak Ridge Claxton	Tornado F3 left a twelve-mile path of damage to homes & FEDC roof creating an SBA Disaster for Oak Ridge	0	3	1	2,500,000	0	
04/16/98	Oliver Springs	Tornado Funnel Cloud reported	0	0	0	0	0	
05/01/00	Oak Ridge Clinton	Tornado F2 Moderate damage	0	0	1	75,000	0	
11/10/02	Oak Ridge Medford Briceville	Tornado F3 75ydsX5.5Miles causing downed power lines, uprooted trees, and damage to 41 homes and businesses sufficient to be declared a Presidential Disaster area.	7	28	41	970,000	0	
8		Totals	7	36	46	4,051,000	0	
Data Sources		**NOAA/NWS, Sheldus, Local Sources**						
Loss Type		**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**						

Major Historic Occurrences Discussion

February 21, 1993: One tornado touched down in the Department of Energy Oak Ridge Reservation near the Oak Ridge Y-12 Plant, continued through the Union Valley business district located just east of the plant, through the adjacent University of Tennessee Arboretum, then continued into the communities of Claxton and Powell. The path length of the tornado was approximately 13 miles. Damage to the Y-12 Plant was minimal, but the Union Valley business district was seriously damaged, including the Fusion Energy Design Center (FEDC) which houses a number of DOE related projects. The preliminary cost estimate of the damage to DOE facilities (both at Y-12 and at the FEDC) was around $520,000.

November 10, 2002: An F2 tornado produced a damage path 75 yards wide for a distance of 5.5 miles from near Briceville to Medford. The Medford community received the brunt of the damage, which was concentrated along Highway 25W, Leinart Road, Bryant Circle, and Old and New Clear Branch roads. In all, 32 homes were damaged while three were totally destroyed. In addition, nine mobile homes were damaged. Seven fatalities and 28 injuries were reported.

5.3.7 Ice/Snow Storm Profile

Ice and sleet storms are storms that generate sufficient quantities of ice or sleet to result in hazardous conditions and/or property damage. An ice storm (freezing rain), probably the most serious of these type storms, occurs during a precipitation incident when warm air aloft exceeds 32°F while the surface remains below the freezing point. When precipitation originating as rain or drizzle contacts the earth, ice forms on all surfaces, creating problems for traffic, and downing utility lines and tree limbs. Sleet forms when precipitation originating as rain falls through a rather large layer of the atmosphere that has below freezing temperatures allowing the rain to freeze before reaching the ground. Sleet is also referred to as ice pellets. Sleet storms are usually of shorter duration than freezing rain and create fewer problems.

Location

The entire county is at risk of ice and snowstorms. On average, snow with accumulations of one to three inches occur one to three times a year with greater accumulations in areas of higher elevation.

Extent

In Tennessee, the landmark winters of the nineteenth century were in 1835 and 1898. February 5, 1835, was called "Cold Friday" because so many cattle and hogs froze to death that day. The most arduous blizzard seasons of the twentieth century were those of 1945, 1951, and 1993. In March of 1993 the "Storm of the Century" struck the eastern half of the state, killing 18 people and causing $18 million in damage. In 1994, a major ice storm created massive utility outages and road damage over two-thirds of the state. The net result was over $100 million in damages and was the largest disaster in the state's history. Additionally, major snowstorms affected citizens of Tennessee in 1996 and 1998, requiring both state and federal response. The total combined cost of these winter storms was in the $25 million range.

Anderson County receives an average of five inches of snowfall each year. This amount may seem inconsequential in comparison with other areas, but even a few inches of snow can make travel impossible given the mountainous terrain throughout much of the county. Snowstorms can close Interstate 75 and other major transportation routes, necessitating emergency sheltering for stranded motorists. Jurisdictions are economically impacted by costs for materials and labor to

clear streets and roadways. Schools are closed, and commerce and industry are affected by restricted travel of employees, delivery services, and customers.

Ice storms bring the entire county to a standstill. Ice accumulation causes trees and utility lines to fall, interrupting telephone service and creating significant power outages. Typically, an ice/snow storm in Anderson County consists of freezing rain or a few inches of snow that may or may not be accompanied by frozen roadways. However, because the county and it citizens are unaccustomed to these storms, they tend to be very disruptive to transportation and commerce. Trees, cars, roads, and other surfaces develop a coating or glaze of ice, making even small accumulations of snow or ice extremely hazardous to motorists and pedestrians. The most prevalent impacts of accumulations of snow and ice are slippery roads and walkways that lead to vehicle and pedestrian accidents; collapsed roofs from fallen trees and limbs and heavy ice and snow loads; and downed trees, telephone poles and lines, electrical wires, and communication towers. Emergency response time is greatly increased, especially to residents in remote, rural areas.

Since 1960, Anderson County has experienced 50 ice/snow incidents, an average of one per year. From 1991 to 2003, Anderson County received $208,329 in FEMA disaster relief funds for damage from snow and ice storms. These incidents have resulted in three fatalities/injuries and $1,912,287 in property damage.

Future Probability

The probability of future ice/snow storm incidents is high, and the entire county is at equal risk. While all jurisdictions are affected, snow and ice have a greater impact on the rural, unincorporated areas of the county. In the higher elevations of the northeastern region (about one-third of the entire county), colder temperatures allow greater accumulation and retard melting of snow and ice. Roads in remote areas may be impassible for several days until the county highway department can complete clearing of the 500 miles of county-maintained roads.

Historic Occurrences

The NOAA/Sheldus databases and local resources have recorded 50 ice/snow incidents in Anderson County since 1960.

Table 5.19 Anderson County Historic Ice and Snow Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
03/21/60	Countywide	Ice/Snow	0	0	0	98039		
12/11/62	Countywide	Ice/Snow	0	0	1	5,263	0	
01/23/63	Countywide	Ice/Snow	0	0	1	5,263	0	
12/22/63	Countywide	Ice/Snow	1	0	1	526	0	
12/31/63	Countywide	Ice/Snow	0	1	1	1,786	0	
01/21/66	Countywide	Ice/Snow	0	0	1	526	0	
01/29/66	Countywide	Ice/Snow	0	0	1	5,263	0	
01/12/68	Countywide	Ice/Snow	0	0	1	526	0	
02/15/69	Countywide	Ice/Snow	0	0	1	526	0	
12/01/82	Countywide	Ice/Snow	0	0	1	0	7,246	A

Table 5.19 Anderson County Historic Ice and Snow Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
07/01/83	Countywide	Ice/Snow	0	0	1	52,632	0	
01/19/85	Countywide	Ice/Snow	1	0	1	19,230	0	
2/20/85	Countywide	Ice/Snow	0	0	1	19,231	0	
04/02/87	Countywide	Ice/Snow	0	0	1	19,230	0	
03/01/93	Countywide	12” Ice/Snow Roads closed	0	0	1	135,000	0	
12/20/93	Countywide	Snow 2 days, mountains were the hardest hit with up to 20.0 inches of snow, roads closed	0	0	1	1,000	0	
01/14/94	Countywide	Snow 2 days 4” Roads closed	0	0	1	1,000	0	
01/16/94	Countywide	Snow 2 days 4” snow	0	0	1	5,000	0	
02/09/94	Countywide	Ice Storm 2 days major ice storm, Trees, Power	0	0	1	500,000	0	
01/17/95	Countywide	Ice/Snow Trees, Power, Accidents	0	0	1	500,000	0	
02/07/95	Countywide	Snow 4”	0	0	1	1,000	0	
01/06/96	Countywide	Snow 2 days 12” Trees/power lines down, roads closed, roofs collapsed, accidents	0	0	0	0	0	
01/11/96	Countywide	Snow 2 days 4”-8” Trees/power lines down, accidents, schools/businesses/roads closed	0	0	0	0	0	
02/09/96	Countywide	Snow 2 days 18”-24” accidents, roads closed, roofs damaged	0	0	0	0	0	
12/18/96	Countywide	Snow 2 days 1”-4”	0	0	0	0	0	
01/10/97	Countywide	Snow 1 day 3”-5”	0	0	0	0	0	
12/30/97	Countywide	Snow 2 days 2”-5”	0	0	0	0	0	
04/01/98	Countywide	Snow	0	0	1	28,000	0	
12/22/98	Countywide	Ice Storm 3 days Trees/Power lines down, accidents	0	0	1	275,000	0	
01/06/99	Countywide	Snow 1 day 2” roads/schools closed	0	0	0	0	0	
03/13/99	Countywide	Ice/Snow 2days 1”-3”	0	0	0	0	0	
01/22/00	Countywide	Ice/Snow 1 day 2”-4” snow, 1/8” ice	0	0	0	0	0	
12/02/00	Countywide	Snow 2 days 2”-4”	0	0	0	0	0	
12/18/00	Countywide	Snow 2 days 2”-4”	0	0	0	0	0	
01/01/01	Countywide	Snow 2 days 3”	0	0	0	0	0	
01/20/01	Countywide	Snow 1”-3”	0	0	0	0	0	
01/05/02	Countywide	Snow 2 Days 2”-4”	0	0	0	0	0	
03/01/02	Countywide	Snow	0	0	1	20,000	0	
01/05/03	Countywide	Snow 1 day 4”	0	0	0	0	0	
01/16/03	Countywide	Snow 1 day 2”-8”	0	0	0	0	0	
01/22/03	Countywide	Snow 2 days 2”-8”	0	0	0	0	0	
02/01/03	Countywide	Snow	0	0	1	41,000	0	
02/09/03	Countywide	Snow 3”-6”	0	0	0	0	0	
01/09/04	Countywide	Snow 1 day 1”-4”	0	0	0	0	0	
02/01/04	Countywide	Ice Snow	0	0	1	170,000	0	

Table 5.19 Anderson County Historic Ice and Snow Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
01/26/04	Countywide	Snow 1 day 3"-6"	0	0	0	0	0	
01/25/05	Countywide	Ice ¼"-1/2" Trees/power lines down	0	0	0	0	0	
01/29/10	Countywide	Snow 4"-8"	0	0	0	0	0	
50			2	1	25	1,905,041	7,246	
Data Sources		NOAA/NWS, Sheldus, Local Sources						
Loss Type		A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup						

Major Historic Occurrences Discussion

March 3, 1960: Anderson County experienced an ice storm on the heels of the fourth big snowstorm of the county's snowiest winter ever. Trees snapped and fell and power lines were affected, leaving residents without power. Tens of thousands of branches lay on the ground. Damage was heaviest across the top of the mountains.

January 6-7, 1996: A strong low-pressure system from the Gulf Coast region brought up to one foot of snow to parts of Anderson County. Many trees and power lines fell. Many roads became impassable, shutting down schools and businesses across the area. Numerous auto accidents occurred with three deaths reported from an accident. There were also collapsed roofs.

5.3.8 Landslide/Mudslide Profile

Landslides and mudslides often occur along with other major natural disasters, such as floods, which involve precipitation, runoff, and ground saturation that may be the result of severe thunderstorms or tropical storms. Earthquakes may cause landslides ranging from rock falls and topples, to massive slides and flows. Landslides into a reservoir may compromise dam safety, or a landslide may affect the dam itself.

Location

The topography and geology of Anderson County is susceptible to the effects of landslides, according to the Geological Survey of Tennessee. Situated in the Valley and Ridge Geologic Province with a heavy clay overburden, Anderson County has experienced many landslides. Several factors combine to make Anderson County susceptible to landslide hazard.

Slopes with the greatest potential for sliding are between 34° and 37°. While most slopes in Anderson County are 25° or less, cuts through mountainous areas for roadway construction have created almost vertical banks, accelerating the process of slope collapse. The Anderson County Highway Department estimates that road cuts are the cause of 95% of landslides in Anderson County.

Deforestation from logging and destruction of vegetation by wildfires and the southern pine beetle have removed root systems needed to stabilize the soil.

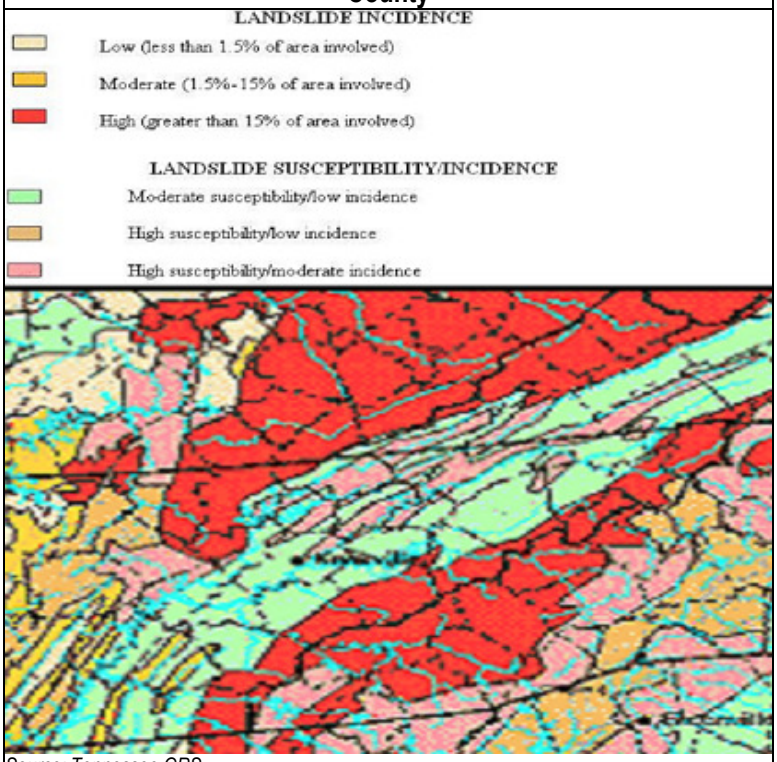
Long- term coal mining activities have altered the natural land contours.

Rainfall averages 55 inches annually in Anderson County.

Extent

On the adjacent Land Slide Incidence/Susceptibility map, Anderson County is in the red zone identifying landslide incidence at greater than 15%. Susceptibility is high. Susceptibility to land sliding is defined as the probable degree of response of [the area] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of land sliding.

Figure 5.16 Land Slide Incidence/Susceptibility in Anderson County



Source: Tennessee GRS

Landslides are not isolated to any specific area and have occurred in Oak Ridge, Oliver Springs, and throughout the unincorporated areas of the county. The steep terrain of the northwestern rural section is particularly susceptible. Landslides routinely occur on State Highways 116 and 330 during periods of heavy rain. At many points, sections of the roadway slide. Transecting a largely rural, mountainous area, these highways are frequently closed for several days while cleanup is performed and road sections are rebuilt.

The impact from a landslide can include loss of life, damage to buildings, lost productivity, disruption in utilities and transportation systems, and reduced property values. It is imperative that any major construction project in the county implement prevention and/or mitigation measures to protect against landslides occurring.

Figure 5.17 A Land Slide in Tennessee

Source: Tennessee GRS

Anderson County has reported 114 landslides resulting in no fatalities/injuries and $1,899,067 in property damage.

Future Probability

The probability for future landslide events is moderate to high for the entire county. Given the topography, the northwestern section is at high risk. Due to numerous road cuts, the remainder of the unincorporated areas of Anderson County, Lake City, and Oliver Springs are at moderate risk, with Clinton, Oak Ridge, and Norris at low risk. Impact from future events would affect Anderson County and its municipalities equally. Unless

measures are undertaken to stabilize banks created by road construction, a high probability exists that landslides will continue to be a significant hazard to Anderson County and its jurisdictions.

Historic Occurrences

Table 5.20 Anderson County Historic Land/Mud Slide Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost Amount	Other Loss or Cost Type
04/16/98	Briceville	7 Landslides	0	0	7	15,200	0	
04/16/98	Lake City	11 Landslides	0	0	11	18,300	0	
04/16/98	North Clinton	13 Landslides	0	0	13	15,000	0	
04/16/98	Marlow Area	8 Landslides	0	0	8	7,500	0	
04/16/98	Claxton Area	6 Landslides	0	0	6	11,440	0	
04/16/98	Hinds Creek	20 Landslides	0	0	20	6,400	0	
04/16/98	Andersonville	11 Landslides	0	0	11	11,000	0	
04/16/98	Brushy Valley	3 Landslides	0	0	3	9,000	0	
04/04/00		2 mudslides closed roads	0	0	2	0	0	
01/25/02	SR 330	Landslide	0	0	1	174,393	0	
02/15/02	SR 62	Landslide	0	0	1	8,680	0	
03/18/02	SR330	Landslide	0	0	1	153,379	0	
02/20/03	SR 116	Landslide	0	0	1	525,840	0	
02/26/03	Willow Springs Rd	1 Landslide and waterline damage	0	0	2	75,872	0	
02/26/03	Herrell Rd	2- Landslides	0	0	9	12,000	0	
02/26/03	Nature Lane	Landslide	0	0	1	4,500	0	
02/26/03	Sulfur Springs	3-Landslide Road	0	0	1	15,688	0	
02/26/03	Coward Road	Landslide Road	0	0	1	4,500	0	
02/26/03	Muddy Ford Rd	3-Landslide Road	0	0	2	8,500	0	
02/26/03	Dutch Valley	Landslide	0	0	1	3,500	0	
02/26/03	Old Emory Rd	2-Landslides	0	0	2	8,500	0	
02/26/03	Ivanhoe Road	Landslide	0	0	1	4,500	0	
02/26/03	Ridgeway Rd	Landslide	0	0	0	2,500	0	
03/05/03	SR 9	Landslide	0	0	1	21,686	0	
03/05/03	SR 116	Landslide	0	0	1	29,475	0	
03/12/03	SR 9	Landslide	0	0	1	288,749	0	
05/03/04	SR 62	Landslide	0	0	1	108,718	0	
05/07/04	SR 116	Landslide	0	0	1	45,454	0	
09/18/09	Clinton	Mud slide closed road	0	0	1	0	0	
02/15/10	Oak Ridge	Landslide 80"X200"	0	0	1	272,793	0	
03/17/10	Frost Bottom Rd	Landslide	0	0	1	12,000	0	
05/11/10	Melton lake Dr	Rockslide closed road 100 tons of Debris	0	0	1	24,000	0	
12/02/10	SR 116	Landslide closed Road	0	0	1	0		
114		TOTALS	0	0	114	1,899,067	0	
Data Sources		**NOAA/NWS, Sheldus, Local Sources**						

Table 5.20 Anderson County Historic Land/Mud Slide Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
Loss Type	A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup							

Major Historic Occurrences Discussion

A major rockslide in 1998 closed Interstate 40 near the Tennessee-North Carolina border for almost two months, resulting in major economic damage to an area highly dependent on tourism. I-40 is a major commerce route for Anderson County.

A landslide in the southbound lanes of I-75 in adjacent Campbell County in late winter of 2005 revealed the existence of a major landslide condition requiring the closure of Interstate 75. A geotechnical investigation revealed the highway embankment was originally constructed on a colluvial deposit of sandstone boulders and soil. Repair of the landslide required massive excavation to in-place stable bedrock and the rebuilding of the highway embankment.

5.3.9 Land Subsidence Profile

Movement of ground water along joints and fractures in soluble rocks results in solution of the rocks and the development of cavities or openings in the rock. A prerequisite for subsidence is the presence of underground openings in rocks or unconsolidated materials. Cavities may form naturally or they may be manmade. The most significant cavities in terms of subsidence in Anderson County are solution cavities in carbonate rock terrains, although there are known instances of sinkholes forming over abandoned mines. Areas in Anderson County underlain by carbonate rocks and characterized by the presence of subsurface cavities, sinkholes, and underground drainage are called "karst terrains." It is these karst areas that are most susceptible to sinkhole development and subsidence.

Location

In Anderson County, the most common causes of land subsidence are the development of sinkholes in areas underlain by soluble carbonate rocks or ground collapse above abandoned mines. Abandoned coal mines create a hazard in terms of foundation safety because of their widespread occurrence in parts of the state underlain by coal beds of the Pottsville Formation, their often-shallow depth, and the progressive deterioration of remaining supports and overburden. Periods of drought, excessive rainfall, well pumpage, and construction activities increase the potential for sinkhole formation in these areas. Rainfall amounts averaging 55 inches per year increase the potential for undermining and erosion to occur, creating conditions for catastrophic sinkhole collapse or the gradual collapse called land subsidence. In Anderson County, most sinkholes are caused by the following:

Loss Of Support: Ground water provides buoyant support to the roofs of subsurface cavities. Lowering the water table removes this support and may result in the collapse of the roof of the subsurface cavity.

Collapse of Unsupported Openings: The collapse of an unsupported opening results from the enlargement of the opening beyond the ability of the materials above to bridge it.

Raveling or piping: The slow erosion of unconsolidated sediments into an underground opening known as a sinkhole. Sinkhole formation is usually a very slow process; however, failure may

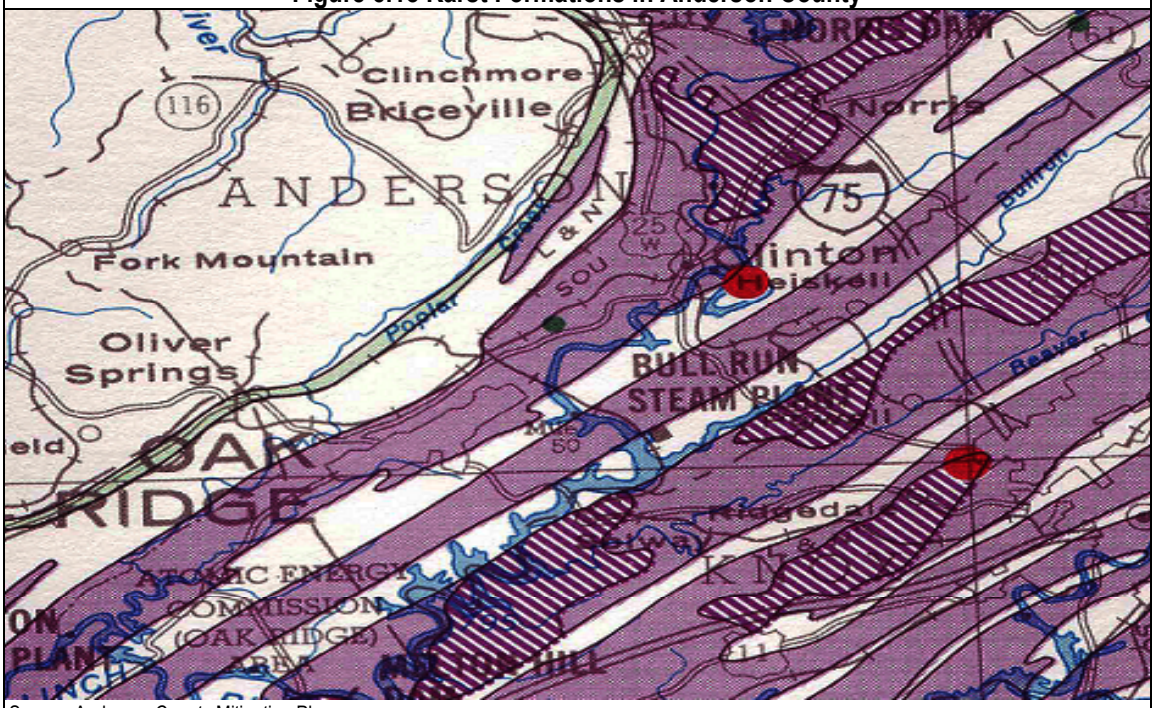
occur suddenly, violently, and without warning. Sinkholes generally form in farm fields, woodlands, and other such terrain, but occasionally may form along city streets, highways, in parking lots, or beneath buildings. This has occurred in a number of Tennessee towns and cities, including Clarksville, McMinnville, Knoxville, and Oak Ridge. In the coalmine districts of Anderson County, abandoned mines, mine shafts, tunnels, and wells have sometimes given way, negatively impacting the surface.

Extent

All of Anderson County and its jurisdictions have underlying karst geology, which makes the entire county subject to sinkhole activity. In addition, in the northwestern third of the county significant coal mining activities have resulted in areas where overlying ground can collapse into abandoned mines.

Abandoned coal mines in the northwestern mountainous section of the county present the potential for collapse of mine shafts and tunnels. The Coal Creek coal seam was deep mined from the 1860s until the late 1990s. The seam outcrops at about elevation 1000 feet MSL, so any areas higher in elevation have probably been undermined. Also, water accumulates in the abandoned mine works due to natural surface infiltration. Sections of the mine without adequate drainage could fill with water, which could be suddenly released. There are at least two, and probably more, abandoned mine portals and shafts in the watershed, which present potential hazards for intruders. One is in the Wye Community between Fraterville and Lake City, and the other is along Slatestone Creek upstream of Briceville. A slate pit has been burning underground in the Tennessee Hollow area of Briceville for over nine years. The map below demonstrates the karst topography covering much of Anderson County.

Figure 5.18 Karst Formations in Anderson County



Source: Anderson County Mitigation Plan

Although land subsidence has not been reported within the boundaries of Clinton, Lake City, and Oliver Springs, these cities are underlain by karst topography. In the northwestern section where

karst topography is absent, mining activities have created the risk of potential ground surface failure. In 1999, Oak Ridge began a $3,193,680 project to acquire and demolish 25 homes on parcels affected by karst. In Norris, a horse dropped into a newly opened sinkhole. Within the unincorporated areas of the county, only two incidents of sinkhole collapse have been recorded – one at a farm near Clinton, and one on Laurel Road. It is likely there have been many unreported incidents. Sinkholes in Anderson County have impacted roads and structures.

Future Probability

The probability of future land subsidence incidents is likely for the entire county. All jurisdictions are equally at moderate to high risk of future incidents. Given population and housing densities and concentrations of commercial, industrial, and manufacturing facilities, such an incident would have greater impact on Clinton and Oak Ridge. The northwestern areas of the county are also susceptible to collapsing of abandoned coalmines. Anderson County has recorded 12 instances of sinkholes in 47 years, an average of one incident every four years. The future probability of an incident is moderate and the vulnerability is low.

Historic Occurrences

Table 5.21 Anderson County Historic Land Subsidence Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
N/A	Wye Community	Abandoned mine shaft collapse	0	0	0	0	0	
N/A	Bear Hollow Fork	Abandoned mine shaft collapse	0	0	0	0	0	
1981	Anderson Co.	Sinkhole Collapse Ross Cemetery Rd,	0	0	0	0	1,000	
1985	Anderson Co.	Sinkhole Collapse Laurel Road	0	0	0	0	1,000	
06/06/00	Oak Ridge	Sinkhole Collapse Mona Lane damaged 25 homes (acquisition)	0	0	25	3,193,680	12,500	C
12/27/07	Norris	Sinkhole 35 Dairy Pond Road a 27-year-old horse, deep in a newly-collapsed sinkhole						
07/18/09	Pellissippi Pkwy	Sinkhole in highway	0	0	1	125,000	0	
		Totals	0	0	26	3,318,680	14,500	
Data Sources	**NOAA/NWS, Sheldus, Local Sources**							
Loss Type	**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**							

Major Historic Occurrences Discussion

June 6, 2000: The sinkhole problem due to the underlying karst formations in the Mona Lane area resulted in a $3,193,680 buyout of property damaged by sinkholes. FEMA paid $2,169,475. The remaining $1,024,205 was shared equally by the city of Oak Ridge and the state.

July 18, 2007: A sinkhole on a major road connecting west Knoxville and Anderson County that highway workers tried to fill in May is sinking again. Both southbound lanes of the Pellissippi Parkway were closed for about nine hours while workers tried to shore up the road. The sinkhole first opened in May. At that time highway crews poured in 36 dump truck loads of rock, about 40 yards of concrete, and 60 tons of asphalt to cover the nearly 10-foot wide sinkhole.

1981-2007: Four sinkholes have appeared on properties since 1981. A newly formed sinkhole in a field swallowed a horse.

5.3.10 Lightning Profile

Lightning, which occurs during all thunderstorms, can strike anywhere. Generated by the buildup of charged ions in a thundercloud, the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air in the channel of a lightning strike reaches temperatures higher than 50,000°F. The rapid heating and cooling of the air near the channel causes a shock wave, which produces thunder.

Location

Lightning incidents can occur anywhere in the planning area.

Extent

The lightning hazard component of thunderstorms is measured as the mean annual ground flash density (flashes per square kilometer). Review of NWS data shows that the central Florida region has over 18-flashes/km^2, the highest density in the U.S. mainland. Tennessee, including Anderson County, averages from 8 to 12 flashes/km^2.

Lightning is the most dangerous and frequently encountered weather hazard that most people in the United States experience. Surpassed only by floods, lightning is the second most frequent killer in the U.S., with nearly 100 deaths and 500 injuries annually. These numbers are likely to underestimate the actual number of casualties because of under-reporting of suspected lightning deaths and injuries. Cloud-to-ground lightning can kill or injure people by either direct or indirect means. The lightning current can branch off to strike a person from a tree, fence, pole, or other tall object. In addition, electrical current may be conducted through the ground to a person after lightning strikes a nearby tree, antenna, or other tall object. The current also may travel through power lines, telephone lines, or plumbing pipes to a person who is in contact with an electric appliance, telephone, or plumbing fixture.

Lightning also causes fires. The period 2000-2006 showed 12,000 wild land fires started by lightning per year with an average loss of 5.2 million acres annually (Source: National Interagency Fire Center, 2007). Some 18% of all lumberyard fires and 30% of all church fires are lightning-related (Source: Ohio Insurance Institute, Columbus, OH). During 2002-2004, U.S. fire departments responded annually to about 31,000 fires caused by lightning, with $213 million in direct property damages (Source: NFPA Report, January 2008).

Looking specifically at storage and processing activities, lightning accounts for 61% of the accidents initiated by natural incidents; in North America, 16 out of 20 accidents involving petroleum products storage tanks were due to lightning strikes. Plant loss in Louisiana was estimated at $10,000,000. On average, 30% of all power outages annually are lightning-related, with total costs approaching $1 billion dollars. The Lightning Institute database shows 145 lightning incidents to privately owned nuclear power plants in the period 1985-2000 (Source: U.S. Nuclear Regulatory Commission, Report March 2001).

Since 1960, 70 incidents of lightning have been reported in Anderson County resulting in five fatalities/injuries and $120,000 in property damage. It is believed that the amount of property damage is significantly under-reported

Future Probability

Based on reports in the NCDC/Sheldus databases and local sources, there have been 70 occurrences of lightning incidents since 1960, a period of 50 years. This indicates that a severe lightning incident occurs in Anderson County approximately 1.4 times a year resulting in a risk

rating of high and a vulnerability rating of low. All jurisdictions are at equal risk of lightning incidents.

Historic Occurrences

Table 5.22 Anderson County Historic Lightning Incidents

Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
8/7/60	Anderson Co	Lightning	1	0	0	0	0	
7/3/62	Anderson Co	Rain, Lightning And Wind	0	0	0	0	0	
7/8/62	Anderson Co	Wind, Rain, Hail And Lightning	0	0	0	0	0	
8/6/62	Anderson Co	Wind, Lightning And Hail	0	0	0	0	0	
9/4/62	Anderson Co	Wind And Lightning	0	0	0	0	0	
3/5/63	Anderson Co	Rain, Wind, Electrical	0	0	0	0	0	
3/11/63	Anderson Co	Rain, Wind, And Lightning	0	0	0	0	0	
5/17/63	Anderson Co	Lightning, Rain, And Wind	0	0	0	0	0	
6/7/63	Anderson Co	Wind, Hail, And Lightning	0	0	0	0	0	
6/8/63	Anderson Co	Wind, Hail, Lightning	0	0	0	0	0	
6/10/63	Anderson Co	Wind, Hail, And Lightning	0	0	0	0	0	
7/8/63	Anderson Co	Lightning, Wind And Rain	0	0	0	0	0	
7/20/63	Anderson Co	Wind, Rain, Lightning And Hail	0	0	0	0	0	
8/7/63	Anderson Co	Wind, Lightning, Rain And Hail	0	0	0	0	0	
1/19/64	Anderson Co	Wind, Lightning, Hail, Rain	0	0	0	0	0	
3/14/64	Anderson Co	Rain And Lightning	0	0	0	0	0	
5/27/64	Anderson Co	Lightning And Wind	0	0	0	0	0	
5/18/65	Anderson Co	Wind, Lightning And Hail	0	0	0	0	0	
6/2/65	Anderson Co	Lightning, Rain, Wind, Hail	0	0	0	0	0	
7/7/65	Anderson Co	Lightning, Wind, Rain, Hail	0	0	0	0	0	
4/12/66	Anderson Co	Hail, Lightning, Wind	0	0	0	0	0	
7/15/66	Anderson Co	Lightning, Wind, Rain	0	0	0	0	0	
10/25/67	Anderson Co	Lightning	0	0	0	0	0	
8/4/68	Anderson Co	Rain, Lightning, Flooding	0	0	0	0	0	
6/23/69	Anderson Co	Heavy Rains, Flooding, Wind, Lightning	0	0	0	0	0	
6/24/69	Anderson Co	Wind, Hail Lightning	0	0	0	0	0	
9/4/19	Anderson Co	Rain, Wind, Lightning	0	0	0	0	0	
3/25/70	Anderson Co	Wind, Lightning, Rain	0	0	0	0	0	
4/13/70	Anderson Co	Thunderstorms, Wind, Hail And Lightning	0	0	0	0	0	
4/27/70	Anderson Co	Lightning	0	0	0	0	0	
5/16/70	Anderson Co	Wind, Electrical	0	0	0	0	0	
6/4/70	Anderson Co	Wind, Hail, Lightning	0	0	0	0	0	
7/3/70	Anderson Co	Wind, Lightning, Funnel Aloft	0	0	0	0	0	

Table 5.22 Anderson County Historic Lightning Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
3/15/71	Anderson Co	Wind, Lightning, Rain	0	0	0	0	0	
4/28/71	Anderson Co	Lightning, Hail	0	0	0	0	0	
6/8/71	Anderson Co	Lighting	0	0	0	0	0	
6/20/71	Anderson Co	Flooding, Wind, Lightning	0	0	0	0	0	
5/3/72	Anderson Co	Lightning	0	0	0	0	0	
7/19/72	Anderson Co	Lightning	0	0	0	0	0	
8/9/72	Anderson Co	Wind, Electrical, Rain, And Hail	0	0	0	0	0	
10/18/72	Anderson Co	Wind, Lightning, Rain	0	0	0	0	0	
5/23/73	Anderson Co	Lightning, Wind	0	0	0	0	0	
8/22/79	Anderson Co	Windstorm, Hail, Lightning	0	0	0	0	0	
8/28/79	Anderson Co	Lightning	1	0	0	0	0	
8/1/80	Anderson Co	Lightning	0	1	0	0	0	
8/7/86	Anderson Co	Lightning	0	1	0	0	0	
05/09/95	Clinton	Tstm-Lightning Shed Fire	0	0	1	10,000	0	
05/18/95	Oak Ridge	Tstm Lightning Storage Unit Caught Fire	0	0	1	5,000		
07/17/95	Norris	Tstm-Lightning House Fire	0	0	1	100,000	0	
05/06/99	Oak Ridge	Tstm Lightning Strike On Transformer Causes Power Outage To Several Homes	0	0	5	0	0	
05/24/00	Oak Ridge	Tstm Lightning Downs Tree Which Damaged A House	0	0	1	0	0	
07/01/00	Clinton	Lightning Set Fire To An Apartment Building	0	0	0	0	0	
07/10/00	Countywide	Lightning Caused Power Outages To 2,000 Across The County	0	0	0	0	0	
07/10/01	Oak Ridge	Lightning Caused About 400 Customers With Out Power, Damaged Traffic Lights	0	0	0	0	0	
07/10/03	Oak Ridge	Lightning Caused Significant Damage To The City's Power System.	0	0	0	0	0	
09/29/03	Oak Ridge	Lightning Caused Power Outages	0	0	0	0	0	
03/08/04	Oak Ridge	Commerce Park Was Out Of Power Because Of Lightning	0	0	0	0	0	
05/28/04	Clinton	Lightning Caused A Power Outage	0	0	0	0	0	
10/25/05	Oak Ridge	Power Outages Were Caused By Lightning	0	0	0	0	0	
04/04/06	Clinton Oak Ridge	Lightning Caused Power Outages And Damage To Meters	0	0	0	0	0	
05/04/06	Oak Ridge	Lightning-Related Fires At 127 Fallberry Street And 220 Alhambra Road.	0	0	2	5,000	0	
04/04/07	Oak Ridge	Building Had Been Struck By Lightning	0	0	1	0	0	
04/14/07	Oak Ridge	Lightning Struck A House	0	0	1	0	0	

Table 5.22 Anderson County Historic Lightning Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
06/12/08	Oliver Springs	Lightning An Oliver Springs Man Was Struck	0	1	0	0	0	
06/12/09	Oak Ridge	Lightning Power Outage	0	0	0	0	0	
05/18/10	Oak Ridge	Lightning 3 Power Outages	0	0	0	0	0	
07/21/10	Oak Ridge	Lightning Power Outage	0	0	0	0	0	
70		Totals	2	3	13	120,000	0	
Data Sources		NOAA/NWS, Sheldus, Local Sources						
Loss Type		A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup						

Major Historic Occurrences Discussion

August 1, 2000: Lightning struck the end of a Willow Run apartment building in Clinton just before 9 p.m., starting a fire and leaving eight families homeless. All residents got out safely, but none was able to salvage any personal items. Clinton firefighters, with assistance from the Oak Ridge Fire Department, battled the blaze for about seven hours.

September 29, 2003: In Oak Ridge, lightning strikes tripped fuses, damaged overhead equipment, and caused short circuits, resulting in massive overloads on the wires that feed electricity into neighborhoods and homes. About 80 customers were without power in four different areas of the city.

March 8, 2004: Lightning, wind and rain in Oak Ridge caused power outages. The worst power outage was in the California Avenue/East Drive area, affecting about 150 customers. All of Commerce Park was out of power because of lightning.

July 21, 2010: A lightning strike to a transformer on Laboratory Road blew out a piece of equipment known as a cutout. This caused a short circuit and knocked out power to roughly 600 customers, including the local hospital.

5.3.11 Wildfire Profile

A wildfire is any instance of uncontrolled burning in grasslands, forests, and brush land. Wildfire is further defined as an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures (FEMA, 2001). Wildfires often begin unnoticed and spread quickly. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires. The Federal Emergency Management Agency (FEMA) Fire Management Assistance Grant Program (FMAGP) indicates that a wildfire, also known as a forest fire, vegetation fire, grass fire, or brush fire, is an uncontrolled fire requiring suppression action.

Location

In Tennessee, significant wild land fires occur about once every two years. However, several hundred lesser incidents occur annually across the entire state. Seasonal wildfires have been destructive, especially during periods of drought. Some of the worst were recorded in 1925, 1935, and the 1980s. These fires have destroyed incalculable acres of cropland as well as wildlife and domestic livestock. The eastern and middle portions of the state are most affected, and a single incident usually impacts less than 5% of any one county's population.

Trees cover about 63% of Anderson County. Though approximately 75% of these are hardwood, throughout the county the southern pine beetle infestation has left thousands of acres of dead trees, increasing the fuel load and creating a hazard to motorists and power lines. While we have not experienced the massive wild land fires of the west, the potential exists, particularly if drought conditions are present. In 2000, arsonists burned more than 13,000 acres of woodland in Anderson County.

The northwestern part of Anderson County contains a large portion of the Windrock Coal Creek Recreation Area, a highly utilized off-highway vehicle and hiking area. This remote, reclaimed coal mining area is primarily unpopulated, heavily forested woodland with few roads other than abandoned logging and mining haul roads. Steep slopes and inaccessibility to vehicles to such a large area impact the efficiency of woodland firefighting. Additional large areas of woodland are the 4,038-acre Norris Dam State Park, and commercial timberland owned by private industry.

Wildfires are common in the mountains of the Coal Creek watershed. One started in 2002 due to spontaneous combustion of an abandoned gob pile associated with an abandoned mine.

Extent

Wildfires pose a great threat to life and property, particularly when they move from forest or rangeland into developed areas. More than 140,000 wildfires occur on average each year in the United States, causing millions of dollars in damage. Since 1990, more than 900 homes have been destroyed each year as a result of wildfire; even relatively small fires have caused substantial losses (Institute for Business and Home Safety, 2001).

Due to the abundance of vegetation throughout the county, wildfires are a moderate threat in all rural areas. The frequency and severity of wildfires is dependent on weather and on human activity. Nearly all wildfires in Anderson County are human-caused (only three percent are caused by lightning), with arson and careless debris burning being the major causes of wildfires. If not promptly controlled, wildfires may grow into a large emergency or disaster. During a severe fire situation in 1999-2000, eight wildfires in Tennessee were declared Fire Disaster Emergencies by FEMA. Even small fires can threaten lives, damage forest resources, and destroy structures. The county's five volunteer fire departments respond to a combined average of 250 wild land fires each year. Of these, an average of 75 fires annually require assistance from the Forestry Department to control the blaze. Significant incidents occur during periods of inadequate rainfall. Lesser incidents occur annually, usually as a result of escaped controlled burning or arson.

Future Probability

Due to the abundance of vegetation throughout the county, wildfires are a moderate to high threat in all rural areas. Many of these fires occur in mixed interface areas and may pose a threat to occupied structures throughout the moderately populated areas. Two municipalities, Oak Ridge and Norris, have extensive areas of greenbelt and parkland, and brush fires in these cities create a significant urban interface danger. The probability of future wildfire incidents is high, with the vulnerability low. However, as population expands, the vulnerability could increase to medium.

Historic Occurrences

Table 5.23 Anderson County Historic Wildland Fire Incidents							
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities,	Fatalities	Injuries	Property Damage	Structure Loss	Other Loss or Cost

							Amount	Type
1974	Anderson County	19 fires - arson 8 debris-8 400ac	0	0	1	0	80,000	A
1975	Anderson County	28 fires - arson18 debris 4 443ac	0	0	1	0	88,600	A
1976	Anderson County	51 fires - arson14 debris 24 899ac	0	0	1	0	179,800	A
1977	Anderson County	44 fires -arson 18 debris 22 1102ac	0	0	1	0	220,400	A
1978	Anderson County	36 fires -arson 22 debris 10 1199ac	0	0	1	0	239,800	A
1979	Anderson County	15 fires – arson 8 debris 7 130ac	0	0	1	0	26,000	A
1980	Anderson County	33 fires -arson 18 debris 10 2091ac	0	0	1	0	418,200	A
1981	Anderson County	41 fires -arson 30 debris 9 1687ac	0	0	1	0	337,400	A
1982	Anderson County	8 fires - arson 7 debris 1 62ac	0	0	1	0	12,400	A
1983	Anderson County	12 fires - arson-6 debris 6 163ac	0	0	1	0	32,600	A
1984	Anderson County	17 fires -arson 14 debris 3 180ac	0	0	1	0	36,000	A
1985	Anderson County	22 fires -arson 10 debris 10 521ac	0	0	1	0	104,200	A
1986	Anderson County	28 fires -arson 15 debris 9 348ac	0	0	1	0	69,600	A
1987	Anderson County	27 fires -arson 20 debris 7 564ac	0	0	1	0	112,800	A
1988	Anderson County	36 fires -arson 15 debris 10 1402ac	0	0	1	0	280,400	A
1989	Anderson County	21 fires - arson 8 debris 9 87ac	0	0	1	0	17,400	A
1990	Anderson County	14 fires -arson 7 debris 5 75ac	0	0	1	0	22,500	A
1991	Anderson County	24 fires -arson 20 debris 3 2027ac	0	0	1	0	608,100	A
1992	Anderson County	30 fires -arson 18 debris 8 526ac	0	0	1	0	157,800	A
1993	Anderson County	17 fires -arson 12 debris-3 340ac	0	0	1	0	102,000	A
1994	Anderson County	30 fires -arson 12 debris 13 919ac	0	0	1	0	275,700	A
1995	Anderson County	23 fires - arson 9 debris 9 664ac	0	0	1	0	199,200	A
1996	Anderson County	12 fires - arson 6 debris 5 196ac	0	0	1	0	58,800	A
1997	Anderson County	10 fires - arson 5 debris 2 397ac	0	0	1	0	119,100	A
1998	Anderson County	31 fires -arson 20 debris 8 596ac	0	0	1	0	178,800	A
1999	Anderson County	37 fires -arson 21 debris 11 2579ac	0	0	1	0	779,100	A
11/22/99	Anderson County North	Wildfires in several areas More than 1,500 acres of woodland have burned, arson is suspected in most of the fires.	0	0	1	0	0	
2000	Anderson County	42 fires -arson 27 debris 6 13659ac	0	0	1	0	4,097,700	A
10/06/00	Anderson County	More than 9,000 acres of woodland have burned bys arsonists	0	0	1	0	0	
2001	Anderson County	33 fires -arson 23 debris 7 1707ac	0	0	1	0	512,100	A
11/05/01	Anderson County	Arsonist forest fires in the New River area burned 40 ac. & threatened several residences, a 20 ac. fire in Seiber Flats	0	0	1	0	0	
2002	Anderson County	8 fires - arson 5 debris 2 620ac	0	0	1	0	186,000	A
2003	Anderson County	6 fires - arson 3 debris 2 28ac	0	0	1	0	8,400	A
2004	Anderson County	5 fires - arson 1 debris 2 41ac	0	0	1	0	12,300	A
4/9/2004	Anderson County	Ten wildfires burned 585 acres in, seven of the fires were the result of arson. The largest fires 250 acres near Briceville	0	0	1	0	0	

Table 5.23 Anderson County Historic Wildland Fire Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Area Impacted, Assets, Utilities, Roads, Bridges Damaged, Evacuation, Etc,	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
03/04/06	Anderson County	A Walden Ridge wildfire burned a Forestry Department truck	0	0	2	55,000	19,000	A
03/15/06	Anderson County	2 fires consumed 1,400 acres on Walden's Ridge, the worst fire damage in 5 years	0	0	1	0	420,000	a
04/09/10	Anderson County	65 acres burn on Walden's Ridge	0	0	1	0	180,000	
1995-2010	Anderson County	2,000 Brushfires w/o Forestry Involvement	0	0	2500	0	2,000,000	A
		Totals	0	0	0	0	14,318,000	
Data Sources	Department of Forestry, Local Sources							
Loss Type	A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup							

Major Historic Occurrences Discussion

November 6, 2000: More than 9,000 acres of woodland in Anderson County burned as suspected arsonists continue to stay one match ahead of firefighters. Over the weekend, area firefighters were joined by forestry personnel from New Mexico, Texas, Oregon, Georgia, and Florida in a joint effort to gain control over more than a half-dozen fires that have burned almost continuously for 7 days.

November 5, 2001: Arsonists are to blame for forest fires set in Anderson County during the past week. One fire in the New River area was still burning today. A fire at Browns Flat in the New River area burned about 40 acres Saturday and threatened several residences. On Sunday, a fire in Seiber Flats, also in New River, burned about 2 acres.

March 4, 2006: A fire moved faster than anticipated on Walden's Ridge Sunday. While crews were dealing with other sections of the forest, the fire rapidly spread, setting fire to a Forestry Department vehicle. Even though the truck had been parked in what was believed to be a safe place, the wind spread the blaze to the vehicle. It went up in a matter of minutes.

March 15, 2006: A forest fire in Anderson County on Walden's Ridge jumped the containment lines Wednesday, forcing crews to set backfires to try bringing it under control. A dozen firefighters from Briceville, made their way up the east end of Walden Ridge as the fire burned towards them from about 100 yards away. State forestry workers set their own fires to keep the main one away from nearby homes. In two weeks, two fires have already consumed 1,400 acres on Walden's Ridge, the worst fire damage in the county in five years. No homes have burned.

April 9, 2010: State forestry officials this week reported that 18 wildfires burned a total of 1,400 across East Tennessee during the first week of April, many of which were reported as intentionally set. Nathan Waters, assistant district forester, said Thursday that arson fires had been set, burning 65 acres on Walden's Ridge in Anderson County.

5.4 TECHNOLOGICAL AND HUMAN-CAUSED HAZARDS PROFILE

Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States – from major industrial plants to local dry cleaning establishments and gardening supply stores. Hazardous materials are transported by highway,

railway, waterway, and pipeline daily, so any area is considered vulnerable to an accident. The Anderson County Mitigation Planning Committee has identified a pandemic and four technological and human-caused hazards that are of concern to the county and its participating jurisdictions and agencies. These are profiled below.

Table 5.24 Anderson County Technological and Human-Caused Hazards Profiled	
Hazardous Materials Spills/Releases	Terrorism
Illegal Drug Laboratories	Urban Fires
Pandemic	

5.4.1 Hazardous Materials Profile

Hazardous materials are chemical substances that, when released or misused, pose a threat to the environment or health. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. Hazardous materials come in the form of explosive, corrosive, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation or industrial accidents.

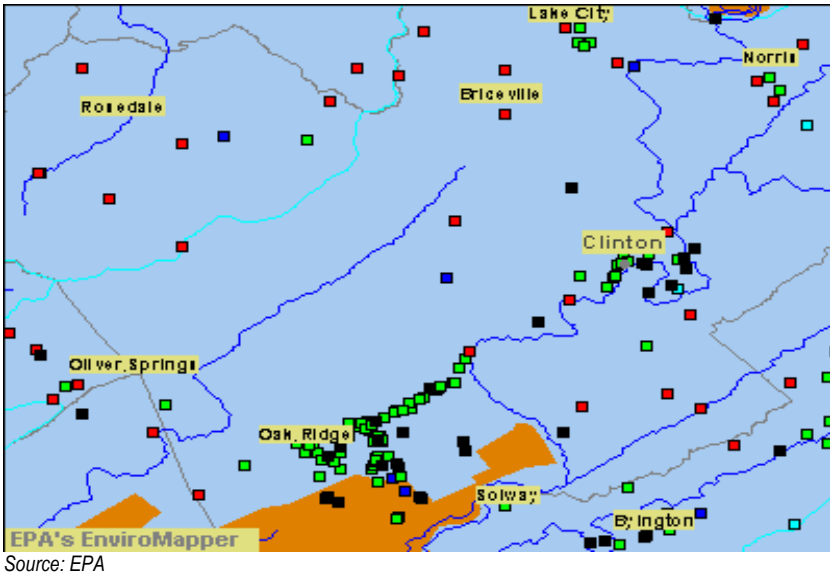
Location

Every city has multiple facilities that produce, store, or use some form of hazardous materials. Every water treatment plant has chlorine on site to treat water. Almost every county has a farmer's Co-Op, which stores significant quantities of pesticides and fertilizers. Every home has hazardous materials present in bleach, cleaners, paint, batteries, and gasoline.

A variety of hazardous materials exist in fixed facilities throughout Anderson County. They range from flammable liquids stored or used to fuel vehicles through exotic biological agents. Some materials are particularly lethal in small amounts, while others require strong concentrations with prolonged exposure. There are approximately 50 facilities within Anderson County that manufacture, store, or utilize legal quantities of hazardous materials in some capacity. An incident at one of these facilities could be expected to affect as much as 10% of the county's population.

In Anderson County, the potential exists for a major hazardous materials transportation incident. Within its boundaries the county has two U.S. and nine state highways and a portion of Interstate 75. These highway routes serve as transportation corridors for hazardous materials. Hazardous materials are transported down many Anderson County roads every day. Propane trucks serve the rural populations, and natural gas, used by both rural and urban citizens, must be treated

Figure 5.19 Hazardous Materials Sites



Source: EPA

as a dangerous hazard. According to the most recent findings at the Tennessee Department of Transportation, more than half of all accidents involving hazardous materials have occurred on state roadways.

Some 59 miles of CSX and Norfolk Southern rail track and numerous sidings and spurs bisect the central portion of the county, passing through Clinton, Lake City, Oak Ridge, and Oliver Springs. Each rail line carries from 50 to 70 cars transporting hazardous materials daily.

Rail transportation risks from hazardous materials affect Anderson County. Valve leakage and releases are sources of spills on pressurized and general service tank cars. Other hazardous materials containers such as covered hoppers, inter-modal trailers/containers, or portable tanks are additional sources. These leaks manifest themselves as odors or vaporous clouds from tanker top valves, spraying or splashing from tanker top valves, wetness on the side of the car, or drainage from the bottom outlet valve. Depending on the type of rail car involved, a leak or spill could result in hundreds to thousands of gallons/pounds of a substance being released.

The majority of non-DOE fixed facility releases of hazardous materials have occurred in industrial parks located in Clinton, Lake City, and Oak Ridge. Minor releases have also occurred in Oliver Springs and the Andersonville area.

Within Anderson County is the U.S. Department of Energy Oak Ridge Reservation (ORR). Composed of three separate sites, the 55 square mile ORR contains the B&W Y-12 National Security Complex, East Tennessee Technology Park (ETTP)(K-25), and Oak Ridge National Laboratory (X-10). Managed by civilian contractors, each of these facilities stores, transports, or processes nuclear materials.

Built in 1942 to develop the nation’s nuclear weapons arsenal, the plants are now focused on peacetime applications of nuclear technology. However, the plants still pose a risk of release of nuclear material into the surrounding communities.

The National Security mission in Oak Ridge is performed at the B&W Y-12 National Security Complex, pictured at right. Programs at Y-12 include manufacturing and reworking nuclear weapon components, dismantling nuclear weapon components returned from the national arsenal, serving as the nation's safe, secure storehouse of special nuclear materials, reducing the global threat from terrorism and weapons of mass destruction, and providing the U.S. Navy with safe, militarily effective nuclear propulsion systems.

The Office of Nuclear Fuel Security and Uranium Technology (NFS) manages the Oak Ridge Department of Energy Uranium Programs. This organization is chartered to manage and facilitate the maintenance and disposition of DOE's excess uranium inventories and to develop and implement strategic and tactical plans to ensure an integrated approach for uranium management activities. The organization is responsible for administering the Lease Agreement and Regulatory Oversight Program with the United States Enrichment Corporation and provides leadership and technical support for the development of advanced uranium enrichment technology. NFS has an established interface with the Nuclear Regulatory Commission for nuclear safety related issues.

Figure 5.20 Oak Ridge Nuclear Facility

ource: EPA

Envirofacts information about Anderson County:

- Facilities that produce and release air pollutants: **37**
- Facilities that have reported toxic releases: **24**
- Facilities that have reported hazardous waste activities: **154**
- Potential hazardous waste sites that are part of Superfund that exist: **6**
- Number of Superfund NPL: **1**
- Number of Superfund: **5**
- Facilities regulated by EPA regulations for radiation and radioactivity: **3**
- Facilities issued permits to discharge to waters of the United States: **42**

Extent

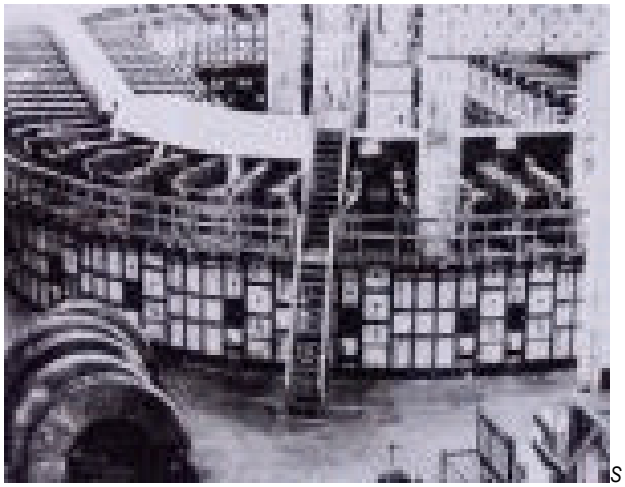
Hazardous materials transportation is a major concern in Anderson County, as there is little information regarding what is traveling on the county road system on a daily basis. Hazardous materials transportation incidents can occur at any place, although the majority occurs on interstate highways, major federal or state highways, or on major rail lines.

The state of Tennessee is home to two nuclear power plants, Sequoyah and Watts Bar, which are operated by the Tennessee Valley Authority (TVA), and provide as much as 20% of the agency's electrical capacity. Anderson County is within the 50-mile Watts Bar emergency planning district. TVA also operates a nuclear plant in Brown's Ferry, Alabama; an accident at this facility could theoretically affect residents of Tennessee. The U.S. Department of Energy Oak Ridge

Reservation also maintains inventories of nuclear material. An incident at a fixed nuclear facility in Tennessee could affect about 20% of the population.

The incident at Three-Mile Island in 1979 led to the creation of standards and protocols to handle emergencies at nuclear power plants. Since that time, a major emergency has not occurred at any of the nation's nuclear facilities. Emergency response plans at TVA, DOE, and the state are kept up-to-date. At least one full-scale exercise is held annually. Anderson County participates in DOE drills and exercises to improve preparedness and response capability.

Figure 5.21 Oak Ridge Nuclear Storage



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ource: EPA

Due to the many hazardous materials at DOE's Oak Ridge Reservation, Anderson County's spill/release history may reflect a higher-than-average number of fixed facility HAZMAT incidents. DOE personnel handle on-site events.

The nature and extent of damage caused by ionizing radiation depend on a number of factors including the amount of exposure (energy strength), the frequency and/or duration of exposure, and the penetrating power of the radiation to which an individual is exposed. Acute exposure to very high doses of ionizing radiation is rare but can cause death within a few days or months. The sensitivity of the exposed cells also influences the extent of damage. For example, rapidly growing tissues, such as developing embryos, are particularly vulnerable radiation.

On October 17, 1986, in response to a growing concern for safety around chemical facilities, Congress enacted the Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendments and Reauthorization Act (SARA). The Act has a far-reaching influence on hazardous materials issues. EPCRA contains five sections covering issues associated with the manufacture, use, exposure, transportation, and public education of hazardous materials. Tennessee Homeland Security and Emergency Management is the lead agency responsible to implement EPCRA and provide administrative functions and support.

Anderson County has a strong, pro-active Local Emergency Planning Committee. Working in conjunction with emergency management, this organization actively solicits membership and tracks TIER II reporting requirements. Each facility that stores or uses hazardous materials above a threshold amount must file an annual report.

For each Tier II facility, the Planning Committee conducted a risk and vulnerability assessment using the criteria in the Table below. For security purposes, information on the Tier II facilities and the risk and vulnerability assessments are documented only in the Supporting Annex.

Table 5.25 Anderson County Hazardous Materials Assessment

Criteria	0	1	2	3	4	5
Material Visibility	X	Existence not well known	X	Existence known locally	X	Existence well known
Material Volatility	None	Very Low	Low	Medium	High	Very High

Material Access	Secure area 24/7 armed guards & access controlled	Fenced guards access controlled	Access & parking restricted	Access Strictly controlled	Entry controlled	Open access
Material Mobility	X	Moved frequently	X	Moved some	X	Fixed in place
Hazard Materials present	No materials	Limited quantity secured	Moderate quantity strict control	Large quantity some control	Large quantity little control	Large quantity no control
SARA Reporting	X	Always Reports	X	Usually Reports	X	No Reporting
Site Population	0	1-250	251-500	501-1000	1001-5000	>5000

Future Probability

Although Anderson County has not experienced a significant fixed facility hazardous materials release event, the potential for future incidents is high. Given the concentration of hazardous materials facilities in Clinton and Oak Ridge, these cities are at greatest risk. With fewer fixed facilities, Lake City, Norris, and Oliver Springs have a smaller potential risk. The unincorporated areas of the county have only scattered hazardous materials facilities and are at least risk. The impact of a release is greatest for Clinton and Oak Ridge due to population density.

Historic Occurrences

Hazardous materials incidents have resulted in 22 fatalities/injuries and $3,804,574 in cleanup and other costs.

Table 5.26 Historic Hazardous Materials Land/Water/Air Release Incidents

Event Date	Location or Map Reference	Extent Description Severity, Cause, Area Impacted, Assets/Utilities Roads/Bridges Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
9/10/10	Milepost: 00c256.6	Land Discharge From A CSX Locomotive, Oil: Diesel	0	0	0	0	0	
4/30/10	1560 Bear Creek Rd	Unknown Oil Leaking on land from Areva Container	0	0	0	0	0	
4/12/10	5602 Clouse Hill Rd	Large Tire Fire releasing smoke in air	0	0	0	0	0	
3/1/10	I 65 South Exit 61	Pegasus Transportation Phenolnaphthalani Company leak into soil	0	0	0	0	0	
11/14/09	Mainline	Spill Of Engine Oil From A Locomotive	0	0	0	0	0	
9/2/09	9720-58 Y12 Plant	Release Of Asbestos. Bwxt Y-12 Llc	0	0	0	0	0	
9/1/09	Sevier Railyard	Release of grease from A Locomotive onto land	0	0	0	0	0	
7/6/09	Mile Post 00c-255	Discharge Of Oil From A CSX Locomotive onto land	0	0	0	0	0	
6/22/09	Y12 Plant	Discharge Of Oil From A Construction Crane into Water	0	0	0	0	0	
6/15/09	Railyard 410 Market Street	Train Released Oil	0	0	0	0	0	

Table 5.26 Historic Hazardous Materials Land/Water/Air Release Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Cause, Area Impacted, Assets/Utilities Roads/Bridges Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
9/22/08	Nova Drive	Hazardous Materials In A Box, Potassium Permanganate	0	0	0	0	0	
8/16/08	Y-12 Complex Bear Creek Road	Mineral Oil Sheen B&W (Y-12) Water	0	0	0	0	0	
7/31/08	1704 East Raccoon Valley Road	Discharge Of Oil from West Motor Freight Train Cars	0	0	0	0	0	
7/31/08	1704 East Raccoon Valley Road	Discharge Of Oil And Antifreeze From Cars onto land after An Accident at West Motor Freight	0	0	0	0	0	
7/24/08	102 South Seivers Blvd	Mercury Spilled At Covenant Health Care Doctors Office. 2 Employees Sent	0	2	0	0	0	
7/4/08	5 Miles Up Trail G-1 Windrock	Vapor From An Atlas Of America Oil Well into the air	0	0	0	0	0	
6/16/08	1500 Shelton Street	Solvent Based Primer Spill onto land from Sherwin-Williams	0	0	0	0	0	
6/12/08	Milepost: 18.5c Lee Rd.	Release Of Oil Onto Land From A Tractor Trailer	0	0	0	0	0	
5/23/08	FedEx Center 200 Swanson Dr	Ten Pounds Of Sodium Dichromate Released By FedEx Freight East Onto Land	0	0	0	0	0	
4/27/08	Melton Hill Water Treatment 285 Moore Lane	600 Gallons 23% Hydrofluorosilicic Acid Leak By Hallsdale Powell Utility District	0	0	0	0	0	
3/18/08	Cove Road	Walden Resources Well Blow-Out/Fire Spilling Crude Oil Onto Land And Into Water	0	1	0	0	0	
3/18/08	Cove Rd Oliver Springs	Walden Resources Well Blow Out/Fire Spilled Natural Gas	0	0	0	0	0	
2/1/08	Boeing 767 Boeing Road	Propelyne Glycol, Antifreeze Released Into Water And Onto Land	0	0	0	0	0	
3/18/07	79.8 On The Clinch River	Norris Dam Marina Gas Leak Into Water (Cinch River)	0	0	0	0	0	
3/6/07	Clinch River I-75 Mile Marker 126	Oil #2 Release From A Tractor Trailer Truck Into Water	0	0	0	0	0	
12/3/06	Yarnell Industrial Parkway	Unknown Oil Caused Sheen In Water	0	0	0	0	0	
9/29/06	In The Rail Yard	#2 Oil Leak From An Train Engine Onto Land	0	0	0	0	0	
9/9/06	Clinch River 79.7	TVA Oil Leak At Tail Deck Of A Dam Norris Unit 1 Into Water	0	0	0	0	0	

Table 5.26 Historic Hazardous Materials Land/Water/Air Release Incidents								
Event Date	Location or Map Reference	**Extent Description** Severity, Cause, Area Impacted, Assets/Utilities Roads/Bridges Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
3/15/06	1008 North Main Street	Release Of Oil, Fuel: No. 1-D Into A Creek By Purnell Distributing	0	0	0	0	0	
11/14/05	Norris Dam Marina	Gas Release From A Vessel At Norris Dam Marina Into Water	0	0	0	0	0	
7/23/05	Milton Hill Lake Marina	A Sunken Vessel Leaking Diesel Fuel Into Water	0	0	0	0	0	
4/4/05	Building # 1916 T2 Y12 Plant	1 Lb Mercury Spill In The Parking Lot At Bwxt Y-12 Llc	0	0	0	0	0	
3/29/05	Milepost 9c To 14c	Diesel From Norfolk Southern Railroad Locomotive Into Water	0	0	0	0	0	
3/24/05	176 Elizabeth Lane	Unknown Oil Into Water	0	0	0	0	0	
11/12/04	Edgemoor/ N. Henderson	Anhydrous Ammonia Spill	0	0	0	0	5,000	
08/27/04	Clinton RR Mi Post 24.8D	Norfolk Southern 30 Gal Oil Leaked	0	0	0	0	20,000	
05/14/04	ORNL	Radioactive Liquid Spill Onto Road	0	0	1	0	350,000	
05/08/04	Oak Ridge 1310 Power House Rd.	Metallic Sodium Spill/Fire, 10 Evacuated, Hwy 58 Closure	0	1	0	0	250,000	
01/08/04	Oak Ridge Y-12 Plant bldg. 9204-1	Fire in oven, vent system cut off, 26 evacuations	0	1	0	0	45,000	
08/13/03	Clinton 520 J.D. Yarnell Parkway	6,000 gallons of Texrol leaked from storage tank	0	1	0	0	15,000	
04/15/03	Oak Ridge Y-12 Plant	Uranium lab fire 30 evacuations	0	0	1	0	30,000	
08/04/02	Norris Dam Marina	Vessel sank - 20 gal. Gasoline spill	0	0	1	0	35,000	
08/02/02	Norris Marina Lake View LN	Storm resulting in gasoline spill	0	0	1	0	10,000	
07/03/02	Briceville 2839 Hwy116	Truck overturned diesel spill	0	1	1	0	15,000	
05/12/02	Marlow RR mi post 27.1D	Norfolk Southern train/truck gas	1	0	2	0	100,000	
01/27/02	Oliver Springs	Oil storage tank, 5 barrels of oil	0	0	1	0	20,000	
2001	ORNL Bldg 3039K	Strontium release	0	1	1	0	25,000	
12/18/0	Oak Ridge Y25	Fluorine gas release 200 evacuated	0	0	0	0	0	
12/13/00	Oak Ridge ETTP Hwy 58	Fluorine gas release 1.2 ppm.	0	0	1	0	25,000	
06/16/00	Oak Ridge Y-12 Plant	Two pounds of mercury leaked	0	0	1	0	10,000	
06/13/00	Clinton RR Mi post 19.4C	Southern train/ truck, 30 gal fuel	0	0	2	0	50,000	
04/10/00	Oak Ridge Turnpike	Storage Tank 50 gal gasoline spill	0	0	1	0	10,000	
03/07/00	Clinton Truck on I-75	Printing ink leak during transport	0	0	1	0	10,000	

Table 5.26 Historic Hazardous Materials Land/Water/Air Release Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Cause, Area Impacted, Assets/Utilities Roads/Bridges Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost Amount	Type
03/07/00	Clinton unknown Rd	Truck accident Unknown spill	0	0	1	0	25,000	
08/16/99	Clinton J D Yarnell Pkwy.	2,268 gal liquid nitrogen released	0	0	1	0	5,000	
08/01/99	Powell Clinton Hwy	Car/ natural gas riser/fire	0	1	2	0	25,000	
07/23/99	Ridge Y12 Plant	Bottle leak dichlorodimethysilane 170 people were evacuated	0	0	0	0	0	
1998	Oak Ridge Y-12 Bldg	Basement flooding/ mercury	0	0	1	0	100,000	
04/17/98	Clinton RR Mile Post 15C	Southern derailed 100 gal fuel	0	0	1	0	100,000	
09/06/97	Lake City RR Mi PostC240	CSX train/ATV gas spill	1	0	2	0	100,000	
07/22/97	Oak Ridge Y-12 Plant	Unk. Materials into Poplar Creek	0	0	1	0	75,000	
07/24/97	Oak Ridge Y-12 Plant	Unk. Materials into Poplar Creek	0	0	1	0	75,000	
07/24/97	Oliver Springs 23D Breeden	Dump fire Unk. Materials	0	0	1	0	7,500	
07/11/96	Oak Ridge X-10 NIH	Package with high level of radioactivity	0	0	1	0	10,000	
09/15/95	Oak Ridge Y-12 Plant Bear Creek Road	1 pound of Mercury leaked	0	0	1	0	10,000	
06/07/95	Oak Ridge ETTP Hwy 58	TSCA incinerator valve allowing steam to escape	0	0	1	0	7,500	
05/31/95	Oak Ridge ETTP Hwy 58	TSCA incinerator valve, unknown material release	0	0	1	0	7,500	
08/17/94	Heiskell Old Andersonville	Chlordane spill	0	0	1	0	2,000	
07/16/94	Oak Ridge Quadrex Flint Road	Nuclear waste fire	0	0	1	0	25,000	
06/21/94	Oak Ridge Y-12 Plant Bear Creek Road	3,300 gallons leachate	0	0	1	0	20,000	
04/14/94	Oak Ridge Y-12 Plant Bear Creek Road	Tank leak, 350 gallons of mineral and nitric acid	0	0	1	0	25,000	
04/11/94	Oak Ridge K-25 Site Hwy 58	Truck PCB Sludge 0.5 gallons spilled	0	0	1	0	10,000	
12/17/93	Oak Ridge Y-12 Plant Bear Creek Road	4,000 gallons Sodium Hypo chlorite	0	0	2	0	35,000	
12/06/93	Oak Ridge Y-12 Plant Bear Creek Road	Heavy rains, old oil spill – booms deployed	0	0	1	0	10,000	
09/24/93	Lake City Ind. Park Rd	Burning Poly-Vinyl Chloride	0	0	1	0	5,000	
08/05/93	Clinton 4751 Greenfield	300 gallons of Micro grind	0	2	1	0	100,000	
07/25/93	Oak Ridge Y-12 Plant	1 gallon of PCBs soil containerized	0	0	1	0	25,000	
07/08/93	Oak Ridge No. 3 Main St	140 lbs anhydrous ammonia	0	0	1	0	2,500	
09/22/92	Oak Ridge Y-12 Plant	185 gal. EPA Waste Water	0	0	1	0	25,000	

Table 5.26 Historic Hazardous Materials Land/Water/Air Release Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Cause, Area Impacted, Assets/Utilities Roads/Bridges Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
08/06/92	Oak Ridge X-10 Plant Bldg.	UST leaked 67 gal gasoline	0	0	1	0	75,000	
06/05/92	Granite RR Mi Post 244.7	CSX train/Car gas leak	0	0	1	0	200,000	
04/07/92	Oak Ridge Y-12 Plant Bear Creek Road	55 gal uranium fire	0	1	1	0	50,000	
01/24/92	Oak Ridge Y-12 Plant	700 lbs Hydrogen Fluoride gas	0	0	1	0	75,000	
10/16/91	Granite RR Mile Post 247	CSX Train/Car gas leak	0	3	2	0	300,000	
10/14/91	Oak Ridge Y-12 Plant	100 gallons of Sulfuric Acid	0	0	1	0	25,000	
09/12/91	Oak Ridge Y-12 Plant	50 gal Copper Sulfate spill	0	0	1	0	25,000	
09/06/91	Oak Ridge Y-12 Plant Bldg.	13.23 pounds of Mercury	0	0	2	0	50,000	
06/30/91	Clinton TVA Substation	4 gal of PCBs released	0	0	1	0	30,000	
06/13/91	Oak Ridge K-25 Plant	20 gal Carbon Tetrachloride	0	0	1	0	15,000	
06/01/91	Clinton Teakwood Ct	Lightning/Nat gas service line	0	0	1	0	2,500	
05/23/91	Oak Ridge D.O.E.	100 lbs propane cylinder leaked	0	0	1	0	5,000	
05/21/91	Oak Ridge Y-12 Plant	Uranium release Unk quantity	0	0	1	0	75,000	
03/04/91	Oak Ridge Bethel Valley	Chlorine cylinder leaked	0	0	1	0	10,000	
03/01/91	Oak Ridge Y-12 Plant	Fish Kill unknown material	0	0	1	0	25,000	
01/24/91	Oak Ridge Y-12 Plant Bear Creek Road	Phosphorous, Sodium, Chlorine, Arsenic release	0	0	1	0	100,000	
11/28/90	Oak Ridge Y-12 Plant	2 gal PCBs – 0.5 gal in creek	0	0	1	0	10,000	
11/01/90	Oak Ridge Y-12 Plant	300 pounds of Mercury	0	0	1	0	100,000	
10/31/90	Oak Ridge DOE Facility	.99 lbs PCBs – Transformer	0	0	1	0	100,000	
10/04/90	Oak Ridge DOE Facility	Gas storage tank – sampling soil	0	0	1	0	35,000	
09/20/90	Oak Ridge K-25 Plant Bldg.	50 gal radioactive material	0	0	1	0	25,000	
08/24/90	Oak Ridge Y-12 Plant Bldg.	2.2 pounds of Mercury	0	0	1	0	25,000	
08/17/90	Oak Ridge DOE	Unknown quantity of PCBs	0	0	1	0	20,000	
08/14/90	Oak Ridge Y-12 Plant	60 pounds of Mercury	0	0	1	0	200,000	
05/16/90	Oak Ridge Y-12 Plant	3 lbs Asbestos	0	5	1	0	25,000	
03/28/90	Oak Ridge Y-12 Plant	Old Asbestos spill found	0	0	1	0	10,000	
03/27/90	Oak Ridge DOE	Unknown material	0	0	1	0	25,000	
1987	Quadrex oak Ridge	Radiation into residential district	0	0	0	0	40,000	
1986	Quadrex Oak Ridge	Radiation release into sewer	0	0	0	0	25,000	
1985	Oak Ridge National Lab.	Strontium release into sewer	0	0	1	0	45,000	
Various Dates	Various Locations	100 minor spills	0	0	0	0	100,000	

Table 5.26 Historic Hazardous Materials Land/Water/Air Release Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Cause, Area Impacted, Assets/Utilities Roads/Bridges Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
111		Totals	2	20	101	88	3,804,574	
Data Sources	Environmental Protection Agency, 911, Local/State Fire Service/Hazmat							
Loss Type	A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup							

Major Historic Occurrences Discussion

July 23, 1999: A bottle leaking a flammable, toxic material led to the evacuation Wednesday afternoon of several buildings at the Oak Ridge Y-12 Plant site. The Y-12 fire department was called when a beaker containing about 3 ounces of a hazardous cleaning agent – known as dichlorodimethysilane – was found in a building where researchers from Oak Ridge National Laboratory's Life Sciences Division work. About 170 people were evacuated from two buildings, according to Y-12.

December 18, 2000: A reported fluorine leak at the Oak Ridge K-25 site could have come from a gasket on a pipe going into a fluorine storage tank. The K-1302 building is a currently unused building that was formerly a fluorine storage and distribution facility. Fluorine was used at K-25 to refine fuel for nuclear power plants when the gaseous diffusion facility was operational from the 1940s to mid-1980s. It is a toxic gas, and exposures can result in a variety of symptoms, ranging from irritation of mucous membranes to severe burns. DOE established emergency teams and began investigating the leak shortly after it was reported. Their efforts consisted of establishing a 1,000-foot boundary around K-1302, sending home more than 200 possibly "at risk" site workers, and taking numerous samples from inside and outside the building. Two hazardous materials specialists entered K-1302 in protective suits, took samples, set up air monitoring equipment, and looked for leaks in piping and other equipment associated with the five fluorine storage tanks in K-1302. The storage tanks were reportedly emptied years ago, but DOE officials said they could still contain small amounts of fluorine. Officials said the monitoring efforts Friday afternoon showed levels of hydrogen fluoride exceeding 50 parts per million, which could irritate the eyes, nose and throat of an unprotected individual. Hydrogen fluoride is formed when fluorine combines with moisture in the air. The interior of K-1302 was fogged with water to reduce airborne levels of hydrogen fluoride. Samples were again taken and no measurable levels of hydrogen fluoride were detected inside the building.

May 2004: Highway 95 was closed due to a release of radioactive materials during transport. Following the $1 million cleanup and repair of Highway 95, DOE constructed a $10 million haul road to move an estimated 100,000 shipments of contaminated cleanup debris from the K-25 site across the Oak Ridge Reservation to a disposal site on Bear Creek Road, without having to use public roadways.

December 22, 2008: A combination of several long-evolving conditions caused a 50-year-old coal-ash storage pond breach and subsequent ash spill at Kingston Fossil Plant. Tennessee Valley Authority's latest estimate is that about 5.4 million cubic yards of ash escaped. This ash and water mixture spread over about half a square mile adjacent to the plant at Emory River mile 2.1. Some flowed into the Emory River, which is a tributary of the Clinch River and Watts Bar Lake.

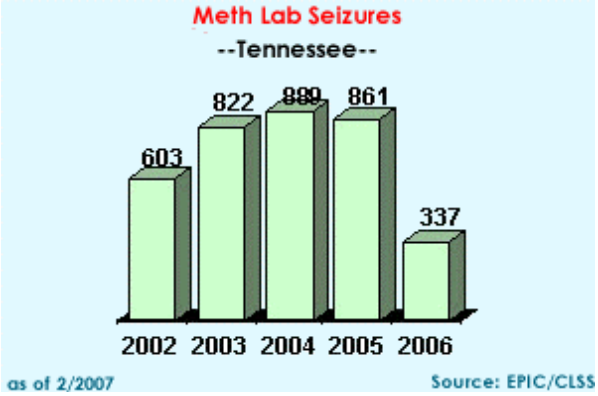
March 19, 2008: Visible for miles, black smoke from an out-of-control oil well fire just north of Oliver Springs burned for six days with flames roaring as high as 100 feet after an explosion that injured a Cove Lane man and forced residents from their homes. Natural gas and then oil erupted from the wellhead about 1 p.m. Tuesday when the drill hit a large pocket of gas at about 3,900 feet. Wild Well Control Inc., a Houston-based company was brought in to extinguish the blaze. Charred vehicles next to the Cove Lane rig site were moved out of the roadway to allow bulldozers to clear the hillside to give a bigger working area. Rescue workers used four-wheel drive "mules" to ferry in residents evacuated from the end of Cove Lane to retrieve necessities. The Red Cross opened a shelter for evacuees at Norwood Middle School.

August 18, 2009: An acid spill triggered an ORNL "operational emergency" when an overflow occurred as a truck was filling a tank with nitric acid. The spill was confined to Building 3544. DOE and its contractors will complete specific recovery plan tasks over the next few days to restore Building 3544 to normal operations.

5.4.2 Illegal Methamphetamine Labs Profile

Domestic labs that produce methamphetamine are dependent on supplies of the precursor chemical pseudoephedrine, which can be diverted from legitimate sources or smuggled from Canada and Mexico. Most illegal lab operators produce and distribute methamphetamine on a small scale. Amphetamine, dextroamphetamine, methamphetamine, and their various salts are collectively referred to as amphetamines. In fact, their chemical properties and actions are so similar that even experienced users have difficulty knowing which drug they have taken. Methamphetamine is the most commonly abused.

Figure 5.22 Methamphetamine Activity in Tennessee



Source: DEA

Location

The county and all municipalities have experienced meth seizures. The Anderson County Sheriff's Office has found meth labs in apartments, motel rooms, vacant buildings in rural areas, vehicles, campsites, and private homes. Although meth lab operators may more easily establish labs in the urban and more remote unincorporated areas, all jurisdictions in the county are at risk from this hazard.

Extent

Methamphetamine has been identified by law enforcement as the number one drug threat. The cooking process itself and the waste that results from the manufacture of meth pose significant public health and safety risks. Methamphetamine recipes rely on the use of volatile organic compounds, explosives, acids, bases, metals, solvents, and salts. These ingredients have the potential for explosions. The process of cooking meth leaves behind a hazardous coating on walls, floors, and ventilation systems.

Drug Enforcement Agency officials estimate that for each pound of meth produced, a lab operator creates 6 pounds of toxic waste, including leftover chemicals such as anhydrous ammonia, lye and solid meth residue. According to the DEA, cleanup of a lab costs an average of $3,280. It involves removing debris, testing soil, and neutralizing chemicals. Larger labs have cost up to $100,000 to shut down.

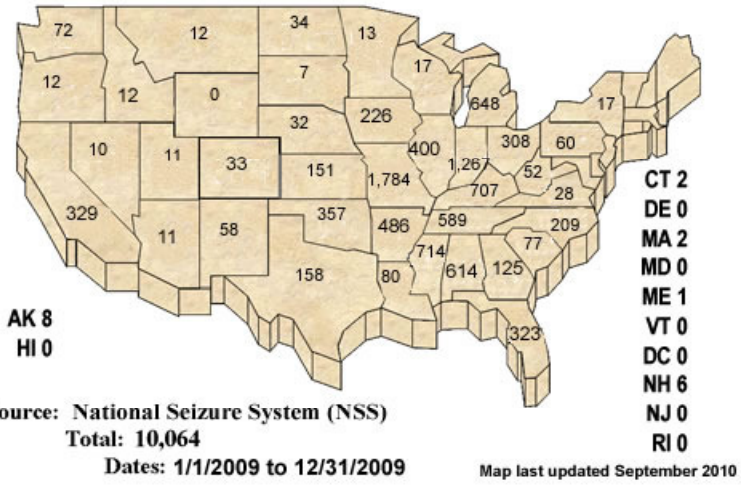
Figure 5.23 Methamphetamine Lab Components

Source: DEA

While law enforcement officers raid labs, anti-drug groups and government officials, are focusing on prevention. Effects of usage include addiction, psychotic behavior, and brain damage. Chronic use can cause violent behavior, anxiety, confusion, delusions, insomnia, auditory hallucinations, weight loss, mood disturbances, and paranoia. Damage to the brain caused by meth usage is similar to Alzheimer's disease, stroke, and epilepsy.

The Tennessee Department of Children's Services have taken an estimated 750 children from parents involved with meth.

Figure 5.24 Methamphetamine Lab Incidents



Source: DEA

In addition to these social and economic impacts, meth labs create a hazard to those emergency responders without the training and equipment to enter a contaminated area. Fires and explosions from "cooking" meth also threaten adjacent residents and homes. Lab operators, substantially involved in the drug's distribution, are frequently armed and often install "booby traps" to injure those entering the lab site uninvited.

A recent trend in meth production is the "Shake 'n Bake" method in which components are placed in a two-liter plastic bottle. Heat generated by the chemical reactions requires the bottle to be shaken periodically to prevent melting the plastic. Meth cooks place the bottle in a car trunk and drive around.

There have been 254 fatalities/injures and $1,067,000 in cleanup costs for illegal meth labs in Anderson County.

Future Probability

There have been 142 incidents of methamphetamine discoveries in Anderson County in 11 years, approximately 12 incidents per year. The potential for future hazard is high, and all areas will be

equally impacted. The future probability of these labs is expected to increase and a have high probability rating. The social impact of the labs contributes to the medium vulnerability rating.

Historic Occurrences

Table 5.27 Anderson County Historic Illegal Meth Laboratories								
Event Date	Location or Map Reference	Extent Description Lab Type, Area Impacted, Assets Damaged Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
1999	Lake City	1 Meth Lab	0	2	1	2,000	4,000	R
2000	Lake City	1 Meth Lab	0	2	1	2,000	4,000	R
04/12/01	Oak Ridge	Meth Lab	0	2	1	2,000	4,000	R
2002	Oliver Springs	2 Meth Labs	0	4	2	4,000	8,000	R
11/04/02	Clinton	Methamphetamine lab in home	0	2	1	4000	2000	R
4/26/02	Days Inn	A Methamphetamine lab at the Days Inn	0	1	4	16000	16000	R
09/20/03	Oak Ridge	Meth Lab	0	2	1	2,000	4,000	R
12/18/03	Oak Ridge	Meth Lab	0	2	1	2,000	4,000	R
07/30/03	Oak Ridge	Five people arrested in home methamphetamine lab	0	5	1	4000	4000	R
07/28/03	Oliver Springs	2 Methamphetamine labs	0	4	2	8000	8000	R
06/11/03	Riceville	Abandoned school bus used as a Methamphetamine lab	0	1	1	1000	4000	R
06/10/03	Batley	Meth lab	0	2	1	4000	4000	R
05/16/03	Oak Ridge	Methamphetamine	0	2	3	12000	12000	R
05/01/03	Marlow	Methamphetamine lab	0	1	1	4000	4000	R
03/19/03	Black Oak Trailer Park	Six people with a methamphetamine lab.	0	6	1	4,000	4,000	R
03/10/03	Clinton	A methamphetamine lab explosion at a Clinton house burned a man. Several elderly people were evacuated	0	1	1	80,000	10,000	R
05/07/03	Windrock	Mobile Methamphetamine lab	0	1	1	4000	2000	R
05/07/03	Oliver Springs	Methamphetamine lab	0	1	1	2000	4000	R
02/26/03	Oak Ridge	Chemicals in two Oak Ridge homes consistent with making Methamphetamine	0	4	2	6000	8000	R
02/18/03	Claxton	Methamphetamine lab in a car in Claxton. Anhydrous lab,	0	1	1	5000	2000	R
01/01/03	Oliver Springs	Methamphetamine lab in a car	0	1	1	6000	2000	R
2003	Countywide	26 additional Meth Labs	0	82	41	104,000	164,000	R
2004	Countywide	43 additional Meth Labs	0	90	45	90,000	180,000	R
02/29/04	Oak Ridge	Mobile Meth Lab	0	2	1	0	4,000	R
09/03/04	Oak Ridge	Mobile Meth Lab	0	2	1	0	4,000	R
03/04/05	Oak Ridge	Meth lab across street from school	0	1	1	4000	5000	R
03/11/05	Clinton	Meth lab in house with 2 children	0	2	1	4000	4000	R
03/14/05	Clinton	Meth lab in house with 2 children	0	2	1	4000	4000	R
03/17/05	Karns	Meth lab in house with 2 children	0	2	1	4000	4000	R
04/11/05	Clinton	Meth lab	0	1	1	4000	4000	R

Table 5.27 Anderson County Historic Illegal Meth Laboratories								
Event Date	Location or Map Reference	Extent Description Lab Type, Area Impacted, Assets Damaged Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
04/11/05	Lake City	Four gallons of Meth oil	0	1	1	4000	4000	R
09/14/05	Lake City	Methamphetamine lab	0	1	1	4000	4000	R
10/18/06	Medford	Meth lab in house	0	1	1	4000	4000	R
01/27/06	Heiskell	Meth lab in house	0	1	1	4000	4000	R
01/27/06	Clinton	Meth lab in house	0	1	1	4000	4000	R
02/22/06	Clinton	Meth lab in house	0	1	1	4000	4000	R
03/23/06	Lake City	Meth Lab in House	0	1	1	4000	4000	R
05/08/06	Clinton	Meth lab in house	0	1	1	4000	4000	R
09/08/06	Lake City	Chemicals associated with making Methamphetamine	0	1	1	4000	4000	R
09/08/06	Lake City	Meth and Meth precursors	0	1	1	4000	4000	R
12/12/06	Beech Grove	Methamphetamine components	0	1	1	4000	4000	R
01/12/07	Fraterville	Components for a Meth lab	0	1	1	4000	4000	R
01/29/07	Clinton	Components of a Methamphetamine lab	0	1	1	4000	4000	R
04/30/07	Offutt Road	Meth Lab	0	1	1	4000	4000	R
06/20/07	Norris	A large quantity of Methamphetamine	0	1	1	4000	12000	R
01/29/08	Oak Ridge	Meth Lab	0	1	1	4000	4000	R
03/07/08	New River	Meth Lab	0	1	1	4000	4000	R
04/06/09	Clinton	Meth-making products	0	1	1	4000	4000	R
04/22/10	Claxton	Meth lab at a house	0	1	1	4000	4000	R
05/28/10	Oak Ridge	Components to make Meth	0	1	1	4000	4000	R
04/22/10	Claxton	Active Meth lab in home	0	1	1	4000	4000	R
05/28/10	Oak Ridge	Components to make Meth	0	1	1	4000	4000	R
06/22/10	Andersonville	Materials to make Methamphetamine	0	1	1	4000	4000	R
33		TOTALS	0	254	145	480,000	587,000	
Data Sources		**DEA, Law Enforcement, Public Health Departments**						
Loss Type		**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**						

Major Historic Occurrences Discussion

March 10, 2003: A Lake City man in critical condition was taken to the University of Tennessee Medical Center at Knoxville and several elderly people were evacuated from the area after what is believed to have been a methamphetamine lab exploded at a Clinton house.

2003: Within 48 hours in 2003, authorities in Anderson County, shut down three labs. The Anderson County busts, reflected the various methods – some clever, some desperate – that lab operators use. One of the cases involved a local retirement home, where two grandchildren of a resident set up a lab while she was in the hospital. The woman's neighbors knew about the lab but were too terrified to report it. In another case, a suspect allegedly ran a lab from his car's trunk. Deputies closed a road for 17 hours while the chemicals were removed. Another bust occurred in a duplex adjoining an elementary school and a daycare center.

2004: Oak Ridge Police Department shut down the K-Mart parking lot after finding a mobile meth lab, including jars of mixed chemicals.

March 4, 2005: As children began to board buses at the end of their school day at Willow Brook Elementary School, members of the Anderson County Sheriff's Department's Drug Task Force were conducting surveillance at a nearby house, known for drug activity.

March 11, 2005: Anderson County Sheriff's Office deputies took two children from a home after finding evidence of methamphetamine production.

March 17, 2005: Anderson County Sheriff's Office Drug Task Force contacted the Department of Children's Services after finding two children in a home with an active methamphetamine lab. The children, ages 6 and 7, were removed from the home and placed in state custody.

5.4.3 Terrorism Profile

The Domestic Preparedness Program is a partnership of federal, state, and local agencies with the goal of ensuring that, as a nation, state, and county, we are prepared to respond to a terrorist attack involving nuclear, biological, or chemical weapons – weapons of mass destruction (WMD). Today, the term "Homeland Security" is used to denote the concept of preparing for these kinds of events. Terrorism involves incidents committed by both international and domestic agents.

Location

The county contains potential target sites for terrorist attack. The presence of these facilities places Anderson County at a high threat level for forms of terrorist attack. The most dangerous variants of terrorism - nuclear, biological, or chemical attacks could affect Anderson County. At present, the most likely form of nuclear, biological, or chemical terrorism may be a threat or hoax of a chemical device or sabotage.

While Anderson County has not experienced international terrorist events, the county contains potential target sites for terrorist attack. The three DOE facilities located in Oak Ridge and TVA's Norris Dam and Bull Run Fossil Plant in the unincorporated areas of the county are high-visibility sites. The presence of these facilities places Anderson County at a high threat level for forms of terrorist attack. A terrorist incident at these facilities would equally impact the entire county. Extremist groups exist within the state; however, it is unlikely that any terrorist act perpetrated by these groups would be disastrous countywide. Authorities on terrorism generally agree that terrorism cannot be wiped out entirely.

Extent

Anderson County has experienced domestic terrorist events in the form of:

Anthrax/Bomb Threats: Though none have been found credible, bomb threats are a continuing problem for schools and government throughout Anderson County. Threats have been received by many of Anderson County's, schools, law enforcement, medical, and business facilities. Oak Ridge National Laboratory receives two to three bomb threats a year. Threats have been received by the Oak Ridge Municipal Building, which houses city administrative offices and courtrooms. Anderson County Courthouse, plagued by threats prompting seven evacuations in 2004, has fewer threats since the publicized installation of caller ID.

Cyber-terrorism: Several facilities in Anderson County have been affected by computer viruses and attempted system entry by "hackers." Improved virus detection capability and system security safeguards have reduced the threat of cyber-terrorism for Anderson County's larger industrial and government facilities. Oak Ridge National Laboratory, Department of Energy Federal Building, the K-25 and Y-12 facilities, Oak Ridge Associated Universities, and Oak

Ridge City computers all experienced minimal impact from viruses in 2000 and 2001. Other businesses and jurisdictions throughout the entire county have experienced cyber terrorism.

Civil Disorder: Anderson County made national headlines on October 5, 1958 when three separate explosions from an estimated 75-100 sticks of dynamite almost completely destroyed Clinton High School. This event was the culmination of more than two years of civil unrest over the integration of the school. The bombing was preceded by demonstration and riots in August 1956. Led by segregationist leaders from other states and fueled by extensive media coverage, these disturbances prompted the formation of an armed "citizens auxiliary" and required intervention of state troopers and 600 National Guard troops with tanks and armored cars.

Since the late 1980s, peace activists have staged non-violent protests at Y-12 at least twice a year, in April and on the Hiroshima anniversary, in opposition to the manufacture of nuclear weapons. Though demonstrations have been orderly and peaceful, arrests for trespassing on federal property are common. Recently groups supporting nuclear weapons have joined the demonstrations. These demonstrations require the presence of law enforcement personnel from Y-12, Oak Ridge, and Tennessee Highway Patrol to ensure the safety of both protesters and Y-12 employees, and to prevent unauthorized entry to the Y-12 site.

The County prepared a Department of Homeland Security sponsored terrorism assessment in 2002 to identify potentially at-risk critical facilities. The assessment drew on the county's Emergency Operations Plan. The assessment considered terrorism as a primary mode of a possible disaster via contamination (chemical, biological, radiological or nuclear), energy (explosive, arson), or failure/denial of services (sabotage, infrastructure breakdown and disruption). It considered eight critical infrastructure categories: telecommunications, electrical power systems, gas and oil facilities, financial institutions, transportation networks, water supply systems, government services and emergency services. Finally, it considered the vulnerability of the county's assets, in terms of its current level of protection of an attack, and its "attractiveness," (e.g., highly visible or draws large crowds).

For this Plan, a terrorism vulnerability assessment of each identified target was conducted. The table builds on the Office of Domestic Preparedness Terrorist Vulnerability Assessment of 2002. For security purposes, the detailed information on identified targets is documented in the Annex.

Table 5.28 Anderson County Terrorism Assessment

Criteria	0	1	2	3	4	5
Asset Visibility	X	Existence not well known	X	Existence known locally	X	Existence well known
Target Utility	None	Very Low	Low	Medium	High	Very High
Asset Access	Secure area 24/7 armed guards & access controlled	Fenced guards access controlled	Access & parking restricted	Access Strictly controlled	Entry controlled	Open access
Asset Mobility	X	Moved frequently	X	Moved some	X	Fixed in place
Hazard Materials present	No materials	Limited quantity secured	Moderate quantity strict control	Large quantity some control	Large quantity little control	Large quantity no control
Potential Collateral Damage	No Risk	Low risk; immediate area only	Medium risk; local area only	Moderate risk within 1mi. radius	High risk within 1 mi. radius	High risk beyond 1mi. radius

Site Population	0	1-250	251-500	501-1000	1001-5000	>5000

Within the county, the fire service and law enforcement have the primary responsibility for responding to WMD/terrorist incidents. A WMD/terrorist incident is a potential crime scene and the responsibility of law enforcement is primary. At a minimum, each county fire department is trained to hazardous materials Awareness Level, as defined in 29 CFR 1910.120. For any WMD/terrorist incident, the county's Hazardous Materials Team would respond. These team members are trained at Hazardous Materials Technician Level, with some Hazardous Material Specialists. In the event a hazardous materials or weapons of mass destruction/terrorism incident exceeds county capabilities, assistance from state and federal agencies may be requested.

The specific hazards created by a terrorist incident are dependent on the type of threat, the number of population affected and involved, and the location where the incident occurs. The hazards to life presented by a terrorist incident is dependent on the type of incident, the physical attributes (topography, bodies of water), weather conditions, buildings/structures/people exposed, and the area where the detonation occurs. People in or immediately adjacent to high-risk facilities are at highest risk. It is fair to assume that an incident would most likely occur in a suburban/urban area where the impact would be greater. Domestic terrorism incidents in Anderson County have resulted in 3 fatalities/injuries and $4,033,680 in costs.

Future Probability

There have been 64 reports of domestic terrorism reported in Anderson County since 1958. However, 61 of these reports have occurred since 1992. This results in the probability of two to three terrorism incidents a year. The expectation is that the future occurrence of a major terrorist incident in the county will continue to be high and the vulnerability to be low, however a significant incident would increase the vulnerability to high. Oak Ridge is at greatest risk of a terrorist incident due to the presence of DOE facilities within the city. Incidents at other locations would equally impact the entire county.

Historic Occurrences

Table 5.29 Historic Terrorist (Domestic/International CBRNE, Cyber) Threats/Incidents

Event Date	Location or Map Reference	Extent Description: Severity, Type, Area Impacted, Assets/Utilities Roads/Bridges Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
10/05/58	Clinton High School	Bomb Explosion	0	0	1	3,856,000	115,680	
11/11/72	DOE Plants, Oak Ridge	Hijacked Plane	0	0	0	0	0	
12/10/79	Norris Police Station	Bomb Explosion	0	2	1	35,000	15,000	
05/01/92	Norris Commons	Chemical spread on public area	0	0	1	0	10,000	
07/09/97	Oak Ridge High School	Bomb Threat	0	0	0	0	0	
09/05/97	Eagle Bend Manufacturing	Bomb Threat	0	0	0	0	0	
01/27/98	Unknown Company	Bomb Threat	0	0	0	0	0	
02/02/98	Roane State Community College	Bomb Threat	0	0	0	0	0	
10/13/98	Oak Ridge Y12 plant	Bomb Threat	0	0	0	0	0	
12/01/98	Oak Ridge Municipal Bldg	Stink Bomb	0	0	0	0	0	
12/18/98	Pathway Bellows	Bomb Threat	0	0	0	0	0	

Table 5.29 Historic Terrorist (Domestic/International CBRNE, Cyber) Threats/Incidents								
01/14/99	Rocky Top market	Bomb Threat	0	0	0	0	0	
02/26/99	Ryan's Steak House	Bomb Threat	0	0	0	0	0	
12/05/99	Ridgeview	Bomb Threat	0	0	0	0	0	
12/17/99	Wal-Mart, Oak Ridge	Bomb Threat	0	0	0	0	0	
05/04/00	Glenwood Elementary School	Bomb Threat school evacuated	0	0	0	0	0	
05/04/00	Johns Market	Bomb Threat	0	0	0	0	0	
06/27/01	Oak Ridge	Firebomb thrown at house	0	0	0	0	0	
06/27/01	Oak Ridge Municipal Building	Bomb Threat	0	0	0	0	0	
09/13/01	Wal-Mart	Bomb Threat	0	0	0	0	0	
09/20/01	Y-12 National Security Complex	Bomb Threat	0	0	0	0	0	
10/16/01	Oak Ridge Planned Parenthood	Suspected Anthrax powder exposed two people	0	2	1	0	2,000	
10/16/01	Briceville Post Office	a powdery substance was found in a postal bag	0	0	0	0	0	
10/23/01	Oak Ridge Federal Building	a powdery substance was found near an air duct. 60 evacuated	0	0	0	0	0	
10/24/01	Oak Ridge Bldg 2714 DOE	Powdery substance discovery	0	0	0	0	0	
12/31/01	Methodist Medical Center	Bomb Threat	0	0	0	0	0	
05/03/02	DOE K-25 Plant	Bomb Threat	0	0	0	0	0	
09/06/02	Clinton Courthouse	Bomb Threat, Courthouse evacuated	0	0	0	0	0	
12/01/03	County Courthouse	Bomb Threat	0	0	0	0	0	
03/18/03	Oak Ridge Y12	Bomb Threat	0	0	0	0	0	
04/23/03	Anderson County High School	Bomb Threat	0	0	0	0	0	
07/03/03	AAMedical Equipment	Bomb Threat	0	0	0	0	0	
01/06/04	County Courthouse	Bomb Threat	0	0	0	0	0	
02/20/04	County Courthouse	Bomb Threat	0	0	0	0	0	
03/31/04	County Courthouse	Bomb Threat	0	0	0	0	0	
04/21/04	County Courthouse	Bomb Threat	0	0	0	0	0	
05/04/04	Client Logic	Bomb Threat	0	0	0	0	0	
07/14/04	County Courthouse	Bomb Threat	0	0	0	0	0	
8/30/04	Oak Ridge High School	Bomb Threat	0	0	0	0	0	
09/01/04	County Courthouse	Bomb Threat	0	0	0	0	0	
09/21/04	The Learn Center	Bomb Threat	0	0	0	0	0	
11/03/04	Anderson County High School	Bomb Threat	0	0	0	0	0	
11/03/04	Oak Ridge Police Dept.	Bomb Threat	0	0	0	0	0	
11/04/04	The Learn Center	Bomb Threat	0	0	0	0	0	

Table 5.29 Historic Terrorist (Domestic/International CBRNE, Cyber) Threats/Incidents								
11/19/04	County Courthouse	Bomb Threat	0	0	0	0	0	
12/22/04	County Courthouse	Bomb Threat	0	0	0	0	0	
01/12/05	County Courthouse	Bomb Threat	0	0	0	0	0	
01/18/05	Anderson County High School	Bomb Threat	0	0	0	0	0	
01/18/05	Norris Middle School	Bomb Threat	0	0	0	0	0	
01/21/05	County Courthouse	Bomb Threat	0	0	0	0	0	
10/04/05	Oliver Springs High School	Bomb Threat	0	0	0	0	0	
11/08/05	County Courthouse	Bomb Threat Bldg evacuated	0	0	0	0	0	
01/19/06	Oak Ridge jail	Bomb Threat	0	0	0	0	0	
04/17/06	Oak Ridge Federal Credit Union	Bomb Threat	0	0	0	0	0	
07/12/06	Oak Ridge Lincoln Mercury	Bomb Threat	0	0	0	0	0	
11/20/06	Wal-Mart	Bomb Threat Bldg evacuated	0	0	0	0	0	
04/05/07	County Courthouse	Bomb Threat	0	0	0	0	0	
04/29/07	SEI Security	Bomb Threat	0	0	0	0	0	
07/14/07	Methodist Med Ctr	Bomb Threat	0	0	0	0	0	
01/17/08	County Courthouse	Bomb Threat	0	0	0	0	0	
02/26/08	Walmart	Bomb Threat	0	0	0	0	0	
64		Totals	0	4	4	3,891,000	142,680	
Data Sources	**911/Fire Departments/Law Enforcement/Education/DHS/Private Sector**							
Loss Type	**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**							

Major Historic Occurrences Discussion

November 11, 1972: The U.S. Atomic Energy Commission Oak Ridge Operations office was notified that Southern Airlines Flight 49, commandeered by three hijackers heavily armed with pistols and hand grenades, would be over Oak Ridge in less than an hour. The hijackers, two of whom had lived in the Scarboro neighborhood of Oak Ridge, were threatening to dive the DC-9 and its 27 passengers and 4 crewmembers into either the Y-12 plant or Oak Ridge National Laboratory to "blow up the whole world." Research reactors were shut down and all but essential personnel of the limited Saturday workforce were evacuated from both facilities. After circling Oak Ridge for an hour, the plane diverted to Lexington, Kentucky for fuel and eventually landed in Cuba where Fidel Castro personally arrested the hijackers, greeted crew and passengers, arranged a festive dinner and hotel for them, and sent the bill to Southern Airlines!

December 1979: Norris Police Department was the target of a bomb explosion that damaged the station and caused injury to an officer.

October 16, 2001: Oak Ridge firefighters for a second time in three days decontaminated people who may have been exposed to a hazardous material. Firefighters went to the Planned Parenthood office at Ridgeway Center and washed down an Oak Ridge police officer and an Oak Ridge postal worker after they came in contact with a piece of mail that may have been contaminated.

2001: During the outbreak of anthrax in the last months of 2001, local firefighters and law enforcement officers investigated several suspicious-looking substances, packages, and mail at a Department of Energy facility, private residences, businesses, a hospital, a post office, and a

school. Though all tests were negative, decontamination procedures were initiated at an Oak Ridge school and post office. Oak Ridge Planned Parenthood received one of several hundred fake anthrax letters mailed by an anti-abortion extremist.

September 1, 2004: Oak Ridge emergency personnel were called to Oak Ridge High School to investigate a suspicious package thought to possibly contain explosives. The discovery occurred at approximately 8:45 a.m. and reportedly involved a box attached to a bicycle, parked in front of the school.

January 19, 2005: A bomb threat closed two schools and caused a lot of anguish for school officials and law enforcement personnel. Clinton Police Chief Rick Scarbrough said a person called Anderson County High School shortly after 7 a.m. Scarbrough said some students already at the school and those who had begun arriving were all moved to Norris Middle School. By the time students got to the middle school, a bomb threat was called in there. The students from both schools were then moved to Norris Elementary School.

5.4.4 Urban Structure Fire Profile

An urban fire is any instance of uncontrolled burning which results in major structural damage to large residential, commercial, industrial, institutional, or other properties in developed areas. Generally a large structure is defined as any structure exceeding 25,000 square feet. Large structural fires therefore would include fully involved structures of this size or greater. Multiple stories may be involved as well and constitute square footage.

Location

Almost every jurisdiction has at least one downtown area, industrial park, hospital, government center, churches, manufacturing facilities, warehouses, and multiple-story buildings. Each of these locations is a prime target for urban fire incidents.

The Tennessee State Fire Marshall reports on rural fire in Tennessee. Fires occur in similar proportions in both rural and urban areas. Structures fires are the most prevalent (33%) type of fire and are responsible for the most deaths and injuries. In structures, the two leading causes are 1) heating, and 2) other equipment. Rural residential structure fires are twice as likely to be caused by heating, as fires in urban areas; fireplaces and chimneys are the most likely type of equipment involved in the fire. Of the structure fires, 48% occurred in structures without an operational smoke alarm. Flame damages were more extensive in rural structure fires contained to the building, than in urban structure fires that were contained to an object or room.

Fires have affected individual structures throughout the rural unincorporated areas of Anderson County and its municipalities, occurring in homes, businesses, and government buildings. The potential for future events exists

Extent

Damages from fire can range from human and livestock deaths to significant property damage and infrastructure problems. All areas of Anderson County are vulnerable to fire conditions. However, the urban areas have the greatest potential for significant loss. The potential for loss of human life in fires is a significant concern. Fires can have a dramatic and sometimes permanent impact on individuals, property, and the environment in the area of the fire. In the past 15 years 955 Tennessee citizens have died in fires, but fires in rural areas have outpaced those in municipalities by a rate of two to one.

Future Probability

Multiple major fires occur in Anderson County every year and will continue to occur. The entire county is at equal risk of fires in individual structures. In terms of large, urban fires within Anderson County, the downtown areas of Lake City and Oliver Springs, comprised of adjoining old wood structures, are at greatest risk. The impact of a large urban fire would be greatest for Clinton and Oak Ridge.

In the past 24 years, 77 businesses, commercial, and multi-residential fire incidents are documented, approximately two to three incidents each year. The probability of a major fire is high, and the vulnerability is also high.

The fires reported in the table below are not all major fires; however the 77 fires reported resulted in 12 fatalities, 38 injuries and $29,480,125 in property losses.

Historic Occurrences

Table 5.30 Historic Urban Fire (Large/Multiple Structure, Fatality/Injury) Incidents

Event Date	Location or Map Reference	Extent Description Severity, Cause, Area Impacted, Assets/Utilities Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
06/20/ 1905	Clinton	fire razed an entire block of present day Market Street	0	0	5	1,000,000	50000	C
01/25/ 1908	Clinton	Both sides of Market Street were totally destroyed by fire	0	0	31	5,000,000	2000000	C
08/05/68	Jacksboro St., Lake City	Community Building	0	0	1	10,000	2,000	C
03/06/71	204 Ind. Park Rd. Lake City	Lake City Health Care	0	0	1	145,000	29,000	C
06/24/74	I-75 @ Lake City Exit	Vehicle Fire	0	0	1	20,000	2000	C
01/01/78	317 Roane St, Oliver Springs	Oliver Springs Elementary School	0	0	1	2,500,000	500000	C
01/05/78	Rideway Rd., Norris	Community Building	0	0	1	700,000	50000	C
04/02/82	Railroad St., Lake City	Southern Railroad Car Fire	0	0	1	40,000	0	
11/05/82	1132 S. Main, Lake City	Lake City High School	0	0	1	12,000	2400	C
02/08/83	I-75 @ Lake City Exit	Tractor Trailer Fire-Hazmat	0	0	1	85,000	0	
07/21/83	Creek Street, Lake City	CSX Train Derailment	0	0	1	650,000	0	
02/12/84	I-75@ Lake City Exit	Vehicle Fire- Ammunition	0	0	1	25,000	0	
10/05/85	402 Lindsay Ave, Lake City	Lake City Elementary School	0	1	1	9,000	1,800	C
08/18/95	Main Street, Lake City	Beau's Recreation	0	0	1	20,000	4,000	C
08/19/95	1202 Seivers Clinton	Get & Go Market	0	0	1	1,000	200	C
08/22/95	308 S. Main, Lake City	Johnson Apartments	4	3	6	150,000	30,000	C
09/19/95	131 N. Main St, Clinton	Apartment fire	0	0	1	150,000	30,000	C
10/17/95	1000 Medaris St, Clinton	Apartment Fire	0	0	1	1,500	300	C
01/01/96	398 N. Main St, Clinton	The Learn Center	0	0	1	100,000	20,000	C
03/29/96	528 Douglas Lane, Clinton	Willow Run Apartments	0	0	1	3,000	600	C
11/04/96	419 Eagle Bend Rd, Clinton	Real Dry Cleaners	0	0	1	2,000	400	C
11/07/96	1027 S. Main, Lake City	Richard's Dry Cleaners	0	0	1	65,000	13,000	C

Table 5.30 Historic Urban Fire (Large/Multiple Structure, Fatality/Injury) Incidents								
Event Date	Location or Map Reference	**Extent Description** Severity, Cause, Area Impacted, Assets/Utilities Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
12/06/96	1 Quality Circle, Clinton	Techmer P.M.	0	0	1	2,500	500	C
02/13/97	195 Edgewood Ave, Clinton	Portwood Laundry	0	0	1	7,500	1,500	C
02/17/97	1260 Carden Farm Dr, Clinton	D.H. Compounding	0	0	1	65,000	13,000	C
03/27/97	1043 N. Main, Lake City	VFW	0	0	1	145,000	29,000	C
05/07/97	1108 Seivers, Clinton	Sonic Drive In	0	0	1	3,500	700	C
05/27/97	904 High St, Clinton	High Street Apartments	0	0	1	1,500	300	C
01/20/98	110 Glenwood Drive, Clinton	Apartment Fire	0	0	1	3,500	700	C
02/23/98	520 Yarnell Pkwy, Clinton	Titan Tire	0	0	1	25,000	5,000	C
08/28/98	203 Yarnell Pkwy, Clinton	Pallet Plus	0	0	1	2,000	400	C
10/26/98	1260 Carden Farm Dr, Clinton	D.H. Compounding	0	0	1	2,500	500	C
11/26/98	838 Clinch Ave, Clinton	Hotel	0	0	1	2,500	500	C
1994-1998	Rural Anderson County	Avg. 100 residential fires/yr @ 30,000 each	1	10	100	30,000,000	3,000,000	C
03/29/99	185 Clinch Ave, Clinton	Town Talk Market	0	0	1	200,000	40,000	C
05/06/99	308 Market St, Clinton	Apartment Fire	0	0	1	1,000	200	C
08/13/99	717 Sharp St, Clinton	Apartment Fire	0	0	1	7,000	1,400	C
09/24/99	1260 Carden Farm Dr, Clinton	D.H. Compounding	0	0	1	2,250	450	C
11/25/99	1260 Carden Farm Dr, Clinton	D.H. Compounding	0	0	1	1,000	200	C
01/10/00	250 Yarnell Pkwy, Clinton	Link-Belt	1	0	0	20,000	4,000	C
01/22/00	1 Quality Cr, Clinton	Techmer P.M.	1	0	0	15,000	3,000	C
05/14/00	1200 Fowler St, Clinton	Gate Manor Apartments	0	0	1	100,000	20,000	C
07/01/00	342 Willow Run, Clinton	Willow Run Apartments	0	0	1	300,000	60,000	C
08/23/00	190 Clinch Ave, Clinton	Goodwill	0	0	1	1,000	200	C
08/25/00	350 Yarnell Pkwy, Clinton	Becromal	0	0	1	35,000	7,000	C
08/29/00	1000 Yarnell Pkwy, Clinton	Eagle Bend Mfg.	0	0	1	2,500	500	C
12/08/00	127 Nesper Road, Oak Ridge	Multi-family Dwelling	0	0	1	130,000	26,000	C
12/19/00	1260 Carden Farm Dr, Clinton	D.H. Compounding	0	0	1	5,000	1,000	C
03/29/01	520 Yarnell Pkwy, Clinton	Carlisle Tire	0	0	1	12,000	2,400	C
04/23/01	2211 Seivers, Clinton	Golden Girls	0	0	1	6,000	1,200	C
06/17/01	275 Seivers, Clinton	Burger King	0	0	1	1,000	200	C
08/29/01	101 N. Main, Clinton	Anderson County Courthouse	0	0	1	1,500	300	C
10/08/01	232 Jefferson Avenue	Multi-family Dwelling	0	0	1	109,500	21,900	C
10/10/01	1200 Fowler St, Clinton	Gate Manor Apartments	0	0	1	200,000	40,000	C
12/18/01	1260 Yarnell Pkwy, Clinton	D.H. Compounding	0	0	1	30,000	6,000	C
03/09/02	Rideway Rd, Norris	Community Building	0	0	1	600,000	70,000	C
03/19/02	1000 Medaris St, Clinton	Apartment Fire	0	0	1	10,000	2,000	C
05/24/02	301 Bradford Place, Clinton	Apartment Fire	0	0	1	25,000	5,000	C
06/19/02	1260 Carden Farm Drive, Clinton	D.H. Compounding	0	0	1	810,000	162,000	C

Table 5.30 Historic Urban Fire (Large/Multiple Structure, Fatality/Injury) Incidents								
Event Date	Location or Map Reference	**Extent Description** Severity, Cause, Area Impacted, Assets/Utilities Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
09/14/02	324 West Outer Dr Oak Ridge	Multi-family Dwelling	1	1	0	85,000	17,000	C
10/31/02	164 Carriage Trace	Apartment Fire	0	0	1	1,500	300	C
12/05/02	123 Leinart, Clinton	Dentist Office	0	0	1	3,000	600	C
05/14/03	303 Turnpike, Oak Ridge	Laundry/Dry Cleaning	0	0	1	52,000	10,400	C
06/22/03	838 Clinch Ave, Clinton	Apartment Fire	0	0	1	10,000	2,000	C
01/09/04	191 Carriage Trace, Clinton	Apartment Fire	1	0	0	3,000	600	C
01/12/04	2571 Oliver Springs Hwy, Oliver Springs	Alta Vista Chiropractic Clinic	1	0	0	86,000	17,200	C
01/12/04	1037 East Drive, Clinton	Clinton Hosing	0	0	1	30,000	6,000	C
03/05/04	703 S. Main, Lake City	Genesis Recovery Center	0	0	1	12,000	2,400	C
08/22/04	300 E. Field Dr, Clinton	Apartment Fire	0	0	1	1,000	200	C
08/27/04	Oak Ridge	YMCA	0	2	0	30,000	12,000	C
12/31/04	203 Michigan Ave. Oak Ridge	First Christian Church	0	0	1	1,231,000	246,200	C
2000-2004	Rural Anderson County	Avg. 100 residential fires/yr @ 30,000 each	1	10	500	30,000,000	6,000,000	C
01/24/05	1355 Carden Farm Drive Clinton	Durakon Industries	0	0	1	100,000	20,000	C
02/28/05	South Clinton	Ridgeview Hotel & Apartments	0	0	1	6,500	1,300	C
07/21/05	Oak Ridge	An arson fire in an apartment building	0	0	1	5,000	1,000	C
02/06/06	Clinton	Arson fires at three apartment complexes	0	0	3	30,000	15,000	C
02/20/06	Oak Ridge Applewood Apt	Apartment fire	0	0	3	30,000	6,000	C
04/18/06	Tocoma Rd Oak Ridge	Apartment fire, firefighter injured	0	1	1	10,000	20,000	C
04/25/06	Alhambra Rd. Oak Ridge	Storage Building	0	0	1	30,000	10,000	C
10/29/06	Oak Ridge Hamshire Condos	Fire damaged entire two-story unit	0	0	1	50,000	12,000	C
10/27/07	Claxton Greenview Apartments	Bedroom fire in an apartment caused smoke damage to several units	0	0	4	30,000	20,000	C
12/03/07	Oak Ridge Tate Tire	Several cars were on fire and burned	0	0	1	25,000	0	C
10/12/07	Bull Run Steam Plant	Transformer in the switchyard	0	0	1	7,000	0	
10/17/09	Oliver Springs	Apartments and 3 businesses	0	0	5	500,000	200,000	C
10/19/10	Oak Ridge	Applebees Restaurant	0	0	1	10,000	2,000	C
2005-2010	Rural Anderson County	Avg. 100 residential fires/yr @ 30,000 each	1	10	500	30,000,000	18,884,950	

Table 5.30 Historic Urban Fire (Large/Multiple Structure, Fatality/Injury) Incidents								
Event Date	Location or Map Reference	Extent Description Severity, Cause, Area Impacted, Assets/Utilities Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost Amount	Other Loss or Cost Type
77		Totals	12	38	1227	105,951,750	18,884,950	
Data Sources	911/Fire Departments/Law Enforcement/Education/DHS/Private Sector							
Loss Type	A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup							

Major Historic Occurrences Discussion

June 20, 1905: Fire razed an entire block of present day Market Street, burning a grocery, a furniture and casket store, a hotel, and a bottling works.

January 25, 1908: Both sides of Market Street were totally destroyed by fire, affecting 27 businesses and 4 residences. The following day an ordinance was passed prohibiting wooden structures in the downtown business area. Two years were required to rebuild lost structures.

August 27, 2004: Due to a fire that broke out at the YWCA of Oak Ridge shelter for battered and abused women and their children earlier this week, the shelter needs help to get back up and running normally. Women and young children were in the shelter at the time of the fire. One woman was treated for second-degree burns and another suffered from minor smoke inhalation

December 4, 2007: Fire protection engineering personnel at the Y-12 National Security Complex in Oak Ridge are trying to determine the cause of an early morning fire that destroyed most of the contents of a metal storage building.

April 4, 2008: A disabled and wheelchair-bound woman was killed in a fire in Anderson County.

November 17, 2009: An early morning fire at an Oliver Springs business and apartment complex destroyed two businesses and damaged apartments and Family Dollar Store merchandise. Residents in three apartments at the back of the building were evacuated. There were no injuries.

October 19, 2010: A 5:00 a.m. Sunday morning fire at Applebee's Neighborhood Grill and Bar may have been caused by a cigarette discarded in mulch outside the restaurant where a fenced storage building is located. Fire extended up the building and above the roof, but did not burn into the interior. The storage building was destroyed. A beer keg inside the shed "gave firefighters a scare" when it exploded just as units arrived on scene.

5.4.5 Pandemic/Epidemic/Vector Profile

Pandemics occur when disease affects large numbers of the population worldwide. Epidemics occur when large numbers are affected in a more localized area such as a city, region, state, or nation.

One of the "emerging" threats to Tennessee and Anderson County are vector-based threats - bacteria, insects, and other animals that pose a direct or indirect hazard to humans, their food supply, or the state's economy. Vector-borne diseases diagnosed in Tennessee include: Western equine encephalitis, St. Louis encephalitis, Colorado tick fever, Rocky Mountain spotted fever, Lyme disease, tularemia, rabies, plague, and hanta-virus. Tennessee has been planning for an outbreak of bird flu since 1999. State officials are modifying those plans now because of a highly aggressive form of avian flu circulating among domestic and wild birds in Asia and Europe.

Location

The county's entire population is susceptible to exposure from both human and plant/animal infectious disease because of the random nature of the diseases. Large population concentrations and sites with large numbers of people are especially at risk in the event of an outbreak.

Human pandemics/epidemics were major killers in the 1700s and 1800s. The worst culprits were smallpox, polio, influenza, measles, cholera, and yellow fever. In 1918, the Spanish flu pandemic struck Tennessee, including Anderson County. Anderson County and its communities have experienced illness and fatalities from historic pandemic/epidemic events. In addition, Anderson County has experienced isolated occurrences or minor exposures of agricultural infectious diseases over the last 50 years.

Extent

Pandemics have occurred four times in the last 100 years in the world's human population.

The 1918-1919 Spanish Flu caused the highest number of deaths. India had 16 million deaths. The U.S. had 675,000 deaths. In England 230,000 died. In Germany 225,000, and in France 166,000 perished. World wide, the estimated fatalities were 20 - 50 million. During the Spanish Flu pandemic, Spain closed its government. New York City closed its port and trains did not run.

The 1957-58 Asian Flu was identified in February 1957 in China. By June, it had crossed the Pacific and entered the U.S. Globally, it caused a million deaths. In the U.S., 70,000 died.

The 1968-69 Hong Kong Flu caused four million deaths worldwide and 34,000 deaths in the U.S. It was a Type A virus.

The 2009-10 Swine Flu was identified in April 2009 in Mexico and was classified as the Novel H1N1 (Swine Flu). In May 2009 it migrated to the U.S. On June 11, 2009, World Health Organization (WHO) declared a pandemic status and raised world alert to level 6 (wide spread human infection). Worldwide, 213 countries and overseas territories reported H1N1 cases. By July 17, 2009, there were 89,921 cases and 382 deaths worldwide. The U.S. had 33, 902 cases and 170 deaths. In the U.S., estimates of H1N1 influenza cases from April 2009 to mid-January 2010 ranged from 41 million to 84 million. H1N1-related hospitalization ranged from 183,000 to 378,000. Deaths numbered between 8,330 and 17,160. The majority of hospitalization and deaths occurred among adults aged 18 to 64.

H5N1 Avian Influenza was identified in humans in December 2003. Mild variants of avian flu are most feared by public health officials. Coughing or sneezing, infectious droplets are spewed at a rate of 150 feet per second. Washrooms, doorknobs, and shaking hands of contaminated public spread the disease quickly. It is a highly pathogenic strain that has swept through chickens and other poultry across Western Asia. Fifteen countries have reported 493 cases and 292 deaths. Egypt has reported 10 cases and 6 deaths in the first three months of 2010. The mortality rate has been as high as 72 % and remains high today at approximately 60 %. Humans have no immunity to H5N1 virus. The Center for Disease Control and Prevention (CDC) is working with World Health Organization (WHO) and other international partners to monitor the virus activity and the development of vaccines. The ability to jump species, the constant changes in the genetic make-up of the influenza viruses, the potential for vaccine loss and the rapidly spreading "flu" virus are the reasons influenza is a threat to a community, state, or country.

Smallpox-variola major was last seen in the U.S. in 1949. The last naturally occurring case was in Somalia in 1977. Except for military personnel, vaccination for smallpox in the U.S. ended in 1972, when smallpox was considered eradicated worldwide. Two laboratories were designated to

keep the virus. One lab was CDC in Atlanta, Georgia and the other lab was in Russia. When the break-up of the USSR occurred, the location of Russia's smallpox virus became unknown. It was widely thought that at least four other countries received part of the virus. Variola is classified, as a biological weapon, on the "A: list by the CDC. The virus can be transmitted from person to person, may result in high mortality rate (30%), may cause panic and social disruption, have a moderate to high potential for large-scale dissemination, and requires special action for public health preparedness and response.

Hepatitis A Virus results from eating food or drinking water contaminated with human excrement. Outbreaks are associated with consumption of produce. Hepatitis A virus attacks the liver, is highly infectious, and can lead to varying degrees of illness, hospitalization and death.

Severe Acute Respiratory Syndrome (SARS) started in China in late 2002. The WHO reported 29 countries were affected by the end of July 2003. There were 8,500 cumulative cases and 774 deaths. Health care workers accounted for 1,707 cases. In the U.S., 29 cases were confirmed. SARS is closely associated with influenza and is of major concern to all public health officials.

Monkey Pox Virus is an orthopoxvirus, which also includes cowpox and smallpox. It is a viral disease occurring in the rain forest of central and west Africa. Monkey pox is milder than smallpox. It was seen in the U.S, June 14, 2003. It was introduced to this country by prairie dogs infected by Gambian rats imported by a distributor of exotic pets. By June 18, 2003, 87 persons in six states were confirmed with the virus.

Tuberculosis XDR-TB is a serious strain that is drug resistant to at least two first-line TB drugs. These patients have a poor prognosis. In a survey conducted by CDC and WHO on data from 2000-2004, XDR-TB has been identified in all regions of the world. It occurs most frequently in countries of the former Soviet Union and Asia. XXDR-TB is a new very serious strain of tuberculosis and is resistant to all first and second line TB drugs. It has been identified in two persons. One was a 19-year old man from Peru who was studying English in Florida. He developed symptoms of TB after arriving in the U.S. He was hospitalized in Ft. Lauderdale, Florida in September 2007 for three months with no improvement. He was transferred to A.G. Holley Hospital for 19 months. He remained on isolation until his discharge in the summer of 2009. The cost to the state of Florida was $500,000.

Current agricultural pandemics/epidemics that are occurring or have the potential of occurring in Anderson County are:

Mad Cow Disease: In the United Kingdom, the country worst affected, more than 179,000 cattle have been infected and 4.4 million slaughtered during the eradication program. Between 460,000 and 482,000 BSE-infected animals had entered the human food chain before controls on high-risk offal were introduced in 1989. After the discovery of the first case of BSE in the U.S. on December 23, 2003, Japan stopped U.S. beef imports. In addition to Japan, 65 nations implemented full or partial restrictions on importing U.S. beef products because of concerns that U.S. testing lacked sufficient rigor. As a result, exports of U.S. beef declined from 1,300,000 metric tons in 2003, before the first mad cow was detected in the U.S., to 322,000 metric tons in 2004.

In humans, Mad Cow Disease is known as new variant Creutzfeldt–Jakob disease (vCJD or nvCJD), and by October 2009, it had killed 166 people in Britain and 44 elsewhere, with the number expected to rise because of the disease's long incubation period.

West Nile Virus (WNV) Less than 1% of humans infected develop meningitis or encephalitis, the most severe forms of the disease, which occur primarily in persons over 50 years of age. Symptoms of encephalitis or meningitis may include severe headache, high fever, neck stiffness, stupor, disorientation, tremors, convulsions, paralysis, coma, and sometimes, death. Tests performed in 2004 on a dead bird confirmed the presence of WNV in Anderson County. No human cases have been reported.

Avian influenza in Birds (AI): Avian flu was first discovered in Canada. It is estimated that 50% of wild ducks in Canada carry various forms of the flu. Highly infectious forms are destructive to domestic poultry causing a rise in food costs. This has a powerful ripple effect of raising costs to processors, grocers and restaurants. Three strains of avian influenza viruses are known to jump the species barrier from birds to non-human animals to humans: A(H9N2), A(H7N7) and A(H5N1). H5N1 is the most lethal.

Fire ants: Unlike many other ants which bite and then spray acid on the wound, fire ants bite only to get a grip, then sting and inject a toxic alkaloid venom called solenopsin. The after-effects of the sting can be deadly to sensitive individuals. These stings can cause blisters and infections, and can even cause anaphylactic shock or death in the most sensitive victims. It is not uncommon for colonies of fire ants to attack and sometimes kill domestic animals, pets, and wildlife. Colonies can destroy entire fields of corn and soybeans. These insects are capable of causing major damage, both in terms of human and animal harm, and in crop damage.

Lyme disease is a biosafety level 2 disease, a potentially serious bacterial infection caused by the bite of an infected deer tick. The disease affects both humans and animals. Early symptoms may include fever, headache, fatigue, depression, and a characteristic circular skin rash called erythema migrans. Left untreated, later symptoms may involve the joints, heart, and central nervous system. Delayed or inadequate treatment can lead to more serious symptoms, which can be disabling and difficult to treat.

Foot and Mouth Disease has been found in Africa, South America, Asia, and parts of Europe in recent years. Currently, North America, Central America, Australia, New Zealand and some countries in Europe are considered free of FMD. The United States has eradicated nine outbreaks of FMD, most recently in 1929.

Plant and Crop related pandemics/epidemics have occurred hundreds of times in the history of the world. Some of the most notable include:

- The potato late blight - Ireland 1845–46 caused a famine and killed 1 million; another million left Ireland.
- Brown spot disease on rice - India 1942-43. Two million died in famine.
- Potato viruses - Australian potato X virus and potato Y virus.
- South American leaf blight in Brazil for years – low sap production.
- Wheat streak and wheat mosaic viruses - Kansas 1950s.
- Leaf blight – U.S. 1970s - destroyed $1 billion worth of corn in southern U.S.

In contrast to typical natural disasters, in which critical components of the physical infrastructure may be threatened or destroyed, an infectious disease outbreak may pose significant threats to the human infrastructure responsible for critical community services due to wide spread absenteeism in the workforce. Examples of such services and personnel in the non-health sector might include highly specialized workers in the public safety, utility, transportation, and food service industries, and will likely vary from jurisdiction to jurisdiction. State and local officials

should identify those services where absenteeism would pose a serious threat to public safety or would significantly interfere with the ongoing response to the outbreak.

An infectious disease outbreak could be perceived as a terrorist attack and cause widespread panic and civil disturbance. This would tax public safety resources.

Influenza occurs every year, and nations attempt to prepare for the "flu season" which brings one to two weeks of symptoms, pneumonia, and even death. The cost in the U.S. is $71 to $167 billion annually. In the U.S, 36,000 and worldwide 250,000 to 300,000 persons die.

In Anderson County, there have been 103 fatalities, 2766 injuries and $301,000 in losses attributed to pandemics/epidemics and agriculture infestations.

Future Probability

The probability of a pandemic affecting Anderson County is low. However should a pandemic occur, vulnerability would be considered high, and the entire county would be equally impacted by human pandemic/epidemic events.

Agriculture infestations have been small problems in the county. The probability for future vector or agriculture infestation incidents is medium, and vulnerability would be medium.

Historic Occurrences

Table 5.31 Historic Pandemic, Epidemic, Infection, Infestation Incidents

Event Date	Location or Map Reference	Extent Description Severity, Type, Area Impacted, Assets Damaged, Evacuation, Etc	Fatalities	Injuries	# Of Assets Damaged	Structure Loss	Other Loss or Cost	
							Amount	Type
1918	Countywide	Spanish Flu pandemic, estimated fatalities/Injuries	40	2000	0	0	0	
1939	Clinton	Typhus Fever outbreak	0	2	0	0	0	
04/12/51	Countywide	Whooping Cough	0	40	0	0	0	
02/14/52	Norris and vicinity	Flu epidemic	0	12	0	0	0	
02/14/56	Clinton	Measles	0	57	0	0	0	
06/20/57	Clinton	Typhoid Fever	0	2	0	0	0	
01/01/57	Countywide	Asian Flu 70,000 US fatalities	30	1000	0	0	0	
05/01/59	Clinton	Hepatitis outbreak	0	45	0	0	0	
01/01/68	Countywide	Hong Kong Flu 34,000 US fatalities	32	200	0	0	0	
12/01/92	Oak Ridge	Clostridium *perfringes* illness	0	42	0	0	0	
1999	Countywide	Pine Beatle Infestation	0	0	0	0	100,000	A
07/2003	Countywide	2 horses died in adjacent counties and birds tested positive for West Nile Virus in Anderson County	0	0	0	0	1,000	A
09/12/03	Knox Co-Oak Ridge	Hepatitis A food contamination	1	70	0	0	200,000	R
02/01/05	Clinton-Oak Ridge	Influenza-schools closed	0	240	0	0	0	
01/02/07	Countywide	Meningitides bacterial meningitis	0	40	0	0	0	
07/14/08	Countywide	Pertusis (whooping cough)	0	12	0	0	0	
2009-10	Countywide	H1N1 Swine Flu	0	4	0	0	0	
17		TOTALS	103	3766	0	0	301,000	
Data Sources	**CDC/Public Health Departments/Local Medical Servers/Agriculture**							
Loss Type	**A=Agriculture, C=Content, E=Equipment, R=Response/Recovery/Cleanup**							

Major Historic Occurrences Discussion

1938: In a handwritten report, the author stated that the county health department vaccinated 2,848 people for typhoid fever, 1,127 for diphtheria, and 814 for small pox to control the diseases. The Anderson County population was about 25,000.

April 12, 1951: There was a whooping cough epidemic. Deaths in the county increased 40% over those in 1950. The population was 59,407.

February 14, 1952: A flu epidemic impacted Norris and surrounding area.

May 14, 1953: Anderson County residents under 20 years old received Polio vaccinations.

June 21, 1956: A measles outbreak infecting 57 people occurred.

June 20, 1957: Two cases of typhoid fever occurred in Anderson County. It was determined that it was caused by drinking water from the Clinch River.

May 1959: Forty-five people were diagnosed with infectious Hepatitis.

December 9, 1992: An outbreak of Clostridium perfringes known as the "buffet" germ occurred at the Oak Ridge Institute of Science and Education. Sixty-five people attended the noon luncheon, 42 of the persons interviewed met case definition for illness. Seven persons agreed to stool culture testing; all tested positive. The next day, 14 employees called in sick.

August 1, 2003: Two horses in adjacent Blount and Hamilton counties were killed by the West Niles virus. The deaths were the first confirmed equine cases in Tennessee this year, according to the state Department of Health. Dead crows from Cocke and Scott counties also tested positive for West Nile. Other cases have been confirmed in Anderson, Campbell, Morgan and Sevier counties. In 2002, 824 birds in 76 counties tested positive for the disease

September 2003: Hepatitis "A" infections occurred in adjacent Knox County at a popular restaurant located along I-40/I-75. There were 70 reported cases. One person died. Knox County implemented its Mass Clinic Plan to administer the immune globulin to 6,000 people in three and one half days. The cost incurred by Knox County was $81,432.64. The State of Tennessee paid the cost of the Hepatitis Immune Globulin, which was about $110,000. The cost to the restaurant in unknown. Loss of work time to the private sector is unknown, as are the costs to surrounding states that had to administer immune globulin.

February 2005: There were over 240 confirmed flu cases in the county.

January 2, 2007: An elderly woman was diagnosed with N. meningitides in a Georgia hospital. She had visited relatives in Norris, Tennessee. A party was given in her honor on December 24, 2006. Forty persons were exposed during her visit. The health department was notified late afternoon on January 4, 2007. The 40 persons were contacted, provided, or offered prophylactic medication that evening.

July 14, 2008: A child was diagnosed with pertussis at Children's Hospital in Knoxville, Tennessee. The child and eight family members were visiting from Ohio. Nasal swabs were obtained on the 3 symptomatic children and the stepfather. All tested positive for whooping cough. Four Anderson County residents were also exposed. The family and four local residents received prophylactic antibiotics.

2009-2010: Swine Flu. Tennessee reported one death. Tennessee Department of Health conducted a strong vaccination campaign. Anderson County Health Department vaccinated 12% of Anderson County's population. Methodist Medical Center and other private providers also vaccinated their employees, employee families, and patients. H1N1 remains a health threat due

to an anticipated second wave of the virus and the number of people who refused to be vaccinated.

June 30, 2009: One Oak Ridge Associated Universities employee has the H1N1 virus, more commonly known as the swine flu.

August 25, 2009: Clinton Elementary School has one reported case of the H1N1. There are at least two suspected cases of the H1N1 flu virus in Oak Ridge schools.

SECTION 6
RISK ASSESSMENT – ASSESSING VULNERABILITY

6.1 INTRODUCTION

This Section 6, Risk Assessment-Assessing Vulnerability provides a vulnerability summary and builds upon the information provided in the hazard profile section. This section summarizes the historic hazards, identifies community assets, identifies the potential impact and amount of damage that could be caused by each profiled hazard, and discusses development trends in Anderson County.

6.1.1 2011 Plan Update

Section 6, Risk Assessment-Assessing Vulnerability is an additional section that replaces the profiling of hazards in Chapter 4, Review: Risk Assessment, of the 2005 Plan. This significant enhancement summarizes critical facilities by jurisdiction, identifies an inventory of current and future "in hazard facilities and populations" by jurisdiction, and contains detailed vulnerability and loss estimates for primary hazards of flooding, high winds, and hazardous materials by jurisdiction. The last item in this section is a discussion of present land use and development trends in Anderson County.

In addition to the data in this section, detailed critical facilities information for each jurisdiction, including jurisdiction maps, is included in the Supporting Annex. The Table below documents the hazards included in the 2005 Plan and their disposition in this Section 6 of the 2011 Hazard Mitigation Plan update.

Table 6.1 Anderson County 2005 Mitigation Plan Hazards/2011 Updated Plan Hazard Status

2011 Hazard	Exp	Risk/Threat	2005 Plan Status	2011 Updated Plan Status
Drought	Poss	Moderate/ Slight	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Earthquake	Poss	Low/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Extreme Temperature	Poss	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Flooding	Prob	Moderate/ High	Identified as Flooding by Thunderstorms, Hurricanes. Some vulnerability assessment	Identified as Tropical Storms/Hurricanes, Thunderstorms, Dam/Levee Failure. Profiled and detailed vulnerability assessment
Hail	Prob	Moderate/ Minimal	Identified under Thunderstorms	Identified/profiled, detailed vulnerability assessment
High Winds	Prob	High/ High	Identified/Profiled as Tornadoes Thunderstorms, Hurricanes. Some vulnerability assessment	Identified as Tropical Storms/Hurricanes, Thunderstorms, Tornadoes. Profiled and detailed vulnerability assessment
Ice/Snow Storms	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Land Subsidence	Prob	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment

Table 6.1 Anderson County 2005 Mitigation Plan Hazards/2011 Updated Plan Hazard Status				
2011 Hazard	**Exp**	**Risk/Threat**	**2005 Plan Status**	**2011 Updated Plan Status**
Landslides Mudslides	Prob	Moderate/ Minimal	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Lightning	Prob	Moderate/ Low	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Wildfires	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Hazardous Materials	Prob	Moderate/ High	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Illegal Meth Labs	Not Rated	Moderate/ Slight	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Terrorism	Poss	Slight/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Urban Fires	Prob	Moderate/ Moderate	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Pandemic	Poss	Low/ High	Identified/profiled, some vulnerability assessment	Identified/profiled, detailed vulnerability assessment
Exp = Possible/Probable, Risk = Probability of Occurrence, Threat = Impact on loss of life and property damage				

6.2 ASSESSING VULNERABILITY METHODOLOGY

Multi-hazard Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
A. Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
B. Does the new or updated plan address the impact of each hazard on the jurisdiction?

CRS Step 5: Assess the Problem Credit is based on what is included in the assessment of vulnerability to the hazards identified. At a minimum the plan must include an overall summary of each hazard and its impact on the community

The vulnerability findings in this section result in an approximation of vulnerability. These estimates should be used to understand relative vulnerability from hazards and the potential losses that may be incurred. Uncertainties are inherent in loss estimation methodology, arising from incomplete scientific knowledge concerning specific hazards and their effects on the environment, incomplete data, and from approximations and simplifications that are necessary to provide a meaningful analysis.

To complete the assessment, each participating entity provided the best available local data. Anderson County Emergency Management then collected data from a variety of sources, including state and federal agencies. Additional work will be done on an ongoing basis to enhance and further improve the accuracy of the baseline established here. It is expected that this vulnerability assessment will continue to be refined through future plan updates as new data and loss estimation methods or tools become available.

Two distinct methodologies were applied to assess the risk for Anderson County. The first, discussed below, includes qualitative analysis that relies on local knowledge and rational decision-making. The second methodology, a quantitative analysis utilizes data from a detailed GIS-based approach using best available critical facility and other local data. When these methodologies are combined, the results are an assessment of potential hazard losses (in dollars). Both methodologies rely upon best available data and technology. The methodologies are

combined to create a "hybrid" approach for assessing hazard vulnerability for Anderson County that allows for some degree of quality control and assurance.

6.2.1 Hazard Event Disaster Declarations

The Table below identifies disaster declarations that included Anderson County.

Table 6.2 Anderson County Disaster Declaration Economic Relief				
Date	Declaration Number	Hazard Incident	Economic Relief	Source
03/93	3095	Snow Storm	$ 150,345	FEMA
02/94	1010	Ice Storm	$ 149,604	FEMA
03/94	1022	Flood	$ 127,472	FEMA
05/95	1057	Flood/Tornadoes	$ 196,682	FEMA
03/97	1167	Flood/Tornadoes	$ 397,684	FEMA
03/97	1171	Tornadoes	$ 36,367	FEMA
01/98	1197	Flood/Winter Storm	$ 147,739	FEMA
04/98	1215	Tornadoes	$ 419,110	FEMA
12/98	1260	Ice Storm	$ 208,329	FEMA
06/00	1331	Tornadoes/Flood	$ 132,639	FEMA
02/02	1408	Severe Flood	$1,841,203	FEMA
11/02	1441	Tornadoes	$ 45,981	FEMA
02/03	1456	Severe Storms/Flood	$ 148,050	FEMA
07/05	3217	Katrina Evacuation		FEMA
12/10	S3039/3055/3065	Drought		USDA
		TOTAL		

6.2.2 Hazard Vulnerability Summary

The table below summarizes the historic hazards that have occurred in Anderson County. It should be noted that economic loss data generally is not available or accurately reported.

Table 6.3 Anderson County Hazard Profile Summary							
Hazard	Incidents	Years	Avg./yr	Fatalities	Injuries	Assets	Asset Loss
Drought	12	98	1 every 8yrs	0	0	4	2,986,466
Earthquake	27	100	1 every 3.7 yrs	0	0	10	46,000
Extreme Temperature	12	92	1 every 7.7 yrs	0	0	4	1,079,631
Flooding-/Trop/Tstm/Front	55	50	1.1 per yr	10	4	6	2,681,593
Hail	63	42	1.5 per yr	0	9	461	538,000
High Wind-Trop//Tstm/Tor	194	58	3.3 per yr	7	36	299	6,454,184
Ice/Snow Storm	50	50	1 per yr	2	1	25	1,912,287
Landslides/Mudslides	114	22	5 per yr	0	0	114	1,899,067
Land Subsidence	7	20	1 every 3 yrs	0	0	5	2,986,340
Lightning	70	62	1.3 per yr	2	3	13	120,000
Wildfires	3272	26	126 per yr	0	0	2539	14,318,000
Hazardous Materials	111	25	4.4 per yr	2	20	101	3,804,574
Illegal Meth Labs	104	11	9.5 per yr	0	254	145	1,067000
Terrorism	64	52	1.2 per yr	3	1	4	4,033,680
Urban Fires	77	42	1.8 per yr	12	38	1227	124,836,700
Pandemics/Vectors	17	102	1 every 7.8 yrs	103	3766	3	301,000
Totals	4178	53	78 incidents per yr	141	4132	4961	169,064,522

The Anderson County Hazard Mitigation Planning Committee designed a Qualitative Methodology hazard rating that relies on historical and anecdotal data, community input, and professional judgment regarding historic and projected future hazard incidents. The qualitative assessment is built around varying degrees and weights of risk values as assigned by the consensus of the Planning Committee. The hazard assessment for Anderson County uses a scoring system based on the below Table.

Table 6.4 Hazard Qualitative Rating Table

Category	0	1	2	3	4	5
Fatalities and Injuries	0 fatalities or injuries	<=4 fatalities or injuries	5 to 15 fatalities or injuries	16 to 49 fatalities or injuries	50 to 99 fatalities or injuries	>100 fatalities or injuries
Economic Loss	No Loss	Less or = than 500K cost	From >500K to = 3Mil cost	From >3 Mil to <=8 Mil cost	From> 8Mil to <=20Mil cost	More than $20Mil cost
Area Impacted	Local no evacuation	Local minimal evacuation	Local some evacuation	1 mile, some evacuation	1 mile, high evacuation	>3 mile and evacuation
Probability of Occurrence	Once every 50 to 100+ years	Once every 20 to 49 years	Once every 7 to 24 years	Once every 1 to 7 years	<= 2 Times a year	More than twice a year
Repetitive Loss	0	1 to 15	16 to 40	41 to 70	71 to 120	>120

The Hazard Mitigation Planning Committee developed the historic and future hazard profile vulnerability assessment tables using the risk table above by assigning a value (1 through 5). In addition, fatalities and injuries were assigned a weighting factor of 3 and economic loss was assigned a weighting factor of 2. The future vulnerability Table assumes a significant incident and increases (over 10 years) in population, facilities, and facility value.

Table 6.5 Anderson County Historic Hazard Profile Vulnerability Assessment

Hazard Event	Fatality and Injury	Economic Loss	Extent or Impact	Probability of Occurrence	Repetitive Loss	Vulnerability Score	Priority
Urban Fires	9	10	2	4	4	29	**1**
Illegal Meth Labs	15	4	1	5	4	29	**2**
Hazardous Materials	9	6	3	5	4	27	**3**
High Wind	9	6	2	5	5	22	**4**
Pandemics/Vectors	15	2	0	2	2	21	**5**
Flooding	6	4	3	3	3	19	**6**
Wildfires	0	8	1	5	5	19	**7**
Terrorism	3	6	3	3	3	18	**8**
Landslides/Mudslides	3	4	1	5	4	17	**9**
Ice/Snow Storm	3	4	2	3	3	15	**10**
Lightning	6	2	0	3	3	14	**11**
Hail	6	2	0	3	3	14	**12**
Land Subsidence	0	4	1	3	1	9	**13**
Drought	0	6	0	2	1	9	**14**
Extreme Temperature	0	4	0	2	1	7	**15**
Earthquake	0	2	0	3	2	7	**16**

Table 6.6 Anderson County Future Hazard Profile Vulnerability Assessment							
Hazard Event	Fatality and Injury	Economic Loss	Extent or Impact	Probability of Occurrence	Repetitive Loss	Vulnerability Score	Priority
Urban Fires	9	10	2	4	4	29	**1**
Hazardous Materials	9	6	4	4	4	27	**2**
High Wind	9	6	0	5	5	25	**3**
Flooding	6	8	3	4	3	24	**4**
Wildfires	3	6	3	5	5	22	**5**
Earthquake	9	8	2	1	1	21	**6**
Pandemics/Vectors	15	2	0	1	1	19	**7**
Terrorism	9	6	1	1	1	18	**8**
Hail	6	4	0	4	3	17	**9**
Landslides/Mudslides	3	4	1	3	4	15	**10**
Illegal Meth Labs	3	2	1	4	4	14	**11**
Ice/Snow Storm	3	4	1	3	2	13	**12**
Lightning	3	2	0	3	4	12	**13**
Land Subsidence	0	6	1	2	1	10	**14**
Extreme Temperature	3	2	1	2	1	9	**15**
Drought	0	4	0	2	1	7	**16**

6.3 VULNERABILITY: REPETITIVE LOSS PROPERTIES

Multi-hazard Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of repetitive loss properties located in the identified hazard areas?

CRS Step 5: Assess the Problem The risk assessment must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively flooded. The community must also address all properties identified in the repetitive loss areas as defined by the community.

The NFIP program tracks properties that file multiple claims of a certain value over a specific period of time, termed Repetitive Loss Properties (RLP) and Severe Repetitive Loss Properties (SRL.

An RLP is defined by FEMA as an NFIP-insured property that, since 1978 and regardless of any changes in ownership during that period, has experienced any of the following:

- Four or more paid losses in excess of $1,000
- Two paid losses in excess of $1,000 within any rolling 10-year period
- Three or more paid losses that equal or exceed the current value of the insured property (FEMA, 2006).

The NFIP is concerned with RLPs because structures that flood frequently strain the National Flood Insurance Fund. In fact, the RLPs are the biggest draw on the Fund. They not only increase the NFIP's annual losses and the need for borrowing, but they drain funds needed to prepare for catastrophic flood events. Community

leaders and residents are also concerned with the RLP problem because residents' lives are disrupted and may be threatened by the continual flooding.

Insurance market analysts insist that by reducing the number of RLPs, actual flood insurance claims will be reduced, and this will both diminish the upward pressure to raise flood insurance rates and stabilize, in the long run, the financial condition of the NFIP. Since 1978, RLPs across the U.S. have cost the NFIP about $2.7 billion. Although RLPs exist in all 50 states, five states (Louisiana, Texas, Florida, North Carolina, and New Jersey) accounted for 63% of all repetitive loss payments from 1978 through 2004. The majority of existing flood-prone structures are residences (not vacation or income-producing homes) "grandfathered" into the NFIP when the program was created. These properties have been repaired multiple times with subsidized flood insurance claim dollars. FEMA estimates that 90% of RLPs were built prior to December 31, 1974, before the preparation of flood insurance rate maps (FIRM) and building codes that adequately reflected the probability of flooding in special flood hazard areas (SFHA). These older, generally less safe pre-FIRM buildings were built before flood hazard risks were fully known and were not constructed to resist floodwaters. Moreover, most of the owners of RLPs pay subsidized rates for flood insurance. FEMA has sought over the years to prioritize RLPs and pursue a variety of insurance and mitigation strategies to stem the disproportionate costs to the NFIP associated with these properties.

An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

c. Has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
d. Has at least two separate claims payments (building payments only), with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.

The long-term goal of the SRL program is to reduce or eliminate NFIP claims. The SRL program will fund mitigation projects which will result in the greatest savings to the National Flood Insurance Fund (NFIF) in the shortest period of time, based on a Benefit-Cost Ratio (BCR) using FEMA-approved methodology to conduct the Benefit-Cost Analysis (BCA).

Participation in this program is voluntary. The SRL program differs from other FEMA mitigation grant programs in that those property owners who decline offers of mitigation assistance will be subject to increases in their insurance premium rates.

In order for local jurisdictions to qualify for hazard mitigation assistance through the Flood Mitigation Assistance Program (FMA), local hazard mitigation plans must include documentation in its mitigation strategy that continued enforcement of applicable flood plain management standards is part of its strategy to reduce flood losses. In addition, a local mitigation plan must include a section in its risk assessment that describes the source of repetitive flooding problems and identifies the number and type (residential, commercial or governmental) of repetitive loss properties in the jurisdiction. This should include the extent of flood depth and damage potential. The table below identifies Repetitive Loss and Severe Repetitive Loss Properties in Anderson County.

Table 6.7 NFIP RLP/SRL Properties								
Flood Location	Type	Total Losses	Insured	Flood Depth	Potential Risk	Flood Type: Out of Banks Storm Water Low Lying	Total Payments	Payment Amounts
Briceville	RLP	2	Y	UNK	H	Out of Banks	2	9,476.03
Briceville	RLP	2	Y	UNK	H	Out of Banks	2	6,207.02
Frost Bottom	RLP	2	Y	UNK	H	Out Of Banks	2	8,146.35
Briceville-acquired via grant	SRL	UNK	Y	UNK	H	Out of Banks	1	54,897.73

6.3.1 Future Structure Vulnerability

The above RLP structures will be considered for elevation above the flood elevation or have the structure area removed from floodplain. Any time development occurs near a floodplain, the jurisdiction ensures that structures are at least two feet above the 100-year flood elevation. Structures proposed to be built in floodplain areas must go through the LOMR process with FEMA, so that they can be removed from floodplain status. Jurisdictions will not allow a structure to be built in a floodplain below the Base Flood Elevation where it could be flooded.

The hazard narratives in the hazard analysis section describe the vulnerability of current structures in existing flood hazards in terms of impact, extent, and future occurrences of flooding.

6.4 VULNERABILITY: IDENTIFYING STRUCTURES

According to FEMA, critical facilities, infrastructure, and systems are those "whose incapacity or destruction would have a debilitating impact on the defense or economic security of a community." These systems include the following eight categories: water systems, gas and oil facilities, telecommunications infrastructure, electrical power systems, banking and financial institutions, transportation networks, government, and emergency services. Anderson County is beginning to maintain a database for critical facilities and infrastructure as its GIS capabilities develop.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?
B. Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

CRS Step 4: Step 4: Assess the Hazard& Step 5: Assess the Problem: For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

All participating municipalities provided a list of critical facilities and or assets within their communities. Anderson County Emergency Management then combined the municipality information with county information to identify all critical assets and structures.

The County's GIS Department and Tax Assessor generated structure values from tax records and other sources. The content value was estimated using the structure value as a basis and the following percentages.

- Residential = 30%
- Government = 40%
- Commercial/Industrial = 50%

For security purposes, the detailed critical facilities tables are located in the Supporting Annex and contain the asset name or description, the type of facility/asset, facility address, time open, capacity, square footage, structure and content value. In addition, the following information is provided.

In Hazard defines whether the facility is within a flood plain or subject to riverine or dam failure flooding, within one mile of a hazardous materials/nuclear facility, within one mile of a rail or roadway carrying hazardous materials, in close proximity to a potential wildland fire area, or can be considered a terrorist target.

Economic Asset defines whether the asset or facility produces significant revenue for the jurisdiction or the loss of the facility would have a negative economic impact on the jurisdiction.

Historic Asset defines whether or not the asset or its contents is of significant historic value.

Emergency Generator identifies if the facility has alternate stand-alone power capability.

Construction defines the material the facility is constructed of: B=Block or Brick, C=Concrete, M=Metal and W=Wood. Only the predominant material is listed.

The table below is a summary table that is extracted from the detailed tables in the Supporting Annex and specifically lists the potentially at-risk buildings or facilities based on the GIS analysis of Anderson County's critical facilities, including federal and state-owned facilities.

Table 6.8 Participating Jurisdictions Critical Facility Summary

Jurisdiction	Total Facilities	Total Sq. Footage	Total Structure Value	Total Content Value	Total Value
Anderson County	48	1612243	1,114,727,923	218,835,000	1,333,562,923
City of Clinton	25	1,918,306	97,886,000	57,743,000	155,629,000
City of Lake City	17	95963	17,505,000	23,230,000	40,735,000
City of Norris	15	1,029,043	1,010,402,000	63,875,000	1,074,277,000
City of Oak Ridge	48	7,711,186	3,198,932,000	762,720,000	3,961,652,000
City of Oliver Springs	10	52,416	7,802,400	20,700,000	28,502,400
Totals	163	12,419,157	5,447,255,323	1,147,103,000	6,594,358,323

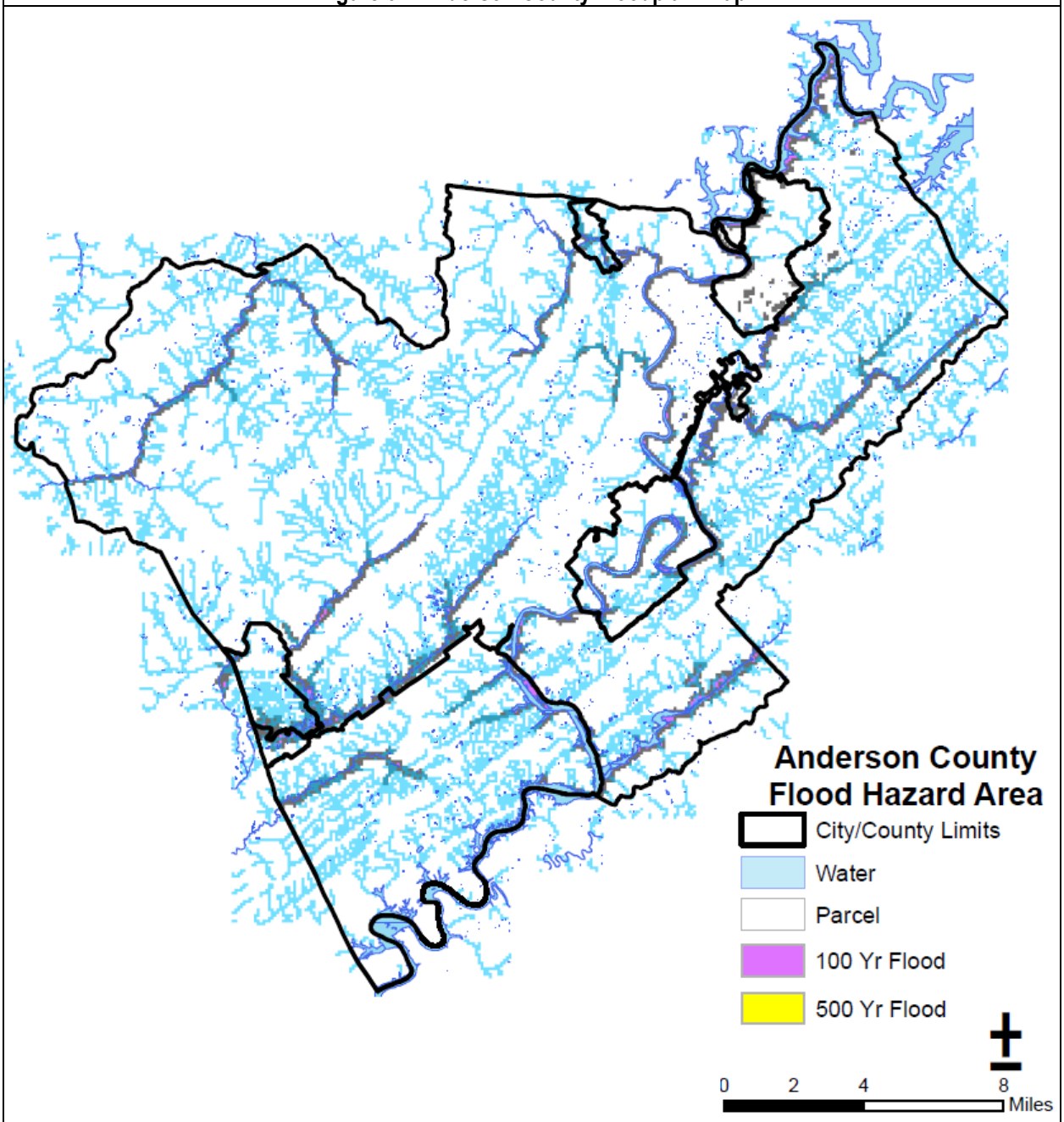
6.4.1 Total 500-Year Flood Hazard Asset Inventory

Incident population and structure/asset information is collected using a GIS system and information from the county property tax assessor and is based on the floodplain map below.

Table 6.9 Anderson County Flood Incident Asset Inventory Summary

Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	8463	75,129	11.26%	14387	78,885	18.25%
Commercial/Ind	180	1,749	10.29%	252	2099	12.01%
Government/NP	186	1298	14.33%	186	1428	13.03%
Residences	1601	27007	5.93%	2402	37810	6.35%
Total	1967	30054	6.54%	2839.5	41336.4	6.87%
Structure Value						
Commercial/Ind	$128,776,000	$836,638,300	15.39%	$167,408,800	$1,003,965,960	16.67%
Government/NP	$64,693,500	$218,412,100	29.62%	$77,632,200	$240,253,310	32.31%
Residences	$174,554,500	$2,676,098,900	6.52%	$296,742,650	$4,014,148,350	7.39%
Total	$368,024,000	$3,731,149,300	9.86%	$541,783,650	$5,258,367,620	10.30%

Figure 6.1 Anderson County Floodplain Map



Source: Anderson County GIS

6.4.2 Jurisdiction Hazard Asset Inventory

For the purpose of vulnerability analysis, the Anderson County Mitigation Planning Committee divided the profiled hazards into Primary and Secondary classes.

6.4.2.1 Primary Hazards

Although Urban Fires is rated the highest hazard, significant mitigation is in place or planned for this hazard. Based on historical and projected future incidents, the remaining three hazards considered high-impact hazards are Flooding, High Wind, and a significant Hazardous Materials incident.

For high wind and hazardous materials incidents where a specific geographical location cannot be identified, hypothetical locations are identified. For a high wind incident, an F4 tornado 300 yards wide and one mile long was predicted, with the center point being the courthouse of a jurisdiction. For a hazardous materials incident, either a Tier II facility or a transportation point on a highway or railroad was selected as a hypothetical center point of the incident.

For flooding incidents, an identified geographic location is defined using 500 year flood plain maps.

The tables and maps below identify current and estimated future population and structures in each jurisdiction that could be impacted by the three primary hazards, including a populated area and a Tier II facility in rural Anderson County. These are also used in the vulnerability loss calculations.

6.4.2.2 Secondary Hazards

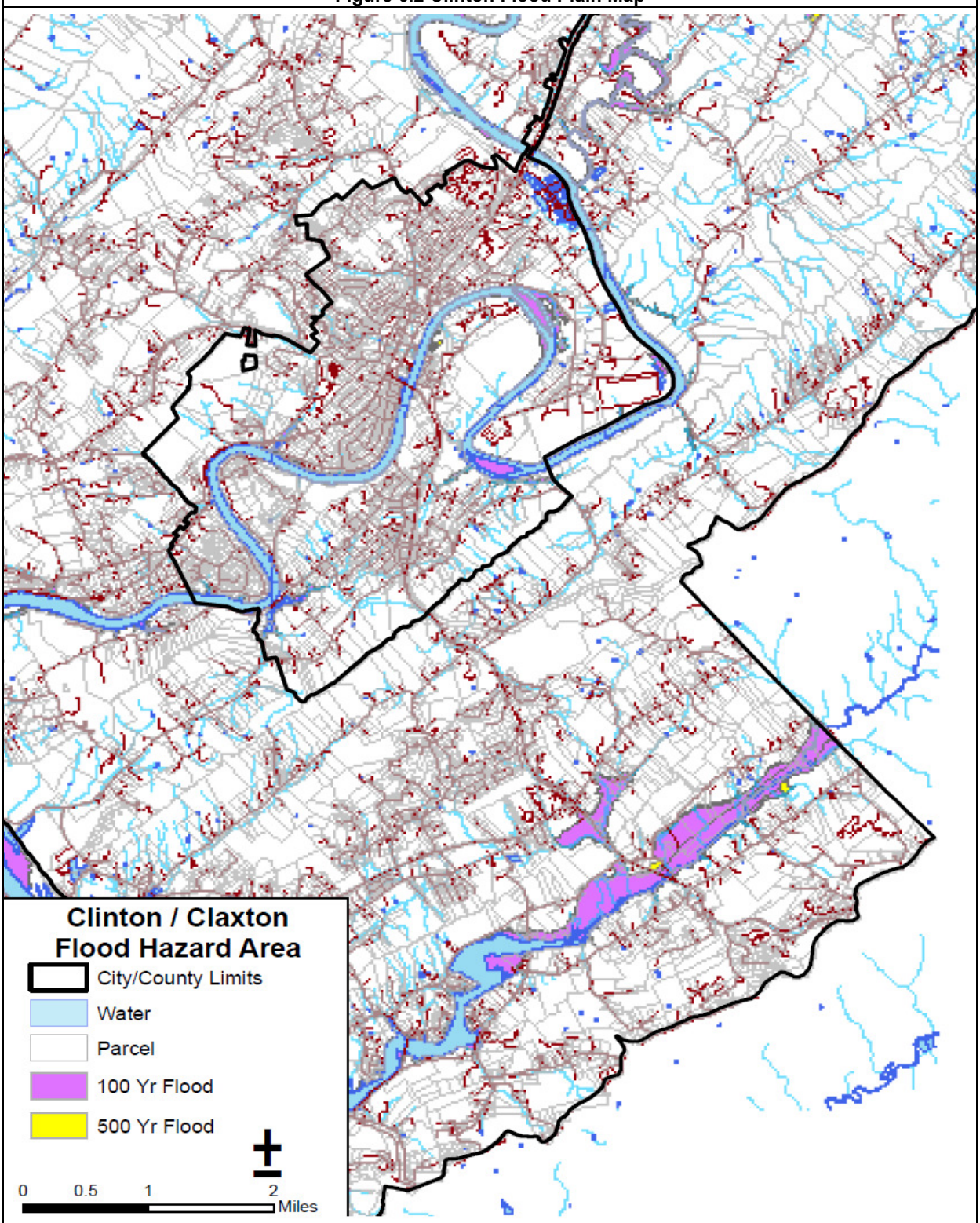
The remaining hazards are considered secondary hazards. Each secondary hazard has a narrative identifying the possible impact on Anderson County and its communities. These hazards are identified in the table below.

Table 6.10 Secondary Hazards

Natural Hazards	Technological or Manmade Hazards
Drought	Illegal Methamphetamine Laboratories
Earthquake	Terrorism
Extreme temperature	Pandemic
Hail	
Lightning	
Ice/Snow	
Landslides/Mudslides	
Land Subsidence	
Wildland Fires	

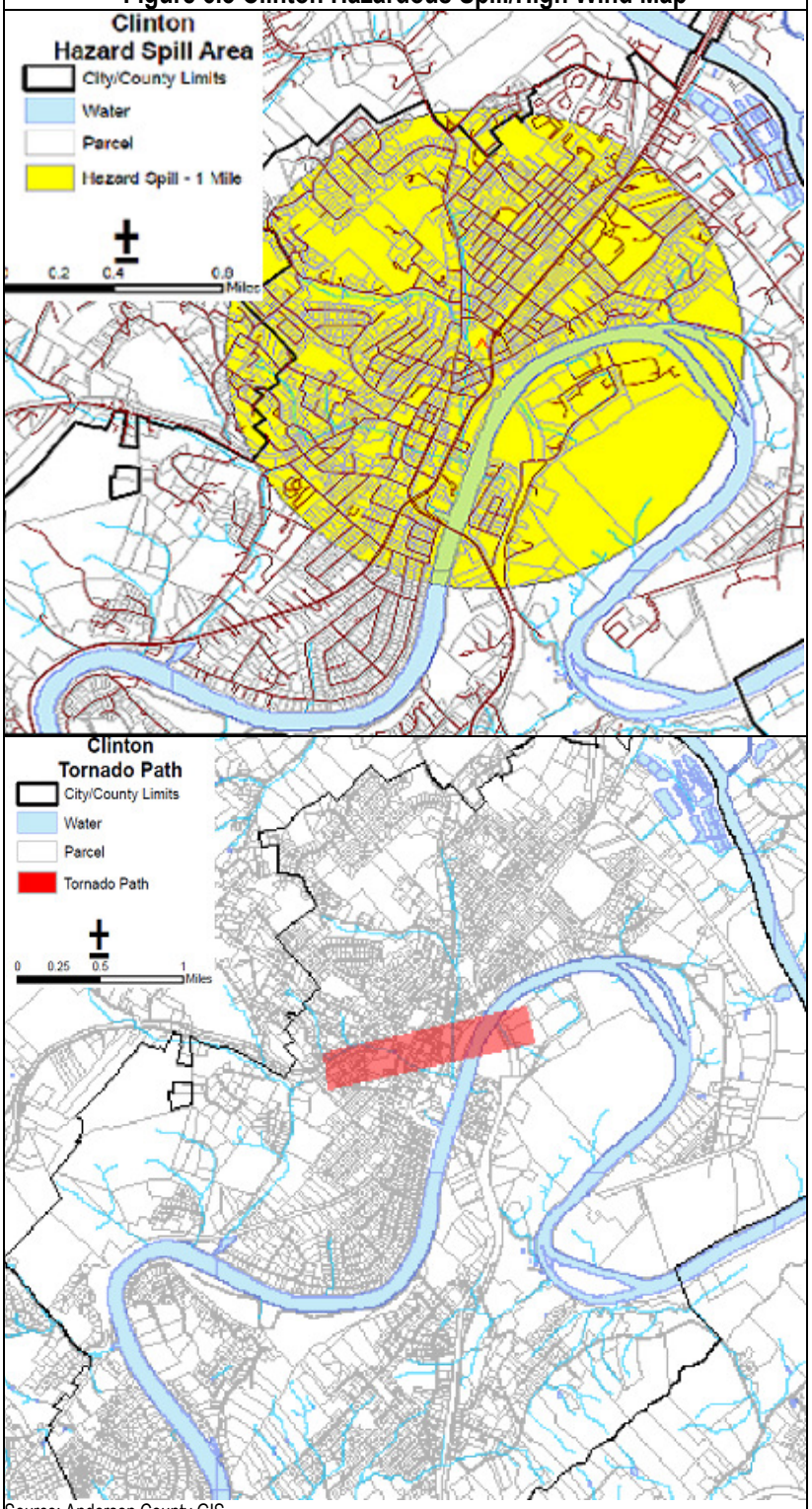
The following maps and tables detail the results of the vulnerability analysis for each jurisdiction if impacted by the primary hazards identified as flooding, high wind, and hazardous materials incidents.

Figure 6.2 Clinton Flood Plain Map



Source: Anderson County GIS

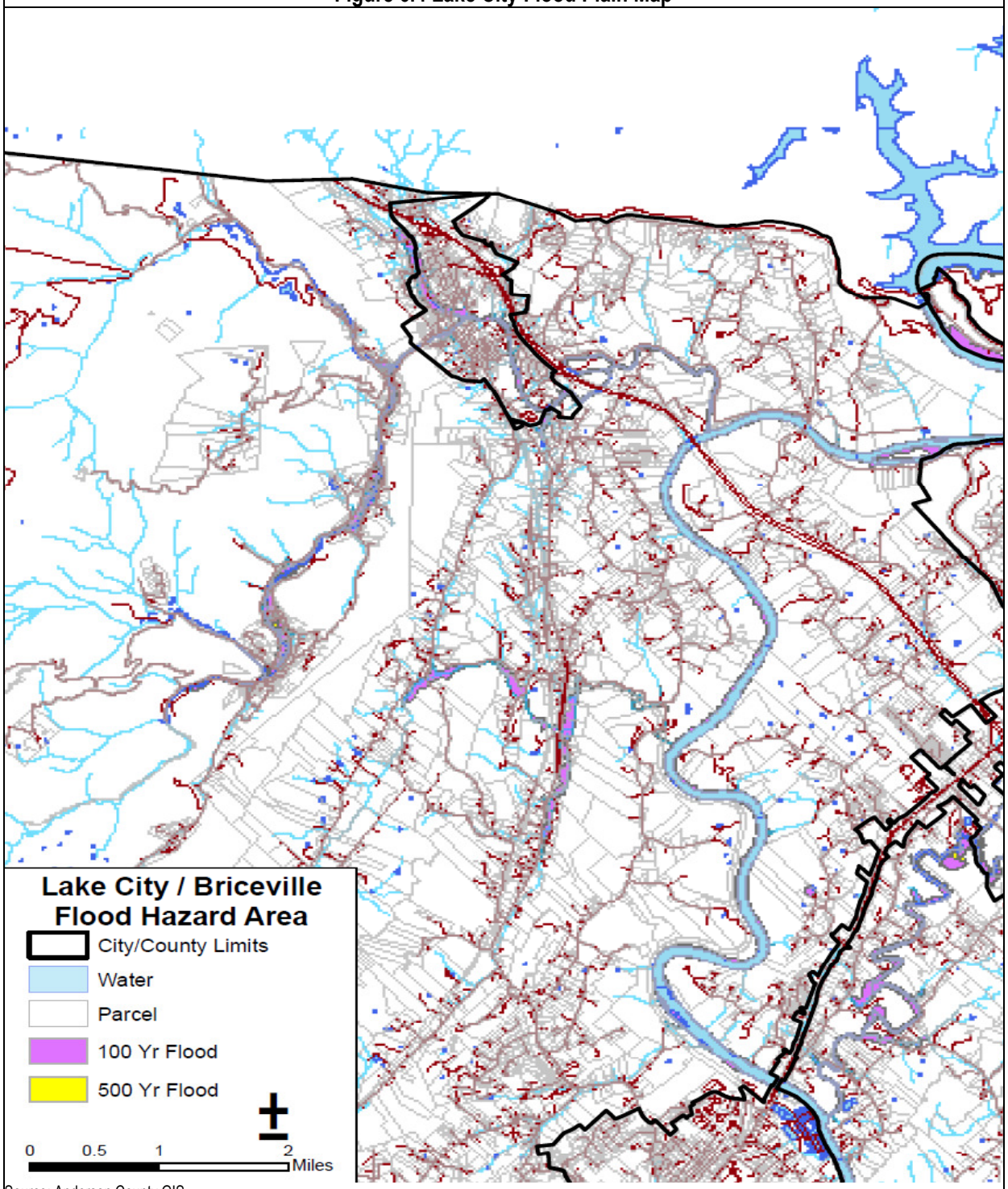
Figure 6.3 Clinton Hazardous Spill/High Wind Map



Source: Anderson County GIS

Table 6.11 Clinton Asset Inventory Summary						
500 Year Flood						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	1430	9,705	14.73%	1573	10467	15.03%
Commercial/Ind	22	398	5.53%	24	458	5.29%
Government/NP	22	181	12.15%	22	208	10.57%
Residences	110	3097	3.55%	132	3407	3.87%
Total	154	3676	4.19%	178	4073	4.38%
Structure Value						
Commercial/Ind	$1,252,550	241,282,000	0.52%	$1,503,060	$277,474,300	0.54%
Government/NP	$851,390	78,119,600	1.09%	$1,021,668	$89,837,540	1.14%
Residences	$7,615,590	334,638,400	2.28%	$9,138,708	$384,834,160	2.37%
Total	$9,719,530	654,040,000	1.49%	$11,663,436	$752,146,000	1.55%
High Wind Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	900	9,705	9.27%	1080	10942	9.87%
Commercial/Ind	33	398	8.29%	40	458	8.65%
Government/NP	8	181	4.42%	10	208	4.61%
Residences	66	3,097	2.13%	79	3562	2.22%
Total	107	3676	2.91%	128	4227	3.04%
Structure Value						
Commercial/Ind	$15,824,400	$241,282,000	6.56%	$18,989,280	$277,474,300	6.84%
Government/NP	$19,007,400	$78,119,600	24.33%	$22,808,880	$89,837,540	25.39%
Residences	$4,278,800	$334,638,400	1.28%	$5,134,560	$384,834,160	1.33%
Total	$39,110,600	$654,040,000	5.98%	$46,932,720	$752,146,000	6.24%
Hazardous Materials Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	4,700	9,705	48.42%	5124	10942	46.82%
Commercial/Ind	204	398	51.26%	245	458	53.48%
Government/NP	120	181	66.30%	144	208	69.18%
Residences	1486	3,097	47.98%	1783	3562	50.07%
Total	1810	3097	58.44%	2172	4227	51.38%
Structure Value						
Commercial/Ind	$71,684,700	$241,282,000	29.71%	$86,021,640	$277,474,300	31.00%
Government/NP	$20,568,600	$78,119,600	26.33%	$24,682,320	$89,837,540	27.47%
Residences	$120,568,600	$334,638,400	36.03%	$144,682,320	$384,834,160	37.60%
Total	$212,821,900	$654,040,000	32.54%	$255,386,280	$752,146,000	33.95%

Figure 6.4 Lake City Flood Plain Map



Source: Anderson County GIS

Figure 6.5 Lake City Hazardous Spill/High Wind Map

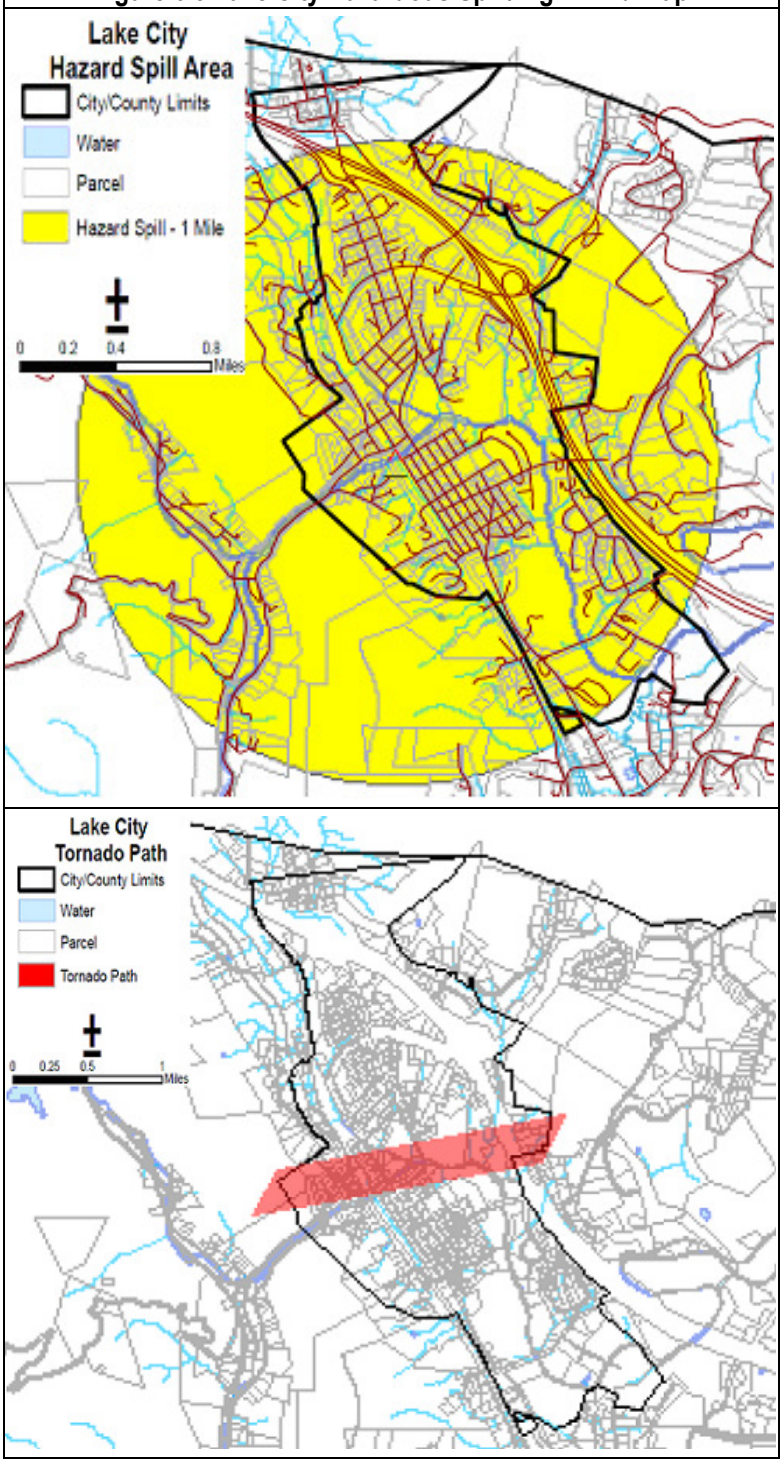
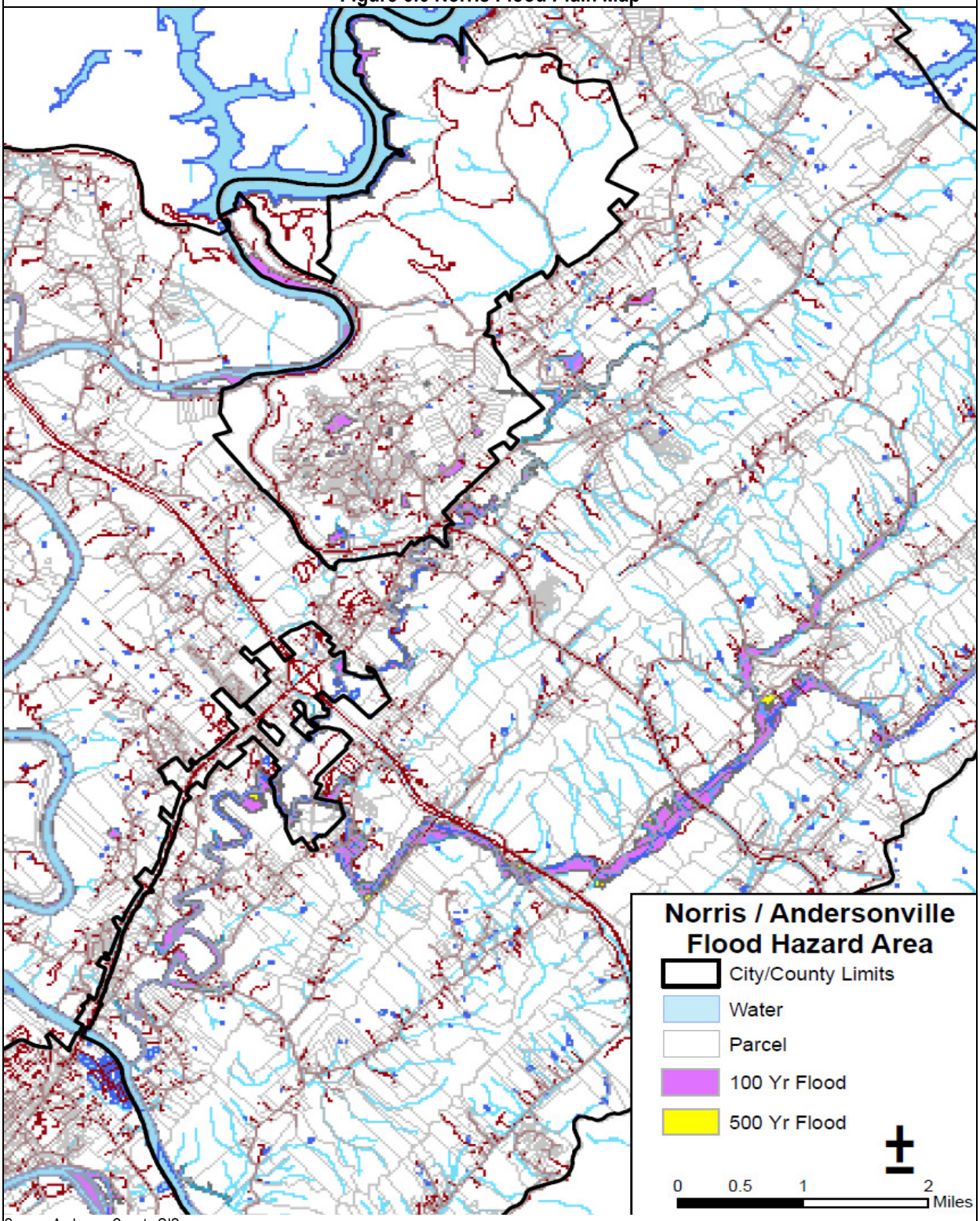


Table 6.12 Lake City Asset Inventory Summary						
500 Year Flood						
Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	1175	1,781	65.97%	1410	2048	68.84%
Commercial/Ind	11	93	11.83%	13	107	12.34%
Government/NP	18	105	17.14%	22	121	17.89%
Residences	105	494	21.26%	126	568	22.18%
Total	134	692	19.36%	161	796	20.21%
Structure Value						
Commercial/Ind	$3,991,000	$78,365,820	5.09%	$4,789,200	$90,120,693	5.31%
Government/NP	$5,298,100	$38,148,860	13.89%	$6,357,720	$43,871,189	14.49%
Residences	$2,809,400	$123,819,190	2.27%	$3,371,280	$142,392,069	2.37%
Total	$12,098,500	$240,333,870	5.03%	$14,518,200	$276,383,951	5.25%
High Wind Incident						
Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	570	1,781	32.00%	684	2048	33.40%
Commercial/Ind	13	93	13.98%	16	107	14.59%
Government/NP	6	105	5.71%	7	121	5.96%
Residences	52	494	10.53%	62	568	10.98%
Total	71	692	10.26%	85	796	10.71%
Structure Value						
Commercial/Ind	$838,600	$78,365,820	1.07%	$1,006,320	$90,120,693	1.12%
Government/NP	$6,399,100	$38,148,860	16.77%	$7,678,920	$43,871,189	17.50%
Residences	$2,874,400	$123,819,190	2.32%	$3,449,280	$142,392,069	2.42%
Total	$10,112,100	$240,333,870	4.21%	$12,134,520	$276,383,951	4.39%
Hazardous Materials Incident						
Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	7840	1,781	440.20%	9408	2048	459.34%
Commercial/Ind	104	93	111.83%	125	107	116.69%
Government/NP	114	105	108.57%	137	121	113.29%
Residences	676	494	136.84%	811	568	142.79%
Total	894	692	129.19%	1073	796	134.81%
Structure Value						
Commercial/Ind	$22,378,500	$78,365,820	28.56%	$26,854,200	$90,120,693	29.80%
Government/NP	$11,927,500	$38,148,860	31.27%	$14,313,000	$43,871,189	32.63%
Residences	$37,346,700	$123,819,190	30.16%	$44,816,040	$142,392,069	31.47%
Total	$71,652,700	$240,333,870	29.81%	$85,983,240	$276,383,951	31.11%

Figure 6.6 Norris Flood Plain Map



Source: Anderson County GIS

Figure 6.7 Norris Hazardous Spill/High Wind Map

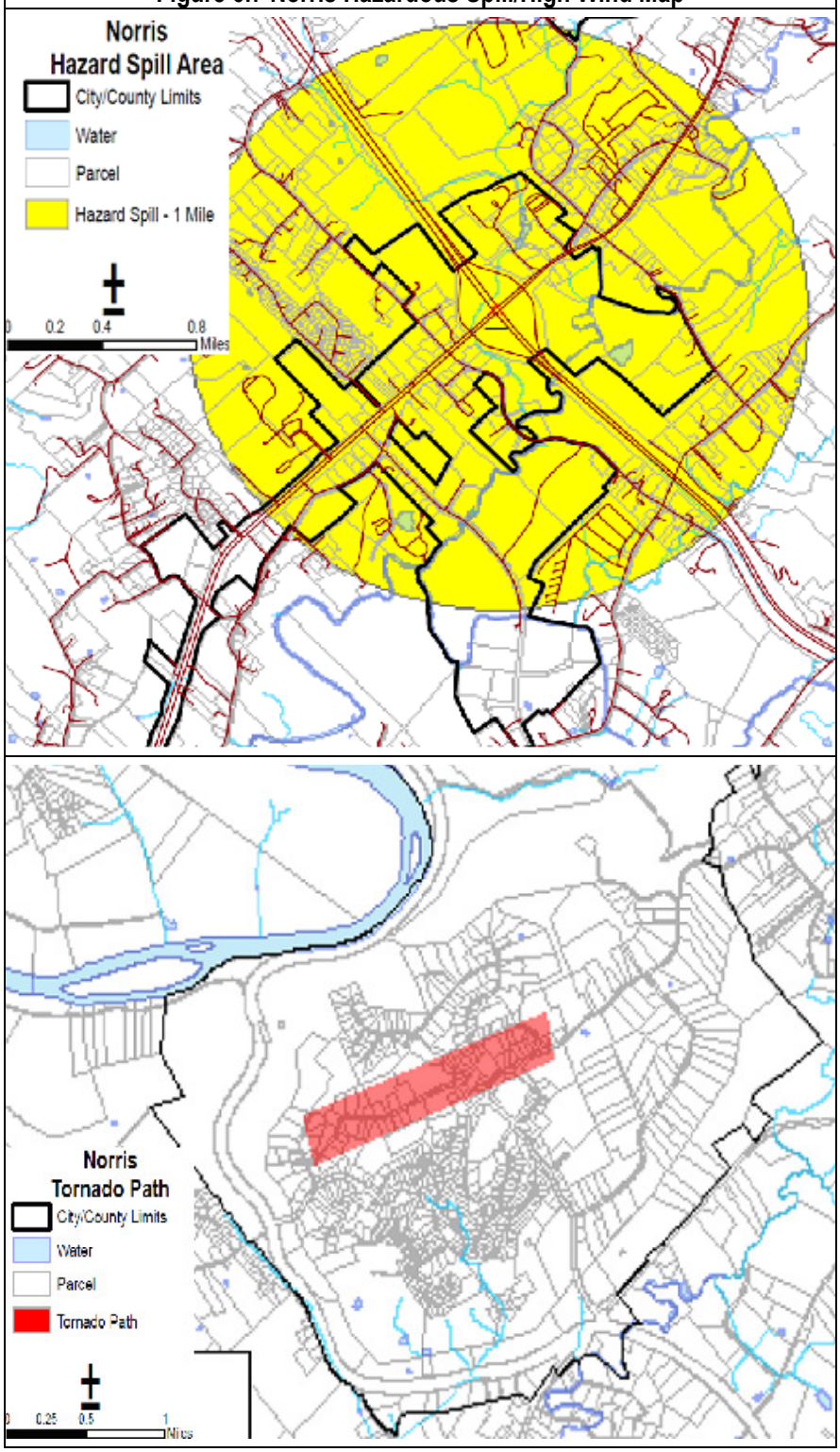
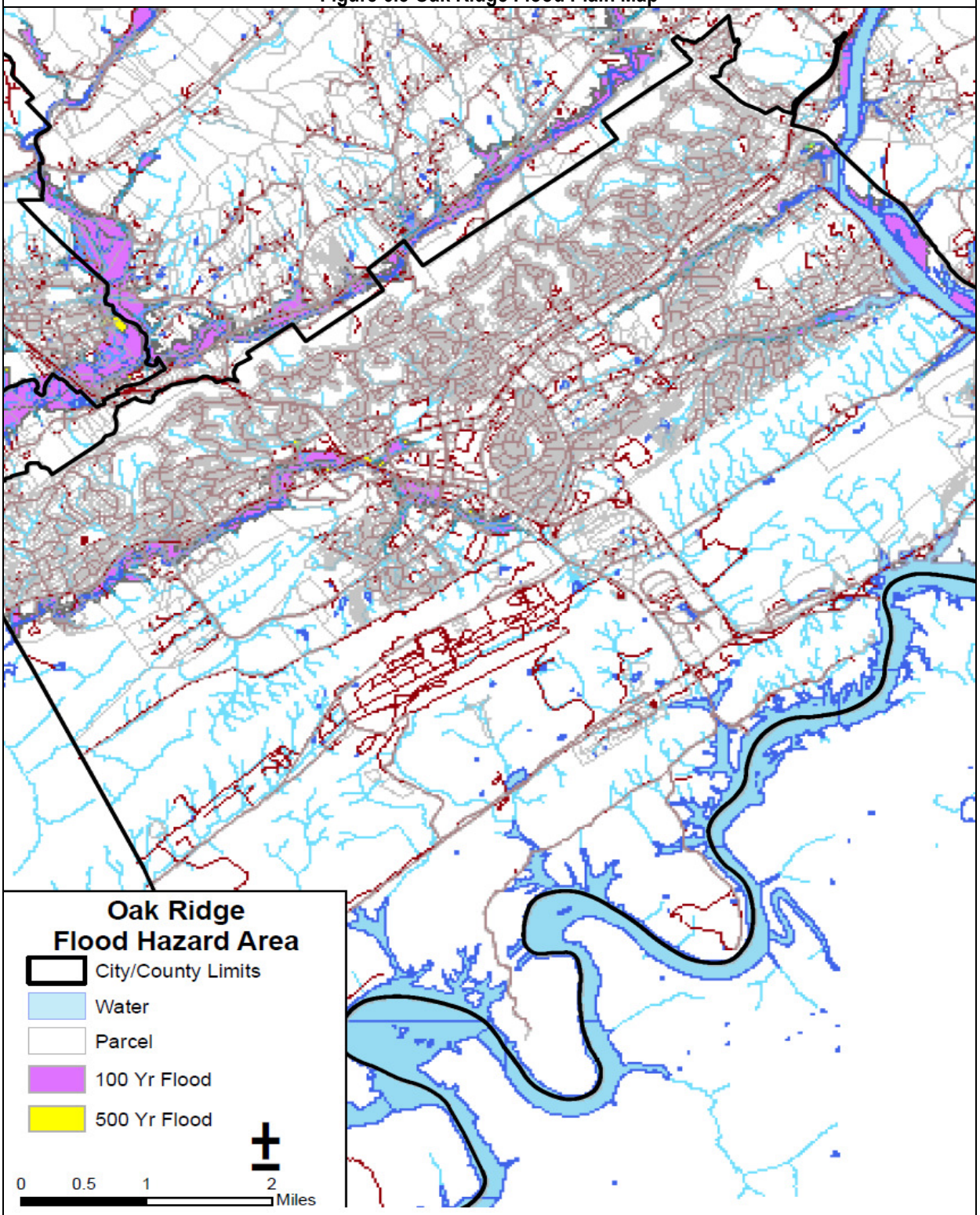


Table 6.13 Norris Asset Inventory Summary						
500 Year Flood						
Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	425	1,491	28.50%	510	1715	29.74%
Commercial/Ind	2	22	9.09%	2	25	9.49%
Government/NP	6	37	16.22%	7	43	16.92%
Residences	45	738	6.10%	54	849	6.36%
Total	53	797	6.65%	64	917	6.94%
Structure Value						
Commercial/Ind	$1,256,900	$31,306,630	4.01%	$1,508,280	$36,002,625	4.19%
Government/NP	$115,400	$5,915,350	1.95%	$138,480	$6,802,653	2.04%
Residences	$8,540,300	$95,455,880	8.95%	$10,248,360	$109,774,262	9.34%
Total	$9,912,600	$132,677,860	7.47%	$11,895,120	$152,579,539	7.80%
High Wind Incident						
Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	435	1,491	29.18%	522	1715	30.44%
Commercial/Ind	3	22	13.64%	4	25	14.23%
Government/NP	1	37	2.70%	1	43	2.82%
Residences	75	738	10.16%	90	849	10.60%
Total	79	797	9.91%	95	917	10.34%
Structure Value						
Commercial/Ind	$1,742,000	$31,306,630	5.56%	$2,090,400	$36,002,625	5.81%
Government/NP	$2,515,700	$5,915,350	42.53%	$3,018,840	$6,802,653	44.38%
Residences	$15,240,900	$95,455,880	15.97%	$18,289,080	$109,774,262	16.66%
Total	$19,498,600	$132,677,860	14.70%	$23,398,320	$152,579,539	15.34%
Hazardous Materials Incident						
Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	3280	1,491	219.99%	3936	1715	229.55%
Commercial/Ind	67	22	304.55%	80	25	317.79%
Government/NP	19	37	51.35%	23	43	53.58%
Residences	408	738	55.28%	490	849	57.69%
Total	494	797	61.98%	593	917	64.68%
Structure Value	561923					
Commercial/Ind	$56,192,300	$31,306,630	179.49%	$67,430,760	$36,002,625	187.29%
Government/NP	$47,290,300	$5,915,350	799.45%	$56,748,360	$6,802,653	834.21%
Residences	$38,401,600	$95,455,880	40.23%	$46,081,920	$109,774,262	41.98%
Total	$141,884,200	$132,677,860	106.94%	$170,261,040	$152,579,539	111.59%

Figure 6.8 Oak Ridge Flood Plain Map



Source: Anderson County GIS

Figure 6.9 Oak Ridge Hazardous Spill/High Wind Map

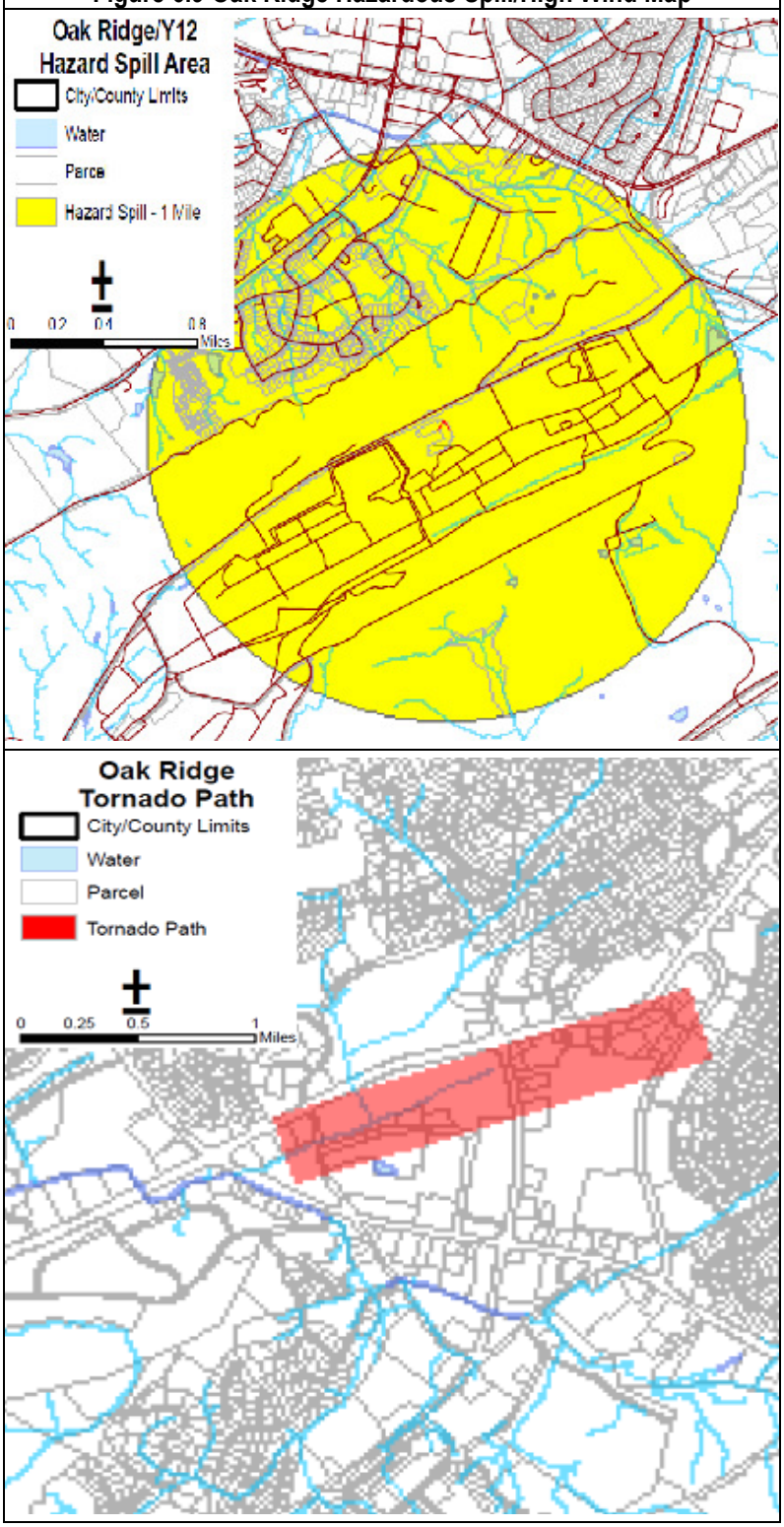
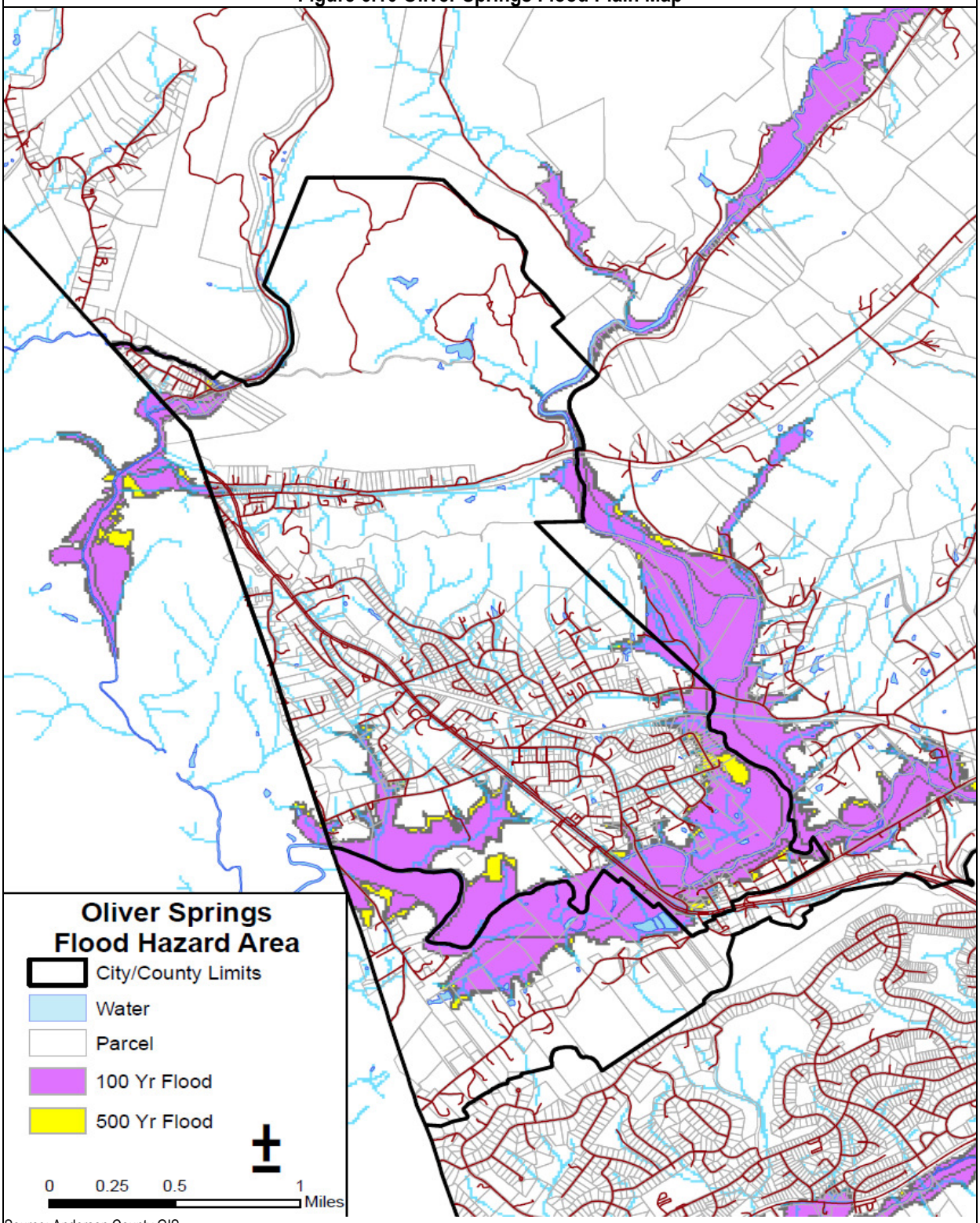


Table 6.14 Oak Ridge Asset Inventory Summary						
500 Year Flood						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	3380	29,330	11.52%	4056	33730	12.03%
Commercial/Ind	88	929	9.47%	106	1068	9.88%
Government/NP	56	395	14.18%	67	454	14.79%
Residences	164	5196	3.16%	197	5975	3.29%
Total	308	6520	4.72%	370	7498	4.93%
Structure Value						
Commercial/Ind	$55,000,800	$179,712,230	30.60%	$66,000,960	$206,669,065	31.94%
Government/NP	$8,746,500	$21,722,240	40.27%	$10,495,800	$24,980,576	42.02%
Residences	$29,251,100	$919,525,440	3.18%	$35,101,320	$1,057,454,256	3.32%
Total	$92,998,400	$1,120,959,910	8.30%	$111,598,080	$1,289,103,897	8.66%
High Wind Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	320	29,330	1.09%	384	33730	1.14%
Commercial/Ind	26	929	2.80%	31	1068	2.92%
Government/NP	2	395	0.51%	2	454	0.53%
Residences	0	5,196	0.00%	0	5975	0.00%
Total	28	6520	0.43%	34	7498	0.45%
Structure Value						
Commercial/Ind	$21,214,600	$179,712,230	11.80%	$25,457,520	$206,669,065	12.32%
Government/NP	$1,425,400	$21,722,240	6.56%	$1,710,480	$24,980,576	6.85%
Residences	$0	$919,525,440	0.00%	$0	$1,057,454,256	0.00%
Total	$22,640,000	$1,120,959,910	2.02%	$27,168,000	$1,289,103,897	2.11%
Hazardous Materials Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	2610	29,330	8.90%	3132	33730	9.29%
Commercial/Ind	41	929	4.41%	49	1068	4.61%
Government/NP	27	395	6.84%	32	454	7.13%
Residences	278	5,196	5.35%	334	5975	5.58%
Total	346	6520	5.31%	415.2	7498	5.54%
Structure Value						
Commercial/Ind	$112,613,400	$179,712,230	62.66%	$135,136,080	$206,669,065	65.39%
Government/NP	$6,812,800	$21,722,240	31.36%	$8,175,360	$24,980,576	32.73%
Residences	$18,027,900	$919,525,440	1.96%	$21,633,480	$1,057,454,256	2.05%
Total	$137,454,100	$1,120,959,910	12.26%	$164,944,920	$1,289,103,897	12.80%

Figure 6.10 Oliver Springs Flood Plain Map



Source: Anderson County GIS

Figure 6.11 Oliver Springs Hazardous Spill/High Wind Map

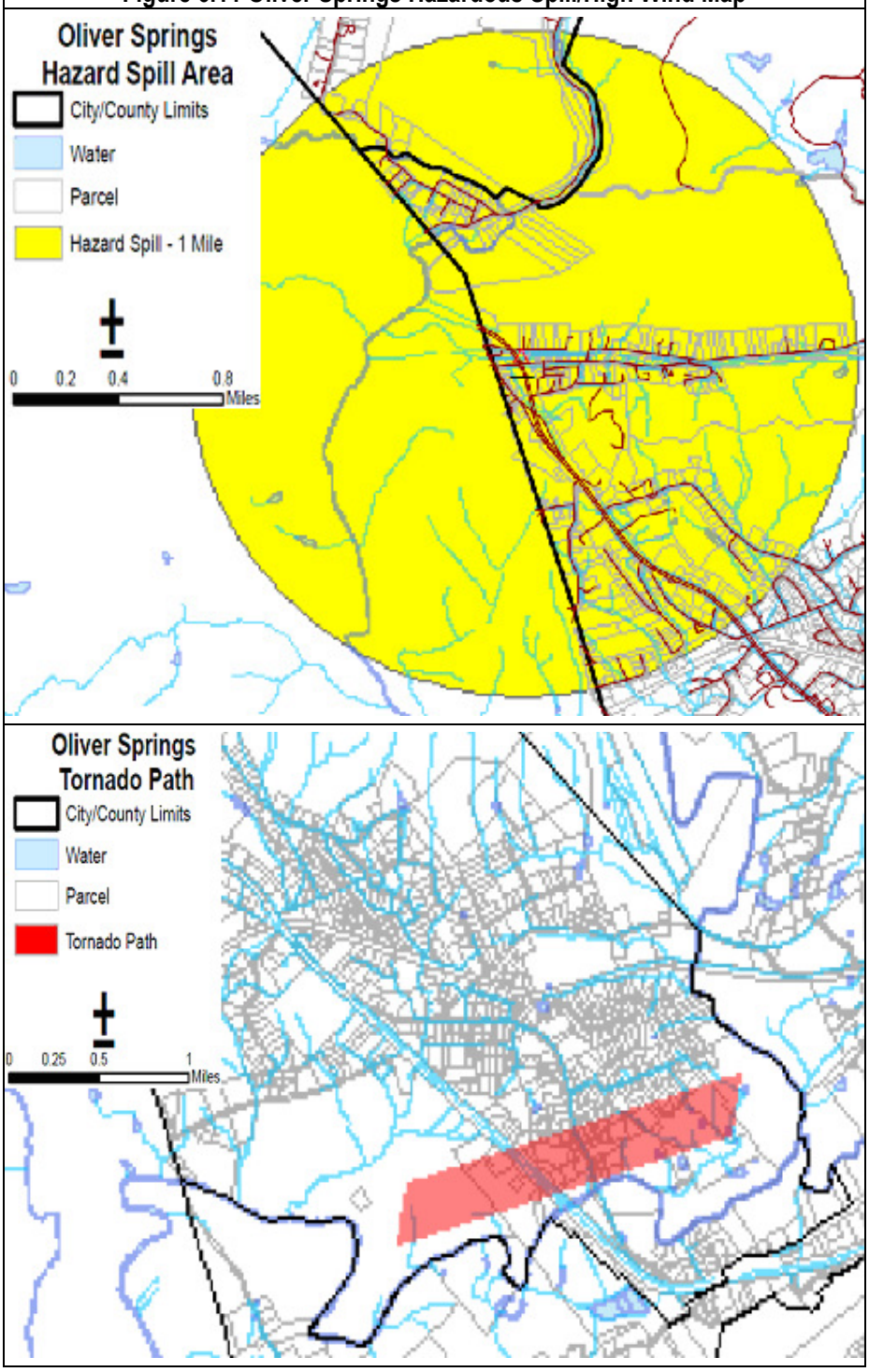
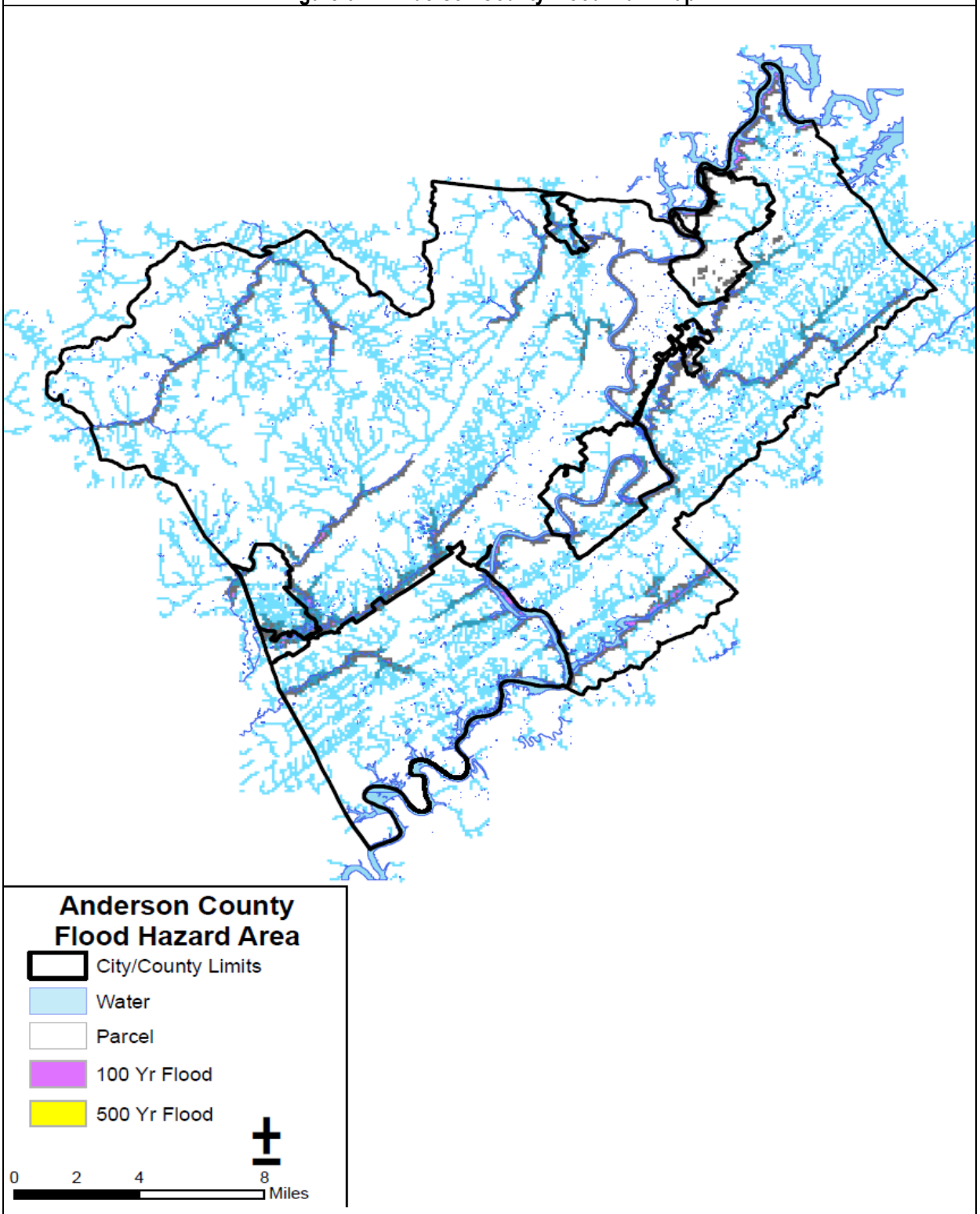


Table 6.15 Oliver Springs Asset Inventory Summary						
500 Year Flood						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	1080	3,231	33.43%	1188	3231	36.77%
Commercial/Ind	20	87	22.99%	22	100	21.99%
Government/NP	4	31	12.90%	4	36	12.34%
Residences	152	937	16.22%	167	1078	15.52%
Total	176	1055	16.68%	194	1213	15.96%
Structure Value						
Commercial/Ind	$3,624,800	$49,104,070	7.38%	$4,349,760	$56,469,681	7.70%
Government/NP	$3,600,000	$18,175,220	19.81%	$4,320,000	$20,901,503	20.67%
Residences	$11,883,300	$279,579,660	4.25%	$14,259,960	$321,516,609	4.44%
Total	$19,108,100	$346,858,950	0.05509	$21,018,910	$381,544,845	5.51%
High Wind Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	380	3,231	11.76%	456	3231	14.11%
Commercial/Ind	11	87	12.64%	13	100	13.19%
Government/NP	2	31	6.45%	2	36	6.73%
Residences	42	937	4.48%	50	1078	4.68%
Total	55	1055	5.21%	66	1213	5.44%
Structure Value						
Commercial/Ind	$5,211,600	$49,104,070	10.61%	$6,253,920	$56,469,681	11.07%
Government/NP	$2,600,000	$18,175,220	14.31%	$3,120,000	$20,901,503	14.93%
Residences	$3,069,000	$279,579,660	1.10%	$3,682,800	$321,516,609	1.15%
Total	$10,880,600	$346,858,950	0.03137	$11,968,660	$381,544,845	3.14%
Hazardous Materials Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	2270	3,231	70.26%	2724	3231	84.31%
Commercial/Ind	32	87	36.78%	38	100	38.38%
Government/NP	19	31	61.29%	23	36	63.96%
Residences	276	937	29.46%	331	1078	30.74%
Total	327	1055	31.00%	392	1213	32.34%
Structure Value						
Commercial/Ind	$4,553,700	$49,104,070	9.27%	$5,464,440	$56,469,681	9.68%
Government/NP	$4,321,800	$18,175,220	23.78%	$5,186,160	$20,901,503	24.81%
Residences	$18,778,900	$279,579,660	6.72%	$22,534,680	$321,516,609	7.01%
Total	$27,654,400	$346,858,950	7.97%	$30,419,840	$381,544,845	7.97%

Figure 6.12 Anderson County Flood Plain Map



Source: Anderson County GIS

Figure 6.13 Unincorporated Anderson County Hazmat Spill/High Wind Map

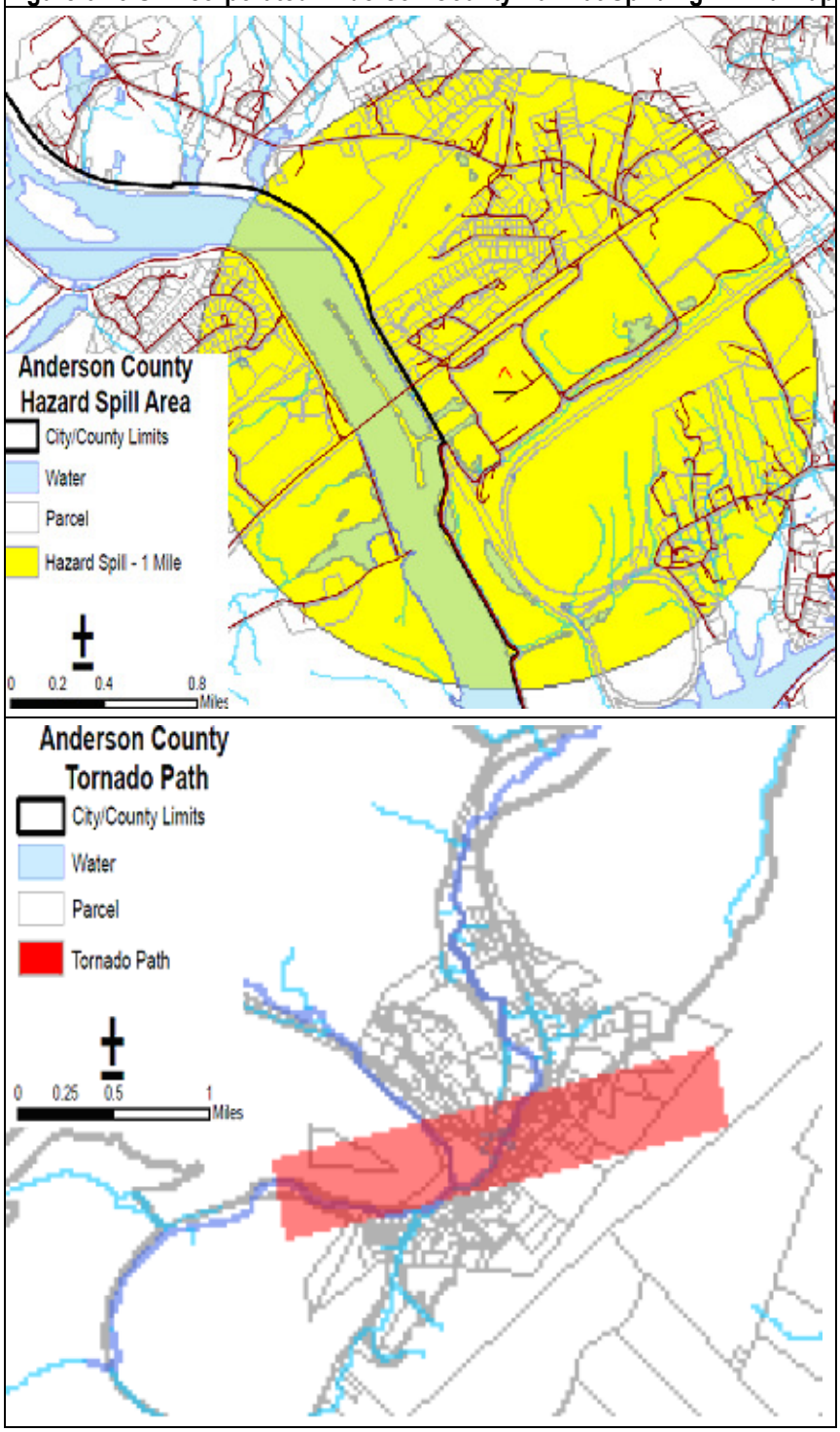


Table 6.16 Anderson Unincorporated Asset Inventory Summary						
500 Year Flood						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	8165	33,012	24.73%	10615	39614	26.79%
Commercial/Ind	37	220	16.82%	41	264	15.42%
Government/NP	80	549	14.57%	80	604	13.25%
Residences	1079	12815	8.42%	1403	15378	9.12%
Total	1,196	13,584	8.80%	1,523	16,246	9.38%
Structure Value						
Commercial/Ind	$12,965,600	$54,439,300	23.82%	$14,262,160	$65,327,160	21.83%
Government/NP	$12,965,600	$34,789,200	37.27%	$14,262,160	$38,268,120	37.27%
Residences	$104,037,900	$1,174,449,300	8.86%	$119,643,585	$1,291,894,230	9.26%
Total	$129,969,100	$1,263,677,800	10.28%	$148,167,905	$1,395,489,510	10.62%
High Wind Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	595	33,012	1.80%	714	39614	1.80%
Commercial/Ind	2	220	0.91%	2	264	0.91%
Government/NP	10	549	1.82%	12	659	1.82%
Residences	55	12,815	0.43%	66	15378	0.43%
Total	67	13,584	0.49%	80	16,301	0.49%
Structure Value						
Commercial/Ind	$162,700	$54,439,300	0.30%	$195,240	$65,327,160	0.30%
Government/NP	$174,200	$34,789,200	0.50%	$209,040	$41,747,040	0.50%
Residences	$1,771,400	$1,174,449,300	0.15%	$2,125,680	$1,409,339,160	0.15%
Total	$2,108,300	$1,263,677,800	0.17%	$2,529,960	$1,516,413,360	0.17%
Hazardous Materials Incident						
Population Structure Count	**In Hazard Current**	**In Jurisdiction Current**	**Percent**	**In Hazard (10yr Projection**	**In Jurisdiction Projected**	**Percent Projected**
Population	2590	33,012	7.85%	3108	39614	7.85%
Commercial/Ind	3	220	1.36%	4	264	1.36%
Government/NP	39	549	7.10%	47	659	7.10%
Residences	278	12,815	2.17%	334	15378	2.17%
Total	320	13584	2.36%	384	16,301	2.36%
Structure Value						
Commercial/Ind	$417,000	$54,439,300	0.77%	$500,400	$65,327,160	0.77%
Government/NP	$6,024,200	$34,789,200	17.32%	$7,229,040	$41,747,040	17.32%
Residences	$47,230,600	$1,174,449,300	4.02%	$56,676,720	$1,409,339,160	4.02%
Total	$53,671,800	$1,263,677,800	4.25%	$64,406,160	$1,516,413,360	4.25%

6.4.3 Asset Inventory For Secondary Hazards

This section of the 2011 Plan update describes the Anderson County current and future assets that may be impacted by secondary hazards.

6.4.3.1 Asset Inventory for Countywide Hazards

The secondary hazards that may have a countywide impact are Drought, Earthquake, Extreme Temperatures, Ice/Snow or a Panemic.

The table below identifies the current countywide assets and an estimate of future (10 years) value of those assets.

Table 6.17 Anderson County Countywide Hazard Asset Inventory Summary

Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard-10yr Projection	In Jurisdiction Projected	Percent Projected
Population	75129	75129	100.00%	78885	78885	100.00%
Commercial/Ind	1749	1,749	100.00%	2099	2099	100.00%
Government/NP	1298	1298	100.00%	1428	1428	100.00%
Residences	27007	27007	100.00%	40511	40511	100.00%
Total	30054	30054	100.00%	44037.1	44037.1	100.00%
Structure Value						
Commercial/Ind	$836,638,300	$836,638,300	100.00%	$1,087,629,790	$1,087,629,790	100.00%
Government/NP	$218,412,100	$218,412,100	100.00%	$262,094,520	$262,094,520	100.00%
Residences	$2,676,098,900	$2,676,098,900	100.00%	$4,014,148,350	$4,014,148,350	100.00%
Total	$3,731,149,300	$3,731,149,300	100.00%	$5,363,872,660	$5,363,872,660	100.00%

6.4.3.2 Asset Inventory for Specific Area Hazards

Specific area hazards are hazard incidents that may occur over a specific area of the county or in a specific populated community. These hazards include Hail, Lightning, Landslides/Mudslides, Land Subsidence, Wildland Fires, Illegal Meth Labs, Terrorism or Urban Fire. The table below assumes the tornado hazard and an average populated area, considering all incorporated and unincorporated populated places in Anderson County.

Table 6.18 Anderson County Specific Hazard Incident Asset Inventory Summary

Population Structure Count	In Hazard Current	In Jurisdiction Current	Percent	In Hazard (10yr Projection	In Jurisdiction Projected	Percent Projected
Population	256	75,129	0.34%	435	78885	0.55%
Commercial/Ind	11	1,749	0.63%	15	2099	0.73%
Government/NP	2	1298	0.15%	2	1428	0.14%
Residences	42	27007	0.16%	63	37810	0.17%
Total	55	30054	0.18%	80.4	41336.4	0.19%
Structure Value						
Commercial/Ind	$3,069,000	$836,638,300	0.37%	$3,989,700	$1,003,965,960	0.40%
Government/NP	$2,000,000	$218,412,100	0.92%	$2,400,000	$327,618,150	0.73%
Residences	$3,780,000	$2,676,098,900	0.14%	$6,426,000	$4,014,148,350	0.16%
Total	$8,849,000	$3,731,149,300	0.24%	$12,815,700	$5,345,732,460	0.24%

6.5 VULNERABILITY: ESTIMATING POTENTIAL LOSSES

To complete the loss estimation, the level of damage must be assessed, both as a percentage of the asset structural and content replacement value, and as the cost for loss of functional use.

To illustrate, a library in a flood hazard could suffer 40% damage. The potential loss is calculated by multiplying the value of the structure, the contents, and the use by 40%.

To determine the loss to the structure in a particular hazard incident, multiply the structure replacement value by the expected percent damage.

> For example, if the library's structure replacement value equals $100,000 and the expected damage from a 100-year flood is 40% of the structure, then the loss to this structure from a flood is $40,000.

Requirement §201.6(c)(2)(ii)(B): The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate
A. Does the new or updated plan estimate potential dollar losses to vulnerable structures?
B. Does the new or updated plan describe the methodology used to prepare the estimate?

CRS Step 5: Assess the Problem: CRS credit is given for an assessment that includes a review of all properties that received flood insurance claims (in addition to repetitive (loss properties) or an estimate of the potential dollar losses to vulnerable structures. This is optional.

To determine the losses to the contents from a particular hazard event, multiply the replacement value of the contents by the expected percent damage.

> For example, if the library's content replacement value equals $225,000 and the expected damage from a 100-year flood is 10 percent of the contents, then the loss to these contents from a flood is $22,500.

To determine the cost of the loss of function for the period that the business or service was unable to operate due to the hazard incident, estimate the losses to structure use and function by determining functional downtime, or the time (in days) that the function would be disrupted by a hazard incident. Then estimate the daily cost of the functional downtime.

> Divide the average annual budget or sales by 365 to determine the average daily operating budget or sales.
>
> Multiply the average daily operating budget or sales by the functional downtime to determine the cost of the loss of function for the period that the business or service was unable to operate due to the hazard incident.
>
> For example, if an ice cream shop had daily sales of $2,500 during the summertime and was forced to close for two weeks because of damages from a hazard incident, the function loss would be $35,000 ($2,500 x 14 days).
>
> For a public facility, such as a library with an annual budget of $600,000 and an average daily budget of $1,644 ($600,000 / 365), the loss estimate for a seven-day closure would be $11,508.

To determine the cost of the displacement from the regular place of business, determine the time (in days) that a facility may need to operate from a temporary location due to a hazard incident and multiply by the temporary location cost per day.

For example, if the library was closed for 7 days (loss of function) and then resumed operations from an empty trailer rented for $10 per day for the next 90 days, the displacement cost would be $900 (90 days x $10 per day).

For residences, the cost of displacement would be the cost of alternate housing multiplied by the average time of residential construction in Anderson County.

If content value is unknown the following uplift factors can be applied to the structure value:

- Residences – 30%
- Government – 40%
- Commercial – 50%

Cubic yards calculations are based on the structure's square feet and the estimated damage. Then use appropriate factors to estimate soil and building demolition debris. Disposal costs per cubic yard are provided by local sanitation officials.

If square footage is unknown, an approximate square footage can be calculated from the structure cost. For example, use the typical governmental and commercial construction cost in the county and divide that into the structure cost. If construction cost is $200 per square foot and the structure value is $1,000,000 the approximate square footage is 10,000 square feet.

For residential square footage, use the median cost of housing in the county and divide that by the dollar per square foot building cost across the county.

Response, evacuation, recovery, and other costs are calculated using a factor times the total structure value. The premise is that structure loss is directly related to the impact and extent of the hazard, and therefore can be used as a basis for cost estimates.

Wages lost are a direct calculation of displaced days, structure capacity or workforce, and the average daily wage for the jurisdiction.

When data on a specific facility's function and use is unavailable, a general methodology is used. The general methodology used in this Plan is based on the categories of structures. Calculations for function and use loss are based on averages identified in past disaster incidents, both locally and those documented by FEMA.

6.5.1 Estimating Potential Loss Summary

For flooding, which has an identified geographic location (500 year flood plain maps), structure, content, function, usage, and wage loss is identified. In addition, debris and response cost is estimated, resulting in a total loss value for the hazard incident. The table below estimates the potential total losses for all of Anderson County that may occur from a 500-year flood incident.

Table 6.19 Anderson Total Potential Flood Hazard Loss								
500 Year Flood								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
180	Commercial/Ind	$119,565,350		35.0%	$59,782,675		29.2%	$59,284,486
186	Government/NP	$53,400,590		30.0%	$21,360,236		20.0%	$20,292,224
1,655	Residential	$1,234,548,990		40.0%	$370,364,697		30.8%	$607,777,964
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
180	Commercial/Ind	30	$7,000	$37,800,000	15	$500	$1,350,000	$39,150,000
186	Government/NP	5	$5,000	$4,650,000	5	$1,000	$930,000	$5,580,000
1,655	Residential	1	$50	$82,750	60	$200	$19,860,000	$19,942,750
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
147,140	1,471,400	$32,370,800	$112	191,690	$21,469,280		$54,988,374	$108,828,454
							Total Disaster Costs	$860,855,879

6.5.2 Estimating Potential Loss Detail for Primary Hazards

Following are detail tables that estimate losses for each jurisdiction for the three major hazards – flood, high wind, and hazardous materials:

For high wind and hazardous materials incidents where a specific geographical location cannot be identified, hypothetical locations and losses are identified.

For flooding, which has an identified geographic location, 500 year flood plain maps are used.

For a high wind incident, an F4 tornado 300 yards wide and one mile long was predicted with the center point being the courthouse of a jurisdiction.

For a hazardous materials incident, either a Tier II facility or a transportation point on a highway or railroad was selected as a hypothetical center point of the incident.

Table 6.20 Clinton Flood, High Wind, Hazmat Hazard Loss								
500 Year Flood								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
22	Commercial/Ind	$1,252,550		35.0%	$626,275		29.2%	$621,056
22	Government/NP	$851,390		30.0%	$340,556		20.0%	$323,528
110	Residential	$7,615,590		40.0%	$2,284,677		30.8%	$3,749,214
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
22	Commercial/Ind	42	$7,000	$6,468,000	30	$500	$330,000	$6,798,000
22	Government/NP	30	$5,000	$3,300,000	10	$1,000	$220,000	$3,520,000
110	Residential	1	$50	$5,500	60	$200	$1,320,000	$1,325,500
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
11,990	119,900	$2,637,800	$112	13,904	$1,557,248		$375,504	$4,570,552
							Total Disaster Costs	$20,907,850
High Wind Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
33	Commercial/Ind	$15,824,400		25.0%	$7,912,200		12.5%	$4,945,125
8	Government/NP	$19,007,400		20.0%	$7,602,960		10.0%	$4,561,776
66	Residential	$4,278,800		40.0%	$1,283,640		20.0%	$1,968,248
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
33	Commercial/Ind	30	$7,000	$6,930,000	15	$500	$247,500	$7,177,500
8	Government/NP	5	$5,000	$200,000	5	$1,000	$40,000	$240,000
66	Residential	1	$50	$3,300	90	$200	$1,188,000	$1,191,300
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
7,339	73,390	$1,614,580	$112	8,422	$943,264		$1,032,763	$3,590,607
							Total Disaster Costs	$23,674,556
Hazardous Materials Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
204	Commercial/Ind	$71,684,700		20.0%	$35,842,350		20.0%	$21,505,410
120	Government/NP	$20,568,600		20.0%	$8,227,440		20.0%	$5,759,208
1,486	Residential	$120,568,600		20.0%	$36,170,580		20.0%	$31,347,836
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
204	Commercial/Ind	14	$5,000	$14,280,000	14	$500	$1,428,000	$15,708,000
120	Government/NP	14	$7,000	$11,760,000	14	$1,000	$1,680,000	$13,440,000
1,486	Residential	1	$50	$74,300	14	$200	$4,160,800	$4,235,100
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
69,392	693,920	$15,266,240	$112	170,968	$19,148,416		$5,275,121	$39,689,777
							Total Disaster Costs	$131,685,331

Table 6.21 Lake City Flood, High Wind, Hazmat Hazard Loss								
500 Year Flood								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
11	Commercial/Ind	$3,991,000		35.0%	$1,995,500		29.2%	$1,978,871
18	Government/NP	$5,298,100		30.0%	$2,119,240		20.0%	$2,013,278
105	Residential	$2,809,400		40.0%	$842,820		30.8%	$1,383,089
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	42	$7,000	$3,234,000	30	$500	$165,000	$3,399,000
18	Government/NP	30	$5,000	$2,700,000	15	$1,000	$270,000	$2,970,000
105	Residential	1	$50	$5,250	60	$200	$1,260,000	$1,265,250
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
10,035	100,350	$2,207,700	$112	12,762	$1,429,344		$430,019	$4,067,063
							Total Disaster Costs	$17,076,551
High Wind Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
13	Commercial/Ind	$838,600		25.0%	$419,300		12.5%	$262,063
6	Government/NP	$6,399,100		20.0%	$2,559,640		10.0%	$1,535,784
52	Residential	$2,874,400		40.0%	$862,320		20.0%	$1,322,224
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
13	Commercial/Ind	30	$7,000	$2,730,000	15	$500	$97,500	$2,827,500
6	Government/NP	10	$5,000	$300,000	5	$1,000	$30,000	$330,000
52	Residential	1	$50	$2,600	90	$200	$936,000	$938,600
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
4,783	47,830	$1,052,260	$112	6,274	$702,688		$280,806	$2,035,754
							Total Disaster Costs	$9,251,925
Hazardous Materials Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
104	Commercial/Ind	$22,378,500		20.0%	$11,189,250		20.0%	$6,713,550
114	Government/NP	$11,927,500		20.0%	$4,771,000		20.0%	$3,339,700
676	Residential	$37,346,700		20.0%	$11,204,010		20.0%	$9,710,142
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
104	Commercial/Ind	14	$7,000	$10,192,000	14	$500	$728,000	$10,920,000
114	Government/NP	14	$5,000	$7,980,000	14	$1,000	$1,596,000	$9,576,000
676	Residential	1	$50	$33,800	14	$200	$1,892,800	$1,926,600
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
36,992	369,920	$8,138,240	$112	78,764	$8,821,568		$1,778,705	$18,738,513
							Total Disaster Costs	$60,924,505

Table 6.22 Norris Flood, High Wind, Hazmat Hazard Loss								
500 Year Flood								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
2	Commercial/Ind	$1,256,900		35.0%	$628,450		29.2%	$623,213
6	Government/NP	$115,400		30.0%	$46,160		20.0%	$43,852
45	Residential	$8,540,300		40.0%	$2,562,090		30.8%	$4,204,455
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
2	Commercial/Ind	20	$7,000	$280,000	15	$500	$15,000	$295,000
6	Government/NP	10	$5,000	$300,000	5	$1,000	$30,000	$330,000
45	Residential	1	$50	$2,250	60	$200	$540,000	$542,250
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
3,810	38,100	$838,200	$112	5,140	$575,680		$389,722	$1,803,602
							Total Disaster Costs	$7,842,372
High Wind Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
3	Commercial/Ind	$1,742,000		25.0%	$871,000		12.5%	$544,375
1	Government/NP	$2,515,700		20.0%	$1,006,280		10.0%	$603,768
75	Residential	$15,240,900		40.0%	$4,572,270		20.0%	$7,010,814
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
3	Commercial/Ind	30	$7,000	$630,000	15	$500	$22,500	$652,500
1	Government/NP	10	$5,000	$50,000	5	$1,000	$5,000	$55,000
75	Residential	1	$50	$3,750	90	$200	$1,350,000	$1,353,750
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
5,105	51,050	$1,123,100	$112	8,500	$952,000		$734,306	$2,809,406
							Total Disaster Costs	$13,029,613
Hazardous Materials Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
67	Commercial/Ind	$56,192,300		20.0%	$28,096,150		20.0%	$16,857,690
19	Government/NP	$47,290,300		20.0%	$18,916,120		20.0%	$13,241,284
408	Residential	$38,401,600		20.0%	$11,520,480		20.0%	$9,984,416
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
67	Commercial/Ind	14	$7,000	$6,566,000	14	$500	$469,000	$7,035,000
19	Government/NP	14	$5,000	$1,330,000	14	$1,000	$266,000	$1,596,000
408	Residential	1	$50	$20,400	14	$200	$1,142,400	$1,162,800
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
18,596	185,960	$4,091,120	$112	46,900	$5,252,800		$3,607,505	$12,951,425
							Total Disaster Costs	$62,828,615

Table 6.23 Oak Ridge Flood, High Wind, Hazmat Hazard Loss								
500 Year Flood								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
88	Commercial/Ind	$55,000,800		35.0%	$27,500,400		29.2%	$27,271,230
56	Government/NP	$8,746,500		30.0%	$3,498,600		20.0%	$3,323,670
164	Residential	$29,251,100		40.0%	$8,775,330		30.8%	$14,400,542
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
88	Commercial/Ind	20	$7,000	$12,320,000	10	$500	$440,000	$12,760,000
56	Government/NP	10	$5,000	$2,800,000	5	$1,000	$280,000	$3,080,000
164	Residential	1	$50	$8,200	60	$200	$1,968,000	$1,976,200
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
26,456	264,560	$5,820,320	$112	20,688	$2,317,056		$3,599,635	$11,737,011
							Total Disaster Costs	$74,548,653
High Wind Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
26	Commercial/Ind	$21,214,600		25.0%	$10,607,300		12.5%	$6,629,563
2	Government/NP	$1,425,400		20.0%	$570,160		10.0%	$342,096
0	Residential	$0		40.0%	$0		20.0%	$0
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
26	Commercial/Ind	30	$7,000	$5,460,000	15	$500	$195,000	$5,655,000
2	Government/NP	10	$5,000	$100,000	5	$1,000	$10,000	$110,000
0	Residential	1	$50	$0	90	$200	$0	$0
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
2,110	21,100	$464,200	$112	800	$89,600		$627,449	$1,181,249
							Total Disaster Costs	$13,917,908
Hazardous Mateials Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
41	Commercial/Ind	$112,613,400		20.0%	$56,306,700		20.0%	$33,784,020
27	Government/NP	$6,812,800		20.0%	$2,725,120		20.0%	$1,907,584
278	Residential	$18,027,900		20.0%	$5,408,370		20.0%	$4,687,254
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
41	Commercial/Ind	14	$7,000	$4,018,000	14	$500	$287,000	$4,305,000
27	Government/NP	14	$5,000	$1,890,000	14	$1,000	$378,000	$2,268,000
278	Residential	1	$50	$13,900	14	$200	$778,400	$792,300
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
13,516	135,160	$2,973,520	$112	32,088	$3,593,856		$3,634,097	$10,201,473
							Total Disaster Costs	$57,945,631

Table 6.24 Oliver Springs Flood, High Wind, Hazmat Hazard Loss								
500 Year Flood								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
20	Commercial/Ind	$3,624,800		35.0%	$1,812,400		29.2%	$1,797,297
4	Government/NP	$3,600,000		30.0%	$1,440,000		20.0%	$1,368,000
152	Residential	$11,883,300		40.0%	$3,564,990		30.8%	$5,850,240
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
20	Commercial/Ind	30	$7,000	$4,200,000	15	$500	$150,000	$4,350,000
4	Government/NP	30	$5,000	$600,000	15	$1,000	$60,000	$660,000
152	Residential	1	$5,000	$760,000	60	$200	$1,824,000	$2,584,000
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
12,308	123,080	$2,707,760	$112	17,744	$1,987,328		$721,243	$5,416,331
							Total Disaster Costs	$22,025,868
High Wind Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
11	Commercial/Ind	$5,211,600		25.0%	$2,605,800		12.5%	$1,628,625
2	Government/NP	$2,600,000		20.0%	$1,040,000		10.0%	$624,000
42	Residential	$3,069,000		40.0%	$920,700		20.0%	$1,411,740
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	30	$7,000	$2,310,000	15	$500	$82,500	$2,392,500
2	Government/NP	10	$5,000	$100,000	5	$1,000	$10,000	$110,000
42	Residential	1	$50	$2,100	90	$200	$756,000	$758,100
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
3,673	36,730	$808,060	$112	5,054	$566,048		$329,793	$1,703,901
							Total Disaster Costs	$8,628,866
Hazardous Materials Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
32	Commercial/Ind	$4,553,700		20.0%	$2,276,850		20.0%	$1,366,110
19	Government/NP	$4,321,800		20.0%	$1,728,720		20.0%	$1,210,104
276	Residential	$18,778,900		20.0%	$5,633,670		20.0%	$4,882,514
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
32	Commercial/Ind	14	$7,000	$3,136,000	14	$500	$224,000	$3,360,000
19	Government/NP	14	$5,000	$1,330,000	14	$1,000	$266,000	$1,596,000
276	Residential	1	$50	$13,800	14	$200	$772,800	$786,600
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
12,272	122,720	$2,699,840	$112	31,626	$3,542,112		$671,286	$6,913,238
							Total Disaster Costs	$20,114,566

Table 6.25 Anderson County Unincorporated Flood, High Wind, Hazmat Hazard Loss								
500 Year Flood								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
37	Commercial/Ind	$54,439,300		35.0%	$27,219,650		29.2%	$26,992,820
80	Government/NP	$34,789,200		30.0%	$13,915,680		20.0%	$13,219,896
1,079	Residential	$1,174,449,300		40.0%	$352,334,790		30.8%	$578,190,425
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
37	Commercial/Ind	20	$7,000	$5,180,000	10	$500	$185,000	$5,365,000
80	Government/NP	10	$5,000	$4,000,000	5	$1,000	$400,000	$4,400,000
1,079	Residential	1	$50	$53,950	60	$200	$12,948,000	$13,001,950
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
82,541	825,410	$18,159,020	$112	122,388	$13,707,456		$49,472,251	$81,338,727
							Total Disaster Costs	$722,508,817
High Wind Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
2	Commercial/Ind	$54,439,300		25.0%	$27,219,650		12.5%	$17,012,281
10	Government/NP	$34,789,200		20.0%	$13,915,680		10.0%	$8,349,408
55	Residential	$1,174,449,300		40.0%	$352,334,790		20.0%	$540,246,678
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
2	Commercial/Ind	30	$7,000	$420,000	15	$500	$15,000	$435,000
10	Government/NP	10	$5,000	$500,000	5	$1,000	$50,000	$550,000
55	Residential	1	$50	$2,750	90	$200	$990,000	$992,750
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
4,470	44,700	$983,400	$112	6,320	$707,840		$50,904,753	$52,595,993
							Total Disaster Costs	$620,182,110
Hazardous Materials Incident								
Qty	Structure Type	Structure Value		Loss %	Content Value		Loss%	Struc/Cont Loss
3	Commercial/Ind	$54,439,300		20.0%	$27,219,650		20.0%	$16,331,790
39	Government/NP	$34,789,200		20.0%	$13,915,680		20.0%	$9,740,976
278	Residential	$1,174,449,300		20.0%	$352,334,790		20.0%	$305,356,818
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
3	Commercial/Ind	14	$7,000	$294,000	0	$500	$0	$294,000
39	Government/NP	14	$5,000	$2,730,000	0	$1,000	$0	$2,730,000
278	Residential	1	$50	$13,900	14	$200	$778,400	$792,300
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
12,196	121,960	$2,683,120	$112	31,724	$3,553,088		$29,828,663	$36,064,871
							Total Disaster Costs	$371,310,755

6.5.3 Estimating Potential Loss Detail for Secondary Hazards

This section of the 2011 Plan update describes the Anderson County estimated vulnerability loss that may be incurred by hazards that may impact the entire planning area equally, and hazards that may impact specific areas of the county or community. The loss percentage for each of these hazards was derived by the 2011 Hazard Mitigation Planning Committee based on both historic losses and local knowledge. Function and use loss was calculated using a factor that was developed from historic events, local knowledge, and other sources. The factor was multiplied against the total estimated loss.

Drought is a hazard that may have a countywide impact. Drought can affect structures primarily through land subsidence (sinkholes) that may impact buildings and infrastructure anywhere within the county. Drought can cause extensive damage to the foundations, framing, and walls of commercial and residential structures, as well as to agricultural crops, roads, bridges, pipelines, utilities, and railroads. Drought can significantly impact agricultural crops, including timber production. Drought may also impact population through the lack of potable water or locally produced food items. However, the larger impact of drought within the county can be the lack of water for public and private landscaping resulting in replacement costs for landscape products. Function and use loss would be negligible, as buildings would remain operational. Loss of life and injuries do occur but are minimal. The Table below estimates the losses from a severe drought incident.

Table 6.26 Anderson County Potential Drought Hazard Loss

Qty	Structure Type	Structure/Content Value	Loss %	Agriculture Value	Loss%	Total Loss
1,749	Commercial/Ind	$2,091,595,750	0.01%	$104,579,788	5.0%	$5,438,149
1,298	Government/NP	$524,189,040	0.01%	$20,967,562	1.0%	$262,095
27,007	Residential	$6,155,027,470	0.01%	$184,650,824	1.0%	$2,462,011

Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
1,749	Commercial/Ind	0.2	$7,000	$2,448,600	0.01	$500	$8,745	$2,457,345
1,298	Government/NP	0	$5,000	$0	0	$1,000	$0	$0
27,007	Residential	0	$50	$0	0	$200	$0	$0

Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost	Response Costs	Related Costs
5	537	$10,837	$64	350	$22,387	$652,980	$686,205
						Total Disaster Costs	$11,305,804

Earthquake is a hazard that may have a countywide impact. An occurrence of an earthquake of significant magnitude would cause property damage and possibly earthquake-related deaths caused by the collapse of structures. The level of damage depends upon the amplitude and duration of the ground shaking, which is directly related to the earthquake size, distance from the fault, site, and regional geology. The impact to Anderson County of a large regional earthquake could be significant. The county loss could result in some cracking of concrete structures and some movement of wood structures off foundations. Brick from buildings could crack and fall. The shaking could result in damage to electrical and water infrastructure. Function and use loss could be moderate as structures could be damaged to the extent that some repairs are needed,

making them unusable for short period of time. The Table below estimates the loss from a 6.5 magnitude earthquake.

Table 6.27 Anderson County Potential Earthquake Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Agriculture Value		Loss%	Total Loss
1,749	Commercial/Ind	$2,091,595,750		5.00%	$104,579,788		0.1%	$104,684,367
1,298	Government/NP	$524,189,040		7.00%	$20,967,562		0.1%	$36,714,200
27,007	Residential	$6,155,027,470		10.00%	$184,650,824		0.1%	$615,687,398
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
1,749	Commercial/Ind	1	$7,000	$12,243,000	1	$500	$874,500	$13,117,500
1,298	Government/NP	1	$5,000	$6,490,000	1	$1,000	$1,298,000	$7,788,000
27,007	Residential	0	$50	$0	1	$200	$5,401,400	$5,401,400
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
49,469	494,691	$10,883,202	$96	3,047	$292,512		$60,566,877	$71,742,591
							Total Disaster Costs	$855,135,457

Extreme Temperatures is a hazard that would have a countywide impact. Both high and low temperatures can cause cracking and buckling of concrete structures and roadways and failure of electrical and mechanical components and equipment. The impact on agriculture could be significant, especially freezing temperatures. Failure of air-conditioning/heating systems and/or direct outdoor exposure of populations can result in severe illness. The human risks associated with extreme heat include heatstroke, heat exhaustion, heat syncope, and heat cramps. Exposure to cold temperatures can lead to serious or life-threatening health problems such as hypothermia, cold stress, frostbite, or freezing of the exposed extremities The table below estimates the cost of an extreme temperatures incident.

Table 6.28 Anderson County Potential Extreme Temperature Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Agriculture Value		Loss%	Total Loss
1,749	Commercial/Ind	$2,091,595,750		0.01%	$104,579,788		2.0%	$2,300,755
1,298	Government/NP	$524,189,040		0.01%	$20,967,562		0.5%	$157,257
27,007	Residential	$6,155,027,470		0.01%	$184,650,824		0.5%	$1,538,757
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
1,749	Commercial/Ind	0.05	$7,000	$612,150	0.01	$500	$8,745	$620,895
1,298	Government/NP	0.05	$5,000	$324,500	0.01	$1,000	$12,980	$337,480
27,007	Residential	0	$50	$0	0.01	$200	$54,014	$54,014
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
5	537	$10,837	$80	152	$12,188		$319,742	$342,767
							Total Disaster Costs	$5,351,925

Hail is a hazard that impacts a specific area and can damage siding, roofing, and break windows in almost any structure. Multiple vehicles can be damaged extensively, requiring glass replacement, body repair, and re-painting. Hail can also destroy landscaping and large

agricultural crops. Function and use loss would be negligible, as buildings would remain operational. Loss of life and injuries do occur but are minimal.

Table 6.29 Anderson County Potential Hail Hazard Loss								
Qty	Structure Type	Structure/Content Value			Loss %	Agriculture Value	Loss%	Total Loss
11	Commercial/Ind	$7,672,500			0.50%	$1,534,500	20.0%	$345,263
2	Government/NP	$4,800,000			0.50%	$960,000	0.5%	$28,800
42	Residential	$8,694,000			3.00%	$1,738,800	1.0%	$278,208
Qty	Structure Type	Days Down	Daily Budget	Function Loss		Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	0	$7,000	$0		0	$500	$0	$0
2	Government/NP	0	$5,000	$0		0	$1,000	$0	$0
42	Residential	0	$50	$0		0	$200	$0	$0
Soil Cu Yards	Demolition Cu Yards	Debris Cost		Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
22	222	$4,886		$96	0	$0		$52,182	$57,068
								Total Disaster Costs	$709,338

Ice/Snow is a hazard that would have a countywide impact. Ice and snow are most destructive against wood-built homes and any structure with a roof that is not designed for an ice or snow load. Ice has the capability to fell large tree limbs, which can damage any type of structure, especially those built of wood. Ice is especially damaging to electrical lines, forcing power outages, which can result in secondary damage to structures. Ice and snow also cause multiple vehicle accidents that create significant losses. There may be some function and use loss as repairs may make the structures unusable for a few days on the average. There may be some loss of life and injuries due to primarily secondary effects (i.e., fall injuries, vehicle accidents, exposure, fires from heaters).

Table 6.30 Anderson County Potential Ice/Snow Hazard Loss								
Qty	Structure Type	Structure/Content Value			Loss %	Agriculture Value	Loss%	Total Loss
1,749	Commercial/Ind	$2,091,595,750			0.04%	$104,579,788	2.0%	$2,928,234
1,298	Government/NP	$524,189,040			0.04%	$20,967,562	0.1%	$230,643
27,007	Residential	$6,155,027,470			0.05%	$184,650,824	0.1%	$3,262,165
Qty	Structure Type	Days Down	Daily Budget	Function Loss		Days Disp	Daily Cost	Usage Loss	Func/Use Loss
1,749	Commercial/Ind	0.1	$7,000	$1,224,300		0	$500	$0	$1,224,300
1,298	Government/NP	0.1	$5,000	$649,000		0	$1,000	$0	$649,000
27,007	Residential	0	$50	$0		0	$200	$0	$0
Soil Cu Yards	Demolition Cu Yards	Debris Cost		Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
258	2,578	$56,719		$96	305	$29,251		$513,683	$599,653
								Total Disaster Costs	$8,893,995

Landslide/Mudslide is a hazard that would impact a specific area. The topography and geology of Anderson County is susceptible to the effects of landslides and mudslides. Landslides have been a significant risk in Anderson County. The impact from a landslide or mudslide can include loss of life, damage to buildings, lost productivity, disruption in utilities and

transportation systems, and reduced property values. Some structures in Anderson County are built close to riverbanks and are susceptible to mudslides. The Table below estimates the loss resulting from a mudslide or landslide involving riverbank structures.

Table 6.31 Anderson County Potential Landslide/Mudslide Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Infrastructure Value		Loss%	Total Loss
11	Commercial/Ind	$7,672,500		0.50%	$3,836,250		0.1%	$42,199
2	Government/NP	$4,800,000		0.50%	$1,920,000		0.1%	$25,920
42	Residential	$8,694,000		1.00%	$0		0.0%	$86,940
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	1	$7,000	$77,000	0	$500	$0	$77,000
2	Government/NP	1	$5,000	$10,000	0	$1,000	$0	$10,000
42	Residential	0	$50	$0	14	$200	$117,600	$117,600
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
9	88	$1,929	$96	13	$1,248		$12,405	$15,582
							Total Disaster Costs	$375,241

Land Subsidence is a hazard that impacts a specific area. All of Anderson County and its jurisdictions have underlying karst geology, which makes the entire county subject to sinkhole activity. In addition, in the northwestern third of the county, significant coal mining activities have resulted in areas where overlying ground can collapse into abandoned mines. Numerous sinkholes have developed in many areas of the county. Large sinkholes have occurred along local highways. Sinkholes in Anderson County have impacted roads and structures. Mining assets have been lost while mining for coal.

Table 6.32 Anderson County Potential Land Subsidence Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Infrastructure Value		Loss%	Total Loss
11	Commercial/Ind	$7,672,500		0.50%	$3,836,250		0.1%	$42,199
2	Government/NP	$4,800,000		0.50%	$1,920,000		0.1%	$25,920
42	Residential	$8,694,000		1.00%	$0		0.0%	$86,940
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	2	$7,000	$154,000	0	$500	$0	$154,000
2	Government/NP	2	$5,000	$20,000	0	$1,000	$0	$20,000
42	Residential	0	$50	$0	420	$200	$3,528,000	$3,528,000
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
9	439	$8,945	$96	26	$2,496		$12,405	$23,846
							Total Disaster Costs	$3,880,905

Lightning is a hazard that impacts a specific area and can damage a structure of any type, but is most damaging when a fire is started in a wooden structure or to, a lesser extent, a commercial or public structure. Electrical infrastructure is subject to significant damage from a lightning strike. Lightning also starts wildland fires that conceivably could burn thousands of acres and many structures. There could also be some amount of function and use loss as some structures would

be unuseable due to repairs. Loss of life may occur directly as a result of a lightning strike or from a secondary effect such as fires.

Table 6.33 Anderson County Potential Lightning Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Infrastructure Value		Loss%	Total Loss
11	Commercial/Ind	$7,672,500		0.50%	$3,836,250		0.1%	$42,199
2	Government/NP	$4,800,000		0.50%	$1,920,000		0.1%	$25,920
42	Residential	$8,694,000		10.00%	$0		0.0%	$869,400
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	2	$7,000	$154,000	0	$500	$0	$154,000
2	Government/NP	2	$5,000	$20,000	0	$1,000	$0	$20,000
42	Residential	0	$50	$0	2	$200	$16,800	$16,800
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
69	693	$15,235	$96	26	$2,496		$75,002	$92,733
							Total Disaster Costs	$1,221,051

Wildland Fires impact a specific area and can destroy thousands of acres of timber and other agriculture assets. Wildland fire can destroy wooden structures or brick structures with wood cores. Even concrete structures can be severely damaged should the fire burn the roof or the heat break windows, allowing the flames to enter a normally "fire resistant" structure. Wildland fires can also damage electrical infrastructure by causing tress to fall across power lines. There may be some function and use loss as a wildland fire would probably damage or destroy some structures, making them unusable during repairs or rebuilding. Loss of life and injuries could also occur among citizens and firefighters.

Table 6.34 Anderson County Potential Wildland Fire Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Agriculture Value		Loss%	Total Loss
11	Commercial/Ind	$7,672,500		0.50%	$15,345,000		10.0%	$1,572,863
2	Government/NP	$4,800,000		0.50%	$1,920,000		1.0%	$43,200
42	Residential	$8,694,000		3.00%	$2,608,200		1.0%	$286,902
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	2	$7,000	$154,000	0	$500	$0	$154,000
2	Government/NP	1	$5,000	$10,000	0	$1,000	$0	$10,000
42	Residential	0	$50	$0	4	$200	$33,600	$33,600
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
22	222	$4,886	$96	24	$2,304		$152,237	$159,427
							Total Disaster Costs	$2,259,992

Illegal Meth Labs is a hazard that affects a specific area and has been identified by local law enforcement as the number one drug threat in Anderson County. The cooking process itself and the waste that results from the manufacture of meth pose significant public health and safety risks. Methamphetamine recipes rely on the use of volatile organic compounds, explosives,

acids, bases, metals, solvents, and salts. These ingredients have the potential for fire or explosions that can damage structures. Meth ingrediants cause damage to anything they come in contact with and must be "cleaned." The cleaning process for a meth lab averages $4,000. Perhaps the most significant cost of meth is the social cost to individuals and children.

Table 6.35 Anderson County Potential Illegal Meth Lab Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Agriculture Value		Loss%	Total Loss
11	Commercial/Ind	$7,672,500		0.10%	$383,625		0.0%	$7,673
2	Government/NP	$4,800,000		0.10%	$240,000		0.0%	$4,800
42	Residential	$8,694,000		1.00%	$86,940		0.0%	$86,940
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	0.5	$7,000	$38,500	0	$500	$0	$38,500
2	Government/NP	0.5	$5,000	$5,000	0	$1,000	$0	$5,000
42	Residential	0	$50	$0	0.5	$200	$4,200	$4,200
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
7	71	$1,569	$96	7	$624		$3,977	$6,169
							Total Disaster Costs	$153,282

Terrorism can impact a specific area (i.e., a bomb) or can have a countywide impact in the case of a bioterriorism or agricultural terrorism incident. Such incidents can result in significant loss of life and damage to structures in any community in the planning area. Major or complete loss of a single structure and associated structures could result from a terrorist bomb (domestic or international), with some collateral damage to structures nearby. Long-term structure loss of use could result from chemical or radiological contamination. The Table below estimates damage from a bomb-like incident.

Table 6.36 Anderson County Potential Terrorism Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Agriculture Value		Loss%	Total Loss
11	Commercial/Ind	$7,672,500		20.00%	$3,836,250		0.1%	$1,538,336
2	Government/NP	$4,800,000		20.00%	$1,920,000		0.1%	$961,920
42	Residential	$8,694,000		1.00%	$2,608,200		0.1%	$89,548
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	7	$7,000	$539,000	7	$500	$38,500	$577,500
2	Government/NP	7	$5,000	$70,000	7	$1,000	$14,000	$84,000
42	Residential	0	$50	$0	2	$200	$16,800	$16,800
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
89	887	$19,518	$96	91	$8,736		$207,184	$235,439
							Total Disaster Costs	$3,503,543

Urban Fire is a hazard that generally impacts a specific area. Damages from fire can range from human death to significant property damage and infrastructure loss. Urban areas have the greatest potential for significant loss. The potential for loss of human life in fires is a significant concern. Fires can have a dramatic and sometimes permanent impact on individuals, property, economics, and the environment. Significant damage or total loss of a structure or a group of

structures in close proximity may occur. The Table below estimates the loss of a large government or business structure in a community.

Table 6.37 Anderson County Potential Urban Fire Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Agriculture Value		Loss%	Total Loss
11	Commercial/Ind	$3,069,000		20.00%	$1,534,500		0.5%	$621,473
2	Government/NP	$2,000,000		20.00%	$800,000		0.5%	$404,000
42	Residential	$3,780,000		2.00%	$1,134,000		0.5%	$81,270
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
11	Commercial/Ind	30	$7,000	$2,310,000	30	$500	$165,000	$2,475,000
2	Government/NP	30	$5,000	$300,000	30	$1,000	$60,000	$360,000
42	Residential	0	$50	$0	7	$200	$58,800	$58,800
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
95	954	$20,997	$96	390	$37,440		$88,539	$146,976
							Total Disaster Costs	$4,147,519

Pandemic/Epidemic is a hazard that would have a countywide impact. Pandemic/epidemic incidents may result in the loss of thousands of lives and have a long-lasting economic impact to all communities in the planning area. While components of the physical infrastructure are not threatened or destroyed as in a natural disaster, an infectious disease outbreak may pose significant threats to the human infrastructure responsible for critical community services due to wide spread absenteeism in the workforce. There could also be extensive function loss for the same reasons. Agriculture diseases/vectors could also have a significant impact on the county.

Table 6.38 Anderson County Potential Pandemic Hazard Loss								
Qty	Structure Type	Structure/Content Value		Loss %	Agriculture Value		Loss%	Struc/Cont Loss
1,749	Commercial/Ind	$836,638,300		0.00%	$418,319,150		0.0%	$0
1,298	Government/NP	$218,412,100		0.00%	$87,364,840		0.0%	$0
27,007	Residential	$2,676,098,900		0.00%	$802,829,670		0.0%	$0
Qty	Structure Type	Days Down	Daily Budget	Function Loss	Days Disp	Daily Cost	Usage Loss	Func/Use Loss
1,749	Commercial/Ind	1	$7,000	$12,243,000	0	$500	$0	$12,243,000
1,298	Government/NP	1	$5,000	$6,490,000	0	$1,000	$0	$6,490,000
27,007	Residential	0	$50	$0	0	$200	$0	$0
Soil Cu Yards	Demolition Cu Yards	Debris Cost	Daily Wage	Wage Days Lost	Wages Lost		Response Costs	Related Costs
0	0	$0	$96	3,047	$292,512		$0	$292,512
							Total Disaster Costs	$19,025,512

6.6 ASSESSING VULNERABILITY: DEVELOPMENT TRENDS

6.6.1 Anderson County

Anderson County is located in the Tennessee River Valley at the foot of the Cumberland Mountains in East Tennessee. Sixty-eight percent of the county's 345 square miles are rural, unincorporated areas populated by 44% of the county's 71,330 residents.

Bounded on the north by Scott and Campbell Counties, on the east by Union County, on the south by Knox County, and on the west by Morgan and Roane Counties, Anderson County is part of the 16-county Knoxville MSA. Clinton is the county seat.

Requirement §201.6(c)(2)(ii)(C): The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
A. Does the new or updated plan describe land uses and development trends?

CRS Step 5: Assess the Problem: The CRS gives credit for a description of the development, redevelopment, and population trends as well as a discussion of what the future brings for development in the community. This is optional..

6.6.1.1 Public Lands

Of the 345 square miles of land in Anderson County, federal and state holdings occupy 83 square miles. The Department of Energy's Oak Ridge Reservation and Federal Building occupy 55 square miles within the City of Oak Ridge. Combined, TVA's Norris Dam Reservation and Bull Run Steam Plant cover 22 square miles. State holdings include the 6 square mile area of Norris Dam State Park. Within the unincorporated area are seven county-owned parks covering 225 acres.

6.6.1.2 Private Fee Areas

The Coal Creek Company owns 64 square miles within the county. This property is leased by Coal Creek to timber, mining, oil and gas exploration, and recreation interests.

6.6.1.3 Commercial and Industrial

Within the five municipalities and throughout the county's rural areas is the typical mix of residential and commercial land use. Due to infrastructure and services, major commercial and industrial facilities are located inside the larger municipalities of Clinton and Oak Ridge. Smaller commercial facilities exist in Lake City, Norris, and Oliver Springs, and are scattered throughout the county on major highways and at crossroad communities to serve the convenience needs of local residents. In November 2006, Clinton annexed 2.1 square miles, extending the city limits along Highway 61 to the I-75 Exit 122 interchange. The provision of municipal infrastructure prompted a rapid expansion of construction for new retail and commercial development, including two large auto dealerships, a Wal-Mart Super Center, a hotel, dining establishments, strip malls, and various chain retail stores. An air ambulance base is in operation, and a fire station will be constructed in 2011.

Major commercial establishments and industries are located in the two largest cities, Clinton and Oak Ridge. The David Jones Industrial Park, located in Anderson County, and seven others located in Clinton, Lake City, and Oak Ridge contain a wide variety of manufacturing and industry. Space remains available in these sites for further development and construction.

Anderson County, Clinton, and Oak Ridge have partnered to create tax and other incentives for new industrial development. The Anderson County Economic Development Board, Oak Ridge Economic Partnership, and Melton Hill Regional Industrial Development Association combine forces with strong Chambers of Commerce in Anderson County, Lake City, and Oak Ridge to foster industry and commerce throughout the county.

6.6.1.4 Infrastructure

Transportation routes encourage industry. Six miles to the east of downtown Clinton, Interstate 75 has three exits into Anderson County, two near the Lake City and I-75 industrial parks. Interstate 40 Exit 356, eight miles from Oak Ridge on the west, serves Horizon Center and ETTP. A current Tennessee Department of Transportation project is widening Highway 58 to provide four-lane access from I-40 in the west to I-75 on the east. Two U.S. highways and nine state highways provide easy access to all cities. With a nine-foot channel depth, the Clinch River provides 32.5 miles of navigable waterway through the county and connects with the Inland Waterway System to reach the Great Lakes and the Gulf of Mexico. Norfolk Southern and CSX lines bisect opposite ends of the county with 59 miles of rail track and numerous sidings and spurs.

For the past 13 years, Tennessee Department of Transportation has proposed construction of Route 475 to serve as a bypass around Knoxville. After study of three routes, the selected 38-mile "Orange Route" will be built at a 2002-estimated cost of $287,412,000. This route will leave Interstate 75 north of Raccoon Valley Road near the Anderson County line, go into Anderson County through the Claxton area, and connect with Interstate 40 in west Knox County. While not all of the estimated 161 residential and eight business relocations will be in Anderson County, the building of this major transportation route will create an enormous impact on the residents, economy, environment, and land development in areas adjacent to this roadway. As this Plan is written, this project has been placed on hold for the foreseeable future.

With these amenities, incentives, and strong support from government, Anderson County may expect to continue to attract business and industry – and to confront the impacts of changes in land use.

6.6.1.5 Agriculture and Forestry

Much of the rural portion of the county is mountainous woodland unsuitable for farming. Agriculture has not been a significant factor in the economy of Anderson County. Land suitable for farming supports some crops but serves mainly as pasture for the grazing of small herds of cattle. Land use development trends in Anderson County have shown a loss in the amount of land used for agriculture purposes and an increase in rural housing sites and small subdivisions. As farms are sold, the trend continues to subdivide the land and sell tracts suitable for residential construction to individuals and developers. From 1990 to 2000, the percentage of the county's total population living in rural, unincorporated areas increased from 25% to 44%.

Some logging continues. The Coal Creek Company has two timber contractors in operation on its property on Windrock Mountain, with an annual output of six million board feet.

There are currently two strip mines and one underground mine on Windrock Mountain leased by Coal Creek Company to contractors. Annual production is in excess of 200,000 tons. Coal Creek Company has an active drilling program on Windrock Mountain through leases to three

contractors operating more than 300 active gas and oil wells. Natural gas wells produce in excess of 2.5 billion cubic feet annually. Annual oil production exceeds 75,000 barrels.

6.6.1.6 Residential

Despite a population growth rate of only 4.5% from 1990 to 2000, residential development continues. In the rural areas, pocket areas of small subdivisions have been developed. More building permits are issued for homes in subdivisions than for single-home property sites. Subdivision developments have largely occurred in the Andersonville area near Norris Lake, with some small developments in the Medford area.

Two types of residential development new to rural areas of the county in the past ten years are condominiums and modular/mobile home subdivisions. Near Andersonville a condominium development at Pinnacle Point has completed seven buildings with 16 units each. Two modular home subdivisions and a new mobile home subdivision continue to grow in the Andersonville and Marlow areas.

Anderson County's Urban Growth Plan was adopted by all jurisdictions in March 2001 and has been amended to allow a 2.1-square mile annexation by Clinton in November 2006, and annexations by Oliver Springs in 2005 (.36 square miles) and 2006 (259 acres).

6.6.2 Clinton

Clinton has a mix of residential, commercial, and industrial sites typical in cities of its size.

Space is available for new industrial expansion in Clinton's Carden Farm, Eagle Bend, and I-75 Industrial Parks. Additional sites are considered for this use as they become available.

After extensive environmental and historical studies, Clinton is presently developing a 16-acre tract in Carden Farm Industrial Park along the Clinch River to serve as a park for recreation. Phase one completed the first portion of the river walking trail; phase two has been approved and will extend the trail to Mariner Point subdivision at the eastern edge of the city limits.

In 2006, Clinton annexed 1.2-square miles, extending the city limits along Highway 61 east to the I-75 Exit 122 interchange. This annexation and availability of municipal infrastructure has created a rapid expansion of construction for new businesses in this area.

6.6.3 Lake City

Lake City Industrial Park is located at Interstate 75 Exit 129. Space is available within this park for new industry.

Lake City enjoys two exits from Interstate 75. Exit 129 has experienced the typical build up of traveler convenience commerce. It is anticipated that Exit 128 may see expansion of similar commercial establishments in the future. Having reached build-out, this small city of 1.6 square miles has limited land for municipal use and has no plans for future projects that would effect changes in land use.

6.6.4 Norris

A private contractor purchased two buildings formerly housing TVA offices in Norris. One building was converted to a 20-unit apartment/condominium complex. The second now houses Norris Academy, operated by Camelot Schools.

In an effort to increase the city's tax base, Norris has recently re-zoned 43 acres along Andersonville Highway for commercial use. It is anticipated that business and industry will develop this area

Some 38% of city land is held as natural, undeveloped, unspoiled land. As a National Historic City, Norris does not anticipate major changes in land use.

6.6.5 Oak Ridge

Oak Ridge has five industrial parks - Oak Ridge Summit, Heritage Center, Horizon Center, Bethel Valley, and Commerce Park - totaling approximately 6,500 acres. Space remains available for new construction within these parks. A 1,200 acre site has been set aside and may be developed as the Clinch River Industrial Park. A strategic goal is to promote joint industrial park development with surrounding communities.

An 800-acre recreation area at Haw Ridge has been set-aside as an undeveloped recreational area for biking. In conjunction with a private group, the city is considering plans to establish more soccer fields throughout the city.

The city's strategic goals include encouraging DOE to release 200 acres near Wisconsin Avenue in the far west end for new housing, and increasing new housing starts by 25% in the next three years. Despite the downturn in the housing market, numerous residential developments have been completed by private developers in the past five years. In east Oak Ridge, two developments sharing a golf course – the 278-acre Centennial Village, and Park Meade Place, a 13-acre development of town homes and private executive homes – have been completed. In west Oak Ridge, Rarity Ridge, a 1,200-acre tract, is underway with a traditional neighborhood development of 2,800 residential units and a town center with retail, commerce, and office space. In central Oak Ridge, Willow Place – a good example of infill redevelopment – construction of 75 mostly single-resident homes is complete. With a population growth of less than seven percent, these developments are planned to attract a portion of the many workers who are employed in, but live outside, Anderson County.

Within the city of Oak Ridge are 55 square miles of federal land under the control of DOE. Recent changes in land use in this area include construction of the $1.4 billion Spallation Neutron Source completed in 2006, and completion of a $10 million haul road to curtail transportation of hazardous cleanup materials on public roadways. Extensive environmental studies were conducted for both projects.

In October 2006, DOE contracted with Oak Ridge to provide fire protection to East Tennessee Technology Park. An additional city fire station has been established at this location and will dramatically improve response time to the large Rarity Ridge subdivision and other homes and businesses in the far western portion of Oak Ridge.

6.6.6 Oliver Springs

In 2005, Oliver Springs annexed .36 square miles near the intersection of Highways 61 and 62. This annexation of established residential tracts did not affect land use. In 2006, 259 acres off Windrock road were annexed to develop a campground with tent sites and cabins.

The second smallest city with an area of 5.5 square miles, Oliver Springs has reached build-out and has no plans for future projects that would effect land use changes.

6.6.7 Land Use Summary

In summary, land use development trends for Anderson County and its municipalities include:

- A reduction in land for agricultural use (Anderson County);
- A shift from urban housing to suburban-style subdivision development with an accompanying increase in rural area population (Anderson County);
- Development of condominiums and modular home/mobile home subdivisions in rural areas (Anderson County);
- Rezoning and/or annexation by municipalities to increase the tax base and/or encourage commercial development (Clinton, Norris, Oliver Springs);
- Acquisition and/or development of recreational areas (Clinton, Norris, Oak Ridge, Oliver Springs);
- Transfer of land from government agencies to municipalities (Norris, Oak Ridge);
- Incentives to foster industrial and commercial development (Anderson County, Clinton, Oak Ridge); and
- Continued growth in new housing units (Anderson County, Clinton, Norris, Oak Ridge).

6.7 MULTI-JURISDICTIONAL RISK ASSESSMENT

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

A. Does the new or updated plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?

CRS Step 4. Assess the Hazard & Step 5: Assess the Problem: For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area

This multi-jurisdictional plan presents information for the general planning area as a whole. However, some hazards and associated losses occur in only part of the planning area. This information is attributed to the particular jurisdiction in which they occur.

In some instances, individual municipalities in Anderson County have specific vulnerabilities to hazards that differ from the countywide vulnerabilities. This differentiation exists due to factors such as geographic location, topography, geologic differences, and proximity to hazards.

In addition to this summary section, within the discussion of each hazard in the profiles section, there is narrative identifying the specific municipalities or areas of the county that have been affected by hazards, the extent of impact, and the probability of future occurrence in Anderson County. The Table below summarizes each jurisdiction's specific risk to each identified hazard.

Table 6.39 Likelihood Of Potential Hazard Incident Occurring

	Drought	Earthquake	Extreme Temp	Flooding	High Wind	Hail	Ice/Snow	Land/Mudslides	Land Subsidence	Lightning	Wildfires	Hazmat	Meth Lab	Terrorism	Urban Fire	Pandemic	Total	Likelihood
Anderson County	2	1	1	2	3	2	2	3	2	3	3	3	3	1	3	1	35	**H**
Clinton	2	1	1	2	3	2	2	2	1	3	1	2	2	1	3	1	29	**H**
Lake City	2	1	1	2	3	2	2	1	1	3	1	2	2	1	3	1	28	**M**
Norris	2	1	1	1	3	2	2	1	1	3	1	1	1	1	3	1	25	**M**
Oak Ridge	2	1	1	1	3	2	2	1	1	3	1	3	2	2	3	1	29	**H**
Oliver Springs	2	1	1	2	3	2	2	2	1	3	2	3	2	1	3	1	31	**H**
Total																		

Likelihood of occurrence in any single year. Very Likely=3, Likely=2, Possible=1
29-35 total likelihood of hazard occurrence is high, 20-28 total likelihood of hazard occurrence is medium, 0-19 total likelihood of hazard occurrence is low.

In addition to differing levels of vulnerability to identified hazards, individual municipalities can also suffer significant differences in losses resulting from the impact and extent of a disaster. Generally these losses are a direct result of population density, commercial development, or housing density and/or value. Within the discussion of each hazard profile, the narrative identifies those municipalities and specific areas of the county that have increased vulnerability and impact to that hazard and notes the factors contributing to an increased impact or vulnerability. The table below depicts the differing aspects of estimated losses by jurisdiction.

Table 6.40 Impact Of Potential Hazard Incident

	Drought	Earthquake	Extreme Temp	Flooding	High Wind	Hail	Ice/Snow	Land/Mudslides	Land Subsidence	Lightning	Wildfires	Hazmat	Meth Lab	Terrorism	Urban Fire	Pandemic	Total	Impact
Anderson County	2	2	2	3	2	2	2	2	2	2	3	2	2	1	2	3	34	**H**
Clinton	1	3	1	2	3	2	2	1	1	2	1	3	2	3	3	3	33	**H**
Lake City	1	2	1	2	3	2	2	1	1	2	1	3	1	2	2	3	29	**H**
Norris	1	2	1	1	3	2	2	1	1	2	1	3	1	2	2	3	28	**M**
Oak Ridge	1	3	1	1	3	2	2	1	1	2	1	3	2	3	3	3	32	**H**
Oliver Springs	1	2	1	2	3	3	2	1	1	2	2	3	1	2	2	3	31	**H**
Total																		

3 = High – Significant and lasting destructive effect on lives or property
2 = Medium – Moderate destructive effect on lives or property; recovery is takes time and is moderately expensive
1 = Low -Lower magnitude of destructive effect on lives or property; recovery is accomplished in a reasonable period of time and is low cost
29-34-Impact of all hazards is high, 20-28-impact of all hazards is medium, 0-19-Impact of all hazards is low

SECTION 7
CAPABILITIES AND HAZARD MITIGATION STRATEGY

7.1 INTRODUCTION

This section of the Plan discusses the capability of Anderson County and the participating local jurisdictions to implement hazard mitigation actions.

The purpose of conducting a capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects. It is important to establish goals, objectives, and actions that are feasible, based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A capability assessment helps determine which mitigation actions are practical and likely to be implemented given a local government's regulatory framework, level of administrative and technical support, and fiscal resources.

The intent of the Mitigation Strategy is to provide Anderson County and its municipal jurisdictions with goals that will guide future mitigation policy and project administration, along with a list of proposed actions deemed necessary to meet those goals and reduce the impact of natural and technological and human-caused hazards. It is designed to be comprehensive and strategic in nature.

7.1.1 2011 Plan Update

Chapter 5 in the 2005 plan is now Section 7 in the 2011 Plan update and now contains a comprehensive capabilities assessment of Anderson County. Capabilities of individual participating jurisdictions are also included in an Individual Mitigation Action Plan for each jurisdiction. The mitigation strategy for the 2011 Plan update has been significantly enhanced. Countywide mitigation goals, objectives, and action items were adopted by each participating jurisdiction. In addition, each participating municipality developed its own Mitigation Action Plan that can be found in the Individual Mitigation Plans Annex.

The 2011 Plan update also now contains added components, which include identifying NFIP status, repetitive loss properties, and prioritizing mitigation actions using the "STAPLEE" methodology. There are now new actions addressing NFIP and protection of existing and new structures.

The mitigation actions identified in the 2005 plan have been extensively reviewed. The effectiveness of the actions implemented is documented in this section. The actions not implemented are either carried forward to this updated Plan or have been eliminated as not feasible or no longer an effective action.

7.2 JURISDICTION CAPABILITIES

7.2.1 Capability Assessment Overview

A capability assessment has two primary components: an inventory of a local jurisdiction's relevant plans, ordinances, or programs already in place, and an analysis of its capacity to carry them out. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local level, which should continue to be supported and enhanced through future mitigation efforts. The capability assessment completed for Anderson County and its jurisdictions serves as a critical planning step and is an integral part of the foundation for designing an effective multi-jurisdictional hazard mitigation strategy. Coupled with the Risk Assessment, the Capability Assessment helps identify and target meaningful mitigation actions for incorporation in the Mitigation Strategy section of the Hazard Mitigation Plan. It not only helps establish the goals and objectives for Anderson County, but also ensures that those goals and objectives are realistically achievable under given local conditions.

7.2.2 Conducting the Capability Assessment

In order to facilitate the inventory and analysis of local government capabilities throughout Anderson County, a Capability Assessment Survey was distributed to the county and its municipalities. The survey was completed by appropriate local government officials and requested information on a variety of "capability indicators" such as existing local plans, policies, programs, or ordinances that contribute to the community's ability to implement hazard mitigation actions. Other indicators requested included information related to each jurisdiction's fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes. At a minimum, survey results provide an extensive inventory of existing local plans, ordinances, programs, and resources in place or under development. The survey instrument not only helps to accurately assess each jurisdiction's degree of local capability, but also serves as a good source of introspection for those jurisdictions wishing to improve their capability as identified gaps, weaknesses, or conflicts can be viewed as opportunities for specific actions to be proposed as part of the community's mitigation strategy.

The survey consisted of three worksheets that each participating jurisdiction's hazard mitigation planning representative completed. The worksheet for Anderson County is included in this section. The worksheets for each municipality are included in the individual Mitigation Action Plans for each municipality.

Worksheet 1: Legal and Regulatory Capability

This worksheet documents authorities available to the jurisdiction and/or enabling legislation at the state level affecting planning and land management tools that support local hazard mitigation planning efforts. The following planning and land management tools are typically used by states and local and tribal jurisdictions to implement hazard mitigation activities. If the jurisdiction does not have this capability or authority, does another entity/jurisdiction have this authority at a higher level of government (county, parish, or regional political entity), or does the state prohibit the local jurisdictions from having this authority?

Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that

account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspections all affect the level of hazard risk faced by a community.

Capital Improvements Plans (CIP) guide the scheduling of spending on public improvements. A CIP can serve as an important mechanism to guide future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

Comprehensive Plans incorporate all aspects of the various tactical plans and programs into a strategic county plan that guides the county and its jurisdictions to successfully improve and enhance the quality of life for all citizens.

Continuity of Operations Plans (COOP) and Continuity of Government Plans (COG) define jurisdiction succession and recovery from disasters. The plan identifies alternate sites, critical processes, records, personnel, tools, etc. that are required to re-establish critical services to the community within 12 hours and be sustained for a minimum of 30 days.

Economic Development Plans provide for development of existing business and a strategy to attract new business to locate in the county. A successful Economic Development Plan provides long-term, attractive employment opportunity to communities and increases the tax base.

EMAP Certification is certification by the Emergency Management Accreditation Program that certifies that the jurisdiction meets all the NIMS and NFPA-1600 requirements.

Emergency Response Plans are part of an Emergency Operations Plan (EOP) that outlines responsibilities and the means by which resources are deployed following an emergency incident or disaster.

Flood Management Plans (or a flood mitigation plan) provide a framework for action regarding the corrective and preventative measures in place to reduce flood-related impacts. Typical flood control activities include structural flood control works (such as bank stabilization, levees, and drainage channels), acquisition of flood-prone land, flood insurance programs and studies, river and basin management plans, public education programs, and flood warning and emergency preparedness planning.

National Flood Insurance Program (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments. The program is promoted by FEMA as a basic first step for implementing and sustaining an effective hazard mitigation program. It is used as a key indicator for measuring local capability as part of this assessment. In order for a county or municipality to join the NFIP, it must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain.

Community Rating System (CRS) is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP, by adding extra measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. This rating can reduce the cost of flood insurance for the community.

Growth Control Ordinances are primarily used by local governments to encourage growth in an orderly manner in the areas covered by the ordinance. The purpose of most growth control ordinances is to preserve residential housing values, protect historic areas, and insure that local governments can provide appropriate services to citizens.

Hazard Setback and Hillside Ordinances or Regulations are usually part of a comprehensive land use plan. Typically, a comprehensive plan is comprised of demographics, land use, transportation elements, and community facilities. Given the nature of the plan and its regulatory standing, the integration of hazard mitigation measures into the comprehensive plan enhances the likelihood of achieving risk reduction goals, objectives, and actions.

Historic Ordinances Identify and protect historic assets, structures, or areas through the use of zoning and building regulations.

Post-Disaster Ordinances provide for the protection of lives and property and enhance recovery from disasters. The ordinance is used to control price gouging, and allows local governments to facilitate the purchase and deployment of equipment and resources to speed disaster recovery.

A Post-Disaster Recovery Plan provides the framework to establish assistance to victims of disaster, assess the long-term economic effects of disaster on the community, facilitate post-disaster recovery, and assist the community with redevelopment plans.

Real Estate Disclosure facilitates real estate transactions and ensures that both buyers and sellers fully understand any mitigating circumstances associated with properties.

Site Plans/Subdivision Ordinance are intended to regulate the development of residential, commercial, industrial, or other uses, including public infrastructure, as land is subdivided into lots for future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development.

Wildfire Ordinances are a means to control the potential of wildfire occurrence by requiring burn permits and the reduction of fuel for wildfires in both urban interfaces and forests in general.

Zoning Ordinances are the means for local governments to control land use. As part of a community's police power, zoning ordinances are used to protect the public health, safety, and welfare of its citizens. Since zoning regulations enable local jurisdictions to limit the type and density of development, it can serve as a powerful tool when applied in identified hazard areas.

The Legal and Regulatory Capabilities survey documents authorities available to the jurisdiction and/or enabling legislation at the state level affecting planning and land management tools that support local hazard mitigation planning efforts. The identified planning and land management tools are typically used by states and local and tribal jurisdictions to implement hazard mitigation activities. If the jurisdiction does not have this capability or authority, another entity/jurisdiction may have this authority at a higher level of government (county, parish, or regional political entity), or the state may prohibit local jurisdictions from having this authority.

Table 7.1 Anderson County Legal And Regulatory Capabilities

Regulatory Tools/Plans	Regulatory Type: Ordinance, Resolution, Codes, Plans Etc.	Date Adopted	Local Authority	State Prohibited	Higher Authority	Electronic copy included
Building Codes	Southern Building Code – ICC (2003)	08/2005	Y			
	Plumbing Code (2003)	08/2005	Y			
	Mechanical Code (2003)	08/2005	Y			
	Gas Code (2003)	08/2005	Y			
	Existing Building Code (2003)	08/2005	Y			
	Swimming Pool Code (2003)	08/2005	Y			
	Housing Code (2003)	02/2006	Y			
	Unsafe Building Code (2003)	02/2006	Y			
Capital Improvements Plan	Annually with Budget	Annually	Y			
Comprehensive Plan	Adopted Comprehensive Plan	06/2009	Y			
Continuity of Operations Plan						
Community Rating System (Flood)						
Economic Development Plan						
Emergency Management Accredited						
Emergency Response Plan	Anderson County Emergency Operations Plan	06/2004	Y		Y	Y
Flood Management Plan	Resolution	01/2005	Y			
Storm Water/Pollution Plan	Resolution	01/2005	Y			
Growth Control Ordinance	Anderson County Urban Growth Plan	03/2001	Y			
Hazard Mitigation Plan	Anderson County Multi-Jurisdictional Plan	10/2005	Y		Y	Y
Hazard Setback Regulations						
Hillside Ordinance						
Historic Ordinance						
NFIP Participant	#470217	09/05/84	Y			
Post-disaster Ordinance						
Post-disaster Recovery Plan	Anderson County Emergency Operations Plan		Y		Y	Y
Real Estate Disclosure	State Real Estate Commission				Y	
Site Plan Requirements	Anderson County Zoning Resolution	08/2009	Y			
Shoreline Ordinance	N/A					
Subdivision Regulations	Anderson County Subdivision Regulation	08/2009	Y			
Wildfire Ordinance						
Zoning Ordinances	Resolution	10/2009	Y			

The Administrative and Technical Capabilities survey documents personnel employed the jurisdiction and public and private sector resources that may be accessed to mitigate hazards in the community. For smaller jurisdictions with limited capacities, no local staff resources may be available for many of the categories, and public resources at the next higher level of government may be able to provide technical assistance to the community.

For some hazard mitigation actions, state and federal agencies that provide technical assistance, such as the U.S. Department of Agriculture (USDA) Cooperative Extension Service, may be listed.

Table 7.2 Anderson County Administrative And Technical Capabilities

C=County Provides #, S=State Provides #, F=Federal Provides #

Position	Staff/Personnel Resources	Department/Agency	Number Fully Trained	Number Fully Equipped	Total Personnel
Agriculture Resource	Agent	State/County Extension Svc.	S3	S3	S3
Building Inspector	Professional(s)	Zoning and Inspections	C3	C3	C3
Emergency Communications	911 specialists	E-911 Dispatch	C13	C13	C13
Emergency Manager	Professional(s)	Emergency Management	C1	C1	C1
Emergency Staff	Professional(s)	Emergency Management	C1	C1	C1
EMS	Certified	Emergency Medical Service	C95	C95	C95
EMT/Paramedic	Certified	Fire/Rescue Service	C48	C28	C76
Fire Personnel	Volunteer(s)	Volunteer Fire Departments	C116	C116	C116
Floodplain Manager	Engineer(s)	Engineering/Public Works	C1	C1	C1
GIS Specialist	Professional(s)	Planning & Zoning	C1	C1	C1
Government Elected	Elected Officials	Mayor/Commissioners	C17	C17	C17
Government Administration	Employees	Jurisdiction Total	C54	C54	C54
Grant writer	Professional(s)	Jurisdiction	C1	C1	C1
Hazards Analysis	Professional(s)	Emergency Management	C1	C1	C1
Hazmat Team	Certified	Fire Department	C6	C6	C6
Information Systems	Professional	Information Systems Department	C1	C1	C1
Land Use/Management	Engineer(s)/Planners	Planning & Zoning	C1	C1	C1
Law Enforcement	Sheriff, Deputies	Sheriff's Office	C82	C82	C82
Medical Practioners	Doctor(s)/Nurse(s)	Medical Facilities	362	362	362
Public Health	Professionals	Department of Public Health	C12	C12	C12
Public Works	Engineers/Staff	Highway Department	C33	C33	C33
Public Utilities	Professionals	Public Utilities	C29	C29	C29
Search & Rescue	Volunteers	Rescue Squad	C18	C5	C23
Surveyor	Professional	Contracted	1	1	1
		Total Jurisdiction Employees		401	

The Fiscal Capabilities survey identifies whether the jurisdiction has access to or is eligible to use certain financial resources for hazard mitigation.

Table 7.3 Anderson County Fiscal Capabilities

Financial Resources	Description	Status			
		Yes	No	TBD	Used
Community Grants	Community Development Block Grants (CDBG)	Y			Y
	Emergency Management Performance Grants (EMPG)	Y			Y
	Hazard Mitigation Planning Grants (HMPG) – disaster related	Y			
	PDM for Disaster Resistant Universities		N		
	PDM Grants for Communities	Y			Y
	Department of Health Grants	Y			Y
	Department of Justice Grants	Y			Y
	Department of Agriculture Grants	Y			Y
	Department of Energy Grants	Y			Y
	Department of Education Grants	Y			Y
	Fire Department Grants	Y			Y
	Flood Management Grants (FMA)	Y			
	Homeland Security Grant Program (HSGP)	Y			Y
	Repetitive Flood Claims Grants (RFC)	Y			Y
	Severe Repetitive Loss Grants (SRL)	Y			
	Private foundation grants	Y			Y
	Private business/industry grants			X	
Debt Procurement	Incur debt based on special tax/revenue bonds	Y			Y
Dept Procurement	Incur debt through private activity bonds (private/jurisdiction bonds)		N		
Impact Fees	Charge developer fees for new developments (impact fees)	Y			Y
Jurisdiction Bonds	Incur debt via general obligation bonds (no guaranteed repayment source)	Y			
Project Funding	Capital improvement budget	Y			Y
Spending Restrictions	Able to withhold spending in hazard-prone areas (permits)	Y			Y
Special Taxes	Authority to levy taxes for specific purposes (i.e. sales tax)	Y			Y
Utility Fees	Collect fees for water, sewer, gas, cable or electric service	Y			Y

Annual RevenueFY09	$103,077,650	Annual Budget	$103,077,650	Sales Tax Revenue	$8,130,494
Public Structures	Number 41	Total Value	1,215,435,920	Total Sq. Ft.	1,181,708
Private Facilities	Number of Businesses	616		Number of Industries	8

7.2.3 Participating Jurisdictions' Capability Assessment Findings

The findings of the capability assessment are summarized in this Plan to provide insight into the relevant capacity of Anderson County's jurisdictions to implement hazard mitigation activities. All information is based upon the responses provided by local government officials to the Capability Assessment Survey and during discussions throughout the planning process.

The information provided by participating jurisdictions was scored using a simple scoring methodology to rank each jurisdiction's overall capability. A total score and general capability rating of "High," "Medium" or "Low" was then determined for each jurisdiction according to the total number of points. The classifications are designed to provide an assessment of each jurisdiction's local capability. The results of this multi-jurisdictional capability assessment provide critical information for developing an effective and meaningful mitigation strategy.

7.2.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of existing plans, ordinances, and programs by a local government. These measures can help demonstrate a local jurisdiction's commitment to guiding and managing growth, development, and redevelopment in a responsible manner, while maintaining the general welfare of the community. Such measures include emergency response and mitigation planning, comprehensive land use planning, and transportation planning, in addition to the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built. Although some conflicts can arise, these planning initiatives present significant opportunities to integrate hazard mitigation principles and practices into the local decision-making process.

This information will help identify opportunities to address existing gaps, weaknesses, or conflicts with other initiatives, in addition to integrating this Plan with existing planning mechanisms, where appropriate.

Table 7.4 Planning and Regulatory Capability Summary

Regulatory Control in Place Yes=1 No=0 0-8=Low 9-15=Medium 16-24=High Jurisdiction	Building Codes	Capital Improvement Plan	Comprehensive Plan	COOP/COG Plan	Community Rating System	Economic Development Plan	EMAP Certified	Emergency Response Plan	Flood Management Plan	Growth Control Ordinance	Hazard Mitigation Plan	Hazard Setback Ordinance	Hillside Ordinance	Historic Ordinance	NFIP Participant	Post-Disaster Ordinance	Post-Disaster Recovery Plan	Real Estate Disclosure	Shoreline Ordinance	Site Plan Requirements	Storm Water Plan	Subdivision Regulations	Wildfire Ordinance	Zoning Regulations	Score	CAPABILITY
Anderson County	1	1	1	0	0	0	0	1	1	1	1	0	0	0	1	0	1	1	0	1	1	1	0	1	14	**M**
Clinton	1	1	1	0	0	1	0	1	1	1	1	1	0	1	1	0	1	1	0	1	0	1	1	1	17	**H**
Lake City	1	1	0	0	0	0	0	1	1	1	1	0	0	0	1	0	1	1	0	1	0	1	1	1	13	**M**
Norris	1	1	1	0	0	1	0	1	1	1	1	0	0	0	1	0	1	1	0	1	0	1	1	1	15	**M**
Oak Ridge	1	1	1	0	0	1	0	1	1	1	1	1	1	0	1	0	1	1	0	1	0	1	1	1	17	**H**
Oliver Springs	1	1	0	0	0	1	0	1	1	1	1	0	1	0	1	0	1	1	0	1	0	1	1	1	15	**M**

7.2.3.2 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability is evaluated by determining how mitigation activities are assigned to local departments and the personnel resources available to implement the activities. Key resources to respond to and mitigate disaster include the following:

Table 7.5 Administrative and Technical Capability Summary

Resources in Place Yes=2 Other Authority=1 No=0 36-46=High 20-35=Medium 0-19=Low Jurisdiction	Agriculture Risk Assessor	Building Inspector	Emergency Manager	Emergency Communications	Emergency Staff	EMS Certified	Emt/Paramedics Certified	Fire Service	Flood Plain Manager	GIS Specialist	Government Administrative	Government Elected	Grant Writer	Hazard Analysis	HAZMAT Team	Information Systems	Land Use Management	Law Enforcement	Medical Practioners	Public Works	Public Utilities	Search and Rescue	Surveyor	Score	CAPABILITY
Anderson County	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	45	**H**
Clinton	1	2	1	2	1	2	2	2	0	2	2	2	0	0	2	2	1	2	2	2	2	2	2	36	**H**
Lake City	1	1	1	2	1	2	2	2	1	1	2	2	0	0	1	2	1	2	0	2	2	1	2	31	**M**
Norris	1	2	1	2	1	2	2	2	2	0	2	2	0	0	1	2	1	2	2	2	2	1	2	34	**M**
Oak Ridge	1	2	1	2	1	2	2	2	1	1	2	2	2	1	2	2	2	2	2	2	2	2	2	40	**H**
Oliver Springs	1	1	1	2	1	2	2	2	1	1	2	2	0	0	1	2	1	2	2	2	2	1	2	33	**M**

7.2.3.3 Fiscal Capability

The ability of a local government to take action is closely associated with the amount of money available to implement policies and projects. This may take the form of outside grants or local-based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff or administrative costs. In other cases, direct expenses are linked to an actual project such as the acquisition of flood prone homes, which can require a substantial commitment from local, state, and federal funding sources. The Capability Assessment Survey was used to capture information on each jurisdiction's fiscal capability through the identification of locally available financial resources.

The survey identifies whether the jurisdiction does or does not have the capability and scores overall fiscal capability.

Table 7.6 Fiscal Capability Summary

Fiscal Capability in Place Yes=1 No=0 7-9=High 5-7=Medium 0-4=Low Jurisdiction	Community Grants	Public Debt Procurement	Private Debt Procurement	Impact Fees	Jurisdiction Bonds	Project Funding	Spending Restrictions	Special Taxes	Utility Fees	Score	CAPABILITY
Anderson County	1	1	0	1	1	1	1	1	1	8	**H**
Clinton	1	1	1	1	1	1	1	1	1	9	**H**
Lake City	1	1	0	1	1	1	1	1	1	8	**H**
Norris	1	1	0	1	1	1	1	1	1	8	**H**
Oak Ridge	1	1	1	1	1	1	1	1	1	9	**H**
Oliver Springs	1	1	0	1	1	1	1	1	1	8	**H**

7.2.3.4 External Resources Capabilities

The tables below list the primary local, state and federal resources available to Anderson County and its municipalities for mitigation planning and implementation.

Table 7.7 Anderson County Mitigation Capability Assessment

Agency/Department Name and Function	Contact Name and email	Contact Telephone	Effect on Loss Reduction		
			Support	Facilitate	Hinder
Anderson County Emergency Management	Steve Payne paynkey@hotmail.com	865-898-6280	X	X	
Anderson County LEPC	Trish Polfus tpolfus@covhlth.com	865-835-3267	X	X	
Anderson County 911 Center Communications	Mark Lucas mlucas@tnacso.net	865-463-6834	X	X	
Anderson County Fire Commission	James Kolopus claxtonfire@att.net	865-463-8955	X	X	
Anderson County Tax Assessor	Vernon Long vlong@andersontn.org	865-457-6225	X	X	
Anderson County GIS	Matthew Lambert mlambert@andersontn.org	865-463-6843	X	X	
Anderson County Highway Department	Gary Long garylongachd@comcast.net	865-457-2735	X	X	
Anderson County Engineering & Public Works	Brian Jenks bjenks@andersontn.org	865-463-6856	X	X	
Anderson County Parks Department	Christine Dixon cdixon@andersontn.org	865-494-9352	X	X	
Anderson County Emergency Medical Service Providers	Nathan Sweet acems_1@comcast.net	865-457-8609	X	X	
American Red Cross Appalachian Chapter	Tony Farris farrist@ comcast.net	865-483-5641	X	X	
Anderson County Schools	Larry Foster lfoster@acs.ac	865-463-8631	X	X	
Clinton City Schools	Vicki Violette vviolette@clintonschools.net	865-457-0159	X	X	
Oak Ridge Schools	Tom Bailey tbailey@ortn.edu	865-425-9001	X	X	
Anderson County Law Enforcement Command Staff	Paul White sheriff@tnacso.net	865-463-6834	X	X	
Anderson County Health Department/Environmental	Gail Baird Gail.Baird@tn.gov	865-425-8775	X	X	
The Courier News (newspaper)	Ken Leinart ken@hometownclinton.com	865-457-2515	X	X	
The Oak Ridger (newspaper)	Darrell Richardson darrell.richardson@oakridger.com	865-481-1021	X	X	
BBB Communications (local cable TV)	Brad Jones news@bbbtv12.com	865-483-8112	X	X	

FEDERAL AND STATE MITIGATION CAPABILITY ASSESSMENT					
Agency/Department Name and Function	Contact Name and email	Contact Telephone	Effect on Loss Reduction		
			Support	Facilitate	Hinder
Federal Emergency Management Agency	W. Craig Fugate	202 646-2500	X	X	
U .S. Department of Homeland Security	Janet Napolitano	202-282-8000	X	X	
National Flood Insurance Program	Norbert Schwartz	312-408-5500	X	X	
Assistance to Firefighters Grant Program	Steve Dumovich Steve.dumovich@dhs.gov	312-408-5588	X	X	
National Weather Service - Morristown	George Matthews George.Matthews@noaa.gov	423-586-3771	X	X	
Tennessee Valley Authority	Maurice Artis martis@tva.gov	423-751-8457	X	X	
Department of Energy – Oak Ridge Reservation	Tony Hart harttony@msn.com	865-574-8171	X	X	
Tennessee Department of Homeland Security	Jenny Holden Jenny.Holden@knoxcounty.org	865-215-1161	X	X	
Tennessee Emergency Management Agency	Tom Cloud tcloud@tnema.org	865-414-5244	X	X	
Tennessee Department of Public Safety	William Snodgrass William.snodgrass@tn.gov	615-532-7825	X	X	
Tennessee Division of Forestry	Bruce Miller bmrmiller@comcast.net	865-494-9434	X	X	
Tennessee Department of Human Services	Gary McCarroll Gary.McCarroll@tn.gov	865-457-3660	X	X	
Tennessee Department of Health & Environment	Art Miller art.miller@tn.gov	865-425-8775	X	X	
Tennessee State Fire Marshal	Jim Pillow Jim.pillow@tn.gov	615-741-2981	X	X	
Tennessee Department of Environment & Conservation	Phil Chambers Phil.Chambers@tn.gov	865-594-6035	X	X	
Tennessee Department of Transportation	Jim Phillips Jim.Phillips@tn.gov	865-594-2410	X	X	
Tennessee Department of Agriculture – Extension Agent	Joe Hall jhall@utk.edu		X	X	
County Technical Advisory Service	Kevin Lauer Kevin.Lauer@tennessee.edu	865-974-3098	X	X	
Municipal Technical Advisory Service	Ron Darden Ron.Darden@tennessee.edu	865-974-0411	X	X	
State Representative	John Reagan Rep.johnreagan@legislature.state.tn.us	865-482-2455	X	X	

7.2.3.5 Shelter Capability

Anderson County and its participating jurisdictions have several shelters. There are designated Red Cross shelters and other facilities that are designated as shelters by municipalities and Anderson County. Below is a table that identifies the shelters and their characteristics.

Table 7.8 Anderson County Shelters

Location	Capacity	Sleeping Capacity	Kitchen Facilities	On Site Commodities	Emergency Generator	Heat/AC	Communications	Safety Rating	Comments
Primary Shelters in Bold									A mobile communications unit and a generator is provided by Red Cross
Anderson County High School	1175	588	Yes	Yes	No	Yes	No	NA	
Clinton High School	965	483	Yes	Yes	No	Yes	No	N/A	
Oak Ridge High School	970	485	Yes	Yes	No	Yes	No	N/A	
Andersonville Elementary School	138	275	Yes	Yes	No	Yes	No	N/A	
Briceville Elementary School	233	465	Yes	Yes	No	Yes	No	N/A	
Claxton Elementary School	430	860	Yes	Yes	No	Yes	No	N/A	
Clinton Middle School	295	590	Yes	Yes	No	Yes	No	N/A	
Dutch Valley Elementary School	80	160	Yes	Yes	No	Yes	No	N/A	
Fairview Elementary School	80	160	Yes	Yes	No	Yes	No	N/A	
Grand Oaks Elementary School	103	205	Yes	Yes	No	Yes	No	N/A	
Lake City Elementary School	208	415	Yes	Yes	No	Yes	No	N/A	
Lake City Middle School	215	430	Yes	Yes	No	Yes	No	N/A	
Norris Elementary School	140	280	Yes	Yes	No	Yes	No	N/A	
Norris Middle School	240	480	Yes	Yes	No	Yes	No	N/A	
Norwood Elementary School	158	315	Yes	Yes	No	Yes	No	N/A	
Norwood Middle School	323	645	Yes	Yes	No	Yes	No	N/A	
Clinton Elementary School	178	355	Yes	Yes	No	Yes	No	N/A	
North Clinton Elementary School	78	155	Yes	Yes	No	Yes	No	N/A	
South Clinton Elementary School	90	180	Yes	Yes	No	Yes	No	N/A	

7.3 REPETITIVE FLOODING MITIGATION

This section describes the source of repetitive flooding problems and identifies the number and type (residential, commercial or governmental) of repetitive loss properties in the jurisdiction.

A repetitive loss structure, as defined by the National Flood Insurance Program (NFIP), is a structure, covered by flood insurance by NFIP, that has suffered flood damage twice over a 10-year period in which the average cost of repair is over 25% of the market value of the structure at the time of the incident.

The table below identifies the repetitive flooding sources structures and mitigation measures taken to reduce future incidents.

Table 7.9 Repetitive Flooding Mitigation

Number of Structures	Structure Type Residential Commercial Government Critical Facility Etc.	Flood Type Storm Water Out Of Banks Low Lying Maintenance	Location	Number of Incidents	Mitigation Action Structure Buy Out Levee Built Drainage Improvement Etc.
1	Residential	Out of Banks	Briceville	2	Drainage Improvement
1	Residential	Out of Banks	Briceville	2	Drainage Improvement
1	Residential	Out of Banks	Frost Bottom	2	Drainage Improvement
1	Residential	Out of Banks	Briceville	1	Structure Buy Out

7.4 MITIGATION STRATEGY

Mitigation Strategy §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

Development of the comprehensive strategy included a thorough review of all natural and selected technological and human caused hazards, and identification of policies and projects to reduce the future impacts of hazards and assist the county and municipalities to achieve compatible economic, environmental, and social goals. The strategy ensures that all policies and projects are linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target implementation deadlines. When applicable, funding sources are identified that can be used to assist in project implementation.

The first step in designing the Mitigation Strategy includes a review of existing mitigation measures and the identification of countywide Mitigation Goals. Mitigation Goals represent broad statements that are achieved through the implementation of more specific, action-oriented objectives listed in the county's Mitigation Action Plan. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas through a local ordinance), and hazard mitigation projects that seek to address specifically targeted hazard risks (such as the mitigation of an area prone to repetitive flooding).

The second step involves the identification and analysis of available mitigation measures to help achieve the identified mitigation goals. This is a long-term, continuous process sustained through the development and maintenance of this Plan. Alternative mitigation measures will continue to

be considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as this Plan is maintained.

The third and last step in designing the Mitigation Strategy is the creation of the local Mitigation Action Plans (MAPs). The MAPs represent unambiguous plans for action, and are considered to be the most essential outcome of the mitigation planning process. They include a prioritized listing of proposed hazard mitigation actions (policies and projects) for each of Anderson County's jurisdictions, along with accompanying information regarding those agencies or individuals assigned responsibility for their implementation, potential funding sources and an estimated target date for implementation. The MAPs provide those individuals or agencies responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring progress over time.

7.4.1 Mitigation Goals and Objectives

Requirement §201.6(c)(3)(i): The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
A: Does the new or updated plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards?

CRS Step 6: Set Goals: Credit is based on a statement of goals to reduce or avoid long-term vulnerability to the identified hazards.

FMA Requirement §78.5(c): The applicant's floodplain management goals for the area covered by the plan.

The hazard mitigation planning process has brought together a group of dedicated representatives from the jurisdictions comprising Anderson County. An early suggestion from several members of the planning committee that the group continue to meet on a regular schedule after Plan approval speaks for the cooperation and sense of community each jurisdiction brings to the planning effort, and instills confidence that the jurisdictions will unite in mitigation and other efforts.

It is the vision of Anderson County and its municipalities to promote citizen and governmental responsibility for hazard awareness and preparedness, and to foster cooperative planning among the jurisdictions to reduce the impact of natural, technological, and human-caused hazards on public and private assets, and on the safety and welfare of all citizens.

The goals and objectives of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan were crafted early in the planning process through a facilitated discussion and brainstorming session with the Mitigation Planning Committee. Both state and local risk assessment findings were used as the bases of goal and objective setting. At each step of the planning process the goals and objectives were reviewed and modified, if necessary, based on any new information that was gathered and assimilated into the Plan. Many of the profiled hazards are addressed by specific goals and objectives while the "All Hazard" goal and objectives address all hazards. The Mitigation Planning Committee believes that all of the following goals and objectives are necessary to begin to address hazard issues in Anderson County. The following goal and objective statements represent a broad target for Anderson County and its municipalities to achieve through the implementation of their own specific Mitigation Action Plans before the next Plan update.

Table 7.10 Countywide Goals and Objectives	
Goals	**Objectives**
Goal 1: Improve the capability of Anderson County and participating jurisdictions to prepare for, respond to, and recover from all profiled hazards	Objective 1.1: Improve capabilities to evaluate and manage hazard incidents. Objective 1.2: Improve dissemination of all hazards awareness, preparedness, and training information to citizens. Objective 1.3: Improve warning, evacuation, and information capabilities. Objective 1.4: Improve multi-jurisdictional, multi-agency response to all hazards Objective 1.5: Improve capabilities to recover from all hazard incidents.
Goal 2: Minimize the impact of hazardous materials spills and releases.	Objective 2.1: Identify and establish requirements for fixed sites with reportable quantities of hazardous materials. Objective 2.2: Educate citizens on response to hazardous materials incidents. Objective 2.3 Improve responder safety and response to hazardous materials incidents. Objective 2.4: Reduce effects to the environment from hazardous materials spills. Objective 2.5: Reduce risk of citizen proximity to hazardous materials incidents.
Goal 3: Minimize the impact of severe weather incidents on citizens and property.	Objective 3.1: Reduce the impact of drought. Objective 3.2: Reduce the impact of extreme temperatures. Objective 3.3: Reduce loss of life and property from high wind, hail, and lightning incidents caused by tropical storms, thunderstorms, and tornados. Objective 3.4: Reduce the impact of ice and snow caused by severe winter storms. Objective 3.5: Minimize utility loss during all severe weather incidents.
Goal 4: Reduce the impact on citizens and property from flash and riverine flooding incidents caused by thunderstorms and tropical storms.	Objective 4.1: Continue participation in and improve citizen awareness of the NFIP. Objective 4.2: Apply for Community Rating System approval. Objective 4.3: Identify and restrict development in flood prone areas. Objective 4.4: Reduce flooding from streams and creeks. Objective 4.5: Reduce repetitive roadway flooding. Objective 4.6: Increase citizen awareness of flood hazard and safety. Objective 4.7: Improve emergency response to flood incidents.
Goal 5: Reduce loss of life and property from urban fires.	Objective 5.1: Increase citizen awareness of fire hazards, prevention, and safety. Objective 5.2: Reduce the incidence and severity of structure fires. Objective 5.3: Improve firefighter safety and urban fire response capabilities. Objective 5.4: Improve water supply in rural areas.
Goal 6: Minimize the impact of wildfires on citizens and property.	Objective 6.1: Increase citizen awareness of and preparedness for wildfire incidents. Objective 6.2: Enforce outdoor burn ban and permit requirements. Objective 6.3: Improve firefighter safety and effectiveness in fighting wild land fires. Objective 6.4: Reduce loss of structures in urban interface wildfire incidents.
Goal 7: Protect the county's citizens and assets from domestic and international terrorism.	Objective 7.1: Increase citizen awareness of and preparedness for terrorism incidents. Objective 7.2: Reduce any loss of life resulting from terrorism incidents. Objective 7.3: Improve terrorism response and emergency responder safety.
Goal 8: Reduce loss of life and property from meth labs.	Objective 8.1: Increase citizen awareness of meth lab hazards, recognition, and reporting. Objective 8.2: Improve emergency responder safety at clandestine labs.
Goal 9: Minimize property damage and public risk from landslides.	Objective 9.1: Identify areas prone to landslide. Objective 9.2: Restrict development in areas prone to landslide. Objective 9.3: Increase citizen awareness of landslide hazards.
Goal 10: Minimize potential loss of life and economic impact from dam failure.	Objective 10.1: Reduce loss of life from Norris Dam failure. Objective 10.2: Reduce loss of life and property from failure of privately owned dams. Objective 10.3: Reduce threat of private dam failure.

Goal 11: Minimize damage to property from land subsidence.	Objective 11.1: Identify karst prone areas. Objective 11.2: Improve citizen awareness of land subsidence hazards.
Goal 12: Minimize damage and loss of life from earthquakes.	Objective 12.1: Evaluate the potential for a damaging earthquake in Anderson County. Objective 12.2: Increase citizen awareness of earthquake hazards and pre-disaster mitigation strategies.
Goal 13: Minimize the impact of bioterrorism and widespread health emergencies.	Objective 13.1: Increase citizen awareness of and preparedness for pandemics. Objective 13.2: Improve response to bioterrorism incidents and pandemic emergencies. Objective 13.3: Reduce the impact of pandemic health emergencies on business, agriculture, and emergency services agencies.

7.4.2 Local and State Goal Continuity

The State of Tennessee Hazard Mitigation Plan establishes a major goal and objectives and strategies to accomplish that goal.

GOAL: Reduce or eliminate the adverse affects of natural, technological and human-caused hazards to the socio-economic and physical environments in the State of Tennessee.

Objectives

Objective 1: Strengthen and coordinate activities emphasizing mitigation as an invaluable tool in not only disaster prevention but recovery processes as well.

Objective 2: Educate the public as to risk/vulnerability, preparedness, and mitigation of natural hazards.

Objective 3: Create/update Emergency Operations Plans.

Objective 4: Improve coordination and communications between state and local governmental response organizations as well as the general public.

Objective 5 (Flood): Reduce or eliminate flooding in flood-prone areas and promote proactive enforcement of floodplain regulations.

Objective 6 (Severe Storm): Reduce the impacts of severe storms/tornadoes on vulnerable populations.

Objective 7 (Earthquake): Reduce vulnerability to seismic activity in areas most susceptible to major seismic incidents.

Objective 8 (Extreme Temperatures): Eliminate/lesson loss of life as well as minimize the economic losses from sustained periods of extreme temperatures.

Objective 9 (Drought): Eliminate/lessen loss of life as well as minimize the economic losses from sustained periods of drought.

Objective 10 (Fire): Eliminate/lessen loss of life as well as minimize the economic losses from fire. Reduce/eliminate fire ignition sources as well as augment response capability in less populated areas.

Objective 11 (Geologic): Reduce/eliminate the adverse affects of geologic occurrences.

The mitigation goals, objectives, and actions of the Anderson County Multi-Jurisdictional All Hazards Mitigation Plan are completely congruent with the state goal and objectives.

7.4.3 Identification of Mitigation Actions

In formulating Anderson County's mitigation strategy, a wide range of actions were considered in order to help achieve countywide and jurisdiction goals and objectives. All actions considered by the Mitigation Planning Committee can be classified under one of the following six broad categories of mitigation techniques:

Requirement §201.6(c)(3)(ii): The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.
A. Does the new or updated plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?

CRS Step 7. Review Possible Activities: Credit is based on a comprehensive evaluation of hazard mitigation measures reviewed in the plan. The review must include a description of why certain activities were recommended and why others were not.

Prevention activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are constructed. They are particularly effective in reducing a community's vulnerability in areas where development is limited or capital improvements have not been substantial. Examples of preventative activities include:

- Planning and zoning
- Building codes
- Hazard mapping
- Open space preservation
- Floodplain regulations
- Storm water management regulations
- Drainage system maintenance
- Capital improvements programming
- Shoreline/riverine/fault zone setbacks
- Site planning and landscape design

Property Protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Acquisition
- Relocation
- Building elevation
- Critical facilities protection
- Retrofitting (e.g., wind proofing, flood proofing, seismic design techniques, etc.)
- Safe rooms, shutters, shatter-resistant glass
- Insurance

Natural Resource Protection reduces the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation organizations often implement these protective measures. Examples include:

- Floodplain protection

- Watershed management
- Riparian buffers
- Forest and vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.)
- Erosion and sediment control
- Wetland preservation and restoration
- Habitat preservation
- Slope stabilization

Structural Mitigation Projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard incident through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Reservoirs
- Dams/levees/dikes/floodwalls
- Diversions/detention/retention
- Channel modification
- Storm sewers

Emergency Services measures minimize the impact of a hazard incident on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard incident. Examples include:

- Warning systems
- Evacuation planning and management
- Emergency response training and exercises
- Sandbagging for flood protection

Public Education and Awareness are used to alert residents, elected officials, business owners, property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects
- Speaker series/demonstration events
- Hazard map information
- Real estate disclosure
- Library materials
- Education programs for school children

7.4.4 Selection of Mitigation Actions

In order to determine the most appropriate mitigation techniques for Anderson County and its municipal jurisdictions, local government officials reviewed and considered the findings of the Capability Assessment and Risk Assessment. Other considerations included the effect of each mitigation action on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if

necessary). The following table of alternative mitigation actions was the basis for developing the mitigation actions to insure that all profiled hazards have mitigation actions.

Table 7.11 Alternative Mitigation Actions

HAZARDS> Alternative Mitigation Actions that can affect the adjacent hazards	Drought	Earthquake	Extreme Temp	Flooding	Hail	High Winds	Ice/Snow	Landslides etc	Land Subsidence	Lightning	Wildfire	Hazmat	Illegal Meth Labs	Pandemic	Terrorism	Urban Fire
Building codes		X		X	X	X	X	X	X	X	X	X			X	X
Density regulations			X	X		X			X	X	X	X		X		X
Hazard setback regulations				X				X	X		X	X			X	X
Development regulations	X	X		X		X	X	X	X	X	X	X				X
Wildfire fuel reduction	X										X					X
Hillside regulations		X					X	X								
Post-disaster ordinance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Setback regulations		X		X				X	X		X	X				
Special use permits	X	X	X	X			X	X	X		X	X	X	X	X	X
Storm water controls	X			X												
Comprehensive plan	X	X		X		X	X	X	X	X	X	X	X	X	X	X
Zoning		X		X				X			X	X				X
Acquire in-hazard assets				X								X				
Facility hazard barriers				X											X	
Structure elevation				X												
Relocation of structures				X				X	X							
Structure retrofits		X		X		X	X	X	X	X	X	X			X	X
Dams monitoring		X		X			X	X	X						X	
Levee/seawall mgt		X		X		X	X	X	X							
Real estate disclosure				X		X		X	X		X	X				
Forest management	X			X		X				X	X			X		
Erosion controls				X												
Waterway management	X			X			X	X								
Landscape management	X		X	X	X	X	X	X	X		X				X	X
Wetlands regulations				X			X									
Vital facilities protection		X		X	X	X	X	X	X	X	X	X			X	X
COOP/COG plan		X		X		X	X				X	X		X	X	X
National Incident Management Trng		X		X		X	X				X	X		X	X	X
Emergency Operations Plan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hazard/threat recognition	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hazard warning systems	X	X	X	X	X	X	X		X	X	X	X		X	X	X
Health/safety information		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pre-disaster mitigation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Post-disaster mitigation	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Safe rooms and shelters				X	X	X	X			X	X	X				X
Public education and preparedness	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

7.4.5 Reducing Hazard Impact on New Buildings and Infrastructure

Some of the mitigation actions and projects included in this plan include:

- Adopting and/or enforcing comprehensive building codes.
- Requiring emergency generator pigtails on new government and special needs structures.
- Providing builders information on hazard areas and associated restrictions.
- Restrictions on building structures in hazard areas.
- Developing and or enforcing a comprehensive land use plan.
- Encouraging new power lines to be buried to reduce power outages.
- Encouraging "right of way" maintenance programs for power lines and pipelines to remove burnable debris and trees that could create natural gas, oil, and power outages.
- Extending water lines and hydrants to combat fires.

7.4.6 Reducing Hazards Impact on Existing Buildings and Infrastructure

Some of the mitigation actions in this plan that reduce impact on existing buildings and infrastructure include:

- Retrofitting structures to reduce high wind loss
- Burying existing power lines to reduce outages
- Improving drainage capacity of canals and ditches
- Installing emergency generators in critical government and special needs structures
- Clearing public utility power line "right of way"

7.4.7 National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.
A. Does the new or updated plan describe each jurisdiction's participation in the NFIP?
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?

CRS Step 8: Action Plan: CRS credits regulations that go above and beyond the minimum of the NFIP.

Participation in the NFIP is based on an agreement between communities and FEMA. The NFIP has three basic aspects:

- Floodplain identification and mapping
- Floodplain management
- Flood insurance

First, NFIP participation requires community adoption of flood maps. Mapping flood hazards creates broad-based awareness of the flood hazards and provides the data needed to administer floodplain management programs and to actuarially rate new construction for flood insurance. Second, to be a participant, the NFIP requires communities to adopt and enforce minimum floodplain management regulations that help mitigate the effects of flooding on new and improved structures. Third, community participation in the NFIP enables property owners to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages.

7.4.8 Analyzing and Prioritizing NFIP Compliance Actions

All local mitigation plans approved by FEMA after October 1, 2008 must describe each jurisdiction's participation in the NFIP. All participating jurisdictions participate in the NFIP, have adopted a flood management plan, and have completed mapping of flood plains.

Basic compliance NFIP actions could include, but are not limited to:

1 - Adoption and enforcement of floodplain management requirements, including regulating all and substantially improved construction in Special Flood Hazard Areas (SFHAs).

2 - Floodplain identification and mapping, including any local requests for map updates.

3 - Description of community assistance and monitoring activities.

The following prioritized actions are included in the jurisdictional Mitigation Action Plans:

- Obtain and maintain NFIP FIRMS to identify jurisdiction flood prone areas.
- Use GIS to develop a database of NFIP and other structures in 100/500-year flood plains.
- Adopt/enforce an NFIP flood plain management plan.
- Join/continue to participate in the National Flood Insurance Program (NFIP).
- Achieve/maintain participation in the NFIP Community Rating System.
- Educate builders, developers, and the public on the National Flood Insurance Program.
- Educate builders, developers, and the public on the location of NFIP flood prone areas.
- Adopt/enforce floodplain legislation to require structures to be elevated above NFIP BSE.

7.4.9 Analyzing and Prioritizing Mitigation Actions

FEMA guidance for meeting planning requirements of the DMA2K specifies that governments prioritize their mitigation actions based on the level of risk a hazard poses to the lives and property of a given jurisdiction. In response to this requirement, the Anderson County Mitigation Planning Committee completed a Mitigation Technique Matrix to make certain they addressed, at a minimum, those hazards posing the greatest threat. The matrix provided the committee with the opportunity to cross-reference each of the priority hazards with the comprehensive range of available mitigation techniques, including prevention; property protection; natural resource protection; structural projects; emergency services; and public education and awareness.

Requirement: §201.6(c)(3)(iii): The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
Does the new or updated mitigation strategy include how the actions are prioritized? (For example, is there a discussion of the process and criteria used?
Does the new or updated mitigation strategy address how the actions will be implemented and administered? (For example, does the action plan identify the responsible department, existing and potential resources, and timeframe?
Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?
D. Does the updated plan identify the completed, deleted or deferred actions from the previously approved mitigation plan?

CRS Step 8: Action Plan: Credit is based on an action plan that identifies who does what, when it will be done, and how it will be financed. The actions must benefits of the proposed projects and their associated costs.

Table 7.12 Anderson County Mitigation Technique Matrix					
	Mitigation Technique	Flooding	High Winds	Urban Fires	Hazardous Materials
1	Prevention	Y	Y	Y	Y
2	Property Protection	Y	Y	Y	Y
3	Natural Resource Protection	Y	Y	Y	Y
4	Structural Mitigation Projects	Y	Y	Y	Y
5	Emergency Services	Y	Y	Y	Y
6	Public Education/Awareness	Y	Y	Y	Y

In order to prioritize mitigation actions, the "STAPLEE" criteria form was used. An addition to the "STAPLEE" evaluation is to use a weighting factor of 3 for mitigating the loss of life or property, and for reducing the overall economic impact by implementing a mitigation action. A weighting factor of 2 is used for the high benefit and low cost of implementation of an action item. The prioritized mitigation actions can be found at the end of this section.

Despite the diligence of the Planning Committee in completing the STAPLEE criteria form, scores for many goal actions were identical, and provided little help in assigning priority. This process did, however, allow the committee a thorough dissection of each action.

Regardless of numerical priority ranking, early implementation dates are assigned to those actions needed to serve as a foundation upon which to build other actions. Also assigned early implementation dates are those actions leading to maintaining eligibility for current grant funding, as well as those which will promote acquisition of new funding sources.

Table 7.13 STAPLEE Mitigation Action Priority Process			
Issue	1	2	3
Social Community Acceptance	Potential objection from public and/or very expensive	Unknown if objectionable, or costs may be significant	Not objectionable and low/no costs
Effect on saving lives	Life saving impact is negligible	Life saving impact is moderate	Life saving impact is significant
Effect on reducing property loss	Effect on reducing property loss is negligible	Effect on reducing property loss is moderate	Effect on reducing property loss is significant
Effect on reducing economic loss	Effect on reducing economic loss is negligible	Effect on reducing economic loss is moderate	Effect on reducing economic loss is significant
Technical Technical Feasibility	Technology not currently existing	Emerging or untested technology or unknown	Technology readily available
Long-Term Solution	No, is not effective in helping reduce losses in the long term	Potentially or unknown	Yes, is effective in helping reduce losses in the long term
Secondary Impacts	Yes, likely to create secondary problems	Potentially or unknown	No, unlikely to create secondary problems
Administrative Staffing	Need to hire a permanent employee(s)	Potentially need to hire a temporary employee(s) or unknown.	Do not have to hire
Funding Potential	No obvious source of funding available and action has significant cost impact	Limited or unknown funding available	Little or no funding required or funding can be readily obtained

Table 7.13 STAPLEE Mitigation Action Priority Process			
Issue	**1**	**2**	**3**
Maintenance/ Operations	The action is likely to require high level of ongoing maintenance	Unknown or action has the potential for moderate ongoing maintenance	Action requires limited or no ongoing maintenance
Political Political Support	Local Elected Official likely to be contentious	Local Elected Official may be controversial	Local Elected Official likely to be supportive
Local Champion	Unlikely there is a Local Elected Official to support	Uncertain if there is a Local Elected Official to champion	A Local Elected Official is likely to support and champion
Public Support	Public political support is unlikely	Public political support is uncertain	Public political support is likely
Legal State Authority Exists	No legal state authority exists	Legal state authority is unclear, uncertain or adoption is in progress	Legal state authority exists
Local Authority Exists	No legal authority exists	Legal authority is unclear, uncertain or adoption is in progress	Legal authority exists
Potential Legal Challenge	High likelihood of legal challenge by stakeholders	Moderate likelihood of legal challenge by stakeholders	Low likelihood of legal challenge by stakeholders
Economic Action Benefit	Low benefit to the jurisdiction from the action	Moderate benefit to the jurisdiction from the action	High benefit to the jurisdiction from the action
Action Cost	High cost to implement action	Moderate cost to implement action	Low cost to implement action
Economic Contribution	Low contribution to other community economic goals	Moderate contribution to other community economic goals	High contribution to other community economic goals
Outside Funding Required	Likely for action to be delayed pending outside sources of funding	Possible for action to be delayed pending outside sources of funding	Unlikely for action to be delayed pending outside sources of funding
Environmental Land/Water Effect	High likelihood of negative consequences to land/water	Moderate likelihood of negative consequences to land/water	Low likelihood of negative consequences to land/water
Endangered Species Effect	High likelihood of potential negative consequences to endangered species	Moderate likelihood of negative consequences to endangered species	Low likelihood of negative consequences to endangered species
Hazmat Waste Site Effect	High likelihood of potential effect on hazardous materials and waste sites	Moderate likelihood of effect on hazardous materials and waste sites	Low likelihood of effect on hazardous materials and waste sites
Environmental Effect	No, project is not consistent with jurisdiction environmental goals	Possible, project is consistent with jurisdiction environmental goals	Yes, project is consistent with jurisdiction environmental goals
Federal Law Compliant	No	Uncertain	Yes
Prioritizing mitigation actions for each jurisdiction was based on the "STAPLEE" process. "STAPLEE" uses multiple factors under the categories of Social, Technical, Administration, Legal, Economic and Environment			

The Table prioritizing Anderson County mitigation actions is located at the end of this section. The prioritization of each jurisdiction's mitigation actions is included in the Individual Mitigation Action Plans in the MAP Annex.

7.4.10 Mitigation Actions Implementation

The success of this Plan hinges on two major action items;

1. The Anderson County Grants Coordinator must pursue all grant opportunities to assist with funding of mitigation actions. Staff must receive necessary grant writing training and evaluation of grant criteria. Without grant funding, Anderson County cannot afford to begin many of the more expensive mitigation actions described in this plan.
2. The Anderson County Emergency Management Agency is tasked with Plan oversight, to include project tracking, progress reports, and reconvening the Planning Committee as needed for Plan review and revision.

It was the intent of the committee to establish realistic, attainable actions that can be implemented within the present fiscal capabilities of the participating jurisdictions and accepted by the citizens of the county. All members of the Planning Committee agreed that starting with small steps, accomplishing the stated goals, and publicizing the success of the county's mitigation efforts will open the community to accept larger, more costly, projects in the future. Specific mitigation actions were identified to prevent future losses; however, the County has limited resources to take on new responsibilities or projects. The implementation of these mitigation actions is dependent on the approval of the local elected governing body and the ability of the community to obtain funding from local or outside sources. Where such actions are high priorities, the community will work with TEMA, FEMA and other federal, state, and county agencies to secure funds.

In addition to the assignment of a local lead department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion.

Many of the actions are interrelated (e.g., providing various categories of preparedness and awareness information to citizens at community events); these will be accomplished under a single, ongoing project. Many of the actions can be accomplished within existing department budgets, costing only the time of employees already on staff. While "time is money" and hours have been estimated in dollars for each action item, there will be no requirement for additional funds to be budgeted to accomplish many of the action items. In general, mitigation actions ranked as high priorities will be addressed first. However, medium or even low priority mitigation actions will be considered for concurrent implementation. Therefore, the ranking levels should be considered as a first-cut, preliminary ranking and will evolve based on input from the County departments and representatives, the public, TEMA, and FEMA as the Plan is implemented.

7.4.11 Mitigation Action Cost/Benefit Review

Section 201.6.c.3iii of 44CFR requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a cost/benefit review of the proposed projects and their associated costs. The county utilized the economic criteria in the following "STAPLEE" evaluation. This benefit/cost review is qualitative; that is, it does not include the level of detail required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program. This qualitative approach was used because projects may not be implemented for up to 10 years, and the associated costs and benefits could change dramatically in that time.

7.4.12 Previously Implemented Mitigation Measures

The success of future mitigation efforts in a community can be gauged to some extent by its ongoing or past efforts. Previously implemented mitigation measures indicate that there is, or has been, a desire to reduce the effects of natural hazards, and the success of these projects can be influential in building local government support for new mitigation efforts. Anderson County's previous mitigation efforts and programs include the following:

In 1959, the U.S. Army Corps of Engineers made channel improvements through the town of Lake City and excavated an overflow gap through a ridge downstream of town. That work provided protection from a 100-year flood incident for most structures that existed in Lake City at that time.

A major flood occurred in the communities of Briceville, Fratersville, and Beech Grove in December 1969, resulting in a fatality on Beech Grove Fork, a tributary of Coal Creek, and prompting TVA to perform channel improvements along Coal Creek from a point approximately 2000 feet upstream of Briceville Elementary School to a point approximately 400 feet downstream of where Beech Grove Fork discharges into Coal Creek, providing protection from a 50-year flood incident for most structures existing at that time.

In 1999, Oak Ridge received a FEMA grant to acquire and raize 25 homes affected by land subsidence. Total cost was $3,193,680.

In 2000 and 2002, Anderson County and FEMA provided Project Impact funding for bank stabilization work in Briceville and Fraterville, to allow a deeper channel to form naturally in select areas over time. Led by Coal Creek Watershed Foundation, volunteers from the community continue each year to remove accumulations of deadwood and debris at bridges along Coal Creek and Beech Grove Fork to reduce the potential for flooding. In spite of the work performed by these government and volunteer agencies, a major flood incident will still cause flood damage from Coal Creek, and many areas remain to be mitigated.

In 2004, Clinton completed mitigation of substandard storm water drainage at Mariner's Point Subdivision. Heavy rains when storm drainage systems were clogged with leaves and debris caused an incidence of street flooding in the fall of 2003. Clinton now schedules an annual clean out of storm drain debris.

Several mitigation measures have been implemented as a result of the 2005 Anderson County Hazard Mitigation Plan. These are:

- The purchase of GIS software and equipment and hiring of a full-time GIS Director.
- Equipment to enhance the EOC's capability to share information during activation.
- Adoption of the National Incident Management System by all jurisdictions.
- Installation of caller ID at the courthouse has reduced the number of bomb threats.
- All three school systems have implemented direct parent contact phone systems.
- Oak Ridge Fire Department has offered to make available to county departments the fire education training trailer for fire prevention education.
- American Red Cross has expanded the number of shelter facilities in rural areas.
- Homeland Security funding provided a countywide hazardous materials apparatus.
- Frequency, quantity, and types of hazardous materials transported by rail were determined.

- State law requires quantity limitations and registration for the purchase of pseudoephedrine and ephedrine products.
- All critical facilities were provided FEMA's *Reducing the Risks of Non-Structural Earthquake Damage* guidebook.
- Anderson County has expanded preparedness exercises to include severe winter weather and earthquake incidents.
- The health department has enhanced planning to include drive-through options and exercised its point-of-dispensing mass clinic plan.
- Consolidation of the Anderson County and North Anderson County water utilities was achieved.
- In Oak Ridge, out-of-bank flooding of the East Fork of Poplar Creek which previously covered the road on Highway 58 at Horizon Center was mitigated in 2010 by the Tennessee Department of Transportation's road-widening project.
- In August 2010, Lake City received a PDM grant totaling $557,335 for bank stabilization and selective removal of earth-rock sediment from the Coal Creek stream bottom to reduce out-of-bank flooding and erosion.
- In 2011, 85% of TIER II facilities in Anderson County filed reports on-line at E-Plan.

7.4.13 Previous Plan Mitigation Action Review

The mitigation actions identified in the previous Plan have been extensively reviewed by the Planning Committee. The effectiveness of the actions implemented is documented in this section. The actions not implemented are either carried forward to the updated Plan or have been eliminated if they are no longer applicable, not an effective action, or are not feasible.

Table 7.14 Previous Plan Mitigation Action Review

Action Item	Action Description	In New Plan: N = No; NC = No, Complete; NA = No Longer Applicable; NE = Not Effective; AA=Another Agency Responsible		
		Status	Mitigation Effectiveness	In New Plan
Goal 1: Improve the county's capabilities to prepare for, respond to, mitigate, and recover from all disasters.				
	Objective 1.1: Improve the county's ability to evaluate and manage hazards.			
1.1.1	Establish and staff a full-time countywide GIS/technology position to create mapping databases and train pertinent users, with jurisdictional cost based on population.	Complete	High	NC
1.1.2	Purchase hardware and GIS software to create county mapping databases.	Complete	High	NC
1.1.3	Provide GIS Director FEMA training to ensure incorporation of HAZUS-MS in GIS databases.	Ongoing	Medium	Y 1.1g
1.1.4	Establish and staff a full-time countywide Hazard Mitigation Coordinator position to identify/assess hazards and oversee mitigation projects with participating jurisdictional cost based on population.	Ongoing	High	Y 1.1b
1.1.5	Establish quarterly meetings of like departments from all jurisdictions to identify problems and develop mitigation strategies.	Ongoing	Low	NE
1.1.6	Encourage jurisdictions to partner in developing comprehensive, economic, and continuity of operations plans.	Ongoing	Medium	Y 1.5a

Table 7.14 Previous Plan Mitigation Action Review				
		In New Plan: N = No; NC = No, Complete; NA = No Longer Applicable; NE = Not Effective; AA=Another Agency Responsible		
Action Item	**Action Description**	**Status**	**Mitigation Effectiveness**	**In New Plan**
1.1.7	Encourage jurisdictions lacking such documents to partner in developing hillside and post-disaster ordinances and regulations governing hazard setback, subdivisions, and wildfires.	Ongoing	High	Y 1.1k
1.1.8	Develop redundancy strategies to prevent loss of public records in the event of damage to critical facilities.	Ongoing	High	Y 1.5b
1.1.9	Explore benefits of consolidation of the county's water utilities	Complete	High	NC
1.1.10	Maintain the Hazard Mitigation Planning Committee and schedule quarterly meetings to review plan progress.	Ongoing	Medium	Y 1.1a
	Objective 1.2: Obtain grant funding.			
1.2.1	Partner all jurisdictions to establish and staff a full-time grant writer position, with jurisdictional cost based on population.	Ongoing	Medium	Y 1.1b
	Objective 1.3: Provide hazard awareness, preparedness, and training information to citizens.			
1.3.1	Develop and maintain a county website to include citizen information such as shelter locations, shelter-in-place instructions, safe room information, citizen training opportunities, FEMA on-line course listing, and links to hazard preparedness websites.	Ongoing	High	Y 1.2a
1.3.2	Partner with volunteer and emergency response agencies to post monthly notices of training available to citizens.	Ongoing	Medium	Y 1.2b
1.3.3	Publish monthly in area newspapers notice of upcoming training and availability of citizen's awareness training on website.	Ongoing	Medium	Y 1.2c
	Objective 1.4: Improve shelter capabilities.			
1.4.1	Partner with volunteer agencies, county schools, and churches to provide more shelter facilities in rural communities.	Complete	High	NC
1.4.2	Assist in finding funding sources to equip rural shelter facilities.	Ongoing	Medium	Y 1.1i
	Objective 1.5: Continue to improve Anderson County Emergency Management capabilities.			
1.5.1	Establish and fund a full-time support staff position to assist the EMA Director in day-to-day emergency management operations	Ongoing	Medium	Y 1.1h
1.5.2	Review annually and after each disaster to revise as necessary the Anderson County Emergency Operations Plan.	Ongoing	High	Y 1.1c
1.5.3	Develop, maintain, and revise annually a countywide comprehensive NIMS-typed resources inventory.	Ongoing	High	Y 1.4c
1.5.4	Develop and incorporate into the EOP ESF-format annexes for mass-casualty and mass-fatality incidents.	Ongoing	High	Y 1.4d
1.5.5	Provide annual Emergency Operations Center training	Ongoing	High	Y 1.1f
1.5.6	Purchase and install office, computer, and display equipment to enhance sharing of information during EOC activation.	Complete	High	NC
	Objective 1.6: Improve multi-jurisdictional, multi-agency response to all emergencies and disasters.			
1.6.1	Encourage adoption of the National Incident Management System by all jurisdictions.	Complete	High	NC
1.6.2	Schedule and conduct Incident Command training annually for all fire, EMS, rescue, and law enforcement as a pre-requisite for NIMS training.	Ongoing	High	Y 1.4b
1.6.3	Schedule and conduct NIMS training annually.	Ongoing	High	Y 1.4b

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1.6.4	Conduct annual tabletop disaster exercises involving all emergency response agencies.	Ongoing	High	Y 1.4f
1.6.5	Publish notice of federal, state, and local training opportunities to all emergency response agencies.	Ongoing	High	Y 1.4h
	Objective 1.7: Improve the county's warning, evacuation, and information capabilities.			
1.7.1	Install warning sirens in cities and unincorporated areas of dense population.	Ongoing	High	Y 1.3a
1.7.2	Continue to activate the EAS as necessary.	Ongoing	High	Y 1.3b
1.7.3	Install NAWAS at Anderson County E-911 Communication Center.	Ongoing	High	Y 1.3c
1.7.4	Purchase and install an automated wide area rapid notification system.	Ongoing	High	Y 1.3d
1.7.5	Develop evacuation routes and procedures.	Ongoing	High	Y 1.3g
1.7.6	Partner with jurisdictional schools to implement and maintain a dedicated phone system for parent information on school evacuations.	Complete	Medium	Y 1.3h
Goal 2: Minimize the impact of hazardous spills and releases.				
	Objective 2.1: Identify and establish requirements for fixed sites with reportable quantities of hazardous materials.			
2.1.1	Partner with LEPC to develop, maintain, and annually update an inventory of sites with hazardous materials.	Ongoing	High	Y 2.1a
2.1.2	Enforce requirements for each site to submit TIER II reports to EMA	Ongoing	High	Y 2.1b
2.1.3	Enforce requirements for each site to report spill/release incidents to TEMA and EMA.	Ongoing	High	Y 2.1c
2.1.4	Require each site to develop and provide to EMA a site emergency plan.	Ongoing	High	Y 2.1d
2.1.5	Enact legislation to require each fixed site to install alert devices and develop a warning plan.	Ongoing	High	Y 2.1e
2.1.6	Create a GIS map database of identified sites to display ERG established zones and evacuation perimeters.	Ongoing	High	Y 2.1f
	Objective 2.2: Educate citizens on response to hazardous materials incidents			
2.2.1	Publish articles in area newspapers to instruct citizens on shelter-in-place.	Ongoing	Medium	Y 2.2a
2.2.2	Partner with LEPC to distribute citizen awareness and preparedness literature at community events.	Ongoing	Medium	Y 2.2b
2.2.3	Partner with schools to present programs on shelter-in-place.	Ongoing	Medium	Y 2.2c
2.2.4	Partner with schools to institute programs on the environmental effects of hazardous materials.	Ongoing	Medium	Y 2.2c
	Objective 2.3: Improve safety of emergency responders and countywide response to hazardous materials incidents.			
2.3.1	Provide funds for overtime and backfill to permit hazardous materials awareness training for all fire, EMS, rescue, and law enforcement emergency responders.	Ongoing	High	Y 2.3a
2.3.2	Provide funds for overtime and backfill to allow for hazardous materials operations level, HMTO, and CBRNE training.	Ongoing	High	Y 2.3a
2.3.3	Provide DOE TEPP training to all emergency responders.	Ongoing	High	Y 2.3a
2.3.4	Purchase and equip a hazardous materials response vehicle.	Complete	High	NC

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2.3.5	Establish and equip a countywide hazardous materials team.	Ongoing	High	Y 2.3b
2.3.6	Establish and equip a CBRNE team to respond to incidents in Homeland Security District II (16 county) region.	Ongoing	High	Y 2.3c
2.3.7	Plan and conduct annual hazardous materials tabletop exercises and drills involving all emergency response agencies.	Ongoing	High	Y 2.3d
2.3.8	Work with rural fire departments to develop hazardous materials response Sags.	Ongoing	High	Y 2.3e
2.3.9	Continue to participate in DOE drills and exercises.	Ongoing	High	Y 2.3g
	Objective 2.4: Reduce effects to the environment resulting from transportation hazardous materials spills.			
2.4.1	Fund training for all firefighters in containing hazardous materials spills.	Ongoing	High	Y 2.4a
2.4.2	Provide all fire departments equipment to contain hazardous materials spills on roadways.	Ongoing	High	Y 2.4b
2.4.3	Partner with LEPC and rail carriers to determine frequency, quantity, and types of hazardous materials transported through the county.	Complete	Medium	NC
2.4.4	Partner with LEPC, CTAS, and TDOT to determine frequency, quantity, and materials moved through the county by ground transport.	No Progress	Medium	N
	Objective 2.5: Reduce risk of citizen proximity to hazardous materials incidents.			
2.5.1	Establish codes to prohibit construction of residential or public structures near fixed hazardous materials sites.	Ongoing	High	Y 2.5a
2.5.2	Establish codes to prohibit construction of special needs population facilities near rail lines..	Ongoing	High	Y 2.5b
Goal 3: Minimize the impact of severe weather on citizens and property.				
	Objective 3.1: Increase citizen awareness of and preparedness for severe weather incidents.			
3.1.1	Partner with LEPC and volunteer agencies to distribute severe weather awareness and preparedness literature at community events.	Ongoing	Medium	Y Various
3.1.2	Partner with NWS and American Red Cross to publicize weather spotter and citizen preparedness training.	Ongoing	Medium	Y 3.3c
3.1.3	Publish news articles and distribute literature to educate the public on safe rooms and shelter-in-place.	Ongoing	Medium	Y 3.3d
3.1.4	Continue and expand participation in the Severe Weather Awareness campaign.	Ongoing	Medium	Y 3.3e
	Objective 3.2: Minimize utility loss during severe weather.			
3.2.1	Continue aggressive power line right-of-way clearing to reduce incidence of telephone and power lines downed by trees.	Ongoing	High	Y 3.5a
3.2.2	Publish news articles and distribute literature to increase citizen awareness of downed line prevention and safety.	Ongoing	Medium	Y 3.5c
3.2.3	Initiate a voluntary program for funding installation of water line insulation for low-income residents.	Ongoing	High	Y 3.5g
	Objective 3.3: Reduce loss of life and property from high winds and tornados.			
3.3.1	Continue to enforce building codes for new structures and structures undergoing renovation.	Ongoing	High	Y 3.3f

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3.3.2	Continue to work with state inspectors to ensure anchor codes are met for newly sited mobile homes.	Ongoing	High	Y 3.3g
3.3.3	Provide funding to assist low-income residents to anchor previously sited mobile homes	Ongoing	High	Y 3.3h
3.3.4	Enact legislation to require mobile home parks to install ground anchors at each mobile home space.	Ongoing	High	Y3.3i
3.3.5	Enact legislation to require new mobile home parks to construct storm shelters of adequate size to protect all residents.	Ongoing	High	Y3.3j
	Objective 3.4: Improve severe weather warning to citizen throughout the county.			
3.4.1	Enact legislation to require NOAA weather radios in all schools, day care, industrial, and health care facilities.	Ongoing	High	Y 1.3e
3.4.2	Initiate a program to provide NOAA weather radios to low-income residents.	Ongoing	High	Y 1.3f
	Objective 3.5: Ensure access of emergency vehicles to victims during severe weather.			
3.5.1	Equip all emergency response vehicles with on-demand tire chains.	Ongoing	High	Y 3.4c
3.5.2	Equip all fire department and rescue vehicles with chain saws.	Ongoing	High	Y 3.3k
	Objective 3.6: Ensure provision of critical needs during severe weather.			
3.6.1	Maintain and update annually contact information for suppliers of drugs, food, water, and fuel.	Ongoing	High	Y 3.4e
3.6.2	Install generators in critical government facilities and fuel depots.	Ongoing	High	Y 3.5e
3.6.3	Obtain portable generators for delivery to shelter sites as needed.	Ongoing	High	Y 3.5f
	Objective 3.7: Reduce the impact of severe cold and extreme heat on special needs populations.			
3.7.1	Partner with county agencies to identify citizens subject to suffer during severe cold and extreme heat.	Ongoing	High	AA
3.7.2	Partner with volunteer agencies to protect the homeless, poor, chronically ill, and elderly during severe cold and extreme heat.	Ongoing	High	AA
3.7.3	Partner with volunteer agencies and utilities to provide utility bill assistance for identified citizens.	Ongoing	High	AA
	Objective 3.8: Reduce the impact of drought on water supplies.			
3.8.1	Enact legislation to restrict non-essential water usage during periods of drought.	Ongoing	High	Y 3.1b
3.8.2	Maintain and update annually contact information for suppliers of potable water.	Ongoing	High	Y 3.1c
3.8.3	Execute agreements with rural fire departments to provide delivery of non-potable water for drought-endangered livestock.	Ongoing	High	Y 3.1d
Goal 4: Reduce the impact of local flooding incidents.				
	Objective 4.1: Identify specific flood prone areas.			
4.1.1	Negotiate with FEMA to update and scale flood plain maps to align with current tax maps to provide detailed flood hazard information.	Complete	High	NC
4.1.2	Break down watershed information into sub-basins to achieve detailed hydrologic studies to project land use.	Ongoing	High	N
4.1.3	Use HAZUS-MH to map 50- and 100-year flood plains.	Complete	High	NC

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4.1.4	Expand flood plain mapping data to indicate residential, commercial, occupied, and unoccupied structures.	Complete	High	NC
4.1.5	Identify repetitive loss areas and structures.	Complete	High	NC
4.1.6	Evaluate the need to relocate or acquire structures in flood hazard areas.	Complete	High	NC
4.1.7	Use mapping database to restrict development in defined flood hazard areas.	Ongoing	High	Y 4.3a
	Objective 4.2: Reduce flooding along creeks.			
4.2.1	Study methods to slow or detain the amount of water from Poplar Creek and feeder streams to reduce flooding in downtown Oliver Springs.	Ongoing	High	Y OS
4.2.2	Ensure the four-lane construction on Highway 58 will mitigate East Fork of Poplar Creek flooding issues for Oak Ridge.	Complete	High	NC
4.2.3	Evaluate the realignment of bridges to remove abutment obstructions to the natural Coal Creek stream channel to reduce flooding in Briceville and Lake City.	Ongoing	High	Y 4.4f LC
4.2.4	Evaluate methods to address flooding of Hinds Creek in the Andersonville area.	Ongoing	High	Y 4.4d
4.2.5	Evaluate methods to address flooding of Bull Run Creek in the Claxton area.	Ongoing	High	Y 4.4c
4.2.6	Evaluate methods to address flooding on Dairy Pond Road and East Circle Road in Norris.	Ongoing	High	Y NOR
4.2.7	Evaluate the feasibility of construction of detention features.	Ongoing	High	Y 4.3c
4.2.8	Identify areas to reduce run-off and erosion by planting vegetation.	Ongoing	High	Y 4.3d
4.2.9	Evaluate methods to improve storm water systems in flood prone areas.	Ongoing	High	Y 4.3b
	Objective 4.3: Eliminate repetitive damage from roadway flooding.			
4.3.1	Identify roadways repetitively damaged by flooding.	Ongoing	High	Y 4.5a
4.3.2	Raise grade level of identified roadways.	Ongoing	High	Y 4.5b
4.3.3	Evaluate the feasibility of expanding ditch depth and width along rural roadways to mitigate flooding of roadway surfaces.	Ongoing	High	Y 4.5b
	Objective 4.4: Provide motorists warning of roadway flooding.			
4.4.1	Erect staff signage indicating water depth at flooding points.	Ongoing	High	Y 4.5d
4.4.2	Install gates to block roadways and bridges during flooding.	Ongoing	High	Y 4.5e
	Objective 4.5: Continue participation in and improve citizen awareness of the National Flood Insurance Program.			
4.5.1	Publish news articles to advise citizens of the availability of flood insurance.	Ongoing	Medium	Y 4.1a
4.5.2	Partner with local property insurance agents to provide flood insurance literature to be distributed to citizens at community events.	Ongoing	Medium	Y 4.1c
4.5.3	Evaluate the benefits of participation in the NFIP's Community Rating System.	Ongoing	High	Y 4.2a
	Objective 4.6: Increase public awareness of flood hazard and safety.			
4.6.1	Work with citizens in affected areas to develop a community flood response plan.	Ongoing	High	Y 4.6b
4.6.2	Distribute flood awareness and preparedness literature at community events.	Ongoing	Medium	Y 4.6a

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	Objective 4.7: Reduce flooding due to debris in streams.			
4.7.1	Provide regular maintenance to remove debris from flood prone streams.	Ongoing	High	Y 4.4b
4.7.2	Install larger culverts to permit clear stream flow.	Ongoing	High	Y 4.4a
	Objective 4.8: Continue strict enforcement of building codes.			
4.8.1	Restrict construction and/or placement of mobile homes within the flood plain.	Ongoing	High	Y 4.3a
Goal 5: Reduce loss of life and property from structure fires.				
	Objective 5.1: Increase citizen awareness of fires hazards, prevention, and safety.			
5.1.1	Continue aggressive fire prevention programs in all schools.	Ongoing	Medium	Y 5.1a
5.1.2	Partner with volunteer agencies to present fire prevention programs to service clubs, senior citizens, and special needs populations.	Ongoing	Medium	Y 5.1c
5.1.3	Partner with fire departments and volunteer agencies to present programs on the use of fire extinguishers.	Ongoing	Medium	Y 5.1d
5.1.4	Partner with fire departments to distribute fire prevention literature at community events.	Ongoing	Medium	Y 5.1e
5.1.5	Partner with the media to promote a “change your clock, change your smoke detector battery” twice yearly.	Ongoing	Medium	Y 5.1f
5.1.6	Assist fire departments in obtaining grants to provide free smoke detectors to residents.	Ongoing	High	Y 5.1g
5.1.7	Partner with volunteer agencies to install smoke detectors for special needs populations.	Ongoing	High	Y 5.1h
5.1.8	Partner with local industry to acquire a fire education-training trailer.	Alternative	Medium	NA
5.1.9	Assist fire departments in obtaining grants to purchase materials and equipment to enhance fire prevention programs.	Ongoing	Medium	Y 5.1b
	Objective 5.2: Reduce the incidence and severity of structure fires.			
5.2.1	Continue rigid enforcement of existing fire and electrical codes.	Ongoing	High	Y 5.2b
5.2.2	Develop emergency pre-plans for all public buildings, schools, businesses, and churches.	Ongoing	High	Y 5.2d
	Objective 5.3: Improve firefighter safety and response capabilities.			
5.3.1	Fund training for state and national certifications for career and volunteer firefighters.	Ongoing	High	Y 5.3a
5.3.2	Assist fire departments in applying for Assistance to Firefighter Grants (AFG).	Ongoing	High	Y 5.3b
5.3.3	Provide matching funds from jurisdictional budgets to departments awarded AFGs.	Ongoing	High	Y 5.3c
	Objective 5.4: Improve water supply in rural areas.			
5.4.1	Create a GIS mapping database to identify water line size and hydrant locations in rural areas.	Ongoing	High	Y 5.4a
5.4.2	Assist in obtaining grant funds to replace smaller diameter lines with six-inch mains.	Ongoing	High	Y 5.4b

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5.4.3	Assist in obtaining grant funds to construct pumping stations to provide adequate pressure in elevated areas.	Ongoing	High	Y 5.4c
5.4.4	Assist in obtaining grant funds to install hydrants at one-half mile intervals in unincorporated areas.	Ongoing	High	Y 5.4d
Goal 6: Minimize the impact of wildfires on citizens and property.				
	Objective 6.1: Increase citizen awareness of and preparedness for wildfire incidents.			
6.1.1	Expand public school fire prevention efforts to include special programs on wildfire and arson.	Ongoing	Medium	Y 6.1a
6.1.2	Publish news articles to promote wildfire awareness.	Ongoing	Medium	Y 6.1b
6.1.3	Publish outdoor burn permit requirements in area newspapers each week, September through May.	Ongoing	Medium	Y 6.1c
6.1.4	Publish outdoor burn ban information in area newspapers daily during periods of ban.	Ongoing	Medium	Y 6.1e
6.1.5	Partner with utilities to include in September utility bills burn permit and safety information, with permit required dates and permit office telephone number.	Ongoing	Medium	Y 6.1d
6.1.6	Partner with the Division of Forestry to distribute USFS fuels reduction, wildfire awareness, and prevention literature at community events.	Ongoing	Medium	Y 6.1f
	Objective 6.2: Enforce outdoor burn ban and permit requirements.			
6.2.1	Enact legislation to make mandatory fines for non-permitted outdoor burning.	Ongoing	High	Y 6.2a
6.2.2	Encourage cooperation between fire departments and law enforcement agencies to issue tickets for non-permitted outdoor burning.	Complete	High	NC
6.2.3	Partner with Forestry to establish a web site for posting burn permits.	No Progress	Low	NE
6.2.4	Require prosecution and restitution for arson.	Ongoing	High	Y 6.2b
	Objective 6.3: Improve firefighter safety and effectiveness of operations during wild land firefighting operations.			
6.3.1	Continue the partnership between fire departments and the Division of Forestry.	Ongoing	High	Y 6.3a
6.3.2	Provide annual wild land fire training for municipal and rural fire departments.	Ongoing	High	Y 6.3b
6.3.3	Provide wild land firefighting equipment to all fire departments in the county.	Ongoing	High	Y 6.3c
6.3.4	Provide fire department-compatible portable radios to Division of Forestry to permit on-scene interoperable communications.	Alternate	High	NA
	Objective 6.4: Reduce loss of structures in urban/urban interface fires.			
6.4.1	Establish and enforce codes stipulating setback distances from woodland for all new structures not constructed of fire-resistive materials.	Ongoing	High	Y 6.4a
6.4.2	Partner with Forestry to publish news articles and distribute literature to increase citizen awareness of recommended setback distances for structures.	Ongoing	Medium	Y 6.4b
Goal 7: Protect the county's citizens and assets from domestic and international terrorism.				
	Objective 7.1 Encourage public vigilance and reporting of suspicious activities.			

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7.1.1	Publish news articles illustrating the importance of citizen vigilance in the fight against terrorism.	Ongoing	Medium	Y 7.1a
	Objective 7.2: Decrease the possibility of and loss of life from attacks on public facilities.			
7.2.1	Restrict parking of vehicles in close proximity to critical facilities.	Ongoing	High	Y 7.2a
7.2.2	Install gates and card readers for parking under the Jolley Building.	Ongoing	High	Y 7.2b
7.2.3	Install caller ID on county courthouse phones.	Complete	High	NC
7.2.4	Develop and practice quarterly an evacuation plan for Anderson County Courthouse.	Ongoing	High	Y 7.2c&d
7.2.5	Partner with schools to improve security and lockdown procedures.	Ongoing	High	Y 7.2e
	Objective 7.3: Improve terrorism response capabilities and safety of emergency responders.			
7.3.1	Continue to participate in the Joint Terrorism Task Force.	Ongoing	High	Y 7.3a
7.3.2	Fund overtime and backfill to provide Emergency Response to Terrorism training for all fire, EMS, rescue, and law enforcement emergency responders.	Ongoing	High	Y 7.3b
7.3.3	Ensure jurisdictional budgets are sufficient to provide adequate fire and law enforcement personnel for every shift.	Complete	High	NC
7.3.4	Fund and maintain a trained bomb dog and handler to serve the entire county.	No Progress	High	N
7.3.5	Assist the rescue squad in obtaining grants to procure equipment and improve capability for search and rescue during terrorism incidents.	Ongoing	High	Y 7.3c
Goal 8: Reduce loss of life and property from meth labs.				
	Objective 8.1: Improve meth lab recognition and reporting.			
8.1.1	Provide meth lab awareness training for citizens and emergency responders.	Ongoing	Medium	Y 8.1b
8.1.2	Partner with schools to promote recognition and reporting of meth labs.	Ongoing	Medium	Y 8.1c
8.1.3	Maintain and publicize weekly in area newspapers a countywide hotline to report suspected meth labs.	No progress	Medium	NA
	Objective 8.2: Reduce availability of precursor materials.			
8.2.1	Enact legislation to require quantity limitations and registration for all pseudoephedrine and ephedrine product sales.	Complete	High	NC
8.2.2	Enlist the cooperation of businesses to refuse large quantity sales of other precursors without purchaser registration.	No Progress	High	NE
	Objective 8.3: Improve emergency responder safety at clandestine labs.			
8.3.1	Fund training, overtime, and backfill cost for law enforcement Meth Task Force training.	Ongoing	High	Y 8.2b
8.3.2	Provide equipment to allow responders safe entry at clandestine labs.	Ongoing	High	Y 8.2b
8.3.3	Develop Meth lab Sags for rural fire and EMS responders.	Ongoing	High	Y 8.2c
Goal 9: Minimize property damage and public risk from landslides.				
	Objective 9.1: Delineate areas prone to landslides.			
9.1.1	Conduct a countywide study of potential landslide areas.	Ongoing	High	Y 9.1a
9.1.2	Conduct meetings between road and planning departments to prioritize areas for and methods of remediation.	Ongoing	High	Y 9.1b

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	Objective 9.2: Increase citizen awareness of landslide areas.			
9.2.1	Distribute landslide safety literature at community events.	Ongoing	Medium	Y 9.3a
9.2.2	Erect signage to warn motorists of landslide danger at identified sites.	Ongoing	Medium	Y 9.3b
	Objective 9.3: Restrict development in landslide areas.			
9.3.1	Revise zoning and building codes to restrict construction in hazard areas.	Ongoing	High	Y 9.2a
Goal 10: Minimize potential loss of life and economic impact from dam failure.				
	Objective 10.1: Reduce loss of life from Norris Dam failure.			
10.1.1	Install alert devices downstream of Norris Dam.	Ongoing	High	Y 10.1a
10.1.2	Educate citizens to recognize and respond immediately to dam failure alert devices.	Ongoing	High	Y 10.1b
	Objective 10.2: Reduce loss of property from failure of privately owned dams.			
10.2.1	Conduct a study to quantify the catastrophic floodplain below privately owned dams.	Ongoing	High	Y 10.2a
10.2.2	Use GIS mapping to identify structures within the catastrophic flood plains.	Ongoing	High	Y 10.2b
10.2.3	Use GIS mapping to prohibit construction within the catastrophic flood plains.	Ongoing	High	Y 10.2c
10.2.4	Update zoning codes to restrict construction in private dam flood plains.	Ongoing	High	Y 10.2c
	Objective 10.3: Reduce threat of dam failure.			
10.3.1	Require owner inspection of dams on a regular basis.	Ongoing	High	Y 10.2d
10.3.2	Require dams to meet engineering standards, even if smaller than regulatory criteria.	Ongoing	High	Y 10.2e
Goal 11: Minimize damage to property from near surface ground control failure.				
	Objective 11.1 Refine delineation of karst prone areas.			
11.1.1	Conduct a countywide study of karst areas and known sinkholes.	Ongoing	High	Y 11.1a
11.1.2	Create GIS karst map overlays.	Ongoing	High	Y 11.1b
11.1.3	Include karst information on plat maps to inform property owners of high sinkhole risk.	Ongoing	High	Y 11.2a
11.1.4	Require property owners to sign acknowledgement of karst risk notification before issuing building permits on high-risk sites.	Ongoing	High	Y 11.2b
	Objective 11.2: Improve citizen awareness of karst hazards.			
11.2.1	Develop local karst education materials.	Ongoing	Medium	Y 11.2c
11.2.2	Distribute karst awareness literature at community events.	Ongoing	Medium	Y 11.2c
Goal 12: Minimize damage and loss of life from earthquakes.				
	Objective 12.1 Evaluate the potential for a damaging earthquake in Anderson County.			
12.1.1	Partner with the state Division of Geology to quantify the potential for an earthquake greater than 6.0 in Anderson County.	Ongoing	High	Y 12.1a
12.1.2	Partner with UT geology department to identify areas of greatest hazard.	Ongoing	High	Y 12.1b
12.1.3	Create GIS mapping database to determine critical facilities and numbers of other structures that would be affected.	Ongoing	High	Y 12.1c
	Objective 12.2: Increase citizen awareness of earthquake hazards and mitigation strategies.			
12.2.1	Distribute earthquake awareness and preparedness literature at community events.	Ongoing	Medium	Y 12.2a

Table 7.14 Previous Plan Mitigation Action Review				
		In New Plan: N = No; NC = No, Complete; NA = No Longer Applicable; NE = Not Effective; AA=Another Agency Responsible		
Action Item	**Action Description**	**Status**	**Mitigation Effectiveness**	**In New Plan**
12.2.2	Partner with local property insurance agency to distribute earthquake insurance information.	Ongoing	Medium	Y 12.2b
12.2.3	Provide critical facilities managers FEMAs guidebook, *Reducing the Risks of Non-Structural Earthquake Damage.*	Complete	High	NC
Goal 13: Minimize the impact of pandemic disease.				
	Objective 13.1: Prepare for bioterrorism and other widespread public health emergencies.			
13.1.1	Develop and recruit volunteers to staff a mass clinic plan to include response to all widespread disease.	Ongoing	High	Y 13.2a
13.1.2	Exercise the mass clinic plan and revise as necessary.	Ongoing	High	Y 13.2b
13.1.3	Continue to participate in Strategic National Stockpile drills and exercises.	Ongoing	High	Y 13.2c
13.1.4	Maintain an inventory of Mark I packs to respond to chemical agent incidents.	Ongoing	High	Y 13.2d

Explanation of 2005 Mitigation Actions not included in the 2011 Plan update:
1.1.5: Individuals in various departments were not interested in this idea, stated they did not have time; therefore, this action was ineffective.
2.2.4: A study has been done at weigh stations on Interstates 40 and 75 near Knoxville, but manpower requirements for THP, TEMA, and TDOT to conduct this type study will not permit a local study.
2.7.1, 2.7.2, 2.7.3: Several United Way agencies provide assistance through well-publicized, long-standing programs. Powell-Clinch Utility District sponsors a "round up" to the nearest dollar to help provide assistance for heating bills for low-income residents.
4.1.2: This action is not feasible at this time.
5.1.8: Since Oak Ridge Fire Department has a fire education trailer and will make this resource available to other fire department in Anderson County, this action is no longer applicable.
6.2.3: After further consideration, this action was determined to be not an effective use of Forestry resources and time.
6.3.4: The intent of this action has been accomplished with the addition of state fire channels available to all fire departments and Forestry. This action is no longer applicable.
7.3.4: No jurisdiction is able at this time to assume the funding required for a trained bomb dog and handler.
8.1.3: Residents report suspected meth lab activity through the local 911 or law enforcement administration phone numbers. It is felt that the expense of an additional "hot line" number is not required.
8.2.2: According to the District Attorney, businesses are reluctant to report large-quantity purchasers or precursors due to the time required for attending depositions and court appearances. It is felt that this action is not effective.

State mitigation efforts and programs that are significant to Anderson County include the following:

State of Tennessee Pipeline Safety Plan: The state of Tennessee, along with gas and oil pipeline providers, maintains a pipeline safety plan. Pipeline providers are required to schedule meetings with local officials to facilitate discussions about mitigation and response to pipeline disasters.

The State Emergency Response Commission is responsible for implementing federal Emergency Planning and Community Right-to-Know Act (EPCRA) provisions in Tennessee and serving as a technical advisor and information clearinghouse for state and federal hazardous materials

programs. The Tennessee Homeland Security and Emergency Management Agency is the lead agency responsible for implementing EPCRA.

Tennessee Emergency Operations Plan (EOP): The Tennessee Emergency Operations Plan is the document that provides the foundation for all disaster and emergency response operations conducted within the state of Tennessee. Tennessee state law requires TEMA to develop this plan and update it on a periodic basis.

TEMA Regional Offices: The regional office serves as the primary day-to-day point of contact with local governments and the citizens of the state. A Regional Program Coordinator (RPC) heads each office. The Area Coordinators travel to local Emergency Management offices to help coordinate planning and preparedness activities, ensure that federally assisted counties are complying with grant requirements, and provide training to emergency responders. The RPC also serves as the agency's conduit to state assistance for major emergencies. An RPC responds to any major emergency, emergencies involving multiple state agencies, hazardous materials, multiple fatalities, and other incidents at the request of local officials.

Each county in Tennessee has its own Local Emergency Management Director that serves at the direction of the respective County Commission. Because disasters occur at the local government level, the Local Director is the key to comprehensive community emergency management. Some local Emergency Management programs receive federal funding assistance through TEMA. Such programs must meet minimum mutually agreed upon criteria. Anderson County Emergency Management is an EMPG agency.

The Domestic Preparedness Program is a partnership of federal, state, and local agencies with the goal of insuring that, as a nation, we are prepared to respond to a terrorist attack involving nuclear, biological or chemical weapons – weapons of mass destruction (WMD). Today, the term "Homeland Security" is used to denote the concept of preparing for these kinds of incidents.

7.4.14 Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.
A. Does the **new or updated** plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?

CRS Step 8: Draft an Action Plan: For CRS credit, when a multi-jurisdictional plan is prepared, it must have action items from at least two of the six categories that directly benefit each community seeking CRS credit.

The Mitigation Actions proposed by each of Anderson County's local governing bodies participating under this Plan are in the individual Mitigation Action Plans (MAPs) Annex. Each MAP has been designed to address the jurisdiction's description, capabilities, and the multi-jurisdictional goals, objectives, and actions of the overall Hazard Mitigation Plan. Some action items in the table below and in the Individual Mitigation Action Plans address specific hazards. Others are general action items that address multiple hazards. Within the action items detailed in the mitigation actions tables are:

1. Actions that address both current and future buildings (i.e., building codes).
2. Actions that address current and future infrastructure.
3. Actions that address each profiled hazard (minimum of 2).
4. Actions for each participating jurisdiction (minimum of 2).

The cohesive collection of actions listed in each jurisdiction's Mitigation Action Plan also can serve as an easily understood menu of mitigation policies and projects for local decision-makers who want to quickly review their jurisdiction's respective element of the countywide Plan. In preparing the individual MAPs, each jurisdiction considered its overall hazard risk and capability to mitigate identified hazards as recorded through the risk and capability assessment process and to meet the countywide mitigation goals and the unique needs of the community.

Each jurisdiction participating in this Plan is responsible for implementing specific mitigation actions as prescribed in the adopted Mitigation Action Plan. In each Mitigation Action Plan, every proposed action is assigned to a specific local department or agency in order to delegate responsibility and accountability and increase the likelihood of subsequent implementation. This approach enables individual jurisdictions to update their unique mitigation strategy as needed, without altering the broader focus of the countywide Plan. The separate adoption of locally specific actions also ensures that each jurisdiction is not held responsible for monitoring and implementing the actions of other jurisdictions involved in the planning process.

The following Table shows the hazard and action item identifier for the Mitigation Actions Table.

Table 7.15 Mitigation Action Item Identifier Table

	All Hazards	Drought	Earthquake	Extreme Temp	Flooding	Hail	High Wind	Ice/Snow	Land/Mudslide	Land Subsidence	Lightning	Wildfire	Pandemic	HAZMAT	Illegal Drugs	Terrorism	Transportation	Urban Fire	Utility Power	Utility Water
Action Identifier and Application	AH	DR	EX	ET	FL	HA	HW	IS	LM	LS	LG	WF	PD	HM	IL	TR	TN	UF	UP	UW
	1				2				3				4				a-z			
	Public Populations				1st Responder				Jurisdiction General				Jurisdiction Specific				Sequence Character			

Table 7.16 Anderson County Mitigation Actions

Hazard Goal & Action	Action/Project Description	Responsible Entity	Funding Source	Cost/ Benefit Estimate	Date Complete Estimate
Goal 1: Improve the capability of Anderson County and participating jurisdictions to prepare for, respond to, and recover from all profiled hazard incidents.					
	Objective 1.1: Improve capabilities to evaluate and manage hazard incidents				
1.1a AH 3	Maintain the Hazard Mitigation Planning Committee: schedule annual meetings to review progress and oversee implementation of the mitigation plan.	EMA	Dept Budget	12,700/ 25,000	Ongoing
1.1b AH 4	Establish and staff a full-time Countywide Hazard Mitigation Coordinator position to identify/assess hazards, prepare grant applications, and oversee mitigation projects with participating jurisdictional cost based on population.	County Mayor, County Comm., Municipal Governments	County Budget, City Budgets	50,000/ 1,000,000	FY 13-14
1.1c AH 4	Review annually and after each disaster to revise as necessary the Anderson County Basic Emergency Operations Plan.	EMA	Dept Budget	12,500/ 100,000	Ongoing

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
1.1d AH 3	Assist the purchasing agent to develop and annually update a list of vendor 24/7 contact information and pre-disaster MOUs.	EMA, Purchasing	Dept Budgets	12,500/ 100,000	FY 12-13
1.1e AH 4	Establish staging areas, county receiving points, and points of distribution locations.	EMA	Dept Budget	2,000/ 100,000	FY 12-13
1.1f AH 4	Provide annual EOC emergency workers training.	EMA	Dept Budget	2,500/ 100,000	Ongoing
1.1g AH 4	Provide GIS director FEMA training to ensure incorporation of HAZUS-MH in GIS databases.	GIS Dept	Dept Budget	1,000/ 30,000	FY 13-14
1.1h AH 4	Establish and fund a full-time support staff position to assist the EMA Director in day-to-day EMA operations.	County Mayor, County Comm.	County Budget	30,000/ 250,000	FY 13-14
1.1i AH 4	Assist in finding funding sources to equip rural shelter facilities.	EMA, Volunteer Agencies	Agency Budgets, Private Grants	2,500/ 100,000	Ongoing
1.1j AH 4	Complete a Disaster Animal Response Team (DART) plan.	EMA	Dept Budget	12,500/ 100,000	FY 12-13
1.1k AH 3	Assist jurisdictions lacking such documents to develop hillside and post-disaster ordinances and regulations governing hazard set-back, subdivisions, and wildfires.	EMA, Jurisdictional Governments	Jurisdiction Budgets	50,000/ 500,000	FY 13-14
1.1l AL 3	Complete requirements to attain NWS Storm Ready Community status.	EMA	Dept Budget	12,500/ 100,000	FY 14-15
	Objective 1.2: Improve dissemination of all hazards awareness, preparedness, and training information to citizens				
1.2a AH1	Develop and maintain a county web page with citizen information to include shelter locations; shelter-in-place, safe room, and flood insurance information; FEMA on-line course listing; and links to disaster preparedness websites.	EMA, County IT Director	Dept Budgets	10,000/ 100,000	FY 12-13
1.2b AH 1	Partner with volunteer and emergency response agencies to post on agency websites links to training available to citizens.	EMA	Dept Budget	500/ 50,000	Ongoing
1.2c AH 1	Publish in area newspapers notice of citizen training opportunities and availability of citizen awareness training links on website.	EMA	Dept Budget	500/ 50,000	Ongoing
	Objective 1.3: Improve warning, evacuation, and information capabilities.				
1.3a AH 1	Seek grant funding to purchase and install warning sirens in unincorporated areas of dense population.	EMA, Grants Director	CDBG, County Budget	500,000/ 1,000,000	FY 14-15
1.3b AH 1	Continue to activate the EAS as necessary.	EMA	N/A	0/ 100,000	Ongoing
1.3c AH 4	Install TEWAS at Anderson County E-911 Communications Center.	TEMA, E-911	TEMA, 911 Budget	3,000/ 100,000	FY 14-15

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
1.3d AH 1	Seek grant funding to purchase and install an automated wide area rapid notification system.	EMA, Grants Director	Dept Budget CDBG, Grants	20,000/ 100,000	FY 14-15
1.3e AH 1	Enact legislation to require NOAA weather radios in all schools, day care, industrial, and health care facilities.	County Comm.	State, Private Industry	3,000/ 500,000	FY 14-15
1.3f AH 1	Seek grant funding to provide NOAA weather radios to low-income residents.	EMA, Grants Director	Private Industry Contribution	25,000/ 1,000,000	FY 14-15
1.3g AH 3	Update evacuation routes and procedures.	EMA	Dept Budget	25,000/ 100,000	FY 14-15
1.3h AH 3	Continue to support school phone system to notify parents of school emergencies.	Board of Education	School Budget	5,000/ 100,000	Ongoing
	Objective 1.4: Improve multi-jurisdictional, multi-agency response to all hazard incidents.				
1.4a AH 4	Assist all response agencies to complete BEOP assigned mitigation and preparedness activities.	EMA	Dept Budget	7,500/ 250,000	Ongoing
1.4b AH 2	Schedule and conduct Incident Command System and National Incident Management System training annually for all emergency response agencies and EOC ESCs.	EMA, TEMA	Dept Budget	450,000/ 2,000,000	Ongoing
1.4c AH 2	Develop and revise as necessary a countywide comprehensive NIMS-typed resources inventory.	EMA	Dept Budget	2,500/ 100,000	Ongoing
1.4d AH 4	Develop and incorporate into the BEOP ESF-format annexes for mass-casualty/mass-fatality and catastrophic incidents.	EMA	Dept Budget	21,000/ 1,000,000	FY 15-16
1.4e AH 4	Assist utility providers to develop emergency response plans, as requested.	Utility Providers, EMA	Dept Budgets	25,000/ 2,000,000	FY 12-13
1.4f AH 2	Conduct annual exercises involving all emergency response agencies.	EMA, Response Agencies	Dept Budget LEPC Grant	20,000/ 100,000	Ongoing
1.4g AH 2	Provide each emergency response agency at least one 800 MHz radio to ensure communications interoperability.	EMA	DHS Grant	130,000/ 500,000	FY 12-13
1.4h AH 2	Publish notice of federal, state, and local training opportunities to all emergency response agencies.	EMA	Dept Budget	500/ 100,000	Ongoing
	Objective 1.5: Improve capabilities to recover from all hazard incidents.				
1.5a AH 3	Assist all jurisdictions to develop comprehensive, economic, and continuity of operations plans.	Jurisdictional Governments, EMA	County Budget	50,000 500,000	FY 15-16
1.5b AH 3	Develop redundancy strategies to prevent loss of public records in the event of damage to critical facilities.	County Departments	Dept Budget	25,000/ 100,000	FY 15-16
1.5c AH 4	Conduct annual damage assessment training.	EMA	Dept Budget	2,500/ 100,000	FY 12-13

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
1.5d AH 4	Develop a debris management plan and provide debris management training for public works and highway departments.	Highway Dept	Dept Budget	12,500/ 2,000,000	FY 15-16
1.5e AH 3	Develop a post-disaster recovery ordinance.	County Comm.	County Budget	3,000/ 1,000,000	FY 15-16
Goal 2: Minimize the impact of hazardous materials spills and releases.					
.	**Objective 2.1: Identify and establish requirements for fixed sites with reportable quantities of hazardous materials**				
2.1a HM 4	Partner with LEPC to develop, maintain, and annually update an inventory of sites with reportable quantities of hazardous materials.	LEPC, EMA, Fire Comm.	LEPC, Dept Budgets	2,500/ 100,000	Ongoing
2.1b HM 4	Enforce requirements for each site to submit TIER II reports to EMA.	TEMA, LEPC, EMA	LEPC, Dept Budgets	1,000/ 100,000	Ongoing
2.1c HM 4	Enforce requirements for each Tier II site to report spill/release incidents to TEMA and EMA.	TEMA, LEPC, EMA	LEPC, Dept Budgets	1,000/ 100,000	Ongoing
2.1d HM 4	Require each Tier II site to develop and provide to EMA a site emergency plan.	LEPC, EMA	TIER II Sites	50,000/ 100,000	FY 14-15
2.1e HM 3	Enact legislation to require each Tier II site to install alert devices and develop a warning plan.	County Comm., EMA	TIER II Sites	100,000/ 200,000	FY 14-15
2.1f HM 3	Create a GIS map database of Tier II sites to display ERG-established zones and evacuation perimeters.	EMA, GIS, Fire Comm.	Dept Budgets	5,000/ 200,000	FY 12-13
	Objective 2.2: Educate citizens on response to hazardous materials incidents.				
2.2a HM 1	Publish articles in area newspapers to instruct citizens on shelter-in-place.	EMA	Dept Budget	500/ 100,000	Ongoing
2.2b HM 1	Partner with LEPC to distribute hazardous materials awareness and preparedness literature at community events.	EMA, LEPC	Dept Budget, LEPC	2,500/ 100,000	Ongoing
2.2c HM 1	Partner with schools to present programs on shelter-in-place and environmental effects of hazardous materials.	EMA, Board of Education	Dept Budgets	5,000/ 100,000	Ongoing
	Objective 2.3: Improve responder safety and Countywide response to hazardous materials incidents.				
2.3a HM 2	Provide training for hazardous materials awareness, operations, TEPP, technician, and CBRNE levels as appropriate for all emergency responders.	EMA , TEMA, Fire Comm.	Dept Budget DHS Grants	50,000/ 1,000,000	Ongoing
2.3b HM 4	Establish and equip a countywide hazardous materials team.	EMA	DHS Grants	200,000/ 1,000,000	Ongoing
2.3c HM 4	Establish and equip a CBRNE team to respond to incidents in DHS District II (16 County region).	EMA	DHS Grants	200,000/ 1,000,000	Ongoing
2.3d HM 2	Plan and conduct annual hazardous materials tabletop exercises and drills involving all emergency response agencies.	EMA, LEPC	Dept Budget, LEPC Grant	25,000/ 100,000	Ongoing
2.3e HM 2	Work with rural fire departments to develop hazardous materials response Sags.	EMA, Fire Comm.	Dept Budgets	12,500/ 100,000	FY 12-13

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
2.3f HM 2	Work with rural fire departments to develop oil/gas well incident Sags.	EMA, Fire Comm., Coal Creek Co.	Dept Budgets	12,500/ 200,000	FY 12-13
2.3g HM 3	Continue to participate in DOE drills and exercises.	EMA, LEPC, DOE	DOE Grant	7,500/ 100,000	Ongoing
	Objective 2.4: Reduce effects to the environment from transportation hazardous materials spills.				
2.4a TN 2	Provide training for firefighters in containing hazardous materials spills on roadways.	Fire Comm.	Dept Budgets	25,000/ 100,000	Ongoing
2.4b TN 2	Provide fire departments equipment to contain hazardous materials spills on roadways.	Fire Comm., EMA	Dept Budgets	15,000/ 500,000	FY 12-13
2.4c TN 1	Partner with TN One-Call to distribute "call before you dig" literature to citizens at community events.	EMA, TN One Call	Dept Budgets	2,500/ 100,000	FY 12-13
2.4d TN 2	Provide fire and rescue departments CSX rail incident training.	Fire Comm.	Dept Budgets	25,000/ 200,000	FY 12-13
	Objective 2.5: Reduce risk of citizen proximity to hazardous materials incidents.				
2.5a HM 3	Establish codes to prohibit construction of residential or public structures near fixed hazardous materials sites.	Codes Dept, County Comm.	County Budget	3,000/ 100,000	FY 14-15
2.5b TN 3	Establish codes to prohibit construction of special needs population facilities near rail lines.	Codes Dept, County Comm.	County Budget	3,000/ 100,000	FY 14-15
2.5c HM 4	Establish codes to require fencing around oil/gas wells and storage tanks.	Codes Dept, County Comm.	County Budget	3,000/ 200,000	FY 15-16
Goal 3: Minimize the impact of severe weather incidents on citizens and property.					
	Objective 3.1: Reduce the impact of drought				
3.1a DR 1	Distribute drought awareness and preparedness literature to citizens at community events.	EMA, Agriculture Agent	Dept Budget	2,500/ 100,000	Ongoing
3.1b DR 3	Enact legislation to restrict non-essential water usage during periods of drought.	County Comm.	County Budget	3,000/ 100,000	FY 13-14
3.1c DR 3	Maintain and update annually contact information for suppliers of potable water.	Purchasing Agent	Dept Budget	500/ 100,000	Ongoing
3.1d DR 4	Develop agreements for rural fire departments to provide delivery of non-potable water for drought-endangered livestock.	EMA, Fire Comm.	Dept Budgets	2,500/ 200,000	FY 13-14
	Objective 3.2: Reduce the impact of extreme temperatures.				
3.2a ET 1	Distribute extreme heat and extreme cold awareness and preparedness literature to citizens at community events.	EMA	Dept Budget	2,500/ 100,000	Ongoing
3.2b ET 1	Assist community agencies to establish heating/cooling centers for vulnerable populations.	EMA, Health Dept	Dept Budgets	3,000/ 100,000	FY 12-13

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
3.2c ET 2	Provide training for all county personnel subject to extreme heat and cold.	Public Works, Highway Dept, Fire Comm.	Dept Budgets	7,500/ 100,000	FY 12-13
	Objective 3.3: Reduce the loss of life and property from high wind, hail, and lightning incidents caused by tropical storms, thunderstorms, and tornados.				
3.3a HA 1	Distribute hail awareness and preparedness literature to citizens at community events.	EMA	Dept Budget	2,500/ 100,000	Ongoing
3.3b HA 4	Incorporate into damage assessment training hail damage to roofs and windows.	EMA, Red Cross	Dept Budgets	1,000/ 100,000	FY 12-13
3.3c HW 1	Partner with NWS and American Red Cross to publicize and conduct weather spotter and citizen preparedness training.	EMA, Red Cross, NWS	Dept Budgets	2,500/ 100,000	Ongoing
3.3d HW 1	Publish news articles and distribute literature to educate the public on safe rooms and shelter-in-place.	EMA, Red Cross	Dept Budgets	2,500/ 100,000	Ongoing
3.3e HW 1	Continue and expand participation in the spring NWS Severe Weather Awareness campaign	EMA, Red Cross, NWS	Dept Budgets	2,500/ 100,000	Ongoing
3.3f HW 3	Continue to enforce building codes for new structures and structures undergoing renovation.	Codes Dept	Dept Budget	15,000/ 500,000	Ongoing
3.3g HW 3	Continue to work with state inspectors to ensure anchor codes are met for newly-sited mobile homes.	Codes Dept	Dept Budget	15,000/ 100,000	Ongoing
3.3h HW 3	Seek grant funding to assist low-income residents to anchor previously sited mobile homes.	Codes Dept, Grants Director	CDBG, ADFAC	300,000/ 1,000,000	FY 14-15
3.3i HW 3	Enact legislation to require mobile home parks to install ground anchors at each mobile home space.	County Comm.	County Budget	3,000/ 1,000,000	FY 14-15
3.3j HW 3	Enact legislation to require new mobile home parks to construct storm shelters of adequate size to protect all residents during high wind incidents.	County Comm.	County Budget	3,000/ 1,000,000	FY 14-15
3.3k HW 2	Equip all fire and rescue vehicles with chain saws to ensure clearing of emergency routes following high wind incidents.	Fire Comm.	AFG Grants, Dept Budgets	12,500/ 100,000	FY 13-14
3.3l LG 1	Distribute lightning awareness and preparedness literature to citizens at community events.	EMA, Red Cross	Dept Budget	2,500/ 100,000	Ongoing
3.3m LG 3	Install lightning protection devices and grounding on critical facilities	Building & Grounds Director	Dept Budget	100,000/ 5,000,000	FY 14-15
	Objective 3.4: Reduce the impact of ice and snow caused by severe winter storms.				
3.4a IS 1	Distribute severe winter storm awareness and preparedness literature to citizens at community events.	EMA, Red Cross	Dept Budgets	2,500/ 100,000	Ongoing
3.4b IS 1	Continue and expand participation in the fall NWS Severe Weather Awareness campaign	EMA, Red Cross, NWS	Dept Budgets	500/ 100,000	Ongoing

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
3.4c IS 2	Seek grant funding to equip all emergency response vehicles with tire chains to ensure access to victims during ice and snow incidents.	Sheriff's Office, EMS, Fire Comm.	AFG Grants, Dept Budgets	200,000/ 1,000,000	FY 15-16
3.4d IS 2	Assist emergency services agencies to develop winter storm response protocols.	EMA	Dept Budgets	2,500/ 100,000	FY 12-13
3.4e IS 4	Maintain and update annually contact information for suppliers of drugs, food, water, and fuel.	Purchasing Agent	Dept Budget	1,000/ 100,000	Ongoing
	Objective 3.5: Minimize utility loss during all severe weather incidents.				
3.5a UP 3	Continue aggressive power line right-of-way clearing to reduce incidence of telephone and power lines downed by high wind or ice/snow incidents.	Electric Utilities, Public Works	Dept Budgets	50,000/ 500,000	Ongoing
3.5b UP 3	Enact legislation to require buried lines in all new cluster developments.	Codes Dept, County Comm.	County Budget	3,000/ 500,000	FY 15-16
3.5c UP 1	Publish news articles and distribute literature to increase citizen awareness of downed line prevention and safety.	Electric Utilities, EMA	Dept Budgets	2,500/ 100,000	Ongoing
3.5d UP 2	Provide downed line safety training to all emergency responders.	Electric Utilities	Dept Budgets	20,000/ 200,000	Ongoing
3.5e UP 3	Seek grant funding to install generators or "pigtails" in critical government facilities and fuel depots.	Grants Director	CDBG, County Budget	100,000/ 1,000,000	FY 15-16
3.5f UP 4	Maintain MOU with Food Lion to deliver portable generators to shelter sites as needed.	EMA, Health Dept	Dept Budgets	1,000/ 100,000	Ongoing
3.5g UW 3	Seek grant funding to install water line insulation for low-income residents.	Grants Director	CDBG, ADFAC	100,000/ 500,000	FY 15-16
Goal 4: Reduce the impact of citizens and property from flash and riverine flooding incidents caused by thunderstorms and tropical storms.					
	Objective 4.1: Continue participation in and improve citizen awareness of the National Flood Insurance Program				
4.1a FL 1	Publish news articles to advise citizens of the availability of flood insurance.	EMA, Red Cross	Dept Budgets	500/ 100,000	Ongoing
4.1b FL 1	Include information on flood insurance availability on county web page.	EMA, IT Director	Dept Budgets	500/ 100,000	FY 12-13
4.1c FL 1	Partner with local insurance agents to provide flood insurance literature to be distributed to citizens at community events.	EMA, Local Insurors	Dept Budgets	2,500/ 100,000	Ongoing
	Objective 4.2: Apply for Community Rating System approval.				
4.2a FL 3	Coordinate application for all jurisdictions to receive Community Rating System status.	EMA	Dept Budget	1,500/ 300,000	FY 14-15
	Objective 4.3: Identify and restrict development in flood prone areas.				
4.3a FL 3	Continue to use updated FIRMs and GIS 100/500 year flood maps to restrict construction or placement of mobile homes within the flood plain.	Codes & Zoning Depts.	Dept Budgets	2,500/ 100,000	Ongoing

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
4.3b FL 3	Evaluate methods to improve storm water systems in flood prone areas.	Storm Water Coordinator	Dept Budget	12,500/ 200,000	FY 14-15
4.3c FL 3	Evaluate the efficacy of construction of water flow and detention ponds in flood prone areas.	Storm Water Coordinator	Dept Budget	12,500/ 200,000	FY 14-15
4.3d FL 3	Continue to work with property owners to relocate RPL/SRL structures.	EMA, FEMA Cnty Officials,	Grants, Cnty Budget	500,000/ 2,000,000	Ongoing
	Objective 4.4: Reduce flooding from streams and creeks.				
4.4a FL 3	Install larger culverts to permit clear stream flow.	Public Works, Highway Dept	Dept Budgets, TDOT	200,000/ 500,000	FY 14-15
4.4b FL 3	Provide regular maintenance to remove debris from flood prone streams and creeks.	Public Works	Dept Budget	150,000/ 300,000	Ongoing
4.4c FL 4	Evaluate methods to address flooding of Bull Run Creek in the Claxton area.	Storm Water Coordinator	Dept Budget	12,500/ 100,000	FY 14-15
4.4d FL 4	Evaluate methods to address flooding of Hinds Creek, Irwin Mill Road, and Pumpkin Hollow Road in the Andersonville area.	Storm Water Coordinator	Dept Budget	12,500/ 100,000	FY 14-15
4.4e FL 4	Seek grant funds to raise and widen bridge and elevate access roadway to address flooding on Airport Road in the Marlow area.	Highway Dept, Grants Director	Dept Budget	12,500/ 100,000	FY 14-15
4.4f FL 4	Evaluate the realignment of bridges to remove abutment obstructions to the Coal Creek stream channel to reduce flooding in Briceville.	Coal Creek Watershed Foundation	Coal Creek Foundation, Corps of Engineers	12,500/ 300,000	FY 14-15
	Objective 4.5: Reduce repetitive roadway flooding.				
4.5a FL 3	Identify and map repetitive flooding roadways and bridges.	Public Works, GIS, Highway Dept	Dept Budgets	12,500/ 300,000	FY 14-15
4.5b FL 3	Evaluate efficacy of raising grade level or expanding ditch depth and width along repetitive flooding roadways	Public Works, Highway Dept	Dept Budgets	12,500/ 500,000	FY 14-15
4.5c FL 1	Partner with NWS to erect “Turn Around, Don’t Drown” signage at flooding points.	Public Works, Highway Dept	Dept Budgets, Private Sector Grants	5,000/ 100,000	FY 13-14
4.5d FL 1	Erect staff signage indicating water depth at flooding points.	Public Works, Highway Dept	Dept Budgets, HMGP Grant	25,000/ 100,000	FY 13-14
4.5e FL 1	Install gates to block roadways and bridges during flooding.	Public Works, Highway Dept	Dept Budgets, HMGP Grant	50,000/ 100,000	FY 13-14
	Objective 4.6: Increase citizen awareness of flood hazard and safety.				

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
4.6a FL 1	Distribute flood awareness and preparedness literature at community events.	EMA, Red Cross	Dept Budgets	2,500/ 100,000	Ongoing
4.6b FL 1	Work with citizens in affected areas to develop a community flood response plan.	EMA	Dept Budget	15,000/ 100,000	FY 13-14
	Objective 4.7: Improve emergency response to flood incidents.				
4.7a FL 3	Identify and map areas made inaccessible by bridge and/or roadway flooding.	Highway Dept, GIS	Dept Budgets	5,000/ 100,000	FY 13-14
4.7b FL 4	Use NWS and TVA websites to monitor precipitation amounts, river level, and stream flow during flood incidents.	EMA	N/A	0/ 50,000	Ongoing
4.7c FL 2	Train emergency response agencies in flood response safety.	EMA, Response Agencies	Dept Budgets	10,000/ 100,000	FY 12-13
4.7d FL 2	Train and equip a countywide swift water rescue team.	EMA, Rescue Squad, Fire Comm.	Dept Budgets	25,000/ 100,000	FY 12-13
Goal 5: Reduce loss of life and property from urban fires.					
	Objective 5.1: Increase citizen awareness of fire hazards, prevention, and safety.				
5.1a UF 1	Continue aggressive fire prevention education programs in all schools.	Fire Comm.	Dept Budgets	10,000/ 100,000	Ongoing
5.1b UF 1	Assist fire departments in obtaining grants to purchase materials and equipment to enhance fire prevention education programs.	EMA	Dept Budget, AFG Program	5,000/ 100,000	Ongoing
5.1c UF 1	Partner with volunteer agencies to present fire prevention education programs to service clubs, senior citizens, and special needs populations.	Fire Comm., Volunteer Agencies	Dept Budgets	5,000/ 100,000	Ongoing
5.1d UF1	Partner with fire departments volunteer agencies to present programs on the use of fire extinguishers.	Fire Comm.	Dept Budgets	5,000/ 100,000	Ongoing
5.1e UF 1	Partner with fire departments to distribute fire prevention education literature at community events.	Fire Comm., EMA	Dept Budgets	2,500/ 100,000	Ongoing
5.1f UF 1	Partner with the media to promote “change your clock, change your smoke alarm battery” twice yearly.	Fire Comm.	Dept Budgets	500/ 100,000	Ongoing
5.1g UF 1	Assist fire departments in obtaining grants to provide free smoke alarms to citizens.	Fire Comm., EMA	Dept Budgets, AFG Program	5,000/ 100,000	Ongoing
5.1h UF 1	Partner with volunteer agencies to install smoke alarms for special needs populations.	Fire Comm., Volunteer Agencies	Dept Budgets, Agency Budgets	2,500/ 100,000	Ongoing
	Objective 5.2: Reduce the incidence and severity of structure fires.				

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
5.2a UF 4	Establish and staff a full-time county fire marshal position.	County Mayor, County Comm.	County Budget	60,000/ 300,000	FY 14-15
5.2b UF 3	Continue rigid enforcement of existing fire and electrical codes.	Codes Dept	Dept Budget	10,000/ 100,000	Ongoing
5.2c UF 3	Enact legislation to require sprinkler systems in all new construction.	County Comm.	County Budget	3,000/ 250,000	FY 14-15
5.2d UF 3	Develop and annually update emergency pre-plans for all public buildings, schools, businesses, and churches.	Fire Comm.	Dept Budgets	50,000/ 2,000,000	Ongoing
	Objective 5.3: Improve firefighter safety and response capabilities.				
5.3a UF 2	Provide training for state and national certifications for career and volunteer firefighters.	Fire Comm.	Dept Budgets	25,000/ 100,000	Ongoing
5.3b UF 3	Continue to assist fire departments in applying for Assistance to Firefighter Grants (AFG).	EMA	Dept Budget	5,000/ 2,000,000	Ongoing
5.3c UF 3	Continue to provide matching funds to departments awarded Assistance to Firefighter Grants (AFG).	County Comm.	County Budget	50,000/ 1,000,000	Ongoing
	Objective 5.4: Improve water supply in rural areas.				
5.4a UW 4	Update annually the GIS database to identify water line size and hydrant locations.	Water Utilities, GIS	Dept Budgets	2,500/ 100,000	Ongoing
5.4b UW 4	Seek grant funding to replace smaller diameter lines with six-inch mains.	Water Utilities, East TN Development District	Dept Budgets, CDBG	5,000/ 300,000	FY 13-14
5.4c UW 4	Seek grant funding to construct pumping stations to provide adequate pressure in elevated areas.	Water Utilities, East TN Development District	Dept Budgets, CDBG	5,000/ 400,000	FY 13-14
5.4d UW 4	Seek grant funding to install hydrants at half-mile intervals in unincorporated areas.	Water Utilities, East TN Development District	Dept Budgets, CDBG	5,000/ 200,000	FY 13-14
Goal 6: Minimize the impact of wildfires on citizens and property.					
	Objective 6.1: Increase citizen awareness and preparedness for wildfire incidents				
6.1a WF 1	Expand public fire prevention education to include programs on wildfire and arson.	Fire Comm.	Dept Budgets	1,000/ 100,000	Ongoing
6.1b WF 1	Publish news articles to promote wildfire awareness.	Fire Comm., Forestry	Dept Budgets	500/ 100,000	Ongoing
6.1c WF 1	Publish outdoor burn permit requirements in area newspapers in October.	Fire Comm., Forestry	Dept Budgets	500/ 100,000	Ongoing
6.1d WF 1	Partner with utilities to include burn permit information in September utility bills.	Forestry, Fire Comm.	Dept Budgets	5,000/ 100,000	FY 12-13
6.1e WF 1	Publish outdoor burn ban information in area newspapers, as required.	Forestry, Fire Comm.	Dept Budgets	500/ 100,000	Ongoing

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
6.1f WF 1	Partner with the Division of Forestry to distribute USFS fuels reduction, wildfire awareness, and prevention literature at community events.	Forestry, Fire Comm.	Dept Budgets	2,500/ 100,000	Ongoing
	Objective 6.2: Enforce outdoor burn ban and permit requirements.				
6.2a WF 3	Enact legislation to make mandatory fines for non-permitted outdoor burning.	County Comm.	County Budget	3,000/ 100/000	FY 14-15
6.2b WF 3	Require prosecution and restitution for arson.	Forestry, County Comm.	Dept Budgets	3,000/ 100,000	FY 14-15
	Objective 6.3: Improve firefighter safety and effectiveness during wild land firefighting operations.				
6.3a WF 3	Continue the partnership between fire departments and the Division of Forestry.	Forestry, Fire Comm.	N/A	0/ 50,000	Ongoing
6.3b WF 3	Provide annual wild land fire training for all fire departments.	Forestry, Fire Comm.	Dept Budgets	25,000/ 100,000	Ongoing
6.3c WF 3	Assist fire departments in obtaining grants for wild land firefighting equipment.	EMA	Forestry Grants, AFG	25,000/ 100,000	Ongoing
	Objective 6.4: Reduce loss of structures in urban interface wildfire incidents.				
6.4a WF 3	Establish and enforce codes stipulating setback distances for all new structures not using fire-resistive materials.	Codes Dept	Dept Budget	3,000/ 150,000	FY 14-15
6.4b WF 3	Partner with Forestry to publish news articles and distribute Firewise literature to increase citizen awareness of recommended setback distances.	Forestry, Fire Comm., EMA	Dept Budgets	2,500/ 150,000	Ongoing
Goal 7: Protect the county's citizens and assets from domestic and international terrorism.					
	Objective 7.1: Increase citizen awareness and preparedness for terrorism incidents				
7.1a TR 1	Partner with TEMA to distribute terrorism awareness and preparedness literature at community events.	TEMA, EMA	Dept Budgets	2,500/ 100,000	Ongoing
	Objective 7.2: Decrease the possibility of and loss of life from attacks on public facilities.				
7.2a TR 3	Continue to restrict parking of vehicles in close proximity to critical facilities.	Public Works	Dept Budget	10,000/ 2,000,000	Ongoing
7.2b TR 4	Install gates and card readers for parking access under the Jolley Building.	County Comm.	County Budget	50,000/ 6,250,000	FY 13-14
7.2c TR 3	Assist critical facilities to develop emergency response plans.	EMA, Critical Facilities	Dept Budgets	25,000/ 250,000	FY 12-13
7.2d TR 3	Develop and practice quarterly an evacuation plan for all critical facilities.	EMA, Critical Facilities	Dept Budgets	12,500/ 250,000	FY 13-14
7.2e TR 3	Partner with schools to improve security and lockdown procedures.	EMA, School Board	Dept Budgets	12,500/ 250,000	Ongoing
	Objective 7.3: Improve terrorism response capabilities and emergency responder safety.				
7.3a TR 3	Continue to participate in the Joint Terrorism Task Force.	Sheriff's Office	Dept Budget	12,500/ 100,000	Ongoing

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
7.3b TR 2	Provide Emergency Response to Terrorism training for all emergency response agencies.	TEMA, Emergency Response Depts.	Dept Budgets	25,000/ 100,000	Ongoing
7.3c TR 2	Assist the rescue squad to obtain grants for equipment and training to improve capability for search and rescue operations during terrorism incidents.	EMA, Rescue Squad	Dept Budgets, Private Sector Grants	2,500/ 100,000	Ongoing
Goal 8: Reduce loss of life and property from meth labs.					
.	**Objective 8.1: Increase citizen awareness of meth lab hazards, recognition, and reporting**				
8.1a IL 3	Partner with law enforcement and the drug task force to distribute meth lab awareness information at community events	Sheriff's Office, EMA	Dept Budgets	2,500/ 100,000	Ongoing
8.1b IL 1	Provide meth lab awareness training for citizens.	Sheriff's Office	Dept Budget	5,000/ 100,000	Ongoing
8.1c IL 1	Partner with schools to promote awareness, recognition, and reporting of meth labs.	Sheriff's Office, Board of Education	Dept Budgets	12,500/ 100,000	Ongoing
	Objective 8.2: Improve emergency responder safety at clandestine labs				
8.2a IL 4	Continue participation in the state and federal drug task force.	Sheriff's Office	Dept Budget, DOJ, DEA	5,000/ 100,000	Ongoing
8.2b IL 2	Provide training and equipment for law enforcement and drug task force personnel.	Sheriff's Office	Dept Budget, DOJ, DEA	30,000/ 100,000	Ongoing
8.2c IL 2	Develop meth lab Sags for emergency responders.	EMA, Fire Comm.	Dept Budgets	5,000/ 100,000	FY 12-13
Goal 9: Minimize property damage and public risk from landslides.					
.	**Objective 9.1: Identify areas prone to landslide**				
9.1a LM 3	Partner with TDOT to conduct a countywide study to determine and GIS map potential landslide areas.	Highway Dept, TDOT, GIS	Dept Budgets	15,000/ 500,000	FY 16-17
9.1b LM 3	Conduct meetings between road and planning departments to prioritize potential landslide areas and methods of remediation.	Public Works, Highway Dept	Dept Budgets	12,500/ 500,000	FY 16-17
9.1c LM 4	Coordinate with TVA to seek grant funding to remediate Lane's Bluff Road slide into the Clinch River.	Highway Dept, TVA, Grants Director	PDM Grant County Budget	12,500 750,000	FY 16-17
	Objective 9.2: Restrict development in areas prone to landslide.				
9.2a LM 3	Revise zoning and building codes to restrict construction in landslide hazard areas.	Codes Dept	Dept Budget	3,000/ 500,000	FY 16-17

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
9.3a LM 1	Distribute landslide awareness and safety information at community events.	EMA	Dept Budget	2,500/ 100,000	Ongoing
9.3b LM 1	Erect signage to warn motorists of landslide danger at identified sites.	Public Works	Dept Budget	5,000/ 100,000	FY 16-17
Goal 10: Minimize potential loss of life and economic impact from dam failure.					
	Objective 10.1: Reduce loss of life from Norris Dam failure.				
10.1a FL 4	Coordinate with TVA to seek grant funds to install alert devices downstream of Norris Dam.	EMA, TVA	TVA	150,000/ 500,000	FY 16-17
10.1b FL 1	Educate citizens to recognize and respond immediately to dam failure alert devices.	EMA, TVA	TVA	5,000/ 500,000	FY 16-17
10.1c FL 1	Distribute dam failure awareness and preparedness literature at community events.	EMA	Dept Budget	2,500/ 100,000	Ongoing
	Objective 10.2: Reduce loss of life and property from failure of privately owned dams.				
10.2a FL 4	Conduct a study to quantify the catastrophic floodplain below privately owned dams.	GIS	Dept Budget	12,500/ 100,000	FY 16-17
10.2b FL 4	Use GIS mapping to identify structures within the catastrophic floodplains.	GIS	Dept Budget	5,000/ 100,000	FY 16-17
10.2c FL 4	Update zoning codes to prohibit construction within the catastrophic floodplains.	Codes Dept	Dept Budget	3,000/ 100,000	FY 16-17
10.2d FL 4	Require owner inspection of non-regulated privately owned dams on a regular basis.	Codes Dept	Dept Budget	2,500/ 100,000	FY 16-17
10.2e FL 4	Require non-regulated dams to meet engineering standards, even if smaller than regulatory criteria.	Codes Dept	Dept Budget	2,5000/ 100,000	FY 16-17
	Objective 10.3: Improve emergency preparedness and response to flooding from dam failure				
10.3a FL 3	Quantify extent of flooding from Norris Dam failure.	GIS	Dept Budget	5,000/ 200,000	FY 16-17
10.3b FL 3	Develop emergency plans for response to and recovery from Norris Dam failure.	Fire Chief, Public Works	Dept Budgets	5,000/ 1,000,000	FY 16-17
10.3c FL 4	Develop and incorporate into the BEOP an ESF-format dam failure annex.	EMA, TEMA	Dept Budget	12,500/ 1,000,000	FY 16-17
Goal 11: Minimize damage to property from land subsidence.					
.	**Objective 11.1: Identify karst prone areas**				
11.1a LS 3	Partner with UT geology department to conduct a countywide study of karst areas and known sinkholes.	EMA	Dept Budget	12,500/ 3,000,000	FY 16-17
11.1b LS 3	Create GIS maps showing karst areas.	GIS	Dept Budget	5,000/ 3,000,000	FY 16-17
	Objective 11.2: Improve citizen awareness of land subsidence hazards.				
11.2a LS 4	Include karst information on plat maps to inform property owners of high subsidence risk.	Planning & Zoning	Dept Budget	5,000/ 100,000	FY 16-17
11.2b LS 3	Require property owners to sign acknowledgement of subsidence risk notification before issuing building permits on high-risk sites.	Planning & Zoning	Dept Budget	5,000/ 100,000	FY 16-17
11.2c LS 1	Distribute subsidence awareness literature at community events.	EMA	Dept Budget	2,500/ 100,000	Ongoing

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
Goal 12: Minimize damage and loss of life from earthquakes.					
	Objective 12.1: Evaluate the potential for a damaging earthquake in Anderson County.				
12.1a EQ 3	Partner with the state Division of Geology to quantify the potential for an earthquake greater than 6.0 in Anderson County.	EMA, GIS	Dept Budgets	12,500/ 100,000	FY 16-17
12.1b EQ 3	Partner with UT geology department to identify areas of greatest earthquake hazard.	GIS	Dept Budget	12,500/ 100,000	FY16-17
12.1c EQ 3	Create a GIS mapping database to determine critical facilities and numbers of other structures that would be affected by earthquake.	GIS	Dept Budget	5,000/ 100,000	FY 16-17
12.1d EQ 4	Develop and incorporate into the BEOP an ESF-format earthquake annex.	EMA	Dept Budget	12,500/ 500,000	FY 16-17
	Objective 12.2: Increase citizen awareness of earthquake hazards and pre-disaster mitigation strategies.				
12.2a EQ 1	Distribute earthquake awareness and preparedness literature at community events.	EMA	Dept Budget	2,500/ 100,000	Ongoing
12.2b EQ 1	Partner with local insurance agents to distribute earthquake insurance information at community events.	EMA, Local Insurance Agencies	Dept Budgets	2,500/ 100,000	Ongoing
Goal 13: Minimize the impact of bioterrorism and widespread health emergencies.					
	Objective 13.1: Increase citizen awareness and preparedness for pandemic health incidents.				
13.1a PD 1	Partner with the health department to distribute pandemic awareness and preparedness literature at community events.	EMA, Health Dept	Dept Budget	2,500/ 100,000	Ongoing
13.1b PD 1	Include on the county web page the state health department link for pandemic planning information.	IT Director	N/A	0/ 100,000	FY 12-13
	Objective 13.2: Improve response to bioterrorism incidents and pandemic health emergencies.				
13.2a PD 4	Continue to recruit volunteers to staff a mass clinic for response to all widespread disease.	Health Dept	Dept Budget	20,000/ 100,000	Ongoing
13.2b PD 4	Continue to exercise and update the Anderson County Point of Dispensing (mass clinic) SOG.	Health Dept	Dept Budget	12,000/ 100,000	Ongoing
13.2c PD 3	Continue to participate in Strategic National Stockpile drills and exercises.	Health Dept	Dept Budget	12,000/ 100,000	Ongoing
13.2d PD 4	Maintain an inventory of Mark I packs for response to chemical agent dispersal incidents.	Anderson County EMS	Dept Budget	5,000/ 100,000	Ongoing
	Objective 13.3: Reduce the impact of bioterrorism and pandemic health emergencies on business, agriculture, and emergency services agencies.				
13.3a PD 3	Assist businesses to develop pandemic emergency plans.	EMA	Dept Budget	25,000/ 200,000	FY 13-14
13.3b PD 3	Develop pandemic emergency plans for emergency services and jurisdiction departments.	EMA, All County Depts. and Agencies	Dept Budgets	12,500/ 300,000	FY 13-14

Table 7.16 Anderson County Mitigation Actions					
Hazard Goal & Action	**Action/Project Description**	**Responsible Entity**	**Funding Source**	**Cost/ Benefit Estimate**	**Date Complete Estimate**
13.3c PD 4	Partner with the agriculture extension agent to determine numbers and locations of livestock populations.	EMA, Agriculture Agent	Dept Budgets	2,500/ 100,000	FY 13-14

Following is the "STAPLEE" evaluation and prioritization of Anderson County's mitigation actions for the 2011 Plan update.

Table 7.17 "STAPLEE" Mitigation Actions Prioritization Table

	Social				Technical			Administrative			Political			Legal			Economic				Environmental					Prioritization
Action/Project Description	High Community Acceptance	High Effect on Loss of Life-WF=3	High Effect on Property Loss WF=3	High Effect on Economic Loss WF=3	Is Technical Feasibility	Is a Long-Term Solution	No Secondary Impacts	Little Staffing Required	Funding Potential is High	Low Maintenance/Operations	High Political Support	Has a Local Champion	Has Public Support	State Authorized	Local Authority Exists	Potential Legal Challenge is High	Action Benefit is High WF=2	Action Cost is Low WF=2	High Economic Goal Contribution	Outside Funding Not Required	Land/Water Effect is Low	Low Endangered Species Effect	HAZMAT Waste Site Effect is Low	Environmental Effect is Low	Federal Law Compliant is High	Total Priority Score
Continue aggressive fire prevention education programs in all schools.	3	9	9	9	3	2	2	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	94
Partner with volunteer agencies to present fire prevention education programs to service clubs, senior citizens, and special needs populations.	3	9	9	9	3	2	2	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	94
Partner with fire departments and volunteer agencies to present programs on the use of fire extinguishers.	3	9	9	9	3	2	2	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	94
Partner with fire departments to distribute fire prevention education literature at community events.	3	9	9	9	3	2	2	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	94
Assist fire departments in obtaining grants to purchase materials and equipment to enhance fire prevention education programs.	3	9	9	9	3	2	2	2	2	2	2	2	3	3	3	3	6	6	3	3	3	3	3	3	3	92
Partner with the media to promote "change your clock, change your smoke alarm battery" twice yearly.	3	6	9	9	3	2	2	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	91
Partner with schools to improve security and lockdown procedures.	3	6	6	6	3	3	3	2	3	2	3	3	3	3	3	3	6	6	3	3	3	3	3	3	3	88
Quantify extent of flooding from Norris Dam failure.	3	6	9	9	3	3	3	2	2	2	2	2	2	3	3	3	6	4	3	3	3	3	3	3	3	88
Develop and incorporate into the BEOP an ESF-format dam failure annex.	2	6	9	9	3	3	3	2	2	2	2	1	2	3	3	3	6	6	3	3	3	3	3	3	3	88
Partner with volunteer agencies to install smoke alarms for special needs populations.	3	6	9	9	3	3	2	2	2	2	2	2	3	3	3	3	6	4	3	2	3	3	3	3	3	87
Partner with the state Division of Geology to quantify the potential for an earthquake greater than 6.0 in Anderson County.	3	6	6	9	3	2	3	2	3	2	2	2	2	3	3	3	6	6	3	3	3	3	3	3	3	87

Table 7.17 "STAPLEE" Mitigation Actions Prioritization Table

	Social				Technical			Administrative			Political			Legal			Economic				Environmental					Prioritization
Action/Project Description	High Community Acceptance	High Effect on Loss of Life-WF=3	High Effect on Property Loss WF=3	High Effect on Economic Loss WF=3	Is Technical Feasibility	Is a Long-Term Solution	No Secondary Impacts	Little Staffing Required	Funding Potential is High	Low Maintenance/Operations	High Political Support	Has a Local Champion	Has Public Support	State Authorized	Local Authority Exists	Potential Legal Challenge is High	Action Benefit is High WF=2	Action Cost is Low WF=2	High Economic Goal Contribution	Outside Funding Not Required	Land/Water Effect is Low	Low Endangered Species Effect	HAZMAT Waste Site Effect is Low	Environmental Effect is Low	Federal Law Compliant is High	Total Priority Score
Partner with UT geology department to identify areas of greatest earthquake hazard.	3	6	6	9	3	2	3	2	3	2	2	2	2	3	3	3	6	6	3	3	3	3	3	3	3	87
Partner with schools to present programs on shelter-in-place and environmental effects of hazardous materials.	3	6	3	6	3	3	3	2	3	2	3	3	3	3	3	3	6	6	3	3	3	3	3	3	3	85
Distribute dam failure awareness and preparedness literature at community events.	3	6	6	9	3	2	3	2	3	2	3	2	3	3	3	3	4	4	3	3	3	3	3	3	3	85
Distribute earthquake awareness and preparedness literature at community events.	3	6	6	9	3	2	3	2	3	2	2	2	2	3	3	3	6	4	3	3	3	3	3	3	3	85
Enforce requirements for each Tier II site to report spill/release incidents to TEMA and EMA.	3	6	6	6	3	3	3	2	3	2	2	2	3	3	3	3	6	4	3	3	3	3	3	3	3	84
Continue to enforce building codes for new structures and structures undergoing renovation.	2	6	9	9	3	3	2	2	2	2	2	2	2	3	3	1	6	4	3	3	3	3	3	3	3	84
Assist fire departments in obtaining grants to provide free smoke alarms to citizens.	3	6	9	9	3	3	2	2	1	2	1	1	3	3	3	3	6	4	3	2	3	3	3	3	3	84
Continue rigid enforcement of existing fire and electrical codes.	2	6	9	9	3	3	2	1	2	2	2	2	2	3	3	2	6	4	3	3	3	3	3	3	3	84
Develop and incorporate into the BEOP an ESF-format earthquake annex.	2	6	6	9	3	2	3	2	3	2	2	2	2	3	3	3	6	4	3	3	3	3	3	3	3	84
Include on the county web page the state health department link for pandemic planning information.	3	9	0	6	3	2	3	2	3	2	3	3	3	3	3	3	6	6	3	3	3	3	3	3	3	84
Continue to recruit volunteers to staff a mass clinic for response to all widespread disease.	3	9	0	6	3	2	3	2	3	2	3	3	3	3	3	3	6	6	3	3	3	3	3	3	3	84
Expand public fire prevention education to include programs on wildfire and arson.	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	83
Publish news articles to promote wildfire awareness.	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	83

Table 7.17 "STAPLEE" Mitigation Actions Prioritization Table

	Social				Technical			Administrative			Political			Legal			Economic				Environmental					Prioritization
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Publish outdoor burn ban information in area newspapers, as required.	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	83
Partner with the Division of Forestry to distribute USFS fuels reduction, wildfire awareness, and prevention literature at community events.	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	83
Create a GIS mapping database to determine critical facilities and numbers of other structures that would be affected by earthquake.	3	6	6	9	3	2	3	2	2	2	2	2	2	3	3	3	6	4	3	2	3	3	3	3	3	83
Maintain the Hazard Mitigation Planning Committee: schedule annual meetings to review progress and oversee implementation of the mitigation plan.	2	9	9	9	3	3	2	1	3	1	2	2	2	3	3	3	6	4	3	1	2	2	2	2	3	82
Partner with LEPC to develop, maintain, and annually update an inventory of sites with reportable quantities of hazardous materials.	3	6	6	6	3	3	3	2	2	2	2	2	3	3	3	3	6	4	3	2	3	3	3	3	3	82
Partner with LEPC to distribute hazardous materials awareness and preparedness literature at community events.	3	6	6	6	3	2	3	2	3	2	2	2	3	3	3	3	6	4	3	2	3	3	3	3	3	82
Continue and expand participation in the spring NWS Severe Weather Awareness campaign	3	6	6	6	3	2	3	2	3	3	3	2	3	3	3	3	4	4	2	3	3	3	3	3	3	82
Continue to use updated FIRMs and GIS 100/500 year flood maps to restrict construction or placement of mobile homes within the flood plain.	2	6	6	9	3	3	2	2	2	1	2	2	2	3	3	3	6	4	3	3	3	3	3	3	3	82
Use NWS and TVA websites to monitor precipitation amounts, river level, and stream flow during flood incidents.	2	6	6	9	3	3	3	2	3	2	3	2	3	3	2	3	3	3	3	3	3	3	3	3	3	82
Publish outdoor burn permit requirements in area newspapers in October.	2	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	6	3	3	3	3	3	3	3	82

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Continue the partnership between fire departments and the Division of Forestry.	3	3	6	6	3	2	3	2	3	2	3	3	3	3	3	3	4	6	3	3	3	3	3	3	3	82
Partner with Forestry to publish news articles and distribute Firewise literature to increase citizen awareness of recommended setback distances.	3	3	6	6	3	2	3	2	3	2	3	3	3	3	3	3	4	6	3	3	3	3	3	3	3	82
Partner with TEMA to distribute terrorism awareness and preparedness literature at community events.	3	3	6	6	3	2	3	2	3	2	3	3	3	3	3	3	4	6	3	3	3	3	3	3	3	82
Partner with local insurance agents to distribute earthquake insurance information at community events.	3	0	6	9	3	3	3	2	3	2	2	2	2	3	3	3	6	6	3	3	3	3	3	3	3	82
Continue to exercise and update the Anderson County Point of Dispensing (mass clinic) SOG.	3	9	0	6	3	2	3	2	3	2	3	3	3	3	3	3	6	4	3	3	3	3	3	3	3	82
Continue to activate the EAS as necessary.	3	9	0	3	3	3	3	2	3	2	3	3	3	3	3	3	6	6	2	3	3	3	3	3	3	81
Work with rural fire departments to develop oil/gas well incident Sags.	3	6	6	6	3	3	2	2	2	2	3	2	2	3	3	3	4	6	2	3	3	3	3	3	3	81
Partner with NWS and American Red Cross to publicize and conduct weather spotter and citizen preparedness training.	3	9	3	6	3	3	3	2	2	2	2	2	2	3	3	3	6	4	3	2	3	3	3	3	3	81
Require prosecution and restitution for arson.	3	3	6	6	3	3	3	2	3	2	3	3	3	3	3	3	4	4	3	3	3	3	3	3	3	81
Conduct a study to quantify the catastrophic floodplain below privately owned dams.	3	6	6	6	3	2	3	2	2	2	2	2	2	3	3	3	6	4	3	3	3	3	3	3	3	81
Continue to participate in Strategic National Stockpile drills and exercises.	3	9	0	6	3	2	3	2	3	2	3	3	3	3	3	3	6	4	3	2	3	3	3	3	3	81
Assist businesses to develop pandemic emergency plans.	3	6	0	6	3	2	3	2	3	2	3	3	3	3	3	3	6	6	3	3	3	3	3	3	3	81
Provide GIS director FEMA training to ensure incorporation of HAZUS-MH in GIS databases.	1	3	9	9	3	3	3	2	2	2	1	1	1	3	3	3	6	4	3	3	3	3	3	3	3	80

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Partner with volunteer and emergency response agencies to post on agency websites links to training available to citizens.	2	6	6	6	3	3	3	3	2	3	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	80
Enact legislation to require NOAA weather radios in all schools, day care, industrial, and health care facilities.	3	9	3	3	3	3	3	2	2	3	2	2	3	3	3	3	6	4	2	3	3	3	3	3	3	80
Distribute flood awareness and preparedness literature at community events.	3	6	6	6	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	80
Work with citizens in affected areas to develop a community flood response plan.	3	6	6	9	3	2	2	2	3	2	3	2	3	3	3	3	3	2	3	3	2	3	3	3	3	80
Develop and annually update emergency pre-plans for all public buildings, schools, businesses, and churches.	2	6	6	6	3	2	3	1	2	2	3	2	3	3	3	3	6	4	3	2	3	3	3	3	3	80
Provide training for state and national certifications for career and volunteer firefighters.	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	4	3	2	3	3	3	3	3	80
Continue to assist fire departments in applying for Assistance to Firefighter Grants (AFG).	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	4	3	2	3	3	3	3	3	80
Continue to provide matching funds to departments awarded Assistance to Firefighter Grants (AFG).	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3	3	6	4	3	2	3	3	3	3	3	80
Assist all response agencies to complete BEOP assigned mitigation and preparedness activities.	2	6	6	6	3	3	3	2	3	2	2	2	2	3	3	3	4	4	3	2	3	3	3	3	3	79
Develop and incorporate into the BEOP ESF-format annexes for mass-casualty/mass-fatality and catastrophic incidents.	2	6	3	6	3	3	3	2	3	2	2	2	2	3	3	3	4	6	3	3	3	3	3	3	3	79
Assist utility providers to develop emergency response plans, as requested.	2	3	3	6	3	3	3	3	3	3	2	2	2	3	3	2	6	6	3	3	3	3	3	3	3	79
Establish and staff a full-time county fire marshal position.	2	6	9	9	3	3	2	1	1	1	1	1	2	3	3	3	6	2	3	3	3	3	3	3	3	79

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Establish staging areas, county receiving points, and points of distribution locations.	2	6	3	3	3	3	3	3	3	3	2	2	2	3	3	2	4	6	4	3	3	3	3	3	3	78
Develop and maintain a county web page with citizen information to include shelter locations; shelter-in-place, safe room, and flood insurance information; FEMA on-line course listing; and links to disaster preparedness websites.	3	9	6	6	3	3	3	1	2	1	2	2	2	3	3	3	4	2	3	2	3	3	3	3	3	78
Provide training for hazardous materials awareness, operations, TEPP, technician, and CBRNE levels as appropriate for all emergency responders.	3	6	6	6	3	2	3	2	2	2	2	2	2	3	3	3	4	4	3	2	3	3	3	3	3	78
Publish news articles and distribute literature to educate the public on safe rooms and shelter-in-place.	3	9	0	3	3	2	3	2	3	3	3	2	3	3	3	3	4	6	2	3	3	3	3	3	3	78
Enact legislation to require mobile home parks to install ground anchors at each mobile home space.	2	6	6	6	3	3	3	2	2	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	78
Partner with local insurance agents to provide flood insurance literature to be distributed to citizens at community events.	2	0	9	6	3	3	2	2	3	2	3	2	3	3	3	3	4	4	3	3	3	3	3	3	3	78
Identify and map repetitive flooding roadways and bridges.	2	6	6	6	3	3	3	2	2	2	3	2	3	3	3	3	3	2	3	3	3	3	3	3	3	78
Assist critical facilities to develop emergency response plans.	3	3	3	6	3	2	3	2	3	2	3	2	3	3	3	3	4	6	3	3	3	3	3	3	3	78
Develop and practice quarterly an evacuation plan for all critical facilities.	3	3	3	6	3	2	3	2	3	2	3	2	3	3	3	3	4	6	3	3	3	3	3	3	3	78
Develop emergency plans for response to and recovery from Norris Dam failure.	3	6	9	9	3	2	3	2	2	2	2	2	2	3	3	3	6	4	3	3	3	3	3	3	3	78

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Develop pandemic emergency plans for emergency services and jurisdiction departments.	3	6	0	6	3	2	3	2	3	2	3	3	3	3	3	3	6	4	3	2	3	3	3	3	3	78
Assist in finding funding sources to equip rural shelter facilities.	3	9	0	3	3	3	2	2	3	3	3	2	3	3	3	3	6	6	3	3	2	2	2	2	3	77
Complete requirements to attain NWS Storm Ready Community status.	2	6	6	6	3	3	2	2	2	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	77
Publish in area newspapers notice of citizen training opportunities and availability of citizen awareness training links on website.	2	3	6	6	3	3	3	3	2	3	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	77
Continue to work with state inspectors to ensure anchor codes are met for newly-sited mobile homes.	2	6	6	5	3	3	3	2	2	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	77
Seek grant funding to assist low-income residents to anchor previously sited mobile homes.	2	6	6	5	3	3	3	2	2	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	77
Enact legislation to require sprinkler systems in all new construction.	2	6	9	9	3	3	2	2	2	2	2	1	1	3	3	1	6	2	3	2	2	3	3	2	3	77
Use GIS mapping to identify structures within the catastrophic floodplains.	3	6	6	6	3	2	3	2	2	2	2	2	2	3	3	3	4	4	2	2	3	3	3	3	3	77
Partner with the health department to distribute pandemic awareness and preparedness literature at community events.	3	9	0	0	3	3	3	2	3	2	2	3	2	3	3	3	6	6	3	3	3	3	3	3	3	77
Assist jurisdictions lacking such documents to develop hillside and post-disaster ordinances and regulations governing hazard set-back, subdivisions, and wildfires.	2	6	6	6	3	3	2	2	3	1	2	2	2	3	3	2	4	6	3	3	2	2	3	2	3	76
Provide each emergency response agency at least one 800 MHz radio to ensure communications interoperability.	2	6	6	6	3	2	3	2	2	2	2	2	2	3	3	3	6	2	3	1	3	3	3	3	3	76

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Maintain an inventory of Mark I packs for response to chemical agent dispersal incidents.	3	6	0	6	3	2	3	2	3	2	3	3	3	3	3	3	6	2	3	2	3	3	3	3	3	76
Provide annual EOC emergency workers training.	1	6	6	6	3	3	3	1	2	2	2	2	2	3	3	3	4	2	4	2	3	3	3	3	3	75
Seek grant funding to provide NOAA weather radios to low-income residents.	3	9	0	3	3	3	3	3	2	2	2	2	2	3	3	3	6	4	2	2	3	3	3	3	3	75
Enforce requirements for each site to submit TIER II reports to EMA.	3	3	3	3	3	3	3	2	3	2	2	2	3	3	3	3	6	4	3	3	3	3	3	3	3	75
Partner with TN One-Call to distribute "call before you dig" literature to citizens at community events.	3	3	3	3	3	3	3	2	2	3	3	2	2	3	3	2	6	6	2	3	3	3	3	3	3	75
Publish news articles and distribute literature to increase citizen awareness of downed line prevention and safety.	2	3	3	3	3	2	3	2	3	3	3	2	3	3	3	3	4	6	3	3	3	3	3	3	3	75
Publish news articles to advise citizens of the availability of flood insurance.	2	0	6	6	3	3	2	2	3	2	3	2	3	3	3	3	4	4	3	3	3	3	3	3	3	75
Include information on flood insurance availability on county web page.	2	0	6	6	3	3	2	2	3	2	3	2	3	3	3	3	4	4	3	3	3	3	3	3	3	75
Provide annual wild land fire training for all fire departments.	3	3	6	6	3	2	3	2	2	2	2	2	2	3	3	3	4	4	3	2	3	3	3	3	3	75
Distribute landslide awareness and safety information at community events.	3	3	3	6	3	2	3	2	3	2	2	2	3	3	3	3	4	4	3	3	3	3	3	3	3	75
Establish and staff a full-time countywide Hazard Mitigation Coordinator position to identify/assess hazards, prepare grant applications, and oversee mitigation projects with participating jurisdictional cost based on population.	2	6	6	6	3	3	3	1	1	2	1	1	2	3	3	3	4	2	4	3	3	3	3	3	3	74

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Review annually and after each disaster to revise as necessary the Anderson County Basic Emergency Operations Plan.	1	6	6	6	3	3	3	2	2	2	2	2	2	3	3	3	4	4	3	3	2	2	2	2	3	74
Require each Tier II site to develop and provide to EMA a site emergency plan.	3	6	3	3	3	3	3	2	3	2	2	2	3	3	2	2	6	2	3	3	3	3	3	3	3	74
Plan and conduct annual hazardous materials tabletop exercises and drills involving all emergency response agencies.	2	6	6	6	3	2	2	2	1	2	2	2	2	3	3	2	6	2	3	2	3	3	3	3	3	74
Continue to participate in DOE drills and exercises.	2	6	6	6	3	2	2	2	2	2	2	2	2	3	3	2	6	4	3	2	2	2	3	2	3	74
Enact legislation to make mandatory fines for non-permitted outdoor burning.	2	3	6	6	3	3	2	2	2	2	2	2	2	3	3	2	4	4	3	3	3	3	3	3	3	74
Continue to restrict parking of vehicles in close proximity to critical facilities.	2	3	3	6	3	3	3	2	3	3	2	2	2	3	3	2	4	4	3	3	3	3	3	3	3	74
Update zoning codes to prohibit construction within the catastrophic floodplains.	2	6	6	6	3	2	2	2	2	2	1	2	1	3	3	1	6	4	3	2	3	3	3	3	3	74
Update annually the GIS database to identify water line size and hydrant locations.	3	3	6	6	3	2	3	2	3	2	3	2	2	3	3	3	6	2	3	1	2	2	3	2	3	73
Revise zoning and building codes to restrict construction in landslide hazard areas.	2	3	3	6	3	3	3	2	3	3	2	1	1	3	3	1	4	6	3	3	3	3	3	3	3	73
Require owner inspection of non-regulated privately owned dams on a regular basis.	2	3	6	6	3	3	3	2	2	2	2	2	2	3	3	2	4	4	2	3	2	3	3	3	3	73
Require non-regulated dams to meet engineering standards, even if smaller than regulatory criteria.	2	3	6	6	3	3	3	2	2	2	2	2	2	3	3	2	4	4	2	3	2	3	3	3	3	73
Assist the purchasing agent to develop and annually update a list of vendor 24/7 contact information and pre-disaster MOUs.	1	3	3	6	3	3	3	3	3	3	2	2	2	3	3	3	3	3	2	3	3	3	3	3	3	72
Seek grant funding to purchase and install an automated wide area rapid notification system.	2	9	3	3	3	3	3	2	1	2	2	2	2	3	3	3	6	2	2	1	3	3	3	3	3	72

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Continue to support school phone system to notify parents of school emergencies.	3	3	0	3	3	3	3	2	3	2	3	3	3	3	3	3	6	4	2	2	3	3	3	3	3	72
Develop and revise as necessary a countywide comprehensive NIMS-typed resources inventory.	2	3	3	6	3	3	3	2	2	2	2	2	2	3	3	3	4	4	3	2	3	3	3	3	3	72
Develop a post-disaster recovery ordinance.	2	3	3	6	3	3	2	2	2	3	1	1	3	3	3	2	4	6	2	3	3	3	3	3	3	72
Enact legislation to require each Tier II site to install alert devices and develop a warning plan.	3	9	3	6	3	3	2	2	2	2	2	1	3	2	2	2	6	2	3	2	2	2	3	2	3	72
Publish articles in area newspapers to instruct citizens on shelter-in-place.	3	6	0	3	3	2	3	2	3	2	2	2	3	3	3	3	6	4	2	2	3	3	3	3	3	72
Work with rural fire departments to develop hazardous materials response Sags.	2	3	3	3	3	3	3	2	2	2	3	2	2	3	3	3	4	6	2	3	3	3	3	3	3	72
Distribute extreme heat and extreme cold awareness and preparedness literature to citizens at community events.	3	3	3	3	3	2	3	2	3	2	3	3	2	3	3	3	4	4	2	3	3	3	3	3	3	72
Distribute severe winter storm awareness and preparedness literature to citizens at community events.	3	3	3	3	3	2	3	2	3	2	2	2	3	3	3	3	4	4	3	3	3	3	3	3	3	72
Coordinate application for all jurisdictions to receive Community Rating System status.	1	0	6	6	3	2	2	2	2	2	2	2	2	3	3	3	4	6	3	3	3	3	3	3	3	72
Seek grant funding to replace smaller diameter lines with six-inch mains.	3	3	6	6	3	3	2	2	1	2	3	2	3	3	3	3	6	2	3	1	2	2	3	2	3	72
Seek grant funding to install hydrants at half-mile intervals in unincorporated areas.	3	3	6	6	3	3	2	2	1	2	3	2	3	3	3	3	6	2	3	1	2	2	3	2	3	72
Assist fire departments in obtaining grants for wild land firefighting equipment.	3	3	6	6	3	2	3	2	1	2	2	2	2	3	3	3	4	2	3	2	3	3	3	3	3	72
Establish and enforce codes stipulating setback distances for all new structures not using fire-resistive materials.	2	3	6	6	3	3	2	2	2	2	1	1	2	3	3	2	4	4	3	3	3	3	3	3	3	72

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Partner with schools to promote awareness, recognition, and reporting of meth labs.	3	0	3	3	3	3	2	2	3	2	3	3	3	3	3	3	4	6	2	3	3	3	3	3	3	72
Establish and fund a full-time support staff position to assist the EMA Director in day-to-day EMA operations.	1	6	6	6	3	3	3	2	1	2	1	1	1	3	3	3	4	2	2	3	3	3	3	3	3	71
Conduct annual exercises involving all emergency response agencies.	2	6	6	6	3	2	2	2	2	2	2	2	2	3	3	2	6	2	3	1	2	2	3	2	3	71
Publish notice of federal, state, and local training opportunities to all emergency response agencies.	2	3	3	3	3	3	3	3	3	3	2	2	2	3	3	3	4	4	2	2	3	3	3	3	3	71
Develop redundancy strategies to prevent loss of public records in the event of damage to critical facilities.	3	0	3	6	3	3	3	2	2	2	3	2	3	3	3	3	6	2	3	1	3	3	3	3	3	71
Establish and equip a countywide hazardous materials team.	3	6	3	6	3	3	3	1	2	1	2	2	2	3	3	3	4	2	3	1	3	3	3	3	3	71
Establish and equip a CBRNE team to respond to incidents in Homeland Security District II (16 county region).	3	6	6	6	3	3	3	1	1	1	1	2	1	3	3	3	4	2	3	1	3	3	3	3	3	71
Provide fire departments equipment to contain hazardous materials spills on roadways.	2	3	3	6	3	3	3	2	2	2	2	2	2	3	3	3	6	2	3	1	3	3	3	3	3	71
Establish codes to prohibit construction of special needs population facilities near rail lines.	3	6	3	3	3	3	2	3	1	3	1	2	3	3	3	2	6	2	2	3	2	3	3	3	3	71
Distribute hail awareness and preparedness literature to citizens at community events.	2	3	3	3	3	3	3	2	2	2	3	2	2	3	3	3	4	6	2	2	3	3	3	3	3	71
Distribute lightning awareness and preparedness literature to citizens at community events.	3	3	3	3	3	2	3	2	2	2	2	2	2	3	3	3	4	6	2	3	3	3	3	3	3	71
Continue and expand participation in the fall NWS Severe Weather Awareness campaign	2	3	3	3	3	2	3	2	3	2	2	2	3	3	3	3	4	4	3	3	3	3	3	3	3	71

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Seek grant funding to construct pumping stations to provide adequate pressure in elevated areas.	3	3	6	6	3	3	2	2	1	2	3	2	3	3	3	2	6	2	3	1	2	2	3	2	3	71
Provide debris management training for public works and highway departments.	3	3	3	6	3	2	3	2	1	2	2	2	2	3	3	3	6	2	3	1	3	3	3	3	3	70
Create a GIS map database of Tier II sites to display ERG-established zones and evacuation perimeters.	3	6	0	6	3	3	3	1	2	1	2	2	2	3	3	3	6	2	3	1	3	3	3	3	3	70
Provide training for firefighters in containing hazardous materials spills on roadways.	3	3	3	3	3	2	3	2	2	2	3	2	2	3	3	3	6	2	3	2	3	3	3	3	3	70
Establish codes to prohibit construction of residential or public structures near fixed hazardous materials sites.	2	6	6	6	3	3	1	2	1	2	1	1	2	2	2	1	6	2	3	3	3	3	3	3	3	70
Partner with TDOT to conduct a countywide study to determine and GIS map potential landslide areas.	2	3	3	3	3	2	2	2	3	3	2	2	2	3	3	3	4	6	2	2	3	3	3	3	3	70
Distribute subsidence awareness literature at community events.	3	3	3	3	3	2	3	2	3	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	70
Schedule and conduct Incident Command System and National Incident Management System training annually for all emergency response agencies and EOC ESCs.	2	3	3	6	3	3	3	2	2	2	2	2	2	3	3	3	4	2	3	1	3	3	3	3	3	69
Assist all jurisdictions to develop comprehensive, economic, and continuity of operations plans.	2	3	3	6	3	3	2	2	2	2	2	1	2	3	3	3	6	2	3	1	3	3	3	3	3	69
Conduct annual damage assessment training.	2	0	6	6	3	2	3	2	1	2	2	2	2	3	3	3	6	2	3	1	3	3	3	3	3	69
Assist emergency services agencies to develop winter storm response protocols.	2	3	0	3	3	2	3	2	3	2	2	2	2	3	3	3	4	6	3	3	3	3	3	3	3	69

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Seek grant funding to install generators or "pigtails" in critical government facilities and fuel depots.	3	3	3	6	3	3	3	2	2	2	2	2	2	3	3	2	4	2	3	1	3	3	3	3	3	69
Maintain MOU with Food Lion to deliver portable generators to shelter sites as needed.	2	6	0	3	3	2	2	2	3	2	3	3	3	3	3	2	4	4	2	2	3	3	3	3	3	69
Continue participation in the state and federal drug task force.	3	0	3	3	3	2	2	2	3	2	2	3	2	3	3	3	4	6	2	3	3	3	3	3	3	69
Install TEWAS at Anderson County E-911 Communications Center.	2	6	3	3	3	3	3	1	1	2	2	2	2	3	3	3	6	2	2	1	3	3	3	3	3	68
Establish codes to require fencing around oil/gas wells and storage tanks.	3	3	3	3	3	3	2	3	2	3	2	2	3	3	3	2	4	4	2	3	2	2	3	2	3	68
Distribute drought awareness and preparedness literature to citizens at community events.	3	0	3	3	3	2	3	2	3	2	2	3	2	3	3	3	4	4	2	3	3	3	3	3	3	68
Provide training for all county personnel subject to extreme heat and cold.	3	3	3	3	3	2	3	2	2	2	2	3	2	3	3	3	4	4	2	1	3	3	3	3	3	68
Provide downed line safety training to all emergency responders.	2	3	3	3	3	2	3	2	2	2	2	2	2	3	3	3	4	4	3	2	3	3	3	3	3	68
Evaluate the efficacy of construction of water flow and detention ponds in flood prone areas.	3	3	3	6	3	3	2	2	2	2	2	2	2	3	3	2	6	4	3	1	2	2	2	2	3	68
Identify and map areas made inaccessible by bridge and/or roadway flooding.	3	6	0	0	3	3	3	2	3	2	3	2	3	3	3	3	3	2	3	3	3	3	3	3	3	68
Train emergency response agencies in flood response safety.	2	6	0	3	3	2	3	2	2	2	2	2	2	3	3	3	6	4	1	2	3	3	3	3	3	68
Partner with UT geology department to conduct a countywide study of karst areas and known sinkholes.	2	3	3	3	3	2	3	2	2	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	68
Create GIS maps showing karst areas.	2	3	3	3	3	2	3	2	2	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	68
Include karst information on plat maps to inform property owners of high subsidence risk.	2	3	3	3	3	2	3	2	2	2	2	2	2	3	3	3	4	4	2	3	3	3	3	3	3	68

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Seek grant funding to purchase and install warning sirens in unincorporated areas of dense population.	3	9	0	3	3	3	2	2	1	2	3	2	3	3	3	2	6	2	2	1	2	2	3	2	3	67
Develop agreements for rural fire departments to provide delivery of non-potable water for drought-endangered livestock.	3	0	3	3	3	2	2	2	3	2	2	3	2	3	3	3	4	4	2	3	3	3	3	3	3	67
Evaluate efficacy of raising grade level or expanding ditch depth and width along repetitive flooding roadways	3	6	6	6	3	3	2	2	1	2	2	2	3	3	2	2	3	1	3	1	2	2	2	2	3	67
Continue to participate in the Joint Terrorism Task Force.	2	3	3	3	3	2	2	2	3	2	2	2	2	3	3	3	4	4	2	2	3	3	3	3	3	67
Conduct meetings between road and planning departments to prioritize potential landslide areas and methods of remediation.	2	3	3	3	3	2	2	2	3	2	2	2	2	3	3	3	4	4	2	2	3	3	3	3	3	67
Educate citizens to recognize and respond immediately to dam failure alert devices.	3	6	0	0	3	2	3	2	3	2	2	2	3	3	3	3	4	4	1	3	3	3	3	3	3	67
Provide fire and rescue departments CSX rail incident training.	2	3	3	3	3	2	3	2	2	3	2	1	2	3	3	3	4	2	2	3	3	3	3	3	3	66
Enact legislation to restrict non-essential water usage during periods of drought.	2	0	3	3	3	3	2	3	2	3	2	2	2	3	3	2	4	4	2	3	3	3	3	3	3	66
Equip all fire and rescue vehicles with chain saws to ensure clearing of emergency routes following high wind incidents.	3	3	3	3	3	2	3	1	2	2	2	2	3	3	3	3	4	4	1	1	3	3	3	3	3	66
Install lightning protection devices and grounding on critical facilities	2	3	6	3	3	3	2	2	1	2	1	1	1	3	3	3	4	4	3	2	3	2	3	3	3	66
Maintain and update annually contact information for suppliers of drugs, food, water, and fuel.	2	3	0	0	3	2	3	2	3	2	2	2	2	3	3	3	4	6	3	3	3	3	3	3	3	66

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Continue aggressive power line right-of-way clearing to reduce incidence of telephone and power lines downed by high wind or ice/snow incidents.	3	3	3	6	3	2	2	1	2	2	3	2	3	3	2	2	6	2	3	1	2	2	3	2	3	66
Evaluate methods to improve storm water systems in flood prone areas.	2	0	3	6	3	3	2	2	2	2	2	2	2	3	3	2	6	4	3	3	2	2	2	2	3	66
Seek grant funds to raise and widen bridge and elevate access roadway to address flooding on Airport Road in the Marlow area.	3	6	6	6	3	3	2	1	1	2	2	2	3	3	2	2	3	1	3	1	2	2	2	2	3	66
Install gates and card readers for parking access under the Jolley Building.	2	3	3	6	3	3	2	2	2	2	2	1	2	3	3	2	4	2	3	1	3	3	3	3	3	66
Provide Emergency Response to Terrorism training for all emergency response agencies.	2	3	3	3	3	2	2	2	2	2	2	2	2	3	3	3	4	4	2	2	3	3	3	3	3	66
Partner with law enforcement and the drug task force to distribute meth lab awareness information at community events	3	0	3	3	3	2	2	2	3	2	2	3	2	3	3	3	4	4	2	2	3	3	3	3	3	66
Develop meth lab Sags for emergency responders.	2	0	3	3	3	2	2	2	3	2	2	2	2	3	3	3	4	6	2	2	3	3	3	3	3	66
Require property owners to sign acknowledgement of subsidence risk notification before issuing building permits on high-risk sites.	2	3	3	3	3	2	2	2	2	2	2	2	2	3	3	2	4	4	2	3	3	3	3	3	3	66
Complete a Disaster Animal Response Team (DART) plan.	2	0	0	3	3	3	3	2	2	2	2	2	3	3	3	3	4	4	3	3	3	3	3	3	3	65
Update evacuation routes and procedures.	2	6	0	0	3	3	3	2	3	2	2	2	2	3	3	3	4	2	2	3	3	3	3	3	3	65
Maintain and update annually contact information for suppliers of potable water.	3	3	0	0	3	2	3	2	3	2	2	3	2	3	3	3	4	4	2	3	3	3	3	3	3	65
Incorporate into damage assessment training hail damage to roofs and windows.	2	0	3	3	3	3	3	2	2	2	2	2	2	3	3	3	4	4	2	2	3	3	3	3	3	65

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Enact legislation to require new mobile home parks to construct storm shelters of adequate size to protect all residents during high wind incidents.	3	9	0	5	3	3	2	2	1	2	1	1	3	3	3	1	6	2	2	1	2	2	3	2	3	65
Evaluate the realignment of bridges to remove abutment obstructions to the Coal Creek stream channel to reduce flooding in Briceville.	2	6	6	6	3	3	2	1	1	2	2	2	3	3	2	2	3	1	3	1	2	2	2	2	3	65
Provide meth lab awareness training for citizens.	3	0	3	3	3	2	2	2	2	2	2	3	2	3	3	3	4	4	2	2	3	3	3	3	3	65
Provide training and equipment for law enforcement and drug task force personnel.	2	0	3	3	3	2	2	2	3	2	2	3	2	3	3	3	4	4	2	2	3	3	3	3	3	65
Partner with the agriculture extension agent to determine numbers and locations of livestock populations.	2	0	3	3	3	2	3	2	2	2	2	2	2	3	3	3	2	6	2	3	3	3	3	3	3	65
Install larger culverts to permit clear stream flow.	3	3	3	6	3	3	2	1	1	2	2	2	2	3	3	2	6	2	3	1	2	2	2	2	3	64
Evaluate methods to address flooding of Bull Run Creek in the Claxton area.	2	3	3	6	3	3	2	2	1	2	2	2	2	3	3	2	6	2	3	1	2	2	2	2	3	64
Evaluate methods to address flooding of Hinds Creek, Irwin Mill Road, and Pumpkin Hollow Road in the Andersonville area.	2	3	3	6	3	3	2	2	1	2	2	2	2	3	3	2	6	2	3	1	2	2	2	2	3	64
Partner with NWS to erect "Turn Around, Don't Drown" signage at flooding points.	2	6	0	0	3	3	3	2	2	2	3	2	3	3	3	3	3	3	1	3	2	3	3	3	3	64
Enact legislation to require buried lines in all new cluster developments.	3	0	3	3	3	3	2	2	2	3	1	2	2	3	3	2	4	4	3	3	2	2	3	2	3	63
Continue to work with property owners to relocate RPL/SRL structures.	2	0	3	6	3	2	2	2	2	2	2	2	2	3	3	2	4	4	3	3	2	2	2	2	3	63
Erect staff signage indicating water depth at flooding points.	3	6	0	0	3	3	3	2	2	2	3	2	3	3	3	3	3	2	1	2	2	3	3	3	3	63

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Install gates to block roadways and bridges during flooding.	3	6	0	0	3	3	3	2	2	2	3	2	3	3	3	3	3	2	1	2	2	3	3	3	3	63
Coordinate with TVA to seek grant funding to remediate Lane's Bluff Road slide into the Clinch River.	2	3	3	3	3	3	2	2	3	2	2	2	2	3	3	2	4	2	3	1	2	3	3	2	3	63
Seek grant funding to equip all emergency response vehicles with tire chains to ensure access to victims during ice and snow incidents.	2	3	0	3	3	3	2	2	2	2	2	2	2	3	3	3	4	2	3	1	3	3	3	3	3	62
Seek grant funding to install water line insulation for low-income residents.	2	0	3	3	3	3	3	2	1	2	1	2	3	3	3	3	4	4	1	1	3	3	3	3	3	62
Provide regular maintenance to remove debris from flood prone streams and creeks.	3	3	3	6	3	2	2	1	1	1	2	2	2	3	3	2	6	2	3	1	2	2	2	2	3	62
Train and equip a countywide swift water rescue team.	2	6	0	3	3	2	3	2	1	2	1	2	2	3	3	3	4	2	1	1	3	3	3	3	3	61
Assist the rescue squad to obtain grants for equipment and training to improve capability for search and rescue operations during terrorism incidents.	2	3	3	3	3	2	2	2	1	2	1	2	1	3	3	3	4	2	3	1	3	3	3	3	3	61
Erect signage to warn motorists of landslide danger at identified sites.	3	3	0	0	3	2	3	2	2	2	2	2	2	3	3	3	4	4	1	2	3	3	3	3	3	61
Assist community agencies to establish heating/cooling centers for vulnerable populations.	3	3	0	3	3	3	2	2	1	1	2	2	2	3	3	2	6	2	2	1	2	2	3	2	3	58
Coordinate with TVA to seek grant funds to install alert devices downstream of Norris Dam.	3	6	0	0	3	3	3	2	1	2	1	1	2	3	3	3	4	2	1	1	2	3	3	2	3	57
Partner with utilities to include burn permit information in September utility bills.	3	3	6	6	3	2	3	2	3	2	3	2	3	3	3		6	6	3	3	3	3	3	3	3	33

SECTION 8
MITIGATION PLAN MAINTENANCE

8.1 INTRODUCTION

Periodic revisions and updates of the Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the Plan is in full compliance with applicable federal and state regulations. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to each jurisdiction's individual Mitigation Action Plan

8.1.1 2011 Plan Update

Mitigation Plan Maintenance is now Section 8 in the 2011 Plan update. This section has been enhanced in the 2011 Plan to expand documenting and describing of monitoring, maintenance and updating. This includes aggressive methodologies to include public participation in Plan maintenance and updating. The current Mitigation Planning Committee extensively reviewed the 2005 Plan maintenance and updating methodologies and processes. Documented in this section is the status of the 2005 methodologies and their effectiveness.

8.2 MONITORING, EVALUATION AND UPDATING METHODOLOGY

The Anderson County Mitigation Planning Committee intends to remain intact as the organization responsible for monitoring, evaluating, and updating this Plan. The Anderson County Emergency Management Hazard Mitigation Plan Coordinator shall continue to act as the coordinator for the Mitigation Planning Committee. Each participating jurisdiction is expected to maintain representation on the committee which shall fulfill the monitoring, evaluation, and updating responsibilities identified in this Section. The Anderson County Hazard Mitigation Plan will be monitored, evaluated, and updated for the following purposes:

1. To maintain the currency of hazard and risk information.
2. To ensure that mitigation projects and actions reflect the priorities of the county and its constituents.

Requirement §201.6(c)(4)(i): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle. A. Does the new or updated plan describe the method and schedule for monitoring the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)
CRS Step 8: Draft an Action Plan: Credit is based on how a community monitors and evaluates its plan on an annual basis and updates it on a five-year cycle.
FMA Requirement §78.5(e): Presentation of the strategy for reducing flood risks and continued compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan

3. To comply with Federal Emergency Management Agency (FEMA) requirements and maintain the county's eligibility for pre-disaster mitigation grants and federal disaster assistance.

It is recognized that individual commitments change over time, and it shall be the responsibility of each department to inform the Mitigation Plan Coordinator by formal letter of any changes in representation. The Coordinator will maintain the committee makeup as a uniform representation of planning partners and stakeholders within the planning area. The Mitigation Planning Committee shall be informed at the time of each change in representation on the committee.

8.3 SCHEDULE FOR MONITORING THE PLAN

The Mitigation Planning Committee shall be responsible for monitoring progress and evaluating the effectiveness of the Plan, and will document this in an annual progress report. During each year, and prior to the annual meeting of the Mitigation Planning Committee, representatives will collect and process the annual reports from the departments, agencies, and organizations involved in implementing mitigation projects or activities, or conduct phone calls and meetings with persons responsible for initiating and/or overseeing the mitigation projects, to obtain progress information. Further, they shall obtain from their municipal supervisor, mayor, or clerk any public comments made on the Plan. The Committee representatives shall be expected to document, as needed and appropriate,

- Hazard incidents and losses occurring in their jurisdiction, including the nature, extent, and the effects that hazard mitigation actions have had on impacts and/or losses,
- Progress on the implementation of mitigation actions, including efforts to obtain outside funding for mitigation actions,
- Any obstacles or impediments to the implementation of actions,
- Additional mitigation actions believed to be appropriate and feasible, and
- Public and stakeholder input and comment on the Plan.

Mitigation Planning Committee representatives may use the progress reporting forms, Worksheets #1 and #3 in the FEMA 386-4 guidance document, to facilitate collection of progress data and information on mitigation actions. Local progress reports shall be provided to the Plan Coordinator at least two weeks prior to the annual Mitigation Planning Committee Plan review meeting.

8.4 SCHEDULE AND METHODOLOGY FOR PLAN EVALUATION

Requirement §201.6(c)(4)(i): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
B. Does the new or updated plan describe the method and schedule for evaluating the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?

The evaluation of the mitigation plan is an assessment of whether the planning process and actions have been effective, if the Plan goals are being reached, and whether changes are needed. The Plan will be evaluated on an annual basis to determine the effectiveness of the programs, and to reflect changes that may affect mitigation priorities or available funding.

The status of the Plan will be discussed and documented at an annual Plan review meeting of the Mitigation

Committee, to be held in the month of October. At least one month before the annual plan review meeting, the Anderson County Hazard Mitigation Plan Coordinator will advise Mitigation Planning Committee members of the meeting date, agenda, and member responsibilities.

The Plan Coordinator will be responsible for calling and coordinating the annual Plan review meeting, and assessing progress toward meeting Plan goals and objectives. These evaluations will assess whether:

- Goals and objectives address current and expected conditions.
- The nature or magnitude of the risks has changed.
- Current resources are appropriate for implementing the Mitigation Plan and if different or additional resources are now available.
- Actions were cost effective.
- Schedules and budgets are feasible.
- Implementation problems, such as technical, political, legal, or coordination issues with other agencies exist.
- Outcomes have occurred as expected.
- Changes in county resources have impacted Plan implementation (e.g., funding, personnel, and equipment).
- New agencies, other departments, or staff should be included, including other local governments as defined by 44 CFR 201.6.
- Documentation is complete for hazards that occurred within the jurisdiction during the last year.

Specifically, the Mitigation Planning Committee will review the mitigation goals, objectives, and activities/projects using performance based indicators, including:

- New agencies/departments created that have authority to implement mitigation actions or are required to meet goals, objectives, and actions.
- Project evaluation based on current needs of the mitigation plan.
- Project completion regarding progress of proposed or ongoing actions.
- Under/over spending regarding proposed mitigation action budgets.
- Achievement of the goals, objectives, and actions.
- Resource allocation to note if resources are required to implement mitigation actions.
- Time frames: comment on whether proposed schedules are sufficient to address actions.
- Budgets: note if budget basis should be changed or is sufficient.
- Lead/support agency commitment: note if there is a lack of commitment on the part of lead or support agencies.
- Availability of adequate resources to implement actions.
- Feasibility: comment regarding whether certain goals, objectives, or actions prove to be not feasible.

Finally, the Mitigation Planning Committee will evaluate how other programs and policies have conflicted or augmented planned or implemented measures, and shall identify policies, programs, practices, and procedures that could be modified to accommodate hazard mitigation actions. Other programs and policies can include those that address:

- Economic Development
- Environmental Preservation & Permitting
- Historic Preservation
- Redevelopment
- Health and/or Safety
- Recreation
- Land Use/Zoning
- Public Education and Outreach
- Transportation

The Mitigation Committee may refer to the evaluation forms, Worksheets #2 and #4 in the FEMA 386-4 guidance document to assist in the evaluation process.

The Mitigation Plan Coordinator shall be responsible for preparing an Annual Mitigation Plan Progress Report, based on the local annual progress reports from each department presented at the annual Mitigation Planning Committee meeting, and other information as appropriate and relevant. These annual reports will provide data for the five-year update of this Plan and will assist in pinpointing implementation challenges. By monitoring the implementation of the Plan on an annual basis, the Mitigation Planning Committee will be able to assess which projects are completed, which are no longer feasible, and which projects may require additional funding.

This annual progress report shall apply to all planning partners, and as such, shall be developed according to an agreed format and with adequate allowance for input and comment of each planning partner prior to completion and submission to the State Hazard Mitigation Officer. Each planning partner will be responsible for providing this report to its governing body for review. During the annual Mitigation Planning Committee meeting, the planning partners shall establish a schedule for the draft development, review, comment, amendment, and submission of the Annual Mitigation Plan Progress Report to the state.

The Annual Mitigation Plan Progress Report shall be posted on the County's Hazard Mitigation Plan website to keep the public apprised of the Plan's implementation.

The Plan will also be evaluated and revised following any major disasters, to determine if the recommended actions remain relevant and appropriate. The risk assessment will also be reviewed to determine if any changes are necessary based on disaster damages, or if hazard profile data collected to facilitate the risk assessment is still relevant. This is an opportunity to increase the community's disaster resistance and build a better and stronger community.

8.5 FIVE YEAR PLAN REVIEW SCHEDULE AND METHODOLOGY

Requirement §201.6(c)(4)(i): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
C. Does the new or updated plan describe the method and schedule for updating the plan within the five-year cycle?

44 CFR 201.6 requires that local hazard mitigation plans be reviewed, revised as appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under DMA2K. It is the intent of the Anderson County Mitigation Planning Committee to update this Plan on a five-year cycle from the date of this 2011 Plan adoption.

To facilitate the update process, the Mitigation Plan Coordinator, with support of the Mitigation Planning

Committee, shall use the third annual Mitigation Committee meeting (October of 2014, assuming this Plan is approved in 2011) to develop and commence the implementation of a detailed Plan update program. The Mitigation Plan Coordinator shall invite representatives from the state to this meeting to provide guidance on Plan update procedures. This program shall, at a minimum, establish who shall be responsible for managing and completing the Plan update effort, what needs to be included in the updated Plan, and a detailed timeline with milestones to assure that the update is completed according to regulatory requirements.

At this meeting, the Mitigation Planning Committee shall determine what resources will be needed to complete the update. The Plan Coordinator will prepare a report: 1) describing the update requirements; 2) summarizing the staff analysis of the Plan, highlighting areas that require modification and identifying why the modification is needed, and; 3) providing detailed recommendations about how the Plan should be updated, noting any technical work that may be required. The report will be provided to Mitigation Planning Committee and County Commission for consideration. The County Commission and Mitigation Planning Committee will review the report and make recommendations to the County Mayor on how to proceed with the update process. The County Mayor will designate an individual or county department to carry out the recommendations and any technical work and prepare draft updates to the Plan on a schedule determined by the Mitigation Planning Committee, the County Commission, and/or the County Mayor.

During the five-year Plan review process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Has the nature or magnitude of risks changed?
- Are the current resources appropriate for implementing the Plan?
- Are there implementation problems, such as technical, political, legal, or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did the jurisdictions, agencies, and other partners participate in the Plan implementation process as proposed?

Anderson County and its participating departments or agencies will forward information on any proposed change(s) to all interested parties including, but not limited to, all affected county and municipal departments, residents, and businesses. When a proposed amendment may directly affect particular private individuals, businesses, or properties, Anderson County will follow existing local, state, or federal notification requirements, which may include published public notices as well as direct mailings. Information on any proposed Plan amendments will also be forwarded to the state. This information will be disseminated in order to seek input on the proposed amendment(s) for not less than a 45-day review and comment period. At the end of the 45-day review and comment period, the proposed amendment(s) and all comments will be forwarded to the Mitigation Planning Committee for final consideration. The committee will review the proposed amendment along with the comments received from other parties, and if acceptable, the committee will submit a recommendation for the approval and adoption of changes to the Plan to each appropriate governing body within 60 days. In determining whether

to recommend approval or denial of a Plan amendment request, the following factors will be considered by the Mitigation Planning Committee:

- There are errors, inaccuracies or omissions made in the identification of issues or needs in the Plan.
- New issues or needs have been identified which are not adequately addressed in the Plan.
- There has been a change in information, data, or assumptions from those on which the Plan is based.
- There has been a change in local capabilities to implement proposed hazard mitigation activities.

Upon receiving the recommendation from the Mitigation Planning Committee and prior to adoption of the Plan, the local governing body will hold a public hearing. The governing body will review the recommendation from the Mitigation Planning Committee (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, the governing body will take one of the following actions:

- Adopt the proposed amendments as presented;
- Adopt the proposed amendments with modifications;
- Refer the amendments request back to the Mitigation Planning Committee for further revision; or
- Defer the amendment request back to the Mitigation Planning Committee for further consideration and/or additional hearings.

When the draft updates are completed, the Mitigation Planning Committee will convene to conduct a comprehensive evaluation and revision. The Mitigation Planning Committee (with input from the stakeholders) will produce a final draft of the updated Plan for consideration by the Mayor and County Commission. The County Commission and Mayor will review the updated Plan, initiate changes, approve, and adopt the Plan in sufficient time to meet FEMA requirements.

8.6 INCORPORATING MITIGATION REQUIREMENTS INTO EXISTING PLANNING MECHANISMS

It is the intention of the Mitigation Planning Committee and participating departments to incorporate mitigation planning as an integral component of daily government operations. Mitigation Planning Committee members will work with local government officials to integrate the newly adopted hazard mitigation goals and actions into the general operations of government and partner organizations. By doing so, the Mitigation Planning Committee anticipates that:

1) Hazard mitigation planning will be formal management efforts

2) The Hazard Mitigation Plan will become a mutually supportive document that works in concert to meet the goals and needs of county residents; and

3) Duplication of effort can be minimized.

It is recognized by all participating departments that this information can be invaluable in making decisions under other planning programs.

The primary process for integrating mitigation strategies into other local planning mechanisms will be through the revision, update, and implementation of each of the individual plans that require specific planning and administrative tasks (e.g., plan amendments, ordinance revisions, capital improvement projects, etc.). The Mitigation Planning Committee will identify which parts of this Plan would be most appropriate to be incorporated into other jurisdiction plans or mechanisms. The Mitigation Plan Coordinator is charged with identifying the schedule and contacts responsible for updating other county plans and mechanisms.

Requirement §201.6(c)(4)(ii): The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate
A. Does the new or updated plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan
B. Does the new or updated plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?
C. Does the updated plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate

CRS Step 3: Coordination with Other agencies:
If the plan includes a review of existing studies, reports, and technical information for the needs goals and plan for that area.

During the planning process for new and updated local planning documents, such as a comprehensive plan, capital improvements plan, or emergency management plan, Anderson County will provide a copy of the Hazard Mitigation Plan to the appropriate parties and recommend that all goals and strategies of new and updated local planning documents are consistent with and support the goals of the Hazard Mitigation Plan and will not contribute to increased hazards.

Although it is recognized that there are many possible benefits to integrating components of this Plan into other local planning mechanisms, the development and maintenance of this stand-alone Hazard Mitigation Plan is deemed by the Mitigation Planning Committee to be the most effective and appropriate method to ensure implementation of local hazard mitigation actions at this time.

The members of the Mitigation Planning Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents are consistent with the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in the Anderson County. The Table below includes existing processes and programs through which the mitigation plan should be implemented.

Table 8.1 Plan Integration		
Process	**Action**	**Implementation of Plan**
Administrative	Departmental or organizational work plans, policies, and procedural changes	Public Works Building/Engineering Planning Emergency Services Health and Social Services Transportation Business and Economic Development
Administrative	Other organizations' plans	Include reference to this plan in risk reduction section of the Municipal Emergency Operations Plans Include references in the creation of ordinances, public education, County Household Hazardous Waste information
Administrative	Jobs/Job Descriptions	Unpaid internships to assist in hazard mitigation plan maintenance
Budgetary	Capital and operational budgets	Review of county and local budgets to include line item mitigation actions
Regulatory	Executive Orders, ordinances and other directives	Comprehensive Planning - Institutionalize hazard mitigation for new construction and land use. Zoning and Ordinances Building Codes-enforcement of codes or higher standard in hazard areas Capital Improvements Plan - Ensure that the person responsible for projects under this plan evaluate if the new construction is in a high hazard area, flood plain, etc. so the construction is designed to mitigate the risk. Revise requirements for this plan to include hazard mitigation in the design of new construction. National Flood Insurance Program – Continue participation in this program and increase participation in Community Rating System Program Continue to implement storm water management plans. Prior to formal changes (amendments), review comprehensive plans, zoning, ordinances, capital improvement plans, or other mechanisms that control development to ensure they are consistent with the Hazard Mitigation Plan.
Funding	Secure traditional sources of financing	Apply for grants from federal or state government, nonprofit organizations, foundations, and private sources including Pre-Disaster Mitigation Program (PDM), Flood Mitigation Assistance Program (FMA), and the Hazard Mitigation Grant Program (HMGP-Stafford Act, Section 404). Research grant opportunities: U.S. Department of Housing and Urban Development's Community Development Block Grant (CDBG) Stafford Act, Section 406 – Public Assistance Program Mitigation Grants Federal Highway Administration Catalog of Federal Domestic Assistance U. S. Fire Administration – Assistance to Firefighter Grants U. S. Small Business Administration Pre and Post Disaster Mitigation Loans U. S. Department of Economic Development Administration Grants U. S. Army Corps of Engineers U. S. Department of Interior, Bureau of Land Management
Partnerships	Develop creative partnerships, funding and incentives	Public-Private Partnerships State Cooperation In-kind Resources

Table 8.1 Plan Integration		
Process	**Action**	**Implementation of Plan**
Partnerships	Existing Committees and Councils	Local Government Committees: Environmental Commissions Planning Boards Zoning Board of Appeals Media and Communications Merchants Association Property Owners Associations
Partnerships	Working with other federal, state, and local agencies	Army Corps of Engineers (USACE) American Red Cross Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) National Oceanic and Atmosphere Agency (NOAA) National Weather Service (NWS) Tennessee Department of Transportation (TDOT) Tennessee Department of Environment and Conservation (TDEC) Tennessee Highway Patrol (THP) United States Department of Agriculture (USDA) United States Department of Transportation (USDOT) United States Geological Service (USGS) Watershed Associations

8.6.1 Previous Plan Maintenance and Incorporation of Mitigation Strategy

The current Mitigation Planning Committee extensively reviewed the previous Plan maintenance, updating methodologies, and processes. Documented in this section are the methodologies that were effective and those that need improvement.

Table 8.2 Plan Maintenance Effectiveness Review		
Plan Maintenance Component	**Status**	**Effectiveness**
Periodic review of hazard vulnerability	Reviewed	Medium
Periodic review to insure the plan is still in compliance with State/Federal regulations	Reviewed	Medium
Periodic review of mitigation action priorities	Reviewed	Medium
Bi-annual review of mitigation action implementation progress	Annual review	Medium
Bi-annual review of any changes to mitigation actions	Annual review	Medium
Publish an annual report if necessary	Not completed	None
Conduct a quarterly meeting to assess project progress and results	Not completed	None
Conduct a five-year plan review to assess the effectiveness and appropriateness of the Plan: Do the goals address current and expected conditions? Has the nature or magnitude of risks changed? Are the current resources appropriate for implementing the Plan? Are there implementation problems, such as technical, political, legal, or coordination issues with other agencies? Have the outcomes occurred as expected? Did the jurisdictions, agencies, and other partners participate in the Plan implementation process as proposed?	Completed	High

Table 8.2 Plan Maintenance Effectiveness Review		
Plan Maintenance Component	**Status**	**Effectiveness**
Following a disaster declaration, the Mitigation Steering Committee will reconvene and the Plan will be revised as necessary to reflect lessons learned, or to address specific circumstances arising from the event	N/A	N/A
When a proposed amendment may directly affect particular private individuals or properties, Anderson County will follow existing local, state or federal notification requirements, which may include published public notices as well as direct mailings. Information on any proposed Plan amendments will also be forwarded to TEMA.	N/A	N/A
The public will be involved in the maintenance, evaluation, and revision process by: Advertising meetings of the Mitigation Planning Committee in the local newspaper, public bulletin boards, and/or city and county office buildings; Designating willing and voluntary citizens and private sector representatives as official members of the Mitigation Planning Committee; Utilizing local media to advise the public of any Plan maintenance and/or periodic review activities taking place; Utilizing city and county web sites to publish the plan, advertise any maintenance and/or periodic review activities taking place; and Keeping copies of the Plan in public libraries.	Completed	Medium

Anderson County and many of the participating jurisdictions have reviewed and incorporated hazard identification and risk assessment into other plans including Comprehensive Plans, Flood Management Plans, and Emergency Operations Plans. Information from the previous Plan was also considered in developing SOGs and FOGs for hazard incident response.

8.7 CONTINUED PUBLIC INVOLVEMENT

Public participation is an integral component of the mitigation planning process and will continue to be essential as this Plan evolves over time. Significant changes or amendments to the Plan require a public hearing prior to any adoption procedures.

Requirement §201.6(c)(4)(iii): The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.
A. Does the new or updated plan explain how continued public participation will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)

CRS Step 10: Impalement, evaluate and revise: The community must have procedures for monitoring implementation, reviewing progress, and recommending revisions to the plan in and annual evaluation report.

The public will have an opportunity to comment on the Plan at the annual review meeting for the Mitigation Plan and during the five-year Plan update. The annual progress reports will be posted in conjunction with the Hazard Mitigation Plan on the county mitigation website. The county will maintain this website, posting the annual progress reports and maintaining an active link to collect public comments.

The Mitigation Plan Coordinator is responsible for coordinating the Plan evaluation portion of the meeting, soliciting feedback, collecting and reviewing the comments, and ensuring their incorporation in the 5-year plan update as appropriate. Additional meetings may also be held as deemed necessary by the Mitigation Planning Committee. The purpose of these meetings is to provide the public an opportunity to express

concerns, opinions, and ideas about the mitigation plan. Annual progress reports will also be posted to the county mitigation web site.

Other efforts to involve the public in the maintenance, evaluation, and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Mitigation Committee in the local newspaper, public bulletin boards, and county and city office buildings;
- Designating willing and voluntary citizens and private sector representatives as official members of the Mitigation Planning Committee;
- Utilizing local media to inform the public of any Plan maintenance and/or periodic review activities taking place;
- Utilizing county and city web sites to advertise any Plan maintenance and/or periodic review activities taking place.

Anderson County is committed to the continued involvement of the public in the hazard mitigation process. Therefore, copies of the adopted 2011 Plan update will be made available for review during normal business hours at the Clinton Public Library, county and city Mayors' offices, and on the county website.

SECTION 9
APPENDICES

9.1 INTRODUCTION

This Hazard Mitigation Plan 2011 update section 9 includes changed references and acknowledgements, minutes of meetings, scanned public announcements and scanned adoption documents

9.2 REFERENCES AND ACKNOWLEDGEMENTS

The following resources were accessed during plan development and in many cases provided specific content, maps, and images:

Agency for Toxic Substances and Disease Registry (ATSDR)
American Red Cross – Appalachian Chapter
Anderson County
Anderson County Appraiser
Anderson County Chamber of Commerce
Anderson County Economic Development Association
Anderson County Emergency Management Agency
Anderson County GIS Department
Anderson County Health Department
Anderson County Local Emergency Planning Committee
Anderson County 911
Anderson County Schools
Anderson County Sheriffs Office
Centers for Disease Control and Prevention (CDC)
Coast Guard, National Response Center
Colorado State University
City-Data.com
City of Clinton
City of Lake City
City of Norris
City Of Oak Ridge
City of Oliver Springs
Clinton City Schools
E-Podunk.com
Environmental Protection Agency
Federal Bureau of Investigation
Federal Computer Incident Response Center
Federal Emergency Management Agency (FEMA)
Federal Motor Carrier Safety Administration
International Association of Emergency Managers (IAEM)

Jurisdictional Websites
Jurisdictional Comprehensive Plans
Methodist Medical Center
National Climatic Data Center:
National Oceanic and Atmospheric Administration-Storm Event Database
National Earthquake Hazards Reduction Program
National Emergency Management Association (NEMA)
National Highway Traffic Safety Administration
National Nuclear Security Administration
National Oceanic and Atmospheric Agency
National Performance of Dams Program-Dam Incident Notification Database
National Response Team (NRT)
National Weather Service
Natural Hazards Center
Oak Ridge Chamber of Commerce
Oak Ridge Economic Partnership
Oak Ridge Schools
Office of Domestic Preparedness
Office of Emergency Preparedness
Root3.eb.com
State of Tennessee Hazard Mitigation Plan
Tennessee Department of Agriculture
Tennessee Department of Agriculture – Division of Forestry
Tennessee Department of Justice
Tennessee Department of Transportation
Tennessee Department of Health
Tennessee Department of Human Resources
Tennessee Emergency Management Agency
Tennessee State Fire Marshal
The Oak Ridger
The Courier News
USACE National Inventory of Dams
University of Tennessee Agriculture Extension Service
U.S. Census Bureau
U.S. Department of Agriculture
U.S. Department of Agriculture Forest Service
U.S. Department of Justice
U.S. Department of Transportation
U.S. Fire Administration
U.S. Geological Survey
U.S. Geological Survey Earthquakes Hazard Program
U.S. Health and Human Services
VOAD
Wikipedia.org

Contacted to provide information as the Planning Committee and Plan Consultant gathered data, many agencies and individuals gave willingly of their time to respond to our requests for information and played a vital role in the completion of this Plan.

9.3 MITIGATION PLANNING MEETINGS/ATTENDANCE

All committee and public meeting minutes and attendance information are copied or scanned into this section.

Hazard Mitigation Initial Project Conference Call
January 20, 2010

The Initial Project Conference Call was held January 20, 2010 with Anderson County EMA Director Steve Payne, Plan Coordinator Lin Chilcoat, and EM-Associates Planning Consultant Les Junge participating.

Steve informed Les the Anderson County Commission had approved the EM-Associates contract for preparation of the 2011 update of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan.

Discussion focused on the overall project approach, new requirements for the Plan update, and building on the work already accomplished at the local and state levels.

Les reviewed categories of members for the Mitigation Planning Committee, emphasizing the importance of inviting businesses, education, emergency services, surrounding county emergency management directors, voluntary organizations, and citizens to participate in the planning process.

Tentative dates for the "kick-off" Planning Committee meeting and public meeting were discussed. Lin will prepare the public notice and news releases to advertise and invite the public to attend both meetings. It was decided that the final mitigation plan project meeting would be held March 9, 2010 at 10:00 a.m., followed by the Project Kickoff meeting at 1:00 p.m., and the public meeting at 6:00 p.m. Meeting room reservations will be finalized by February 1.

Les suggested areas to include in drafting a new public participation survey to be distributed to garner public input into the risk assessment data. Surveys will be placed in libraries and government offices.

Les will send data forms and PowerPoint prior to the Planning Committee meeting. He outlined the use of on-line forms to gather jurisdictional data.

There being no further business, the call was ended.

To Distribution Above:

Anderson County Emergency Management Agency has received a FEMA grant to perform the required five-year update of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan. This revision is due to FEMA on or before September 30, 2011.

Under Federal law, our county and its municipalities must have a FEMA-approved hazard mitigation plan in place to be eligible for pre-disaster mitigation assistance, and to qualify for Presidential disaster declaration and funding after a disaster has impacted the county.

The grant requires that the planning process includes input from government agencies, business and industries, academia, non-profit organizations, and the public. I am asking that your agency participate in this important project by providing a representative to serve on the Hazard Mitigation Planning Committee.

Over the next year, Planning Committee participants:

· will be asked to attend three countywide mitigation-planning meetings and to schedule any jurisdictional meetings necessary to collect mitigation planning information. The attached Participants and Responsibilities document provides an overview of expectations.

· will be required to complete an electronic survey that addresses jurisdictional hazards and threats. The survey will take about two hours to complete.

· will be asked to submit mitigation goals for their jurisdiction.

In-kind labor of the mitigation planning committee will meet the grant's 25% match. There will be no cost to your agency.

The initial meeting of the Planning Committee will be held from 1:00 – 5:00 p.m. on Tuesday, March 9, 2010, in the Anderson County Health Department conference room, 710 North Main Street, in Clinton. The purpose of the meeting is to provide an overview of the work to be completed, establish subcommittees, assignments, and timelines, and explore information sources. The meeting will be conducted by Mr. Les Junge of EM-Associates, the strategic planning firm employed to guide us through this critical planning process. Before this meeting, please access and review the present plan at:

andersontn.org/emergencymanagement.html.

Please complete the attached Point-of-Contact document signifying your agency's commitment to participate in the mitigation planning process and return to me at themarlowmama@hotmail.com no later than March 1, 2010. Please contact me if I can provide further information.

Thank you for your willingness to participate in this important work to allow our jurisdictions to meet Federal requirements and help us plan for a safer, disaster-resistant community for our citizens.

Sincerely,

Lin Chilcoat

Plan Coordinator

457-7846

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Hazard Mitigation Project Meeting
March 9, 2010

A hazard mitigation project meeting was held at 10:00 a.m. on March 9, 2010 at the Anderson County Emergency Management Agency. Present were EM-Associates consultants Les Junge and Jim Kincaid, and Anderson County Emergency Management Plan Coordinator, Lin Chilcoat.

Lin reported on invitation of public participation in the planning process through a legal notice, and through a news release and letter to the editor published in both local newspapers. Consultants reviewed the public participation survey form that has been placed in all public libraries (6) throughout the county and distributed to the county's ten fire departments.

Format for the 6:00 p.m. public meeting was discussed.

Format and responsibilities for the 1:00 p.m. planning committee meeting were decided.

Jurisdictional data will be submitted by committee members to EM-Associates by April 15 via on-line forms. Jim will send Lin the forms link to be distributed to pertinent committee members.

Consultants and the Plan Coordinator will meet with jurisdictions during the week of July 12-16 to ensure complete data for hazard incidents, critical facilities, and fiscal, administrative, technical, legal, and regulatory capabilities.

The date for the next planning committee meeting will be established based on completion date of a draft plan.

Les discussed new plan requirements and tasks needed to meet those requirements. Lin will oversee the evaluation of progress on the present hazard mitigation plan goals and activities.

There being no further business, the meeting was adjourned at 12:15 p.m.

Hazard Mitigation Planning Committee Kickoff Meeting
March 9, 2010

A meeting of the Anderson County Multi-Jurisdictional Planning Committee was held at 1:00 p.m. on March 9, 2010 at the Anderson County Health Department with 23 attending. Presenters at the meeting were EM-Associates Consultants Les Junge and Jim Kincaid, and Anderson County Emergency Management Plan Coordinator, Lin Chilcoat.

A list of attendees is attached.

Les Junge presented an overview of the importance and process of hazard mitigation planning. Forms for data compilation were distributed to each jurisdiction and their respective agencies. EM-Associates and the Plan Coordinator will meet with all jurisdictions during the week of July 12 -16 to ensure complete data for hazard incidents, critical facilities, and fiscal, administrative, technical, legal, and regulatory capabilities.

Jim Kincaid presented an overview of EM-Associates' on-line forms. Jim will send the forms link to Lin to be distributed to pertinent committee members. Data forms are to be submitted by April 15.

Committee members were advised to review the present mitigation plan at www.andersontn.org/emergencymanagement.html for scope and types of data collection required.

Lin Chilcoat spoke about the importance of accurate records for recording in-kind hours. A form will be e-mailed to all Planning Committee members to be shared with and submitted by all persons who participate in data collection. Lin will advise of allowable hourly rate.

Lin reported on the invitation of public participation in the planning process. The public participation survey form was distributed to all Planning Committee members. Participants were invited to attend the 6:00 p.m. public meeting at Anderson County Courthouse, Room 118A.

The date for the next Hazard Mitigation Planning Committee meeting will be established based on completion date of a draft plan.

There being no further business, the meeting was adjourned at 3:30 p.m.

Hazard Mitigation Planning Committee Kickoff Meeting Attendance
March 9, 2010

Paul White	Anderson County Sheriff's Office
Richard Pumphrey	Citizen
Jim Shetterly	City of Lake City
Matthew Lambert	Anderson County GIS
Sarah Booker	Anderson County Planning
Brian Jenks	Anderson County Storm Water/Solid Waste
Greg Darnell	Anderson County Building Commissioner
Gary Long	Anderson County Highway Department
Audry Goins	Food Lion
Matt Foster	Roane State Community College
Archie Brummitt	Clinton Fire Department
Jeff Little	Clinton Fire Department
Jim Kolopus	Anderson County Fire Commission
Chuck Stearle	Citizen
Trish Polfus	Methodist Medical Center
Kim Farmer	City of Oak Ridge
Tim Hester	City of Norris
Samantha Walking	Anderson County Health Department
Betty Dick	Anderson County Health Department
Gail Baird	Anderson County Health Department
Justin Bailey	Oliver Springs Fire Department
Dan Hawkins	Clinton Utilities Board
Lin Chilcoat	Anderson County Emergency Management Agency

Hazard Mitigation Public Meeting
March 9, 2010

A public meeting of the Anderson County Hazard Mitigation Planning Committee was held at 6:00 p.m. on March 9, 2010 at the Anderson County Courthouse, Room 118A, for the purpose of garnering citizen interest and input in assessing local and regional natural and man-made hazards, establishing mitigation goals and objectives, and identifying projects to develop the Anderson County Multi-Jurisdictional Hazard Mitigation Plan and enable the Anderson County Emergency Management Agency to prepare for and reduce the impacts of disasters in Anderson County and its local jurisdictions.

Attending were:
Jerry King, citizen
Ken Fritts, Tennessee Emergency Management Agency
Steve Payne, Anderson County Emergency Management Agency
Lin Chilcoat, Anderson County Emergency Management Agency

EM Associates' Les Junge presented an overview of the importance and process of hazard mitigation planning.

Following the presentation, Jerry King shared concerns for water issues in his community in relation to response to wildfire. Mr. King completed a Public Participation Survey.

There being no further business, the meeting was adjourned at 8:05 p.m.

To Mitigation Planning Committee Members,

Jurisdictional Homework

The e-mail to which this is attached has the consultant link to enter information for your jurisdiction. Just click on it and bookmark the site. These forms are clear and easy to complete — lots better than paper!

For the Historic Hazards incident form, you will complete and submit one form for each incident that has occurred in the past five years.

For the Critical Facilities form, you will complete and submit one form for each critical facility in your jurisdiction.

> The majority of your critical facilities will be listed in the present mitigation plan at andersontn.org/emergencymanagement.html. Updates in value will need to be made. Be sure to add any new facilities.

For the Fiscal Capabilities, Administrative and Technical Capabilities, and Legal and Regulatory forms, your jurisdiction will submit only one form.

When you have completed these forms, be sure to print a copy for your files. Please submit these forms to Les no later than April 15th!!

In-Kind Hours

Also attached is the in-kind hours tracking form. FEMA has determined that regardless of what you earn at work, your hourly rate for in-kind will be $20/hr plus benefits. Since the county's benefit percentage is 37%, everyone's hourly rate for in-kind will be $27.40, which I have already entered on the form.

Please use this form to track every minute of your time in quarter hours, and to send on to others in your jurisdiction who research for you or answer questions. More workers are good! When you have completed your work, the forms may be e-mailed to me at themarlowmama@hotmail.com.

Jurisdictional Meetings

Les and Jim will soon be scheduling jurisdictional meetings to take place during the week of July 12-16.

Please contact me if you have questions. Thanks for all your work!

Lin

Subject: RE: Mitigation Plan Jurisdiction Meeting Schedule
From: Lin Chilcoat <themarlowmama@hotmail.com>
Date: Mon, Jul 05, 2010 1:06 pm
To: larry miller <lmiller@clintontn.net>, <rscarbrough@clintontn.net>, archie brummitt <abrummitt@clintontn.net>, <lcpd@bellsouth.net>, sam bailey <chieflcfd@comcast.net>, <mbailey@cortn.org>, <amassengill@cortn.org>, <osfd399@aim.com>, terry phillips <oschief@bellsouth.net>, <ozchief301@yahoo.com>, matthew lambert <mlambert@andersontn.org>, <vlong@mail.acgis.net>, jeff cole <jcole@andersontn.org>, <mlucas@tnacso.net>, <sheriff@tnacso.net>, <garylongachd@comcast.net>, <lmurphy@clintontn.net>, steve byrd <sbyrd@cortn.org>, <oscitymanager@comcast.net>, <rlynch@andersontn.org>, steve payne <paynkey@hotmail.com>, <kfritts@tnema.org>, <ljunge@em-associates.org>

Am re-sending this info since I have not had confirmation from anyone except Norris and Oliver Springs.

Please note on the schedule below Oliver Springs has been moved to Thursday at 1:00 p.m.

Mack, Jim, and Larry, please let me know where your jurisdiction's meeting will be held.

Thanks much,

Lin
457-7846

From: themarlowmama@hotmail.com
To: lmiller@clintontn.net; rscarbrough@clintontn.net; abrummitt@clintontn.net; lcpd@bellsouth.net; chieflcfd@comcast.net; timdhester@comcast.net; norrisps@bellsouth.net; mbailey@cortn.org; amassengill@cortn.org; osfd399@aim.com; oschief@bellsouth.net; ozchief301@yahoo.com; mlambert@andersontn.org; vlong@mail.acgis.net; jcole@andersontn.org; mlucas@tnacso.net; sheriff@tnacso.net; garylongachd@comcast.net; lmurphy@clintontn.net; sbyrd@cortn.org; oscitymanager@comcast.net; rlynch@andersontn.org; paynkey@hotmail.com; kfritts@tnema.org; themarlowmama@hotmail.com; ljunge@em-associates.org
Subject: Mitigation Plan Jurisdiction Meeting Schedule
Date: Tue, 15 Jun 2010 11:57:36 -0400

Gentlemen,

Our consultant, Les Junge, will meet with each jurisdiction to finalize data and gather information for compilation of the mitigation plan.

In each jurisdiction he has asked to meet with a representative from fire, law enforcement, public works, and the city/county clerk. A meeting will also be held with the county GIS department and assessor.

Meetings will be approximately two hours in length. Please bring to the meeting your jurisdiction's comprehensive growth plan and copies of information your jurisdiction has submitted to Les to date.

Schedule of meetings is:

Tuesday, July 13

9:00 - 11:00 Norris
12:30 - 2:30 Lake City
3:00-5:00 Clinton

Wednesday, July 14

12:30- 2:30 Oak Ridge
3:00-5:00 Anderson County

Thursday, July 15

9:00 - 11:00 GIS and Assessor
1:00-3:00 Oliver Springs

Anderson County Hazard Mitigation Plan
Jurisdictional Meetings
July 13, 14, and 15, 2010

Planning consultant Les Junge and plan coordinator Lin Chilcoat met with representatives from each of the Anderson County Jurisdictions on July 13, 14, and 15, 2010.

To begin each meeting, Les Junge briefly reviewed the purpose and importance to the community of hazard mitigation planning. Les explained the five types of mitigation grants available and suggested ways in which the jurisdiction can meet the required match for pre-disaster mitigation grants. Each jurisdiction stated that matching funds have been a hindrance in applying for grant funds. Lin will send all jurisdictions the website for FEMA's Hazard Mitigation Assistance Unified Guidance which details the five hazard mitigation assistance programs.

Participants were provided a copy of their jurisdiction's table of critical facilities, and tables for legal and regulatory, fiscal, and administrative and technical capabilities. These were reviewed for accuracy.

Additions were made to the table of critical facilities to include childcare facilities and income-producing commercial establishments critical to sales tax revenue for the jurisdiction. Missing information on the capabilities tables was provided.

During the second half of the meeting mitigation goals objectives and action items were discussed. While the plan will contain countywide goals, objectives, and actions common to all jurisdictions, each jurisdiction was asked to identify action items specific to the unique needs of its community. Les explained the jurisdiction's need to establish goals, objectives, and actions. These will be used to create the jurisdiction's individual Mitigation Action Plan.

To assist the process, Les distributed a table with sample action items and asked each jurisdiction to tailor pertinent items to the jurisdiction's needs or to create other actions important to the community. Each jurisdiction was asked to submit a list of 20 or so action items, complete with information reflecting responsibility, funding source, cost benefit, completion date, and priority by August 31.

Following questions and a general discussion of community concerns, the meetings were adjourned.

Meeting times, participants, and special concerns were:

Norris

July 13, 9:00 a.m. to 11:00 a.m. – Norris Community Center

Tim Hester, City Manager; Danny Humphrey, Chief Norris Public Safety

Norris has a concern about a hazardous materials transportation accident on Interstate 75.

Clinton

July 13, 3:00 p.m. to 5:00 p.m. – Clinton City Hall

Anthony Braden, Clinton Fire Department; Vickie Fagan, Clerk; Larry Miller, Clinton Police Department; Lynn Murphy, Public Works Director; Curtis Perez, Zoning

Clinton has concerns regarding its water supply capabilities in a flood incident.

Lake City

July 14, 9:00 a.m. to 11:00 a.m. – Lake City City Hall

Sam Bailey, Lake City Fire Chief; Jim Shetterly, Lake City Police Chief; James Wills, Public Works Director

Lake City has concerns regarding a hazardous materials rail accident.

Oak Ridge

July 14, 12:30 p.m. to 2:30 p.m. – Oak Ridge Municipal Building

Mack Bailey, Oak Ridge Fire Chief; Steve Byrd, Public Works; Ken Kruchenski, City Attorney

Oak Ridge contains four DOE facilities with radiological and many other hazardous materials.

Anderson County

July 14, 3:00 p.m. to 5:00 p.m. – Anderson County Zoning & Codes Office

Sarah Booher, Community Planning; Greg Darnell, Codes and Building Commissioner; Brian Jenks, Storm Water Coordinator; Matthew Lambert, GIS

Oliver Springs

July 15, 1:00 p.m. to 3:00 p.m. – Oliver Springs City Hall

David Bolling, City Manager; Justin Bailey, Oliver Springs Fire Department; Ken Morgan, Oliver Springs Police Chief

Oliver Springs has serious concerns regarding flooding in the downtown area, at the bridge on Airport Road, and at Arrowhead Park below Oliver Springs High School.

Anderson County GIS/Assessor

July 15, 9:00 a.m. to 11:00 a.m. – Anderson County EMA Office

Matthew Lambert, GIS; Vernon Long, Assessor (by phone)

In the meeting with the County's GIS technician (and by phone, the County Assessor, who was on vacation), Les discussed the process for mapping hazard scenarios to estimate damage to types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas. Matthew, the GIS technician will map critical facilities and update maps to comply with the mitigation planning requirements of section 201.

Following questions and general discussion, the meeting was adjourned.

9.4 PUBLIC MEETING ANNOUNCEMENTS

To: The Courier News

From: Anderson County Emergency Management Agency
Lin Chilcoat, Hazard Mitigation Plan Coordinator

Re: Hazard Mitigation Public Meeting

Date: February 15, 2010

Please run the following legal announcement in your February 28, 2010 edition and provide a Publisher's Affidavit. Thank you.

Notice of Public Meeting

Notice is hereby given to all residents of Anderson County, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs, Tennessee, and all other persons of interest, that an open, public, called meeting of the Anderson County Hazard Mitigation Planning Committee will be held in Room 312, Anderson County Courthouse, 100 North Main Street, Clinton Tennessee, on Tuesday, March 9th at 6:00 p.m. for the purpose of garnering citizen interest and input in assessing local and regional natural and man-made hazards, establishing mitigation goals and objectives, and identifying projects to develop the Anderson County Multi-Jurisdictional Hazard Mitigation Plan and enable the Anderson County Emergency Management Agency to prepare for and reduce the impacts of disasters in Anderson County and its local jurisdictions. Any person requiring auxiliary aid must make request to the County Mayor 48 hours prior to the meeting

NOTICE OF PUBLIC MEETING

Notice is hereby given to [redacted]

and Oliver Springs, Tennessee, [redacted] an open, public, called meeting of the Anderson County Hazard Mitigation Planning Committee will be held in Room 119A, Anderson County Courthouse, 100 North Main Street, Clinton, Tennessee, on Tuesday, March 9th at 6:00 p.m. for the purpose of gathering citizen interest and input in assessing local and regional natural and man-made hazards, establishing mitigation goals and objectives, and identifying projects to develop the Anderson County Multi-Jurisdictional [redacted] and assist the Anderson County Emergency Management Agency to prepare for and reduce the impacts of disasters in Anderson County and its local jurisdictions. Any person requiring auxiliary aid must make request to the County Mayor 48 hours prior to the meeting. [redacted]

0228-23-1

Publisher's Affidavit

I do solemnly swear that the attached Notice was published for 1 consecutive weeks in The Courier-News on the following dates:

2/28/10

Signed Don Bridgeman
Publisher

Subscribed and sworn to before me this, the 2nd day of March, 2010

Kimberly Sullivan
Notary Public

My Commission Expires 2/23/13

JENNY SULLIVAN NOTARY PUBLIC AT LARGE ANDERSON COUNTY, TENN.

The Courier-News, Oliver, TN

Hazard mitigation committee plans public meeting March 9

The Anderson County Multi-Jurisdictional Hazard Mitigation planning committee will hold a public meeting at 6 p.m. Tuesday, March 9.

The meeting will be in Room 118A, Anderson County Courthouse.

Topics for discussion will include the mitigation planning process, identifying natural and man-made hazards, and suggesting projects to reduce the impacts of disasters in Anderson County.

Call 457-7846 for further information.

Meeting set on 'hazards' plan

EDITOR:

Residents of Anderson County, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs are invited to attend a public meeting in Room 118A of the Anderson County Courthouse at 6 p.m. Tuesday, March 19, to learn about hazard mitigation planning, provide information regarding concerns about specific natural and man-made hazards in their neighborhoods, and suggest projects to reduce the impact of hazards in Anderson County.

Information from residents will be incorporated by the mitigation planning committee to update the Anderson County Multi-Jurisdictional Hazard Mitigation Plan.

When complete, the plan will be approved by the Federal Emergency Management Agency and adopted by all Anderson County jurisdictions.

A mail-in public participation survey is available at libraries in Briceville, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs.

The present plan may be accessed at andersontn.org/emergencymanagement.html. Questions may be directed to 457-7846.

I encourage residents to take part in this planning process to help make our county more resistant to disasters.

Sincerely,

Lin Chilcoat
Plan Coordinator
Anderson County
Emergency

THE OAK RIDGER

Darrell G. Richardson, editor & publisher
darrell.richardson@oakridger.com (865) 220-5510

Donna Smith, news editor
donna.smith@oakridger.com (865) 220-5502

Friday, March 5, 2010 • 61st YEAR — No. 23

Participation urged in hazard mitigation plan

To The Editor:

Residents of Anderson County Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs are invited to attend a public meeting in Room 118A of the Anderson County Courthouse on Tuesday, March 9, at 6 p.m. to learn about hazard mitigation planning, provide information regarding concerns about specific natural and man-made hazards in their neighborhoods, and suggest projects to reduce the impact of hazards in Anderson County.

Information from residents will be incorporated by the mitigation planning committee to update the Anderson County Multi-Jurisdictional Hazard Mitigation Plan. When complete, the plan will be approved by the Federal Emergency Management Agency and adopted by all Anderson County jurisdictions.

A mail-in public participation survey is available at libraries in Briceville, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs. The present plan may be accessed at www.andersontn.org/emergencymanagement.html. Questions may be directed to (865) 457-7846.

I encourage residents to take part in this planning process to help make our county more resistant to disasters.

Plan Coordinator
Anderson County Emergency Management Agency

To: The Courier News

News Release: February 19, 2010

Contact: Lin Chilcoat
Anderson County Emergency Management Agency
457-7846

Hazard Mitigation Committee Seeks Citizen Input

The Anderson County Multi-Jurisdictional Hazard Mitigation planning committee will hold a public meeting in room 312, Anderson County Courthouse, on Tuesday, March 9th at 6:00 p.m. All citizens are invited to attend to learn about the mitigation planning process, help identify natural and man-made hazards, and suggest projects to reduce the impacts of disasters in Anderson County. Please call Lin Chilcoat at 457-7846 for further information.

To: BBB TV

PSA Request: February 19, 2010

Contact: Anderson County Emergency Management Agency
Lin Chilcoat, Administrative Assistant
457-7846

Steve Payne, Director
898-6280

Please include information in your programming to help us publicize this invitation for citizen participation in updating the county's hazard mitigation plan. Thank you.

****

The Anderson County Multi-Jurisdictional Hazard Mitigation planning committee will hold a public meeting in room 312, Anderson County Courthouse, on Tuesday, March 9th at 6:00 p.m. All citizens are invited to attend to learn about the mitigation planning process, help identify natural and man-made hazards, and suggest projects to reduce the impacts of disaster in Anderson County. Please call Lin Chilcoat at 457-7846 for further information.

Anderson County
Office of Emergency Management and Homeland Security
Steve Payne, Director

111 South Charles G. Seivers Boulevard
Clinton, TN 37716
Phone 865/457-6765 Fax 865/457-6557

March 1, 2010

The Courier News
233 North Hicks Street
Clinton, TN 37716

To The Editor:

Residents of Anderson County, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs are invited to attend a public meeting in Room 312 of the Anderson County Courthouse on Tuesday, March 9 at 6:00 p.m. to learn about hazard mitigation planning, provide information regarding concerns about specific natural and man-made hazards in their neighborhoods, and suggest projects to reduce the impact of hazards in Anderson County.

A mail-in public participation survey will be available at libraries throughout the county.

Information from residents will be incorporated by the mitigation planning committee to update the Anderson County Multi-Jurisdictional Hazard Mitigation Plan. When complete, the plan will be approved by the Federal Emergency Management Agency and adopted by all Anderson County jurisdictions.

I encourage residents to take part in this planning process to help make our county more resistant to disasters.

Sincerely,

Lin Chilcoat
Plan Coordinator
Anderson County Emergency Management Agency

Dear Hazard Mitigation Planning Committee Members,

Thanks to the input and hard work of many agencies through out the county, we're approaching completion of a draft hazard mitigation plan.

Please mark your calendars and plan to attend the following meetings:
Hazard Mitigation Planning Committee Meeting:
Thursday, June 16, 3:00 p.m., Anderson County Health Department Conference Room, 710 North Main Street, Clinton.
The meeting will be conducted by our planning consultant, Les Junge. The purpose of the meeting is to review plan components, discuss concerns, and propose any changes.

Public Meeting:
Thursday, June 16, 6:00 p.m., Anderson County Courthouse Room 118A, 100 North Main Street, Clinton.
The purpose of this meeting is to allow citizens to review components of and comment on the plan. Your presence will lend jurisdictional support for the plan.

Your attendance and input at these meetings is important! We're hopeful that our "first draft" to be submitted to TEMA on June 30 will pass muster and be our "final plan" to FEMA for successful adoption by all jurisdicdtions.

The first nine sections have been posted for your review on the EM Associates website -- em-associates.org/anderson-county.htm. Sections of the new plan are at the bottom of the center box. As soon as all sections are posted, the link will be advertised to the public in news releases to the Courier News and the Oak Ridger.

I'm finishing edits to the jurisdiction plans this week and will let you know when they are posted. In your review, please give particular attention to these sections pertaining to your individual jurisdiction. And please! Don't forget to keep track of your in-kind time for this review!

If you have questions (or find typos!) please contact me. Thanks much for your work to keep our county and your jurisdiction eligible for pre- and post-disaster assistance. I hope to see each of you on the 16th!

Lin Chilcoat
Mitigation Plan Coordinator
Anderson County EMA
457-7846
themarlowmama@hotmail.com

To: BBB TV

PSA Request: May 30, 2011

Contact: Anderson County Emergency Management Agency
Lin Chilcoat, Administrative Assistant
457-7846

Steve Payne, Director
898-6280

Please include information in your programming to help us publicize this invitation for citizen participation in updating the county's hazard mitigation plan. Thank you.

****

The Anderson County Hazard Mitigation Planning Committee will hold a public meeting in Room 118A, Anderson County Courthouse, on Thursday, June 16th, at 6:00 p.m. All citizens are invited to attend to review plan components and comment on the plan. A copy of the draft plan is available for inspection in the Anderson County Mayor's office, Room 208, and is posted online at em-associates.org/anderson-county.htm. Please call 457-7846 for further information.

Anderson County
Office of Emergency Management and Homeland Security
Steve Payne, Director

111 South Charles G. Seivers Boulevard
Clinton, TN 37716
Phone 865/457-6765 Fax 865/457-6557

By E-Mail

May 30, 2011

The Oak Ridger
785 Oak Ridge Turnpike
Oak Ridge, TN 37830

To The Editor:

The Anderson County Hazard Mitigation Planning Committee is presently updating the county's Hazard Mitigation Plan.

The plan will identify natural and man-made hazards, establish mitigation goals and objectives, and propose projects that will enable the county and its municipalities to prepare for and reduce the impact of disasters. When complete, the plan will be approved by the Federal Emergency Management Agency and adopted by all Anderson County jurisdictions.

A copy of the draft plan is available for inspection in the Anderson County Mayor's office, Room 208, and is posted online at em-associates.org/anderson-county.htm.

All residents of Anderson County are encouraged to attend a public meeting to review plan components and comment on the plan. The meeting will be held June 16 at 6:00 p.m. in Room 118A of the Anderson County Courthouse, 100 North Main Street, Clinton.

I encourage residents to take part in this planning process to help make our county more resistant to disasters. Please call 865-457-7846 for further information.

Anderson County
Office of Emergency Management and Homeland Security
Steve Payne, Director

111 South Charles G. Seivers Boulevard
Clinton, TN 37716
Phone 865/457-6765 Fax 865/457-6557

By E-Mail

May 30, 2011

The Oak Ridger
785 Oak Ridge Turnpike
Oak Ridge, TN 37830

To The Editor:

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I encourage residents to take part in this planning process to help make our county more resistant to disasters. Please call 865-457-7846 for further information.

Sincerely,

Lin Chilcoat
Plan Coordinator
Anderson County Emergency Management Agency

Anderson County
Office of Emergency Management and Homeland Security
Steve Payne, Director

111 South Charles G. Seivers Boulevard
Clinton, TN 37716
Phone 865/457-6765 Fax 865/457-6557

By E-Mail

May 30, 2011

The Courier News
233 North Hicks Street
Clinton, TN 37716

To The Editor:

The Anderson County Hazard Mitigation Planning Committee is presently updating the county's Hazard Mitigation Plan.

The plan will identify natural and man-made hazards, establish mitigation goals and objectives, and propose projects that will enable the county and its municipalities to prepare for and reduce the impact of disasters. When complete, the plan will be approved by the Federal Emergency Management Agency and adopted by all Anderson County jurisdictions.

A copy of the draft plan is available for inspection in the Anderson County Mayor's office, Room 208, and is posted online at em-associates.org/anderson-county.htm.

All residents of Anderson County are encouraged to attend a public meeting to review plan components and comment on the plan. The meeting will be held June 16 at 6:00 p.m. in Room 118A of the Anderson County Courthouse, 100 North Main Street, Clinton.

I encourage residents to take part in this planning process to help make our county more resistant to disasters. Please call 865-457-7846 for further information.

To: The Oak Ridger

From: Lin Chilcoat
Anderson County Emergency Management Agency
457-7846

News Release: May 30, 2011

Please publish the following news release to invite the public to participate in our mitigation planning. Thank you.

Hazard Mitigation Committee Seeks Citizen Input

The Anderson County Multi-Jurisdictional Hazard Mitigation Planning Committee will hold a public meeting in Room 118A, Anderson County Courthouse, on Thursday, June 16th, at 6:00 p.m. All citizens are invited to attend to review plan components and comment on the plan. The plan is available for inspection in the Anderson County Mayor's Office, Room 208, and is posted online at em-associates.org/anderson-county.htm. Please call Lin Chilcoat at 457-7846 for further information.

To: The Courier News

From: Lin Chilcoat
Anderson County Emergency Management Agency
457-7846

News Release: May 30, 2011

Please publish the following news release to invite the public to participate in our mitigation planning. Thank you.

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The Anderson County Multi-Jurisdictional Hazard Mitigation Planning Committee will hold a public meeting in Room 118A, Anderson County Courthouse, on Thursday, June 16th, at 6:00 p.m. All citizens are invited to attend to review plan components and comment on the plan. The plan is available for inspection in the Anderson County Mayor's Office, Room 208, and is posted online at em-associates.org/anderson-county.htm. Please call Lin Chilcoat at 457-7846 for further information.

To: **The Oak Ridger**

From: **Lin Chilcoat**
Anderson County Emergency Management Agency
457-7846

News Release: **May 30, 2011**

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Hazard Mitigation Committee Seeks Citizen Input

The Anderson County Multi-Jurisdictional Hazard Mitigation Planning Committee will hold a public meeting in Room 118A, Anderson County Courthouse, on Thursday, June 16th, at 6:00 p.m. All citizens are invited to attend to review plan components and comment on the plan. The plan is available for inspection in the Anderson County Mayor's Office, Room 208, and is posted online at em-associates.org/anderson-county.htm. Please call Lin Chilcoat at 457-7846 for further information.

THURSDAY, JUNE 9, 2011

County Hazard Mitigation Committee seeks citizen input

The Anderson County Multi-Jurisdictional Hazard Mitigation Planning Committee will hold a public meeting at 6 p.m. June 16, in Room 118A at the Anderson County Courthouse in Clinton.

All citizens are invited to attend to review plan components and comment on the plan. The plan is available for inspection in the Anderson County Mayor's Office, Room 208, and is posted online at em-associates.org/anderson-county.htm. Call Lin Chilcoat at (865) 457-7846 for more information.

The Courier News
June 5, 2011

Hazard Mitigation Plan being updated

EDITOR:

The Anderson County Hazard Mitigation Planning Committee is presently updating the county's Hazard Mitigation Plan.

The plan will identify natural and man-made hazards, establish mitigation goals and objectives, and propose projects that will enable the county and its municipalities to prepare for and reduce the impact of disasters.

When complete, the plan will be approved by the Federal Emergency Management Agency and adopted by all Anderson County jurisdictions.

A copy of the draft plan is available for inspection in the Anderson County Mayor's office, Room 208, and is posted online at em-associates.org/anderson-county.htm.

All residents of Anderson County are encouraged to attend a public meeting to review plan components and comment on the plan.

The meeting will be held June 16 at 6:00 p.m. in Room 118A of the Anderson County Courthouse, 100 North Main Street, Clinton.

I encourage residents to take part in this planning process to help make our county more resistant to disasters.

Please call 865-457-7846 for further information.

Lin Chilcoat
Plan Coordinator
Anderson County Emergency Management Agency

Sunday, June 5, 2011

NOTICE OF PUBLIC MEETING

Notice is hereby given to all residents of Anderson County, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs, Tennessee, and all other persons of interest, that an open, public, called meeting of the Anderson County Hazard Mitigation Planning Committee will be held in Room 118A, Anderson County Courthouse, 100 North Main Street, Clinton, Tennessee, on Thursday, June 16th, at 6:00 p.m. for the purpose of commenting on the proposed Anderson County Hazard Mitigation Plan that will enable the Anderson County Office of Emergency Management and Homeland Security to prepare for and reduce the impacts of disasters in Anderson County and its local jurisdictions. A copy of the plan will be available for inspection in the Anderson County Mayor's office, Room 208, and is posted online at em-associates.org/anderson-county.htm. Any person requiring auxiliary aid must make request to the County Mayor 48 hours prior to the meeting.

0605-2-1

Sunday, August 7, 2011

NOTICE OF PUBLIC HEARING

Notice is hereby given to all residents of Anderson County, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs, Tennessee, and all other persons of interest, that an open, public hearing will be held in Room 312, Anderson County Courthouse, 100 North Main Street, Clinton, Tennessee, on Monday, August 15th, at 6:00 p.m. for the purpose of soliciting public comment regarding adoption of the updated Anderson County Multi-Jurisdictional Hazard Mitigation Plan by all Anderson County jurisdictions. A copy of the plan is available for public inspection in the Anderson County Mayor's office, Room 208, and is posted online at em-associates.org/anderson-county.htm. Any person requiring auxiliary aid must make request to the County Mayor 48 hours prior to the meeting.

0807-4-1

0807-4-1

Publisher's Affidavit

I do solemnly swear that the attached Notice was published for 1 consecutive weeks in The Courier-News on the following dates:

8/7/11

Signed _____ Publisher

Subscribed and sworn to before me this, the 26th day of August, 2011

Notary Public

My Commission Expires 2/23/13

The Courier News
August 7, 2011

Letters

We have a plan

EDITOR:

The Anderson County Hazard Mitigation Planning Committee has received FEMA approval of the updated Hazard Mitigation Plan, pending adoption by all Anderson County jurisdictions.

The plan identifies natural and man-made hazards, establishes mitigation goals and objectives, and proposes projects that will enable the county and its municipalities to prepare for and reduce the impact of disasters.

A copy of the plan is available for inspection in the Anderson County Mayor's office, Room 208, and is posted online at http://em-associates.org/anderson-county.htm.

All residents of Anderson County are encouraged to attend a public hearing to comment on the adoption of the plan. The hearing will be held at 6 p.m. Aug. 15, in Room 312 of the Anderson County Courthouse, 100 North Main Street, Clinton.

I encourage residents to take part in this planning process to help make our county more resistant to disasters. Please call 865-457-7846 for further information.

Sincerely,

Lin Chilcoat
Plan Coordinator
Anderson County Emergency Management Agency

THE OAK RIDGER

Darrell G. Richardson, editor & publisher
darrell.richardson@oakridger.com (865) 220-5510

Donna Smith, news editor
donna.smith@oakridger.com (865) 220-5502

Wednesday, August 10, 2011 • 62nd YEAR — No. 133

LETTERS

Public hearing set for local Hazard Mitigation Plan

To The Editor:

The Anderson County Hazard Mitigation Planning Committee has received FEMA approval of the updated Hazard Mitigation Plan, pending adoption by all Anderson County jurisdictions.

The plan identifies natural and man-made hazards, establishes mitigation goals and objectives, and proposes projects that will enable the county and its municipalities to prepare for and reduce the impact of disasters.

A copy of the plan is available for inspection in the Anderson County Mayor's office, Room 208, and is posted online at em-associates.org/anderson-county.htm.

All residents of Anderson County are encouraged to attend a public hearing to comment on the adoption of the plan. The hearing will be held at 6 p.m. on Aug. 15, in Room 312 at the Anderson County Courthouse, 100 N. Main St., Clinton.

I encourage residents to take part in this planning process to help make our county more resistant to disasters. Please call (865) 457-7846 for further information.

Lin Chilcoat
Plan Coordinator
Anderson County Emergency
Management Agency

9.5 MITIGATION PLAN CERTIFICATION AND ADOPTION

This section of the plan includes Plan certification and copies of local resolutions passed by each of Anderson County's local jurisdictions.

The notarized certification and the adoption resolutions are scanned into this section.

44 CFR Requirement

44 CFR Part 201.6(c)(5): The plan shall include documentation that the plan has been formally adopted by the local governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Anderson County, Tennessee
Board of Commissioners

RESOLUTION NO. 11-412

RESOLUTION TO ADOPT THE ANDERSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the State of Tennessee has ordained that every county and incorporated municipality in the state is required to have a Hazard Mitigation Plan approved by the Tennessee Emergency Management Agency to maintain eligibility for state disaster assistance after November 2004; and

WHEREAS, the Federal Emergency Management Agency (FEMA), under the Disaster Mitigation Act of 2000, has ordained that every county and incorporated municipality within the county is required to have a Hazard Mitigation Plan approved by FEMA in order to be eligible for Hazard Mitigation Grant Program funding for Presidential disasters declared after November 2004; and

WHEREAS, under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency has issued an Interim Final Rule that details the minimum criteria for local hazard mitigation plans; and

WHEREAS Anderson County agrees with the concept and necessity for hazard mitigation planning; and

WHEREAS the Anderson County Hazard Mitigation Planning Committee recommends the adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS the Tennessee Emergency Management Agency and the Federal Emergency Management Agency have conducted a review of and approved the Anderson County Multi-Jurisdictional Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED by the Anderson County Board of Commissioners meeting in regular session on this 15th day of August, 2011 at the Anderson County Courthouse, Clinton, Tennessee, that:

SECTION 1. The Anderson County Board of Commissioners hereby adopts the Anderson County Multi-Jurisdictional Hazard Mitigation Plan as submitted this day.

SECTION 2. This Resolution shall take effect on the 15th day of August, 2011, the public welfare requiring it.

Adopted this 15th day of August, 2011

Mark Alderson, Chairman

Myron Iwanski, County Mayor

ANDERSON COUNTY TENNESSEE

ATTEST:

Jeff Cole, County Clerk

Resolution No. 686

RESOLUTION TO ADOPT THE ANDERSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the State of Tennessee has ordained that every county and incorporated municipality in the state is required to have a Hazard Mitigation Plan approved by the Tennessee Emergency Management Agency to maintain eligibility for state disaster assistance after November 2004; and

WHEREAS, the Federal Emergency Management Agency (FEMA), under the Disaster Mitigation Act of 2000, has ordained that every county and incorporated municipality within the county is required to have a Hazard Mitigation Plan approved by FEMA in order to be eligible for Hazard Mitigation Grant Program funding for Presidential disasters declared after November 2004; and

WHEREAS, under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency has issued an Interim Final Rule that details the minimum criteria for local hazard mitigation plans; and

WHEREAS, the City of Clinton agrees with the concept and necessity for hazard mitigation planning; and

WHEREAS the Anderson County Hazard Mitigation Planning Committee recommends the adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS the Tennessee Emergency Management Agency and the Federal Emergency Management Agency have conducted a review of and approved the Anderson County Multi-Jurisdictional Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Clinton, meeting in regular session on this 29th day of August, 2011 at Clinton, Tennessee, that:

SECTION 1. The Clinton City Council hereby adopts the Anderson County Multi-Jurisdictional Hazard Mitigation Plan as submitted this day.

SECTION 2. This Resolution shall take effect on the 29th day of August, 2011, the public welfare requiring it.

Adopted this 29th day of August, 2011

ATTEST:

Scott Burton, Mayor

Regina Ridenour, City Recorder

Resolution No. 483

RESOLUTION TO ADOPT THE ANDERSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the State of Tennessee has ordained that every county and incorporated municipality in the state is required to have a Hazard Mitigation Plan approved by the Tennessee Emergency Management Agency to maintain eligibility for state disaster assistance after November 2004; and

WHEREAS, the Federal Emergency Management Agency (FEMA), under the Disaster Mitigation Act of 2000, has ordained that every county and incorporated municipality within the county is required to have a Hazard Mitigation Plan approved by FEMA in order to be eligible for Hazard Mitigation Grant Program funding for Presidential disasters declared after November 2004; and

WHEREAS, under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency has issued an Interim Final Rule that details the minimum criteria for local hazard mitigation plans; and

WHEREAS, the City of Lake City agrees with the concept and necessity for hazard mitigation planning; and

WHEREAS the Anderson County Hazard Mitigation Planning Committee recommends the adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS the Tennessee Emergency Management Agency and the Federal Emergency Management Agency have conducted a review of and approved the Anderson County Multi-Jurisdictional Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED by the legislative body of the City of Lake City meeting in regular session on this 18th day of August, 2011 at Lake City, Tennessee, that:

SECTION 1. The City of Lake City hereby adopts the Anderson County Multi-Jurisdictional Hazard Mitigation Plan as submitted this day.

SECTION 2. This Resolution shall take effect on the 18th day of August, 2011, the public welfare requiring it.

Adopted this the 18th day of August, 2011.

Timothy L. Sharp, Mayor

ATTEST:

Janet Parks, City Recorder

City of Norris Tennessee

RESOLUTION NO. 8-2011

RESOLUTION TO ADOPT THE ANDERSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the State of Tennessee has ordained that every county and incorporated municipality in the state is required to have a Hazard Mitigation Plan approved by the Tennessee Emergency Management Agency to maintain eligibility for state disaster assistance after November 2004; and

WHEREAS, the Federal Emergency Management Agency (FEMA), under the Disaster Mitigation Act of 2000, has ordained that every county and incorporated municipality within the county is required to have a Hazard Mitigation Plan approved by FEMA in order to be eligible for Hazard Mitigation Grant Program funding for Presidential disasters declared after November 2004; and

WHEREAS, under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency has issued an Interim Final Rule that details the minimum criteria for local hazard mitigation plans; and

WHEREAS the City of Norris agrees with the concept and necessity for hazard mitigation planning; and

WHEREAS the Anderson County Hazard Mitigation Planning Committee recommends the adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS the Tennessee Emergency Management Agency and the Federal Emergency Management Agency have conducted a review of and approved the Anderson County Multi-Jurisdictional Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Norris, meeting in regular session on this 22nd day of August, 2011 at Norris, Tennessee, that:

SECTION 1. The City of Norris City Council hereby adopts the Anderson County Multi-Jurisdictional Hazard Mitigation Plan as submitted this day.

SECTION 2. This Resolution shall take effect on the 22nd day of August 2011, the public welfare requiring it.

Mayor

ATTEST:

City Manager

NUMBER 10-92-11

RESOLUTION

A RESOLUTION TO ADOPT THE UPDATED 2011 ANDERSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN IN ACCORDANCE WITH FEDERAL REQUIREMENTS.

WHEREAS, the State of Tennessee has ordained that every county and incorporated municipality in the state is required to have a Hazard Mitigation Plan approved by the Tennessee Emergency Management Agency (TEMA) to maintain eligibility for state disaster assistance after November 2004; and

WHEREAS, the Federal Emergency Management Agency (FEMA), under the Disaster Mitigation Act of 2000, has ordained that every county and incorporated municipality within the county is required to have a Hazard Mitigation Plan approved by FEMA in order to be eligible for Hazard Mitigation Grant Program funding for Presidential disasters declared after November 2004; and

WHEREAS, under the Disaster Mitigation Act of 2000, FEMA has issued an Interim Final Rule that details the minimum criteria for local hazard mitigation plans; and

WHEREAS, the City of Oak Ridge agrees with the concept and necessity for hazard mitigation planning; and

WHEREAS, the Anderson County Hazard Mitigation Planning Committee recommends the adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, under the Disaster Mitigation Act of 2000, FEMA has issued an Interim Final Rule that details the minimum criteria for local hazard mitigation plans; and

WHEREAS, TEMA and FEMA have conducted a review of and approved the Anderson County Multi-Jurisdictional Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF OAK RIDGE, TENNESSEE:

That in accordance with federal requirements, the *Anderson County Multi-Jurisdictional Hazard Mitigation Plan* is hereby adopted as recommended by the Anderson County Hazard Mitigation Planning Committee.

BE IT FURTHER RESOLVED that the Mayor is hereby authorized to execute all necessary legal documents to accomplish the same.

This the 10th day of October 2011.

APPROVED AS TO FORM AND LEGALITY:

Kenneth R. Krushenski, City Attorney

Thomas L. Beehan, Mayor

Diana R. Stanley, Acting City Clerk

RESOLUTION NO. 11-09-01A

WHEREAS, the State of Tennessee has ordained that every county and incorporated municipality in the state is required to have a Hazard Mitigation Plan approved by the Tennessee Emergency Management Agency to maintain eligibility for state disaster assistance after November 2004; and,

WHEREAS, the Federal Emergency Management Agency (FEMA), under the Disaster Mitigation Act of 2000, has ordained that every county and incorporated municipality within the county is required to have a Hazard Mitigation Plan approved by FEMA in order to be eligible for Hazard Mitigation Grant Program funding for Presidential disasters declared after November 2004; and,

WHEREAS, under the Disaster Mitigation Act of 2000, the Federal Emergency Management Agency has issued an Interim Final Rule that details the minimum criteria for local hazard mitigation plans; and,

WHEREAS, the Town of Oliver Springs by and through its Town Council agrees with the concept and necessity for hazard mitigation planning; and,

WHEREAS, the Anderson County Hazard Mitigation Planning Committee recommends the adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan; and,

WHEREAS, the Tennessee Emergency Management Agency and the Federal Emergency Management Agency have conducted a review of and approved the Anderson County Multi-Jurisdictional Hazard Mitigation Plan; and,

NOW, THEREFORE, BE IT RESOLVED by the Town Council of the Town of Oliver Springs, meeting in regular session on this the day and date last below written, that:

SECTION 1: The Oliver Springs Town Council hereby adopts the Anderson County Multi-Jurisdictional Hazard Mitigation Plan as submitted this day.

SECTION 2: This Resolution shall take effect on the 14 day of September, 2011, the public welfare requiring it.

ADOPTED this 14 day of September, 2011.

Town of Oliver Springs

By: Chris Hepler
Chris Hepler, Mayor

ATTEST:

Joseph H. Van Hook, City Recorder

Anderson County, Tn.
Multi-Jurisdictional
Hazard Mitigation Plan
2011 Update

Anderson County Hazard Mitigation Plan Certification

I, Steve Payne, Emergency Management Agency Director for the County of Anderson, State of Tennessee, do hereby certify that public involvement and input regarding the Anderson County Multi-Jurisdictional Hazard Mitigation Plan was carried out in accordance with Plan requirements and in accordance with local policy and ordinance.

I further certify that public notification was given and public input was sought, during the planning process and preceding adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan by the jurisdictional governments in Anderson County, by placing notice to the public in the Courier News on February 28, 2010; June 5, 2011; and August 7, 2011 in accordance with the open meetings laws of Tennessee, and that citizens had ample opportunity for input during Plan development.

I further certify that public meetings were held at Anderson County Courthouse on March 9, 2010; and June 16, 2011, to solicit citizen comment and input into the Anderson County Multi-Jurisdictional Hazard Mitigation Plan.

I further certify that a public hearing was held at Anderson County Courthouse on August 15, 2011 to solicit public comment preceding adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan by the jurisdictional governments of Anderson County, Clinton, Lake City, Norris, Oak Ridge, and Oliver Springs.

I further certify that copies of jurisdictional Board or Council meeting minutes, kept in accordance with Tennessee law, regarding approval and adoption of the Anderson County Multi-Jurisdictional Hazard Mitigation Plan are on file and available to members of the public, and local, state, and federal agencies. Inspection of these minutes may be made upon reasonable request to the respective jurisdictional authority.

This certification is in accordance with provisions of the Disaster Mitigation Act of 2000 (44 CFR 201.6 and NCGS 62A).

Certified this 14th day of December, 2011.

Anderson County Emergency Management Agency Director

State of Tennessee,
County of Anderson County

I, Pat A. Schmitt, a Notary Public for said County and State, do hereby certify that Steve Payne personally appeared before me this day and acknowledged the foregoing instrument.

Witness my hand and seal this 14th day of December 2011.

Notary Public

My Commission expires June 27, 2015

PAT A. SCHMITT STATE OF TENNESSEE NOTARY PUBLIC ANDERSON COUNTY

INSTRUCTIONS FOR USING THE PLAN REVIEW CROSSWALK FOR REVIEW OF LOCAL MITIGATION PLANS

Attached is a Plan Review Crosswalk based on the ***Local Multi-Hazard Mitigation Planning Guidance***, published by FEMA in July, 2008. This Plan Review Crosswalk is consistent with the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* (Stafford Act), as amended by Section 322 of the *Disaster Mitigation Act of 2000* (P.L. 106-390), the *National Flood Insurance Act of 1968,* as amended by the *National Flood Insurance Reform Act of 2004* (P.L. 108-264) and *44 Code of Federal Regulations (CFR) Part 201 – Mitigation Planning,* inclusive of all amendments through October 31, 2007.

SCORING SYSTEM
N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.
S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a summary score of "Satisfactory." A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing.

When reviewing single jurisdiction plans, reviewers may want to put an N/A in the boxes for multi-jurisdictional plan requirements. When reviewing multi-jurisdictional plans, however, all elements apply. States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements. Optional matrices for assisting in the review of sections on profiling hazards, assessing vulnerability, and identifying and analyzing mitigation actions are found at the end of the Plan Review Crosswalk.

The example below illustrates how to fill in the Plan Review Crosswalk.:

Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

Element	Location in the Plan (section	Reviewer's Comments	SCORE	
			N	S

A. Does the **new or updated** plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Section II, pp. 4-10	The plan describes the types of assets that are located within geographically defined hazard areas as well as those that would be affected by winter storms.		☐
B. Does the **new or updated** plan address the **impact** of each hazard on the jurisdiction?	Section II, pp. 10-20	The plan does not address the impact of two of the five hazards addressed in the plan. **Required Revisions:** • Include a description of the impact of floods and earthquakes on the assets. **Recommended Revisions:** This information can be presented in terms of dollar value or percentages of damage.	☐	
		SUMMARY SCORE	☐	

LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

Prerequisite(s) (Check Applicable Box)	**NOT MET**	**MET**
1. Adoption by the Local Governing Body: §201.6(c)(5) OR	NA	NA
2. Multi-Jurisdictional Plan Adoption: §201.6(c)(5)		X
AND		
3. Multi-Jurisdictional Planning Participation: §201.6(a)(3)		X

Planning Process	**N**	**S**
4. Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		X

Risk Assessment	**N**	**S**
5. Identifying Hazards: §201.6(c)(2)(i)		X
6. Profiling Hazards: §201.6(c)(2)(i)		X
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		X
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		X
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		X
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		X
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		X
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		X

*States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Mitigation Strategy	N	S
13. Local Hazard Mitigation Goals: §201.6(c)(3)(i)		X
14. Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		X
15. Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		X
16. Implementation of Mitigation Actions: §201.6(c)(3)(iii)		X
17. Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		X

Plan Maintenance Process	N	S
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		X
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		X
20. Continued Public Involvement: §201.6(c)(4)(iii)		X

Additional State Requirements*	N	S
Insert State Requirement		x
Insert State Requirement		x
Insert State Requirement		x

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED	
See Reviewer's Comments	
PLAN APPROVED	X

Local Mitigation Plan Review and Approval Status

Jurisdiction: Anderson County, Tennessee	Title of Plan: Multi-Jurisdictional Hazard Mitigation Plan	Date of Plan: June 30,2011
Local Point of Contact: Lin Chilcoat	Address: Anderson County Emergency Management Agency 111 South Charles G. Seivers Blvd. Clinton, TN. 37716	
Title: Plan Coordinator		
Agency: Anderson County Emergency Management Agency		
Phone Number: 865-457-7864	E-Mail: themarlowmama@hotmail.com	

State Reviewer: Craig Hanrahan	Title: EM Planner Supv.	Date: 7-7-11

FEMA Reviewer: Darlene Booker Linda L. Byers (QC)	Title: Hazard Mitigation Community Planner R4 Lead Planning Specialist	Date: 7-13-2011 July 27, 2011
Date Received in FEMA Region IV	7-11-2011	
Plan Not Approved	July 27, 2011 (QC) pending adoption	
Plan Approved	7-27-2011 (Pending APA)	
Date Approved	12/29/2011	

Jurisdiction:	DFIRM		NFIP Status*			
	In Plan	NOT in Plan	Y	N	N/A	CRS Class
1. Anderson County		X	Y			10
2. City of Clinton		X	Y			10
3. City of Lake City		X	Y			10

4. City of Norris		X	Y			10
5. City of Oak Ridge		X	Y			10
6. City of Oliver Springs		X	Y			10

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

PREREQUISITE(S)

1. Adoption by the Local Governing Body

***Requirement §201.6(c)(5)*:** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			NOT MET	MET
A. Has the local governing body adopted **new or updated** plan?	N/A	This is a multi-jurisdictional plan. **This is a multi-jurisdictional plan.**	**N/A**	**N/A**
B. Is supporting documentation, such as a resolution, included?	N/A	This is a multi-jurisdictional plan. **This is a multi-jurisdictional plan.**	**N/A**	**N/A**
		SUMMARY SCORE	**N/A**	**N/A**

2. Multi-Jurisdictional Plan Adoption

***Requirement §201.6(c)(5)**: For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan indicate the specific jurisdictions represented in the plan?	Section 3 pp3-3, Table 3.1 Page 1-3	This table identifies the following jurisdictions as participanted in the plan: Anderson County, Clinton, Lake City, Norris and Oak Ridge The Updated Plan indicates that Anderson County, Cities of Clinton, Norris, Oak Ridge and Towns of Lake City and Oliver Spring are participating jurisdictions in the plan.		x
B. For each jurisdiction, has the local governing body adopted the **new or updated** plan?	Section 3 pg 3-11 Section 3 Page 3.2	This section mentions that the five jurisdictions that will adopt the plan following conditional approval by FEMA. The Updated Plan has not been adopted by the local government bodies but indicates that each jurisdiction will adopt the updated plan. **REQUIRED:** The Updated Plan must be adopted within one calendar year of FEMA's approval pending adoption" of the **Updated Plan**. *For more information, see "Adoption by the Local Governing Body," in the Local Multi-Hazard Mitigation Planning Guidance, Page 17-18.* *The Updated Plan has been adopted by Anderson County, Cities of Clinton, Lake City, Norris, Oak Ridge and Town of Oliver Spring.*		x
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	Section 3 pg 3-11	This section mentions that there are five jurisdictions that will adopt the plan following conditional approval by FEMA. The Updated Plan indicates that supporting documentation has not been submitted adopting the plan. **REQIRED REVISIONS:** The Updated Plan shall include a copy of the resolution or other documentation of formal adoption of the **Updated Plan** within one calendar year. *For more information see "Adoption by the Local Governing Body", in the Local Multi-Hazard Mitigation Planning Guidance, Page 17-18.* Each Participating jurisdiction in the plan has submitted an adoption resolution adopting the plan.		x

3. Multi-Jurisdictional Planning Participation

***Requirement §201.6(a)(3)*:** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan describe **how** each jurisdiction participated in the plan's development?	Sections 3.4 & 3.5 pp 3-2 to 3-3 Section 3 Pages 3.5-3.6	The plan states that each of the jurisdictions, agencies, and departments were required to perform a provided list of tasks to satisfy multi-jurisdictional participation requirements. The Updated Plan indicates that the Anderson County Mitigation Planning Committee consisted of participants representing all areas of the county and was responsible for the development of the Plan. In addition to regular meetings, committee members routinely communicated and were kept informed through a dedicated e-mail distribution group. Each of the jurisdictions, agencies, and departments was required to perform such tasks to satisfy multi-jurisdictional participation requirements listed on Page 3-3 in the plan.		X
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	Section 3.5 pp 3-3 to 3-4, Table 3.1 Section 3, Page 3.3	The plan states that all jurisdictions that participated in the 2005 Plan development participated in the 2011 Plan update. The Updated Plan indicates that all jurisdictions that participated in the 2005 Plan development participated in the 2011 Plan update.		X

SUMMARY SCORE		X

PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process* ***shall*** *include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan* ***shall*** *document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a narrative description of the process followed to prepare the **new or updated** plan?	Section 3 pp 3-1 to 3-6 Figure 3.1, on Page 3-5	The Updated Plan indicates an initial plan meeting took place on 01/20/2010. Anderson County applied the Community Rating System (CRS) 10-step planning process to hazard mitigation plan development. The preparation of this 2011 update required a series of meetings with the Mitigation Planning Committee and local community officials for facilitating discussion and data collection efforts. The Plan describes a narrative description of the process used to develop this plan in Figure 3.1 on Page 3-5 in the plan.		X

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process* ***shall*** *include:*

(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan* ***shall*** *document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

	Location in		SCORE	
B. Does the **new or updated** plan indicate who was involved in the **current** planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, *etc*.?)	Section 3 pp 3-6 to 3-11 Pages 3-3 and 3-4 Table 3.4, on pages 3.7-3.8	The plan indicates who was involved at each meeting mentioned in the plan. For example, on pg. 3-9, identifies Lin Chilcoat as the EM County Plan Coordinator. The Updated Plan indicates a community-based mitigation committee developed this Plan update in cooperation with the Tennessee Emergency Management Agency (TEMA) and consulting company EM-Associates. The Updated Plan also reference on Page 3.3, Table 3.1, a list of participants that participated in the planning process of the plan.		X

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process* ***shall*** *include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan* ***shall*** *document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

	Location in		SCORE	
C. Does the **new or updated** plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	Section 3.9 pp 3-12 to 3-13 Page 3-9 Pages 3-12 thru 3-13	The plan states that Public input was sought using four methods: (1) surveys; (2) news releases; (3) open public meetings; and (4) publicizing the availability of the draft hazard mitigation plan at government offices and an Internet site. The Updated Plan indicates that a countywide public "kickoff" meeting was held to guide public input regarding unique hazard concerns and mitigation actions that could be included in the hazard mitigation plan update. The public input was sought using four methods: (1) surveys; (2) news releases; (3) open public meetings; and (4) publicizing the availability of the draft hazard mitigation plan at government offices and an Internet site. The Plan also indicates that public hearing was held to allow citizens to comment during draft stage and final adoption of the 2011 Plan update. The completed Plan was available for public review and comment, both prior to and during the meeting.		X
D. **Does the new or updated plan discuss**	Section 3.10 pp	The Updated Plan indicates that a range of		

4. Documentation of the Planning Process

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(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan* ***shall*** *document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

	Location in		SCORE	
the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	3-13 Page 3-13	stakeholders was invited and encouraged to participate in the development of the Hazard Mitigation Plan. Stakeholder involvement was encouraged through notifications and invitations to agencies and individuals to participate. These included representatives from Anderson County and each participating jurisdiction, LEPC, private sector businesses, voluntary agencies, citizens, and surrounding counties.		x
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	Section 3.11 pp 3-13 to 3-15 Table 3.7, Page 3-14, 3-15 Pages 3-13 thru 3-15	The Updated Plan indicates that the Planning Committee reviewed and incorporated existing data and plans to support the mitigation plan. Such policies, plans were used such as: • Anderson County Basic Emergency Operations Plan • Anderson County Urban Growth Plan • City of Norris 2008 – 2013 Strategic Plan • Anderson County Schools Emergency Response/Crisis Management Plan • Tennessee Multi-Jurisdictional Emergency Response Plan for the Oak Ridge Reservation .		x

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process* ***shall*** *include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan* ***shall*** *document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

	Location in		SCORE	
		The Plan reference several other documents and plans in Table 3.6 on Page 3-14 in the plan.		
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?	Section 3.2 pp3-1, Section 3.5 pp3-3, Section 3.7 pp3-5 to 3-6, Section 3.14 pp 3-17-19: And the beginning of each section Sections 3- 8, 17-19, Page 7-1	The Updated Plan indicates that all sections have been updated and enhanced in the 2011 Plan to include more detailed and updated current information. The Plan reference in the beginning of each section that information has been updated and included in this 2011 Updated plan.		x
		SUMMARY SCORE		x

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

5. Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?	Section 4 pp4-1 to 4-19 Throughout Section 5, Pages 5.1-59	The plan provides a good description for the hazards identified. The Updated Plan indicates that drought, earthquake, extreme temperature, flooding (hurricane/ tropical storm, thunderstorm, dam/ levee failure), hail, high winds (tornadoes, thunderstorm, hurricane/ tropical storm), ice/snow storm, land subsidence, lightning, and wildfire are the natural hazards that affect Anderson County and its participating jurisdictions in the plan.		X
		SUMMARY SCORE		X

6. Profiling Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*

Element	Location in	SCORE

	the **Plan** (section or annex and page #)	Reviewer's Comments	N	S
A. Does the risk assessment identify the **location** (*i.e.*, geographic area affected) of each natural hazard addressed in the **new or updated** plan?	Section 5 pp 5-1 to 5-58 Section 5, 5-1 thru 5-59 Table 5.9, Table 7.9 Table 5.4,	For each hazard profiled the location (geographic area) was identified. The Updated Plan identifies the location of each natural hazard addressed in the updated plan throughout Pages 5-59 in the plan. The Updated Plan reference flooding locations in Anderson County that were affected on Page 7-14 in the plan. Flash Flooding occurs in Anderson County in residential and business/industrial areas. The Plan indicates that in 1993, an earthquake was identified running parallel to Interstate 75 from Chattanooga, northward to Oak Ridge in Anderson County. The Plan reference landslides routinely occur on State Highways 116 and 330 during periods of heavy rain. At many points, sections of the roadway slide.		X
B. Does the risk assessment identify the **extent** (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?	Section 5 pp 5-1 to 5-58 Section 5, Pages 5-1 to 59, Table 5.4	The plan describes the extent for each hazard profiled. The Updated Plan identifies the extent of each hazard addressed in the updated plan. The Plan reference April 4, 2000: Heavy rain falling for three days created widespread flooding problems across Anderson County. County schools were closed. A total of 3.61 inches of rain fell in Oak Ridge. The rain caused sewer line and storm drain		X

		backups as well as road closings. The Updated Plan references the October 5, 1995 tropical storm/hurricane: A large part of East Tennessee, including Anderson County, experienced high winds from the remnants of Hurricane Opal. Wind speeds at the higher elevations of the Appalachians were measured at 70 mph. Over 20,000 homes were without power as a result of the storm. Over 70 miles of the Appalachian Trail were closed. The Plan also reference Drought of 2006-2008: Rainfall in East Tennessee was down about 50 percent, almost 12 inches below normal. Water levels on parts of the Tennessee River system were significantly down because of the drought conditions, and tributary reservoir levels were 10 feet below normal on average. The drought that devastated agriculture also caused some cities to run out of water.		
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the **new or updated** plan?	Section 5 pp 5-1 to 5-58 Tables Throughout Section 5, Pages 5-59, Page 5-8, 5-24 to 5-27	The plan describes the previous occurrences for each hazard profiled. The Updated Plan reference throughout Pages 5-59 the previous occurrences of each hazard addressed in the updated plan. The Updated Plan indicates that there have been 55 flooding incidents identified impacting Anderson County since 1961, a period of 50 years. The Updated Plan reference in 55 years, Anderson County has experienced 183 incidents of high wind from thunderstorms and weather fronts.		x
D. Does the plan include the **probability of**	Section 5 pp	The plan describes the probability of future events		

future events (*i.e.*, chance of occurrence) for each hazard addressed in the **new or updated** plan?	5-1 to 5-58 Section 5 Pages 5-6 to 5-59, Table 6.39 Likelihood Of Potential Hazard Incident Occurring, Pages 6-50 and 6-51	for each hazard profiled. The Updated Plan includes probability of future events for each hazard addressed in the updated plan. The Updated Plan indicates that Anderson County has a 5% to 9.99% probability of incurring a drought condition in any one year. The Updated Plan indicates that general flooding occurs annually in Tennessee and is the most common and costly disaster in the state. The Plan indicates that the entire county is at risk of ice and snowstorms. On average, snow with accumulations of one to three inches occurs one to three times a year with greater accumulations in areas of higher elevation.		X
		SUMMARY SCORE		X

7. Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Section 6 pp 6-1 to 6-2, Table 6.3 pp 6-3 Section 5 Page 5-24 Page 5-33	In addition to describing the methodologies used in the updated vulnerability assessment, the plan provides a table that outlines the vulnerability for each hazard. The Updated Plan indicates that the probability and risk from future flooding incidents is high for Lake City, Norris, Oliver Springs, and the unincorporated areas of the county. With adequate storm water systems in place, Clinton and Oak Ridge share a moderate risk. A major flood incident would equally impact the entire county except for the mountainous northwestern area. The Plan indicates that Anderson County is at equal risk of future occurrences. The potential for property damage and loss of lives is equally high for incorporated and unincorporated areas of the county due to the large number of mobile homes throughout the rural areas.		x
B. Does the **new or updated** plan address the **impact** of each hazard on the jurisdiction?	Section 6.5 pp 6-30 to 6-45 Section 6,	Tables 6.20 thru 6.25 provide a good representation of the impact for each hazard per jurisdiction. The Updated Plan indicates that the November 2010 drought resulted in Federal Disaster Declaration		

	Page 6-3-Disaster Declaration List Section 5 Page 5-42 Page 5-7	(S3055) for Anderson County crop losses ranging from 30 to 50%. The Updated Plan reference a severe heat wave that struck Tennessee in 1980 and resulted in 156 heat-related deaths. The Plan also indicates from 1963 through 2010, flooding has resulted in 22 Presidential declared disasters across the State of Tennessee with expenditures in excess of $100 million.		X
		SUMMARY SCORE		X

8. Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): *[The risk assessment]* ***must*** *also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of *repetitive loss properties* located in the identified hazard areas?	Section 6.3 pp 6-5 to 6-7 Pages 6-6 and 6-7	***Note: This requirement becomes effective for all local plans approved after October 1, 2008.*** The Updated Plan references the repetitive loss properties on Pages 6-6 and 6-7 in the plan which indicates that the types of properties are residential, commercial or governmental properties.		X
		SUMMARY SCORE		X

9. Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): *The plan* ***should*** *describe vulnerability in terms of the types of and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 6.3 pp 6-5 to 6-29, Supporting Annex Section1 pp1-1 to 1-12 Section 6, Tables throughout Section 6	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*** The Updated Plan has provided Countywide descriptions of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas throughout Section 6 in the plan. The Plan indicates that the hazards were divided to describe vulnerability of types and numbers. The Plan also provides tables and maps throughout Section 6 to identify current structures in each jurisdiction that could be impacted by the hazards, including a populated area and a Tier II facility in rural Anderson County.		X
B. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 6.3 pp 6-5 to 6-29 Section 6, Tables throughout Section 6	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*** The Updated Plan has provided a Countywide description of the types and numbers of future projection buildings, infrastructure, and critical facilities located in the identified hazard areas throughout Tables in Section 6 in the plan.		X

SUMMARY SCORE

	X

10. Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan estimate **potential dollar losses** to vulnerable structures?	Section 6.5 pp 6-32 to 6-45 Pages 6-1 to 6-29 and 6-30-6-44.	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*** The Updated Plan provides potential dollar losses for existing and future buildings throughout Tables in Section 6 in this updated plan.		x
B. Does the **new or updated** plan describe the **methodology** used to prepare the estimate?	Section 6.5 pp 6-30 to 6-31 Section 6 in the plan.	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*** The Updated Plan indicates that two distinct methodologies were applied to assess the risk for Anderson County. The first methodology includes qualitative analysis that relies on local knowledge and rational decision-making. The second methodology, a quantitative analysis utilizes data from a detailed GIS-based approach using best available critical facility and other local data.		x
		SUMMARY SCORE		x

11. Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): *[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe land uses and development trends?	Section 6.6 pp 6-46 to 6-50 Section 6.6., Pages 46-50	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*** The Updated Plan indicates that in November 2006, Clinton annexed 2.1 square miles, extending the city limits along Highway 61 to the I-75 Exit 122 interchange. The provision of municipal infrastructure prompted a rapid expansion of construction for new retail and commercial development, including two large auto dealerships, a Wal-Mart Super Center, a hotel, dining establishments, strip malls, and various chain retail stores. An air ambulance base is in operation, and a fire station will be constructed in 2011. The Plan also reference continued growth in new housing units (Anderson County, Clinton, Norris, and Oak Ridge).		X
		SUMMARY SCORE		X

12. Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(2)(iii): *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	Section 6.7 pp 6-50 to 6-51 Section 6, Page s 46-47,	The plan explains that there are hazards unique to specific areas due to topology and geographic location. The plan utilizes a table to outline the unique and varied risks. The Updated Plan indicates that this multi-jurisdictional plan presents information for the general planning area as a whole. The Plan indicates that all of Anderson County and its jurisdictions have underlying karsts geology, which makes the entire county subject to sinkhole activity. Although land subsidence has not been reported within the boundaries of Clinton, Lake City, and Oliver Springs, these cities are underlain by karst topography. The Plan also indicates that landslides are not isolated to any specific area and have occurred in Oak Ridge, Oliver Springs, and throughout the unincorporated areas of Anderson County. The steep terrain of the northwestern rural section is particularly susceptible. **RECOMMENDED REVISIONS:** As more information is gathered for land subsidence, please include in the next update.		X
		SUMMARY SCORE		X

MITIGATION STRATEGY: *§201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

13. Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new or updated** plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?	Section 7.4 pp 7-14 to 7-17 Section 7, Table 7.10, Pages 7-16 thru 17	Table 7.10 provides an outline of the goals and objectives. The Updated Plan list throughout Pages 7-16 thru 17 a list of mitigation goals to reduce or avoid long-term vulnerability to all identified hazards in the plan.		x
		SUMMARY SCORE		x

14. Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): *[The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify and analyze a **comprehensive range** of specific	Section 7.4.3 pp 7-18 to 7-20,	Table 7.16 provides a listing of a comprehensive range of actions.		

mitigation actions and projects for each hazard?	Section 7.4.14 pp7-38 to 7-52 Section 7, Pages 37-53	The Updated Plan identifies and analyzes a comprehensive range of specific mitigation actions and projects for each hazard such as: • Provide regular maintenance to remove debris from flood prone streams and creeks; • Install gates to block roadways and bridges during flooding; • Seek grant funding to purchase and install warning sirens in unincorporated areas of dense population; • Distribute lightning awareness and preparedness literature to citizens at community events;		x
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	Section 7.4.5 pp 7.21 Section 7.4.14 pp 7.38 to 7-52 Section 7, Page 7-21 Pages 37-53	The Updated Plan identifies actions and projects addressing the reduction of hazards on new buildings and infrastructure such as: • Enact legislation to require new mobile home parks to construct storm shelters of adequate size to protect all residents during high wind incidents; • Establish and enforce codes stipulating setback distances for all new structures not using fire resistive materials; • Revise zoning and building codes to restrict construction in landslide hazard areas;		x

		• Require property owners to sign acknowledgement of subsidence risk notification before issuing building permits on high-risk sites;		
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	Section 7.4.6 pp 7-21, Section 7.4.14 pp 7-38 to 7-52 Section 7, Page 7-21 Pages 37-53	The Updated Plan identifies actions and projects addressing the reduction of hazards on existing buildings and infrastructure such as: • Continue to work with property owners to relocate RPL/SRL structures; • Seek grant funds to raise and widen bridge and elevate access roadway to address flooding on Airport Road in the Marlow area; • Identify and map repetitive flooding roadways and bridges;		x
		SUMMARY SCORE		x

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): *[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe the jurisdiction (s) participation in the NFIP?	Section 7.4.7 pp 7-21 Section 3, Page 3.5 Section 7, Page 22, 71 talks about the aspects of being a NFIP participant Page 7-22	***Note: This requirement becomes effective for all local mitigation plans approved after October 1, 2008.*** The Updated Plan indicates that Anderson County and participating jurisdictions performed the additional steps as outlined in the CRS criteria. The Plan also indicates that all participating jurisdictions participate in the NFIP, and have adopted a flood management plan, and have completed mapping of flood plains.		X
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	Section 7.4.8 pp 7-22, Section 7.4.9 pp 7-22 to 7-24 Section 7, Page 7-22 and 63	***Note: This requirement becomes effective for all local mitigation plans approved after October 1, 2008.*** The Updated Plan identifies, analyzes and prioritize actions related to continue compliance with the NFIP such as: • Coordinate application for all jurisdictions to receive Community Rating System status; • Use GIS mapping to identify structures		X

		within the catastrophic floodplains; • Obtain and maintain NFIP FIRMS to identify jurisdiction flood prone areas; • Adopt/enforce an NFIP flood plain management plan;		
		SUMMARY SCORE		**x**

16. Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): *[The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the **new or updated** mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	Section 7.4.8 pp 7-22, Section 7.4.9 pp 7-22 to 7-24, Section 7.4.13 pp 7-53 to 7-70, IMAPs Sections 1.9 to 1.11 Pages 7.53-7.58	The plan utilizes the STAPLEE method for prioritizing the actions. The Updated Plan indicates that the STAPLEE method was used to prioritize the actions in the 2011 Updated plan.		x
B. Does the **new or updated** mitigation strategy address how the actions will be implemented and administered, including the responsible department, existing and potential resources and the timeframe to complete each action?	Section 7.4.10 pp 7-24 to 7-25, Section 7.4.14 pp 7-38 to 7-52, IMAPs Sections	The Updated Plan indicates how actions will be implemented, administered including the responsible department, existing and potential resources and timeframe to complete each action throughout Pages 7-37 through 7-53 in		x

	1.9 to 1.11 Throughout Pages 37-53	the plan.		
C. Does the **new or updated** prioritization process include an emphasis on the use of a **cost-benefit review** to maximize benefits?	Section 7.4.11 pp 7-25 Section 7, Page 7-25	The Updated Plan indicates that the qualitative approach of cost-benefit review was used in this updated plan to maximize benefits.		**X**
D. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	Section 7.4.12 pp 7-26 to 7-27, Section 7.4.13 pp 7-27 to 7-38 Section 7, 7-27 thru 7-37	Table 7.14 provides a status review list of previous and current actions. The Updated Plan includes a table starting on Page 7.27-7.37 that includes and identifies actions that are completed, deleted, and deferred to show progress as a benchmark.		**X**
		SUMMARY SCORE		**X**

17. Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): *For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new or updated** plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?	Section 7.4.14 pp 7-38 to 7-52, IMAPs Section 1.10 Section 7, Page 45, 39-52	The Updated Plan include an identifiable action item for each jurisdiction requesting FEMA approval such as: • Coordinate application for all jurisdictions to receive Community Rating System status;		x
B. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	Section 7.4.12 pp 7-26 to 7-27, Section 7.4.13 pp 7-27to 7-38 Section 7, 7-27 thru 7-37	The Updated Plan includes a table starting on Page 7.27-7.37 that includes and identifies actions that are completed, deleted, and deferred to show progress as a benchmark.		x
		SUMMARY SCORE		x

PLAN MAINTENANCE PROCESS

18. Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): *[The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

	Location in the	SCORE

Element	**Plan** (section or annex and page #)	**Reviewer's Comments**	N	S
A. Does the **new or updated** plan describe the method and schedule for **monitoring** the plan, including the responsible department?	Section 8.1 pp 8-1 to 8-2, Section 8.3 pp 8-2 Pages 8-1 thru 8-2	The plan provides a narrative description of the method and schedule for monitoring. The Updated Plan indicates that the Anderson County Mitigation Planning Committee will remain the organization responsible for monitoring the progress of the plan in an annual progress report. During each year, and prior to the annual meeting of the Mitigation Planning Committee, representatives will collect and process the annual reports from the departments, agencies, and organizations involved.		x
B. Does the **new or updated** plan describe the method and schedule for **evaluating** the plan, including how, when and by whom (*i.e.* the responsible department)?	Section 8.4 pp 8-2 to 8-4 Pages 8-2 thru 8-4	The plan provides a narrative description of the method and schedule for evaluating. The Updated Plan indicates that the plan will be evaluated by the Anderson County Mitigation Planning Committee on an annual basis to determine the effectiveness of the programs, and to reflect changes that may affect mitigation priorities or available funding. The Plan will also be evaluated and revised following any major disasters, to determine if the recommended actions remain relevant and appropriate. The risk assessment will also be reviewed to determine if any changes are necessary based on disaster damages, or if hazard profile data collected to facilitate the risk assessment is still relevant. The Plan summarizes the process throughout		x

		Pages 8-2 and 8-4 in the plan.		
C. Does the **new or updated** plan describe the method and schedule for **updating** the plan within the five-year cycle?	Section 8.5 pp 8-4 to 8-6 Pages 8-4 thru-8-5	The plan provides a narrative description of the method and schedule for updating. The Updated Plan indicates that the Anderson County Mitigation Planning Committee will update this Plan on a five-year cycle from the date of this 2011 Plan adoption. The Mitigation Plan Coordinator, with support of the Mitigation Planning Committee, will facilitate the update process to develop and commence the implementation of a detailed Plan update program. The Mitigation Plan Coordinator shall invite representatives from the state to this meeting to provide guidance on Plan update procedures.		X
		SUMMARY SCORE		X

19. Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii): *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	Section 8.6 pp 8-7 to 8-9 Pages 8.7 thru 8.10	Table 8.1 provides support to a narrative description of incorporation. The Updated Plan includes existing processes and programs through which the mitigation plan should be implemented throughout Pages 8-8 thru 8-9 in the updated plan.		x
B. Does the **new or updated** plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	Section 8.6 pp 8-7to 8-9 Pages 8.7, 8-9 and 8-10	Table 8.1 provides support to a narrative description of incorporation. The Updated Plan indicates that at the bi-annual reviews the local government will look at any changes made within the mitigation action implementation progress and of any changes to mitigation actions. The Plan indicates that integrating mitigation strategies into other local planning mechanisms will be through the revision, update, and implementation of each of the Individual plans that require specific planning and administrative tasks such as plan amendments, ordinance revisions, and capital improvement projects.		x
C. Does the **updated** plan explain how the local	Section 8.6 pp 8-	The plan states that Anderson County and		

government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	7to 8-9, Section 8.6.1 pp 8-9 to 8-10 Section 8, Page 8-10	many of the participating jurisdictions have reviewed and incorporated hazard identification and risk assessment into other plans including Comprehensive Plans, Flood Management Plans, and Emergency Operations Plans. Information from the previous Plan was also considered in developing SOGs and FOGs for hazard incident response. The Updated Plan indicates that Anderson County and many of the participating jurisdictions have reviewed and incorporated hazard identification and risk assessment into other plans including Comprehensive Plans, Flood Management Plans, and Emergency Operations Plans.		X
		SUMMARY SCORE		X

Continued Public Involvement

Requirement §201.6(c)(4)(iii): *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	SCORE N	SCORE S
A. Does the **new or updated** plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	Section 8.7 pp 8-10 to 8-11	In addition to the information provided in the page numbers provided, the plan states that Anderson County is committed to the continued involvement of the public in the hazard mitigation process. Therefore, copies of the adopted 2011 Plan update will be made available for review during normal business hours at the Clinton Public Library, county and city Mayors' offices, and on the county		

	Section 8.7 Pages 8-10-8-11	website. The Updated Plan indicates that public participation will continue to be essential as this Plan evolves over time. Significant changes or amendments to the Plan require a public hearing prior to any adoption procedures. The public will have an opportunity to comment on the Plan at the annual review meeting for the Mitigation Plan and during the five-year Plan update. The annual progress reports will be posted in conjunction with the Hazard Mitigation Plan on the county mitigation website. The county will maintain this website, posting the annual progress reports and maintaining an active link to collect public comments.		X
		SUMMARY SCORE		X