WHITFIELD COUNTY
HAZARD MITIGATION PLAN 2016

Including the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta

Table of Contents

Chapter 1
Introduction

1.1 Purpose

The Disaster Mitigation Act of 2000 has helped to bring attention to the need for successful hazard mitigation planning throughout the United States. Section 322 of the Act emphasizes the importance of comprehensive multi-hazard planning at the local level, both natural and technological, and the necessity of effective coordination between State and local entities to promote an integrated, comprehensive approach to mitigation planning. The Hazard Mitigation Planning and Hazard Mitigation Grant Program (HMGP) interim final rule published on February 26, 2002, identifies these new local mitigation planning requirements. According to this rule, state and local governments are required to develop, submit, and obtain FEMA approval of a hazard mitigation plan (HMP). Completion of an HMP that meets the new Federal requirements will increase access to funds for local governments and allow them to remain eligible for Stafford Act assistance.

The HMP becomes part of the foundation for emergency management planning, exercises, training, preparedness and mitigation within the County. Such a plan sets the stage for long-term disaster resistance through identification of actions that will, over time, reduce the exposure of people and property to identifiable hazards. This plan provides an overview of the hazards that threaten the County, and what safeguards have been implemented, or may need to considered for implementation in the future.

Hazards, for purposes of this plan, have been divided into two basic categories: natural and technological. Natural hazards include all hazards that are not caused either directly or indirectly by man and are frequently related to weather events, such as tornados and winter storms. Technological hazards include hazards that are directly or indirectly caused by man, including hazardous materials spills and weapons of mass destruction (WMD)

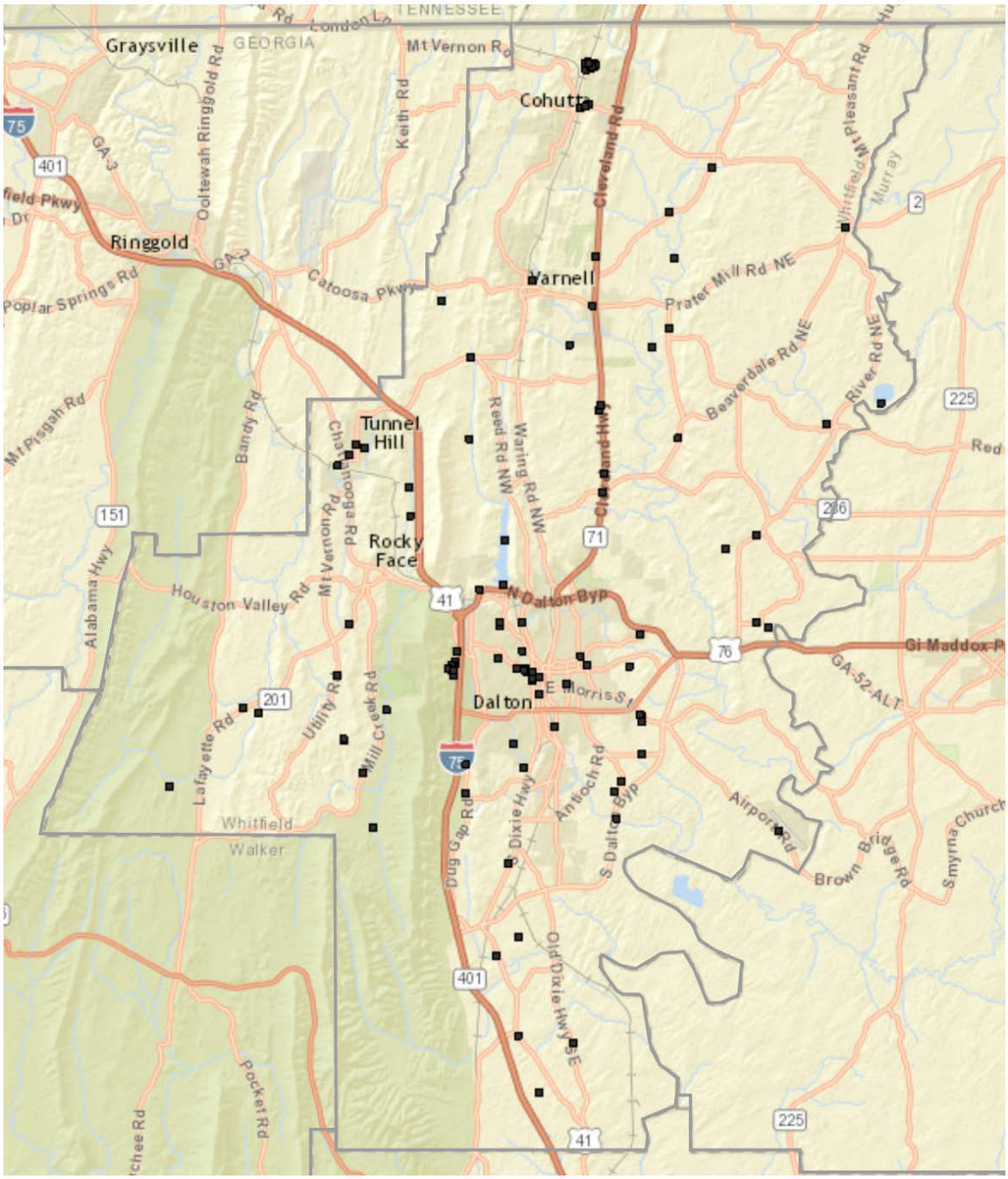
events, although terrorism is not the particular focus of this Plan. This Plan also makes some recommendations that transcend this classification of natural and technological hazards. In other words, some of the recommendations contained within this Plan apply to many or all hazards. This is commonly referred to as an "all-hazards approach". Most hazards throughout the United States could happen anytime and anywhere. However, the main focus of this plan is on those hazards that are most likely to affect Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta in the future.

1.2 Organization of the Plan

The Hazard Mitigation Plan (HMP) consists of four main components: 1) the narrative plan, 2) the Hazard History Database, 3) the Hazard Frequency Table, and 4) a Critical Facilities Database. The narrative plan itself is the main component of the HMP. This part of the Plan includes an overview of the planning process, a summary of the County's hazard history, hazard frequency projections, a detailed discussion of proposed mitigation measures, and a description of how future reviews and updates to the Plan will be handled. The Hazard History Database is attached as a Microsoft Excel spreadsheet and includes relevant information on past hazards within the County. The Hazard Frequency Table is derived from the hazard history and provides frequency-related statistics for each discussed hazard. This table is also attached as a Microsoft Excel spreadsheet. Finally, the Critical Facilities Database is an online tool developed in part by UGA for GEMA that contains detailed information on critical facilities within the County. Critical facilities for the purposes of this plan are those facilities that are among the most important within a specific jurisdiction with regard to the security and welfare of the persons and property within that jurisdiction. Typical critical facilities include hospitals, fire stations, police stations, critical records storage locations, etc. These facilities will be given special consideration during mitigation planning. For instance, a critical facility should not be located in a floodplain if at all possible. Using the critical facilities information, including GPS coordinates and replacement values, along with different hazard maps from GEMA, this database becomes a valuable planning tool that can be used by Counties to help estimate losses and assess vulnerabilities. This interactive Critical Facilities Database will also help to integrate mitigation planning into their other planning processes.

The following map displays the location of critical facilities within Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta. These facilities may be viewed in much greater detail within the Critical Facilities Database. Access to this database is limited and can only be viewed with the permission of the EMA Director due to the sensitive nature of some of the information.

Whitfield County Critical Facilities Map



A risk assessment, which is composed of elements from each of the four main HMP components, provides the factual basis for all mitigation activities proposed within this Plan.

Inventory of Critical Facilities: Critical facilities are defined as facilities that provide essential products and services to the public. Many of these facilities are government buildings that provide a multitude of services to the public, including most public safety disciplines such as emergency management, fire, police, and EMS. Other government

buildings/facilities commonly classified as critical facilities are water distribution systems, wastewater treatment facilities, public works, public schools, administrative services, and post offices. For the purposes of this Plan, critical facilities have been identified by the HMPC and important information gathered for each one. This information is located in the Critical Facilities Database (Appendix A).

Hazard Identification: During the planning process, a hazard history was created based upon available records from the past fifty years. This hazard history includes the natural and technological hazards that are most likely to affect the County. Unfortunately, record keeping was not as accurate or detailed decades ago as it is now. Therefore, the most useful information relating to these hazard events is found within the last ten to fifteen years. This fact is obvious upon review of the Hazard History Database (Appendix B), and the Hazard Frequency Table (Appendix C).

Profile of Hazard Events: Each hazard identified was analyzed to determine likely causes and characteristics, and what portions of the County's population and infrastructure were most affected. However, each of the hazards discussed in this Plan has the potential to negatively impact any given point within the County. A profile of each hazard discussed in this plan is provided in Chapter 2.

Vulnerability Assessment: This step is accomplished with the Critical Facilities Database by comparing GEMA hazard maps with the inventory of affected critical facilities, other buildings, and population exposed to each hazard (see Worksheets 3a).

Estimating Losses: Using the best available data, this step involved estimating structural and other financial losses resulting from a specific hazard. This is also accomplished to some degree using the Critical Facilities Database. Describing vulnerability in terms of dollar amounts provides the County with a rough framework in which to estimate the potential effects of hazards on the built environment.

Based on information gathered, the Plan identifies some specific mitigation goals, objectives, and actions to reduce exposure or impact from hazards that have the most impact on each community. A framework for Plan implementation and maintenance is also presented within this document.

Planning grant funds from the Federal Emergency Management Agency, administered by GEMA, funded the HMP. The HMP was developed by the HMPC, with technical assistance from GEMA and North Georgia Consulting Group.

1.3 Participants in Planning Process

This Hazard Mitigation Plan (HMP) is designed to protect both the unincorporated areas of the County as well as the Cities. Though the County facilitated this planning process, the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta provided critical input into the process. Without this mutual cooperation, the Plan would not exist in its present comprehensive form. Note: Please keep in mind that throughout this Plan, the term "county" typically refers to all of Whitfield County, Including the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta.

The process for updating Whitfield County's Hazard Mitigation Plan can be found in the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Planning's "How To" Guides. According to "Getting Started: Building Support for Mitigation Planning;" the suggested process for preparing a Hazard Mitigation Plan is to 1) Organize resources and identify stakeholders and those holding technical expertise; 2) Access risks to the community; 3) Develop a Mitigation Plan and lastly; 4) Implement and Monitor that plan once it is adopted. (FEMA 386-1)

The Whitfield County Hazard Mitigation Planning Committee (HMPC) is made up of a variety of members. The Chairman of the HMPC is EMA Director Claude Craig. The Chairman's responsibilities include all decisions relating to the overall direction of the Plan, retrieval of data from various departments, and serving as a central point of contact for all matters relating to the Plan. The consultant, NGCG, is responsible for facilitation of HMPC meetings, integration of updated data into the Plan, grant administration, and other administrative functions. The HMPC was represented by local government officials, County, City, and Town employees, and representatives from Georgia Forestry and the University of North Georgia. Representatives for utilities and local businesses were also extended an invitation to participate. Potential participants were invited either verbally or by email, depending upon the participant. Each jurisdiction had representatives on the HMPC which provided critical data for consideration through meetings, email, and/or site visits. This diverse group provided valuable input into the planning process including identifying hazards and developing important mitigation measures to be considered in the future. The entire HMPC met several times over the course of this planning process. These meetings occurred on October 15, 2015, November 12, 2015, December 10, 2015, January 14, 2016, February 11, 2016, March 10, 2016, and May 19, 2016. Other meetings were held throughout this planning process at various times between two or more HMPC members in order to accomplish smaller tasks. Two public meetings relating to this Plan are required by FEMA: one during the drafting stages of the Plan, and one after the final version of the Plan is completed. The first of these two meetings occurred on June 13, 2016 during the drafting stages of the Plan. Once necessary revisions were made to the Plan, a second public meeting was held on September 18, 2017 where it was adopted by Whitfield County. A copy of the adoption resolution is included in the Appendices. Prior to adoption at the final public meeting, the public was provided with an additional opportunity to review and comment on the Plan. This final version was then submitted to GEMA and FEMA for review and approval. All public meetings were advertised on the Whitfield County website (see screenshot on the following page).

The Plan is the result of a community-wide effort put forth over the past several months utilizing FEMA's Hazard Mitigation Plan "How To" Guides to aid in laying out the planning process described above. Stakeholders and persons with technical expertise were

identified early in the process. Full participation was provided by Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta. Each jurisdiction had representatives on the Hazard Mitigation Planning Committee and provided critical data to the HMPC for consideration.

The public involvement elements of this Plan were reviewed by the HMPC. They were determined to have remained effective and were approved for use in the current Plan update process.

HMPC members are listed in the following table:

Name	Jurisdiction/Dept	Title/Position/Specialty
Paul Alexander	City of Dalton Public Works	Safety
Norman Barashick	DWSWA	Director
Gayle Brannon	Whitfield County Health Dept	Director
Gary Brown	Whitfield County Building & Grounds	Director
Roy Brunson	Tunnel Hill Police Dept	Chief of Police
Terry L. Bryson	Whitfield County Public Works	Infrastructure, Herbicide & Community Service Coordinator
Darryl Camp	Georgia Department of Public Health	NGHD 1-2
Amy Cooley	Whitfield County EMA	Emergency Management Specialist
Lee Duman	HEMS	Captain
Randall Ertzberger	Dalton Utilities	Assistant Vice President of Communications and Technology
Mike Ewton	Whitfield County Schools	Assistant Superintendent of Operations
Raymond Grossman	Town of Cohutta Police Dept	Chief of Police
Jess Hansen	Whitfield County GIS	GIS Coordinator
Sean Hudson	City of Dalton	Patrol Officer
Dewayne Hunt	Whitfield County Public Works	Director

David Huskey	Georgia Department of Public Health	NGHD 1-2
Brenda Jackson	Whitfield County Extension	Agent
Jamie Johnson	City of Dalton Police Dept	Lieutenant
Randy Kittle	Whitfield County Fire Dept	Deputy Fire Chief
Chad Mulkey	Whitfield County Environmental Health	Manager
Daniel Nicholson	City of Dalton Police Dept	Sergeant
Ed O'Brien	Whitfield County Fire Dept	Fire Chief
Jeff Ownby	Whitfield County EMA	Deputy Director
Todd Pangle	City of Dalton Fire Dept	Deputy Fire Chief
Kristi Queen	Whitfield County Tax Assessors Office	Deputy Chief Appraiser
Scott Radeker	Hamilton EMS	Director
Chris Sampson	Whitfield County Health Department	Operational Support Manager
Bruce Satterfield	City of Dalton Fire Dept	Fire Chief
Randy Selby	Georgia Power Company	Engineering Supervisor
Larry Staton	Georgia Department of Public Health	NGHD 1-2
Jerry Tatum	Hamilton Medical Center	Director of Public Safety
Ashlee Zahn	Whitfield County 911	Deputy 911 Director

Various County and City departments, schools, and others participated in conversations with the EMA Director that directly contributed to the development of this Plan. Due to limited resources within the County, Cities, and Towns, attendance at HMPC meetings for many was not an option. Nevertheless, their direct input was utilized by the HMPC to develop this Plan.

The Plan was posted on the county's website during the planning process. This was done to allow the general public, including other nearby communities, as well as other agencies to review and comment on the Plan utilizing the contact information provided on the website.

1.4 HRV summary/Mitigation goals

Whitfield County has experienced a number of hazard events throughout its history, most resulting in fairly localized damage. Flooding, tornados, winter storms, wildfire, severe thunderstorms, earthquakes, dam failure and hazardous materials to varying degrees represent known threats to Whitfield County. The Whitfield County HMPC used information gathered throughout this planning process to identify mitigation goals and objectives as well as some recommended mitigation actions. Each potential mitigation measure identifies an organization or agency responsible for initiating the necessary action, as well as potential resources, which may include grant programs and human resources. An estimated timeline is also provided for each mitigation action.

1.5 Multi-Jurisdictional Special Considerations

The Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta were active participants and equal partners in the planning process as well as the previous planning process. As an active part of the HMPC, these jurisdictions contributed significantly to the identification of mitigation goals and objectives and potential mitigation measures contained within the HMP.

Participation in Mitigation Plan

Jurisdiction	*2016 Plan*	*2011 Plan*
Whitfield County	☐	☐
City of Dalton	☐	☐
City of Tunnel Hill	☐	☐
City of Varnell	☐	☐
Town of Cohutta	☐	☐

1.6 Adoption, Implementation, Monitoring, Evaluation

Upon completion of the Plan, it will be forwarded to GEMA for initial review. GEMA will then forward the Plan to FEMA for final review and approval. Once final FEMA approval has been received, Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta will be responsible for initiating the appropriate courses of action related to this Plan. Actions taken may be in coordination with one another or may be pursued separately. The "Plan Update and Maintenance" section of this document details the formal process that will ensure that the Whitfield County HMP remains an active and relevant document. The HMP maintenance process includes monitoring and evaluating the Plan annually, and producing a complete Plan revision every five years. Additionally, procedures will ensure public participation throughout the plan maintenance process. This Plan will be considered for integration into various existing plans and programs, including the Whitfield County Comprehensive Plan at its next scheduled update. Mitigation actions within the HMP may be used by the County, Cities, and Towns as one of many tools to better protect the people and property of Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta. Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta are each individually responsible for the processes necessary to formally adopt this Plan.

Adoption Status

Jurisdiction	*Date of Adoption*
Whitfield County	Upon GEMA & FEMA Approval
City of Dalton	Upon GEMA & FEMA Approval
City of Tunnel Hill	Upon GEMA & FEMA Approval
City of Varnell	Upon GEMA & FEMA Approval
Town of Cohutta	Upon GEMA & FEMA Approval

1.7 Review and Incorporation

The HMPC recognized the need to integrate other plans, codes, regulations, procedures and programs into this Hazard Mitigation Plan (HMP). Whitfield County did not have the opportunity to incorporate the original HMP's strategy into other planning mechanisms, but will now ensure that during the planning process for new and updated local planning documents such as a comprehensive plan or Local Emergency Operations Plan, the EMA Director will provide a copy of the HMP to the appropriate parties, so incorporation will be considered in future updates. All goals and strategies of new and updated local planning documents should be consistent with, and support the goals of, the HMP and not contribute to increased hazards in the affected jurisdiction(s).

Record of Review

Existing planning mechanisms	Reviewed? (Yes/No)	Method of use in Hazard Mitigation Plan
Comprehensive Plan (multi-jurisdictional)	Yes	Development trends
Local Emergency Operations Plan	Yes	Identifying hazards; Assessing vulnerabilities
Storm Water Management / Flood Damage Protection Ordinance	Yes	Mitigation strategies
Building and Zoning Codes and Ordinances	Yes	Development trends; Future growth
Mutual Aid Agreements	Yes	Assessing vulnerabilities
State Hazard Mitigation Plan	Yes	Risk assessment
Land Use Maps	Yes	Assessing vulnerabilities; Development trends; Future growth
Critical Facilities Maps	Yes	Locations
Community Wildfire Protection Plan	Yes	Mitigation strategies

As set forth in the plan maintenance section of this plan (Section 6.4), the Hazard Mitigation Planning Committee will meet during the plan approval anniversary date of every year to complete a review of the Hazard Mitigation Plan. It is during this review

process that the mitigation strategy and other information contained within the Hazard Mitigation Plan are considered for incorporation into other planning mechanisms as appropriate. Opportunities to integrate the requirements of this HMP into other local planning mechanisms will continue to be identified through future meetings of the HMPC on an annual basis. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of each jurisdiction's individual action plans that require specific planning and administrative tasks (e.g., plan amendments and ordinance revisions).

During the planning process for new and updated local planning documents such as a comprehensive plan or Local Emergency Operations Plan, the EMA Director will provide a copy of the HMP to the appropriate parties. It will be recommended that all goals and strategies of new and updated local planning documents be consistent with, and support the goals of, the HMP and will not contribute to increased hazards in the affected jurisdiction(s).

Although it is recognized that there are many benefits to integrating components of this plan into other local planning mechanisms, and that components are actively integrated into other planning mechanisms when appropriate, the development and maintenance of this stand-alone HMP is deemed by the committee to be the most effective method to ensure implementation of local hazard mitigation actions at this time. Therefore, the review and incorporation efforts made in this update and the last, which consisted of a simple review of the documents listed in the chart above by various members of the HMPC, are considered successful by the HMPC and will likely be utilized in future updates.

The County's EMA is committed to incorporating hazard mitigation planning into its Local Emergency Operations Plan and other public emergency management activities. As the EMA Director becomes aware of updates to other County or City plans, codes, regulations, procedures and programs, the Director will continue to look for opportunities to include hazard mitigation into these mechanisms.

1.8 Scope of Updates

Changes have been made to the HMP in this updated version. These changes are summarized in the following table.

Chapter or Section	Chapter or Section Description	Changes this Update
1.2	Organization of the Plan	Descriptions
1.3	Participants in Planning Process	Data
1.5	Multi-Jurisdictional Special Considerations	Data
1.6	Adoption, Implementation, Monitoring, Evaluation	Descriptions, Data
1.7	Review and Incorporation	Descriptions, Data
1.8	Scope of Updates	Descriptions, Data
1.9	Brief County Overview	Descriptions, Data
2	Introduction	Descriptions, Data
2.1	Severe Thunderstorm	Descriptions, Data, Visual Aids
2.2	Winter Storm	Descriptions, Data, Visual Aids
2.3	Flooding	Descriptions, Data, Visual Aids
2.4	Tornado	Descriptions, Data, Visual Aids
2.5	Wildfire	Descriptions, Data, Visual Aids
2.6	Drought	Descriptions, Data, Visual Aids
2.7	Earthquake	Descriptions, Data, Visual Aids
3.1	Hazardous Materials Release	Descriptions, Data, Visual Aids
3.2	Dam Failure	Descriptions, Data, Visual Aids
4	Land Use & Dev. Trends	Descriptions, Data, Visual Aids
5	HM Goals Obj. & Actions	Descriptions, Data
6.1	Action Plan Implementation	Descriptions
6.2	Evaluation	Descriptions
6.3	Multi-Jurisdictional Strategy & Considerations	Descriptions

Chapter or Section	Chapter or Section Description	Changes this Update
6.4	Plan Update & Maintenance	Descriptions, Data
7.2	References	Data
App. A	Critical Facilities Database	Data, Visual Aids
App. B	Hazard History Database	Data
App. C	Hazard Frequency Table	Data
App. D	Other Planning Documents	Descriptions, Data, Visual Aids

1.9 Brief County Overview

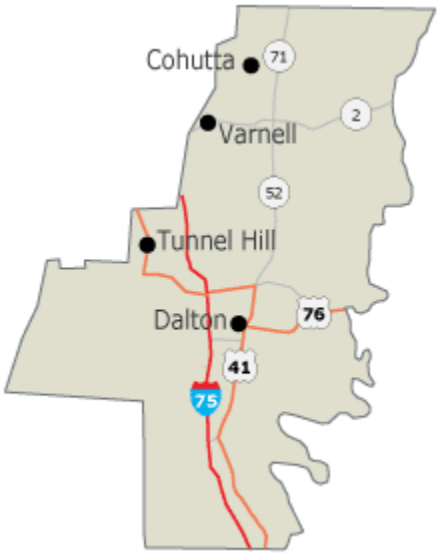
County Formed: December 30, 1851

County Seat: Dalton

Incorporated Municipalities: Cohutta, Dalton, Tunnel Hill and Varnell

Population Estimates	
Jurisdiction	Population
Whitfield County	104,216 (2015)
City of Dalton	33,529 (2014)
City of Tunnel Hill	872 (2014)
City of Varnell	1,781 (2014)
Town of Cohutta	634 (2014)

Total Area: 290 square miles



History:

Woodland Indians and Creek Nation held the area of present-day Dalton, Georgia until the mid 18th century, when the Cherokee pushed the Creek to the west and south. The Cherokee Indians called the mountains of north Georgia their "Enchanted Land" until their forced removal in 1838, the Trail of Tears.

By the time the last Cherokees had left, work was underway for a railroad, the Western and Atlantic, to join the Tennessee River with the Chattahoochee River. In 1847, the newly renamed railway was defined as a mile radius from the city center - the Western and Atlantic Depot. The final segment of this pivotal railway was completed in Tunnel Hill, Whitfield County, Ga. in 1850. A second railroad, the East Tennessee and Georgia was completed in 1852.

With the invention of the automobile, a cottage industry arose in the homes along "Peacock Alley", U.S. Highway 41. Running from Copper Harbor, Michigan, to Miami Beach, Florida, the route ran on paved state roads. It was designated in 1925 and signed in 1926. Women would sell quilts to drivers along this popular north-south route. From this early origin, the carpet tufting industry grew in Dalton. Today, Carpet Mills remain major area employers.

During the Civil War, Dalton saw its first action during the Great Locomotive Chase, on April 12, 1862. More than a year later, on September 19–20, 1863, massive Union and Confederate forces battled a few miles west of Dalton at Chickamauga, and later at Chattanooga. The war came to Whitfield County in the spring of 1864. The First Battle of Dalton included the battle of Rocky Face Ridge and Dug Gap began on May 7, 1864, and ended when General Johnston completed his withdrawal from Dalton on May 12. The Second Battle of Dalton occurred August 14-15, 1864. The last campaign of the Confederacy, the John Bell Hood's Nashville Campaign attacked a Union blockhouse in

Tilton before passing through Dalton and heading west. The U.S. government recently declared Dalton and Whitfield County to have more intact Civil War artifacts than any other place in the country. Also of interest is the site of the historic Western & Atlantic Railroad Station; one of the few still standing and restored to its original architectural state, this site is now the Dalton Depot Restaurant. The steel center marker for the original surveying of the City of Dalton is still inside the depot.

Dalton is often referred to as the "Carpet Capital of the World", home to 150+ carpet plants. The industry employs more than 30,000 people in the Whitfield County area. More than 90% of the functional carpet produced in the world today is made within a 65-mile radius of the city.

The agglomeration of the carpet industry in Dalton can be traced back to a wedding gift given in 1895 by a teenage girl, Catherine Evans Whitener, to her brother, Henry Alexander Evans, and his bride, Elizabeth Cramer. The gift was an unusual tufted bedspread. Copying a quilt pattern, she sewed thick cotton yarns with a running stitch into unbleached muslin, clipped the ends of the yarn so they would fluff out, and finally, washed the spread in hot water to hold the yarns by shrinking the fabric. Interest grew in young Catherine's bedspreads, and in 1900, she made the first sale of a spread for $2.50. Demand became so great for the spreads that by the 1930s, local women had "haulers", who would take the stamped sheeting and yarns to front porch workers. Often entire families worked to hand tuft the spreads for 10 to 25 cents per spread. Nearly 10,000 area cottage "tufters"--men, women, and children, were involved in the industry. Income generated by the bedspreads was instrumental in helping many area families survive the depression. Chenille bedspreads became amazingly popular all over the country and provided a new name for Dalton: the Bedspread Capital of the World.

When a form of mechanized carpet making was developed after World War II, Dalton became the center of the new industry due to the fact that specialized tufting skills were required and the city had a ready pool of workers with those skills.

By the 1970s manufacturers had begun to develop techniques to move from plain tufted carpet to sculpted carpet. Improved patterning, stain and wear resistance, and colors have made today's tufted carpet the choice for functional carpet for the vast majority of homes and moved woven carpet to a decorative role.

Chapter 2

Local Natural Hazard, Risk and Vulnerability (HRV) Summary

The Whitfield County Hazard Mitigation Planning Committee (HMPC) identified eight natural hazards the County is most vulnerable to based upon available data including scientific evidence, known past events, and future probability estimates. As a result of this planning process, which included an analysis of the risks associated with probable frequency and impact of each hazard, the HMPC determined that each of these natural hazards pose a threat significant enough to address within this Plan. These include tornados, severe thunderstorms (including hail & lightning), flooding, winter storms, wildfire, drought, earthquakes, and landslides. For this plan update, the HMPC reviewed the natural hazards listed in the 2011 Georgia Hazard Mitigation Strategy Standard Plan Update to assess the applicability of these hazards to Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta (See Table 2.1). Each of these natural hazards is addressed in this chapter of the Plan. An explanation and results of the vulnerability assessment are found in Tables 2-1 and 2-2.

The HMPC also discussed how changes in the climate may in some ways impact the County, Cities and Towns. If this is the case, at this point there is insufficient data to calculate how and to what degree such changes may impact Whitfield County in the future. However, it seems likely that the impact of any changes in climate would be manifested in the form of the same hazards currently addressed within this Plan, even though frequency, probability and severity of those hazards might change.

Table 2.1 – Hazards Terminology Differences

Hazards Identified in 2011 Georgia State Plan	Equivalent/Associated Hazards Identified in the 2015 Whitfield County Plan	Difference
Tornadoes	Tornados	Grammatical only.
Wind	Severe Thunderstorms	HMPC views as an associated hazard.
Severe Weather	Severe Thunderstorms	Difference in terminology.
Hailstorm	Severe Thunderstorms	HMPC views as an associated hazard.
Lightning	Severe Thunderstorms	HMPC views as an associated hazard.
Tropical Cyclonic Events	Severe Thunderstorms Flooding	Due to the County's inland location, not directly viewed as a threat. Tropical weather has limited effects within the County and is generally considered in terms of Severe Thunderstorms and Flooding, associated hazards.
Inland Flooding	Flooding	Difference in terminology.
Earthquake	Earthquake	None
Severe Winter Storms	Winter Storms	Difference in terminology.
Wildfire	Wildfire	None
Drought	Drought	None

Table 2.2 – Vulnerability Assessment - Natural Hazards *(see Keys below)*

HAZARD	Whitfield County	Dalton	Tunnel Hill	Varnell	Cohutta
Severe Thunderstorms (includes lightning & hail)					
Frequency	H	H	H	H	H
Severity	H	H	EX	H	H
Probability	H	H	H	H	H
Tornados					
Frequency	M	M	L	M	M
Severity	EX	EX	EX	M	EX
Probability	H	H	H	M	H
Flooding					
Frequency	H	M	H	H	H
Severity	H	H	H	H	H
Probability	H	M	H	H	H
Winter Storms					
Frequency	H	H	H	M	H
Severity	H	EX	H	H	H
Probability	H	H	H	M	H
Drought					
Frequency	M	M	M	H	M
Severity	H	H	H	H	H
Probability	M	M	M	H	M
Wildfire					
Frequency	M	L	M	M	M
Severity	H	M	M	M	H
Probability	M	L	M	M	M
Earthquake					
Frequency	VL	VL	VL	VL	VL
Severity	M	M	M	L	M
Probability	L	L	VL	VL	L
Dam Failure					
Frequency	VL	VL	VL	VL	VL
Severity	EX	M	VL	VL	EX
Probability	VL	VL	VL	VL	VL
Hazardous Materials Release					
Frequency	M	M	M	H	M
Severity	EX	EX	H	H	EX
Probability	H	H	L	H	H
Landslide					
Frequency	VL	VL	VL	VL	VL
Severity	L	L	L	L	L
Probability	VL	VL	VL	VL	VL
Tropical Cyclonic Events (Hurricanes & Tropical Storms)					
Frequency	NA	NA	NA	NA	NA
Severity	NA	NA	NA	NA	NA
Probability	NA	NA	NA	NA	NA
Coastal Flooding					
Frequency	NA	NA	NA	NA	NA
Severity	NA	NA	NA	NA	NA
Probability	NA	NA	NA	NA	NA
Sinkhole					
Frequency	NA	NA	NA	NA	NA
Severity	NA	NA	NA	NA	NA
Probability	NA	NA	NA	NA	NA

Key for Table 2.2 – Vulnerability Assessment Frequency and Probability Definitions

NA = Not applicable; not a hazard to the jurisdiction
VL = Very low risk/occurrence
L = Low risk; little damage potential (for example, minor damage to less than 5% of the jurisdiction)
M = Medium risk; moderate damage potential (for example, causing partial damage to 5-15% of the jurisdiction, infrequent occurrence)
H = High risk; significant risk/major damage potential (for example, destructive, damage to more than 15% of the jurisdiction, regular occurrence)
EX = Extensive risk/probability/impact

Key for Table 2.2 – Vulnerability Assessment Severity Definitions

	Low	Medium	High	Extensive
Tropical Cyclonic Events		*(See Wind & Inland Flooding)*		
Wind – Wind Speed	38 MPH	39–50 MPH	50-73 MPH	73–91 MPH
Severe Thunderstorm		*(See Wind & Inland Flooding)*		
Tornado - Magnitude	< EF3	EF3	EF4	EF5
Inland Flooding - Water depth	3" or less	3 – 8"	8-12"	12"+
Severe Winter Storms – Ice/ Sleet	½" or less	½ – 4"	4-7"	7"+
Severe Winter Storms - Snow	1" or less	1-6"	6-12"	12"+
Drought – Duration	1 year	1 – 2 years	2-5 years	5+ years
Wildfire - # of Acres	<50	50-110	110-200	200+
Earthquake - Magnitude	1-2	3	4	5+

2.1 Tornados

A. Hazard Identification – A tornado is a dark, funnel-shaped cloud containing violently rotating air that develops below a heavy cumulonimbus cloud mass and extends toward the earth. The funnel twists about, rises and falls, and where it reaches the earth causes great destruction. The diameter of a tornado varies from a few feet to a mile; the rotating winds attain velocities of 200 to 300 mph, and the updraft at the center may reach 200 mph. A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud "freight train" noise. In comparison with a hurricane, a tornado covers a much smaller area but can be just as violent and destructive. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity, and the convergence of warm, moist air at low levels with cooler, drier air aloft. A tornado travels in a generally northeasterly direction with a speed of 20 to 40 mph. The length of a tornado's path along the ground varies from less than one mile to several hundred.

The Fujita Scale was the standard scale in the United States for rating the severity of a tornado as measured by the damage it causes from 1971 to 2007 (see table below).

The Fujita Scale of Tornado Intensity			
F-Scale Number	**Intensity Phrase**	**Wind Speed**	**Type of Damage Done**
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards.
F1	Moderate tornado	73-112 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	Significant tornado	113-157 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	Severe tornado	158-206 mph	Roof and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted
F4	Devastating tornado	207-260 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel reinforced concrete structures badly damaged.

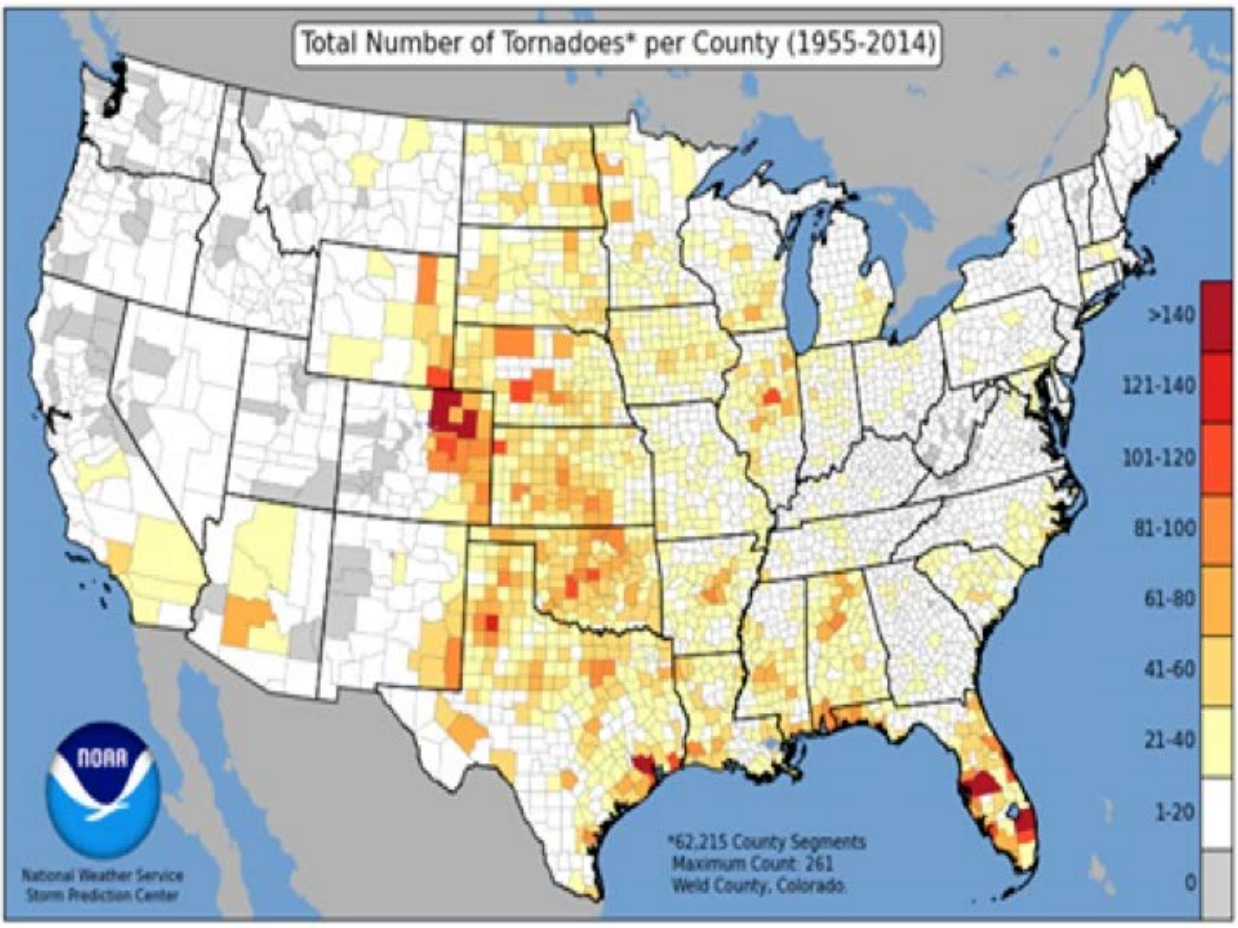
The Enhanced Fujita (EF) Scale for Tornado Damage is an update to the original Fujita Scale by a team of meteorologists and wind engineers that was implemented in the United States in 2007. The EF Scale is still a set of wind estimates (not measurements) based on

damage. It uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to 28 indicators. These estimates vary with height and exposure. The three-second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one-minute mile" speed.

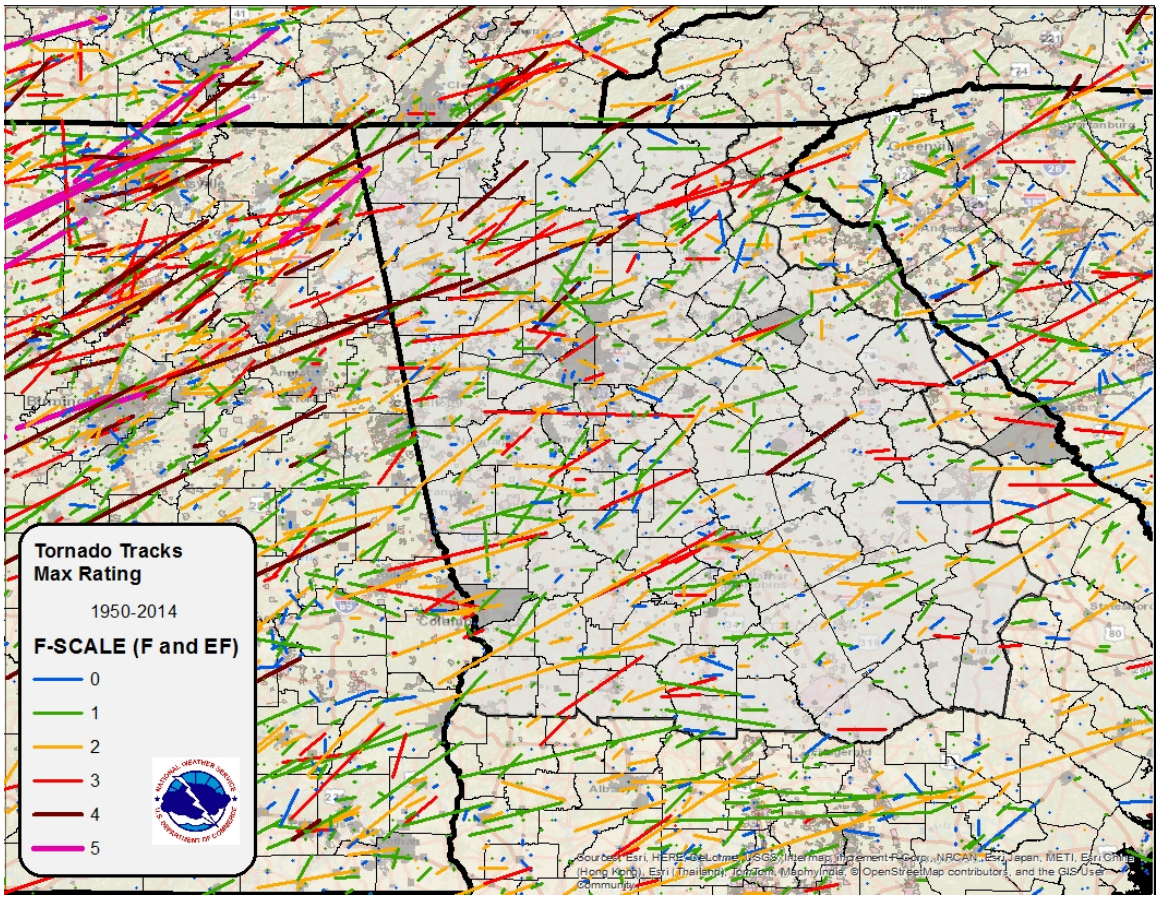
Levels of the Enhanced Fujita scale
Grade, damage and windspeeds

Source: Fema

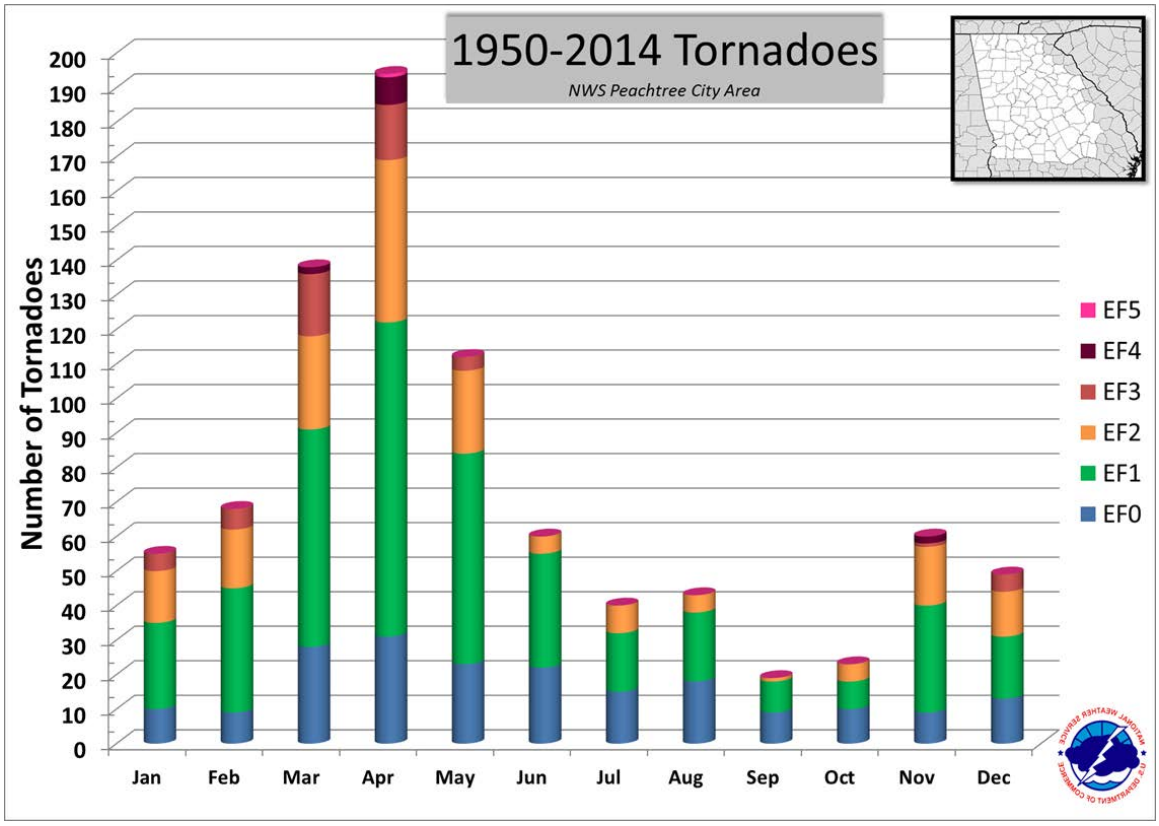
The NOAA map below represents the total number of tornados per county from 1955 to 2014. This is the latest version of this NOAA Map. Whitfield County averaged 1 to 20 during this time period.



The following NOAA map represents the United States severe report database (tornadoes 1950-2014) converted into shapefile (.shp) file format along with a Geographic Information System (GIS) database. In other words, these maps show the estimated paths and intensities of recorded tornados over this time period. Although this 64-year time period does not match up exactly with the 50-year timeline reviewed within this Plan, the map remains a valuable visual aid by providing a regional perspective on historical tornado activity.



Tornadoes are considered to be the most unpredictable and destructive of weather events in Georgia, even though they are not the most frequently occurring natural hazard within Whitfield County. Tornado season in Georgia is ordinarily said to run from March through August, with the peak activity being in April. However, tornados can strike at any time of the year when certain atmospheric conditions are met, including during the coldest months of the year. See the National Weather Service graph below, which covers the NWS Peachtree City Area of Georgia.



B. Hazard Profile – All areas within Whitfield County are vulnerable to the threat of a tornado. There is simply no method to determine exactly when or where a tornado will occur. The Whitfield County Hazard Mitigation Planning Committee (HMPC) reviewed historical data from the Georgia Tornado Database, the National Climatic Data Center, and various online resources in researching the past effects of tornados within the County. With most of the County's recorded tornado events, only basic information was available. However, dozens of tornado watches have been recorded during this period, and certainly some tornados go undetected or unreported. Therefore, any conclusions reached based upon available information on tornados within Whitfield County should be treated as the minimal possible threat.

In the Peachtree City County Warning Area (CWA), which includes Whitfield County, the average number of tornado days per year is six, according to the National Weather Service. While tornadoes have been reported in all months of the year, most occur in the months of March, April, and May. During this "tornado season" the most likely time of occurrence is from mid-afternoon through early evening. Tornado intensities of F2 or greater are involved in 37% of the events when the data is broken down into a county-by-county basis. These strong tornados are more likely to occur during the month of April than in any other month.

The most recent reported tornado to occur within Whitfield County occurred on April 28, 2014 at approximately 10:05pm. The National Weather Service (NWS) out of Peachtree City, GA reported it as an EF-1 tornado. The tornado was 50-yards-wide when it touched down approximately five miles east of Cohutta and then headed northeast collapsing a chicken coop killing 16 thousand chickens. The tornado also destroyed a farm structure. It then headed further northeast and grew wider to 100-yards where it snapped some trees and crossed into Tennessee.

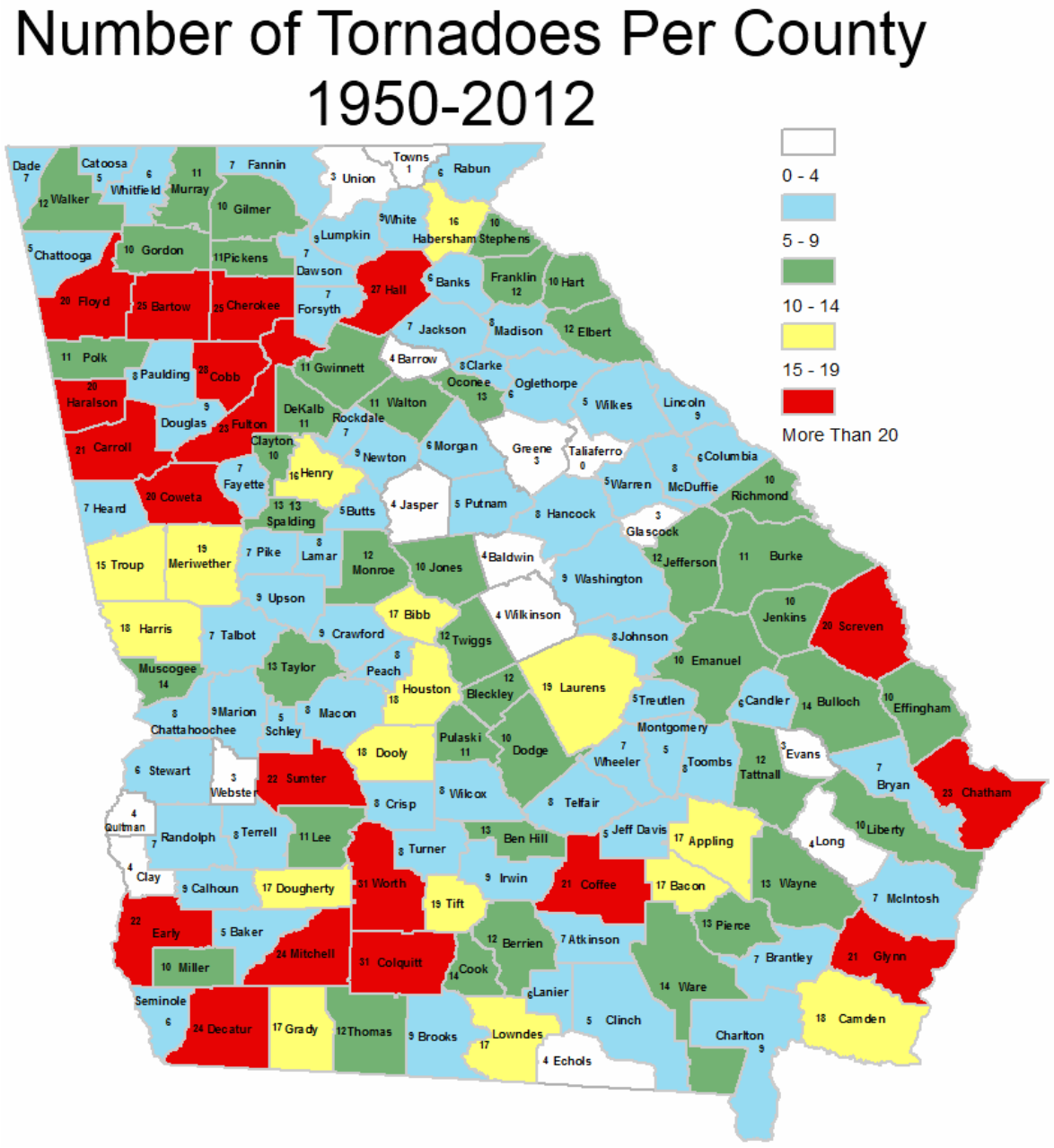
(National Climatic Data Center) NCDC and other records show that five tornados occurred within the County over the past fifty years, which equates to a 10% annual frequency of reported events. It would appear that tornado activity has remained relatively steady over time within the County. The following chart provides annual frequency of reported events over the past five, ten, twenty, and fifty-year periods. The most recent five-year period, covering the span of time since the last update to this Plan, is highlighted in gold.

Whitfield County – Tornado Frequency (based on Reported Events)				
Time Period	**5yrs (2011-2016)**	**10yrs (2006-2016)**	**20yrs (1996-2016)**	**50yrs (1966-2016)**
Number of Reported Events	**1**	**1**	**1**	**5**
Frequency Average per Year	**0.2**	**0.1**	**0.05**	**0.1**
Frequency Percent per Year	**20%**	**10%**	**5%**	**10%**

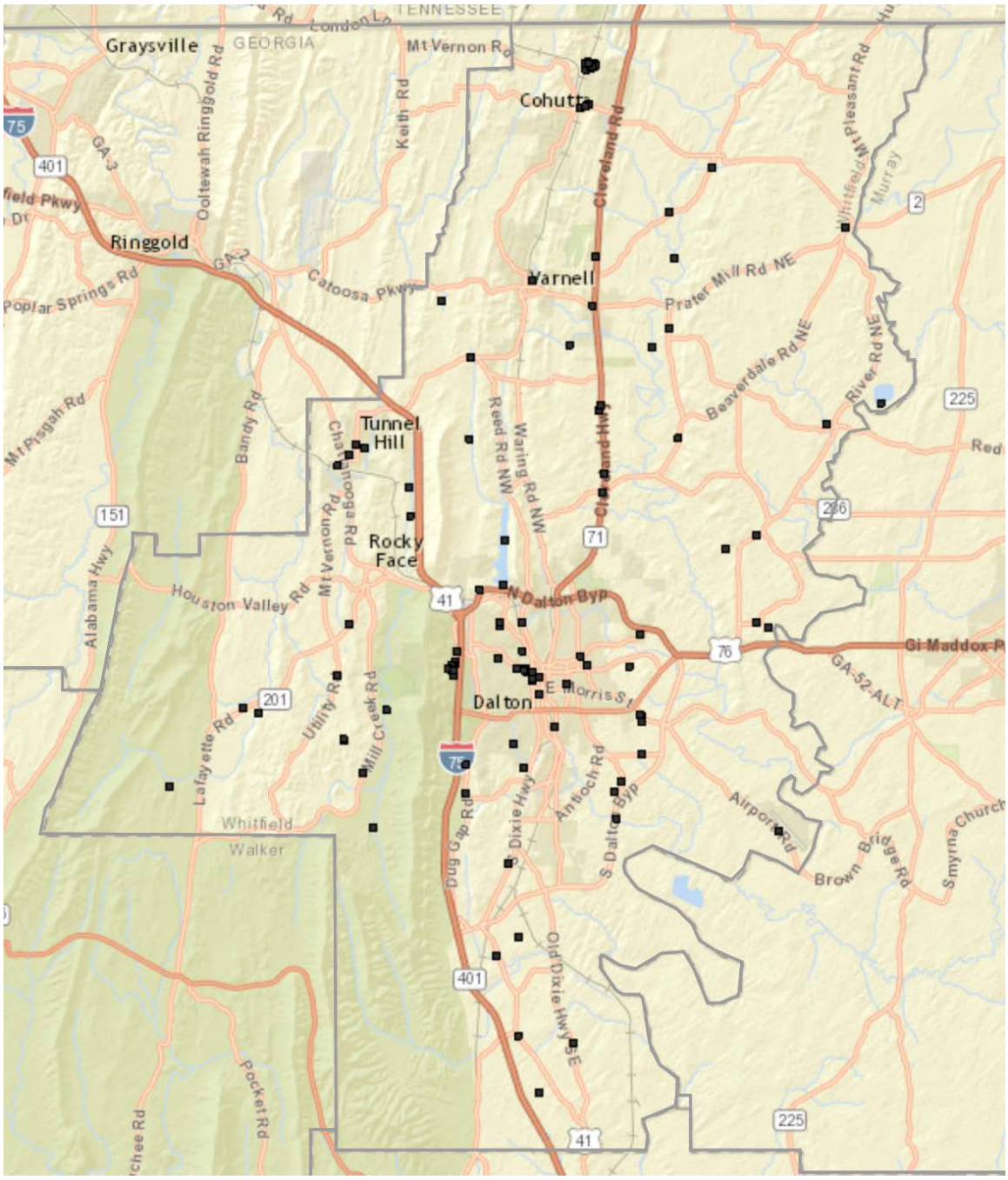
The National Weather Service statewide map on the following page shows the six Whitfield County tornados on record from 1950 to 2012. However, this Hazard Mitigation Plan covers the past 50 years (1966 to 2016), which includes only five reported events. See the following chart.

Whitfield County - Recorded tornados 1966 to 2016		
Date	Time	Intensity
1/11/1974	4:45am	F1
4/3/1974	4:40pm	F4
5/19/1983	6:00pm	F1
4/24/1992	6:40pm	F0
4/28/2014	10:05pm	EF1

The most recent version of this National Weather Service map below covers the period from 1950-2012. It demonstrates historic tornado activity of the County in relationship to surrounding counties, and the entire state.

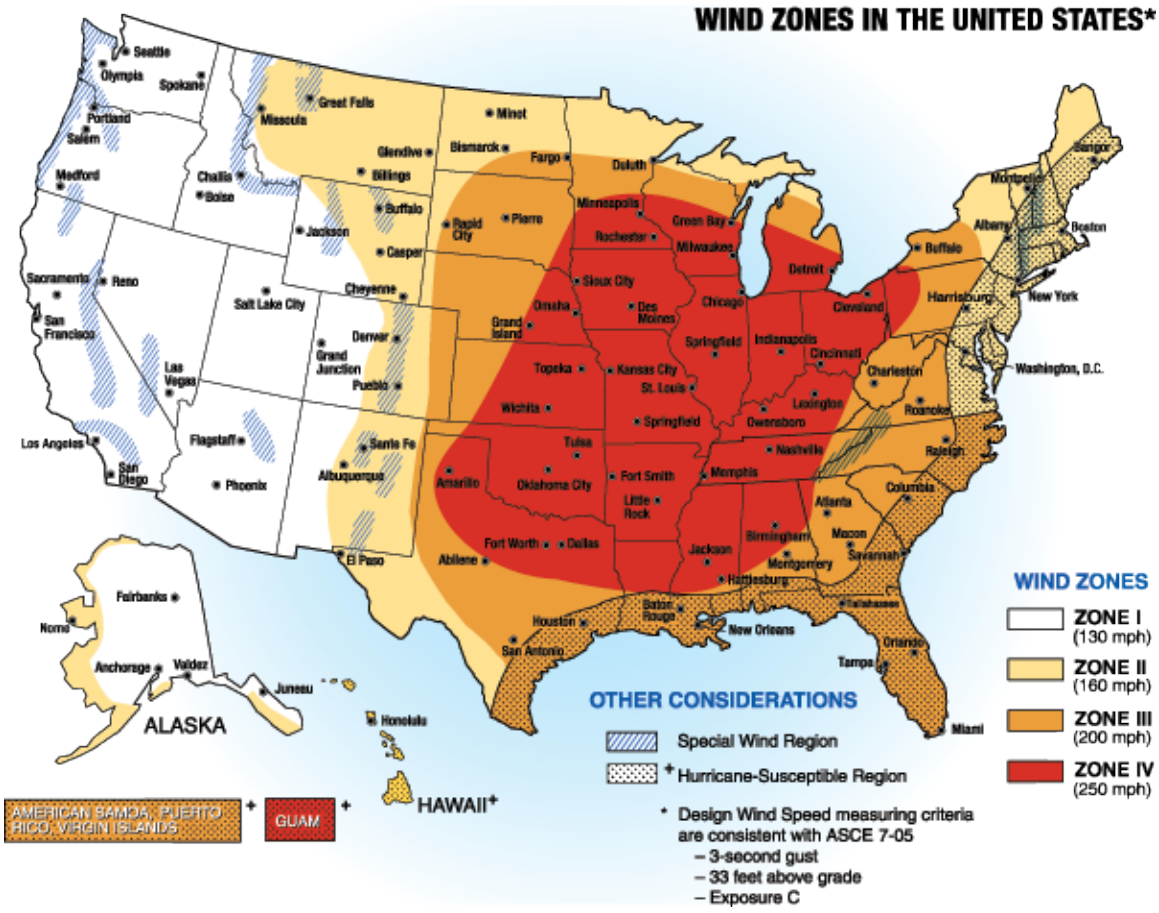


C. Assets Exposed to Hazard - Tornados are unpredictable and are indiscriminate as to when or where they strike. All public and private property including critical facilities are susceptible to tornados since this hazard is not spatially defined. The map below identifies critical facilities located within the hazard area, which in the case of tornados includes all areas within the County, Cities, and Towns.

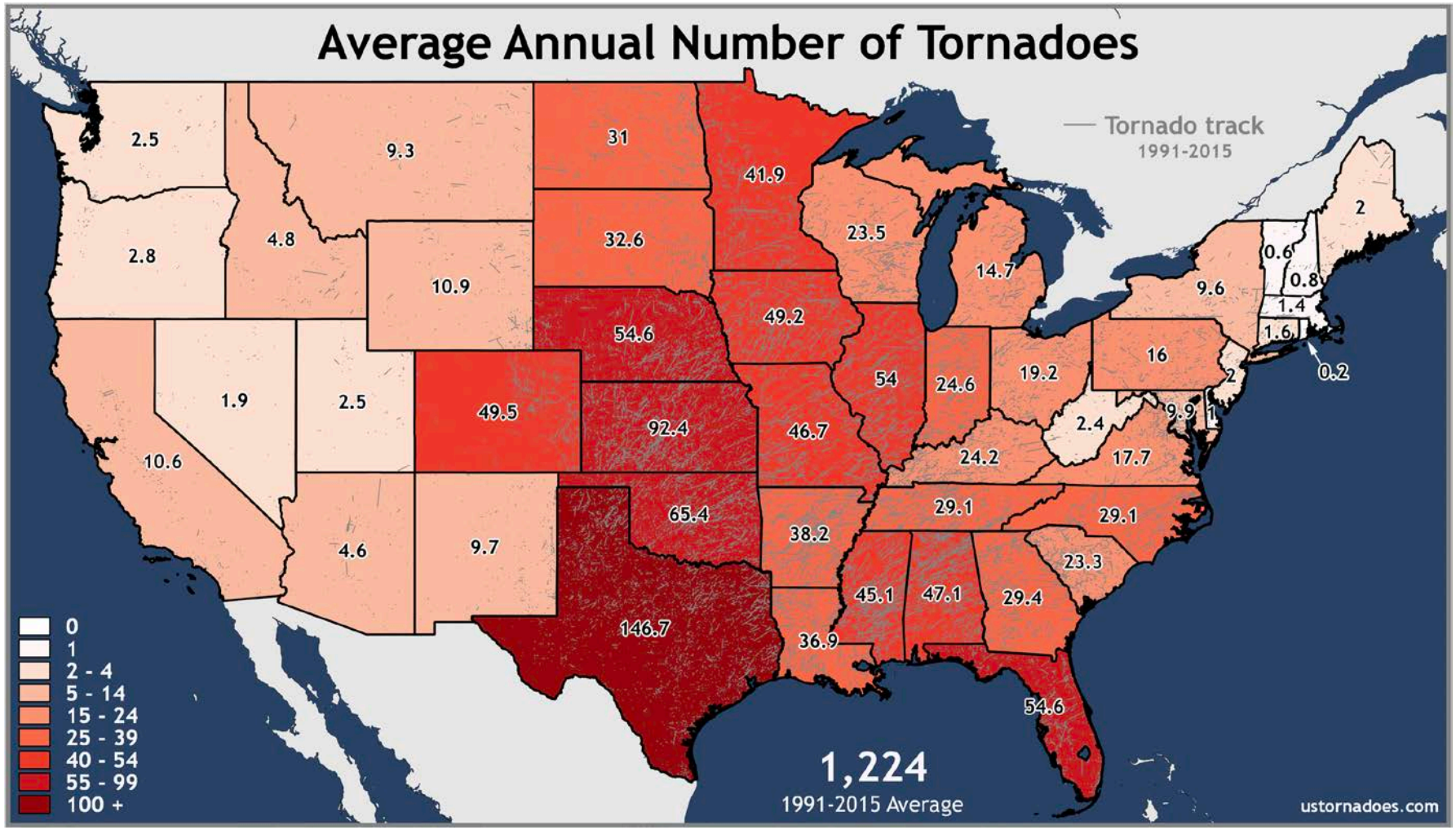


D. Estimate of Potential Losses – For loss estimate information, please refer to the Critical Facilities Database (Appendix A).

Whitfield County is located in wind zone IV, which is associated with 250-mph design wind speeds as determined by the American Society of Civil Engineers (ASCE). Construction must adhere to the Georgia State Minimum Standard Codes (Uniform Codes Act). The minimum standards established by these codes provide reasonable protection from most natural hazards. See the following ASCE map.



The following map from USTornadoes.com was derived from National Weather Service data and shows the impact of recorded tornadoes from 1991 to 2015 by State.



E. Multi-Jurisdictional Concerns - Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta have a design wind speed of 250 mph as determined by the American Society of Civil Engineers (ASCE). Since no part of the County is immune from tornados, any mitigation steps taken related to tornados will be undertaken on a countywide basis, Including the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta. See the following ASCE design wind speed map.

F. Hazard Summary – Based on its history, Whitfield County has a high exposure to potential damage from tornados. Should a tornado strike residential areas or critical facilities, significant damage and loss of life could occur. Due to the destructive power of tornados it is essential that the mitigation measures identified in this plan receive full consideration. Specific mitigation recommendations related to tornados are identified in *Chapter 5*.

2.2 Severe Thunderstorms (including Hail & Lightning)

A. Hazard Identification – A Severe Thunderstorm is defined as a thunderstorm producing wind at or above 58 mph and/or hail one inch in diameter or larger. This threshold is met by approximately 10% of all thunderstorms. These storms can strike any time of year, but similar to tornados, are most frequent in the spring and summer months. They are nature's way of providing badly needed rainfall, dispersing excessive atmospheric heat buildup and cleansing the air of harmful pollutants. Not only can severe thunderstorms produce injury and damage from violent straight-line winds, hail, and lightning, but these storms can produce tornados very rapidly and without warning. Note: For the purposes of this Plan, severe thunderstorms that result from tropical storms and hurricanes are included in this section.

The most damaging phenomena associated with thunderstorms, excluding tornado activity, are thunderstorm winds. These winds are generally short in duration involving straight-line winds and/or gusts in excess of 50 mph. However, these winds can gust to more than 100 miles an hour, overturning trailers, unroofing homes, and toppling trees and power lines. Such winds tend to affect areas of the County with significant tree stands, as well as areas with exposed property, infrastructure, and above-ground utilities. Resulting damage often includes power outages, transportation and economic disruptions, and significant property damage. Severe thunderstorms can ultimately leave a population with injuries and loss of life. Thunderstorms produce two types of wind. Tornados are characterized by rotational winds. The other more predominant winds from a thunderstorm, downbursts, are small areas of rapidly descending air beneath a thunderstorm that strike the ground

producing isolated areas of significant damage. Every thunderstorm produces a downburst. The typical downburst consists of only a 25 mph gusty breeze, accompanied by a temperature drop of as much as 20 degrees within a few minutes. However, severe downburst winds can reach from 58 to 100 mph, or more, significantly increasing the potential for damage to structures. Downbursts develop quickly with little or no advance warning and come from thunderstorms whose radar signatures appear non-severe. There is no sure method of detecting these events, but atmospheric conditions have been identified which favor the development of downbursts. Severe downburst winds have been measured in excess of 120 miles per hour, or the equivalent of an EF2 tornado, on the Enhanced Fujita Scale. Such winds have the potential to produce both a loud "roaring" sound and the widespread damage typical of a tornado. This is why downbursts are often mistaken for tornados.

Hail can also be a destructive aspect of severe thunderstorms. Hail causes more monetary loss than any other type of thunderstorm-spawned severe weather. Annually, the United States suffers about one billion dollars in crop damage from hail. Storms that produce hailstones only the size of a dime can produce dents in the tops of vehicles, damage roofs, break windows and cause significant injury or even death. Unfortunately hail is often much larger than a dime and can fall at speeds in excess of 100 mph. Hailstones are created when strong rising currents of air called updrafts carry water droplets high into the upper reaches of thunderstorms where they freeze. These frozen water droplets fall back toward the earth in downdrafts. In their descent, these frozen droplets bump into and coalesce with unfrozen water droplets and are then carried back up high within the storm where they refreeze into larger frozen drops. This cycle may repeat itself several times until the frozen water droplets become so large and heavy that the updraft can no longer support their weight. Eventually, the frozen water droplets fall back to earth as hailstones.

Finally, one of the most frightening aspects of thunderstorms is lightning. Lightning kills nearly one hundred people every year in the United States and injures hundreds of others. A possible contributing reason for this is that lightning victims frequently are struck before or just after the occurrence of precipitation at their location. Many people apparently feel safe from lightning when they are not experiencing rain. Lightning tends to travel the path of least resistance and often seeks out tall or metal objects. With lightning however, it's all relative. A 'tall' object can be an office tower, a home, or a child standing on a soccer field. Lightning can and does strike just about any object in its path. Some of the most dangerous and intense lightning may occur with severe thunderstorms during the summer months, when outdoor activities are at their peak.

B. Hazard Profile – Severe thunderstorms, hail, and lightning are serious threats to the residents of Whitfield County. Over the course of a year, the County experiences dozens of thunderstorms, with about one in ten being severe. Severe thunderstorms occur more frequently than any other natural hazard event within Whitfield County. Most of these storms include lightning and/or hail. There have been dozens of severe thunderstorm events within Whitfield County over the past fifty years according to available documentation. It is very likely this is a low estimate due to poor record keeping in decades past. It is clear from information collected that more accurate record keeping related to

severe thunderstorms developed over the past two decades, with even more detailed information available for the past ten years.

Most of the available information relating to severe thunderstorms, hail, and lightning occurrences within Whitfield County fails to describe damage estimates in great detail. However, with each thunderstorm event it is likely there are unreported costs related to infrastructure and utilities repair and public safety costs, at a minimum. Severe thunderstorms have occurred in all parts of the day and night within Whitfield County. They have also taken place in every single month of the year.

The table below contains information on the most costly hail event on record for Whitfield County. It occurred May 7, 1998 and had estimated property damage of $25,000. Hail was reported to have been as large as 2.75 inches in diameter, or more.

Storm Events Database

Search Results / Next

Event Details:

Event	**Hail**
Magnitude	**2.75 in.**
State	**GEORGIA**
County/Area	**WHITFIELD**
WFO	**FFC**
NCEI Data Source	**PDC**
Begin Date	**1998-05-07 17:45:00.0 EST**
Begin Location	**5S ROCKY FACE**
Begin Lat/Lon	**34.73/-85.03**
End Date	**1998-05-07 18:00:00.0 EST**
End Location	**TILTON**
End Lat/Lon	**34.67/-84.93**
Deaths Direct/Indirect	**0/0** (fatality details below, when available...)
Injuries Direct/Indirect	**0/0**
Property Damage	**25K**
Crop Damage	
Event Narrative	**Several public reports indicated hail ranged from golf ball to baseball size. Lots of damage to cars and house roofs occurred.**

The table below contains information on the most costly thunderstorm wind event on record for Whitfield County. The storm occurred on June 18, 2011 and had estimated property damage at $1.25 million, and wind gusts approximated between 65 and 70mph.

Search Results / Next

Storm Events Database

Event Details:

Event	**Thunderstorm Wind**
Magnitude	**61 kts.**
State	**GEORGIA**
County/Area	**WHITFIELD**
WFO	**FFC**
Report Source	**Amateur Radio**
NCEI Data Source	**CSV**
Begin Date	**2011-06-18 15:35:00.0 EST-5**
Begin Location	**6WSW ROCKY FACE**
Begin Lat/Lon	**34.7668/-85.1277**
End Date	**2011-06-18 15:55:00.0 EST-5**
End Location	**0WSW DAWNVILLE**
End Lat/Lon	**34.82/-84.87**
Deaths Direct/Indirect	**0/0** (fatality details below, when available...)
Injuries Direct/Indirect	**0/0**
Property Damage	**1.25M**
Crop Damage	**0.00K**
Episode Narrative	**A series of strong short waves were moving across the U.S. These short waves were ejecting from a large upper trough in the western U.S. These vigorous short waves encountered a hot, moist, unstable air mass across the U.S. However, dry mid-level atmosphere air and west to west-northwest flow aloft promoted the development of organized lines of thunderstorms, which produced extensive strong outflow boundaries supporting wind gusts of 50 to 60 mph, even greater in some cases. During the afternoon of the 18th, such thunderstorm gust fronts affected northwest Georgia in particular with widespread damaging wind gusts, likely in excess of 70 mph, blowing down hundreds of trees, dozens of power lines, and causing damage to some structures. This area of thunderstorms progressed southeast toward Atlanta, before dissipating during the mid-evening. Considerable wind damage was noted in the northern and northwestern suburbs of Atlanta from this activity.**
Event Narrative	**Amateur radio operators and the public reported that hundreds of trees were down across the county from west of Rocky Face to Dalton. Wind gusts were estimated at 65 to 70 mph. At least 40 homes across the county sustained minor to moderate damage from fallen trees. Four homes in Dalton and two homes in Rocky Face suffered extensive damage from trees which fell on the structures. Multiple trees and several power lines were down on Cleveland Highway north of Dalton. A number of power lines were down throughout the city of Dalton.**

The table below contains information on the most costly lightning event on record for Whitfield County. The storm occurred on June 24, 2011 and had estimated property damage at $100,000 due largely to the loss of a commercial structure on Beaverdale Rd.

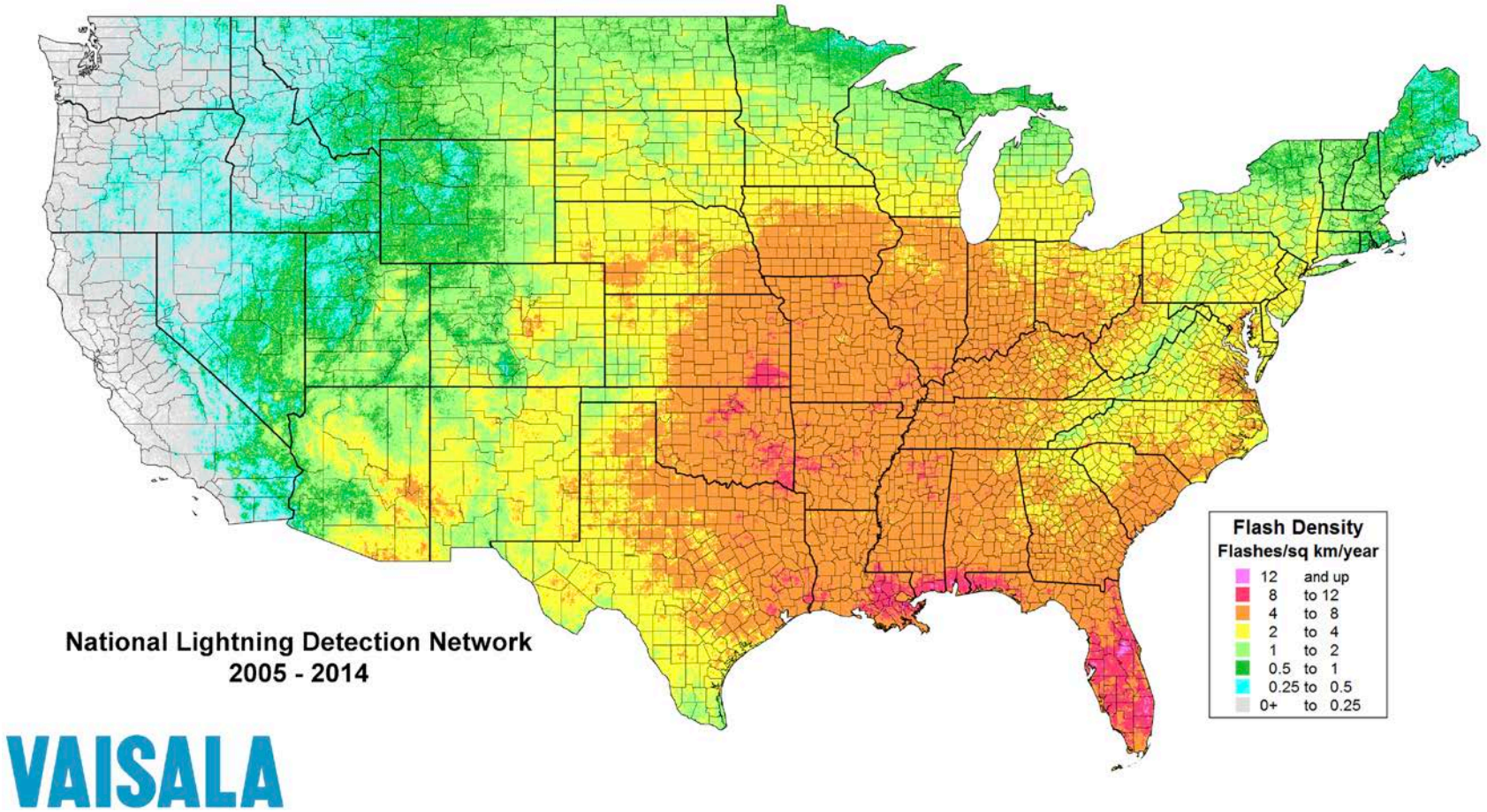
Storm Events Database

Search Results / Next

Event Details:

Event	**Lightning**
State	**GEORGIA**
County/Area	**WHITFIELD**
WFO	**FFC**
Report Source	**Emergency Manager**
NCEI Data Source	**CSV**
Begin Date	**2011-06-24 15:32:00.0 EST-5**
Begin Location	**0W TOONNERVILLE**
Begin Lat/Lon	**34.8705/-84.8872**
End Date	**2011-06-24 15:32:00.0 EST-5**
End Location	**0W TOONNERVILLE**
End Lat/Lon	**34.8705/-84.8872**
Deaths Direct/Indirect	**0/0** (fatality details below, when available...)
Injuries Direct/Indirect	**0/0**
Property Damage	**100.00K**
Crop Damage	**0.00K**
Episode Narrative	**A persistent and strong subtropical ridge centered across the Southern Plains continued to provide Georgia with an unstable northwest flow aloft. A series of upper-level disturbances were embedded within the flow, each generating rounds of thunderstorms across the Tennessee Valley which progressively moved southeast into Georgia. This pattern remained in place through much of June and into early July, for that matter. A quasi-stationary front extended westward from the Carolinas and Tennessee westward into Oklahoma. Numerous convective outflow boundaries were noted throughout the Tennessee Valley and the Carolinas. A complex of thunderstorms moved into north Georgia during the mid-afternoon and steadily propagated southward into central Georgia during the evening before diminishing. Many reports of damaging wind and some hail were reported during this event.**
Event Narrative	**The Whitfield County Emergency Management Director reported that a commercial structure on Beaverdale Road was set on fire by lightning. No specific details regarding damages were provided.**

The National Lightning Detection Network Map below shows lightning flash density by county. From 2005 to 2014, Whitfield County averaged between 2 and 8 flashes per square kilometer per year.

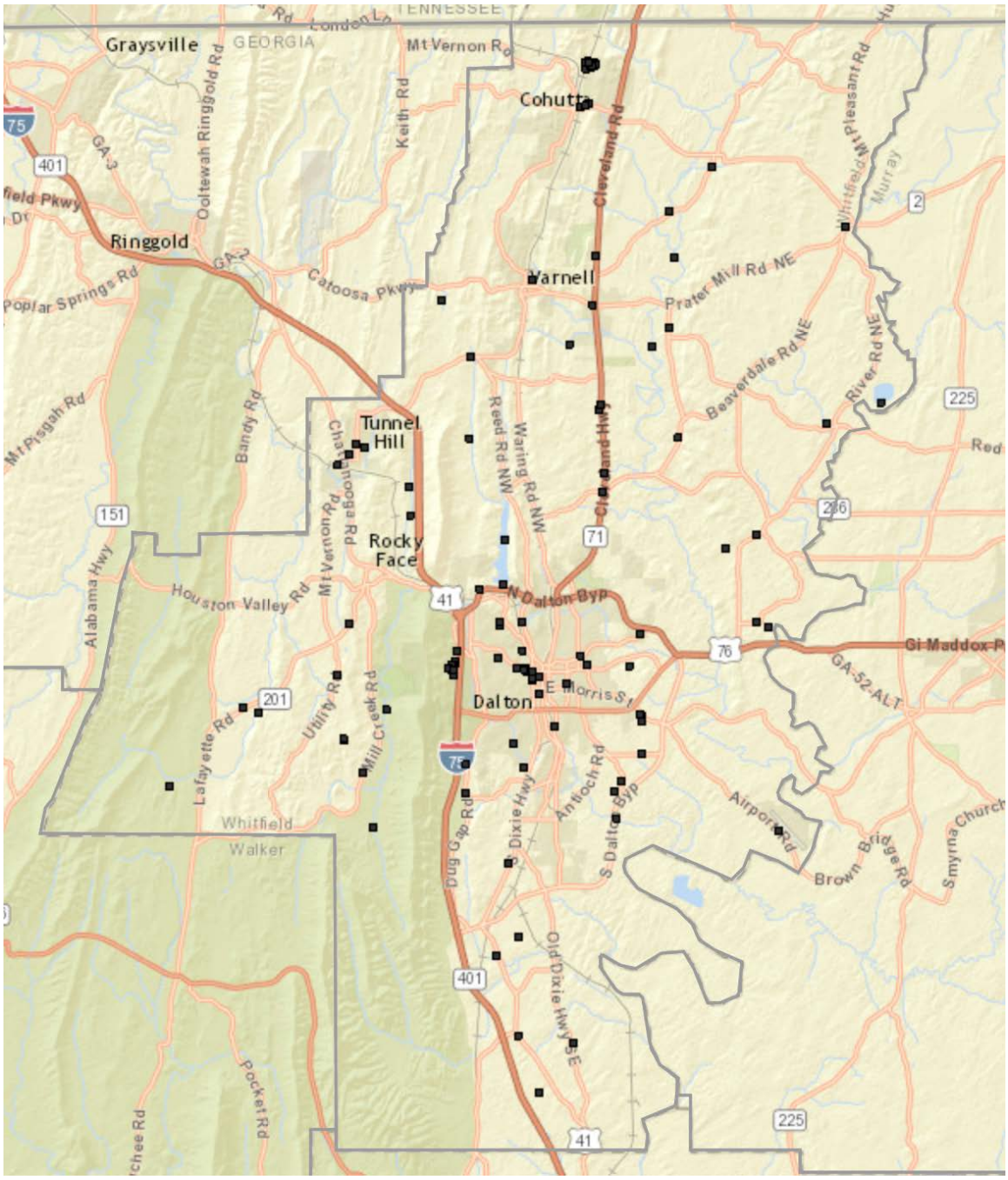


The Whitfield County HMPC utilized data from the National Climatic Data Center, the National Weather Service, numerous weather-related news articles and various online resources, and the Whitfield County Emergency Operations Plan in researching severe thunderstorms and their impact on the County. With most of the County's recorded severe thunderstorm events, only basic information was available. It is also likely that some severe thunderstorm events have gone unrecorded. Therefore, any conclusions reached based upon available information on severe thunderstorms within Whitfield County should be treated as the minimal possible threat.

NCDC records show that 196 severe thunderstorms occurred within the County over the past fifty years, which equates to a 392% annual frequency based upon reported events. Over the past twenty years that frequency has essentially doubled. It would appear that severe thunderstorm activity has increased over time within the County. This may be the case or it may simply be that record keeping and technology have improved significantly over the course of time, reflecting the higher numbers. It may also be a combination of these two factors. The following chart provides annual frequency of reported events over the past five, ten, twenty, and fifty-year periods. The most recent five-year period, covering the span of time since the last update to this Plan, is highlighted in gold.

Whitfield County – Severe Thunderstorm Frequency including Hail & Lightning (based on Reported Events)				
Time Period	**5yrs (2011-2016)**	**10yrs (2006-2016)**	**20yrs (1996-2016)**	**50yrs (1966-2016)**
Number of Reported Events	**34**	**77**	**160**	**196**
Frequency Average per Year	**6.8**	**7.7**	**8.0**	**3.92**
Frequency Percent per Year	**680%**	**770%**	**800%**	**392%**

C. Assets Exposed to Hazard – All public and private property including critical facilities are susceptible to severe thunderstorms, hail, and lightning since this hazard is not spatially defined. The map below identifies critical facilities located within the hazard area, which in the case of severe thunderstorms includes all areas within the County, Cities, and Towns.



D. Estimate of Potential Losses – For loss estimate information, please refer to the Critical Facilities Database (Appendix A).

E. Multi-Jurisdictional Concerns – Any portion of Whitfield County can be negatively impacted by severe thunderstorms, hail, and lightning. Therefore, any mitigation steps taken related to these weather events will be pursued on a countywide basis and include the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta.

F. Hazard Summary – Overall, severe thunderstorm, hail, and lightning events pose one of the greatest threats to Whitfield County in terms of property damage, injuries and loss of life. These weather events represent the most frequently occurring natural hazard within Whitfield County and have a great potential to negatively impact the County each year. Based on the frequency of this hazard, as well as its ability to negatively impact any part of the County, the HMPC recommends that the mitigation measures identified in this plan for severe thunderstorm, hail, and lightning be aggressively pursued. Specific mitigation actions related to these weather events are identified in *Chapter 5*.

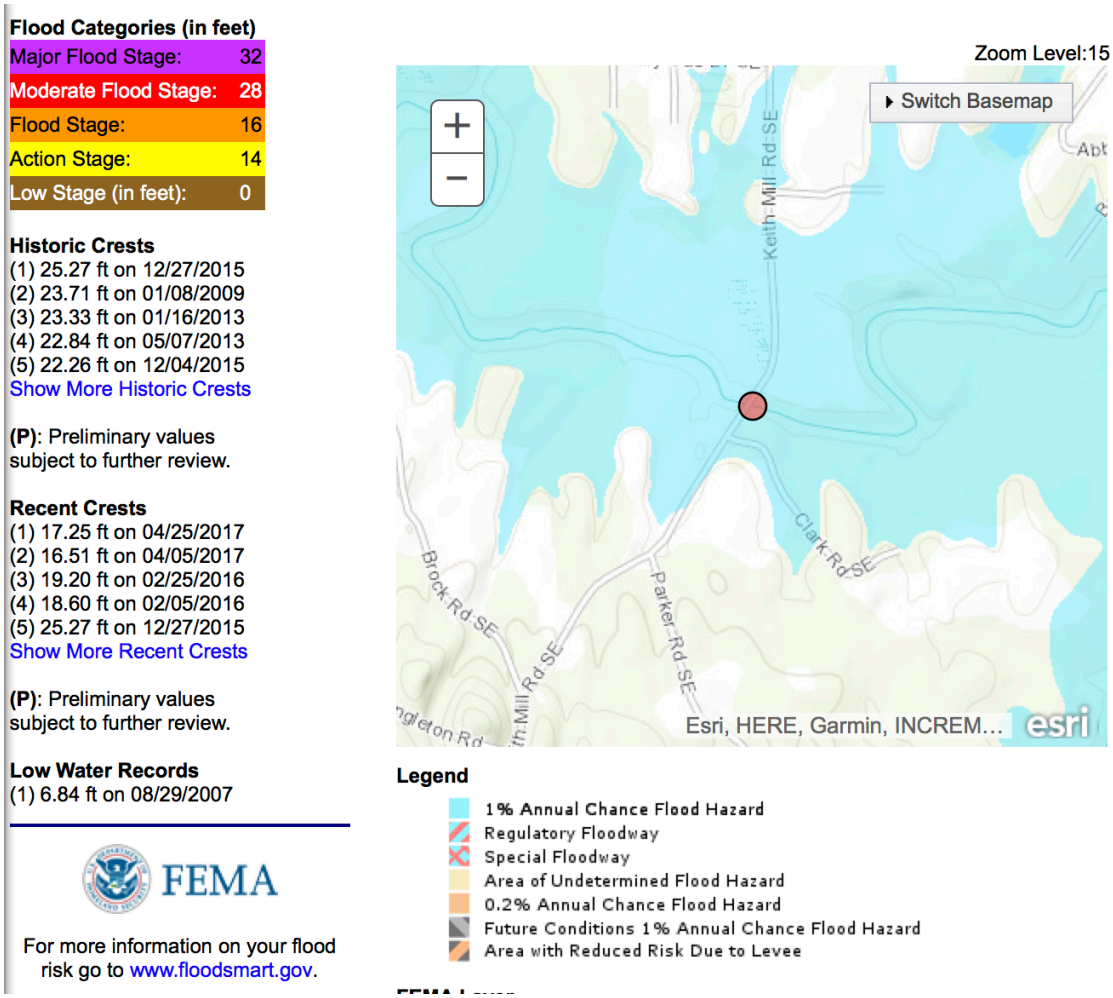
2.3 Flooding

A. Hazard Identification: The vulnerability of a river or stream to flooding depends upon several variables. Among these are topography, ground saturation, rainfall intensity and duration, soil types, drainage, drainage patterns of streams, and vegetative cover. A large amount of rainfall over a short time span can result in flash flood conditions. Nationally, the total number of flash flood deaths has exceeded tornado fatalities during the last several decades. Two factors seem to be responsible for this: public apathy regarding the flash flood threat and increased urbanization. A small amount of rain can also result in floods in locations where the soil is saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, etc. Topography and ground cover are also contributing factors for floods in that water runoff is greater in areas with steep slopes and little or no vegetation.

B. Hazard Profile: Over the past fifty years, flood events on record in Whitfield County have usually been associated with areas in the vicinity of the County's many creeks and lakes. The areas most affected or potentially most affected include locations in the vicinity of Dee St, Old Grade Rd at Admiral Mack Gaston Pkwy, Old Dixie Hwy at South Bypass, Hickory Flats Rd, Brock Dr, Susan Dr, Hunter Cr, 1710 Cleveland Hwy, Needham Dr, Mill Creek at Underwood Rd/Underwood St, Mill Creek at Environs Ln, Mill Creek at SR 71 (Cleveland Hwy), Mill Creek at I-75, and Mill Creek from US 41 at Willowdale Rd to US 41 at Shugart Rd. Relatively little information on flooding damage estimates, in terms

of dollars, was available. However, with each of these events there were certainly significant costs related to road repair, infrastructure repair, and public safety, at a minimum. Most of the flood damage that has occurred historically within the County appears to be "public" flood damage. More specifically, roads and culverts washing out have been the most common flooding problem on record.

Below are two graphics illustrating both the historical and recent crests of the Coahulla Creek at Keiths Mill and the Conasauga River near Tilton. The record historic crest of the Coahulla Creek at Keith s Mill was 25.27ft on December 27, 2015. with a more recent flood level crest of 17.25ft on April 25, 2017. The record historic crest of the Conasauga River near Tilton was 34.00ft on April 1, 1886, with a more recent flood level crest of 18.72ft on February 26, 2016.



Flood Categories (in feet)

Major Flood Stage:	28
Moderate Flood Stage:	24
Flood Stage:	18
Action Stage:	15
Low Stage (in feet):	0

Historic Crests
(1) 34.00 ft on 04/01/1886
(2) 30.20 ft on 03/30/1951
(3) 29.89 ft on 02/17/1990
(4) 28.42 ft on 03/29/1994
(5) 28.13 ft on 03/18/1973
Show More Historic Crests

(P): Preliminary values subject to further review.

Recent Crests
(1) 18.72 ft on 02/26/2016
(2) 25.99 ft on 12/28/2015
(3) 22.42 ft on 12/04/2015
(4) 18.44 ft on 07/09/2013
(5) 23.33 ft on 05/08/2013
Show More Recent Crests

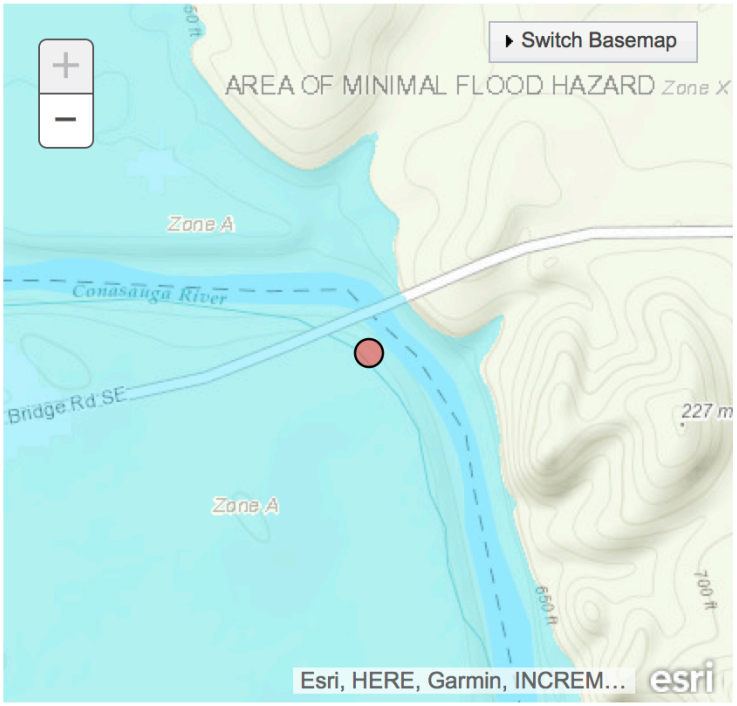
(P): Preliminary values subject to further review.

Low Water Records
(1) 1.68 ft on 09/05/2007

FEMA

For more information on your flood risk go to www.floodsmart.gov.

Zoom Level:16



Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

NCDC records show that 18 flood events occurred within the County over the past fifty years, which equates to a 36% annual frequency based upon reported events. However, flooding events may have been underreported during the first few decades of the fifty-year history. The following chart provides annual frequency of reported events over the past five, ten, twenty, and fifty-year periods. The most recent five-year period, covering the span of time since the last update to this Plan, is highlighted in gold.

Whitfield County – Flooding Frequency (based on Reported Events)				
Time Period	**5yrs (2011-2016)**	**10yrs (2006-2016)**	**20yrs (1996-2016)**	**50yrs (1966-2016)**
Number of Reported Events	**3**	**3**	**16**	**18**
Frequency Average per Year	**0.6**	**0.3**	**0.8**	**0.36**
Frequency Percent per Year	**60%**	**30%**	**80%**	**36%**

Whitfield County (CID No. 130193), the City of Dalton (CID No. 130194), the City of Tunnel Hill (CID No. 130489), the City of Varnell (CID No. 130667), and the Town of Cohutta (CID No. 130618) each participate in the National Flood Insurance Program (NFIP) and follow the Program guidelines to ensure future development is carried out in the best interests of the public. According to NFIP guidelines, each jurisdiction has executed a Flood Damage Prevention Ordinance. The purpose of this ordinance is to minimize the loss of human life and health as well as to minimize public and private property losses due to flood conditions. The ordinance requires that potential flood damage be evaluated at the time of initial construction of structures, facilities and utilities, and that certain uses be restricted or prohibited based on this County evaluation. The ordinance also requires that potential homebuyers be notified that property is located in a flood area. In addition, all construction must adhere to the Georgia State Minimum Standard Codes (Uniform Codes Act). The minimum standards established by these codes provide reasonable protection to persons and property within structures that comply with the regulations for most natural hazards.

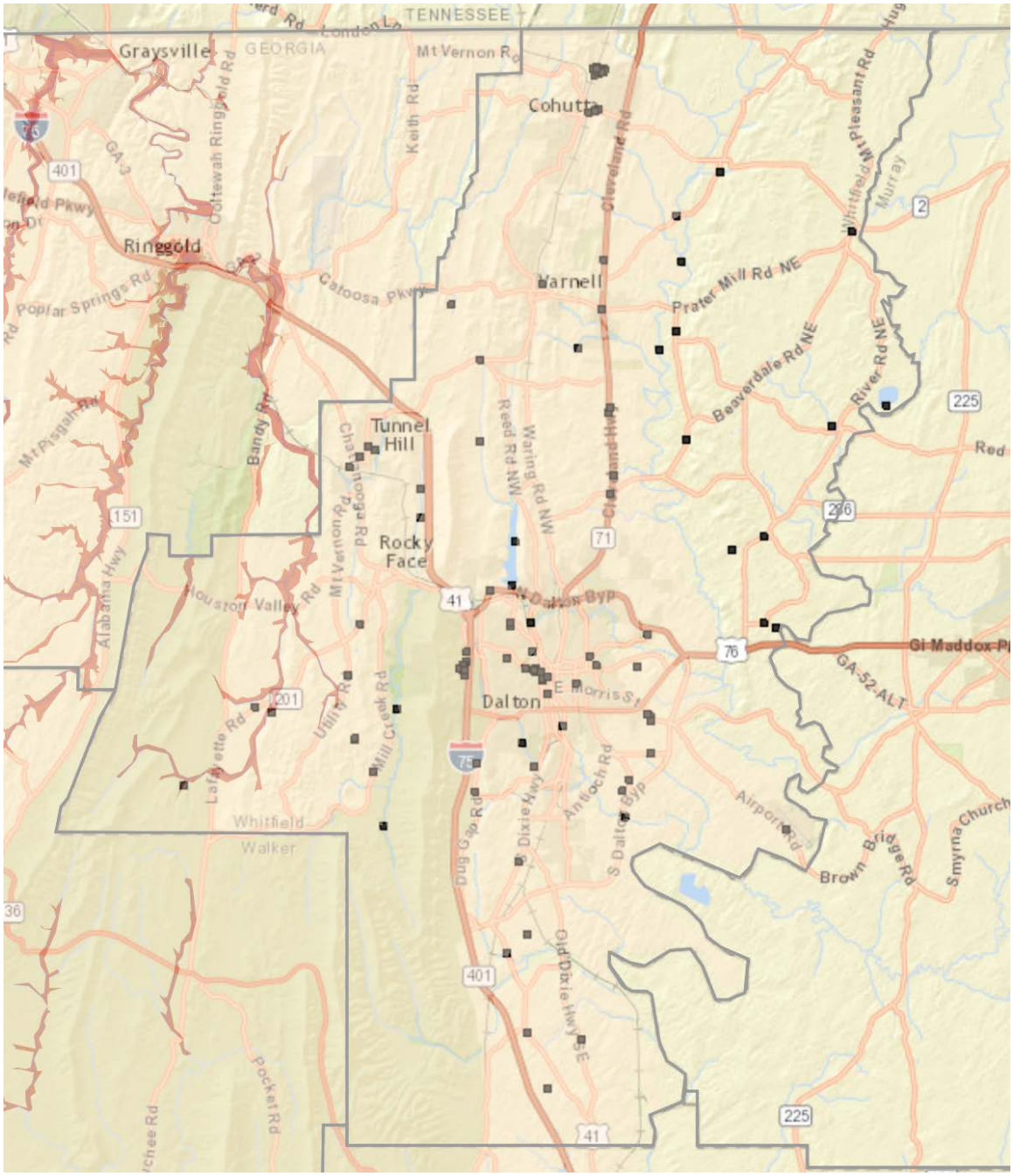
According to the National Flood Insurance Reform Act, a repetitive loss structure is defined as "…a building covered by a contract for flood insurance that has incurred flood-related damages on two occasions during a 10-year period ending on the date of the event for which a second claim is made, in which the cost of repairing the flood damage, on the average, equaled or exceeded 25 percent of the market value of the building at the time of each such flood event." **As of December 2016, there are EIGHT official residential "repetitive loss structures" on file for Whitfield County. These have occurred in unincorporated Whitfield County, including the Rocky Face community, and the City of Dalton.** *Specific addresses for repetitive loss structures cannot be included in this Plan,*

but a current list of these structures may be viewed in GMIS by authorized individuals, as determined by the EMA Director.

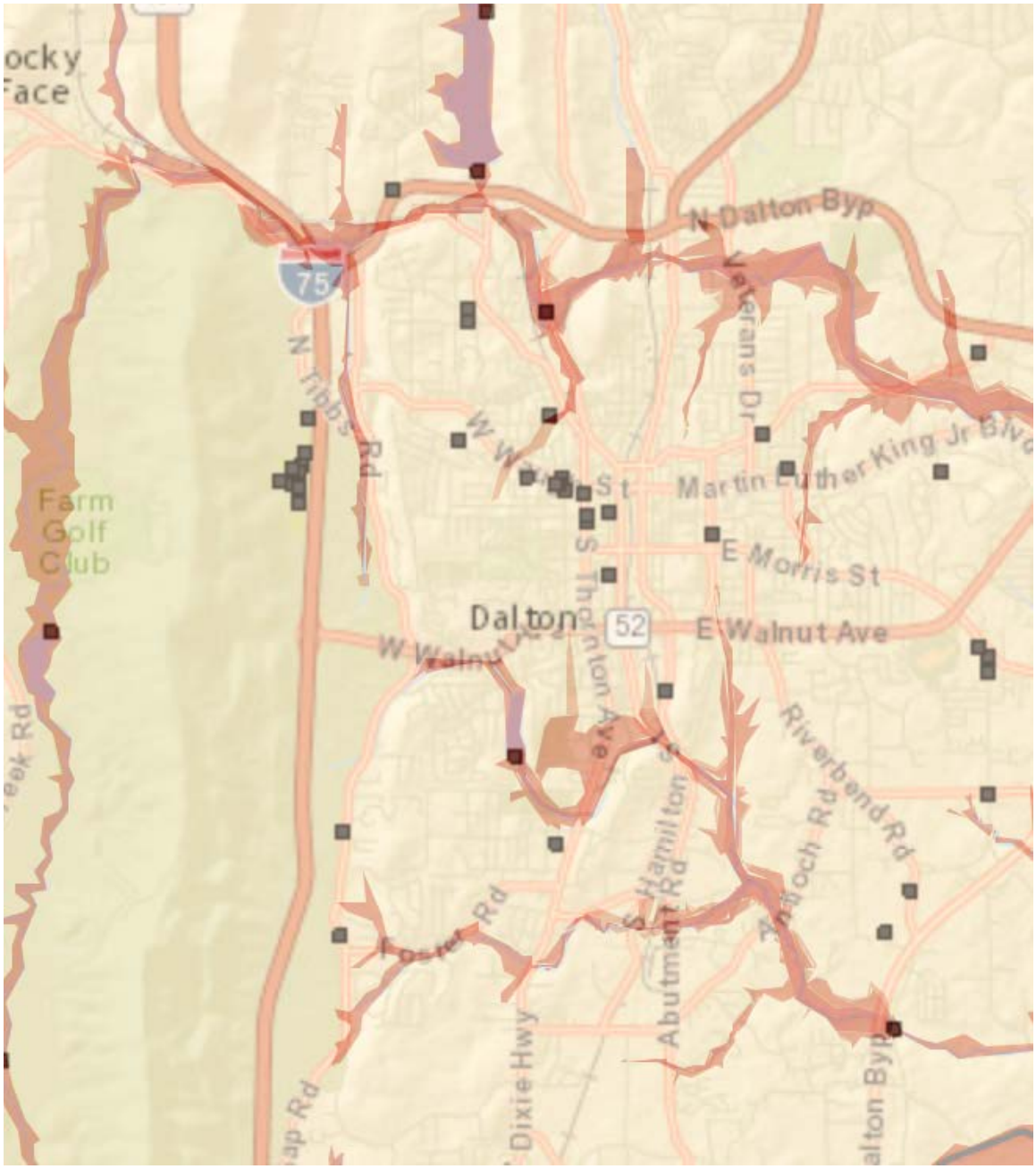
C. Assets Exposed to Hazard – In evaluating assets that may potentially be impacted by the effects of flooding, the HMPC determined that, although all critical facilities, public and private property are potentially susceptible to flooding, structures located within the vicinity of Dee St, Old Grade Rd at Admiral Mack Gaston Pkwy, Old Dixie Hwy at South Bypass, Hickory Flats Rd, Brock Dr, Susan Dr, Hunter Cr, 1710 Cleveland Hwy, Needham Dr, Mill Creek at Underwood Rd/Underwood St, Mill Creek at Environs Ln, Mill Creek at SR 71 (Cleveland Hwy), Mill Creek at I-75, and Mill Creek from US 41 at Willowdale Rd to US 41 at Shugart Rd are the most susceptible.

The maps on the following pages identify the locations of critical facilities in relationship to the known flooding hazard areas located within the County and each City and Town.

Whitfield County

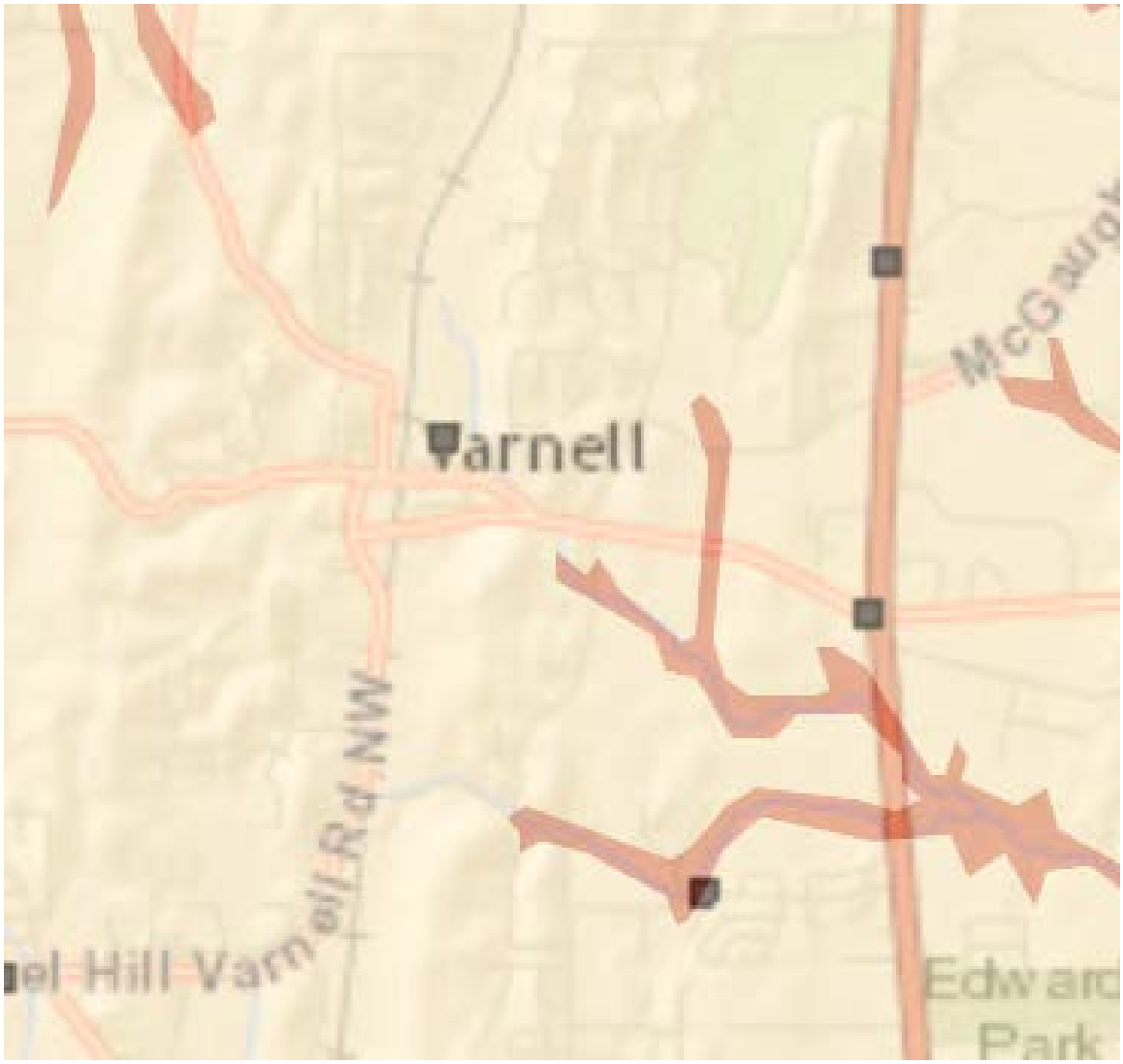


City of Dalton

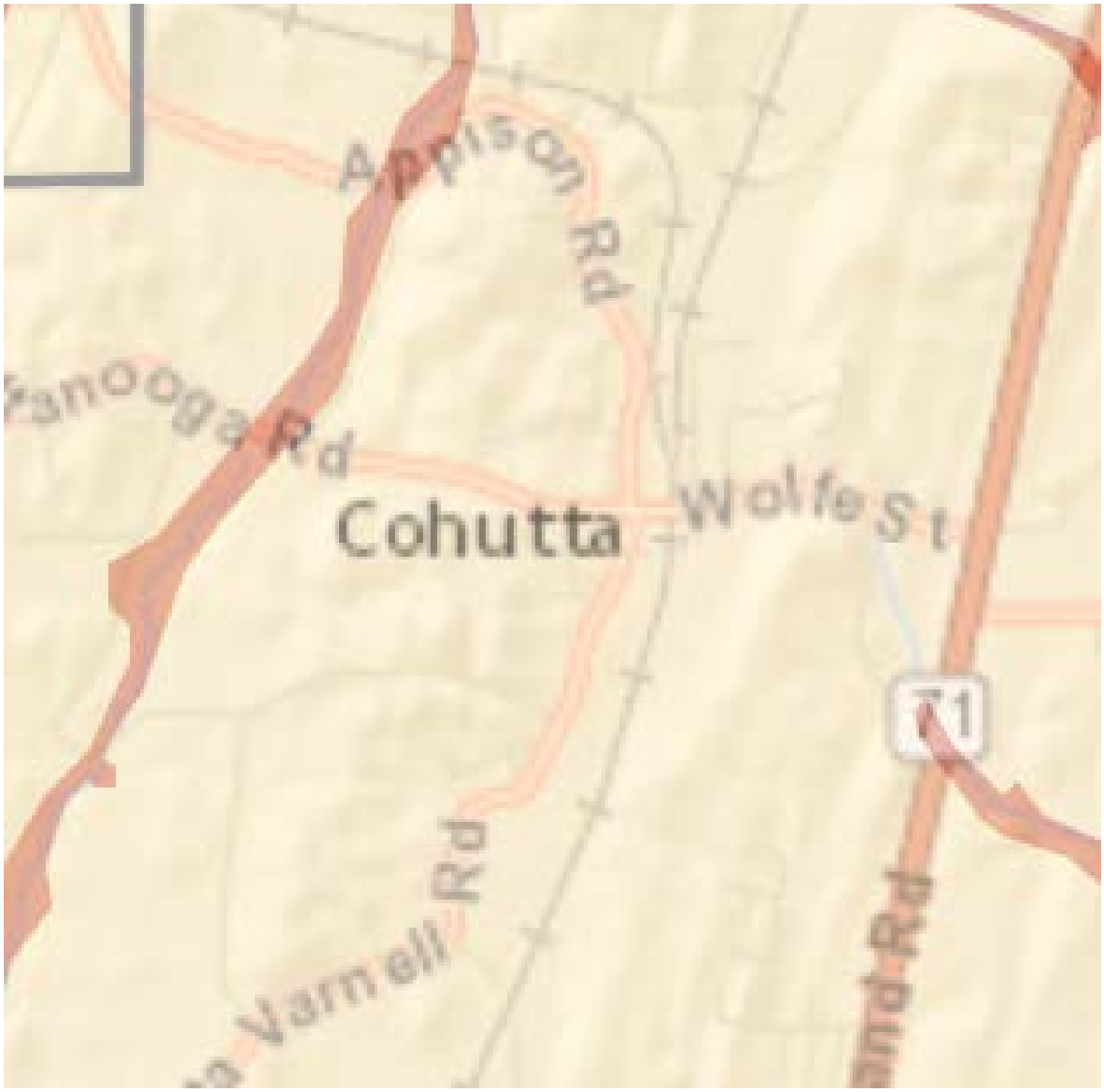


City of Tunnel Hill

City of Varnell



Town of Cohutta



D. Estimate of Potential Losses – For loss estimate information, please refer to the Critical Facilities Database (Appendix A).

E. Multi-Jurisdictional Concerns – Any portion of Whitfield County can potentially be impacted by flooding, however, the areas most prone to flooding have historically been those areas located in the vicinity of Dee St, Old Grade Rd at Admiral Mack Gaston Pkwy, Old Dixie Hwy at South Bypass, Hickory Flats Rd, Brock Dr, Susan Dr, Hunter Cr, 1710 Cleveland Hwy, Needham Dr, Mill Creek at Underwood Rd/Underwood St, Mill Creek at

Environs Ln, Mill Creek at SR 71 (Cleveland Hwy), Mill Creek at I-75, and Mill Creek from US 41 at Willowdale Rd to US 41 at Shugart Rd. Any mitigation steps taken related to flooding will be pursued on a countywide basis and include the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta. According to GMIS flood maps, the County and each of the municipalities all have significant flood-prone areas within their jurisdictions.

F. Hazard Summary – Severe flooding has the potential to inflict significant damage within Whitfield County. Mitigation of flood damage requires the community to have knowledge of flood-prone areas, including roads, bridges, bodies of water, and critical facilities, as well as the location of the County's designated shelters. The Whitfield County HMPC identified flooding as a hazard requiring mitigation measures and identified specific mitigation goals, objectives and action items they deemed necessary to lessen the impact of flooding. These findings are found in *Chapter 5*.

2.4 Winter Storms

A. Hazard Identification – The Whitfield County HMPC researched historical data from the National Climatic Data Center, The National Weather Service, as well as information from past newspaper articles and various online resources relating to winter storms in Whitfield County. Winter storms bring the threat of freezing rain, ice, sleet, snow and the associated dangers. A heavy accumulation of ice, especially when accompanied by high winds, devastates trees and power lines. Such storms make highway travel or any outdoor activity extremely hazardous due to falling trees, ice, and other debris.

B. Hazard Profile – Although winter storms occur relatively infrequently, they have the potential to wreak havoc on the community when they do strike. Winter storms within Whitfield County typically cause damage to power lines, trees, buildings, structures, and bridges, to varying degrees. Portions of the County with higher elevations have highways with steep grades, resulting in very hazardous travel conditions when they are covered with frozen precipitation. Another hazard exists due to the large tree population. Trees and branches weighed down by snow and ice become very dangerous to person and property.

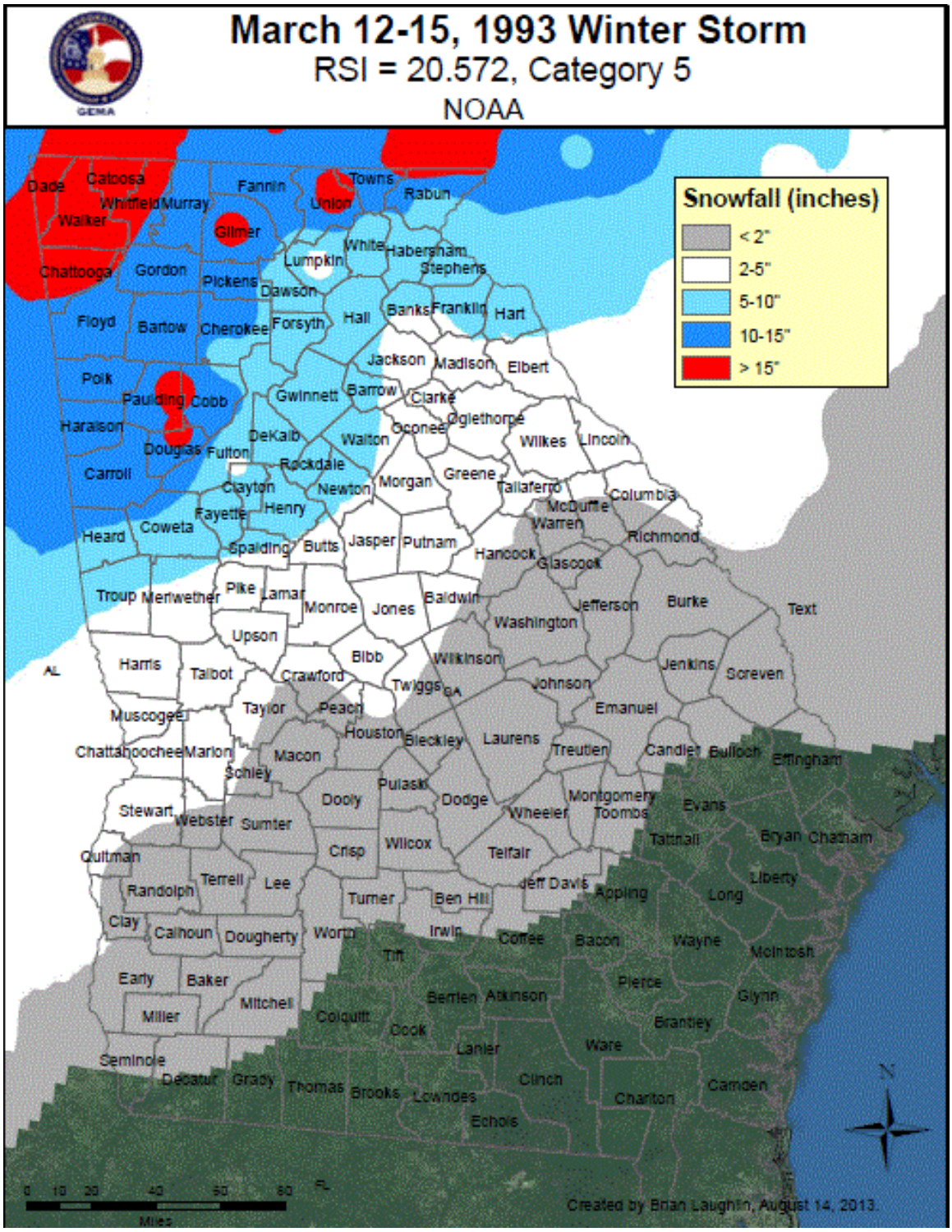
NCDC records show that 40 winter storms occurred within the County over the past fifty years, which equates to a 80% annual frequency based upon reported events. Over the course of the entire 50-year period that frequency has essentially doubled. It would appear that winter storm activity has increased over time within the County. This may be the case or it may simply be that record keeping and technology have improved significantly over the course of time, reflecting the higher numbers. It may also be a combination of these two factors. The following chart provides annual frequency of reported events over the past five, ten, twenty, and fifty-year periods. The most recent five-year period, covering the span of time since the last update to this Plan, is highlighted in gold.

Whitfield County – Winter Storm Frequency
(based on Reported Events)

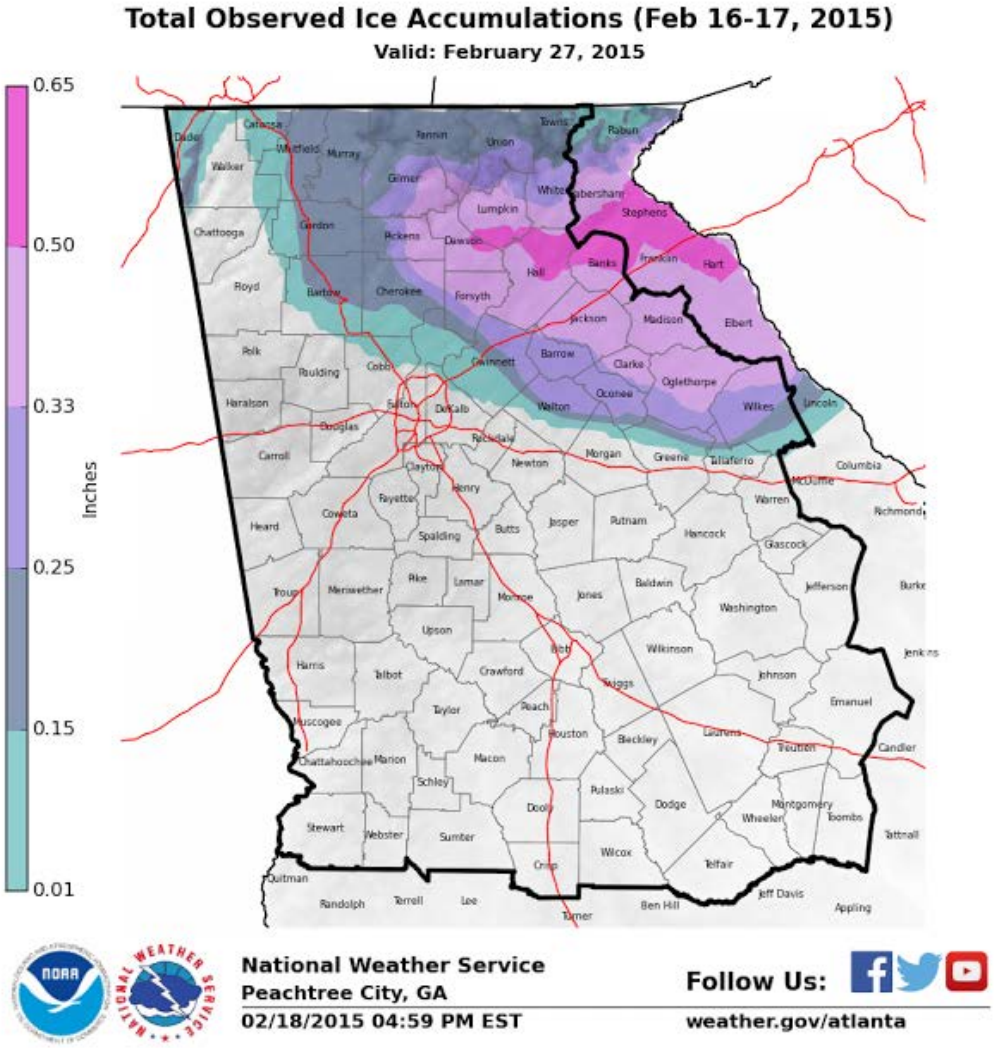
Time Period	5yrs (2011-2016)	10yrs (2006-2016)	20yrs (1996-2016)	50yrs (1966-2016)
Number of Reported Events	7	18	36	40
Frequency Average per Year	1.4	1.8	1.8	0.8
Frequency Percent per Year	140%	180%	180%	80%

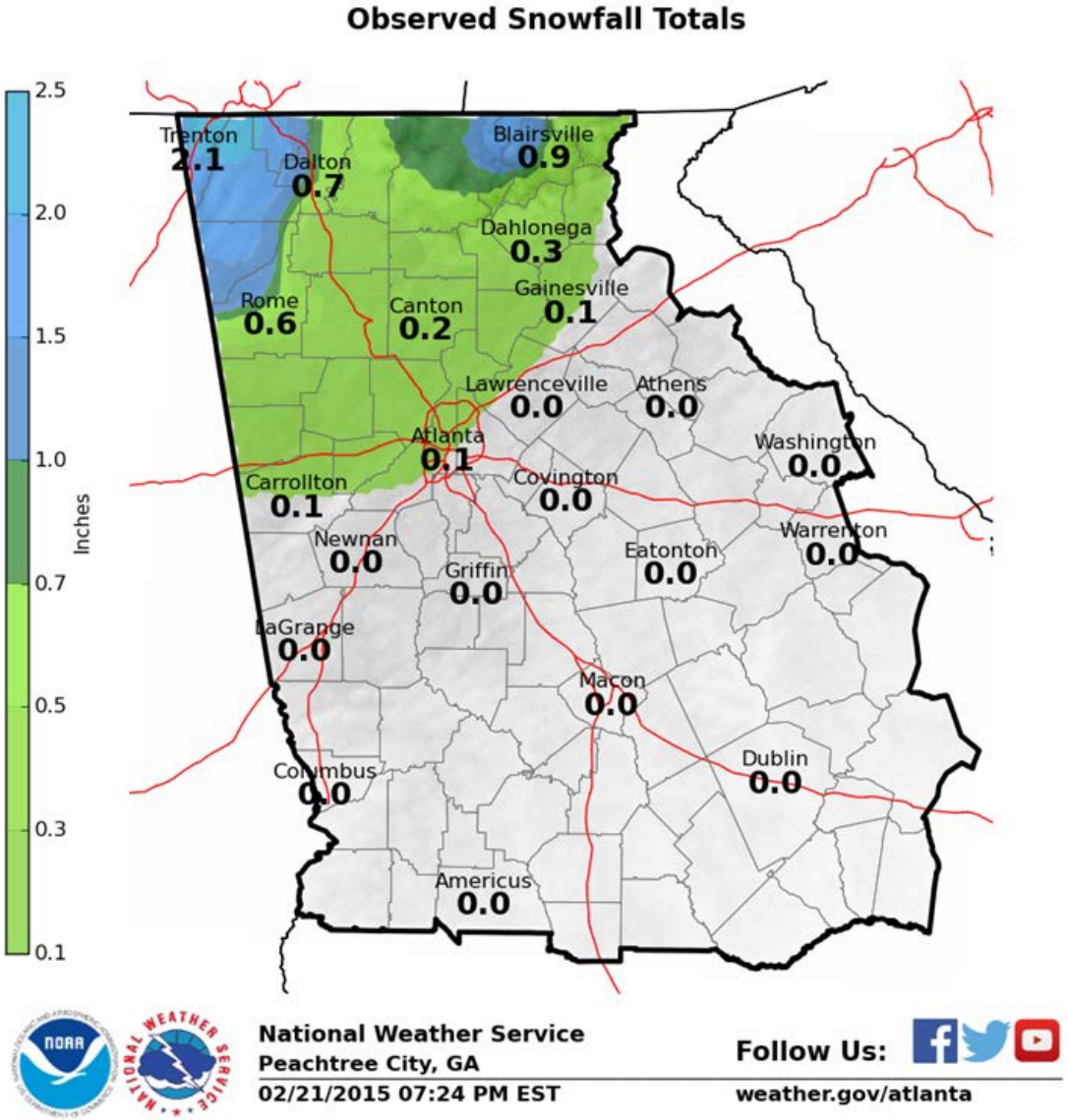
March 13, 1993 "Storm of the Century"

On Wednesday, March 10, 1993, Atlanta's high was 75 degrees, while other parts of the state hit the 80s. But by Friday, forecasters at the National Weather Service were sounding ominous warnings of overnight blizzard conditions as a hurricane-like storm churned out of Florida into Georgia. The "Storm of the Century" as it became known hit metro Atlanta on Saturday, March 13, 1993. The snow began falling early that morning and by the time it had tapered off nearly three feet had fallen across parts of extreme north Georgia, with Whitfield County receiving over 15 inches in some locations. Fifteen people were killed in Georgia, while the death toll across the U.S., Canada and Cuba hit 310. The storm paralyzed metro Atlanta and north Georgia for days, the heavy snowfall closing interstates from Atlanta northward. Saturday's blizzard conditions subsided somewhat by late in the day but were followed by bitter cold, with temperatures plummeting into the teens on Sunday. The following Monday, hundreds if not thousands of motorists were still stranded on snow-packed I-75 through northwest Georgia. National Guardsmen in four-wheel drive vehicles made their way up the interstate, handing out bags of fruit to stranded motorists. The weight of all that snow took its toll on the carpet industry in northwest Georgia, where the roofs of numerous large carpet mills and warehouses collapsed. Over 10 million utility customers lost power as the storm developed into a fierce Nor'easter as it skirted the Atlantic coast northward. In Georgia, more than a half-million Georgia Power customers were without electricity, some for as long as two weeks.

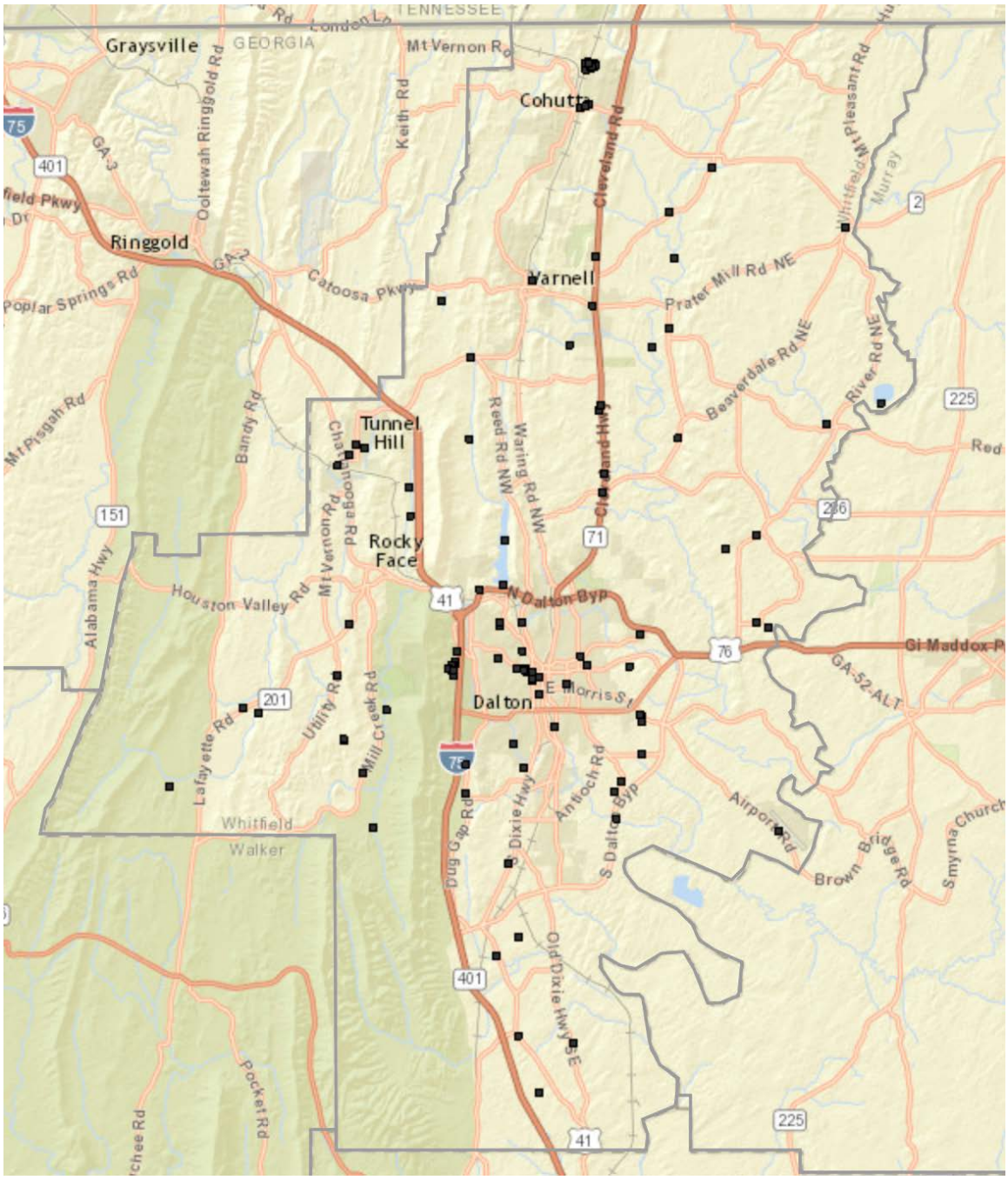

March 12-15, 1993 Winter Storm
RSI = 20.572, Category 5
NOAA
Snowfall (inches)
< 2"
2-5"
5-10"
10-15"
> 15"
Dade
Catoosa
Whitfield
Murray
Walker
Fannin
Towns
Union
Rabun
Gilmer
Chattooga
Gordon
Pickens
Lumpkin
White
Habersham
Stephens
Dawson
Floyd
Bartow
Cherokee
Forsyth
Hall
Banks
Franklin
Hart
Polk
Paulding
Cobb
Gwinnett
Barrow
Jackson
Madison
Elbert
Clarke
Oglethorpe
Haralson
Douglas
Fulton
DeKalb
Walton
Oconee
Wilkes
Lincoln
Carroll
Rockdale
Clayton
Newton
Morgan
Greene
Taliaferro
Columbia
McDuffie
Warren
Fayette
Henry
Coweta
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Glascock
Richmond
Troup
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Jefferson
Burke
Text
Washington
Upson
Harris
Talbot
Crawford
Bibb
Wilkinson
Twiggs
Johnson
Jenkins
Screven
AL
GA
Taylor
Peach
Emanuel
Muscogee
Houston
Bleckley
Laurens
Treutlen
Candler
Bulloch
Effingham
Chattahoochee
Marion
Macon
Schley
Pulaski
Dooly
Dodge
Montgomery
Toombs
Evans
Stewart
Webster
Sumter
Wheeler
Tattnall
Bryan
Chatham
Quitman
Crisp
Wilcox
Telfair
Randolph
Terrell
Lee
Turner
Ben Hill
Jeff Davis
Appling
Liberty
Long
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Early
Baker
Mitchell
Berrien
Atkinson
Pierce
Glynn
Miller
Colquitt
Cook
Brantley
Lanier
Ware
Seminole
Decatur
Grady
Thomas
Brooks
Lowndes
Clinch
Charlton
Camden
Echols
FL
0 10 20 40 60 80
Miles
N
Created by Brian Laughlin, August 14, 2013.

The latest winter storm to affect Whitfield County occurred in mid-February of 2015. A strong cold front pushed across Georgia by the morning of February 15th, bringing in plenty of below freezing temperatures to north Georgia. As a low pressure system approached the area from the west on February 16th, warmer temperatures surged northward, bringing much of the area above freezing. However, temperatures at the surface across parts of north and northeast Georgia hovered at or below freezing as the rainfall increased, thanks to a wedge of cold air. Freezing rain continued for these areas into the early morning hours of February 17th before coming to an end. Freezing rain totals reached over 1/2" in some areas, leading to widespread tree and power line damage. By the morning of February 17th, more than 200,000 customers were without power, generally for the northeast Atlanta metro area and points north and east. The following maps shows ice accumulations and snowfall totals in Whitfield County and surrounding areas.




Observed Snowfall Totals
2.5
2.0
1.5
1.0
0.7
0.5
0.3
0.1
Inches
Trenton
2.1
Dalton
0.7
Blairsville
0.9
Dahlonega
0.3
Gainesville
0.1
Rome
0.6
Canton
0.2
Lawrenceville
0.0
Athens
0.0
Atlanta
0.1
Washington
0.0
Carrollton
0.1
Covington
0.0
Warrenton
0.0
Newnan
0.0
Griffin
0.0
Eatonton
0.0
LaGrange
0.0
Macon
0.0
Columbus
0.0
Dublin
0.0
Americus
0.0
National Weather Service
Peachtree City, GA
02/21/2015 07:24 PM EST
Follow Us:
weather.gov/atlanta

C. Assets Exposed to Hazard - All public and private property including critical facilities are susceptible to winter storms since this hazard is not spatially defined. The map below identifies critical facilities located within the hazard area, which in the case of winter storms includes all areas within the County, Cities, and Towns.



D. Estimate of Potential Losses - For loss estimate information, please refer to the Critical Facilities Database (Appendix A).

E. Multi-Jurisdictional Concerns – Any portion of Whitfield County can be negatively impacted by winter storms. Therefore, any mitigation steps taken related to winter storms will be pursued on a countywide basis and include the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta.

G. Hazard Summary – Winter storms, unlike other natural hazards, typically afford communities some advance warning. The National Weather Service issues winter storm warnings and advisories as these storms approach. Unfortunately, even with advance warning, some of the most destructive winter storms have occurred in the Southern United States, where buildings, infrastructure, crops, and livestock are not well-equipped for severe winter conditions. Motorists, not accustomed to driving in snow and icy conditions, pose an additional danger on roads and highways. The Whitfield County HMPC recognized the potential threats of winter storms and identified specific mitigation actions. These can be found in *Chapter 5*.

2.5 Wildfire

A. Hazard Identification – The Whitfield County HMPC utilized data from Georgia Forestry Commission (GFC) and the Community Wildfire Protection Plan (CWPP) in researching wildfires and their impact on the County.

A wildfire is defined as an uncontrolled fire occurring in any natural vegetation. For a wildfire to occur, there must be available oxygen, a supply of fuel, and enough heat to kindle the fuel. Often, these fires are begun by combustion and heat from surface and ground fires and can quickly develop into a major conflagration. A large wildfire may crown, which means it may spread rapidly through the topmost branches of the trees before involving undergrowth or the forest floor. As a result, violent blowups are common in forest fires, and on rare occasion they may assume the characteristics of a firestorm. A firestorm is a violent convection caused by a continuous area of intense fire and characterized by destructively violent surface indrafts. Sometimes it is accompanied by tornado-like whirls that develop as hot air from the burning fuel rises. Such a fire is beyond human intervention and subsides only upon the consumption of everything combustible in the locality. No records were found of such an event ever occurring within Whitfield County, but this potential danger will be considered when planning mitigation efforts.

The threat of wildfire varies with weather conditions: drought, heat, and wind participate in drying out the timber or other fuel, making it easier to ignite. Once a fire is burning, drought, heat, and wind all increase its intensity. Topography also affects wildfire, which spreads quickly uphill and slowly downhill. Dried grass, leaves, and light branches are considered flash fuels; they ignite readily, and fire spreads quickly in them, often

generating enough heat to ignite heavier fuels such as tree trunks, heavy limbs, and the matted duff of the forest floor. Such fuels, ordinarily slow to kindle, are difficult to extinguish. Green fuels (growing vegetation) are not considered flammable, but an intense fire can dry out leaves and needles quickly enough to allow ready ignition. Green fuels sometimes carry a special danger: evergreens, such as pine, cedar, fir, and spruce, contain flammable oils that burst into flames when heated sufficiently by the searing drafts of a wildfire.

Tools for fighting wildfires range from the standard equipment of fire departments to portable pumps, tank trucks, and earth-moving equipment. Firefighting forces specially trained to deal with wildfire are maintained by local, state and federal entities including the Whitfield County Fire Department, Georgia Forestry, and U.S. Forest Service. These trained firefighters may attack a fire directly by spraying water, beating out flames, and removing vegetation at the edge of the fire to contain it behind a fire line. When the very edge is too hot to approach, a fire line is built at a safe distance, sometimes using strip burning or backfire to eliminate fuel in the path of the uncontrolled fire or to change the fire's direction or slow its progress. Backfiring is used only as a last resort.

The control of wildfires has developed into an independent and complex science costing approximately $100 million annually in the United States. Because of the extremely rapid spreading and customary inaccessibility of fires once started, the chief aim of this work is prevention. However, despite the use of modern techniques (e.g., radio communications, rapid helicopter transport, and new types of chemical firefighting apparatus) more than 10 million acres of forest are still burned annually. Of these fires, about two thirds are started accidentally by people, almost one quarter are of incendiary origin, and more than 10% are due to lightning.

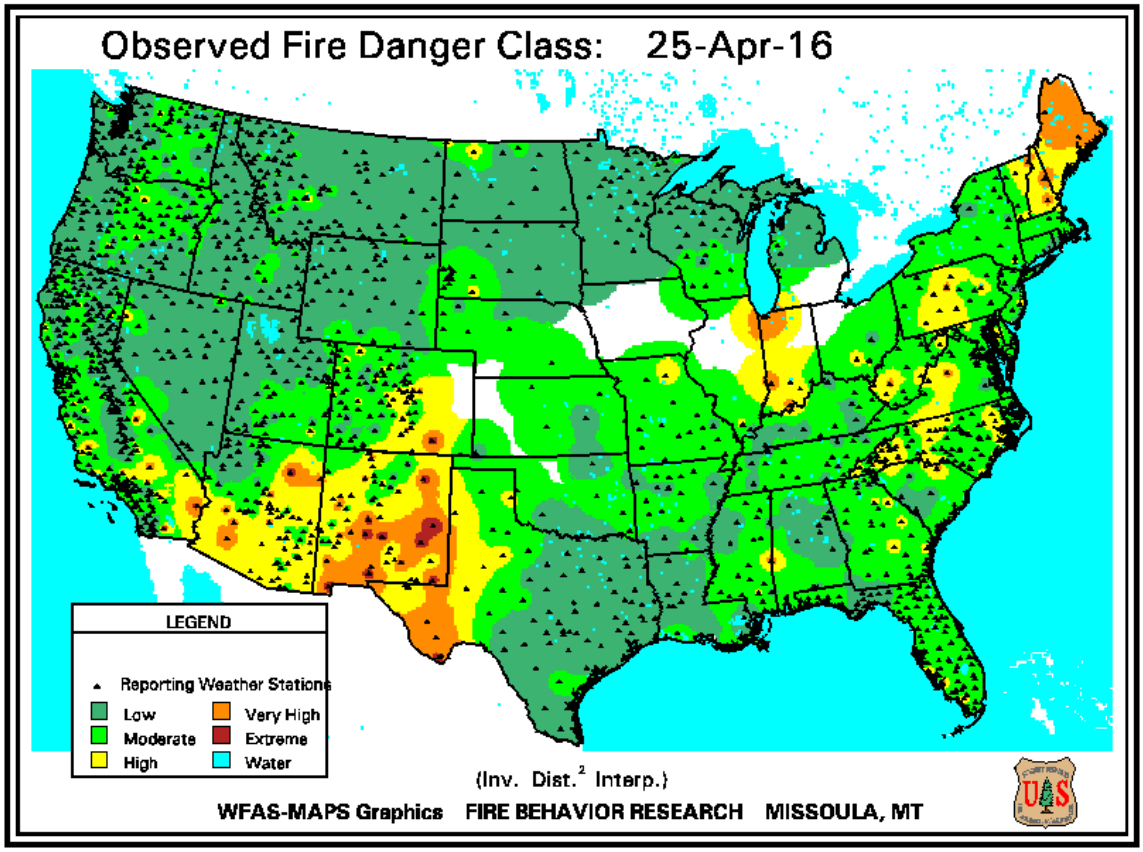
B. Hazard Profile – Wildfire activity in Whitfield County has been consistent during the past five years. According to the Georgia Forestry Commission (GFC), reported wildfire is low in comparison to most counties in Georgia. This is due to rapid initial attack on most ignitions and excellent interagency cooperation. Examination of GFC records shows that incendiarism and debris escapes, remains the leading causes of wildfire. Causes range across most cause categories recognized by the GFC, which are: campfire, children, debris (ag fields, pastures, orchards, etc.), debris (construction land clearing), debris (escaped prescribed burn), debris (household garbage), debris (other), debris (residential, leaf piles, yard, etc.), incendiary, machine use, miscellaneous, miscellaneous (other), miscellaneous (power lines, electric fences), railroad, smoking, and undetermined. GFC records shown below include all fires involving a GFC response regardless of size or cause.

GFC records show that 3,109 wildfires occurred within the County over the past fifty years, which equates to a 6,218% annual frequency based upon reported events. Over the course of the entire 50-year period the frequency of reported events has steadily declined. It would appear that wildfire activity has decreased over time within the County. The following chart provides annual frequency of reported events over the past five, ten, twenty, and fifty-year periods. The most recent five-year period, covering the span of time since the last update to this Plan, is highlighted in gold.

Whitfield County – Wildfire
(based on Reported Events)

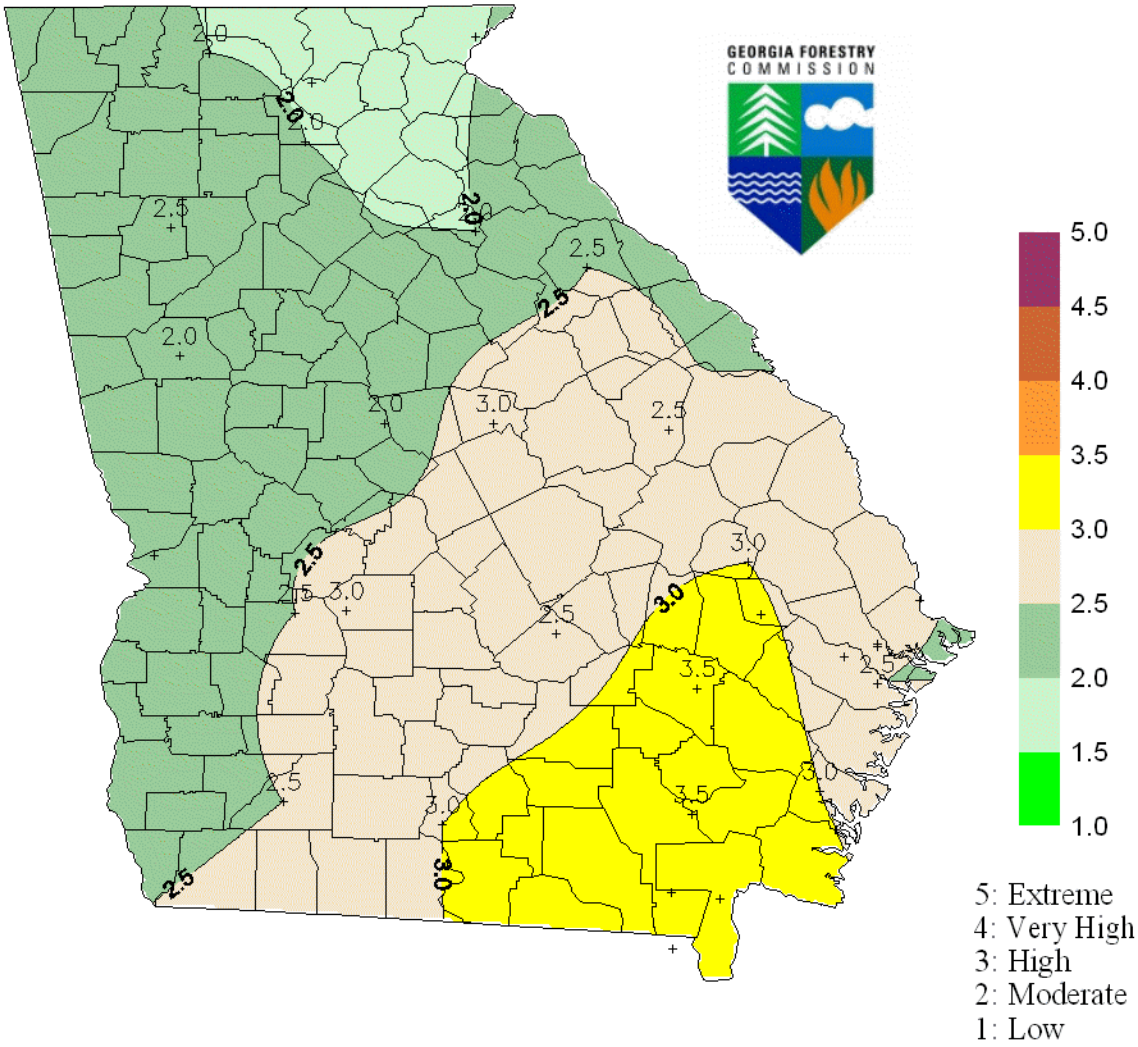
Time Period	5yrs (2011-2016)	10yrs (2006-2016)	20yrs (1996-2016)	50yrs (1966-2016)
Number of Reported Events	89	249	727	3109
Frequency Average per Year	17.8	24.9	36.35	62.18
Frequency Percent per Year	1780%	2490%	3635%	6218%

As of April 25, 2016, Whitfield County's threat of wildfire was classified as "moderate" by the U.S. Forest Service. However, this status can change from week to week. See the following map.



Another resource utilized during the planning process comes from the Georgia Forestry Commission. GFC forecasts a "moderate" level of fire danger for Whitfield County for April 25, 2016. These results change daily. See map below.

Forecast Fire Danger for Tomorrow
Produced at April 25, 2016 130pm EST

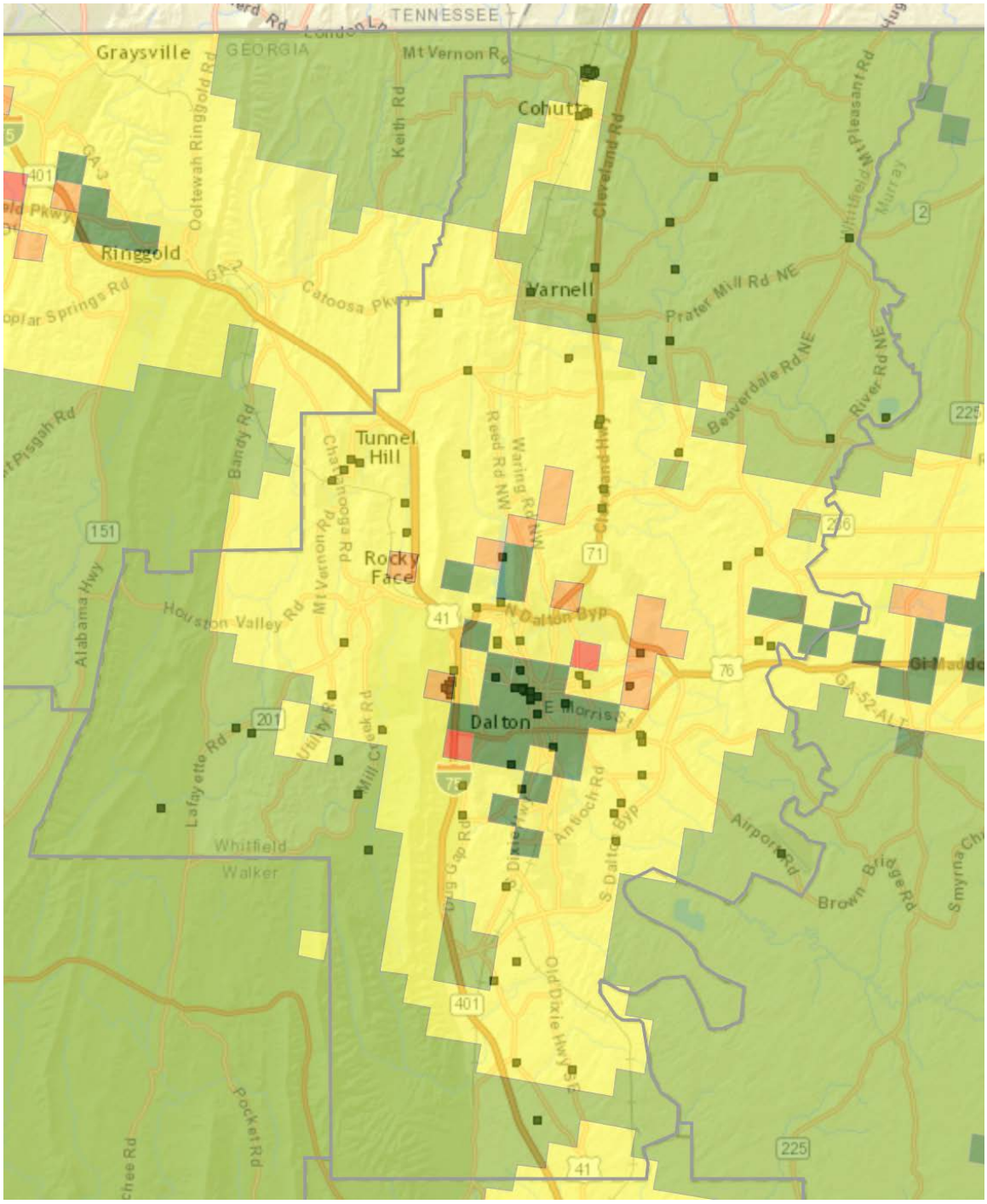


C. Assets Exposed to Hazard – In evaluating assets that are susceptible to wildfire, the committee determined that all public and private property is susceptible to wildfire, including all critical facilities. The maps on the following pages display the wildfire risk potential for Whitfield County and each of the municipalities, including locations of critical facilities within the hazard areas. The following key applies to each of the maps.

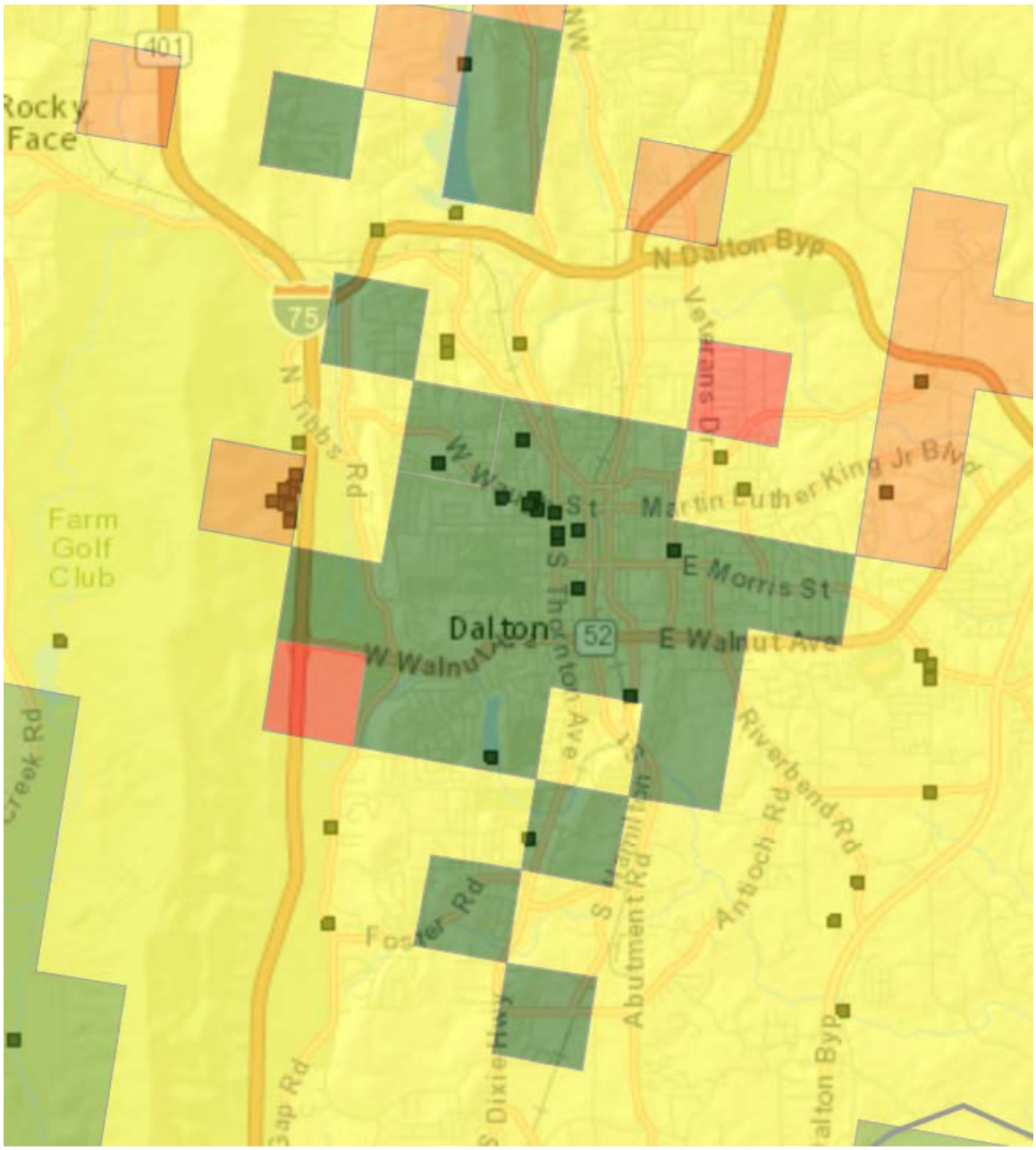
	Wildfire Threat Category	Description
	0	LOWEST THREAT: includes areas with no houses, areas with bodies of water, agricultural areas, and/or cities
	1	VERY LOW THREAT
	2	LOW THREAT
	3	MODERATE THREAT
	4	HIGH THREAT
	*****	ALL OTHER VALUES

The Wildfire Risk Layer was based on the USDA Forest Service, RMRS Fire Sciences Laboratory "Wildland Fire Risk to Flammable Structures, V 1.0" map. Although this data was not intended for use at a detail greater than state-wide analysis, it has been included as the best available data on wildfire risk. The scores are based on the risk value from the original layer. The horizontal positional accuracy is unknown for this layer.

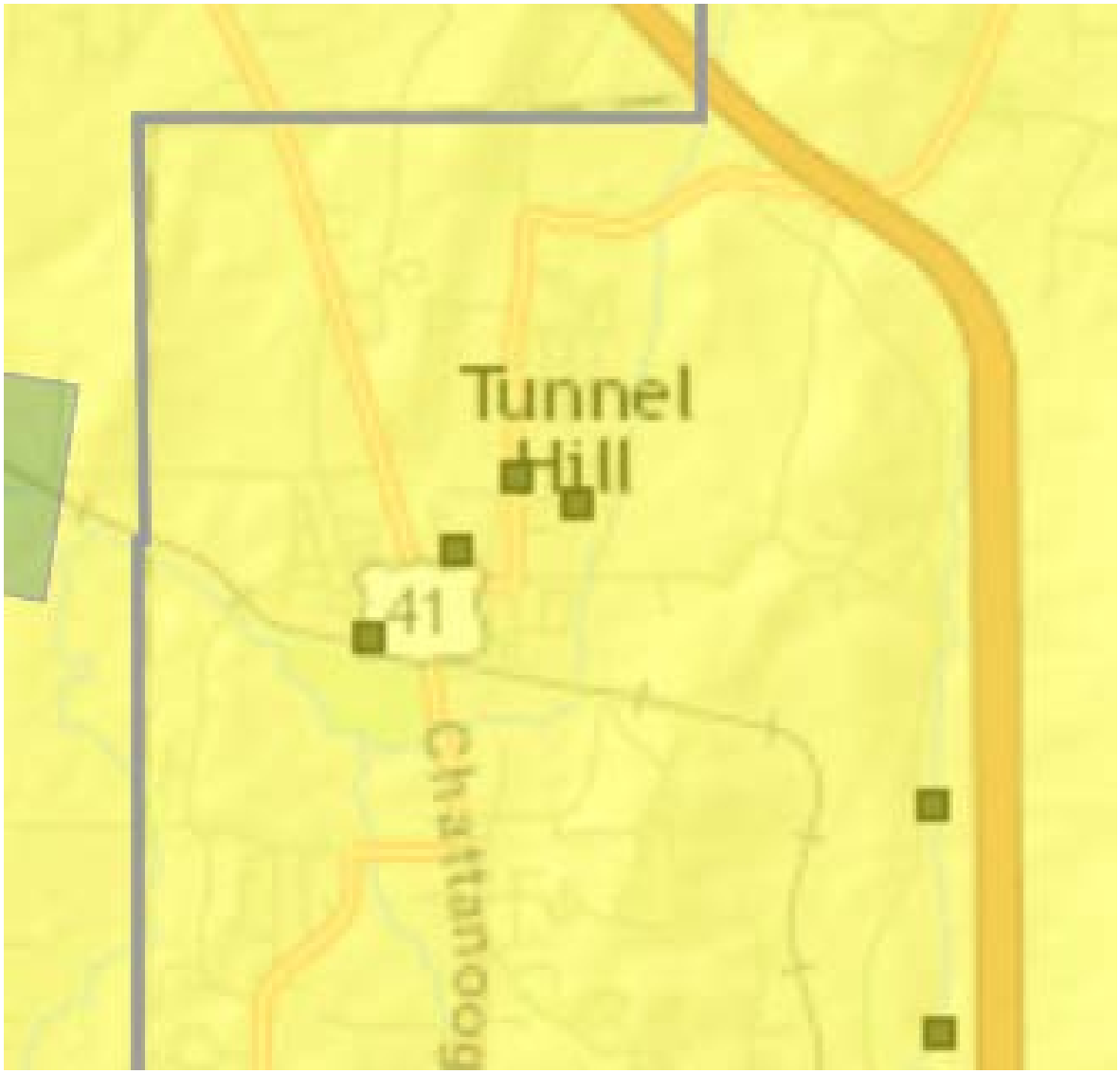
Whitfield County



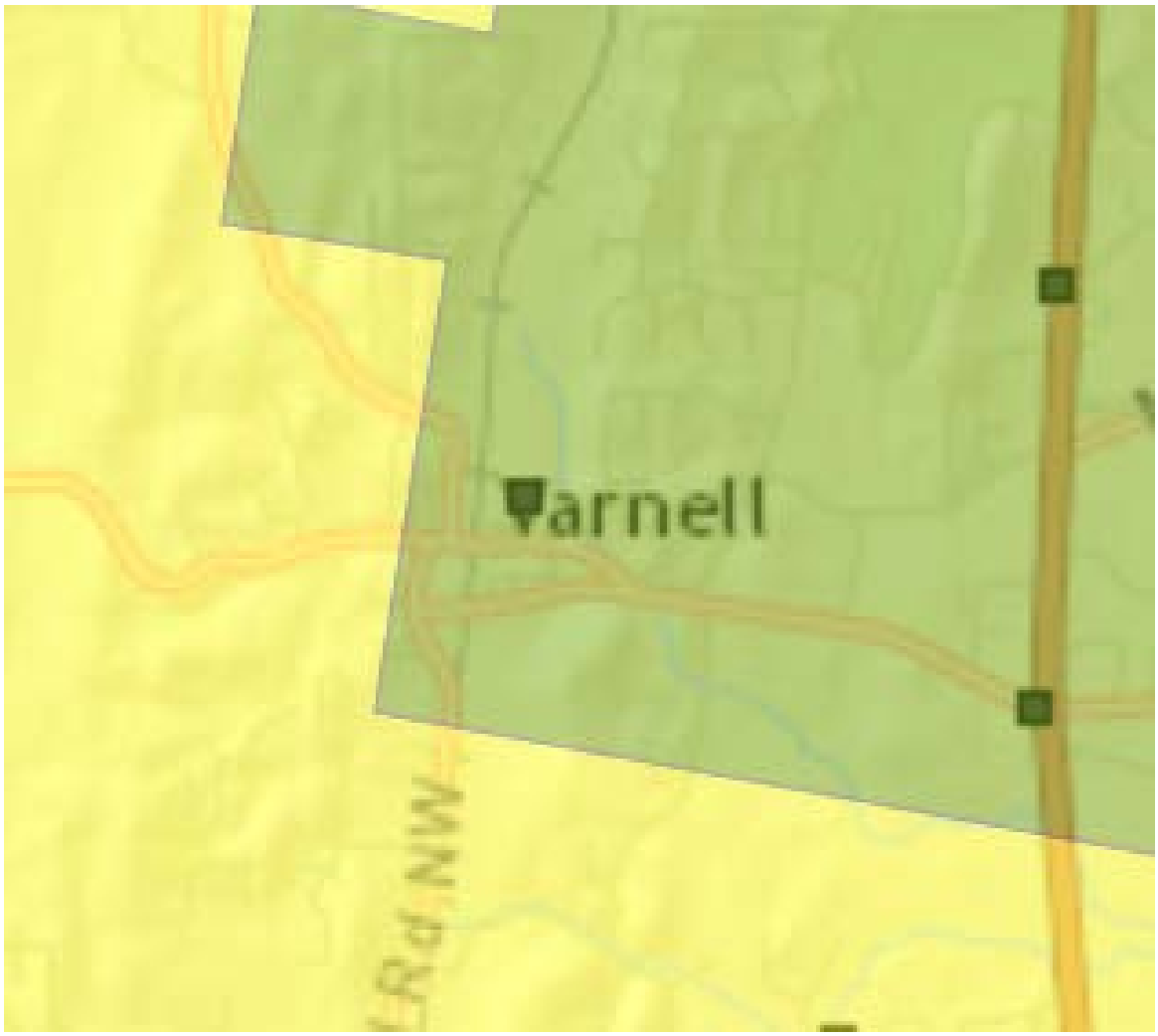
City of Dalton


401
Rocky Face
75
N Dalton Byp
Veterans Dr
N Tibbs Rd
W Waugh St
Martin Luther King Jr Blvd
E Morris St
Farm Golf Club
Dalton
52
W Walnut Ave
E Walnut Ave
S Thornton Ave
Riverbend Rd
Antioch Rd
Abutment Rd
Foster Rd
S Dixie Hwy
Gap Rd
Dalton Byp

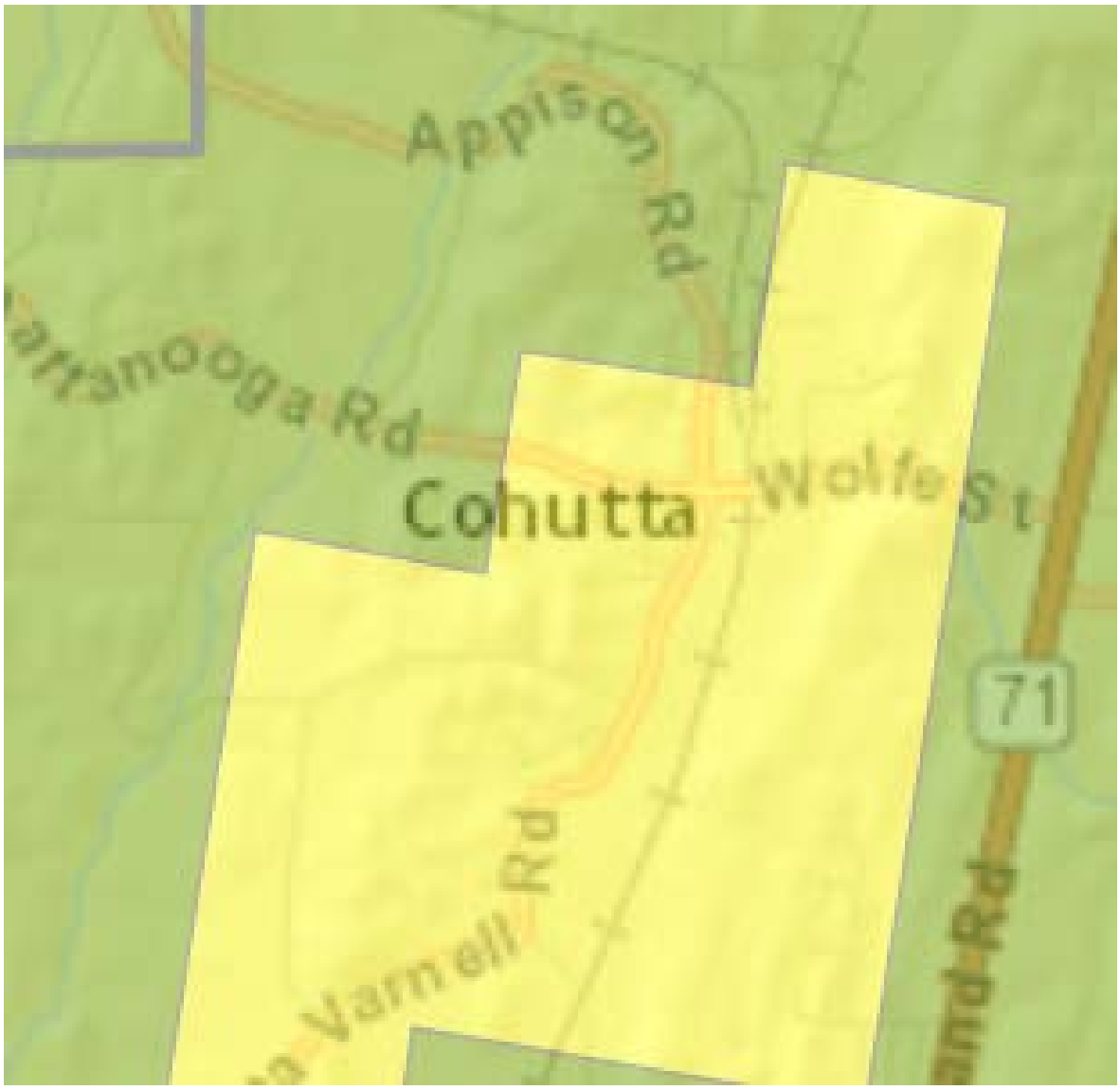
City of Tunnel Hill



City of Varnell



Town of Cohutta



All portions of the County, Cities, and Towns have been classified under Wildfire Threat Categories 0, 1 or 2, among the lowest threats on a scale of 0 to 4, with the exception of areas in and around the City of Dalton which does contain some areas classified under Wildfire Threat Categories 3 (moderate threat) and 4 (high threat). For the most part this model shows a relatively low wildfire threat for the County and Cities/Towns in general. It would appear, however, to show a slightly higher threat of Wildfire for areas in and around the City of Dalton. Nevertheless, the threat of wildfire certainly exists for all jurisdictions.

D. Estimate of Potential Losses – In most of the documented cases of wildfire within Whitfield County, relatively little information on damages, in terms of dollars, was available. The potential commercial value of the land lost to wildfire cannot be accurately calculated, other than replacement costs of structures and infrastructure. With regard to the land itself, aside from the loss of timber and recreation, the damage is inestimable in terms of land rendered useless by ensuing soil erosion, elimination of wildlife cover and forage, and the loss of water reserves collected by a healthy forest. For available loss estimate information, please refer to the Critical Facilities Database (Appendix A).

E. Multi-Jurisdictional Concerns – Despite low countywide wildfire threat classifications, any portion of Whitfield County has to potential to be impacted by wildfire. One reason for this is the common interface between urban developments and the forest. Any steps taken to mitigate the effects of wildfire should be undertaken on a countywide basis and include the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta.

F. Hazard Summary – Wildfires pose a serious threat to Whitfield County in terms of property damage, as well as injuries and loss of life. Wildfires are one of the most frequently occurring natural hazards within the County each year. Based on the frequency of this hazard, as well as its ability to inflict devastation most anywhere in the County, the mitigation measures identified in this plan will be thoroughly pursued. Specific mitigation actions related to wildfire are identified in *Chapter 5*.

2.6 Drought

A. Hazard Identification –The term "drought" has various meanings, depending upon context. To a farmer, a drought is a period of moisture deficiency that affects the crops under cultivation (even two weeks without rainfall can stress many crops during certain periods of the growing cycle). To a water manager, a drought is a deficiency in water supply that affects water availability and water quality. To a meteorologist, a drought is a prolonged period when precipitation is less than normal. To a hydrologist, a drought is an extended period of decreased precipitation and streamflow.

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. Droughts in Georgia historically have severely affected municipal and industrial water supplies, agriculture (including both livestock and crops), stream water quality, recreation at major reservoirs, hydropower generation, navigation, and forest resources. Drought is also a key factor in wildfire development by making natural fuels (grass, brush, trees, dead vegetation) more fire prone.

In Georgia, droughts have been documented at U.S. Geological Survey (USGS) streamflow gaging stations since the 1890's. From 1910 to 1940, about 20 streamflow gaging stations were in operation. Since the early 1950's through the late 1980's, about 100 streamflow gaging stations were in operation. Currently, the USGS streamflow gaging network consists of more than 135 continuous-recording gages. Groundwater levels are currently monitored at 165 wells equipped with continuous recorders.

B. Hazard Profile – The Whitfield County HMPC reviewed historical data from the National Oceanic and Atmospheric Administration (NOAA), the National Climatic Data Center (NCDC), the U.S. Geological Survey (USGS), the Georgia Department of Natural

Resources (GA DNR) and the Georgia Forestry Commission (GFC) in researching drought events of the County and the State. Most historical information related to drought within this Plan has been derived from USGS streamflow data and NOAA precipitation data. Due to the nature of drought to affect large areas of the State simultaneously and the availability of only very limited County-specific drought information, the threat of drought is looked at within this Plan from a statewide perspective. Similarly, due to limited month-by-month information on drought, this hazard will be quantified on an annual basis (either there was a drought or there was not for any given year within the State). These guidelines are also used in Appendix B and Appendix C with regard to historical hazard information.

In the State of Georgia significant drought events, as identified by USGS, NOAA and other sources, have occurred in 23 of the last 50 years. Whitfield County was affected to varying degrees in each of those years. Some of the most extreme droughts to affect the State include the following:

Note: When researching drought, one term that is frequently used is *recurrence interval*. The recurrence interval is the average time between droughts of a given severity. For instance, in a drought with a 25-year recurrence interval the low streamflows occur, on average, once every 25 years.

1903-1905: According to the USGS, the 1903 to 1905 drought is "the earliest recorded severe drought in Georgia." In 1904, the U.S. Weather Bureau (today's National Weather Service) reported, "Levels in streams and wells were the lowest in several years. Many localities had to conserve water for stock and machinery and many factories were forced to close or operate at half capacity." When the 1903 drought struck, farm jobs dried up as quickly as the fields. The cities attracted many of these workers who migrated to Atlanta.

1924-1927: The drought that struck from 1924 to 1927 affected a wider area than simply north Georgia, affecting the Coosa River and Altamaha Basin as well at the Chattahoochee River. The U.S. Weather Bureau reported the lowest stream levels ever recorded in north Georgia in July-September of 1925, stating that the drought not only affected agricultural operations, but industrial operations as well. The scarcity of water had a profound influence on industrial and agricultural conditions in Georgia. This may have been the first time Georgia media used the term "Drought of the Century". Combined with the ongoing devastation from the boll weevil and technological advances in agriculture that increased efficiency and thereby reduced the number of farm jobs, migration from rural Georgia to urban Georgia increased significantly. The impact of this drought, plus other natural events, helped send the Georgia economy into a depression well before the rest of the United States.

1930-1935: Although the drought of 1930-1935 had little long term impact on north Georgia, it contributed to the ongoing economic problems throughout the state and the United States as a whole. The USGS reports that the severity of this drought "exceeded a 25-year recurrence interval" in central and southwestern Georgia and affected much of the

Country. In extreme northern and southeastern Georgia, the recurrence interval was 10–25 years. This period was also referred to as the "Drought of the Century."

Central Georgia - 1936

1938-1944: Many of the same areas that suffered during the 1930 to 1935 drought endured severe drought again from 1938 to 1944. The drought of 1938-1944 struck the upper Coosa River basin and the Chattahoochee River basin. According to USGS the recurrence interval exceeded 50 years in those areas. In extreme northern and southwestern Georgia, the drought had recurrence intervals of 10–25 years. It was this drought that convinced politicians to move towards massive hydroelectric projects that would supply power and keep water available to constituents throughout long dry spells. One of the key supporters of hydroelectric power in the United States was Senator Richard B. Russell, member of the Senate Appropriations Committee. The first such dam in the State, Allatoona, was begun in 1941 and completed after World War II.

1950-1957: A large statewide drought lasted from 1950 to 1957. Most streamflows had recurrence intervals exceeding 25 years according to USGS. The catastrophic drought devastated crops by 1954. This event also earned the title as "Drought of the Century." This drought was most severe in southern Georgia, with most streamflows having recurrence intervals exceeding 25 years. In northeastern Georgia, the drought severity also exceeded the 25-year recurrence interval. The low rainfall affected the length of time it took to fill Lake Lanier for the first time since its creation in 1950 and completion in 1956. In northwestern Georgia, the recurrence interval of the drought was between 10 and 25 years.

1976-1978: According to USGS, beginning in 1976, the weather over southwest Georgia turned towards a persistent pattern of late-summer drought including parts of the Chattahoochee Valley.

1980-1982: The 1980 to 1982 drought resulted in the lowest streamflows since 1954 in most areas, and the lowest streamflows since 1925 in others. Recurrence intervals of 10–25 years were common in most of Georgia. Pool levels at four major reservoirs receded to the lowest levels since first filling. Groundwater levels in many observation wells were lower than previously observed. Nearly continuous declines were recorded in some wells for as long as 20 consecutive months, and water levels remained below previous record lows for as long as nine consecutive months.

1985-1989: Many North Georgia residents remember the drought of 1985 to 1989 that saw Lake Lanier reach its lowest levels since it was filled in 1950. Streamflows touched the lows reached during the 1925 drought. Water-supply shortages occurred in Georgia in 1986. Shortages first occurred in a few Atlanta metropolitan systems, primarily because of large demand and small reservoir storage. As the drought continued, other systems in the southern part of the metropolitan area also had water-supply problems, as did several municipalities in northern and central Georgia. During 1986, the U.S. Army Corps of Engineers significantly decreased the release of water from Lake Lanier, but reservoir levels continued to recede to about 2 feet above the record minimum lake level. Ground-water levels in northern Georgia were significantly less than normal during the 1985 to 1989 drought, and shortages in ground-water supplies from domestic wells occurred in the northern one-third of the State.

1998-2003: From 1998 until 2003, with a brief respite in 2000-2001, North Georgia suffered through a historic drought. The term "historic," in this instance, is used by weathermen to describe a drought of unusually long duration, one of the three measures of a drought. While the regional impact of a long-term drought is massive, in North Georgia's case, the drought's effect was mitigated, simply because of technology, mostly the dams built by the Corps of Engineers and others. Earlier droughts, however, did not have the benefit of these dams and had a "historic" impact on North Georgia. Shortages of surface-water supplies similar to those during 1986 occurred in the 1998 to 2003 drought. Water shortages during the summer of 2000 prompted the Georgia Department of Natural Resources to institute statewide restrictions on outdoor water use.

2006-2009: Beginning in late 2006 another drought struck north Georgia, on the heels of the earlier 5-year drought. River levels plummeted, causing lakes to fill up more slowly when water was released. Georgia politicians battled against the Army Corps of Engineers' continuous flow requirement for Lake Lanier due to the looming water shortages. The Georgia Environmental Protection Division (EPD) declared a level four drought response across the northern third of Georgia, including Whitfield County, which prohibits most types of outdoor residential water use effective immediately.

Lake Lanier and Lake Allatoona 2007 (L to R)

Lake Hartwell 2008

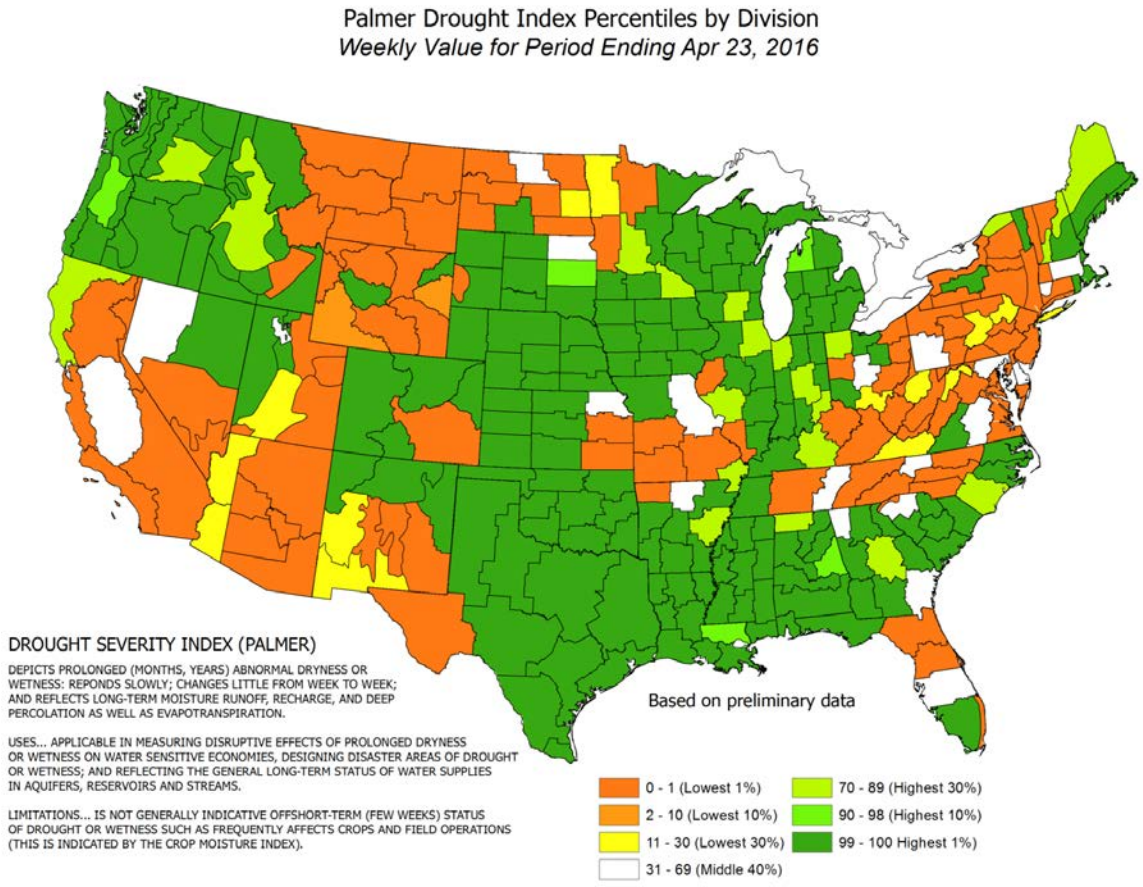
2011-2012: Drought conditions were experienced once again throughout much of the State. However, significant rains beginning in the second half of 2012 and continuing through 2015 all but eliminated drought conditions throughout Georgia at the time.

2016-2017: The most recent drought began in 2016 and had not ended at the time this Plan was updated.

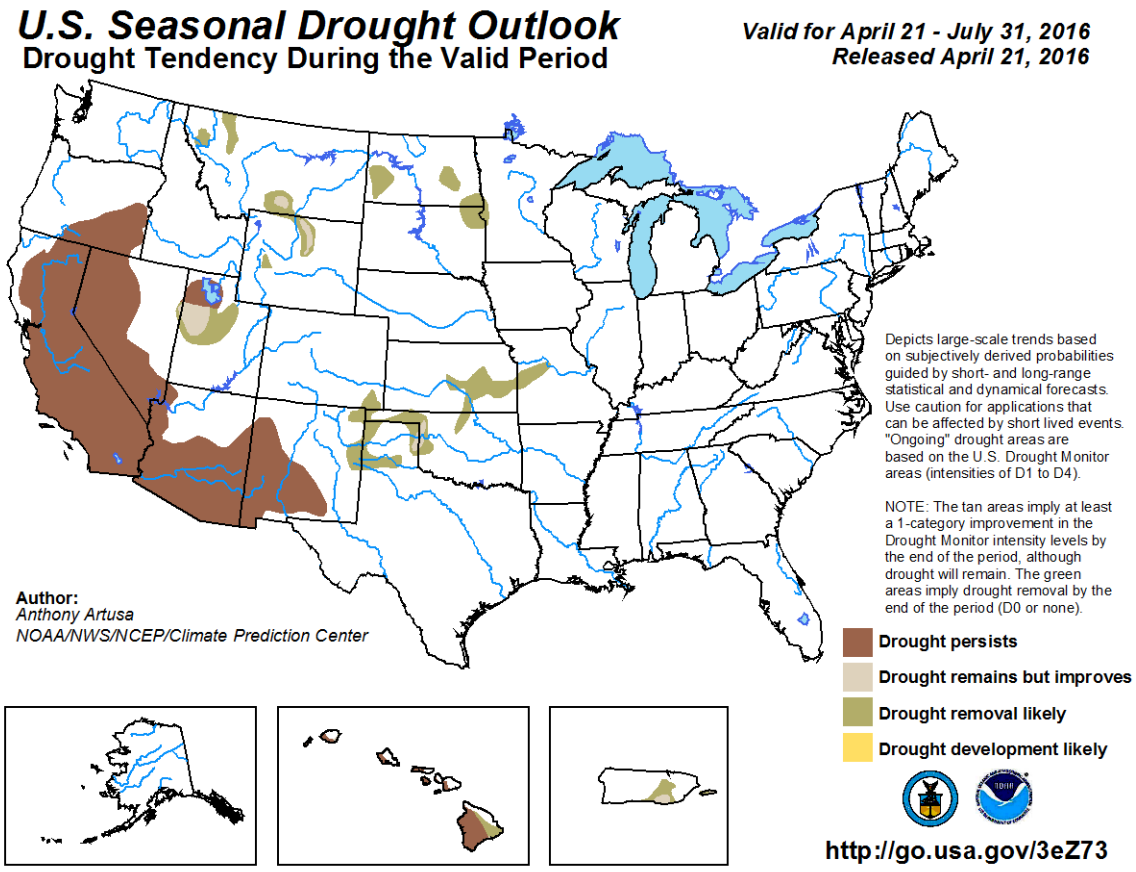
Agricultural crop damage during periods of drought is difficult to estimate. Water supplies, industries, power generation, agriculture, forests, wetlands, stream water quality, navigation, and recreation for the State of Georgia have been severely impacted over time. Because of the extremely unpredictable nature of drought (to include duration), reliably calculating a recurrence interval is difficult. The Hazard Frequency Table in Appendix C analyzes historical data from the past fifty years to provide a general idea of the frequency of drought within the State.

The following four maps represent current and forecasted drought conditions. Each of these maps is updated on a regular basis. Drought conditions can change very rapidly and must be continuously monitored.

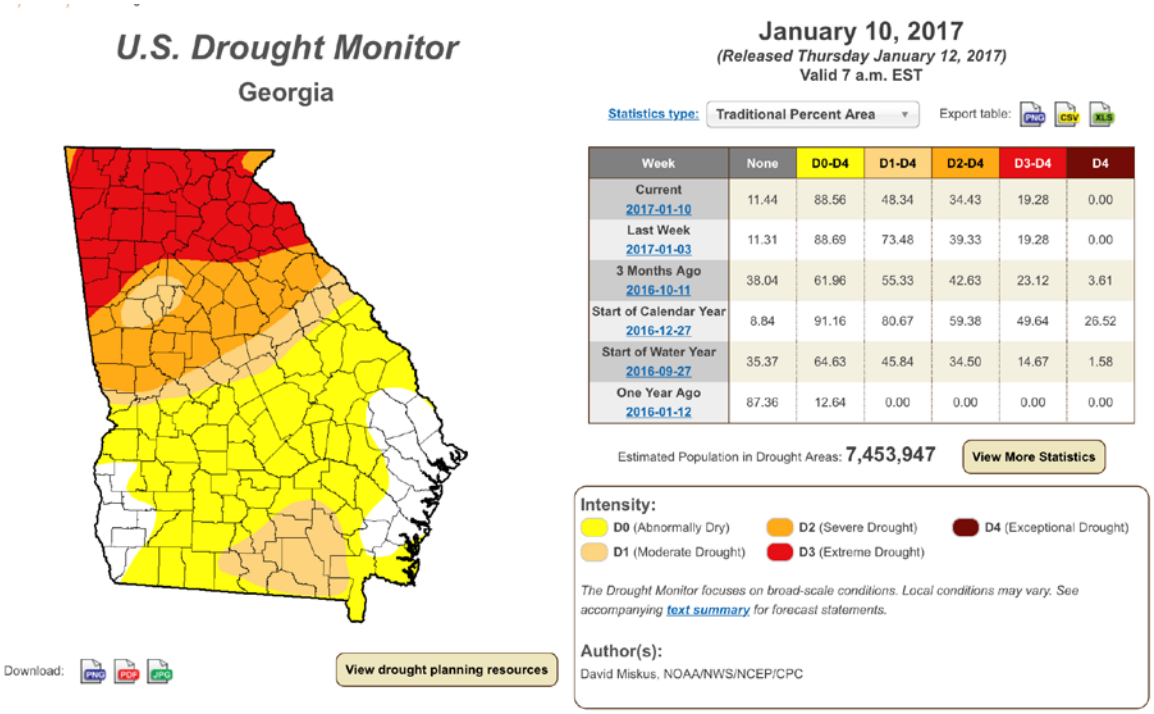
The Palmer Drought Severity Index map shows current drought conditions nationwide and is updated weekly. The following map is for the week ending April 23, 2016.



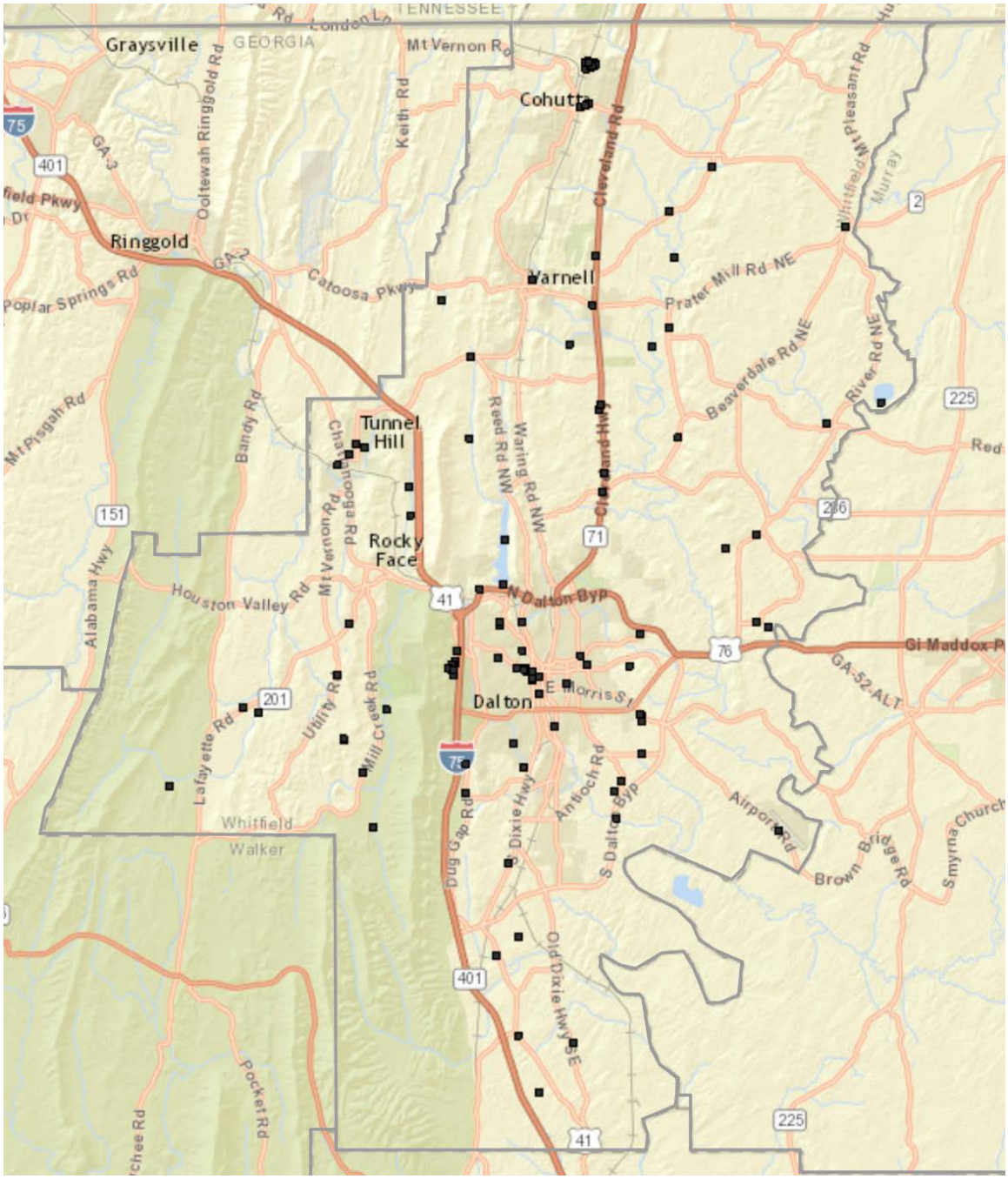
The U.S. Seasonal Drought Outlook map, forecasts likely drought conditions through July 31, 2016, which indicates that drought conditions are not expected to develop in Whitfield County within this time period.



The U.S. Drought Monitor indicates that as of January 10, 2017, Whitfield County is experiencing “extreme” drought conditions at this time.



C. Assets Exposed to Hazard – All public and private property including critical facilities are susceptible to drought since this hazard is not spatially defined. The danger of drought is compounded due to the fact that drought conditions create a heightened risk for wildfire. The map below identifies critical facilities located within the hazard area, which in the case of drought includes all areas within the County, Cities, and Towns.

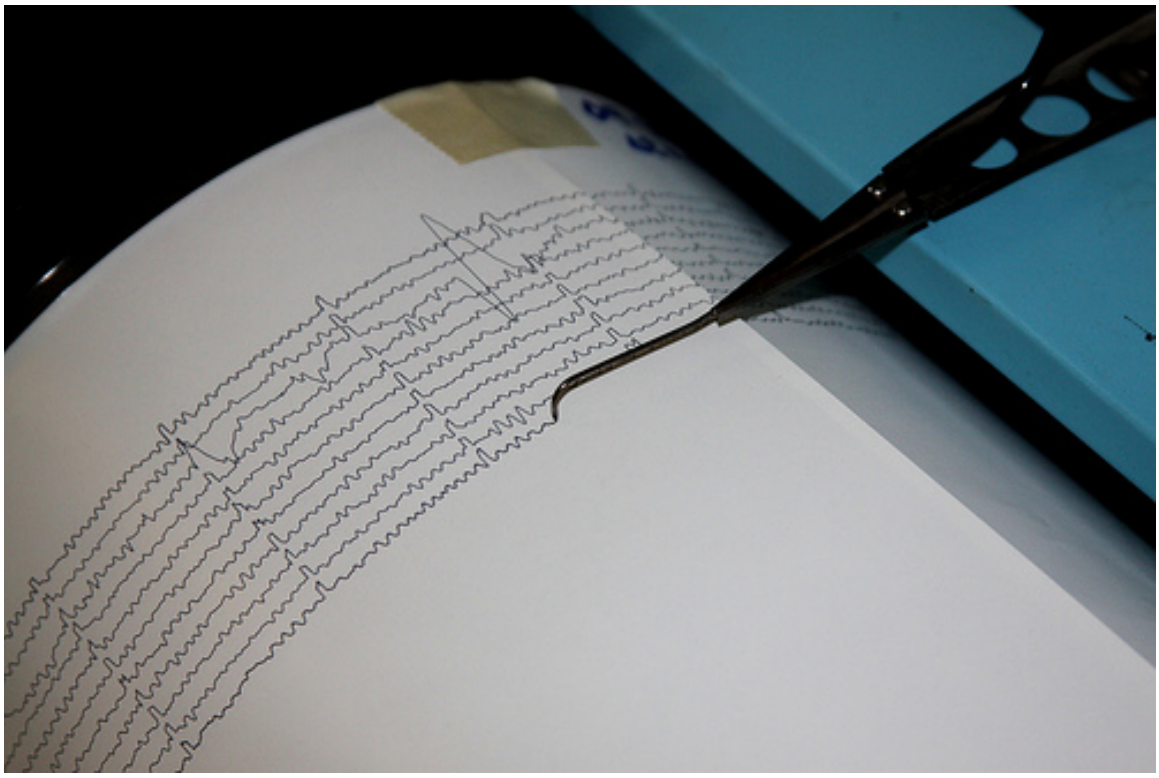


D. Estimate of Potential Losses – No damage to facilities is anticipated as a result of drought conditions, aside from the threat of wildfire. Crop damage cannot be accurately quantified due to several unknown variables: duration of the drought, temperatures during the drought, severity of the drought, rainfall requirements for specific crops and livestock, and the different growing seasons. There may also be financial losses related to water system shortages. For loss estimate information, please refer to Appendix A, the Critical Facilities Database, and Appendix D, Worksheet 3a, for each jurisdiction.

E. Multi-Jurisdictional Concerns – Agricultural losses associated with drought are more likely to occur in the rural, less concentrated areas of the County. Although the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta may be slightly less likely to experience agricultural-related drought losses than the County, they can be financially impacted by water resource-related drought losses.

F. Hazard Summary – Unlike other hazard events, drought causes damage slowly. A sustained drought can cause severe economic stress to the agricultural interests of the County and even the entire State or Region. The potential negative effects of sustained drought are numerous. In addition to an increased threat of wildfires, drought can affect water supplies, stream-water quality, water recreation facilities, hydropower generation, as well as agricultural and forest resources. The HMPC realized the limitations associated with mitigation actions for drought, but did identify some basic mitigation measures in *Chapter 5*.

2.7 Earthquakes



A. Hazard Identification – One of the most frightening and destructive natural hazards is a severe earthquake. An earthquake is a sudden movement of the Earth, caused by the abrupt release of strain that has accumulated over a long time. The forces of plate tectonics shape the Earth as the huge plates that form the Earth's surface slowly move over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free. If the earthquake occurs in a populated area, it may cause many deaths, injuries and extensive property damage.

The goal of earthquake prediction is to give warning of potentially damaging earthquakes early enough to allow appropriate response to the disaster, enabling people to minimize loss of life and property. The U.S. Geological Survey conducts and supports research on the likelihood of future earthquakes. This research includes field, laboratory, and theoretical investigations of earthquake mechanisms and fault zones. A primary goal of earthquake research is to increase the reliability of earthquake probability estimates. Ultimately, scientists would like to be able to specify a high probability for a specific earthquake on a particular fault within a particular year. Scientists estimate earthquake probabilities in two ways: by studying the history of large earthquakes in a specific area and the rate at which strain accumulates in the rock.

Scientists study the past frequency of large earthquakes in order to determine the future likelihood of similar large shocks. For example, if a region has experienced four magnitude 7 or larger earthquakes during 200 years of recorded history, and if these shocks occurred randomly in time, then scientists would assign a 50 percent probability (that is, just as likely to happen as not to happen) to the occurrence of another magnitude 7 or larger quake in the region during the next 50 years. But in many places, the assumption of random occurrence with time may not be true, because when strain is released along one part of the fault system, it may actually increase on another part.

Another way to estimate the likelihood of future earthquakes is to study how fast strain accumulates. When plate movements build the strain in rocks to a critical level, like pulling a rubber band too tight, the rocks will suddenly break and slip to a new position. Scientists measure how much strain accumulates along a fault segment each year, how much time has passed since the last earthquake along the segment, and how much strain was released in the last earthquake. This information is then used to calculate the time required for the accumulating strain to build to the levels that result in an earthquake. This simple model is complicated by the fact that such detailed information about faults is rare. In the United States, only the San Andreas Fault system has adequate records for using this prediction method.

Magnitude and intensity measure different characteristics of earthquakes. Magnitude measures the energy released at the source of the earthquake and is determined from measurements on seismographs. Intensity measures the strength of shaking produced by the earthquake at a certain location and is determined from effects on people, human structures, and the natural environment. The following two tables describe the Abbreviated Modified Mercalli Intensity Scale, and show intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes.

Magnitude / Intensity Comparison

Magnitude	Typical Maximum Modified Mercalli Intensity
1.0 - 3.0	**I**
3.0 - 3.9	**II - III**
4.0 - 4.9	**IV - V**
5.0 - 5.9	**VI - VII**
6.0 - 6.9	**VII - IX**
7.0 and higher	**VIII** or higher

Abbreviated Modified Mercalli Intensity Scale

I. Not felt except by a very few under especially favorable conditions.

II. Felt only by a few persons at rest, especially on upper floors of buildings.

III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.

IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.

V. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.

VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.

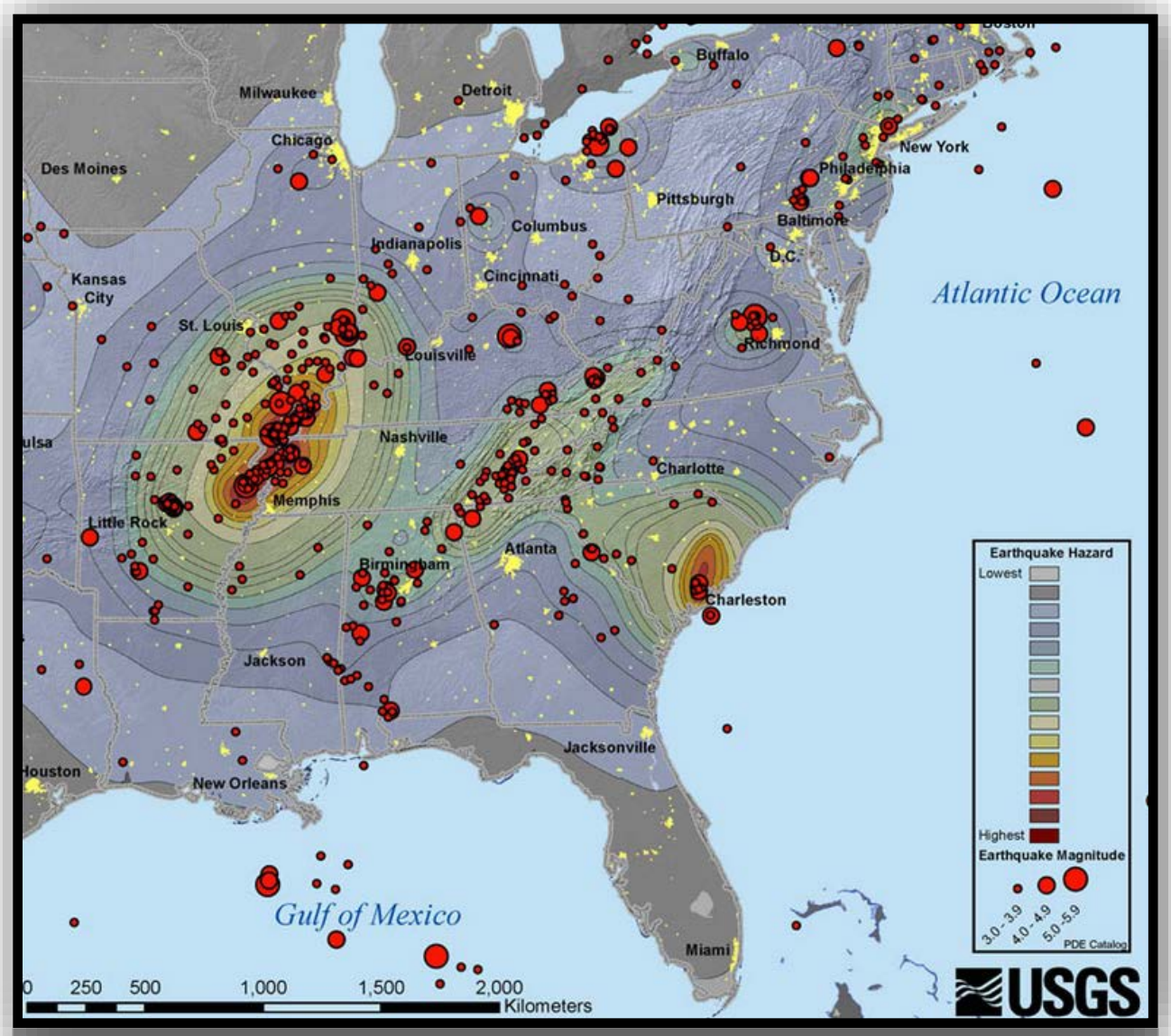
IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

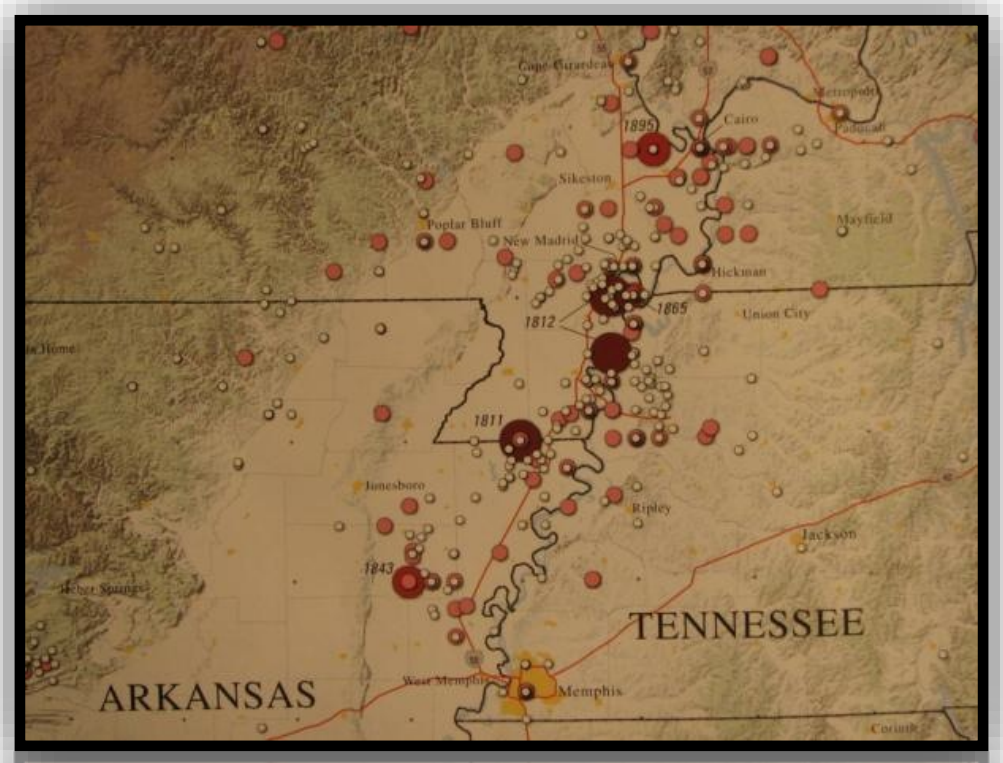
XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.

XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

The following USGS map provides a historical view of earthquakes in the Eastern United States.



B. Hazard Profile – The first earthquakes recorded as being felt in Georgia were the great New Madrid earthquakes of 1811-1812 (also known as the Mississippi River Valley earthquakes) centered in northeast Arkansas and New Madrid, Missouri. There were hundreds of earthquakes during the two month period between December 16, 1811 and February 7, 1812. On the basis of the large area of damage (600,000 square kilometers), the widespread area of perceptibility (5,000,000 square kilometers), and the complex physiographic changes that occurred, this series of earthquakes rank as some of the largest in the United States since its settlement by Europeans. The area of strong shaking associated with these shocks is two to three times larger than that of the 1964 Alaska earthquake and 10 times larger than that of the 1906 San Francisco earthquake. The first three major earthquakes occurred in northeast Arkansas on December 16, 1811 (three shocks - Mfa 7.2/MSn 8.5; Mfa 7.0/MSn 8.0; and MSn 8.0). There were six aftershocks on December 16th and 17th alone in the range of M5.5 to M6.3 (Note: aftershocks actually *are* earthquakes). The fourth earthquake occurred in Missouri on January 23, 1812 (Mfa 7.1/MSn 8.4). The fifth earthquake occurred in New Madrid, Missouri on February 7, 1812 (Mfa 7.4/ MSn 8.8). This is the earthquake that created Reelfoot Lake, located in northwest Tennessee. It was reported to have been formed as the Mississippi River flowed backward for 10–24 hours to fill the lake. As a result of this earthquake, the original town of New Madrid now lies under the Mississippi River.



This accounted for a total of five earthquakes of magnitude MSn 8.0 or higher occurring in a period of 54 days. The first earthquake caused only slight damage to man-made structures, mainly because the region was so sparsely populated. However, as the earthquakes continued, they began to open deep cracks in the ground, created landslides on the steeper bluffs and hillsides, large areas of land were uplifted, and sizable sink areas were created. These five main earthquakes, and several aftershocks, were felt over almost all of the eastern United States including the State of Georgia. In Georgia this series of earthquakes was strong enough to have shaken bricks from chimneys and other minor damage.

The great Charleston, South Carolina, earthquake of 1886 killed approximately 60 people. The magnitude 7.3 earthquake is the most damaging earthquake to occur in the Southeast United States and one of the largest historic shocks in Eastern North America. It damaged or destroyed many buildings in the old city of Charleston. Property damage was estimated at $5-$6 million. Structural damage was reported several hundred

kilometers from Charleston including in the State of Georgia. On August 31, 1886 at 9:25 pm, preceded by a low rumble, the shock waves reached Savannah. People had difficulty remaining standing. One woman died of fright as the shaking cracked walls, felled chimneys, and broke windows. Panic at a revival service left two injured and two more were injured in leaping from upper story windows. Several more were injured by falling bricks. Ten buildings in Savannah were damaged beyond repair and at least 240 chimneys damaged. People spent the night outside. At Tybee Island light station the 134 foot

lighthouse was cracked near the middle where the walls were six feet thick, and the one-ton lens moved an inch and a half to the northeast. In Augusta the shaking was the most severe (VIII on the Modified Mercalli scale) in the State. An estimated 1000 chimneys and many buildings were damaged. The business and social life was paralyzed for two days. Brunswick and Darien were affected as well.

June 17, 1872: An earthquake on June 17, 1872 in Milledgeville, GA and had an intensity of at least V on the Modified Mercalli scale, the lowest intensity in which some damage may occur. It was reported as a sharp shock, jarring brick buildings and rattling windows.

November 1, 1875: On November 1, 1875, at 9:55 in the evening, an intensity VI earthquake occurred near the South Carolina border. It was felt from Spartanburg and Columbia, South Carolina, to Atlanta and Macon, Georgia, from Gainesville to Augusta, and generally over an area of 25,000 square miles.

October 18, 1902: A more local event occurred on October 18, 1902, with a sharp shock felt along the east face of Rocky Face Mountain, just west of Dalton, GA with intensity VI and at LaFayette, GA with intensity V. The earthquake was felt over an area of about 1500 square miles including Chattanooga, Tennessee.

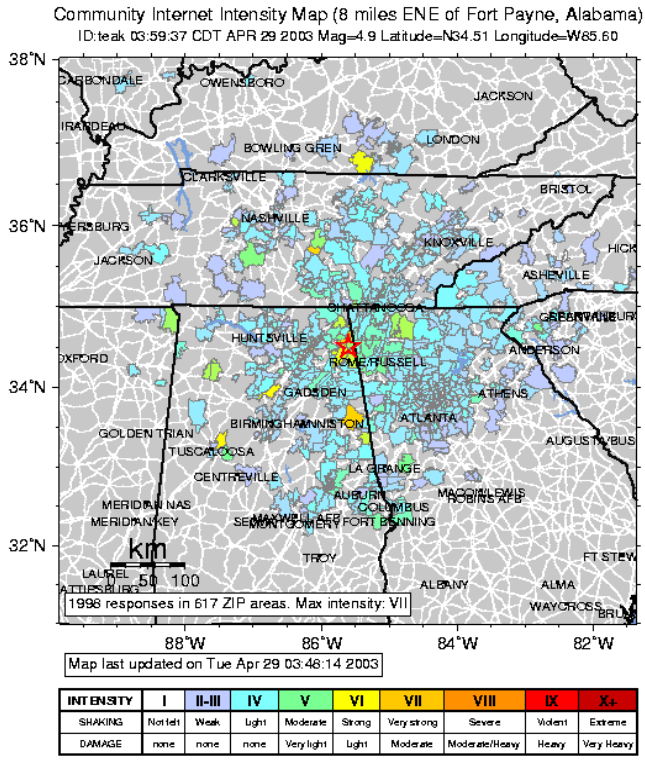
January 23, 1903: The Savannah, GA area was shaken with an intensity VI earthquake on January 23, 1903. Centering near Tybee Island, it was felt over an area of 10,000 square miles including Savannah (intensity VI), Augusta (intensity III), Charleston (intensity IV-V), and Columbia (intensity III-IV). Houses were strongly shaken.

June 20, 1912: Another shock was felt on June 20, 1912, at Savannah with intensity V.

March 5, 1914: According to USGS, Georgia experienced another earthquake on March 5, 1914. Magnitude 4.5.

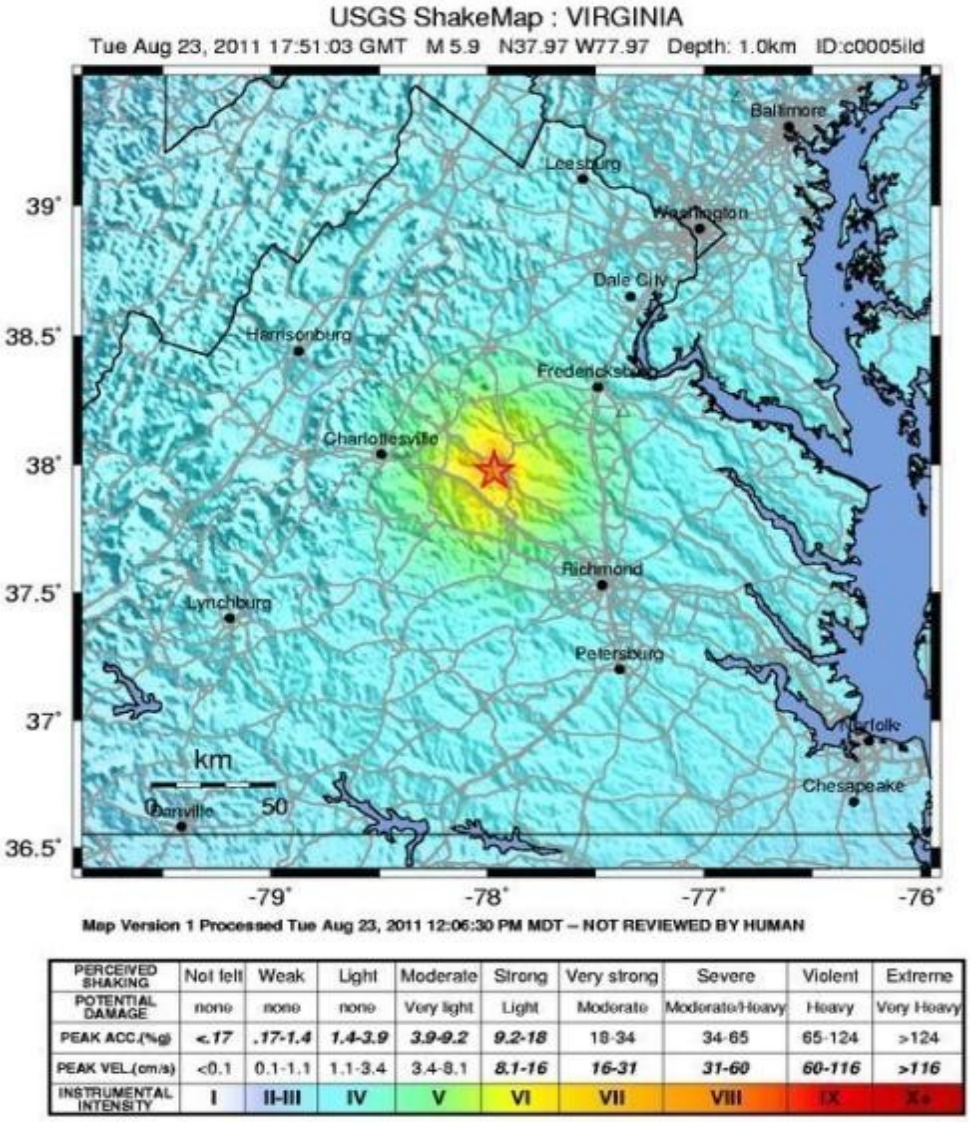
March 5, 1916: On March 5, 1916, an earthquake centered 30 miles southeast of Atlanta was felt over an area of 50,000 square miles, as far as Cherokee County, North Carolina, by several people in Raleigh, and in parts of Alabama and Tennessee.

March 12, 1964: An earthquake of intensity V or over occurred on March 12, 1964, centered near Haddock, GA less than 20 miles northeast of Macon. Intensity V was recorded at Haddock while shaking was felt in four counties over a 400-square-mile area.



April 29, 2003: On April 29, 2003 just before 5:00 a.m. a moderate earthquake, rated 4.9 on the Richter Scale, shook most of the northwest corner of Georgia, south to Atlanta. The epicenter was located in Menlo, GA, about 37 miles south of Chattanooga. See map to right.

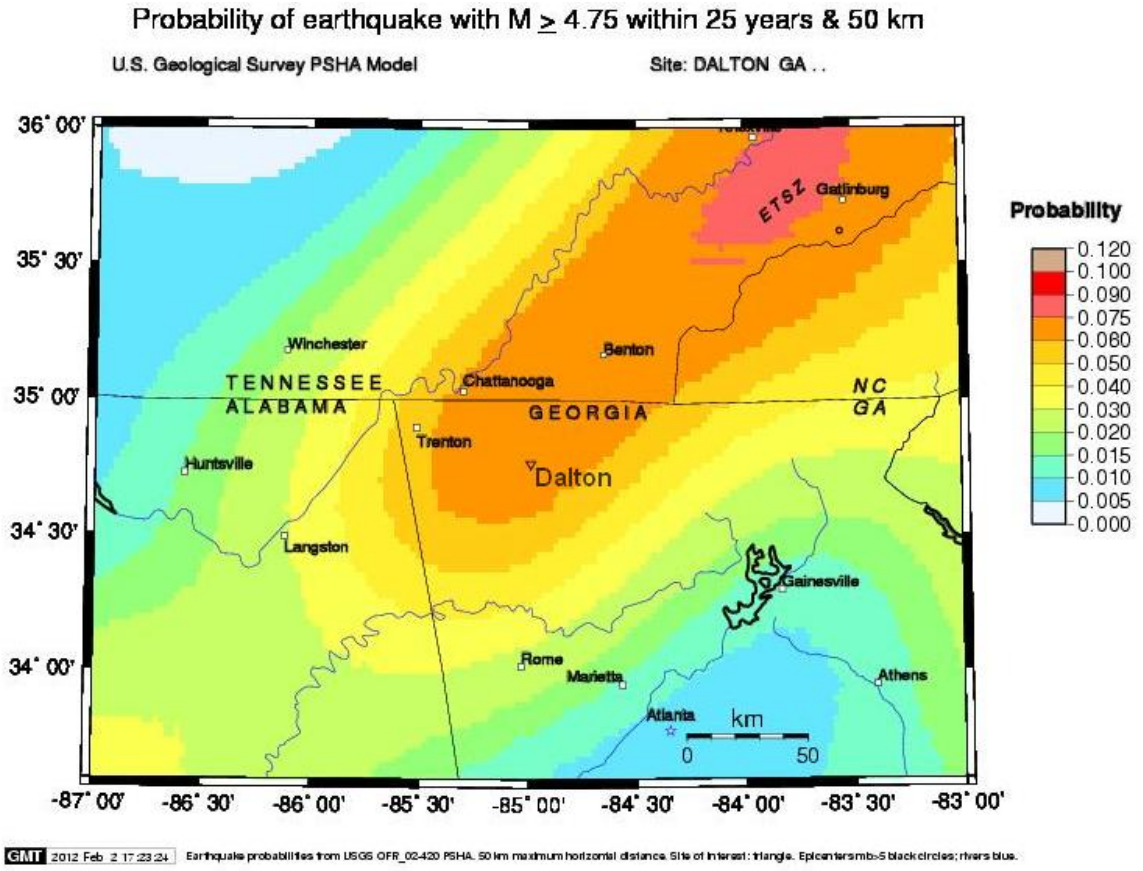
August 23, 2011: On August 23, 2011 at 1:51pm, a 5.8 magnitude earthquake originated near Louisa and Mineral, Virginia. It struck Washington DC (about 100 miles away from epicenter) causing moderate shaking and potentially significant damage. The earthquake was recorded all along the Appalachians, from Georgia to New England. The earthquake was felt so widely because it was a shallow earthquake, and geologic conditions in the eastern U.S. allow the effects of earthquakes to propagate and spread much more efficiently than in the western United States. Only mild movement was felt in Whitfield County. See map to the right.



To a large extent, the HMPC was unable to determine which of these earthquakes affected Whitfield County and, if so, to what degree. Nevertheless, the HMPC has determined that most of the earthquakes documented above, which is not an all-inclusive list, would have been strong enough or would have occurred close enough to the County to merit consideration. Two of these earthquakes occurred within the 50-year study period and are included in the hazard history of this Plan. The threat of earthquakes in Whitfield County may be more significant than the documented earthquake history would seem to indicate.

Based on U.S. Geological Survey estimations using the earthquake frequency method described in the section above, the probability of an earthquake of a magnitude of 4.75 or more within Whitfield County over the next 25 years is between 6% and 7.5% (see map below). As discussed above, such predictions are based on limited information, and cannot necessarily be relied upon for their precision. However, they do help demonstrate that the

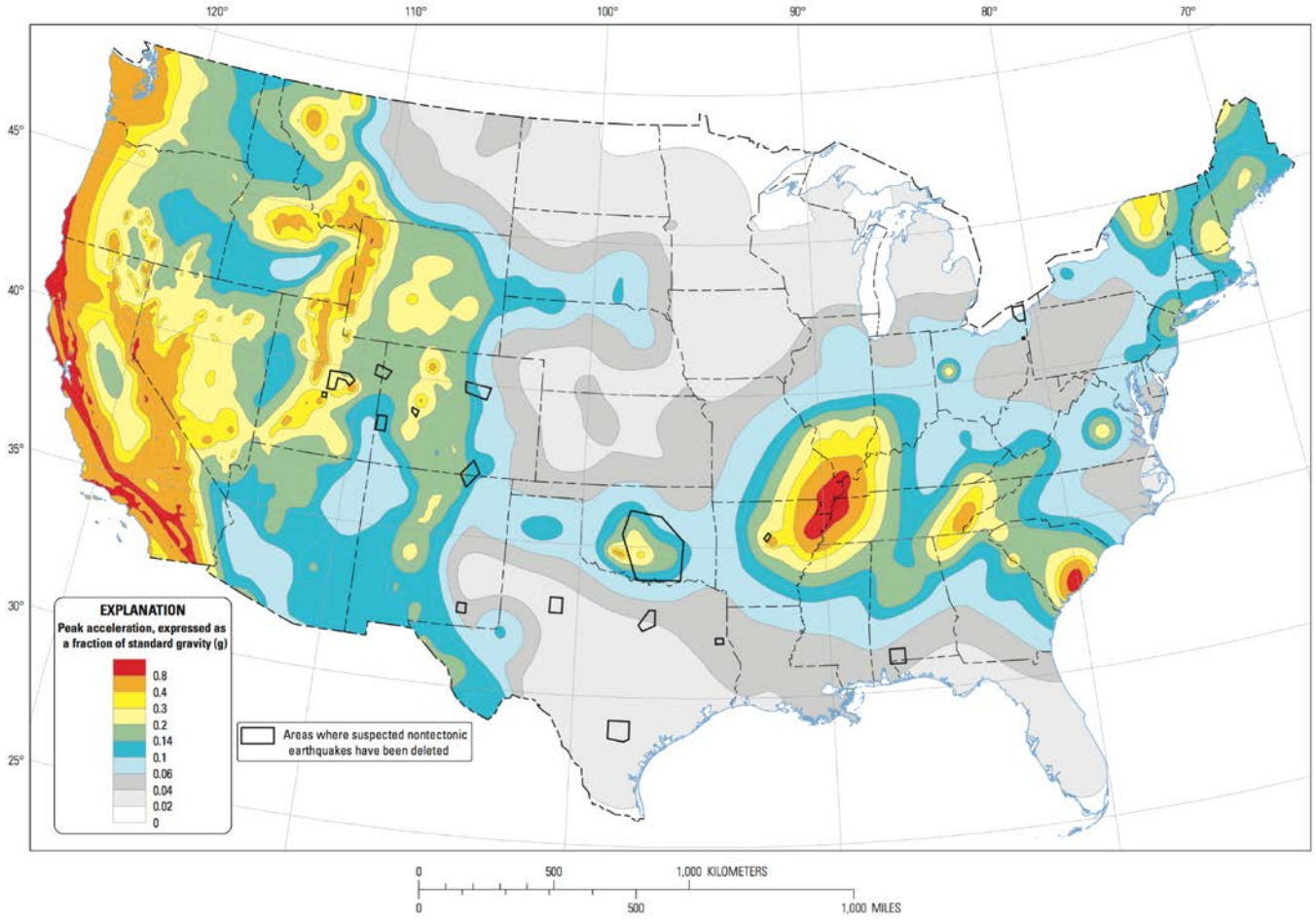
threat of earthquakes cannot be overlooked especially in the northwestern portions of Georgia.



The 2014 U.S. Geological Survey (USGS) National Seismic Hazard Maps, including the one on the following page, display earthquake ground motions for various probability levels across the United States and are applied in seismic provisions of building codes, insurance rate structures, risk assessments, and other public policy. The updated maps represent an assessment of the best available science in earthquake hazards and incorporate new findings on earthquake ground shaking, faults, seismicity, and geodesy. The USGS National Seismic Hazard Mapping Project developed these maps by incorporating information on potential earthquakes and associated ground shaking obtained from interaction in science and engineering workshops involving hundreds of participants, review by several science organizations and State surveys, and advice from expert panels and a Steering Committee. The new probabilistic hazard maps represent an update of the seismic hazard maps; previous versions were developed by Petersen and others (2008) and Frankel and others (2002), using the methodology developed Frankel and others (1996). Algermissen and Perkins (1976) published the first probabilistic seismic hazard map of the United States which was updated in Algermissen and others (1990).

The National Seismic Hazard Maps are derived from seismic hazard curves calculated on a grid of sites across the United States that describe the annual frequency of exceeding a set of ground motions. Data and maps from the 2014 U.S. Geological Survey National Seismic Hazard Mapping Project are available for download below. Maps for available periods (0.2 s, 1 s, PGA) and specified annual frequencies of exceedance can be calculated from the hazard curves. Figures depict probabilistic ground motions with a 2 percent probability of exceedance. Spectral accelerations are calculated for 5 percent damped linear elastic oscillators. All ground motions are calculated for site conditions with Vs30=760 m/s, corresponding to NEHRP B/C site class boundary.

Simplified 2014 Hazard Map (PGA, 2% in 50 years)



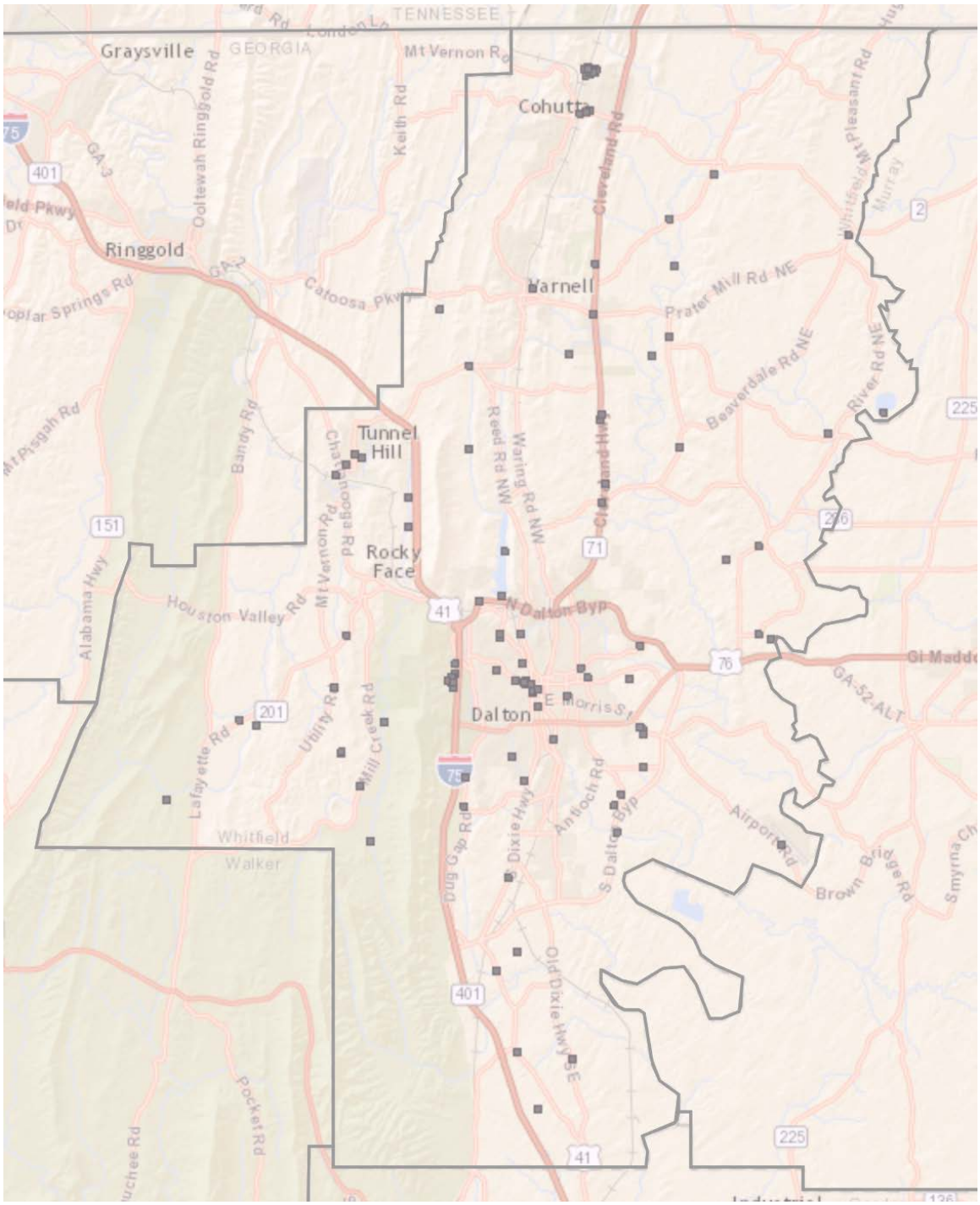
Two-percent probability of exceedance in 50 years map of peak ground acceleration

C. Assets Exposed to Hazard - All structures and facilities within Whitfield County are susceptible to earthquake damage since they can occur in any portion of the County or Cities/Towns. According to the USGS model below, all areas of Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta are located within Seismic Threat Category 4, "highest threat".

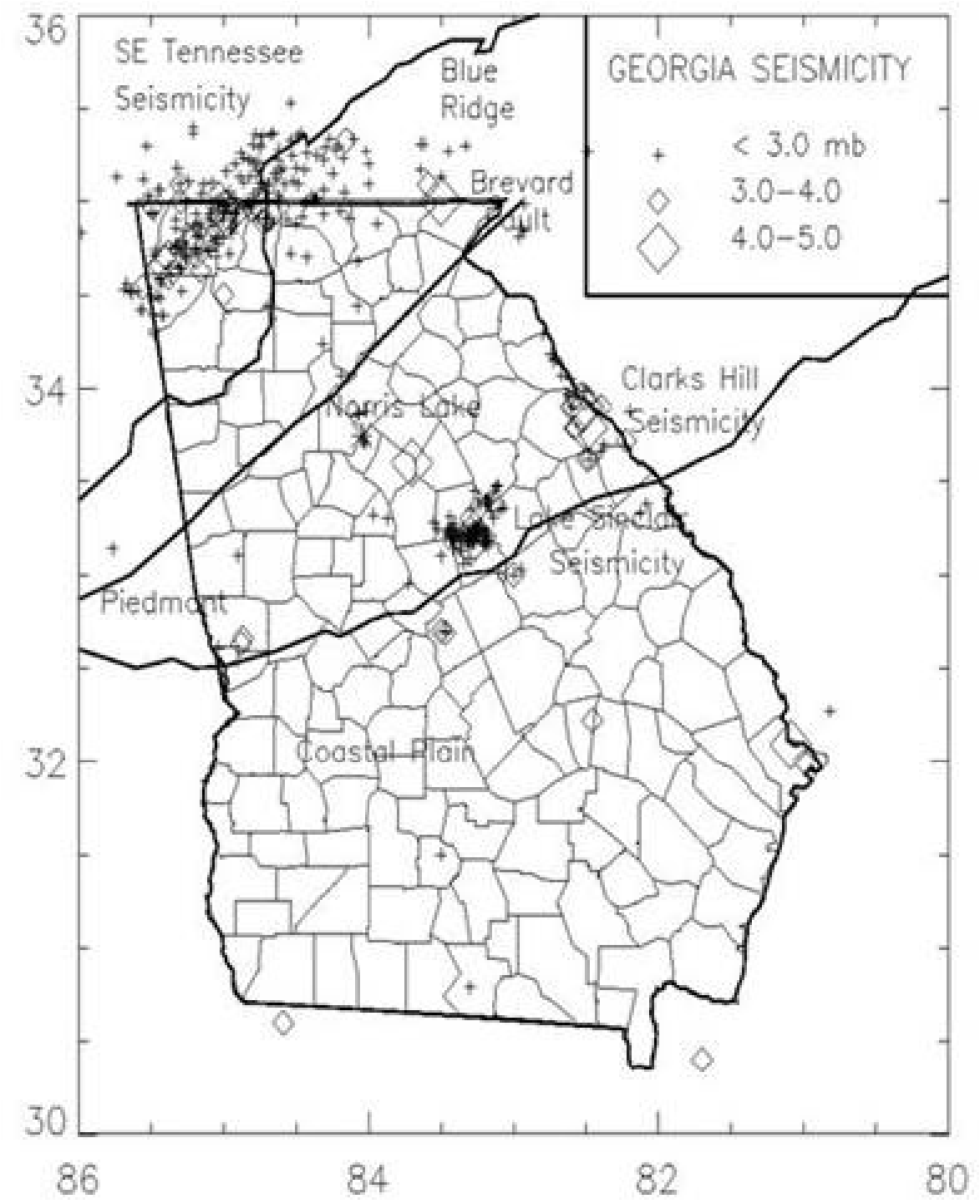
The seismic hazard layer used in the maps that follow is based on the USGS Probabilistic Seismic Hazard Map, showing the percentage of gravity that the area has a 2 percent probability of exceedance in 50 years. The score classification reflects that used by the IRC Seismic Design Categories. The horizontal positional accuracy is unknown for this layer.

	Seismic Threat Category	Original Value	Description
	1	A	0-17% gravity (lowest threat)
	2	B	17-33% gravity (low to moderate threat)
	3	C	33-50% gravity (moderate to high threat)
	4	D1	50-83% gravity (highest threat)
	*****	Not applicable	All other values

Whitfield County



Georgia has a few large faults, including the Blue Ridge fault. The Blue Ridge fault extends from Alabama through Georgia and into Tennessee. The fault runs across the northwest corner of Georgia. This region of Georgia is the most seismically active in the State. Whitfield County is located in this active area.



D. Estimate of Potential Losses – For loss estimate information, please refer to Appendix A, the Critical Facilities Database, and Appendix D, Worksheet 3a, for each jurisdiction.

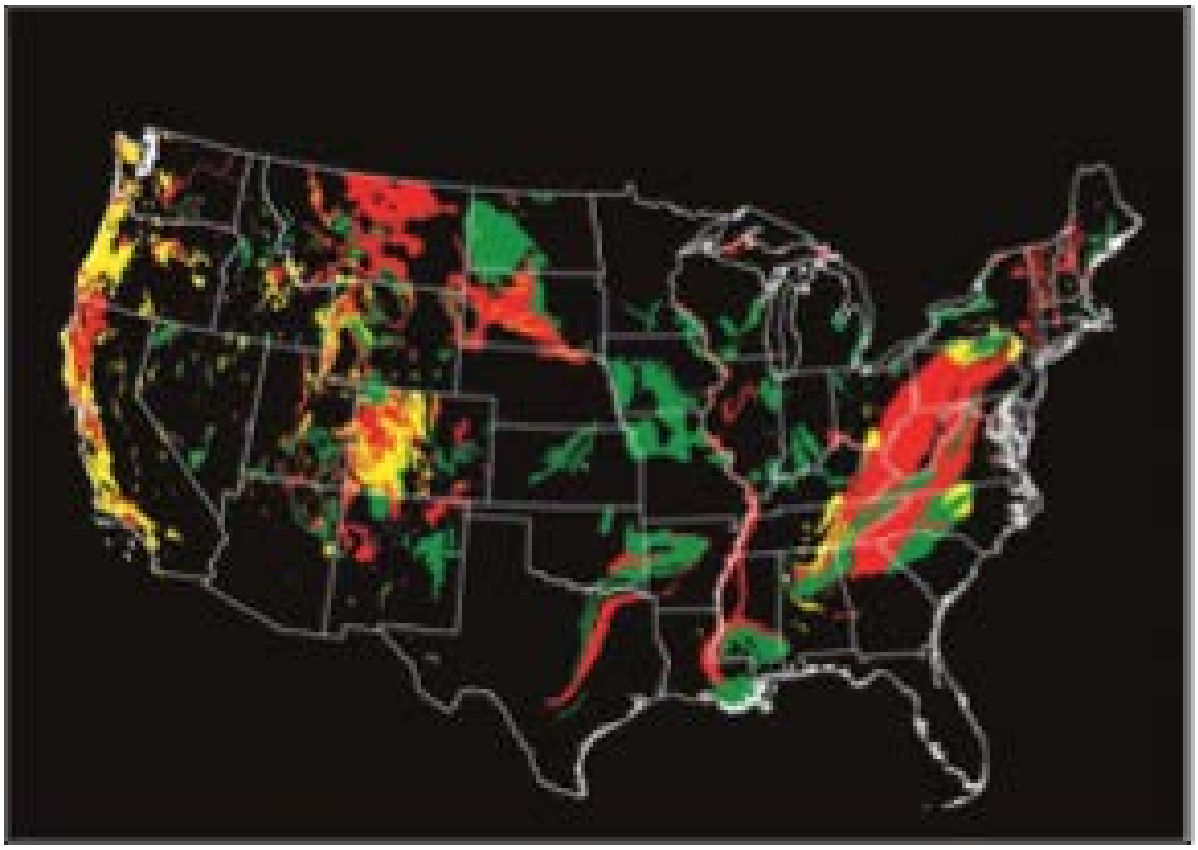
E. Multi-Jurisdictional Concerns – All of Whitfield County has the potential to be affected by earthquakes. Any steps taken to mitigate the effects of earthquake will be undertaken on a countywide basis and include the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta.

F. Hazard Summary – Scientific understanding of earthquakes is of vital importance to the Nation. As the population increases, expanding urban development and construction works encroach upon areas susceptible to earthquakes. With a greater understanding of the causes and effects of earthquakes, we may be able to reduce damage and loss of life from this destructive phenomenon. The HMPC was limited in its ability to develop mitigation measures associated with earthquakes, but did provide some guidance in *Chapter 5*.

2.8 Landslides

A. Hazard Identification – Landslides occur in every U.S. states and territory. In a landslide, masses of rock, earth, or debris move down a slope. Landslides can be small, large, slow or rapid. They can be activated by storms, earthquakes, volcanic eruptions, fires, freeze/thaw cycles, and steep-slope erosion. Landslides are often more damaging and deadly than the triggering event. The dangerous conditions may be high even as emergency personnel are providing rescue and recovery services. Landslide problems can be caused by land mismanagement, particularly in mountain, canyon and coastal regions. In areas burned by forest and brush fires a lower threshold of precipitation may initiate landslides. Land-use zoning, professional inspections, and proper design can minimize many landslide, mudflow, and debris flow problems.

USGS Landslide Potential Map:



***Red**-Very High; **Yellow**- High; **Green**-Moderate*

B. Hazard Profile – Landslides are a threat to Whitfield County. According to the USGS, north Georgia has a very high potential to experience landslides (see map above). All of north Georgia ranges from a moderate to a very high potential for landslide activity. Although no record of significant landslides was found, Whitfield County lies within an area with moderate potential for landslides according to USGS. Steep slopes, combined with the potential for wildfires increase the probability of a landslide occurring in Whitfield County within any given year. The majority of the ridges and mountains in the County have steep slopes of 25% or greater incline.

C. Assets Exposed to Hazard – In evaluating assets that are susceptible to landslides, the HMPC determined that any public and private property located in the vicinity of Whitfield County's steep slopes is susceptible to landslides, including critical facilities. In addition, any portion of the County, Cities, and Towns can be negatively impacted in the event a landslide blocks a road or highway preventing public safety response.

D. Estimate of Potential Losses – Landslide losses are difficult to estimate due to their unpredictable nature. For available loss estimate information, please refer to the Critical Facilities Database (Appendix A).

E. Multi-Jurisdictional Concerns – Due to topography, many portions of Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta can be negatively impacted by landslides. Therefore, any mitigation steps taken related to these weather events will be pursued on a countywide basis and include all jurisdictions.

F. Hazard Summary – Though not very common, landslide events do pose a threat to Whitfield County in terms of property damage, injuries and loss of life. Specific mitigation actions related to these weather events are identified in *Chapter 5*.

Chapter 3
Local Technological Hazard, Risk and Vulnerability (HRV) Summary

In accordance with FEMA guidelines, the Whitfield County Hazard Mitigation Planning Committee (HMPC) also included information relating to technological or "human-caused" hazards into this plan. The term, "technological hazard" refers to incidents resulting from human activities such as the manufacture, transportation, storage, and use of hazardous materials. This plan assumes that hazards resulting from technological sources are accidental, and that their consequences are unintended. Unfortunately, the information relating to technological hazards is much more limited, due largely to the very limited historical data available. This causes a greater level of uncertainty with regard to mitigation measures. However, enough information has been gathered to provide a basic look at technological hazards within Whitfield County.

The Whitfield County Hazard Mitigation Planning Committee (HMPC) identified two technological hazards the County is vulnerable to based upon available data including scientific evidence, known past events, and future probability estimates. As a result of this planning process, which included an analysis of the risks associated with probable frequency and impact of each hazard, the HMPC determined that each of these technological hazards pose a threat significant enough to address within this Plan. These include hazardous materials release and dam failure. Each of these technological hazards is addressed in this chapter of the Plan. An explanation and results of the vulnerability assessment are found in Tables 3-1 and 3-2.

Table 3.1 – Hazards Terminology Differences

Hazards Identified in 2008 Georgia State Plan	Equivalent/Associated Hazards Identified in the 2011 Whitfield County Plan	Difference
Dam Failure	Dam Failure	None

Table 3.2 – Vulnerability Assessment - Technological Hazards *(see Keys below)*

HAZARD	Whitfield	Dalton	Tunnel Hill	Varnell	Cohutta
Hazardous Materials Release					
Frequency	M	M	M	H	M
Severity	EX	EX	H	H	EX
Probability	H	H	L	H	H
Dam Failure					
Frequency	VL	VL	VL	VL	VL
Severity	EX	M	VL	VL	EX
Probability	VL	VL	VL	VL	VL

Key for Table 3.2 – Vulnerability Assessment Frequency and Probability Definitions

NA = Not applicable; not a hazard to the jurisdiction
VL = Very low risk/occurrence
L = Low risk; little damage potential (for example, minor damage to less than 5% of the jurisdiction)
M = Medium risk; moderate damage potential (for example, causing partial damage to 5-15% of the jurisdiction, infrequent occurrence)
H = High risk; significant risk/major damage potential (for example, destructive, damage to more than 15% of the jurisdiction, regular occurrence)
EX = Extensive risk/probability/impact

3.1 Hazardous Materials Release

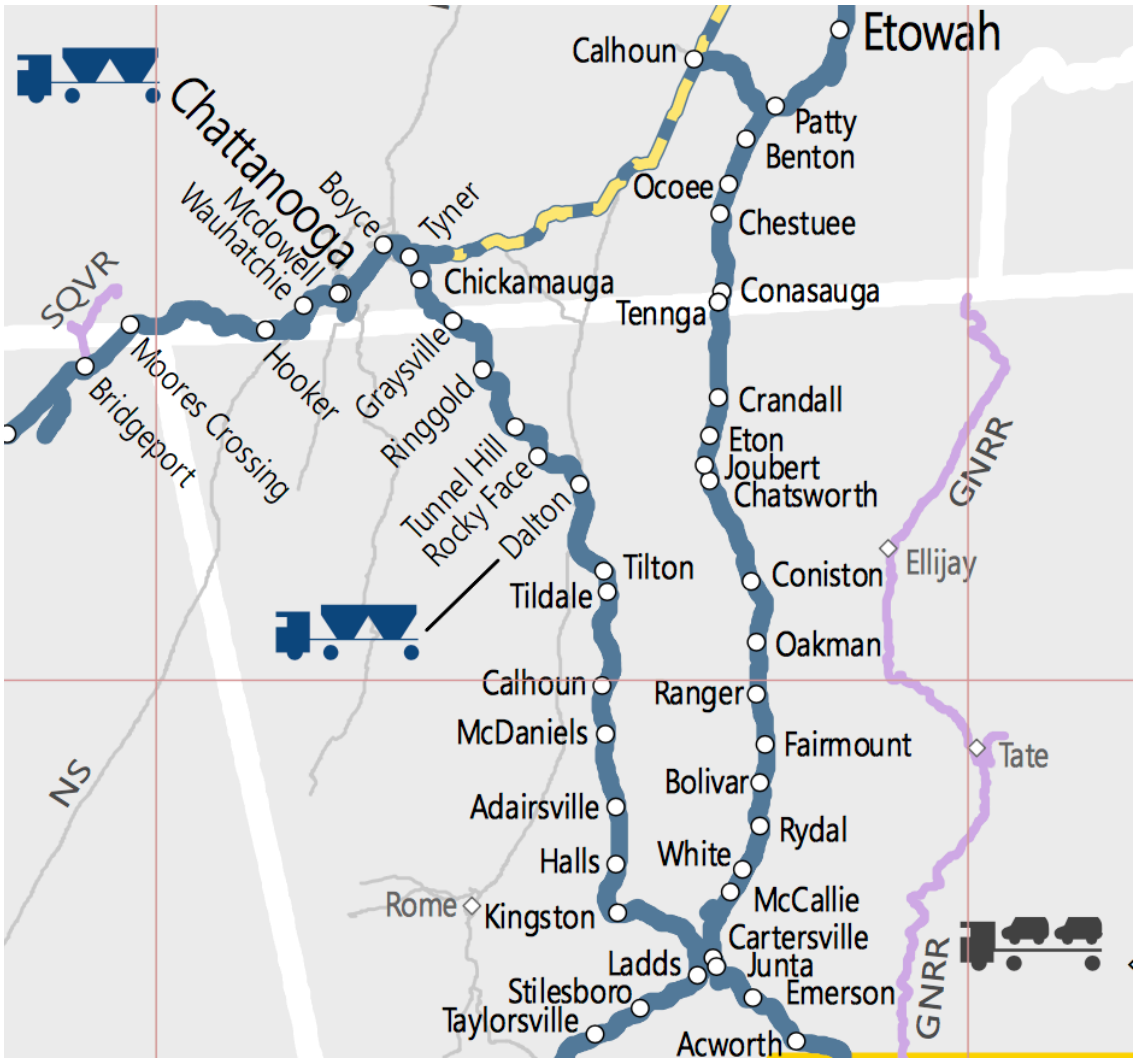
A. Hazard Identification – Hazardous materials (hazmat) refers to any material that, because of its quantity, concentration, or physical or chemical characteristics, may pose a real hazard to human health or the environment if it is released. Hazmat includes flammable and combustible materials, toxic materials, corrosive materials, oxidizers, aerosols, and compressed gases. Specific examples of hazmat are gasoline, bulk fuels, propane, propellants, mercury, asbestos, ammunition, medical waste, sewage, and chemical, biological, radiological, nuclear, and explosive (CBRNE) threat agents. Specific federal and state guidelines exist on transport and shipping hazardous materials. Research institutes, industrial plants, individual households, and government agencies all generate chemical waste. Approximately one percent is classified as hazardous.

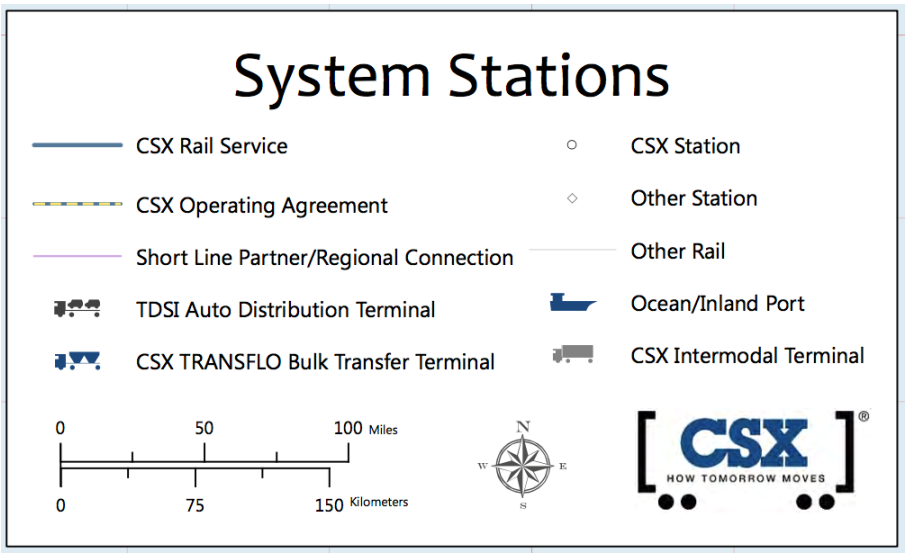
A hazmat spill or release occurs when hazardous material or waste gets into the environment in an uncontrolled fashion. Many manufacturing processes use hazardous materials or generate hazardous waste, but a hazardous spill doesn't always come from a chemical plant or a factory. Any substance in the wrong place at the wrong time in too large an amount can cause harm to the environment. The response to a spill depends on the situation. When the emergency response team is notified of a spill, it must quickly decide what sort of danger is likely. Members of the team collect appropriate clothing and

equipment and travel to the scene. There they try to contain the spill, sometimes testing a sample to identify it. If necessary, they decontaminate themselves before leaving the area. Once material has been identified, other personnel arrive to remove it.

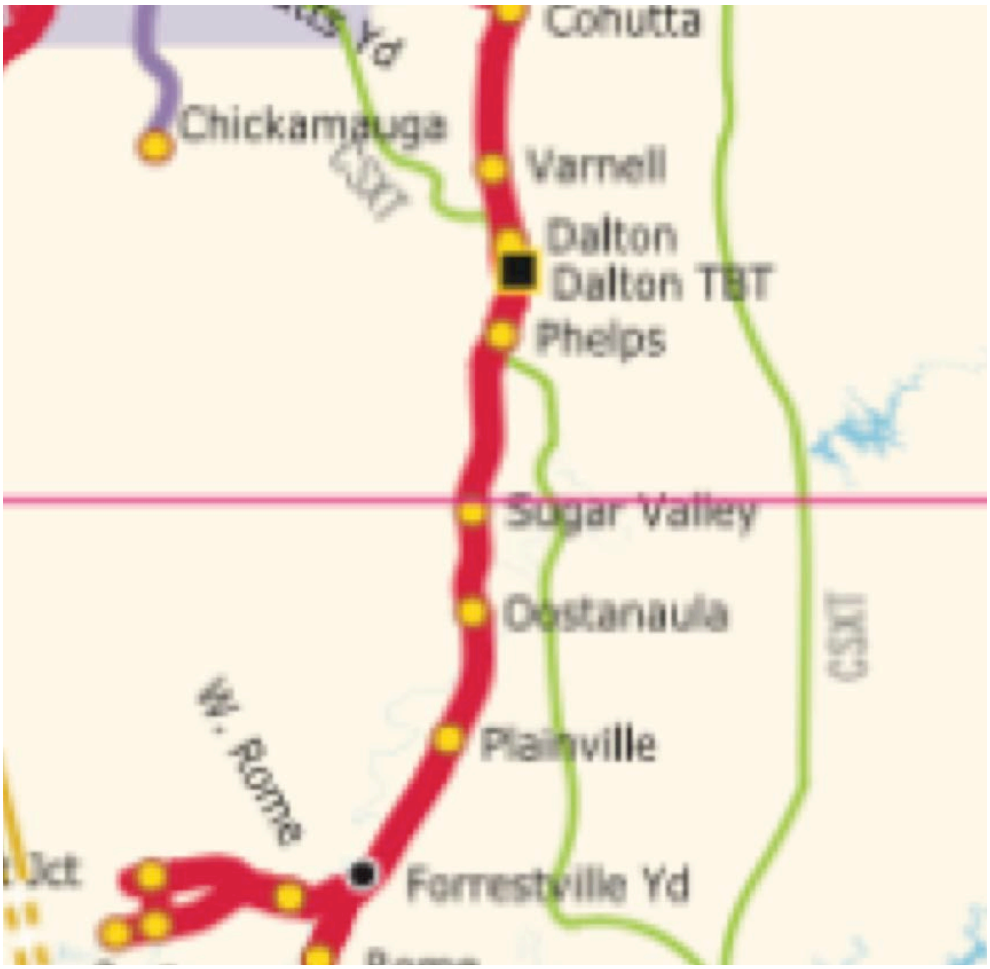
B. Hazard Profile – Hazmat spills are usually categorized as either fixed releases, which occur when hazmat is released on the site of a facility or industry that stores or manufactures hazmat, or transportation-related releases, which occur when hazmat is released during transport from one place to another. Both fixed and transportation-related hazmat spills represent tremendous threats to Whitfield County. Potential fixed hazmat spills within the County would come from local commercial and industrial establishments. Whitfield County also has major CSX and Norfolk Southern rail lines running through the County carrying some of the heaviest loads in the State. This represents a major threat to the County and Cities with regard to hazmat release.

CSX Rail line map:



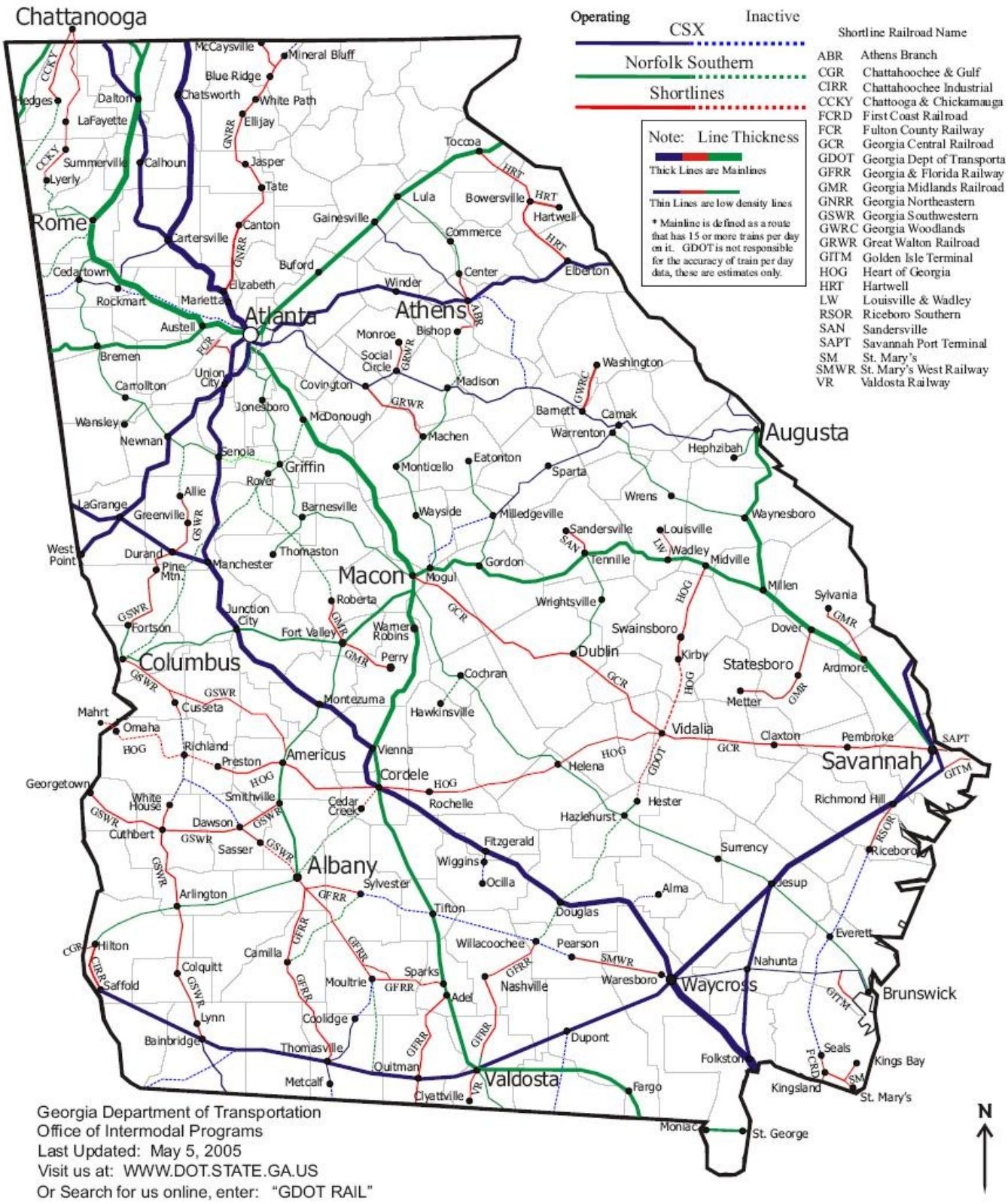


Norfolk Southern rail line map:

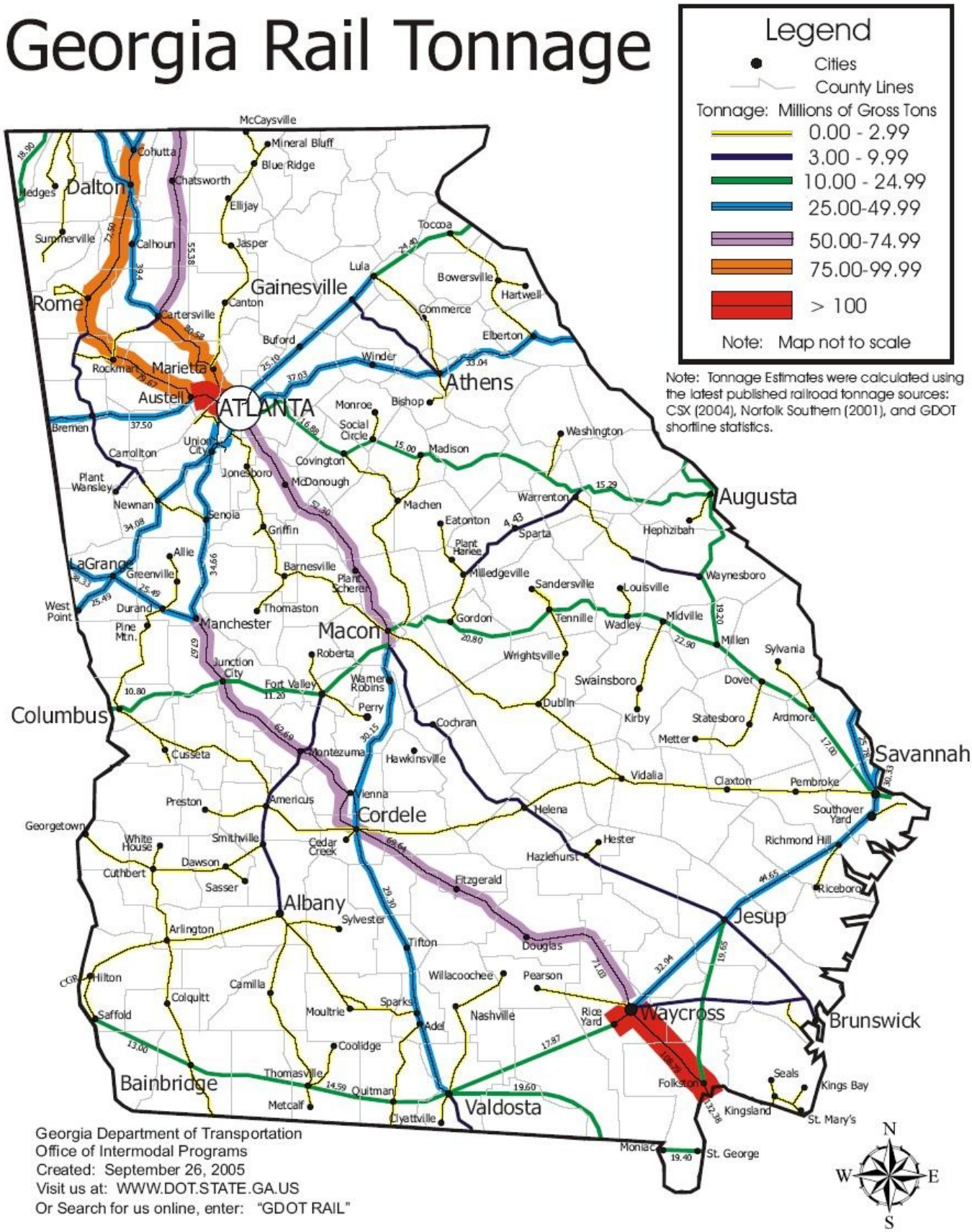


The Georgia Department of Transportation (GDOT) rail maps on the following two pages provide locations of the rail lines running through Whitfield County, as well as the information relating to tonnage.

Georgia Rail System



Georgia Rail Tonnage



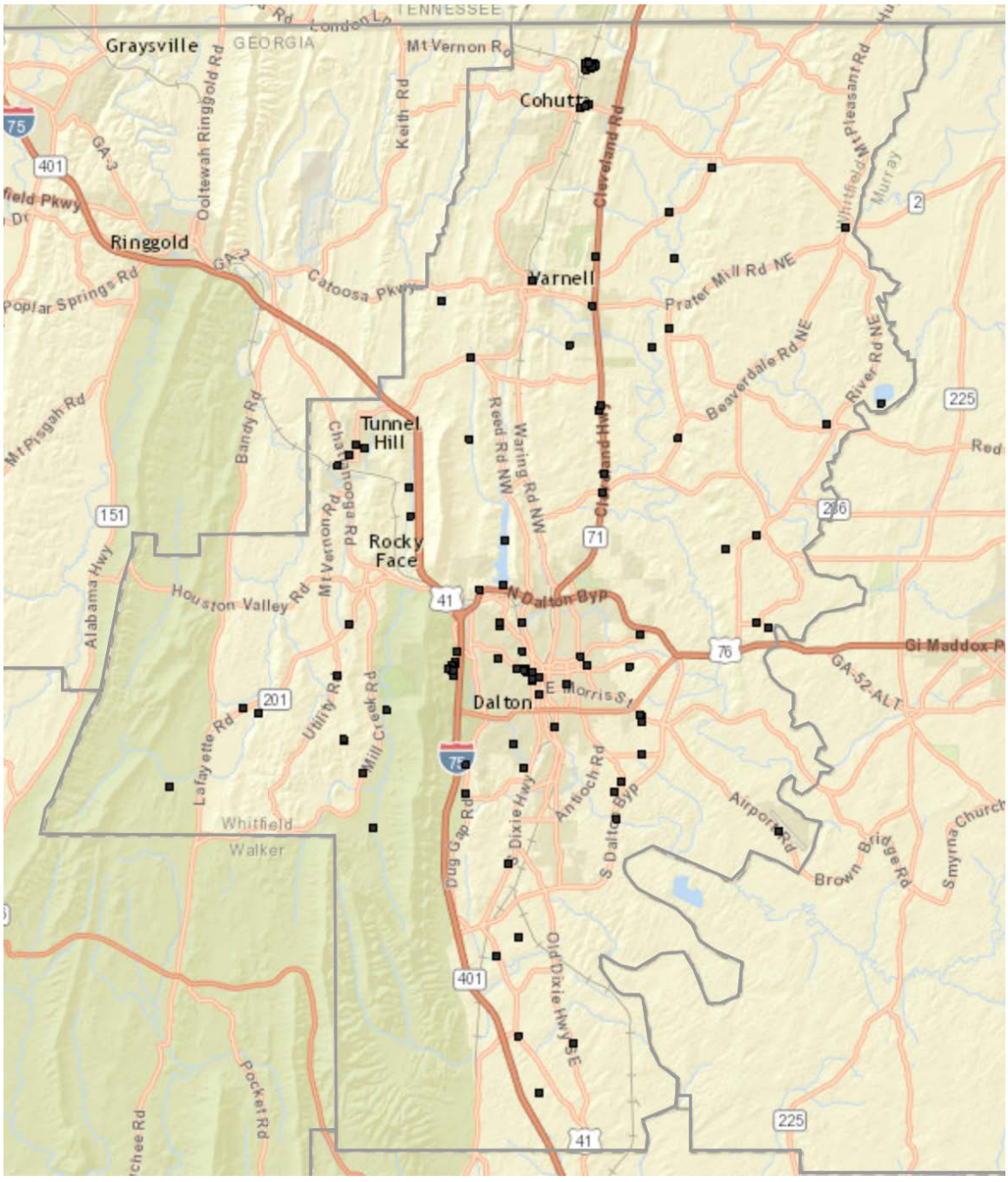
Georgia Department of Transportation
Office of Intermodal Programs
Created: September 26, 2005
Visit us at: WWW.DOT.STATE.GA.US
Or Search for us online, enter: "GDOT RAIL"

COX

C. Assets Exposed to Hazard – The environment is especially vulnerable to hazardous materials releases, with waterways being at greatest risk of contamination. Georgia EPD tracks information on waterways within Whitfield County that have been contaminated to varying degrees due to hazmat spills. These incidents include contamination to Mill Creek, Tar Creek, Cohutta Creek, Conasauga River, Swamp Creek, Bear Creek, Drowning Bear Creek, Tanyard Creek, Oostanaula River as well as other unnamed creeks, lakes, storm sewers, wells, and drainage ditches. Such releases are also a potential threat to all property and persons within any primary highway corridors or railroad corridors of Whitfield Co. since certain hazmat releases can create several square miles of contamination. The same holds true of property and persons located in the vicinity of facilities or industries that produce or handle large amounts of hazardous materials. The most common hazmat releases have generally included diesel, gasoline, oil, and sewage. Unfortunately, Georgia EPD no longer makes specific hazmat spill information available to the public as they once did. If at some point this changes, that data will be considered at the next Plan update.

All public and private property including critical facilities are susceptible to hazardous materials release since this hazard is not spatially defined. The map below identifies critical

facilities located within the hazard area, which in the case of drought includes all areas within the County, Cities, and Towns.



D. Estimate of Potential Losses - It is difficult to determine potential damage to the environment caused by hazardous materials releases. What can be calculated are the significant response costs incurred once a hazmat release does occur including emergency

response, road closings, evacuations, watershed protection, expended man-hours, and cleanup materials and equipment. Corridors for Interstate 75, US Routes 41, 76, and 411, and State Routes 2, 52, 71, 201, 286, 520, and for CSX and Norfolk Southern rail lines are most vulnerable to transportation-related releases. However, such releases can occur in virtually any part of the County accessible by road. Fixed location releases are not as likely to affect the more rural areas of the County. For additional loss estimate information, please refer to the Critical Facilities Database (Appendix A).

E. Multi-Jurisdictional Concerns – All of Whitfield County, Including the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta, is vulnerable to both fixed and transportation-related hazardous materials releases.

F. Hazard Summary – Hazardous materials releases are a significant threat to Whitfield County. Unknown quantities and types of hazmat are transported through the County by truck and railroad on a daily basis. The main corridors of concern are Interstate 75, US Routes 41, 76, and 411, and State Routes 2, 52, 71, 201, 286, 520, and for CSX and Norfolk Southern rail lines. These hazmat shipments pose a great potential threat to all of Whitfield County. The fact that the County is unable to track these shipments seriously limits the mitigation measures that can be put into place. Fixed hazmat releases are also considered to be a major threat to Whitfield County due to the industries located therein. Therefore, the Whitfield County HMPC has identified specific mitigation actions for hazardous materials releases in *Chapter 5*.

3.2 Dam Failure

A. Hazard Identification – Georgia law defines a dam as any artificial barrier which impounds or diverts water, is 25 feet or more in height from the natural bed of the stream, or has an impounding capacity at maximum water storage evaluation of 100 acre-feet (equivalent to 100 acres one foot deep) or more. Dams are usually constructed to provide a ready supply of water for drinking, irrigation, recreation and other purposes. They can be made of rock, earth, masonry, or concrete or of combinations of these materials.

Dam failure is a term used to describe the major breach of a dam and subsequent loss of contained water. Dam failure can result in loss of life and damage to structures, roads, utilities, crops, and livestock. Economic losses can also result from a lowered tax base, lack of utility profits, disruption of commerce and governmental services, and extraordinary public expenditures for food relief and protection. National statistics show that overtopping due to inadequate spillway design, debris blockage of spillways, or settlement of the dam crest account for one third of all U.S. dam failures. Foundation defects, including settlement and slope instability, account for another third of all failures. Piping and seepage, and other problems cause the remaining third of national dam failures. This includes internal erosion caused by seepage, seepage and erosion along hydraulic structures, leakage through animal burrows, and cracks in the dam. The increasing age of dams nationwide is a contributing factor to each of the problems above.

B. Hazard Profile – Congress first authorized the US Army Corps of Engineers to inventory dams in the United States with the National Dam Inspection Act (Public Law 92-367) of 1972. The Water Resources Development Act of 1986 (P.L. 99-662) authorized the Corps to maintain and periodically publish an updated National Inventory of Dams (NID), with re-authorization and a dedicated funding source provided under the Water Resources Development Act of 1996 (P.L. 104-3). The Corps also began close

collaboration with the Federal Emergency Management Agency (FEMA) and state regulatory offices to obtain more accurate and complete information. The National Dam Safety and Security Act of 2002 (P.L. 107-310) reauthorized the National Dam Safety Program and included the maintenance and update of the NID by the Corps of Engineers.

The most recent Dam Safety Act of 2006 reauthorized the maintenance and update of the NID.

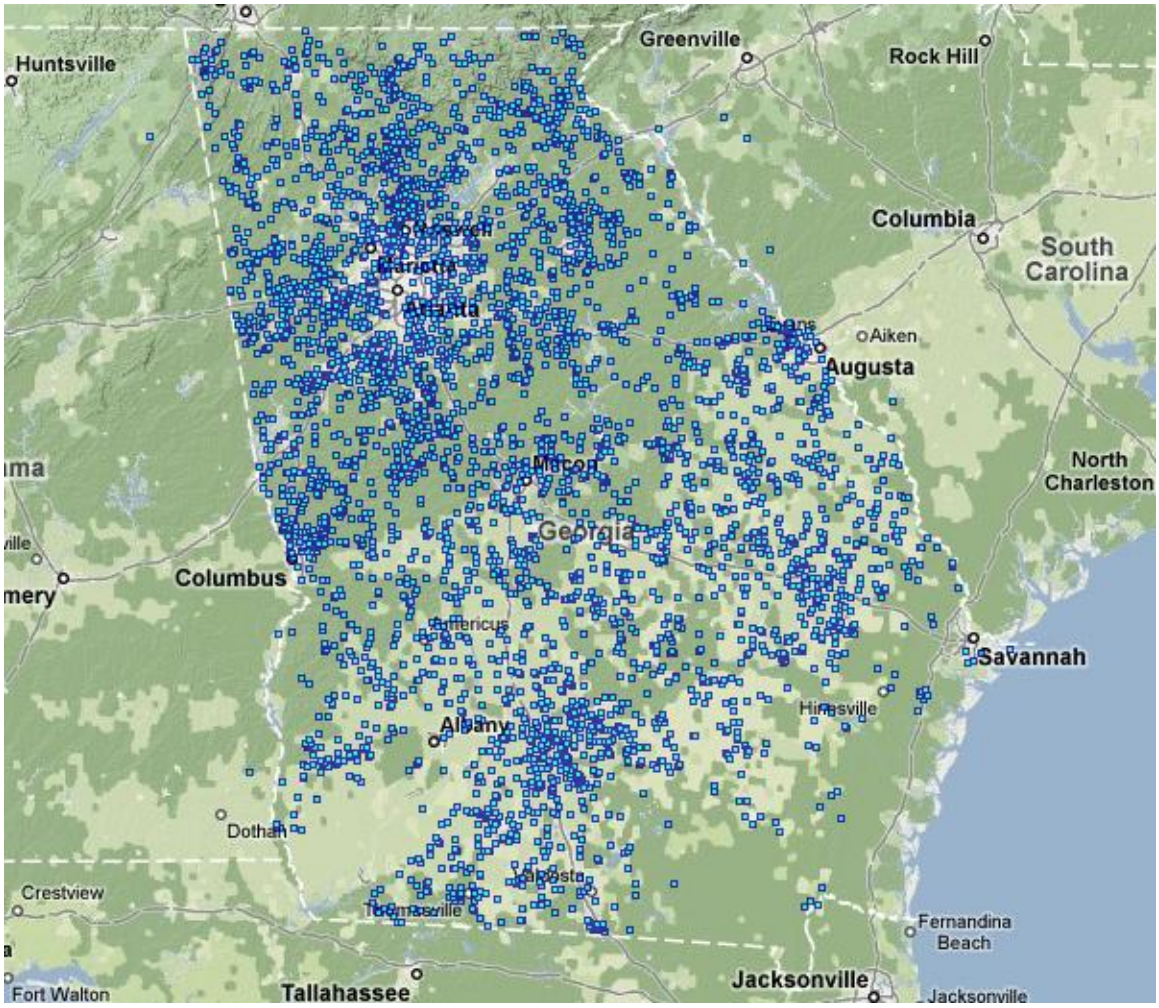
The NID consists of dams meeting at least one of the following criteria:

1) High hazard classification - loss of one human life is likely if the dam fails,
2) Significant hazard classification - possible loss of human life and likely significant property or environmental destruction,
3) Equal or exceed 25 feet in height and exceed 15 acre-feet in storage,
4) Equal or exceed 50 acre-feet storage and exceed 6 feet in height.

The goal of the NID is to include all dams in the U.S. that meet these criteria, yet in reality, is limited to information that can be gathered and properly interpreted with the given funding. The inventory initially consisted of approximately 45,000 dams, which were gathered from extensive record searches and some feature extraction from aerial imagery. Since continued and methodical updates have been conducted, data collection has been focused on the most reliable data sources, which are the various federal and state government dam construction and regulation offices. In most cases, dams within the NID criteria are regulated (construction permit, inspection, and/or enforcement) by federal or state agencies, who have basic information on the dams within their jurisdiction. Therein lies the biggest challenge, and most of the effort to maintain the NID; periodic collection of dam characteristics from states, territories, and 18 federal offices. Database management software is used by most state agencies to compile and export update information for the NID. With source agencies using such software, the Corps of Engineers receives data that can be parsed and has the proper NID codes. The Corps can then resolve duplicative and conflicting data from the many data sources, which helps obtain the more complete, accurate, and updated NID.

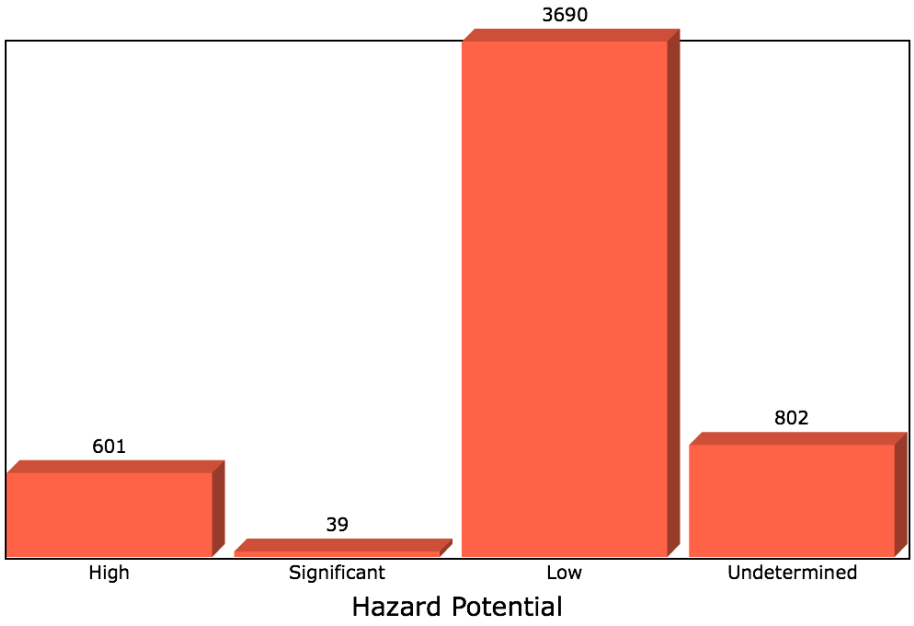
The National Inventory of Dams Map for the State of Georgia is located below and displays the State's current inventory of 5,132 dams.

U.S Army Corps of Engineers National Inventory of Dams

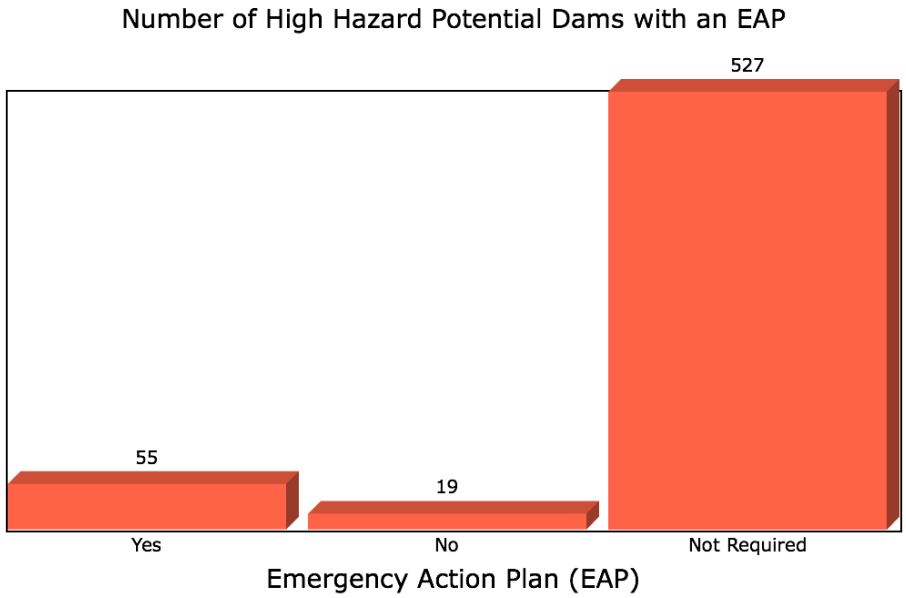


The following eight US Army Corps of Engineers charts are derived from NID information and present information related to number, hazard potential, Emergency Action Plan (EAP) status, height, ownership, type, purpose, and age of Georgia dams.

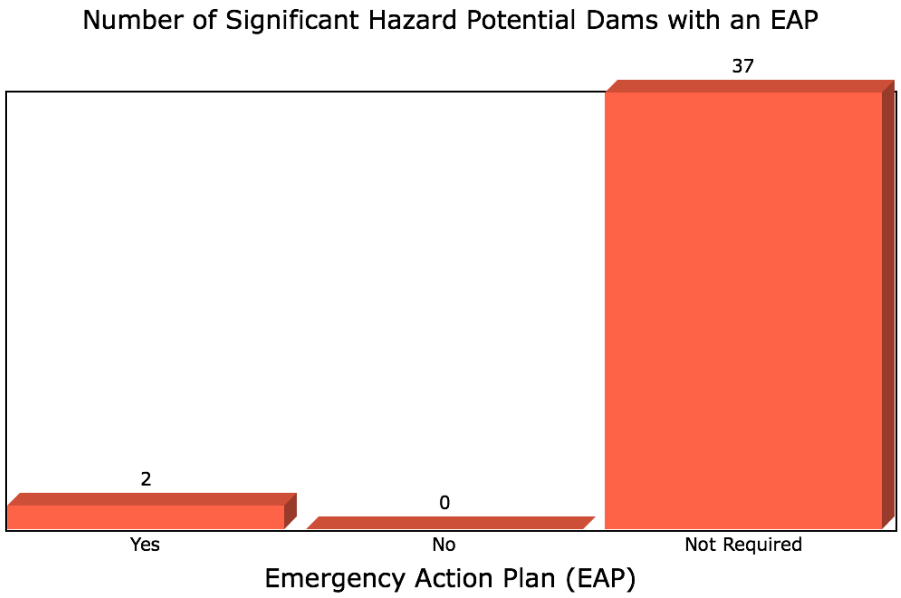
Dams by Hazard Potential



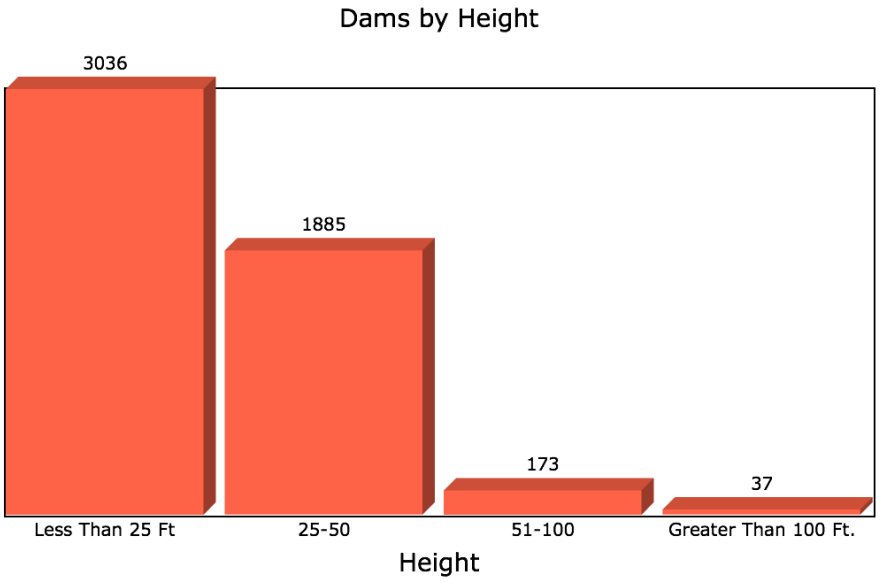
Number of High Hazard Potential Dams with an Emergency Action Plan (EAP)



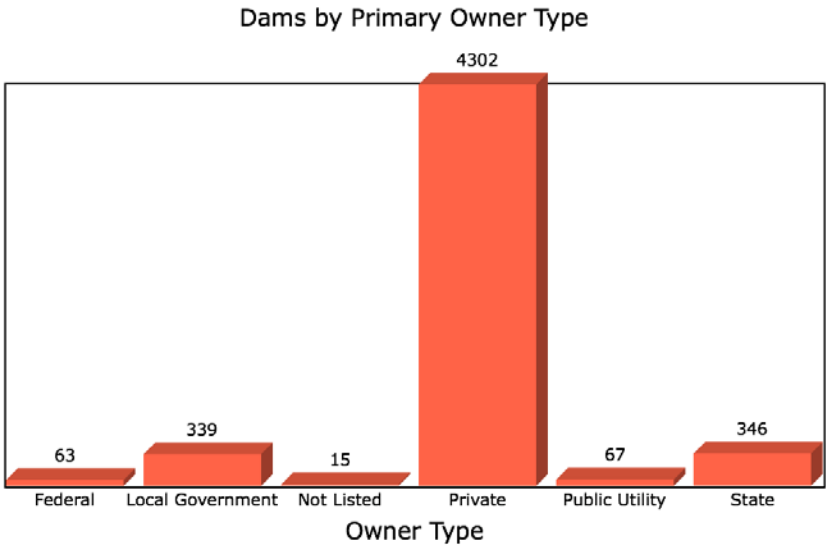
Number of Significant Hazard Potential Dams with an Emergency Action Plan (EAP)



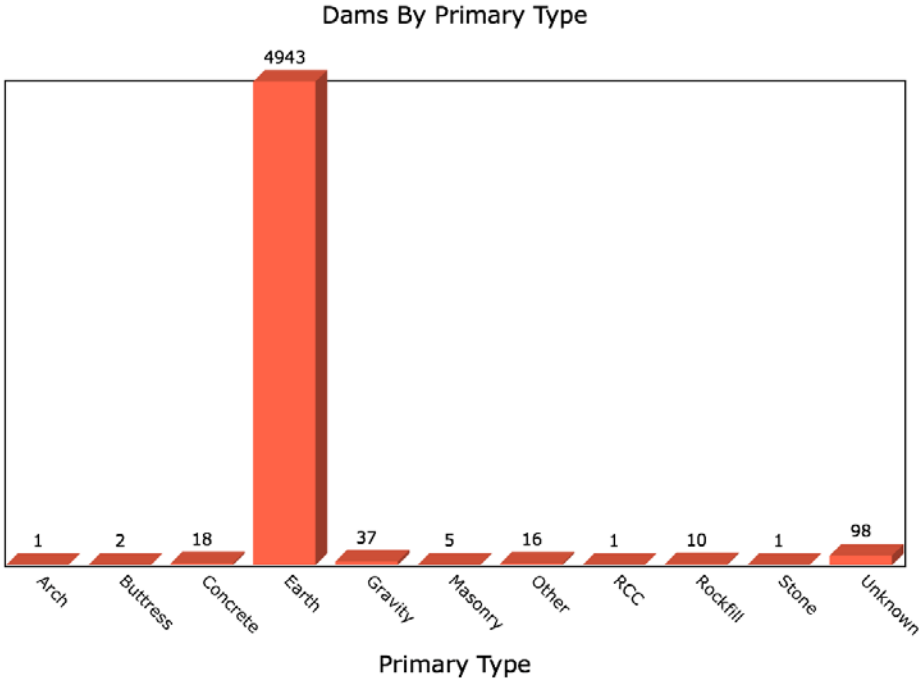
Dams by Height



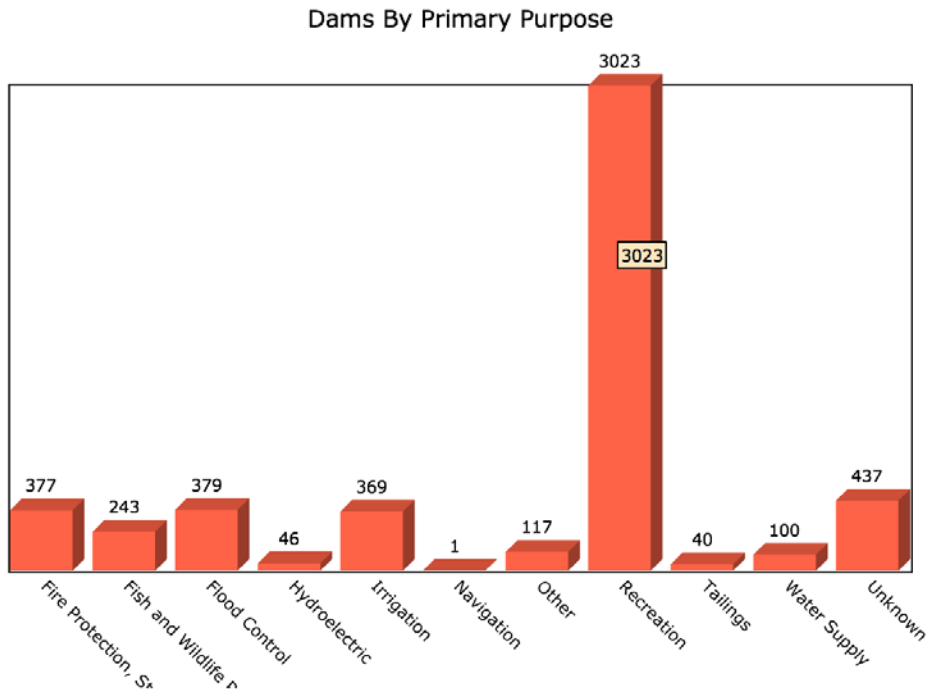
Dams By Primary Owner Type



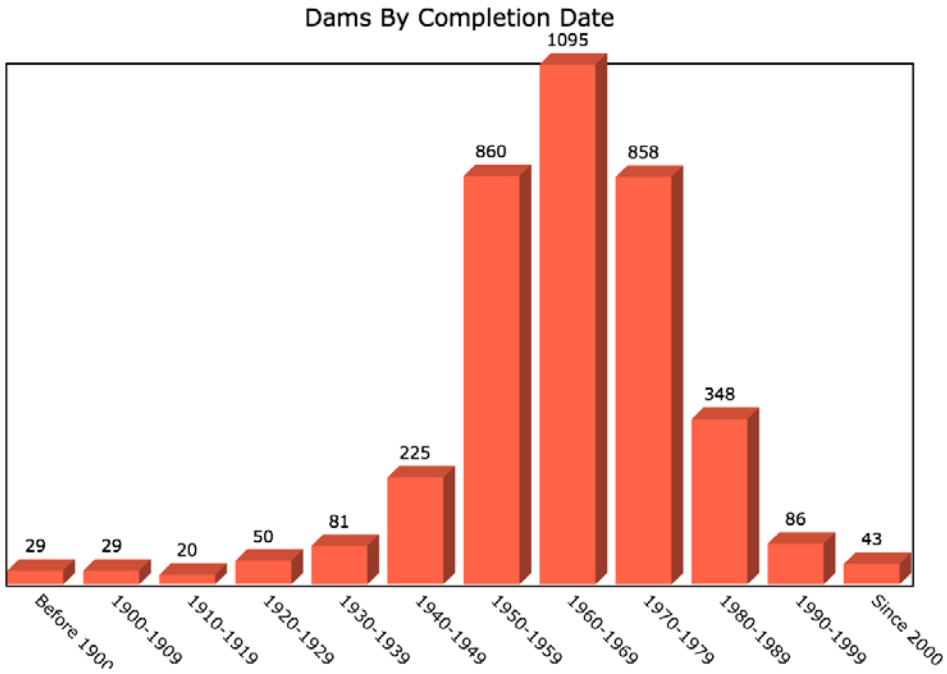
Dams By Primary Type



Dams By Primary Purpose



Dams By Completion Date



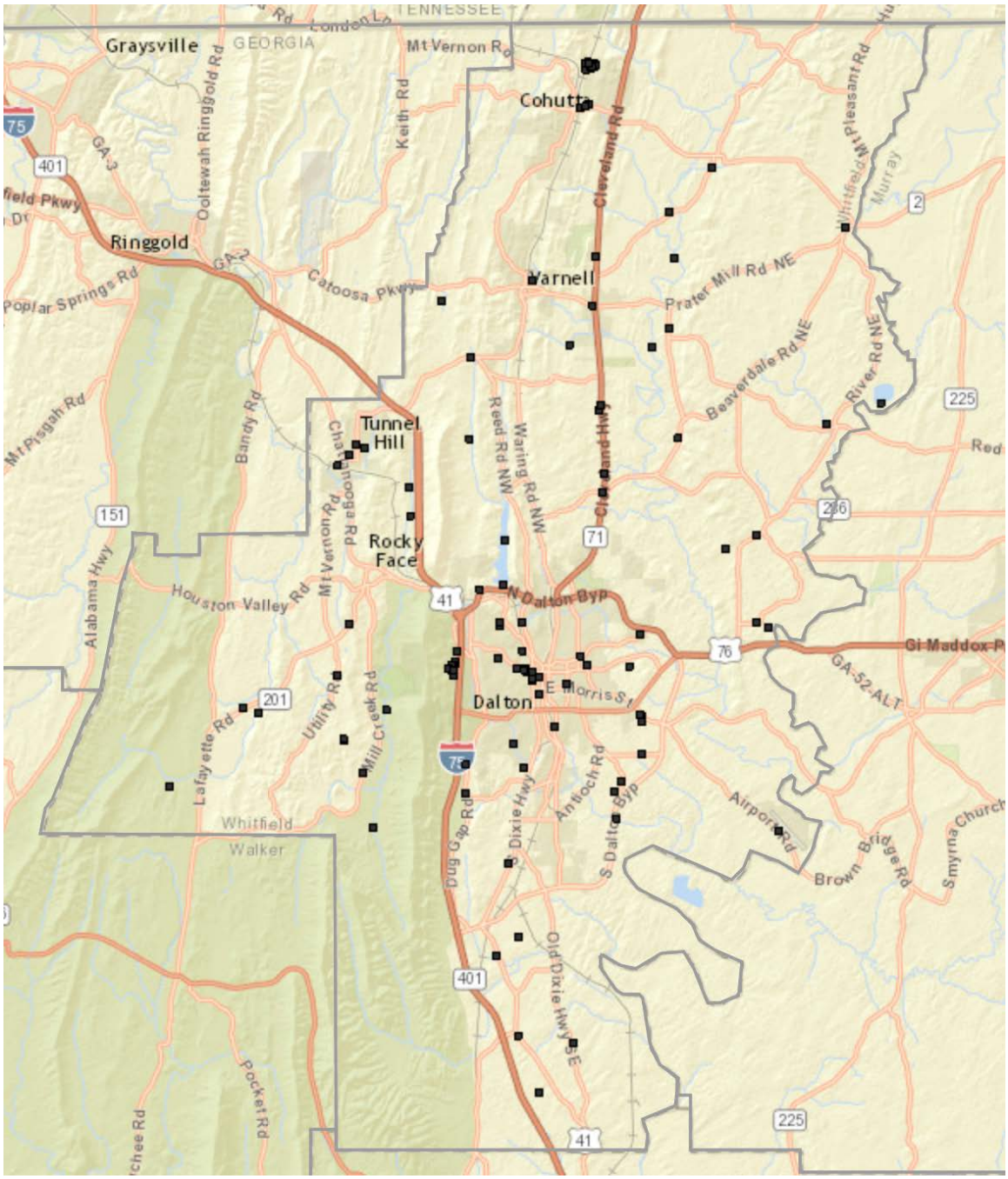
As you can see in the last chart above, most Georgia dams were built during the 1950's through the 1970's. This puts the average age of Georgia dams at close to 50 years old. The Whitfield County HMPC reviewed data from the US Army Corps of Engineers National Inventory of Dams, the Environmental Protection Division (EPD) within the Georgia Department of Natural Resources (DNR), as well as County records in their research involving dam failure within Whitfield County. Fortunately, Whitfield County has never experienced a total dam failure with a Category I dam. It is also possible that some small private dams have been breached at some point in the past, but no records have been found to indicate any type of emergency response related to such a failure, or even that such a failure has taken place. However, the potential for such a disaster does exist, and the appropriate steps must be taken to minimize such risks. The Georgia Safe Dams Program helps to accomplish that.

The Georgia Safe Dams Act of 1978 established Georgia's Safe Dams Program following the November 6, 1977 failure of the Kelly Barnes Dam in Toccoa, GA, in which 39 people lost their lives when the breached dam, which held back a 45-acre lake, sent a 30-foot-high wall of water sweeping through Toccoa Falls College. The Environmental Protection Division (EPD) within the Georgia Department of Natural Resources (DNR) is responsible for administering the Program. The purpose of the Program is to *provide for the inspection and permitting of certain dams in order to protect the health, safety, and welfare of all citizens of the state by reducing the risk of failure of such dams.* The Program has two main functions: (1) to inventory and classify dams and (2) to regulate and permit high hazard dams. Although a total Category I dam failure has never been recorded in Whitfield County, a partial failure of Lookout Lake Dam did occur in 2004. Mitigation actions are not yet completed for the Dam.

Structures below the State minimum height and impoundment requirements (25 feet or more in height or an impounding capacity of 100 acre-feet or more) are exempt from regulation by the Georgia Safe Dams Program. The Program checks the flood plain of the dam to determine its hazard classification. Specialized software is used to build a computer model to simulate a dam breach and establish the height of the flood wave in the downstream plain. If the results of the dam breach analysis, also called a flood routing, indicate that a breach of the dam would result in a probable loss of human life, the dam is classified as Category I (high-hazard). As of December 2011, the Program's statewide inventory of dams consisted of 475 Category I dams, 3,410 Category II dams and 1,186 exempt dams. The Program noted that an additional 120 Category II dams needed to be studied for possible reclassification to Category I dams. The Safe Dams Program also approves plans and specifications for construction and repair of all Category I dams. In addition, Category I dams are continuously monitored for safety by Georgia EPD.

To date, the Safe Dam Program has identified **five Category I dams** within Whitfield County: Threadmill Lake Dam, Mill Creek Watershed No. 9, Dalton Utilities Impoundment Dike No. 3, River Road Reservoir Dam, and Lower Haig Mill Lake Dam. The remaining 15 classified dams within the County are Category II dams (13) or exempt dams (2). There may be a number of unclassified dams within the County as well. The Program requires all Category II dams to be inventoried at least every five years.

C. Assets Exposed to Hazard – Areas most vulnerable to the physical damages associated with dam failure within Whitfield County, though such a risk appears to be relatively low, are the low-lying and downstream areas associated with the 14 dams inventoried by the Safe Dam Program. Although physical damages associated with dam failure would be limited to certain areas, the damage to the local economy and problems associated with delivery of water and other utilities could be felt Countywide and include all areas of the County, Cities, and Towns.



D. Estimate of Potential Losses - Loss estimation due to dam failure is an approximate effort, at best. Direct loss to infrastructure, critical facilities and businesses in terms of repair and replacement can be roughly estimated. For additional loss estimate information, please refer to the Critical Facilities Database (Appendix A).

E. Multi-Jurisdictional Concerns – All of Whitfield County, Including the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta, is vulnerable to the negative impact of dam failure.

F. Hazard Summary – Even though no Category I dams have been identified in Whitfield County, the Whitfield County HMPC has identified some specific mitigation actions for dam failure in *Chapter 5*.

Chapter 4
Land Use and Development Trends

After review by the HMPC, it was determined that current and future development does not appear to significantly impact the vulnerabilities of Whitfield County, Including the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta. Nevertheless, the most current development information available is outlined below.

Whitfield County includes the municipalities of Cohutta, Dalton, Tunnel Hill and Varnell. It also consists of numerous smaller communities that are not incorporated cities but are recognized places in the County. These are addressed by geographic area:

Northside
The northern portion of the County (north of Dalton city limits/Dawnville Road area and east of I-75) includes agricultural and low density residential uses east of SR 71/Cleveland Highway, suburban neighborhoods and commercial nodes along SR 71, and the ridges of Rocky Face and Cohutta. Northside Whitfield County includes the following communities: Beaverdale, Cedar Valley, Cohutta Ridge, Hopewell, Norton, Plainview, Pleasant Grove, Prater's Mill, Norton, Rocky Face Ridge, Toonerville and Waring.

Southside
The south side of Whitfield County is located south of the City of Dalton. The area includes portions of the Chattahoochee National Forest located west of I-75, interchange areas at Carbondale and Connector 3 as well as historic rural communities located throughout the area. Southside Whitfield County includes the following communities: Carbondale, Five Springs, Nance Springs, Phelps, River Bend and Tilton.

Westside
The west side of the County is comprised of the areas west of I-75, including residential areas south of Tunnel Hill, the steep slopes of the Dug Gap Ridge, the Chattahoochee National Forest and the western most portion of the county, and the following communities: Dug Gap Ridge, Gordon Springs, Mill Creek, Mt. Vernon and Trickum.

Eastside
The eastern portion of Whitfield County includes areas east of the City of Dalton, including a segment of the Dalton Bypass, commercial development along SR 76, higher density residential areas just east of Dalton, and the Dalton Municipal Airport. Eastside
Whitfield County includes the following communities: Dawnville, Cedar Ridge and Keith's Mill.

Within Whitfield County, unincorporated areas make up roughly 90.9% of the County's 291.5 square miles. Table 4-1 compares the existing land use for the total County (includes cities) with the unincorporated areas.

Table 4-1 - Existing Land Use (Whitfield County)

Land Use Classification	*Unincorporated Whitfield County*		*Whitfield County*	
	Acres	% of Total	Acres	% of Total
Unknown	3,698.9	2.3%	4,181.0	2.3%
Agricultural/Rural/Undeveloped	108,575.9	66.3%	111,567.1	62.1%
Commercial	3,948.4	2.4%	6,103.2	3.4%
Parks/Recreation/Conservation	13,545.2	8.3%	14,744.8	8.2%
Public/Institutional	5,748.2	3.5%	7,793.6	4.3%
Historical	0.0	0.0%	6.4	0.0%
Industrial	3,838.7	2.3%	5,878.2	3.3%
Public Utility	460.1	0.3%	527.7	0.3%
Residential - Multi-Family	288.2	0.2%	811.9	0.5%
Residential Less than 0.5 Acres	2,035.4	1.2%	3,561.0	2.0%
Residential 0.5-to-1 acre	5,384.7	3.3%	6,502.2	3.6%
Residential 1-to-5 acres	16,225.6	9.9%	17,892.2	10.0%
Total	163,749.3	100.0%	179569.2	100.0%

Land classified as Agricultural/Rural/Undeveloped makes up the largest portion of both the County as a whole and the unincorporated areas. More than 62.1% of the total County and 66.3% of the unincorporated areas of the County are categorized as Agricultural/Rural/Undeveloped areas.

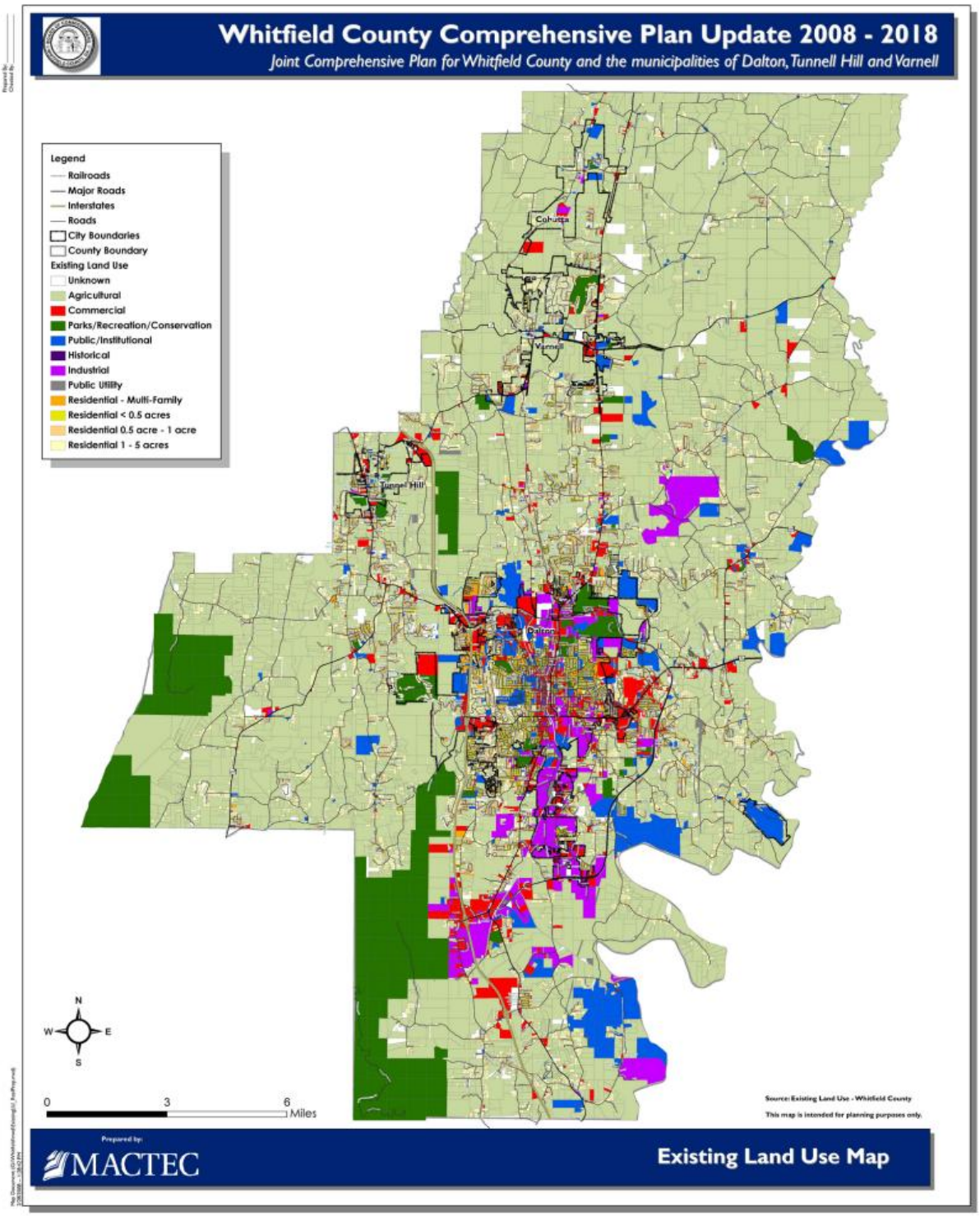
Land classified as Residential (combination of less than 0.5 acre, 0.5-to-1.0 acre and 1.0-to-5.0 acres) makes up 16.1% of the County and 15.6% of the unincorporated areas of the County. The bulk of these residential classifications are represented by the 1-to-5 acre category.

Land classified as Parks, Recreation, and Conservation makes up almost 8.2% of the County's total area. In addition to conservation land, this category includes golf courses, public and private ball fields as well as public parks.

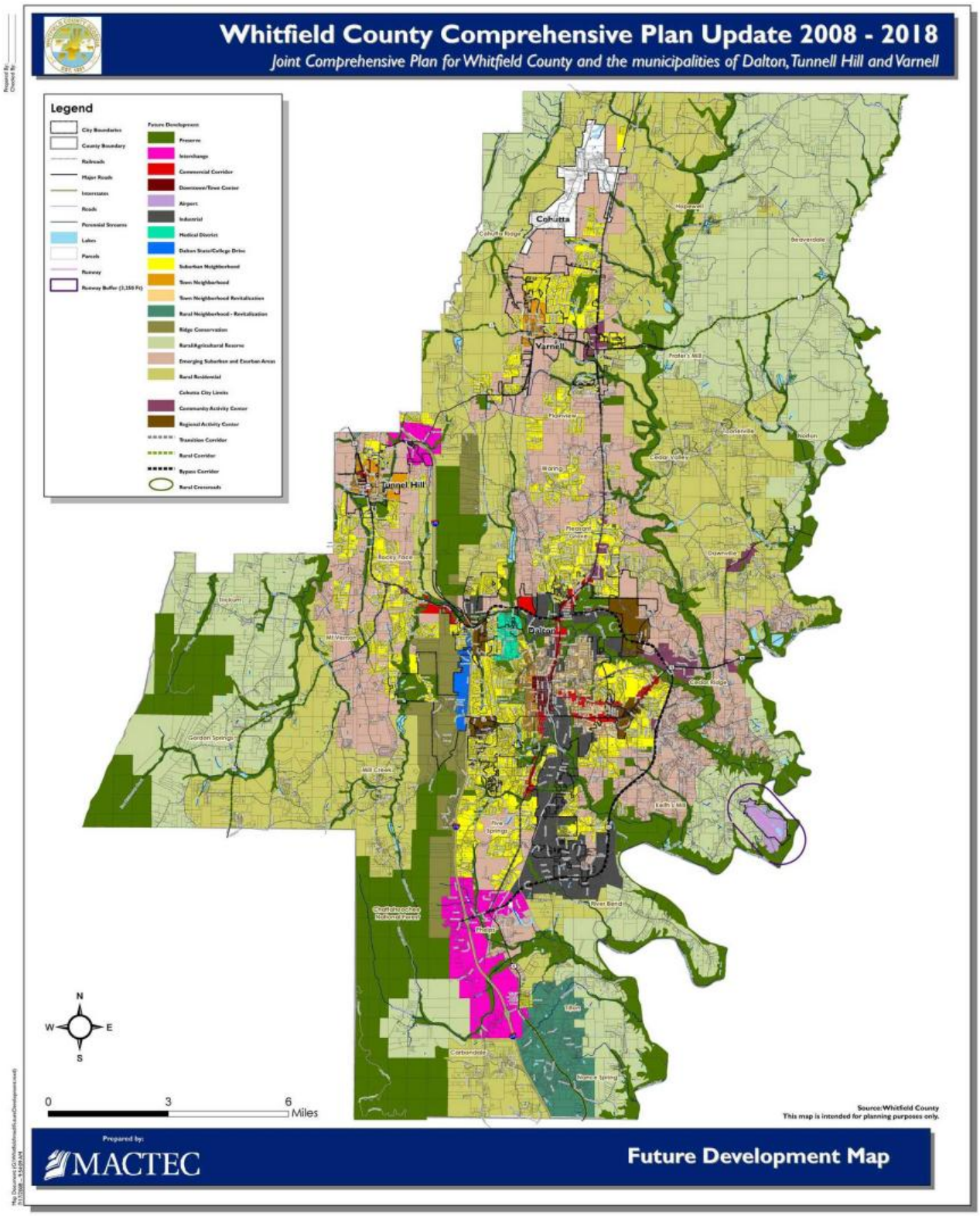
Properties classified as Public/Institutional account for approximately 4.3% of the total county and 3.5% of the unincorporated area. Public/Institutional uses include schools and places of worship.

Commercial classification properties make up only 3.4% of the total County area. Commercial land uses are primarily within the cities. Commercial properties account for 2.4% of the unincorporated area of the County. Properties classified as Industrial account for approximately 3.3% of the total County and 2.3% of the unincorporated area. Industrial uses include light and heavy manufacturing and warehousing/distribution.

The Existing Land Use Map for Whitfield County:



The Future Land Use Map for Whitfield County:



City of Dalton

The incorporated city of Dalton includes roughly 6.9% of the County's 291 square miles. Table 4-2 presents the existing land use distribution and the Dalton Existing Land Use Map, found at this end of this chapter, shows existing land use for the city of Dalton.

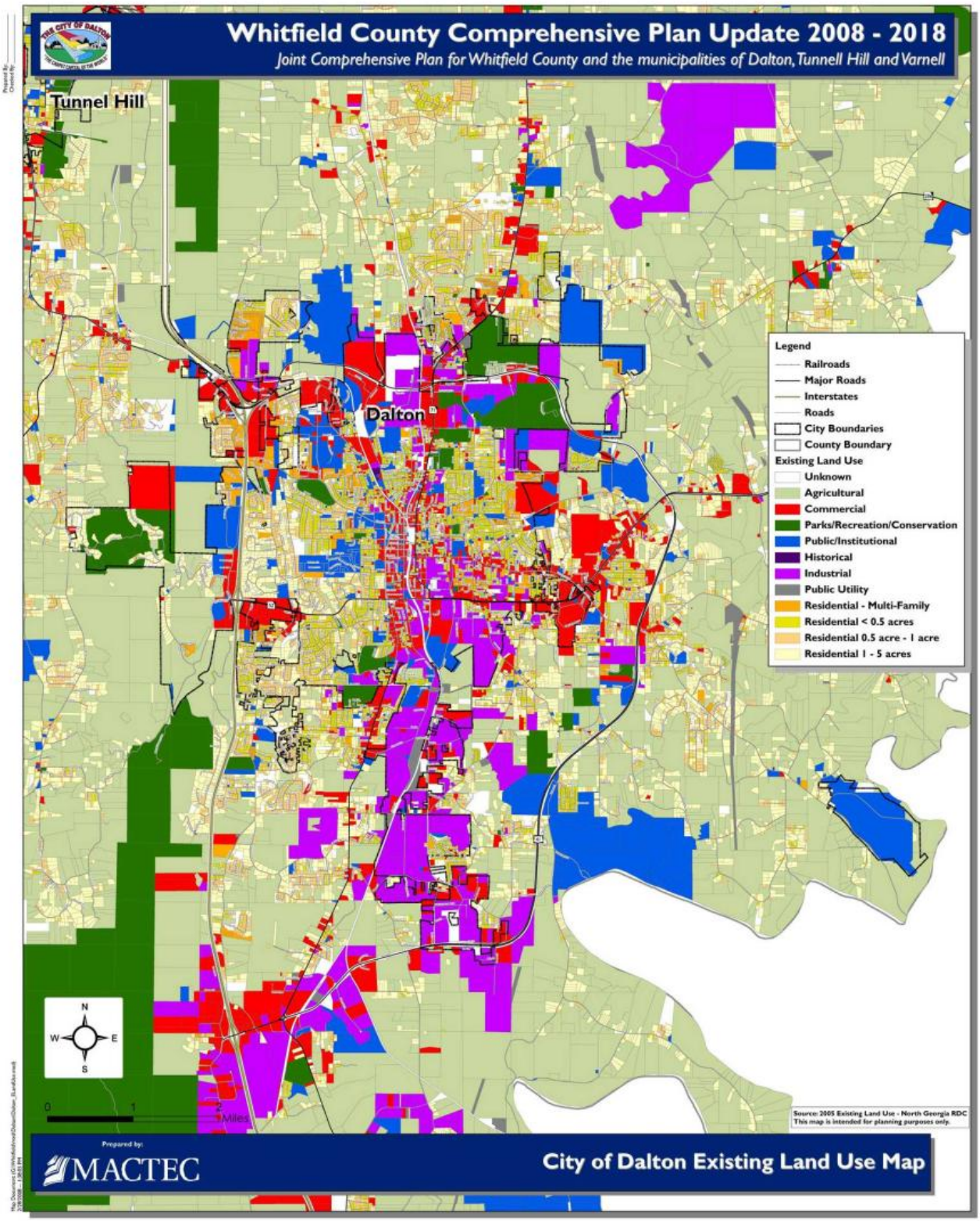
Table 4-2 – Existing Land Use (City of Dalton)

Land Use Classification	Acres	% of Total
Unknown	417.3	3.6%
Agricultural	860.2	7.4%
Commercial	1,909.9	16.4%
Parks/Recreation/Conservation	1,058.7	9.1%
Public/Institutional	1,732.2	14.9%
Historical	6.4	0.1%
Industrial	1,975.8	17.0%
Public Utility	61.5	0.5%
Residential - Multi-Family	517.3	4.4%
Residential Less than 0.5 Acres	1,355.8	11.6%
Residential 0.5 acre to 1 acre	830.4	7.1%
Residential 1 to 5 acres	912.8	7.8%
Total	11,638.3	100.0%

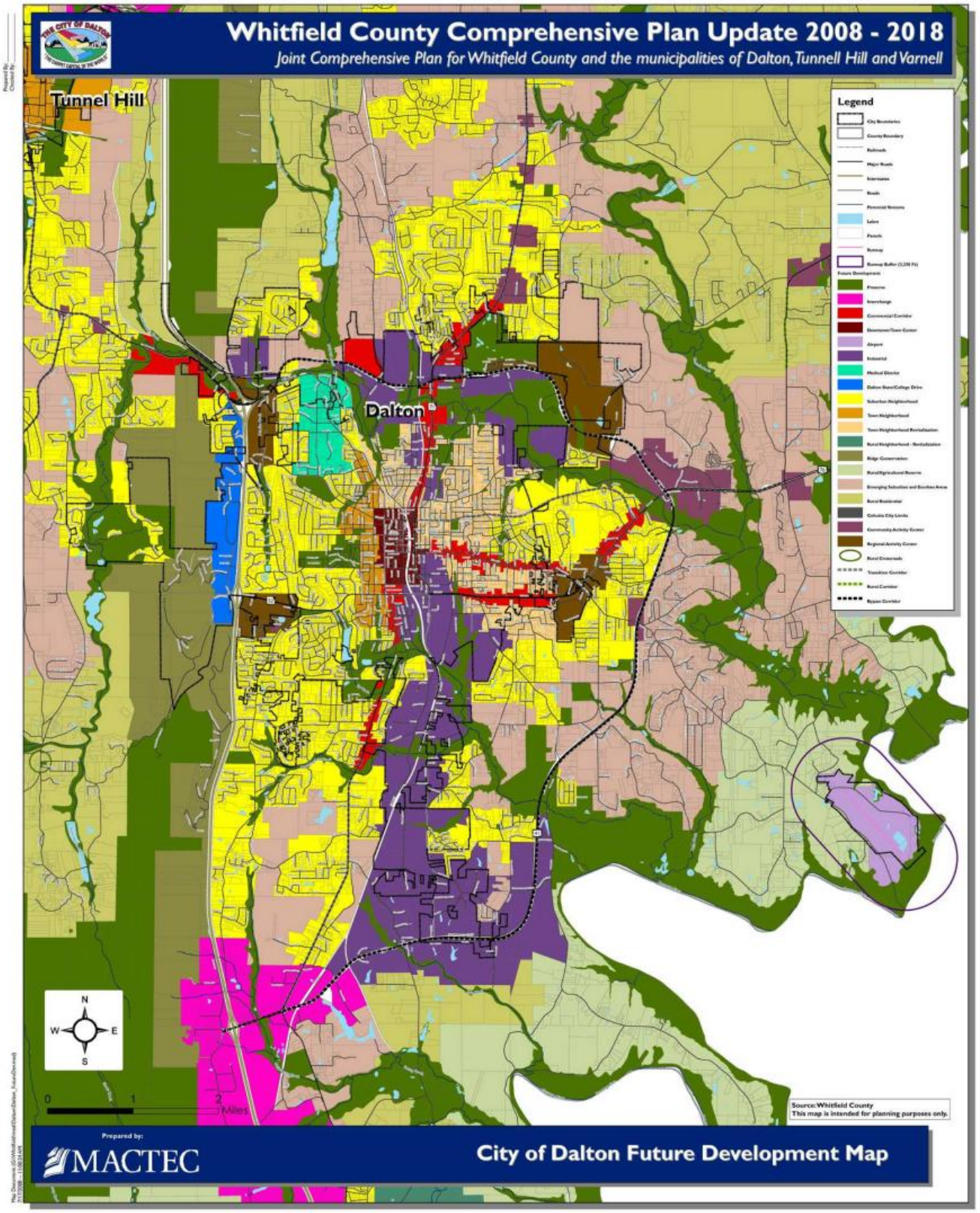
Land classified as Residential (combination of less than 0.5 acre, 0.5 to 1.0 acre and 1.0 to 5.0 acres) makes up the largest portion of the city at 26.5%. More than 40% of this residential classification falls into the less than 0.5 acres classification. Multifamily Development makes up 4.4%. Agricultural/Rural/Undeveloped land represents 7.4% of the city. Properties classified as Industrial account for 17.0%. Industrial includes light and heavy manufacturing and warehousing/distribution. Commercial classification properties make up 16.4% of the city.

Land classified as Parks, Recreation, and Conservation equates to almost 9.1% of the city's total area. In addition to conservation land, this category includes golf courses, public and private ball fields as well as public parks. Properties classified as Public/Institutional account for approximately 14.9%. Public/Institutional areas include schools and places of worship.

The Existing Land Use Map for the City of Dalton:



The Future Land Use Map for the City of Dalton:



City of Tunnel Hill

The incorporated city of Tunnel Hill makes up roughly one percent of the County's 291 square miles. Table 4-3 presents the existing land use for the city. The Tunnel Hill Existing Land Use Map, found at this end of this chapter, shows existing land use for unincorporated Tunnel Hill.

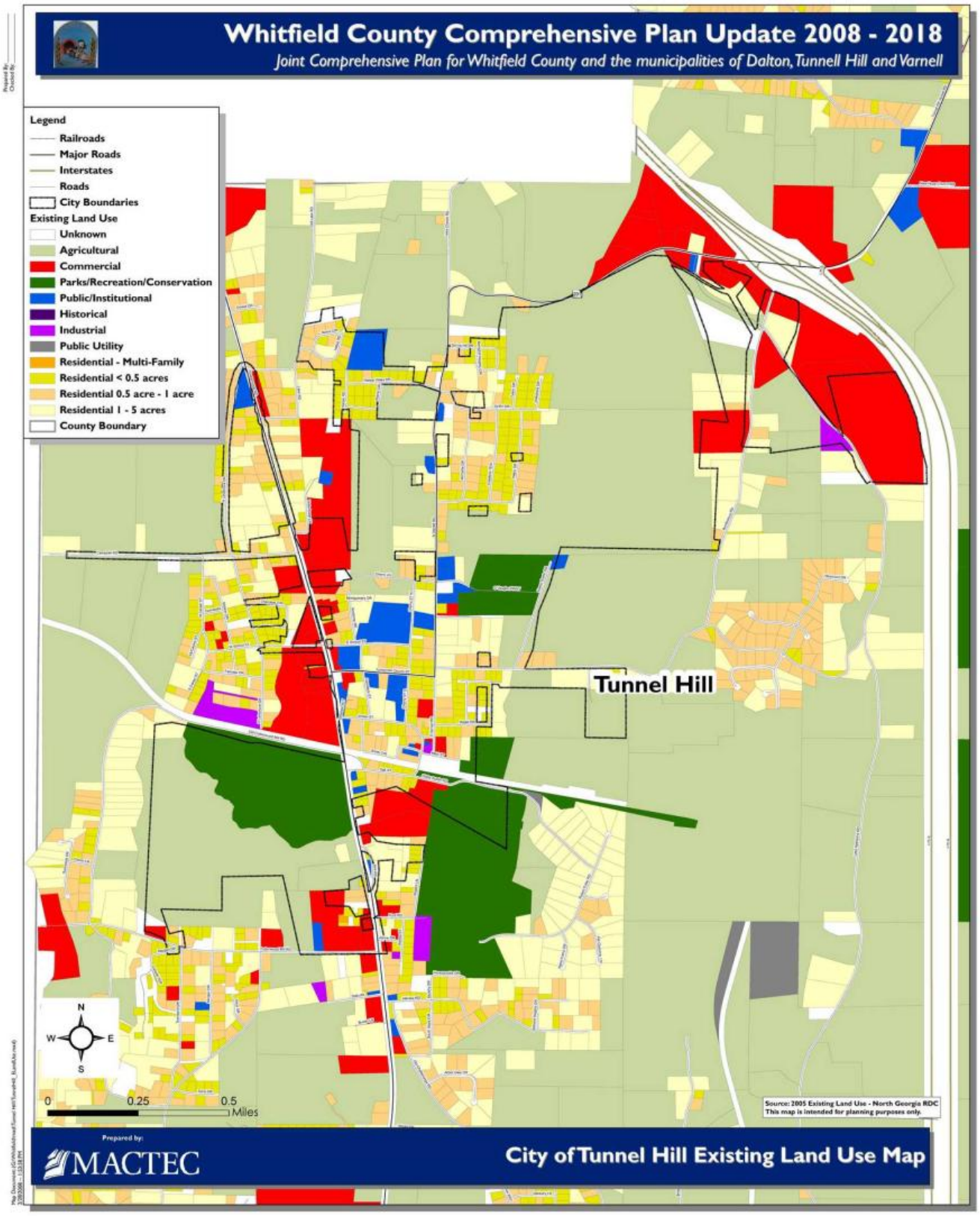
Table 4-3 – Existing Land Use (City of Tunnel Hill)

Land Use Classification	*Acres*	*% of Total*
Unknown	12.0	1.3%
Agricultural/Rural/Undeveloped	424.0	48.2%
Commercial	90.2	10.0%
Parks/Recreation/Conservation	99.2	11.0%
Public/Institutional	32.8	3.6%
Industrial	2.7	0.3%
Residential - Multi-Family	0.3	0.0%
Residential Less than 0.5 Acres	79.1	8.7%
Residential 0.5 acre to 1 acre	70.3	7.8%
Residential 1 to 5 acres	94.7	10.5%
Total	905.4	100.0%

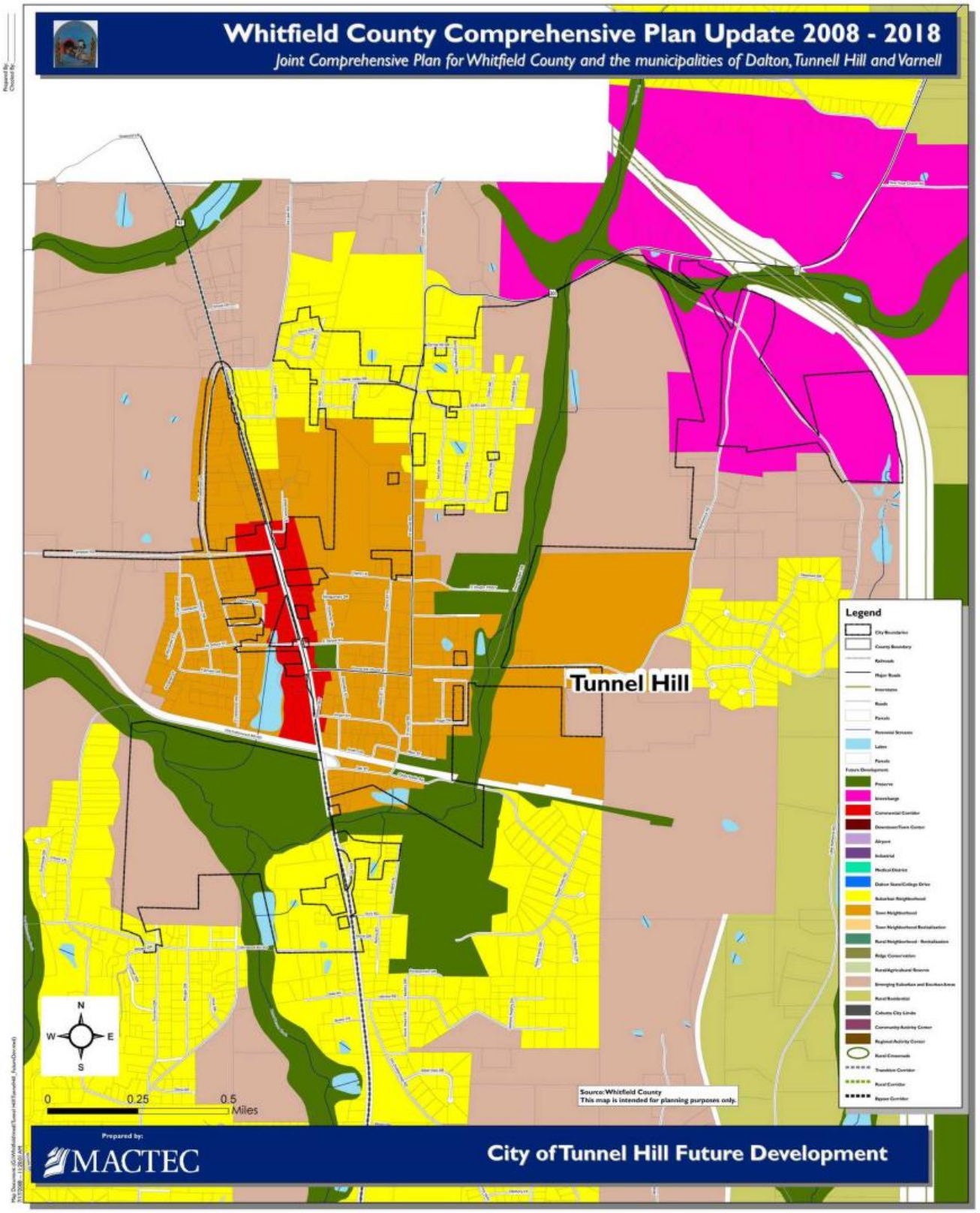
Agricultural/Rural/Undeveloped land makes up the largest portion of the city. Roughly 48.2% of the city is categorized as Agricultural/Rural/Undeveloped areas. Land classified as Residential makes up 27% of the city, including 10.5% in the Residential 1-to-5 acres category. Properties classified as Industrial account for approximately 0.3% of the city. Industrial includes light and heavy manufacturing and warehousing/distribution. Commercial classification properties made up 10.0% of the city.

Land classified as Parks, Recreation, and Conservation makes up almost 11.0% of the city's total area. In addition to conservation land, this category includes areas such as golf courses, public and private ball fields, public parks and includes the historic tunnel. Properties classified as Public/Institutional account for approximately 3.6%. Public/Institutional areas include schools and places of worship.

The Existing Land Use Map for the City of Tunnel Hill:



The Future Land Use Map for the City of Tunnel Hill:



City of Varnell

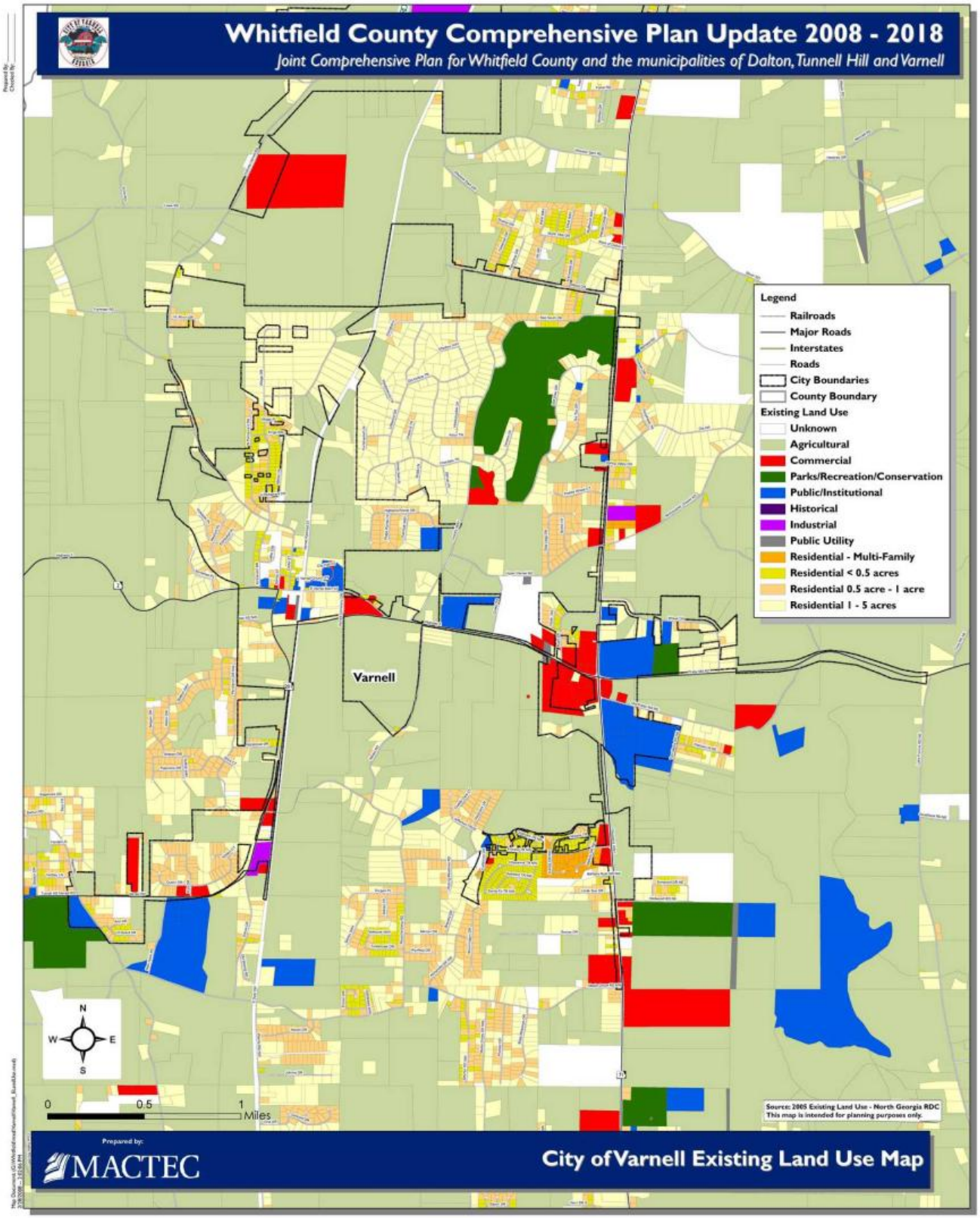
The incorporated city of Varnell makes up roughly one percent of the County's 291 square miles. Table 4-4 presents the existing land use for the city. The Varnell Existing Land Use Map, found at this end of this chapter, shows existing land use for Varnell.

Table 4-4 – Existing Land Use (City of Varnell)

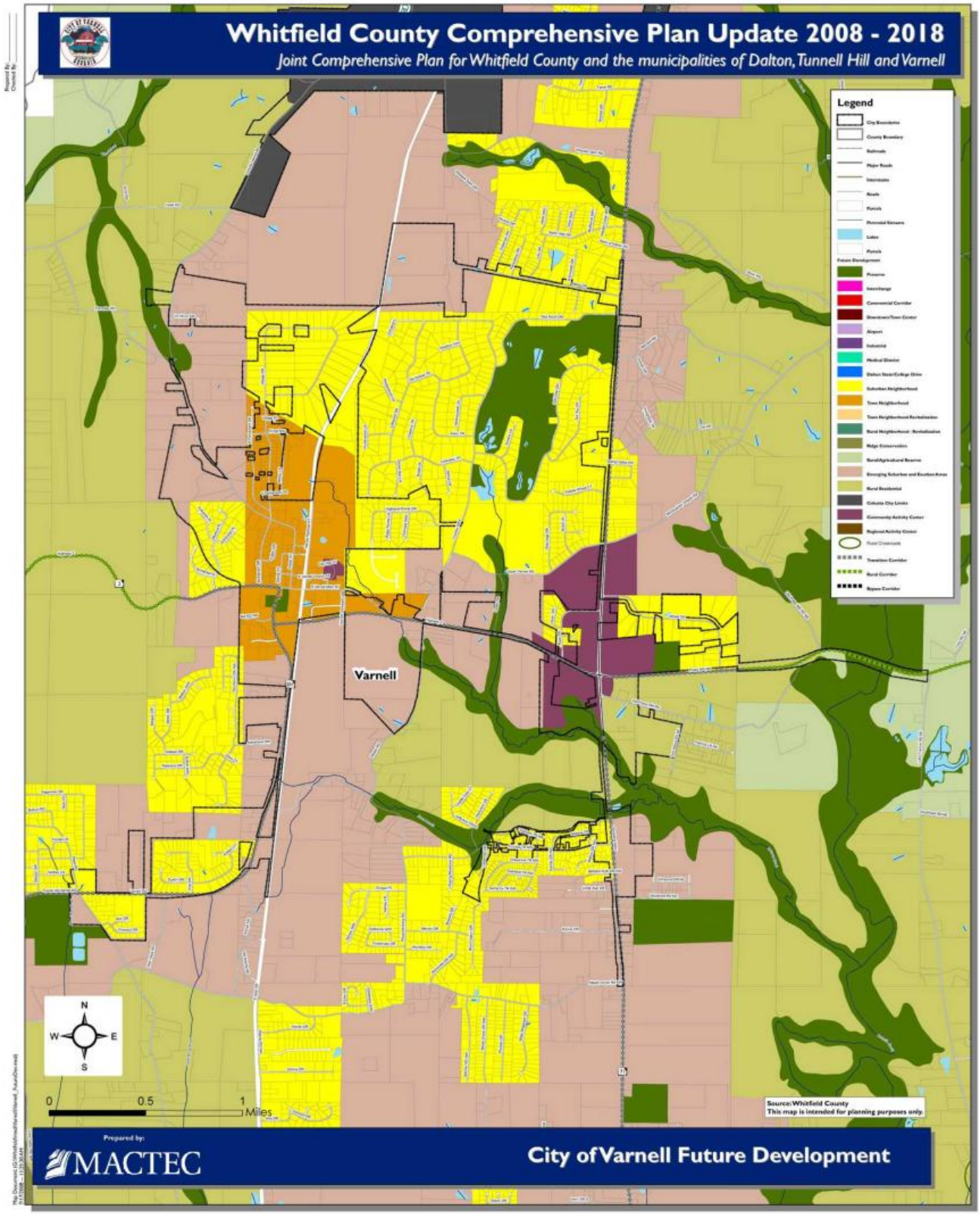
Land Use Classification	Area	% of Total
Unknown	35.9	2.0%
Agricultural/Rural/Undeveloped	787.8	44.9%
Commercial	79.0	4.5%
Parks/Recreation/Conservation	15.7	0.9%
Public/Institutional	161.7	9.2%
Industrial	6.5	0.4%
Public Utility	1.8	0.1%
Residential - Multi-Family	3.2	0.2%
Residential Less than 0.5 Acres	71.8	4.1%
Residential 0.5 acre to 1 acre	166.8	9.5%
Residential 1 to 5 acres	425.4	24.2%
Total	1,755.7	100.0%

Agricultural/Rural/Undeveloped land makes up the largest portion of the city. Roughly 44.9% of the city is categorized as Agricultural/Rural/Undeveloped areas. Land classified as Residential (1 to 5 acres) makes up the second largest portion of the city at 24.2% and Multifamily Development makes up 0.2%. Properties classified as Industrial accounts for approximately 0.4% of the city. Industrial includes light and heavy manufacturing and warehousing/distribution. Commercial classification properties make up 4.5% of the city. Land classified as Parks, Recreation, and Conservation makes up almost 0.9% of the city's total area. In addition to conservation land, this category includes areas such as golf courses, public and private ball fields as well as public parks. Properties classified as Public/Institutional account for approximately 9.2% Public/ Institutional areas include schools and places of worship.

The Existing Land Use Map for the City of Varnell:



The Future Land Use Map for the City of Varnell:



Local Capabilities

Local mitigation capabilities are existing authorities, policies, programs and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. The HMPC reviewed local capabilities and the available information is included in the Local Capabilities Assessment Chart below.

Local Capability Assessment

Plan, Code/Ordinance, Tool or Funding Method	In place to address hazard mitigation by following jurisdictions (W-Whitfield, D=Dalton, T= Tunnel Hill, V=Varnell, C=Cohutta)	Adequately utilized or enforced to address hazard mitigation	Updated regularly or as required by law	Notes
Comprehensive Plan	W, D, T, V, C	Y	Y	Updated 2013
Local Emergency Operations Plan (LEOP)	W	Y	Y	
Transportation Plan	W	Y	Y	
Community Wildfire Protection Plan (CWPP)	W	Y	Y	Updated as required
Building Code	W, D	Y	Y	2015 International Building Code
Site Plan Review	W, D	Y	Y	process continuously updated
ISO Rating	W, D	Y	Y	ISO Rating: W=3, D=2
Zoning Ordinance	W, D	Y	Y	
Subdivision Ordinance	W, D	Y	Y	
Floodplain Ordinance	W, D, T, V, C	Y	Y	as required by NFIP participation
Planning Commission	W	Y	Y	
Hazard Mitigation Planning Committee (HMPC)	W, D, T, V, C	Y	Y	2017 HMP update completed
Mutual Aid Agreements	W, D, T, V, C	Y	Y	State and local jurisdictions
Mass Notification System	W	Y	Y	
Grant Writing	W, D, T, V, C	Y	NA	staff and contracted grant writers
CERT Team	W	Y	Y	
Public outreach & education programs	W, D, T, V, C	Y	Y	see mitigation actions chart
GEMA School Safety Plan	W	Y	Y	updated annually & submitted to GEMA
Storm Ready Certification	W	NA	NA	
Capital improvement projects	W, D, T, V, C	Y	NA	see mitigation actions chart

Impact fees	W	NA	NA	NA
Bonds, taxes, utility fees	W, D, T, V, C	Y	NA	ongoing

Chapter 5
Hazard Mitigation Goals, Objectives, & Actions

When Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta begin any large-scale planning effort, it is imperative that the planning process is driven by a clear set of goals and objectives. Goals and objectives are the foundation of an effective Hazard Mitigation Plan. They address the key problems and opportunities to help establish a framework for identifying risks and developing strategies to mitigate those risks. Whitfield County's multi-jurisdictional Hazard Mitigation Planning Committee (HMPC) reviewed and re-evaluated the four major goals and numerous objectives for the

purposes of this Plan and determined that they all remain valid and effective. No changes were recommended.

In order to fully understand the hazard mitigation goals, objectives, and actions, it is necessary to clearly define the terms **"goal"**, **"objective"**, and **"action"**:

A **goal** is a broad-based statement of intent that establishes the direction for the Whitfield County Hazard Mitigation Plan. Goals can essentially be thought of as the desired "outcomes" of successful implementation of the Plan.
An **objective** is the stated "means" of achieving each goal, or the tasks to be executed in the process of achieving goals.
An **action** is a project-specific strategy to mitigate a particular hazard event within the context of the overarching goals and objectives.

While specific mitigation actions are listed later in this chapter, it is important to note that the actions were selected and evaluated in relation to the overarching hazard mitigation goals and objectives of this plan, which are as follows:

Goal #1. Protect life and minimize loss of property damage.

Objective 1-1. Implement mitigation actions that will assist in protecting lives and property by making homes, businesses, public facilities, and infrastructure more resistant to vulnerable hazards.
Objective 1-2. Review existing ordinances, building codes, and safety inspection procedures to help ensure that they employ the most recent and generally acceptable standards for the protection of buildings.
Objective 1-3. Ensure that public and private facilities and infrastructure meet established building codes and enforce the codes to address any deficiencies.
Objective 1-4. Implement mitigation actions that encourage the protection of the environment.
Objective 1-5. Integrate the recommendations of this plan into existing land use plans and capital improvement programs.
Objective 1-6. Build upon past databases to ensure that vulnerable hazards' risks are accurate.
Goal #2. Increase Public Awareness.

Objective 2-1. Develop and implement additional education and outreach programs to increase public awareness of the risks associated with hazards and on specific preparedness activities available.
Objective 2-2. Encourage homeowners and businesses to take preventative actions and purchase hazard insurance.

Goal #3. Encourage Partnerships.

Objective 3-1. Strengthen inter-jurisdictional and inter-agency communication, coordination, and partnerships to foster hazard mitigation actions designed to benefit multiple jurisdictions.
Objective 3-2. Identify and implement ways to engage public agencies with individual citizens, nonprofit organizations, business, and industry to implement mitigation activities more effectively.

Goal #4. Provide for Emergency Services.

Objective 4-1. Where appropriate, coordinate and integrate hazard mitigation actions with existing emergency operations plans.
Objective 4-2. Identify the need for, and acquire, any special emergency services and equipment to enhance response capabilities for specific hazards.
Objective 4-3. Encourage the establishment of policies to help ensure the prioritization and implementation of mitigation actions designed to benefit critical facilities, critical services, and emergency traffic routes.

Format Utilized to Develop Mitigation Actions

The HMPC reviewed each jurisdiction's annual budget, multiyear work programs, and comprehensive plans to determine existing mitigation actions that met the goals and objectives of this Plan. The committee then developed a list of tentative mitigation actions based on committee members' personal knowledge, interviews with other officials of each jurisdiction, and knowledge of successful actions implemented in other communities.

The committee members developed a prioritized list utilizing the GEMA recommended STAPLEE prioritization methodology, with special emphasis on the following:

1. Cost effectiveness (and when potential federal projects are anticipated, cost-benefit reviews will be conducted prior to application);
2. Comprehensiveness, i.e. addresses a specific goal and objective;
3. Addresses reducing effects of hazards on new and existing buildings and infrastructure;
4. Addresses reducing effects of hazards on critical facilities where necessary; and,
5. Identification of future public buildings and infrastructure (Note: recognizing that the Plan may be modified and evaluated during the monitoring and evaluation period, and will definitely be completely updated within the federally mandated five year approval cycle, future development including future buildings will only include the five year period from Plan completion).

All rankings were composited to represent the consensus of the HMPC.

Members of the HMPC prioritized the potential mitigation measures identified in this Plan. A list of mitigation goals, objectives and related action items was compiled from the inputs of the HMPC, as well as from others within the community. The subcommittee prioritized the potential mitigation measures based on what they considered most beneficial to the community. Several criteria were established to assist HMPC members in the prioritization of these suggested mitigation actions. Criteria included perceived cost benefit or cost effectiveness, availability of potential funding sources, overall technical feasibility, measurable milestones, multiple objectives, determination of public and political support for the proposed actions, and the STAPLEE method described above. Through this prioritization process, several projects emerged as being a greater priority than others. Some of the projects involved expending considerable amounts of funds to initiate the required actions. Most projects allowed the community to pursue completion of the project using potential grant funding. Still others required no significant financial commitment by the community. All proposed mitigation actions were evaluated to determine the degree to which the County would benefit in relation to the project costs. After review by the HMPC, the prioritized list of mitigation measures, as presented within this Plan, was determined.

This same method of prioritization was utilized for the prior update to this Plan. Additionally, it was reviewed by the HMPC during the current plan update process and approved for continued use due to its effectiveness. No changes were recommended.

Mitigation Actions

Each mitigation action is presented by jurisdiction, or in the case of joint actions by multiple jurisdictions, or by independent public bodies (such as School System), or by private nonprofits (such as a Medical Center), in priority order (objective), by best estimate of cost, if applicable, by potential funding source if other than operating budgets, by

department or agency that will administer the action, and by timeframe. Timeframes do not begin until funding is obtained for any particular project unless otherwise indicated.

Each mitigation action that follows may be supported by one or more jurisdictions below, as indicated by the corresponding letters as follows:

W = Whitfield County (unincorporated)
D = City of Dalton
T = City of Tunnel Hill
V = City of Varnell
C = Town of Cohutta

A = All of the above jurisdictions

The Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta have relatively small populations. Due to limited financial and human resources, much support with regard to public safety is provided by Whitfield County. This includes assistance with emergency management, fire protection, and law enforcement. The Cities and Towns do have some capability, but it is augmented by the County. Therefore, many mitigation actions included on behalf of the County in the Plan are likely to have an indirect benefit for the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta.

Each mitigation action that follows is designed to mitigate one or more hazards discussed in this Plan. Those specific hazards are listed for each mitigation action at the end of each mitigation action description. The term "All" as used in the mitigation action section below refers to all hazards discussed in this Plan (severe thunderstorm, winter storm, flooding, tornado, wildfire, drought, earthquake, hazardous materials release, and dam failure).

Each mitigation action that follows mitigates the effects of hazards on existing structures/infrastructure, future structures/infrastructure, or both, as indicated.

In addition, the status of each mitigation action that follows is indicated by one of the following three terms:

PRELIMINARY – unfunded projects or projects in planning stages.
IN PROGRESS – funded projects that have begun but aren't completed.
ONGOING – continuous projects that are never truly completed; may be funded or unfunded at any given time but are expected to continue unless removed from Plan.

**Note: fully completed or deleted projects are not found below, but in Appendix D.*

Mitigation Action	Hazard(s) Addressed	Jurisdictional Participants	Responsible Party or Agency	Project Status	Cost Estimate	Potential Funding Sources	Project Length	Goals and Objectives	Structures & Infrastructure Impacted
Floodplain Management	Flooding	All	All jurisdictions planning depts	Ongoing	Staff time	Each jurisdiction	2017-2018	1-1, 1-2, 1-3, 1-4, 1-6, 2-1, 2-2, 4-3	Existing and Future
Flooding Mitigation Projects for areas associated with Mill Creek	Flooding	Whitfield	Whitfield Planning	Preliminary	$1.5 million	Public or private grants	2017-2021	1-1, 1-2, 1-3, 1-4, 1-6, 2-1, 2-2	Existing and Future
Flooding Mitigation Projects for areas associated with Underwood Road	Flooding	Dalton	Dalton Planning	Preliminary	$320K	Public or private grants	2017-2018	1-1, 1-2, 1-3, 1-4, 1-6, 2-1, 2-2	Existing and Future
Flooding Mitigation Projects for areas associated with Needham Drive	Flooding	Dalton	Dalton Planning	Preliminary	$300K	Public or private grants	2017-2018	1-1, 1-2, 1-3, 1-4, 1-6, 2-1, 2-2	Existing and Future
Updated Floodplain Mapping – minor updates by FEMA	Flooding Dam Failure	All	All jurisdictions planning depts	In progress	FEMA	Public or private grants	2017-2018	1-1, 1-2, 1-3, 1-4, 1-6, 2-1, 2-2	Existing and Future
Road Maintenance Equipment and Supplies for Winter Weather	Winter Storm	Whitfield	Whitfield Public Works	Ongoing	$300K	Public or private grants	2017-2018	4-1, 4-2	Existing and Future
Generators for Critical Facilities & Infrastructure (including necessary wiring)	All	All	Whitfield EMA and all jurisdictions	Ongoing	Up to $50K each	Public or private grants	2017-2021	1-3, 3-1, 4-1, 4-2	Existing and Future
Update of LEOP	Hazmat Release	All	Whitfield EMA	Ongoing	Staff time	Whitfield County	2017-2018	1-2, 1-3, 1-4, 1-5, 1-6, 2-1, 3-1, 3-2, 4-1, 4-2, 4-3	Existing and Future
Community Awareness Program – GEMA Area 1	All	All	Whitfield EMA	Preliminary	$256K	Public or private grants	2017-2018	1-2, 1-3, 1-4, 1-5, 1-6, 2-1, 3-1, 3-2, 4-1, 4-2, 4-3	Existing
Dalton Public Education Program – Fire Safety House	Wildfire	Dalton Whitfield	Dalton Fire Dept	Preliminary	$50K	Public or private grants	2017-2018	2-1, 3-1, 3-2, 4-2	Existing

Mitigation Action	Hazard(s) Addressed	Jurisdictional Participants	Responsible Party or Agency	Project Status	Cost Estimate	Potential Funding Sources	Project Length	Goals and Objectives	Structures & Infrastructure Impacted
Weather Radios for citizens	All	All	Whitfield EMA	Ongoing	$300K	Public or private grants	2017-2021	2-1, 3-1, 3-2, 4-2	Existing
Sound Design and Comprehensive Inspection of unclassified Dams	Dam Failure	Whitfield	All jurisdictions planning depts	Preliminary	$100K per year minimum	Public or private grants; general funds	2017-2021	1-2, 1-3, 1-4, 1-6, 3-1, 3-2, 4-1	Existing and Future
CERT Program	All	All	Whitfield EMA	Ongoing	$11K per year	Public or private grants; general funds	2017-2021	2-1, 3-1, 3-2, 4-1	Existing and Future
GEMA School Safety Plan updates	All	All	Whitfield EMA	Ongoing	Staff time	Whitfield County	2017-2021	1-3, 1-6, 2-1, 3-1, 3-2, 4-1, 4-2	Existing
New Communications System (800 mHz)	All	Whitfield	Whitfield EMA	In progress	$13 million	Public or private grants	2017-2021	3-1, 4-2	Existing and Future
Community Wildfire Protection Plan updates	Wildfire	All	Whitfield Fire and Dalton Fire Depts	Ongoing (last update 2014)	Staff time	Whitfield County	2017	1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 2-1, 2-2, 3-1, 3-2, 4-1	Existing and Future
Community Rating System	Flooding	All	Whitfield Planning	Ongoing	Staff time	Whitfield County	2017-2021	1-1, 1-2, 1-3, 1-4, 1-6, 2-1, 2-2, 4-3	Existing and Future
Seismic Loss Estimation Studies	Earthquake	All	Whitfield Planning	Preliminary	$100K minimum	Public or private grants	2017-2018	1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 2-1, 2-2, 3-1, 3-2, 4-1	Existing
Hazardous Materials Rescue Team – supplies, equipment, training (see Appendix D)	Hazmat Release	All	Whitfield Fire and Dalton Fire Depts	Ongoing	$50K per year	Public or private grants; general funds	2017-2021	3-1, 4-1, 4-2	Existing
Dispatcher Emergency Guidance System by APCO	All	Whitfield	Whitfield 911	In progress	$150K	Public or private grants	2017	3-1, 4-2	Existing and Future
911 Physical Security	All	Whitfield	Whitfield 911	Preliminary	$12K	Public or private grants; general funds	2017	1-3, 4-2	Existing

Mitigation Action	Hazard(s) Addressed	Jurisdictional Participants	Responsible Party or Agency	Project Status	Cost Estimate	Potential Funding Sources	Project Length	Goals and Objectives	Structures & Infrastructure Impacted
City of Dalton Fire Stations Construction	All	Dalton	Dalton Fire Dept	Preliminary	$1.3 million per station plus property cost	Public or private grants; SPLOST	2017-2021	1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 4-1, 4-2	Future
Whitfield County Fire Headquarters and two new stations	All	Whitfield	Whitfield Fire	Preliminary	$5 million	Public or private grants; SPLOST	2017-2019	1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 4-1, 4-2	Future
Mass Casualty Incident supplies, equipment, training	All	All	Whitfield Fire	Ongoing	$100K	Public or private grants; general funds	2017-2018	3-1, 4-2	Existing and Future
Hamilton Medical Center Decontamination Incident – supplies, equipment, training	Hazmat Release	All	Hamilton Medical Center	Ongoing	$115K	Public or private grants, HMC	2017-2018	1-4, 3-1, 3-2, 4-1, 4-2	Existing and Future
In-cab Terminals linked to 911 Center	All	All	Whitfield 911	Preliminary	$150K	Public or private grants	2017-2018	3-1, 4-2	Existing and Future
Quarantine Supplies	Hazmat Release	All	Whitfield Fire and Dalton Fire Depts	Ongoing	$89K	Public or private grants	2017-2018	1-4, 4-1, 4-2	Existing and Future
Home Monitoring System	Hazmat Release	All	Whitfield Health Dept	Preliminary	$103K	Public or private grants	2017-2018	3-1, 3-2, 4-2	Existing
Medical Personnel Transportation 4x4 vehicles	Winter Storm	All	Hamilton Medical Center	Preliminary	$63K	Public or private grants, HMC	2017-2018	3-1, 3-2, 4-1, 4-2	Existing and Future
Hospital Physical Security	All	All	Hamilton Medical Center	Preliminary	$42K	Public or private grants, HMC	2017-2018	1-3, 4-2	Existing
Manufactured Homes Anchoring	Tornado	All	Whitfield Planning	Preliminary	Staff time	Whitfield County	2017-2021	1-1, 1-2, 2-1, 3-2	Existing

Mitigation Action	Hazard(s) Addressed	Jurisdictional Participants	Responsible Party or Agency	Project Status	Cost Estimate	Potential Funding Sources	Project Length	Goals and Objectives	Structures & Infrastructure Impacted
Electronic Traffic Signs	All	Whitfield Dalton	Whitfield EMA and Dalton Fire Dept	Preliminary	$30K each	Public or private grants	2017-2018	2-1, 3-1, 3-2, 4-1, 4-2	Existing and Future
National Historic Register – structure protection	Flooding	All	Whitfield Planning	Preliminary	TBD	Public or private grants	2017-2018	1-1, 1-2, 1-3, 1-4, 1-6, 2-1, 2-2	Existing
Emergency Fuel Plan	All	Whitfield Dalton	Whitfield and Dalton Public Works	Preliminary	$50K	Public or private grants; general funds	2017-2018	4-1, 4-2	Existing and Future
Fuel Supply (Mobile Tankers)	All	Whitfield Dalton	Whitfield and Dalton Public Works	Preliminary	$200K each	Public or private grants	2017-2018	4-1, 4-2	Existing and Future
Expansion of Fixed Fuel Supply	All	Whitfield Dalton	Whitfield and Dalton Public Works	Preliminary	TBD	Public or private grants; general funds	2017-2019	4-1, 4-2	Existing and Future
Rapid Communications Trailer w/radio tower, 700/800 MHz, VHF & UHF repeaters/mobile radio stations, generators, mobile satellite data/phone capabilities, and gateway interface capabilities	All	Whitfield	Whitfield EMA and 911	Preliminary	$150K	Public or private grants; SPLOST	2017-2019	3-1, 4-2	Existing and Future
Disaster response radio cache multiband P25 radios with accessories, extra batteries and bank chargers	All	Whitfield	Whitfield EMA and 911	Preliminary	$150K for 24 radios ($6,250 for each additional)	Public or private grants, SPLOST	2017-2019	3-1, 4-2	Existing and Future
Collect GPS and other data on critical facilities needed by GMIS for Hazus Reports	All	Whitfield	Whitfield EMA	Preliminary	Staff time	Whitfield County	2017-2018	1-6, 3-1, 4-1	NA

Chapter 6
Executing the Plan

6.1 – Action Plan Implementation

The hazard mitigation planning process was overseen by the Whitfield County Emergency Management Agency. Facilitation of the planning process was conducted by North Georgia Consulting Group, LLC. Once GEMA completes its initial review of this Plan, it will be presented to the Whitfield Board of Commissioners for consideration. Once adopted, the Whitfield County EMA Director shall assume responsibility for the maintenance of the Plan. It shall be the responsibility of the EMA Director to ensure that this Plan is utilized as a guide for initiating the identified mitigation measures within the community. The EMA Director shall be authorized to convene a committee to review and update this Plan annually. The Plan will also have to be updated and resubmitted once every five years. Through this Plan updating process, the EMA Director shall identify projects that have been successfully undertaken in initiating mitigation measures within the community. These projects shall be noted within the planning document to indicate their completion. Additionally, the committee called together by the EMA Director shall help to identify any new mitigation projects that can be undertaken in the community.

Members of the HMPC prioritized the potential mitigation measures identified in this Plan. A list of mitigation goals, objectives and related action items was compiled from the inputs of the HMPC, as well as from others within the community. The subcommittee prioritized the potential mitigation measures based on what they considered most beneficial to the community. Several criteria were established to assist HMPC members in the prioritization of these suggested mitigation actions. Criteria included perceived cost benefit or cost effectiveness, availability of potential funding sources, overall feasibility, measurable milestones, multiple objectives, and both public and political support for the proposed actions. Through this prioritization process, several projects emerged as being a greater priority than others. Some of the projects involved expending considerable amounts of funds to initiate the required actions. Most projects allowed the community to pursue completion of the project using potential grant funding. Still others required no significant financial commitment by the community. All proposed mitigation actions were evaluated to determine the degree to which the County will benefit in relation to the project costs. After review by the HMPC, the prioritized list of mitigation measures, as presented within this Plan, was determined.

6.2 – Evaluation

As previously stated, the Whitfield County EMA Director will be charged with ensuring that this plan is monitored and updated at least annually or more often if deemed necessary. The method of evaluation will consist of utilizing a checklist to determine what mitigation actions were undertaken, the completion date of these actions, the cost associated with each completed action, and whether actions were deemed to be successful. A committee, perhaps with much of the same membership as the existing HMPC, will convene in order to accomplish the annual plan evaluation. Additionally, the EMA Director is encouraged to maintain a schedule of regular meetings, either quarterly or semiannually to preserve continuity throughout the continuing process. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the HMP. The EMA Director will ensure the results of the evaluation(s) are reported to the Whitfield County Board of Commissioners, as well as to any agencies or organizations having an interest in the hazard mitigation activities identified in the plan.

6.3 – Multi-Jurisdictional Strategy and Considerations

As set forth by Georgia House Bill 489, the Emergency Management Agency is the overall implementing agency for projects such as hazard mitigation. Whitfield County will work in the best interests of the County as well as the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta. Each of these municipalities played an active role in the planning process. Participation from each jurisdiction was solicited and received by Whitfield County EMA. As a result, a truly multi-jurisdictional plan was created for Whitfield County and the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta, with ideas and viewpoints of all participants included.

6.4 – Plan Update and Maintenance

According to the requirements set forth in the Disaster Mitigation Act of 2000, Whitfield County is required to update and revise the Hazard Mitigation Plan every five years. However, the Hazard Mitigation Planning Committee will meet on the plan approval anniversary date of every year, or within 30 days of said date as determined and scheduled by the EMA Director, to complete a review of the Hazard Mitigation Plan. At each such meeting, the HMPC will review the main facets of the HMP including the vulnerability assessment, critical facilities inventory, and mitigation goals, objectives, and actions. All revisions will be posted to the County website for public review and comment. Further revisions may take place based upon public comments received.

It is during this review process that the mitigation strategies and other information contained within the Hazard Mitigation Plan are considered for incorporation into other planning mechanisms as appropriate. Opportunities to integrate the requirements of this HMP into other local planning mechanisms will continue to be identified through future meetings of the HMPC on an annual basis.

The HMPC recognizes the need to integrate other plans, codes, regulations, procedures and programs into future Hazard Mitigation Plan (HMP) updates. This plan is multi-jurisdictional; therefore the mechanism for implementation of various mitigation plan items may vary by jurisdiction. This includes reviewing other local planning documents, processes or mechanisms for possible integration with the HMP.

To Be Reviewed in Future Update

Existing planning mechanisms	Method of use in Hazard Mitigation Plan
Comprehensive Plan (multi-jurisdictional)	Development trends
Local Emergency Operations Plan	Identifying hazards; Assessing vulnerabilities
Storm Water Management / Flood Damage Protection Ordinance	Mitigation strategies
Building and Zoning Codes and Ordinances	Development trends; Future growth
Mutual Aid Agreements	Assessing vulnerabilities
State Hazard Mitigation Plan	Risk assessment
Land Use Maps	Assessing vulnerabilities; Development trends; Future growth
Critical Facilities Maps	Locations
Community Wildfire Protection Plan	Mitigation strategies

It will be the responsibility of each participating jurisdiction to determine additional implementation procedures when appropriate.

During the planning process for new and updated local planning documents such as a comprehensive plan or Local Emergency Operations Plan, the EMA Director will provide a copy of the HMP to the appropriate parties. It will be recommended that all goals and strategies of new and updated local planning documents be consistent with, and support the goals of, the HMP and will not contribute to increased hazards in the affected jurisdiction(s).

Although it is recognized that there are many benefits to integrating components of this plan into other local planning mechanisms, and that components are actively integrated into other planning mechanisms when appropriate, the development and maintenance of this stand-alone HMP is deemed by the committee to be the most effective method to ensure implementation of local hazard mitigation actions at this time. Therefore, the review and incorporation efforts made in this update and the last, which consisted of a simple review of the documents listed in the chart above by various members of the HMPC, are considered successful by the HMPC and will likely be utilized in future updates.

The County's EMA is committed to incorporating hazard mitigation planning into its Local Emergency Operations Plan and other public emergency management activities. As the EMA Director becomes aware of updates to other County or City/Town plans, codes, regulations, procedures and programs, the Director will continue to look for opportunities to include hazard mitigation into these mechanisms.

The Whitfield County HMPC will reconvene not later than the fourth anniversary of the plan approval anniversary date, as determined and scheduled by the EMA Director, to begin planning for the formal Hazard Mitigation Plan revision process. The revision process will include a clear schedule and timeline, and identify any agencies or organizations participating in the plan revision. The committee will review the mitigation goals, objectives and actions to determine their relevance to changing situations within the different jurisdictions, as well as changes in State or Federal policy, and to ensure current and expected conditions are being addressed. The HMPC will also review the prior vulnerability assessments to determine if this information should be updated or modified, given any new available data.

Whitfield County is dedicated to involving the public directly in reviews and updates of the HMP. During the plan revision process, the committee will conduct, at a minimum, two public hearings during the revision process. These public hearings will provide the public a forum for which they can express their concerns, opinions, or ideas about the Plan. Additionally, if persons from the community express interest in participation in the planning process, they will be provided the opportunity, via meetings, the County website, social media, and/or public forums, to suggest possible mitigation measures for the community. Documentation will be maintained to indicate all efforts at continued public involvement. All relevant information will be forwarded to GEMA and FEMA as a product of the proposed plan revision. Public involvement activities will continue throughout the 5 year planning cycle and will be evaluated for effectiveness by the HMPC next planning cycle.

The EMA Director will ensure the revised plan is presented to the governing body of each jurisdiction for formal adoption. In addition, all holders of the HMP will be notified of affected changes. The EMA Director shall submit a revised Hazard Mitigation Plan not later than the five-year anniversary of the most recently updated HMP to the Georgia Emergency Management Agency for review and subsequent submittal to the Federal Emergency Management Agency for ultimate approval.

Once approved by FEMA, copies of the Whitfield County Hazard Mitigation Plan will be provided by the EMA Director to the appropriate governmental jurisdictions, agencies, and/or departments for review and possible inclusion into plans and programs. The HMP will be distributed by the EMA Director to the appropriate officials to allow them to review the Plan and determine to what extent the Plan should be integrated into, or referenced by, other plans and programs. Limitations may be placed on certain sensitive information by the EMA Director.

Chapter 7
Conclusion

7.1 – Summary

Whitfield County has gained a great deal of knowledge relating to the County's disaster history and future potential for disaster as a result of the hazard mitigation planning process. This includes an extensive hazard history of recorded hazard events from the past fifty years, a detailed critical facilities database with valuable information on some of most critical county and city/town structures, as well as some valuable ideas from the community abroad concerning measures that should be considered for future hazard mitigation. Community involvement has been at the heart of this effort. Not only did the planning process include the creation of a Hazard Mitigation Planning Committee with representatives from all walks of life, but two public hearings were conducted to provide all Whitfield County citizens with the opportunity to comment on, and offer suggestions concerning potential hazard mitigation measures within the community. Whitfield County, the Cities of Dalton, Tunnel Hill, and Varnell, and the Town of Cohutta all worked in concert to ensure a broad range of citizens were represented. Elected officials, local government employees, public safety officials, Red Cross representatives, GA Forestry representatives, businesspersons, media, and other volunteers and interested parties provided important varying viewpoints to create a workable Plan. GEMA and NGCG provided valuable assistance as well. These efforts have all had the effect of better protecting our Community from the threats of nature and technology. While it would be naïve to believe this Plan provides complete protection to Whitfield County and its residents, it is the hope of all parties involved in this planning process that the recommended mitigation measures contained within the Plan will provide some level of increased preparedness as well as spur further discussion and planning related to the important subject of Hazard Mitigation.

7.2 – References

Numerous sources were utilized to ensure the most complete planning document could be assembled:

Publications/Documents:
The Disaster Mitigation Act of 2000
Robert T. Stafford Disaster Relief and Emergency Assistance Act
FEMA Pre-Disaster Mitigation *How-to Guides #1, 2, 3, 7*
GEMA Supplements to FEMA Pre-Disaster Mitigation How-to Guides
Georgia Tornado Database 1808 – 2002 (Westbrook)
Earthquake Information Bulletin, Volume 3, Number 6, November-December 1971
Whitfield County Hazard Mitigation Plan

Web Sites:
www.fema.gov (FEMA)
www.usfa.fema.gov (USFA)
www.fs.fed.us (USFS Fire Danger Class)
www.cpc.ncep-noaa.gov (Drought Severity Index)
www.ncdc.noaa.gov (National Climatic Data Center)
http://eqint.cr.usgs.gov (USGS Earthquake Probability Maps)
www.tornadoproject.com (Tornado Project Online)
www.disastercenter.com (The Disaster Center)
www.gema.state.ga.us (GEMA)
www.gfc.state.ga.us (GFC)
www.georgiadrought.org (Drought in Georgia)
www.weather.com (The Weather Channel)
www.accuweather.com (AccuWeather)
www.gwrr.com (Genesee & Wyoming, Inc.)

Other Sources:
American Red Cross
American Society of Civil Engineers
Whitfield County
City of Dalton
City of Tunnel Hill
City of Varnell
Town of Cohutta
Federal Emergency Management Agency
Georgia Department of Natural Resources
Georgia Emergency Management Agency
Georgia Forestry Commission
Georgia Safe Dams Program
National Climatic Data Center
National Oceanic & Atmospheric Administration
National Weather Service

New Georgia Encyclopedia (www.georgiaencyclopedia.org)
U.S. Army Corps of Engineers
U.S. Census Bureau
U.S. Fire Administration
U.S. Forest Service
U.S. Geological Survey

Appendices

Appendix A – Critical Facilities Database / HAZUS Report

Appendix B – Hazard History Database

Appendix C – Hazard Frequency Table

Appendix D – Other Planning Documents

Appendix E - Glossary